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# SECTION EC

## ENGINE CONTROL SYSTEM

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### Alphabetical Index

UBS001C1

**NOTE:**

If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-145. "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

x: Applicable —: Not applicable

Items (CONSULT-II screen terms)	DTC*1		Trip	MIL lighting up	Reference page
	CONSULT-II GST*2	ECM*3			
A/T 1ST GR FNCTN	P0731	0731	2	x	<a href="#">AT-136</a>
A/T 2ND GR FNCTN	P0732	0732	2	x	<a href="#">AT-141</a>
A/T 3RD GR FNCTN	P0733	0733	2	x	<a href="#">AT-146</a>
A/T 4TH GR FNCTN	P0734	0734	2	x	<a href="#">AT-151</a>
A/T TCC S/V FNCTN	P0744	0744	2	x	<a href="#">AT-164</a>
APP SEN 1/CIRC	P2122	2122	1	x	<a href="#">EC-503</a>
APP SEN 1/CIRC	P2123	2123	1	x	<a href="#">EC-503</a>
APP SEN 2/CIRC	P2127	2127	1	x	<a href="#">EC-511</a>
APP SEN 2/CIRC	P2128	2128	1	x	<a href="#">EC-511</a>
APP SENSOR	P2138	2138	1	x	<a href="#">EC-525</a>
ASCD BRAKE SW	P1572	1572	1	—	<a href="#">EC-481</a>
ASCD SW	P1564	1564	1	—	<a href="#">EC-474</a>
ASCD VHL SPD SEN	P1574	1574	1	—	<a href="#">EC-491</a>
ATF TEMP SEN/CIRC	P0710	0710	2	x	<a href="#">AT-121</a>
BRAKE SW/CIRCUIT	P1805	1805	2	—	<a href="#">EC-497</a>
CAN COMM CIRCUIT	U1000	1000	1	x	<a href="#">EC-145</a>
CAN COMM CIRCUIT	U1001	1001	2	—	<a href="#">EC-145</a>
CKP SEN/CIRCUIT	P0335	0335	2	x	<a href="#">EC-277</a>
CLOSED LOOP-B1	P1148	1148	1	x	<a href="#">EC-436</a>
CMP SEN/CIRCUIT	P0340	0340	2	x	<a href="#">EC-283</a>
CTP LEARNING	P1225	1225	2	—	<a href="#">EC-451</a>
CTP LEARNING	P1226	1226	2	—	<a href="#">EC-453</a>
CYL1 MISFIRE	P0301	0301	2	x	<a href="#">EC-267</a>
CYL2 MISFIRE	P0302	0302	2	x	<a href="#">EC-267</a>
CYL3 MISFIRE	P0303	0303	2	x	<a href="#">EC-267</a>
CYL4 MISFIRE	P0304	0304	2	x	<a href="#">EC-267</a>
ECM	P0605	0605	1 or 2	x or —	<a href="#">EC-372</a>
ECM BACK UP/CIRC	P1065	1065	2	x	<a href="#">EC-375</a>
ECT SEN/CIRCUIT	P0117	0117	1	x	<a href="#">EC-181</a>
ECT SEN/CIRCUIT	P0118	0118	1	x	<a href="#">EC-181</a>
ECT SENSOR	P0125	0125	1	x	<a href="#">EC-193</a>
ENG OVER TEMP	P1217	1217	1	x	<a href="#">EC-438</a>
ENGINE SPEED SIG	P0725	0725	2	x	<a href="#">AT-132</a>
ETC ACTR	P1121	1121	1 or 2	x	<a href="#">EC-390</a>
ETC FUNCTION/CIRC	P1122	1122	1	x	<a href="#">EC-392</a>
ETC MOT	P1128	1128	1	x	<a href="#">EC-404</a>
ETC MOT PWR	P1124	1124	1	x	<a href="#">EC-399</a>

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Items (CONSULT-II screen terms)	DTC*1		Trip	MIL lighting up	Reference page
	CONSULT-II GST*2	ECM*3			
ETC MOT PWR	P1126	1126	1	×	<a href="#">EC-399</a>
EVAP GROSS LEAK	P0455	0455	2	×	<a href="#">EC-338</a>
EVAP PURG FLOW/MON	P0441	0441	2	×	<a href="#">EC-294</a>
EVAP SMALL LEAK	P0442	0442	2	×	<a href="#">EC-301</a>
EVAP SYS PRES SEN	P0452	0452	2	×	<a href="#">EC-324</a>
EVAP SYS PRES SEN	P0453	0453	2	×	<a href="#">EC-330</a>
EVAP VERY SML LEAK	P0456	0456	2	×	<a href="#">EC-346</a>
FTT SEN/CIRCUIT	P0182	0182	2	×	<a href="#">EC-256</a>
FTT SEN/CIRCUIT	P0183	0183	2	×	<a href="#">EC-256</a>
FTT SENSOR	P0181	0181	2	×	<a href="#">EC-251</a>
FUEL LEV SEN SLOSH	P0460	0460	2	×	<a href="#">EC-354</a>
FUEL LEVEL SENSOR	P0461	0461	2	×	<a href="#">EC-356</a>
FUEL LEVL SEN/CIRC	P0462	0462	2	×	<a href="#">EC-359</a>
FUEL LEVL SEN/CIRC	P0463	0463	2	×	<a href="#">EC-359</a>
FUEL SYS-LEAN-B1	P0171	0171	2	×	<a href="#">EC-238</a>
FUEL SYS-RICH-B1	P0172	0172	2	×	<a href="#">EC-245</a>
HO2S1 (B1)	P0132	0132	2	×	<a href="#">EC-201</a>
HO2S1 (B1)	P0133	0133	2	×	<a href="#">EC-207</a>
HO2S1 (B1)	P0134	0134	2	×	<a href="#">EC-216</a>
HO2S1 (B1)	P1143	1143	2	×	<a href="#">EC-409</a>
HO2S1 (B1)	P1144	1144	2	×	<a href="#">EC-415</a>
HO2S1 HTR (B1)	P0031	0031	2	×	<a href="#">EC-151</a>
HO2S1 HTR (B1)	P0032	0032	2	×	<a href="#">EC-151</a>
HO2S2 (B1)	P0138	0138	2	×	<a href="#">EC-223</a>
HO2S2 (B1)	P0139	0139	2	×	<a href="#">EC-230</a>
HO2S2 (B1)	P1146	1146	2	×	<a href="#">EC-421</a>
HO2S2 (B1)	P1147	1147	2	×	<a href="#">EC-428</a>
HO2S2 HTR (B1)	P0037	0037	2	×	<a href="#">EC-157</a>
HO2S2 HTR (B1)	P0038	0038	2	×	<a href="#">EC-157</a>
IAT SEN/CIRCUIT	P0112	0112	2	×	<a href="#">EC-177</a>
IAT SEN/CIRCUIT	P0113	0113	2	×	<a href="#">EC-177</a>
IAT SENSOR	P0127	0127	2	×	<a href="#">EC-196</a>
INT/V TIM CONT-B1	P0011	0011	2	×	<a href="#">EC-148</a>
INT/V TIM V/CIR-B1	P1111	1111	2	×	<a href="#">EC-385</a>
ISC SYSTEM	P0506	0506	2	×	<a href="#">EC-363</a>
ISC SYSTEM	P0507	0507	2	×	<a href="#">EC-365</a>
KNOCK SEN/CIRC-B1	P0327	0327	2	—	<a href="#">EC-273</a>
KNOCK SEN/CIRC-B1	P0328	0328	2	—	<a href="#">EC-273</a>
L/PRESS SOL/CIRC	P0745	0745	2	×	<a href="#">AT-174</a>
MAF SEN/CIRCUIT	P0101	0101	1	×	<a href="#">EC-163</a>
MAF SEN/CIRCUIT	P0102	0102	1	×	<a href="#">EC-171</a>
MAF SEN/CIRCUIT	P0103	0103	1	×	<a href="#">EC-171</a>

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[QG18DE (ULEV)]

Items (CONSULT-II screen terms)	DTC*1		Trip	MIL lighting up	Reference page
	CONSULT-II GST*2	ECM*3			
MAF SENSOR	P1102	1102	1	×	<a href="#">EC-379</a>
MULTI CYL MISFIRE	P0300	0300	2	×	<a href="#">EC-267</a>
<b>NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.</b>	No DTC	Flashing*6	—	Flashing*6	<a href="#">EC-73</a>
<b>NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.</b>	<b>P0000</b>	0000	—	—	—
O/R CLTCH SOL/CIRC	P1760	1760	2	×	<a href="#">AT-194</a>
P-N POS SW/CIRCUIT	P1706	1706	2	×	<a href="#">EC-493</a>
PNP SW/CIRC	P0705	0705	2	×	<a href="#">AT-116</a>
PURG VOLUME CONT/V	P0444	0444	2	×	<a href="#">EC-311</a>
PURG VOLUME CONT/V	P0445	0445	2	×	<a href="#">EC-311</a>
PURG VOLUME CONT/V	P1444	1444	2	×	<a href="#">EC-460</a>
PW ST P SEN/CIRC	P0550	0550	2	—	<a href="#">EC-367</a>
SENSOR POWER/CIRC	P1229	1229	1	×	<a href="#">EC-455</a>
SFT SOL A/CIRC	P0750	0750	1	×	<a href="#">AT-180</a>
SFT SOL B/CIRC	P0755	0755	1	×	<a href="#">AT-184</a>
TCC SOLENOID/CIRC	P0740	0740	2	×	<a href="#">AT-160</a>
THERMSTAT FNCTN	P0128	0128	2	×	<a href="#">EC-199</a>
TP SEN/CIRC A/T	P1705	1705	1	×	<a href="#">AT-188</a>
TP SEN 1/CIRC	P0222	0222	1	×	<a href="#">EC-260</a>
TP SEN 1/CIRC	P0223	0223	1	×	<a href="#">EC-260</a>
TP SEN 2/CIRC	P0122	0122	1	×	<a href="#">EC-186</a>
TP SEN 2/CIRC	P0123	0123	1	×	<a href="#">EC-186</a>
PT SENSOR	P2135	2135	1	×	<a href="#">EC-518</a>
TW CATALYST SYS-B1	P0420	0420	2	×	<a href="#">EC-289</a>
VEH SPD SEN/CIR AT	P0720*5	0720	2	×	<a href="#">AT-127</a>
VEH SPEED SEN/CIRC	P0500*5	0500	2	×	<a href="#">EC-361</a>
VENT CONTROL VALVE	P0447	0447	2	×	<a href="#">EC-317</a>
VENT CONTROL VALVE	P1446	1446	2	×	<a href="#">EC-468</a>

\*1: 1st trip DTC No. is the same as DTC No.

\*2: These numbers are prescribed by SAE J2012.

\*3: Is Diagnostic Test Mode-II (self-diagnostic results), there numbers are controlled by NISSAN.

\*4: These DTCs are displayed with CONSULT-II only.

\*5: The MIL illuminates when both the "Revolution sensor signal" and the "Vehicle speed sensor signal" meet the fail-safe condition at the same time.

\*6: When engine is running.

## DTC No. Index

UBS001C2

### NOTE:

If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-145, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

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[QG18DE (ULEV)]

×: Applicable —: Not applicable

DTC*1		Items (CONSULT-II screen terms)	Trip	MIL lighting up	Reference page
CONSULT-II GST*2	ECM*3				
No DTC	Flashing*6	<b>NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.</b>	—	Flashing*6	<a href="#">EC-73</a>
U1000	1000	CAN COMM CIRCUIT	1	×	<a href="#">EC-145</a>
U1001	1001	CAN COMM CIRCUIT	2	—	<a href="#">EC-145</a>
<b>P0000</b>	<b>0000</b>	<b>NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.</b>	—	—	—
P0011	0011	INT/V TIM CONT-B1	2	×	<a href="#">EC-148</a>
P0031	0031	HO2S1 HTR (B1)	2	×	<a href="#">EC-151</a>
P0032	0032	HO2S1 HTR (B1)	2	×	<a href="#">EC-151</a>
P0037	0037	HO2S2 HTR (B1)	2	×	<a href="#">EC-157</a>
P0038	0038	HO2S2 HTR (B1)	2	×	<a href="#">EC-157</a>
P0101	0101	MAF SEN/CIRCUIT	1	×	<a href="#">EC-163</a>
P0102	0102	MAF SEN/CIRCUIT	1	×	<a href="#">EC-171</a>
P0103	0103	MAF SEN/CIRCUIT	1	×	<a href="#">EC-171</a>
P0112	0112	IAT SEN/CIRCUIT	2	×	<a href="#">EC-177</a>
P0113	0113	IAT SEN/CIRCUIT	2	×	<a href="#">EC-177</a>
P0117	0117	ECT SEN/CIRCUIT	1	×	<a href="#">EC-181</a>
P0118	0118	ECT SEN/CIRCUIT	1	×	<a href="#">EC-181</a>
P0122	0122	TP SEN 2/CIRC	1	×	<a href="#">EC-186</a>
P0123	0123	TP SEN 2/CIRC	1	×	<a href="#">EC-186</a>
P0125	0125	ECT SENSOR	1	×	<a href="#">EC-193</a>
P0127	0127	IAT SENSOR	2	×	<a href="#">EC-196</a>
P0128	0128	THERMSTAT FNCTN	2	×	<a href="#">EC-199</a>
P0132	0132	HO2S1 (B1)	2	×	<a href="#">EC-201</a>
P0133	0133	HO2S1 (B1)	2	×	<a href="#">EC-207</a>
P0134	0134	HO2S1 (B1)	2	×	<a href="#">EC-216</a>
P0138	0138	HO2S2 (B1)	2	×	<a href="#">EC-223</a>
P0139	0139	HO2S2 (B1)	2	×	<a href="#">EC-230</a>
P0171	0171	FUEL SYS-LEAN-B1	2	×	<a href="#">EC-238</a>
P0172	0172	FUEL SYS-RICH-B1	2	×	<a href="#">EC-245</a>
P0181	0181	FTT SENSOR	2	×	<a href="#">EC-251</a>
P0182	0182	FTT SEN/CIRCUIT	2	×	<a href="#">EC-256</a>
P0183	0183	FTT SEN/CIRCUIT	2	×	<a href="#">EC-256</a>
P0222	0222	TP SEN 1/CIRC	1	×	<a href="#">EC-260</a>
P0223	0223	TP SEN 1/CIRC	1	×	<a href="#">EC-260</a>
P0300	0300	MULTI CYL MISFIRE	2	×	<a href="#">EC-267</a>
P0301	0301	CYL1 MISFIRE	2	×	<a href="#">EC-267</a>
P0302	0302	CYL2 MISFIRE	2	×	<a href="#">EC-267</a>
P0303	0303	CYL3 MISFIRE	2	×	<a href="#">EC-267</a>
P0304	0304	CYL4 MISFIRE	2	×	<a href="#">EC-267</a>
P0327	0327	KNOCK SEN/CIRC-B1	2	—	<a href="#">EC-273</a>
P0328	0328	KNOCK SEN/CIRC-B1	2	—	<a href="#">EC-273</a>



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[QG18DE (ULEV)]

DTC*1		Items (CONSULT-II screen terms)	Trip	MIL lighting up	Reference page
CONSULT-II GST*2	ECM*3				
P0335	0335	CKP SEN/CIRCUIT	2	×	<a href="#">EC-277</a>
P0340	0340	CMP SEN/CIRCUIT	2	×	<a href="#">EC-283</a>
P0420	0420	TW CATALYST SYS-B1	2	×	<a href="#">EC-289</a>
P0441	0441	EVAP PURG FLOW/MON	2	×	<a href="#">EC-294</a>
P0442	0442	EVAP SMALL LEAK	2	×	<a href="#">EC-301</a>
P0444	0444	PURG VOLUME CONT/V	2	×	<a href="#">EC-311</a>
P0445	0445	PURG VOLUME CONT/V	2	×	<a href="#">EC-311</a>
P0447	0447	VENT CONTROL VALVE	2	×	<a href="#">EC-317</a>
P0452	0452	EVAP SYS PRES SEN	2	×	<a href="#">EC-324</a>
P0453	0453	EVAP SYS PRES SEN	2	×	<a href="#">EC-330</a>
P0455	0455	EVAP GROSS LEAK	2	×	<a href="#">EC-338</a>
P0456	0456	EVAP VERY SML LEAK	2	×	<a href="#">EC-346</a>
P0460	0460	FUEL LEV SEN SLOSH	2	×	<a href="#">EC-354</a>
P0461	0461	FUEL LEVEL SENSOR	2	×	<a href="#">EC-356</a>
P0462	0462	FUEL LEVL SEN/CIRC	2	×	<a href="#">EC-359</a>
P0463	0463	FUEL LEVL SEN/CIRC	2	×	<a href="#">EC-359</a>
P0500*5	0500	VEH SPEED SEN/CIRC	2	×	<a href="#">EC-361</a>
P0506	0506	ISC SYSTEM	2	×	<a href="#">EC-363</a>
P0507	0507	ISC SYSTEM	2	×	<a href="#">EC-365</a>
P0550	0550	PW ST P SEN/CIRC	2	—	<a href="#">EC-367</a>
P0605	0605	ECM	1 or 2	×	<a href="#">EC-372</a>
P0705	0705	PNP SW/CIRC	2	×	<a href="#">AT-116</a>
P0710	0710	ATF TEMP SEN/CIRC	2	×	<a href="#">AT-121</a>
P0720*5	0720	VEH SPD SEN/CIR AT	2	×	<a href="#">AT-127</a>
P0725	0725	ENGINE SPEED SIG	2	×	<a href="#">AT-132</a>
P0731	0731	A/T 1ST GR FNCTN	2	×	<a href="#">AT-136</a>
P0732	0732	A/T 2ND GR FNCTN	2	×	<a href="#">AT-141</a>
P0733	0733	A/T 3RD GR FNCTN	2	×	<a href="#">AT-146</a>
P0734	0734	A/T 4TH GR FNCTN	2	×	<a href="#">AT-151</a>
P0740	0740	TCC SOLENOID/CIRC	2	×	<a href="#">AT-160</a>
P0744	0744	A/T TCC S/V FNCTN	2	×	<a href="#">AT-164</a>
P0745	0745	L/PRESS SOL/CIRC	2	×	<a href="#">AT-174</a>
P0750	0750	SFT SOL A/CIRC	1	×	<a href="#">AT-180</a>
P0755	0755	SFT SOL B/CIRC	1	×	<a href="#">AT-184</a>
P1065	1065	ECM BACK UP/CIRC	2	×	<a href="#">EC-375</a>
P1102	1102	MAF SENSOR	1	×	<a href="#">EC-379</a>
P1111	1111	INT/V TIM V/CIR-B1	2	×	<a href="#">EC-385</a>
P1121	1121	ETC ACTR	1 or 2	×	<a href="#">EC-390</a>
P1122	1122	ETC FUNCTION/CIRC	1	×	<a href="#">EC-392</a>
P1124	1124	ETC MOT PWR	1	×	<a href="#">EC-399</a>
P1126	1126	ETC MOT PWR	1	×	<a href="#">EC-399</a>
P1128	1128	ETC MOT	1	×	<a href="#">EC-404</a>

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[QG18DE (ULEV)]

DTC*1		Items (CONSULT-II screen terms)	Trip	MIL lighting up	Reference page
CONSULT-II GST*2	ECM*3				
P1143	1143	HO2S1 (B1)	2	×	<a href="#">EC-409</a>
P1144	1144	HO2S1 (B1)	2	×	<a href="#">EC-415</a>
P1146	1146	HO2S2 (B1)	2	×	<a href="#">EC-421</a>
P1147	1147	HO2S2 (B1)	2	×	<a href="#">EC-428</a>
P1148	1148	CLOSED LOOP-B1	1	×	<a href="#">EC-436</a>
P1217	1217	ENG OVER TEMP	1	×	<a href="#">EC-438</a>
P1225	1225	CTP LEARNING	2	—	<a href="#">EC-451</a>
P1226	1226	CTP LEARNING	2	—	<a href="#">EC-453</a>
P1229	1229	SENSOR POWER/CIRC	1	×	<a href="#">EC-455</a>
P1444	1444	PURG VOLUME CONT/V	2	×	<a href="#">EC-460</a>
P1446	1446	VENT CONTROL VALVE	2	×	<a href="#">EC-468</a>
P1564	1564	ASCD SW	1	—	<a href="#">EC-474</a>
P1572	1572	ASCD BRAKE SW	1	—	<a href="#">EC-481</a>
P1574	1574	ASCD VHL SPD SEN	1	—	<a href="#">EC-491</a>
P1705	1705	TP SEN/CIRC A/T	1	×	<a href="#">AT-188</a>
P1706	1706	P-N POS SW/CIRCUIT	2	×	<a href="#">EC-493</a>
P1760	1760	O/R CLTCH SOL/CIRC	2	×	<a href="#">AT-194</a>
P1805	1805	BRAKE SW/CIRCUIT	2	—	<a href="#">EC-497</a>
P2122	2122	APP SEN 1/CIRC	1	×	<a href="#">EC-503</a>
P2123	2123	APP SEN 1/CIRC	1	×	<a href="#">EC-503</a>
P2127	2127	APP SEN 2/CIRC	1	×	<a href="#">EC-511</a>
P2128	2128	APP SEN 2/CIRC	1	×	<a href="#">EC-511</a>
P2135	2135	TP SENSOR	1	×	<a href="#">EC-518</a>
P2138	2138	APP SENSOR	1	×	<a href="#">EC-525</a>

\*1: 1st trip DTC No. is the same as DTC No.

\*2: These numbers are prescribed by SAE J2012.

\*3: Is Diagnostic Test Mode-II (self-diagnostic results), there numbers are controlled by NISSAN.

\*4: These DTCs are displayed with CONSULT-II only.

\*5: The MIL illuminates when both the "Revolution sensor signal" and the "Vehicle speed sensor signal" meet the fail-safe condition at the same time.

\*6: When engine is running.

**PRECAUTIONS**

PF0:00001

**Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”**

UBS001C3

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

**WARNING:**

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

**On Board Diagnostic (OBD) System of Engine and A/T**

UBS001C4

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

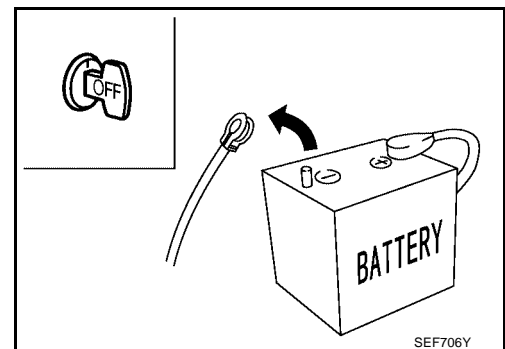
**CAUTION:**

- Be sure to turn the ignition switch “OFF” and disconnect the negative battery cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to [PG-46, "HARNES CONNECTOR"](#) .
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the EVAP system or fuel injection system, etc.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.

**Precautions**

UBS001C5

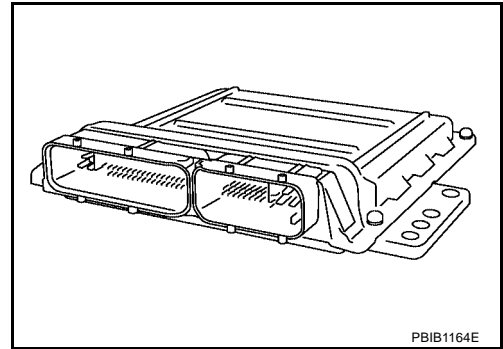
- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery terminal. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned off.
- Before removing parts, turn off ignition switch and then disconnect battery ground cable.



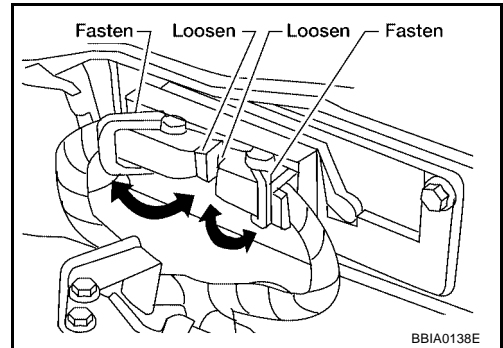
# PRECAUTIONS

[QG18DE (ULEV)]

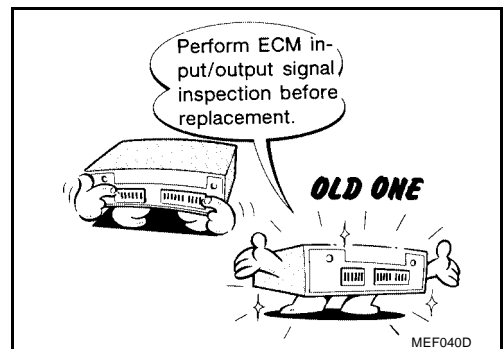
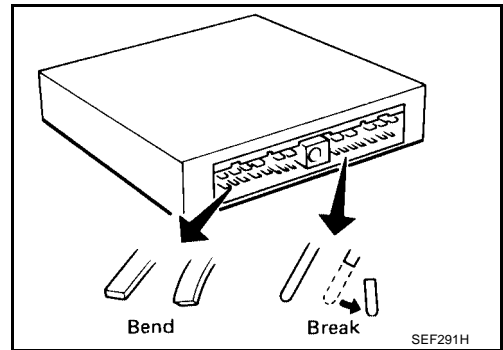
- Do not disassemble ECM.
- If a battery terminal is disconnected, the memory will return to the ECM value.  
The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a problem. Do not replace parts because of a slight variation.



- When connecting ECM harness connector, fasten it securely with a lever as far as it will go, as shown at left.



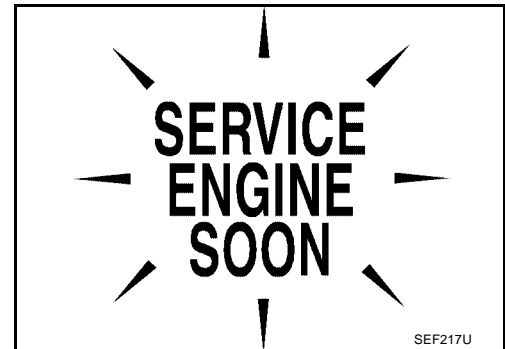
- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).  
Make sure that there are not any bends or breaks on ECM pin terminals when connecting pin connectors.
- Securely connect ECM harness connectors.  
A Poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent a engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep engine control system parts and harness dry.
- Before replacing ECM, perform Terminals and Reference Value inspection and make sure ECM functions properly. Refer to [EC-105. "ECM Terminals and Reference Value"](#).



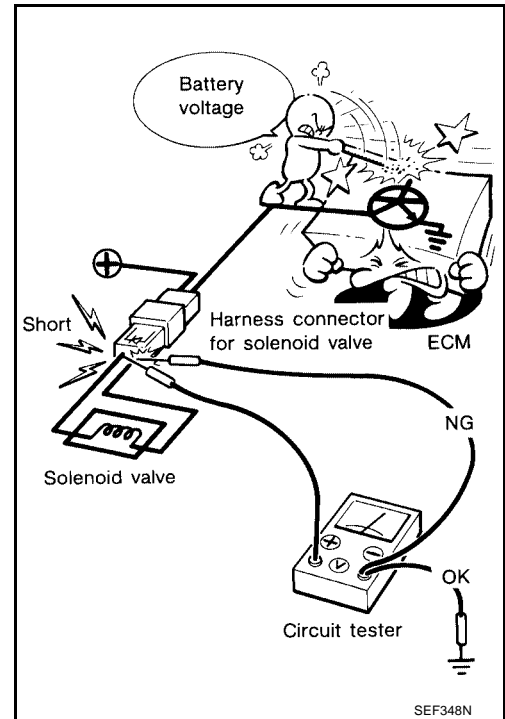
# PRECAUTIONS

[QG18DE (ULEV)]

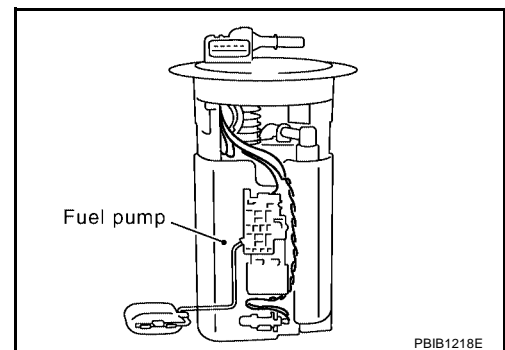
- After performing each TROUBLE DIAGNOSIS, perform “Overall Function Check” or “DTC Confirmation Procedure”.  
The DTC should not be displayed in the “DTC Confirmation Procedure” if the repair is completed. The “Overall Function Check” should be a good result if the repair is completed.



- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- Handle mass air flow sensor carefully to avoid damage.
- Do not disassemble mass air flow sensor.
- Do not clean mass air flow sensor with any type of detergent.
- Even a slight leak in the air intake system can cause serious problems.
- Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).



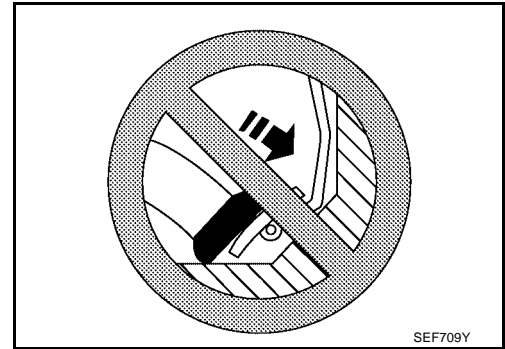
- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.



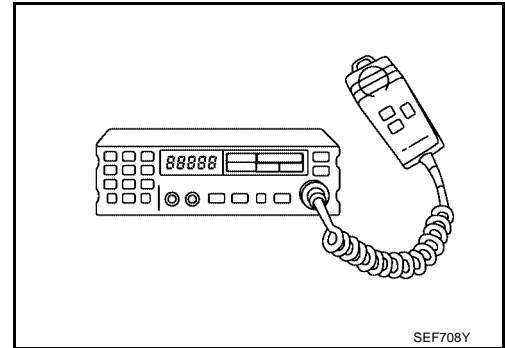
# PRECAUTIONS

[QG18DE (ULEV)]

- Do not depress accelerator pedal when starting.
- Immediately after starting, do not rev up engine unnecessarily.
- Do not rev up engine just prior to shutdown.



- When installing C.B., ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.
  - Keep the antenna as far as possible from the electronic control units.
  - Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls. Do not let them run parallel for a long distance.
  - Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
  - Be sure to ground the radio to vehicle body.



## Wiring Diagrams and Trouble Diagnosis

UBS001C6

When you read Wiring diagrams, refer to the following:

- [GI-13, "How to Read Wiring Diagrams"](#)
- [PG-2, "POWER SUPPLY ROUTING"](#) for power distribution circuit

When you perform trouble diagnosis, refer to the following:

- [GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"](#)
- [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#)

# PREPARATION

[QG18DE (ULEV)]

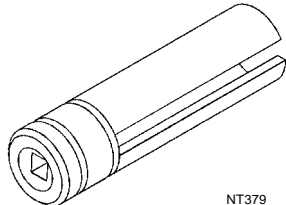
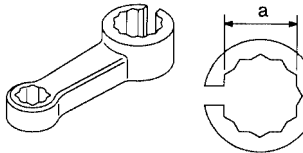
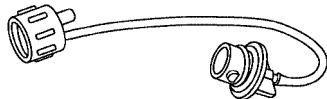
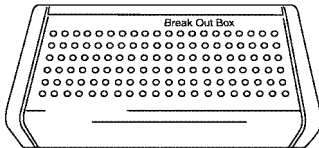
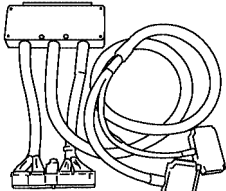
PF0:00002

UBS001C7

## PREPARATION

### Special Service Tools

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description	
KV10117100 (J36471-A) Heated oxygen sensor wrench	 <p style="text-align: center;">NT379</p>	Loosening or tightening heated oxygen sensor 1 with 22 mm (0.87 in) hexagon nut
KV10114400 (J-38365) Heated oxygen sensor wrench	 <p style="text-align: center;">NT636</p>	Loosening or tightening heated oxygen sensor 2 <b>a: 22 mm (0.87 in)</b>
Fuel filler cap adapter (J-45356)	 <p style="text-align: center;">NT815</p>	Checking fuel tank vacuum relief valve opening pressure
KV109E0010 (J-46209) Break-out box	 <p style="text-align: center;">S-NT825</p>	Measuring the ECM signals with a circuit tester
KV109E0080 (J-45819) Y-cable adapter	 <p style="text-align: center;">S-NT826</p>	Measuring the ECM signals with a circuit tester

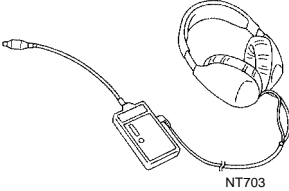
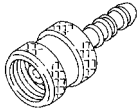
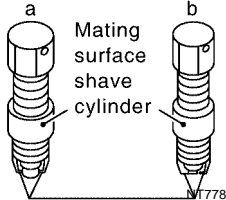
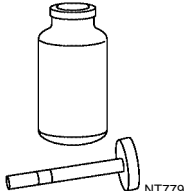
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# PREPARATION

[QG18DE (ULEV)]

UBS001C8

## Commercial Service Tools

Tool name	Description
Leak detector i.e.: (J41416)	 <p style="text-align: center;">NT703</p> Locating the EVAP leak
EVAP service port adapter i.e.: (J41413-OBDD)	 <p style="text-align: center;">NT704</p> Applying positive pressure through EVAP service port
Oxygen sensor thread cleaner i.e.: (J-43897-18) (J-43897-12)	 <p style="text-align: center;">NT778</p> Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. <b>a: J-43897-18 18 mm with 1.5 mm pitch dia., for Zirconia Oxygen Sensor</b> <b>b: J-43897-12 12 mm with 1.25 mm pitch dia., for Titania Oxygen Sensor</b>
Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)	 <p style="text-align: center;">NT779</p> Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.



ENGINE CONTROL SYSTEM

System Diagram

PFP:23710

UBS001C9

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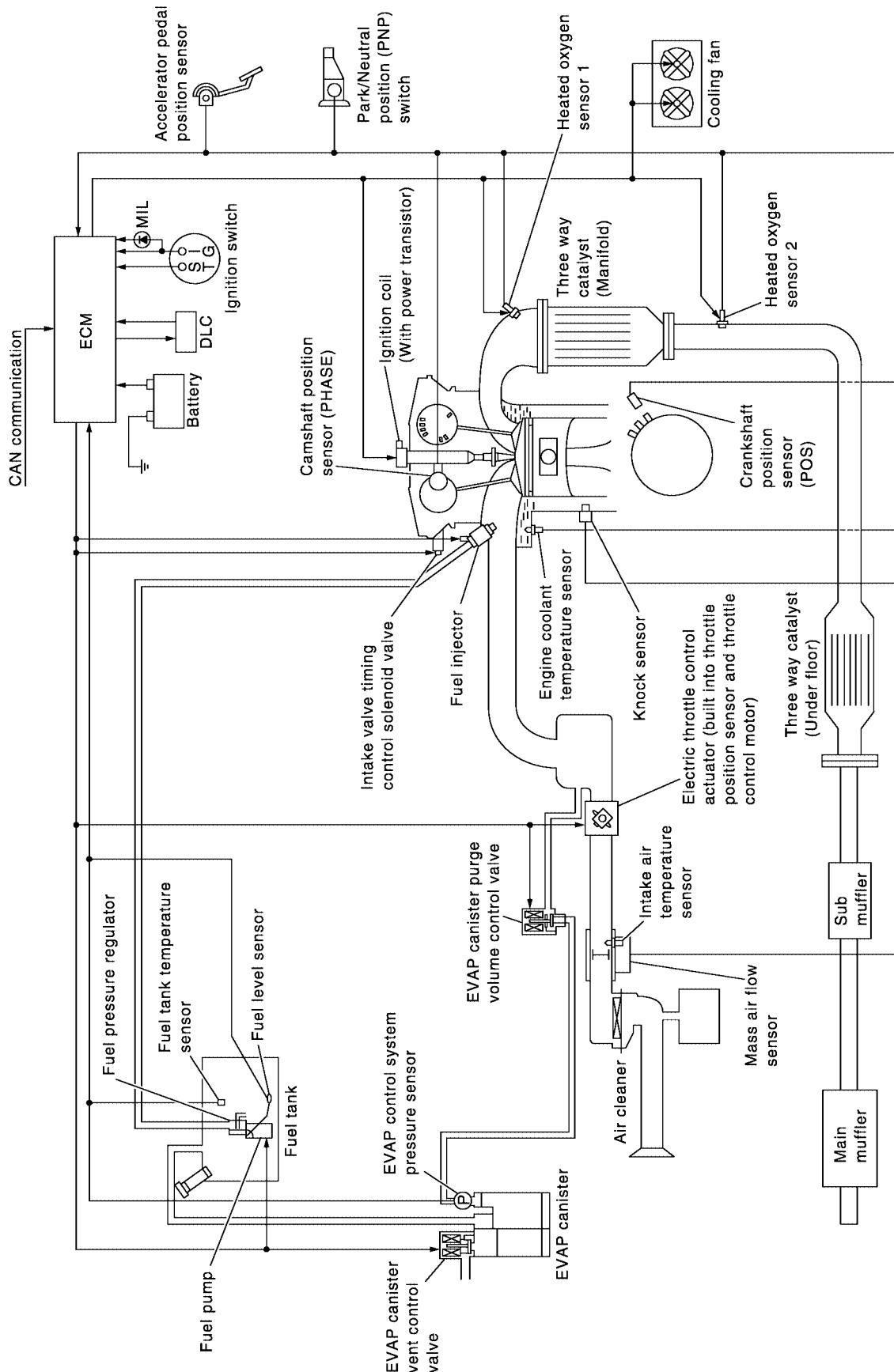
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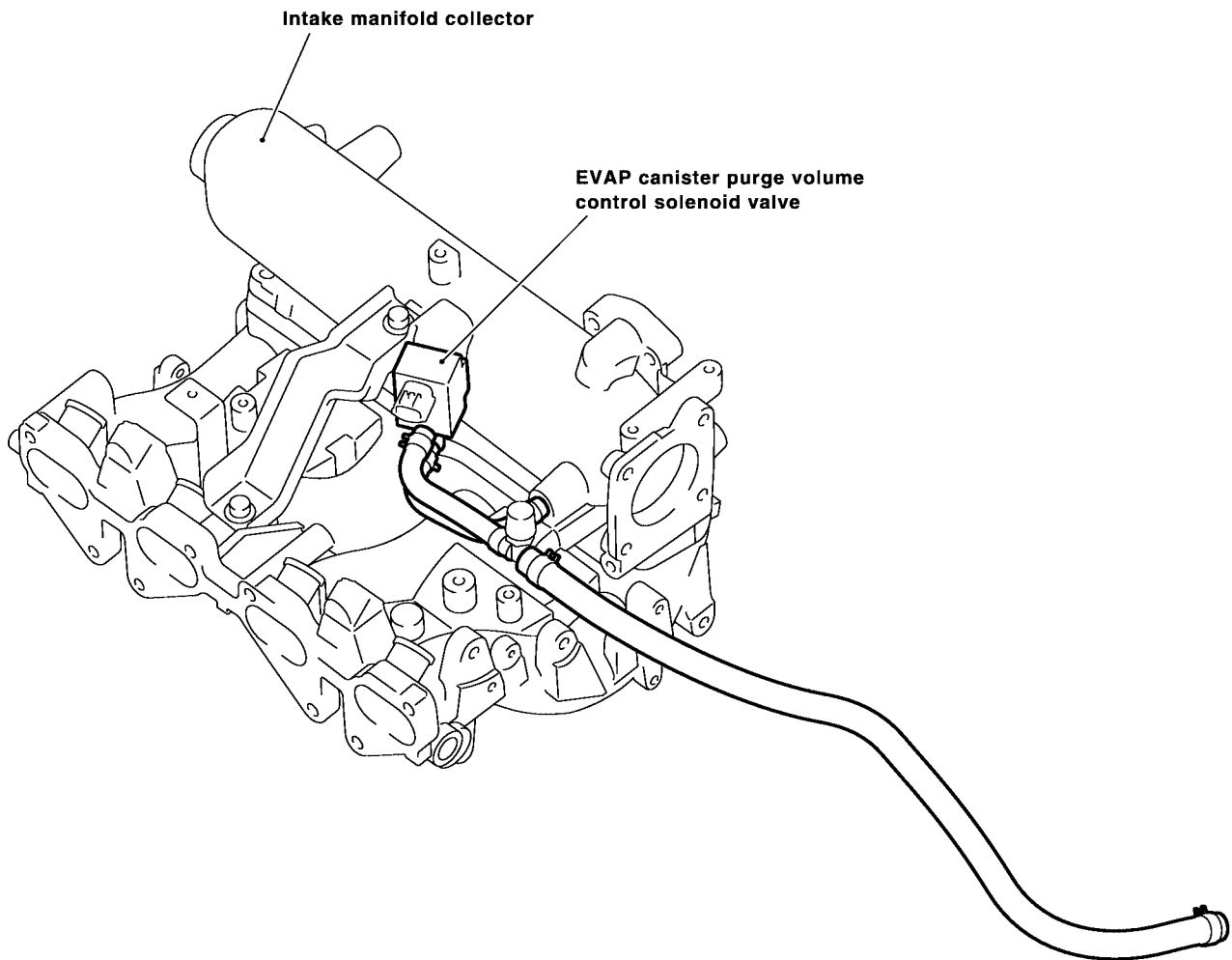
M



PBIB1055E

### Vacuum Hose Drawing

UBS001CA



**NOTE :** Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

Refer to [EC-33, "System Diagram"](#) for Vacuum Control System.

PBIB1056E

## System Chart

Input (Sensor)	ECM Function	Output (Actuator)	
<ul style="list-style-type: none"> <li>● Camshaft position sensor (PHASE)</li> <li>● Crankshaft position sensor (POS)</li> <li>● Mass air flow sensor</li> <li>● Engine coolant temperature sensor</li> <li>● Heated oxygen sensor 1</li> <li>● Ignition switch</li> <li>● Throttle position sensor</li> <li>● PNP switch</li> <li>● Air conditioner switch</li> <li>● Knock sensor</li> <li>● EVAP control system pressure sensor</li> <li>● Fuel tank temperature sensor*<sup>1</sup></li> <li>● Battery voltage</li> <li>● Power steering pressure sensor</li> <li>● Vehicle speed signal*<sup>2</sup></li> <li>● Intake air temperature sensor</li> <li>● Heated oxygen sensor 2*<sup>3</sup></li> <li>● TCM (Transmission control module)*<sup>2</sup></li> <li>● Electrical load</li> <li>● Fuel level sensor*<sup>1</sup> *<sup>2</sup></li> <li>● Refrigerant pressure sensor</li> <li>● ASCD steering switch</li> <li>● ASCD brake switch</li> <li>● ASCD clutch switch</li> <li>● Accelerator pedal position sensor</li> <li>● Stop lamp switch</li> </ul>	Fuel injection & mixture ratio control	Injectors	
	Distributor ignition system	Power transistor	
	Intake valve timing control	Intake valve timing control solenoid valve	
	Fuel pump control	Fuel pump relay* <sup>4</sup>	
	On board diagnostic system	Malfunction indicator lamp (On the instrument panel)	
	Heated oxygen sensor 1 and 2 heater control	Heated oxygen sensor heater	
	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve	
	Cooling fan control	Cooling fan relays	
	Air conditioning cut control	Air conditioner relay	
	ASCD vehicle speed control	Electric throttle control actuator	
		ON BOARD DIAGNOSIS for EVAP system	● EVAP canister vent control valve

\*1: These sensors are not used to control the engine system. They are used only for the on board diagnosis.

\*2: These input signals are sent to the ECM through CAN communication line.

\*3: This sensor is not used to control the engine system under normal conditions.

\*4: These output signals are sent from the ECM through CAN communication line.

## Multipoint Fuel Injection (MFI) System INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed* <sup>3</sup> and piston position	Fuel injection & mixture ratio control	Injector
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Heated oxygen sensor 1	Density of oxygen in exhaust gas		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
PNP switch	Gear position		
Vehicle speed signal* <sup>2</sup>	Vehicle speed		
Air conditioner switch	Air conditioner operation		
Knock sensor	Engine knocking condition		
Electrical load	Electrical load signal		
Battery	Battery voltage* <sup>3</sup>		
Power steering pressure sensor	Power steering operation		
Heated oxygen sensor 2* <sup>1</sup>	Density of oxygen in exhaust gas		

\*1: Under normal conditions, this sensor is not for engine control operation.

\*2: This signal is sent to the ECM through CAN communication line.

\*3: ECM determines the start signal status by the signals of engine speed and battery voltage.

### SYSTEM DESCRIPTION

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined by input signals (for engine speed and intake air) from both the camshaft position sensor and the mass air flow sensor.

### VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

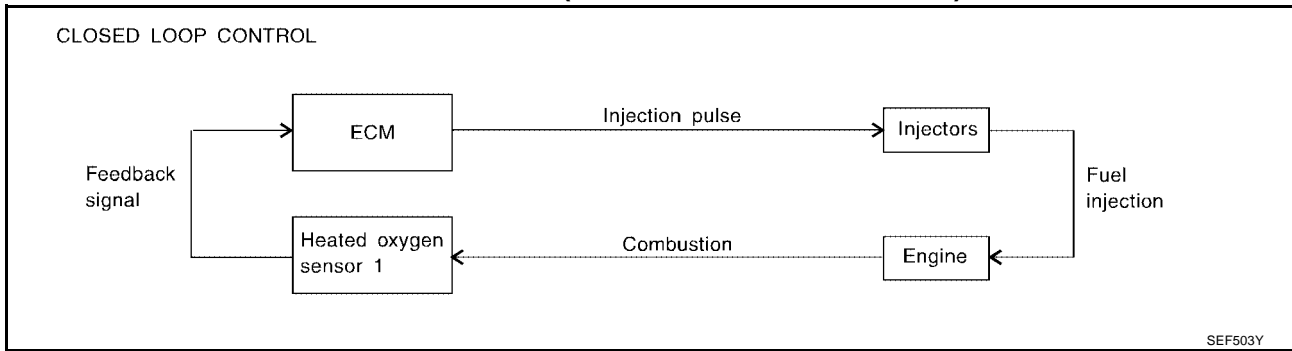
In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from "N" to "D" (A/T models only)
- High-load, high-speed operation

<Fuel decrease>

- During deceleration
- During high engine speed operation
- During high vehicle speed operation
- Extremely high engine coolant temperature

**MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)**

The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The three way catalyst can then better reduce CO, HC and NOx emissions. This system uses a heated oxygen sensor 1 in the exhaust manifold to monitor if the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about the heated oxygen sensor 1, refer to [EC-201](#). This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).

This stage is referred to as the closed loop control condition.

Heated oxygen sensor 2 is located downstream of the three way catalyst. Even if the switching characteristics of the heated oxygen sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from the heated oxygen sensor 2.

**Open Loop Control**

The open loop system condition refers to when the ECM detects any of the following conditions. Feedback control stops in order to maintain stabilized fuel combustion.

- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of heated oxygen sensor 1 or its circuit
- Insufficient activation of heated oxygen sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- When starting the engine

**MIXTURE RATIO SELF-LEARNING CONTROL**

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from the heated oxygen sensor 1. This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. Both manufacturing differences (i.e., mass air flow sensor hot film) and characteristic changes during operation (i.e., injector clogging) directly affect mixture ratio.

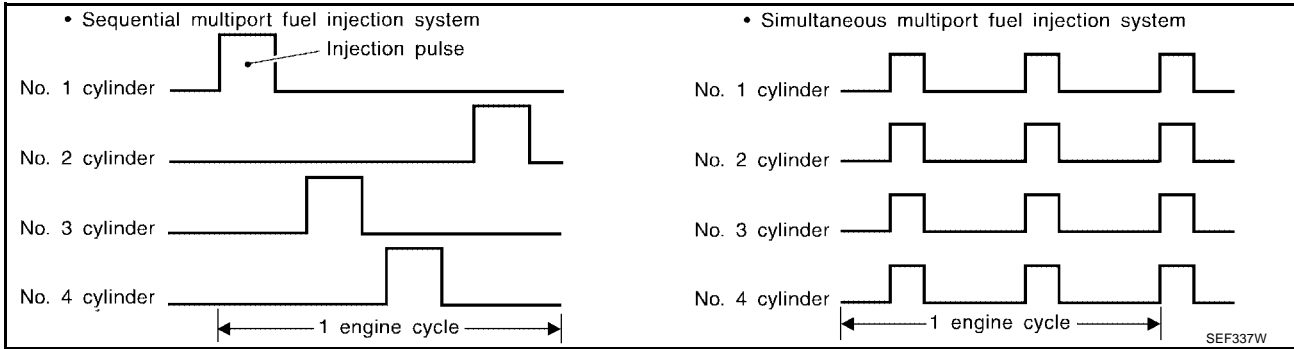
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

"Fuel trim" refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes short term fuel trim and long term fuel trim.

"Short term fuel trim" is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from the heated oxygen sensor 1 indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.

"Long term fuel trim" is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

**FUEL INJECTION TIMING**



Two types of systems are used.

**Sequential Multiport Fuel Injection System**

Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.

**Simultaneous Multiport Fuel Injection System**

Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.

The four injectors will then receive the signals two times for each engine cycle.

This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

**FUEL SHUT-OFF**

Fuel to each cylinder is cut off during deceleration or operation of the engine at excessively high speeds.

**Electronic Ignition (EI) System  
INPUT/OUTPUT SIGNAL CHART**

UBS001CD

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed*2 and piston position	Ignition timing control	Power transistor
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Vehicle speed signal*1	Vehicle speed		
Knock sensor	Engine knocking		
PNP switch	Gear position		
Battery	Battery voltage*2		

\*1: This signal is sent to the ECM through CAN communication line.

\*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

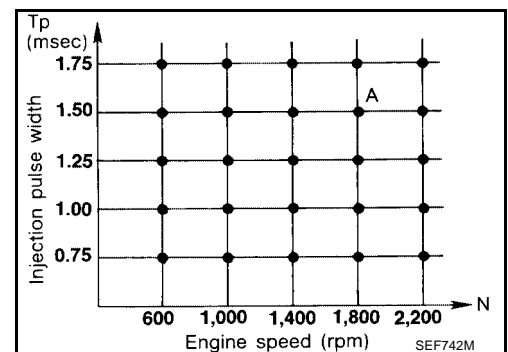
**SYSTEM DESCRIPTION**

The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM. This data forms the map shown above.

The ECM receives information such as the injection pulse width and camshaft position sensor (PHASE) signal. Computing this information, ignition signals are transmitted to the power transistor.

e.g., N: 1,800 rpm, Tp: 1.50 msec  
A°BTDC

During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.



- At starting
- During warm-up
- At idle
- At low battery voltage
- During acceleration

The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not operate under normal driving conditions.

If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

## Air Conditioning Cut Control INPUT/OUTPUT SIGNAL CHART

UBS001CE

Sensor	Input Signal to ECM	ECM function	Actuator
Power steering pressure sensor	Power steering operation	Air conditioner cut control	Air conditioner relay
Vehicle speed signal*2	Vehicle speed		
Air conditioner switch	Air conditioner "ON" signal		
PNP switch	Neutral position		
Throttle position sensor	Throttle position		
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed*1		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*1		
Refrigerant pressure sensor	Refrigerant pressure		

\*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

\*2: Signal is sent to the ECM through CAN communication line.

## SYSTEM DESCRIPTION

This system improves engine operation when the air conditioner is used. Under the following conditions, the air conditioner is turned off.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- When operating power steering during low engine speed or low vehicle speed.
- When engine speed is excessively low.
- When the refrigerant pressure is excessively high or low.

## Fuel Cut Control (at No Load and High Engine Speed) INPUT/OUTPUT SIGNAL CHART

UBS001CF

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed signal*1	Vehicle speed	Fuel cut control	Injectors
PNP switch	Neutral position		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		

\*1: This signal is sent to the ECM through CAN communication line.

## SYSTEM DESCRIPTION

If the engine speed is above 2,500 rpm with no load, (for example, in Neutral and engine speed over 2,500 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed. Fuel cut will operate until the engine speed reaches 2,000 rpm, then fuel cut is cancelled.

**NOTE:**

This function is different from deceleration control listed under [EC-36, "Multiport Fuel Injection \(MFI\) System"](#) .

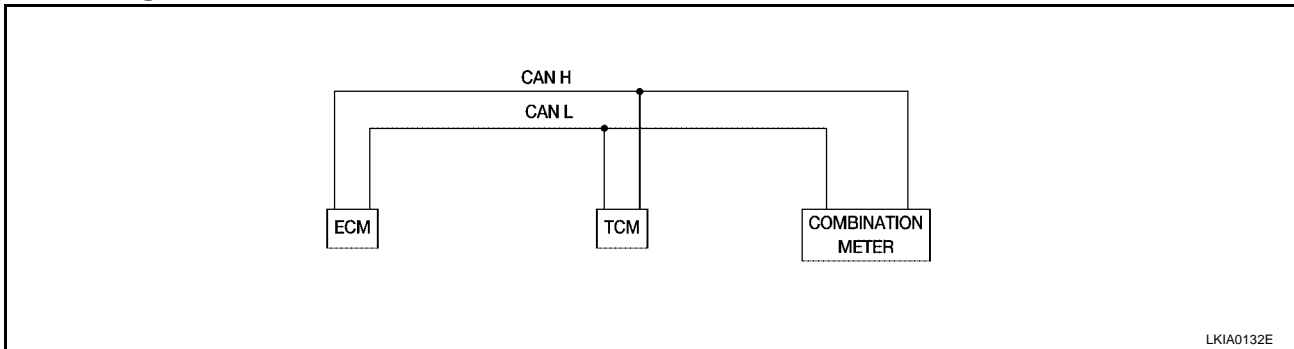
## CAN communication SYSTEM DESCRIPTION

UBS003PF

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

## A/T MODELS

### System Diagram



### Input/Output Signal Chart

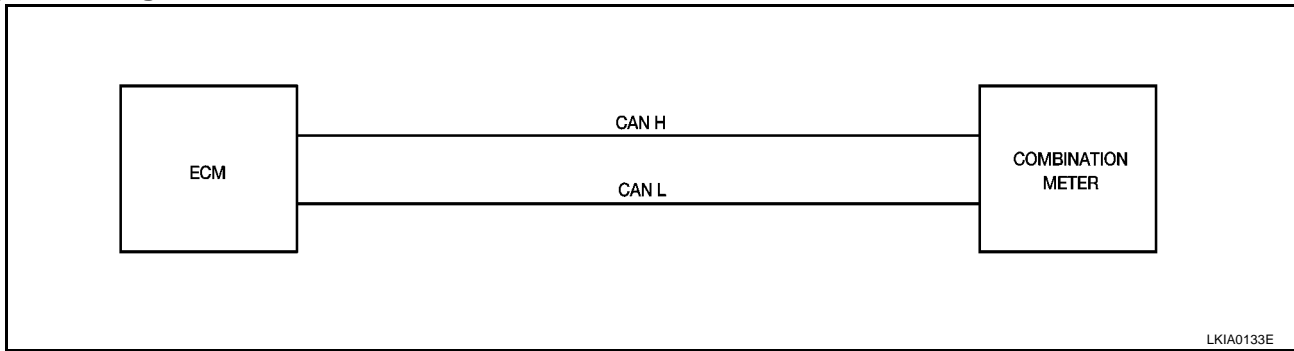
T: Transmit R: Receive

Signals	ECM	TCM	Combination meter
Accelerator pedal position signal	T	R	
Output shaft revolution signal	R	T	
A/T self-diagnosis signal	R	T	
Closed throttle position signal	T	R	
Wide open throttle position signal	T	R	
Stop lamp switch signal		R	T
Overdrive control switch signal		R	T
O/D OFF indicator signal		T	R
Engine speed signal	T		R
Engine coolant temperature signal	T		R
Vehicle speed signal	R		T
Fuel level sensor signal	R		T
Malfunction indicator lamp signal	T		R
ADCD SET lamp signal	T		R
ASCD CRUISE lamp signal	T		R



**M/T MODELS**

**System Diagram**



**Input/Output Signal Chart**

T: Transmit R: Receive

Signals	ECM	Combination meter
Engine speed signal	T	R
Engine coolant temperature signal	T	R
Vehicle speed signal	R	T
Fuel level sensor signal	R	T
Malfunction indicator lamp signal	T	R
ASCD SET lamp signal	T	R
ASCD CRUISE lamp signal	T	R

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## BASIC SERVICE PROCEDURE

PFP:00018

### Idle Speed and Ignition Timing Check IDLE SPEED

UBS001CG

#### Using CONSULT-II

Check idle speed in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

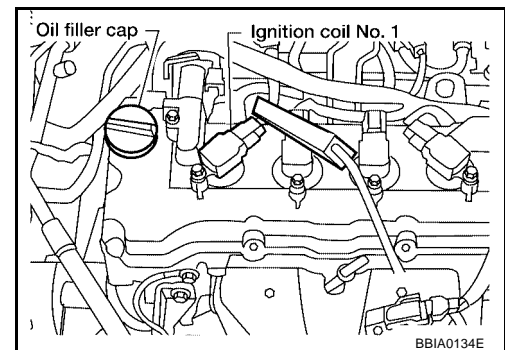
SEF058Y

### IGNITION TIMING

Any of following two methods may be used.

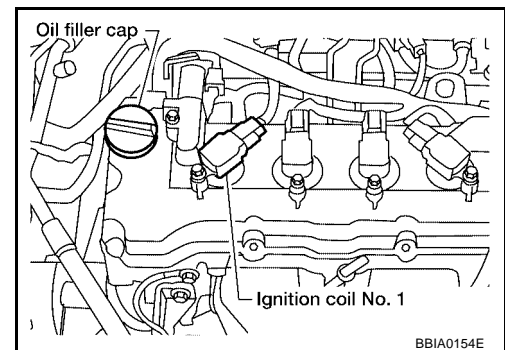
#### Method A

1. Slide the harness protector off ignition coil No.1 to clear the wires.
2. Attach timing light to the wires as shown in the figure.
3. Check ignition timing.

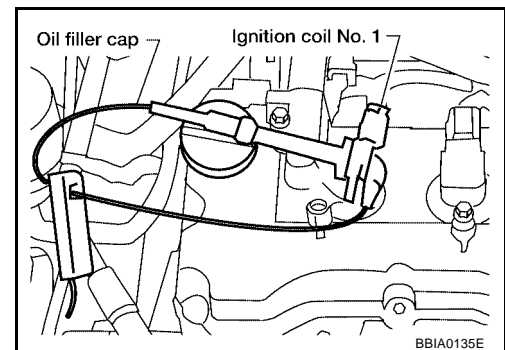


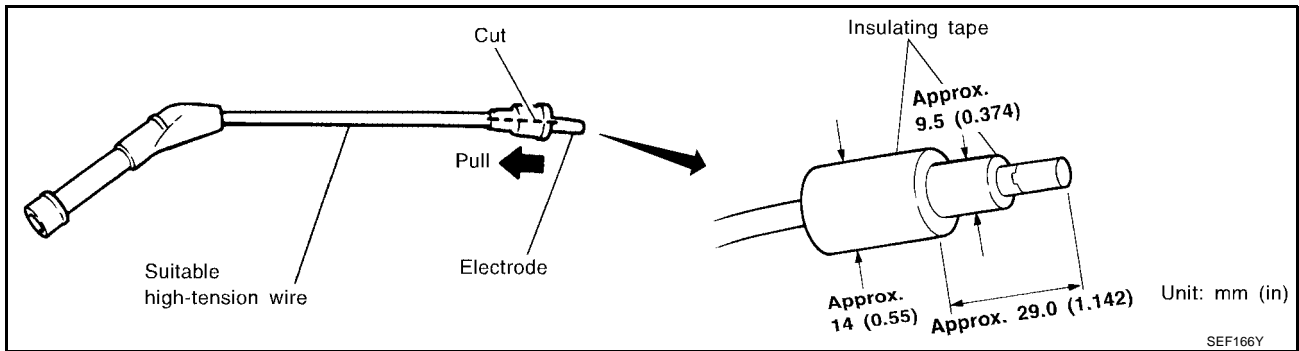
#### Method B

1. Remove No. 1 ignition coil.

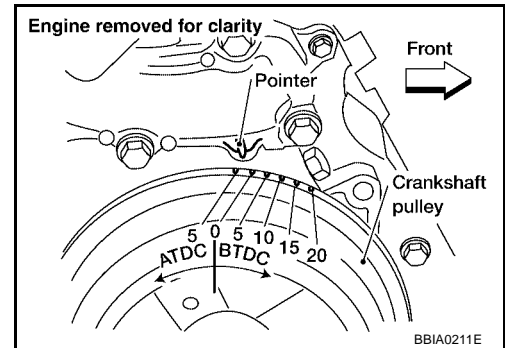


2. Connect No. 1 ignition coil and No. 1 spark plug with suitable high-tension wire as shown, and attach timing light clamp to this wire.





3. Check ignition timing.

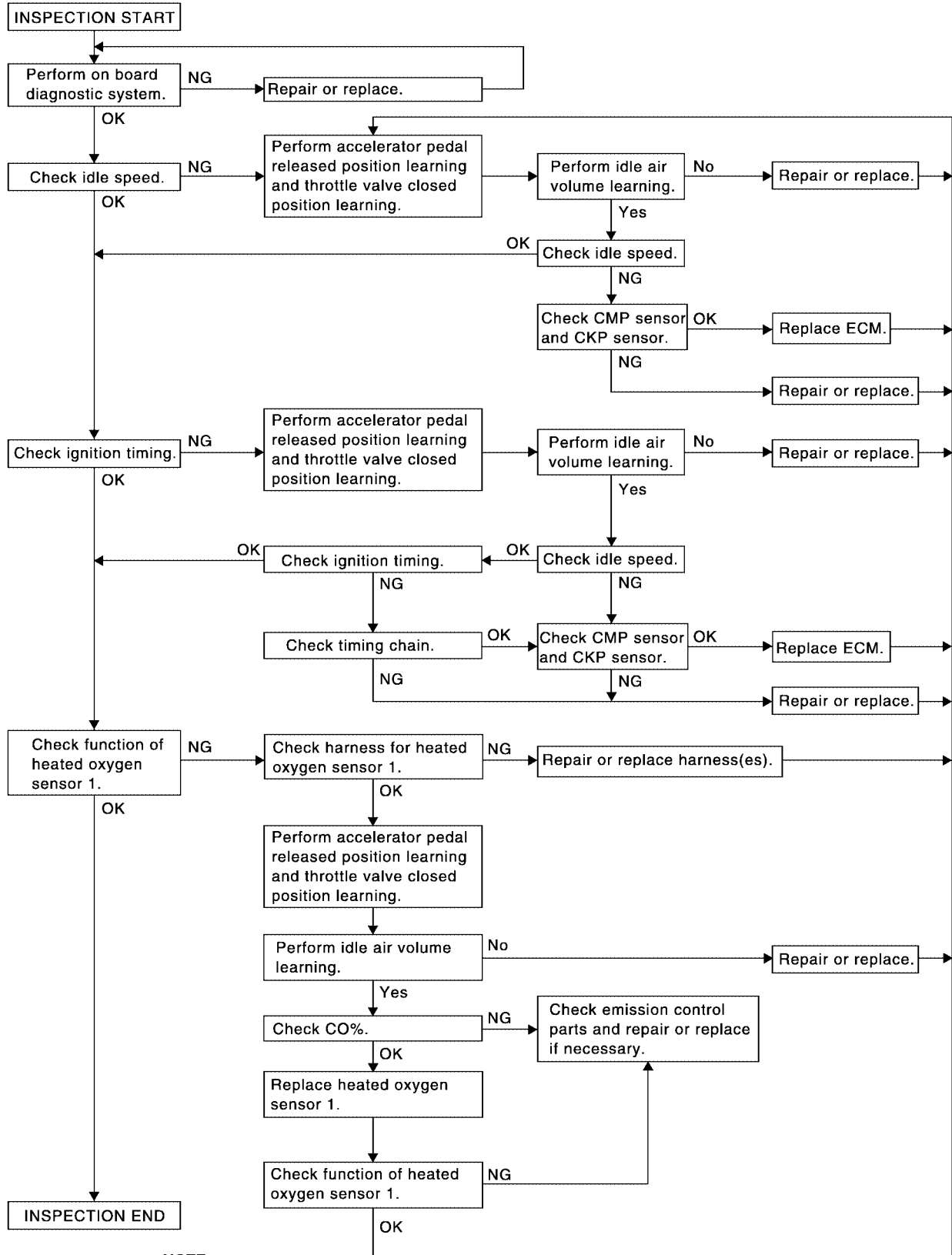


### Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment PREPARATION

UBS006DO

1. Make sure that the following parts are in good order.
  - Battery
  - Ignition system
  - Engine oil and coolant levels
  - Fuses
  - ECM harness connector
  - Vacuum hoses
  - Air intake system  
(Oil filler cap, oil level gauge, etc.)
  - Fuel pressure
  - Engine compression
  - Throttle valve
  - Evaporative emission system
2. On air conditioner equipped models, checks should be carried out while the air conditioner is "OFF".
3. On automatic transmission equipped models, when checking idle rpm, ignition timing and mixture ratio, checks should be carried out while shift lever is in "N" position.
4. When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.
5. Turn off headlamp, heater blower, rear window defogger.
6. Keep front wheels pointed straight ahead.

## OVERALL INSPECTION SEQUENCE



**NOTE:**

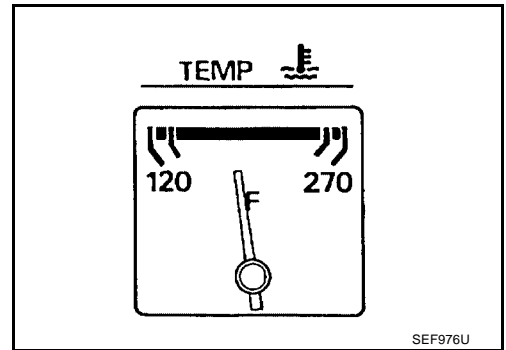
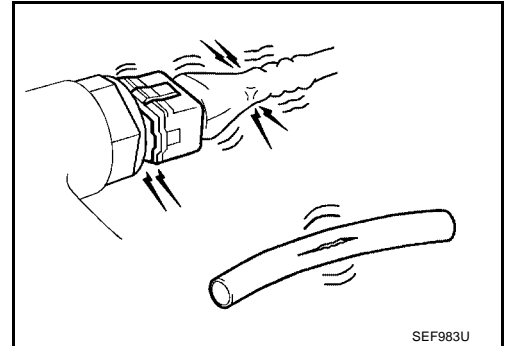
If a vehicle contains a part which is operating outside of design specifications with no MIL illumination, the part shall not be replaced prior to emission testing unless it is determined that the part has been tampered with or abused in such a way that the diagnostic system cannot reasonably be expected to detect the resulting malfunction.

PBIB1054E

## INSPECTION PROCEDURE

### 1. INSPECTION START

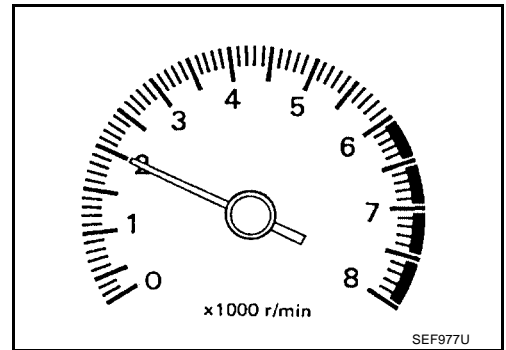
1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
  - Harness connectors for improper connections
  - Wiring harness for improper connections, pinches and cut
  - Vacuum hoses for splits, kinks and improper connections
  - Hoses and ducts for leaks
  - Air cleaner clogging
  - Gasket
3. Confirm that electrical or mechanical loads are not applied.
  - Headlamp switch is OFF.
  - Air conditioner switch is OFF.
  - Rear window defogger switch is OFF.
  - Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge. Ensure engine stays below 1,000 rpm.



5. Run engine at about 2,000 rpm for about 2 minutes under no-load.
6. Make sure that no DTC is displayed with CONSULT-II or GST.

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. REPAIR OR REPLACE

Repair or replace components as necessary according to corresponding "Diagnostic Procedure".

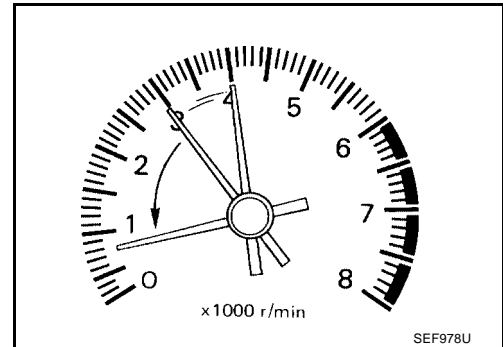
>> GO TO 3.

A  
EC  
C  
D  
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I  
J  
K  
L  
M

## 3. CHECK TARGET IDLE SPEED

### With CONSULT-II

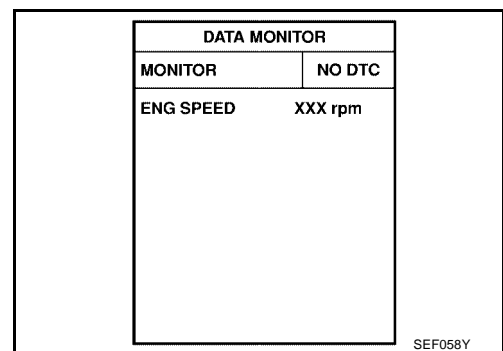
1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.



3. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**



### Without CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.
3. Check idle speed.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

#### OK or NG

- OK    >> GO TO 10.
- NG    >> GO TO 4.

## 4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 5.

## 5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 6.

**6. PERFORM IDLE AIR VOLUME LEARNING**

Perform [EC-53, "Idle Air Volume Learning"](#).

Is "Idle Air Volume Learning" carried out successfully?

Yes or No

Yes >> GO TO 7.

No >> 1. Follow the instruction of "Idle Air Volume Learning".

2. GO TO 4.

**7. CHECK TARGET IDLE SPEED AGAIN****Ⓜ With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

**ⓧ Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

OK or NG

OK >> GO TO 10.

NG >> GO TO 8.

**8. DETECT MALFUNCTIONING PART**

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-283](#).
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-277](#).

OK or NG

OK >> GO TO 9.

NG >> 1. Repair or replace.

2. GO TO 4.

**9. CHECK ECM FUNCTION**

Substitute another known-good ECM to check ECM function. (ECM may be the cause of a incident, but this is the rarely the case.)

>> GO TO 4.

**10. CHECK IGNITION TIMING**

1. Run engine at idle.
2. Check ignition timing with a timing light.

**M/T: 7 ± 5° BTDC**

**A/T: 18 ± 5° BTDC (in "P" or "N" position)**

OK or NG

OK (With CONSULT-II)>>GO TO 19.

OK (Without CONSULT-II)>>GO TO 20.

NG >> GO TO 11.

## 11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

---

1. Stop engine.
2. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 12.

## 12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

---

Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 13.

## 13. PERFORM IDLE AIR VOLUME LEARNING

---

Perform [EC-53, "Idle Air Volume Learning"](#) .

Is "Idle Air Volume Learning" carried out successfully?

Yes or No

- Yes >> GO TO 14.  
 No >> 1. Follow the instruction of "Idle Air Volume Learning".  
 2. GO TO 4.

## 14. CHECK TARGET IDLE SPEED AGAIN

---

### With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

### Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

OK or NG

- OK >> GO TO 15.  
 NG >> GO TO 17.

## 15. CHECK IGNITION TIMING AGAIN

---

1. Run engine at idle.
2. Check ignition timing with a timing light.

**M/T: 7 ± 5° BTDC**

**A/T: 18 ± 5° BTDC (in "P" or "N" position)**

OK or NG

- OK (With CONSULT-II)>>GO TO 19.  
 OK (Without CONSULT-II)>>GO TO 20.  
 NG >> GO TO 16.



## 16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to [EM-39, "TIMING CHAIN"](#) .

OK or NG

- OK >> GO TO 17.
- NG >> 1. Repair the timing chain installation.
- 2. GO TO 4.

## 17. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-283](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-277](#) .

OK or NG

- OK >> GO TO 18.
- NG >> 1. Repair or replace.
- 2. GO TO 4.

## 18. CHECK ECM FUNCTION

Substitute another known-good ECM to check ECM function. (ECM may be the cause of a incident, but this is the rarely the case.)

>> GO TO 4.

## 19. CHECK HEATED OXYGEN SENSOR 1 SIGNAL

 With CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode.
3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

- 1 time: RICH → LEAN → RICH
- 2 times: RICH → LEAN → RICH → LEAN → RICH

OK or NG

- OK >> INSPECTION END
- NG (Monitor does not fluctuate.)>>GO TO 21.
- NG (Monitor fluctuates less than 5 times.)>>GO TO 28.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
HO2S1 MNTR (B1)	RICH

SEF820Y

## 20. CHECK HEATED OXYGEN SENSOR 1 (BANK 1) SIGNAL

 Without CONSULT-II

1. Stop engine and set ECM to Self-diagnostic mode II (Heated oxygen sensor 1 monitor). Refer to [EC-73, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#) .
2. Start engine and run it at about 2,000 rpm for about 2 minutes under no-load.
3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds.

OK or NG

- OK >> INSPECTION END
- NG (MIL does not come on)>>GO TO 21.
- NG (MIL comes on less than 5 times)>>GO TO 28.

## 21. CHECK HEATED OXYGEN SENSOR 1 HARNESS

1. Turn ignition switch "OFF" and disconnect battery ground cable.
2. Disconnect ECM harness connector.
3. Disconnect heated oxygen sensor 1 harness connector.
4. Check harness continuity between ECM terminal 35 and heated oxygen sensor 1 terminal 1. Refer to Wiring Diagram, [EC-201](#).

**Continuity should exist.**

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 22.

NG >> 1. Repair or replace harness between ECM and heated oxygen sensor 1.  
2. GO TO 4.

## 22. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Reconnect ECM harness connector.
2. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#).

>> GO TO 23.

## 23. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-53, "Throttle Valve Closed Position Learning"](#).

>> GO TO 24.

## 24. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-53, "Idle Air Volume Learning"](#).

**Is "Idle Air Volume Learning" carried out successfully?**

Yes or No

Yes (With CONSULT-II)>>GO TO 25.

Yes (Without CONSULT-II)>>GO TO 26.

No >> 1. Follow the instruction of "Idle Air Volume Learning".  
2. GO TO 4.

## 25. CHECK "CO"%

 **With CONSULT-II**

1. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
2. Turn ignition switch "OFF", wait at least 10 seconds and then turn "ON".
3. Select "ENG COOLANT TEMP" in "ACTIVE TEST" mode.
4. Set "ENG COOLANT TEMP" to 5°C (41°F) by touching "DWN" and "Qd".
5. Start engine and rev it (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.
6. Check "CO"%.

**Idle CO: 3 – 11% and engine runs smoothly.**

OK or NG

OK >> GO TO 28.

NG >> GO TO 27.

ACTIVE TEST	
ENG COOLANT TEMP	XXX °C
MONITOR	
ENG SPEED	XXX rpm
INJ PULSE-B1	XXX msec
IGN TIMING	XXX BTDC

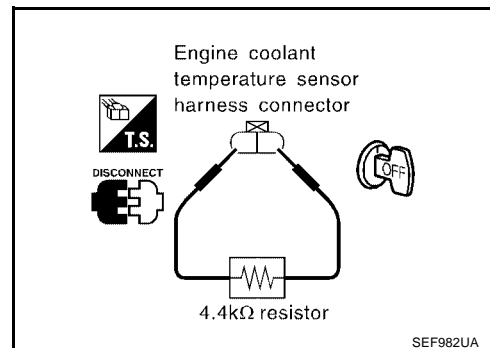
SEF172Y

**26. CHECK "CO"%****⊗ Without CONSULT-II**

1. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge.
2. Turn ignition switch "OFF".
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect a resistor (4.4 kΩ) between terminals of engine coolant temperature sensor harness connector.
5. Start engine and rev it (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.
6. Check "CO"%.

**Idle CO: 3 – 11% and engine runs smoothly.**

7. After checking "CO"%, turn ignition switch "OFF", disconnect the resistor from the terminals of engine coolant temperature sensor harness connector, and then connect engine coolant temperature sensor harness connector to engine coolant temperature sensor.

**OK or NG**

- OK >> GO TO 28.  
 NG >> GO TO 27.

**27. RECONNECT HEATED OXYGEN SENSOR 1 HARNESS CONNECTOR**

1. Turn ignition switch "OFF".
2. Reconnect heated oxygen sensor 1 harness connector.

>> GO TO 31.

**28. REPLACE HEATED OXYGEN SENSOR 1**

1. Stop engine.
2. Replace heated oxygen sensor 1 on the malfunctioning bank.

With CONSULT-II>>GO TO 29.  
 Without CONSULT-II>>GO TO 30.

**29. CHECK HEATED OXYGEN SENSOR 1 SIGNAL****Ⓜ With CONSULT-II**

1. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
2. See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode.
3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

**1 time: RICH → LEAN → RICH**

**2 times: RICH → LEAN → RICH → LEAN → RICH**

**OK or NG**

- OK >> GO TO 4.  
 NG >> GO TO 31.

## 30. CHECK HEATED OXYGEN SENSOR 1 SIGNAL

### ⊗ Without CONSULT-II

1. Set ECM to Self-diagnostic mode II (Heated oxygen sensor 1 monitor). Refer to [EC-73, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#) .
2. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds.

#### OK or NG

- OK >> GO TO 4.  
 NG >> GO TO 31.

## 31. DETECT MALFUNCTIONING PART

Check the following.

- Check fuel pressure regulator and repair or replace if necessary. Refer to [EC-56, "Fuel Pressure Check"](#) .
- Check mass air flow sensor and its circuit, and repair or replace if necessary. Refer to [EC-163](#) , [EC-171](#) and [EC-379](#) .
- Check injector and its circuit, and repair or replace if necessary. Refer to [EC-547](#) .
- Check engine coolant temperature sensor and its circuit, and repair or replace if necessary. Refer to [EC-181](#) and [EC-193](#) .

#### OK or NG

- OK >> GO TO 33.  
 NG >> 1. Repair or replace.  
 2. GO TO 32.

## 32. ERASE UNNECESSARY DTC

After this inspection, unnecessary DTC might be displayed.

Erase the stored memory in ECM and TCM. Refer to [EC-71, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) and [AT-40, "HOW TO ERASE DTC"](#) .

>> GO TO 4.

## 33. CHECK ECM FUNCTION

Substitute another known-good ECM to check ECM function. (ECM may be the cause of a problem, but this is the rarely the case.)

>> GO TO 4.

## Accelerator Pedal Released Position Learning DESCRIPTION

UBS006E7

“Accelerator Pedal Released Position Learning” is an operation to learn the fully released position of the accelerator pedal by monitoring the accelerator pedal position sensor output signal. It must be performed each time harness connector of accelerator pedal position sensor or ECM is disconnected.

### OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch “ON” and wait at least 2 seconds.
3. Turn ignition switch “OFF” wait at least 10 seconds.
4. Turn ignition switch “ON” and wait at least 2 seconds.
5. Turn ignition switch “OFF” wait at least 10 seconds.

## Throttle Valve Closed Position Learning

UBS006E8

### DESCRIPTION

“Throttle Valve Closed Position Learning” is an operation to learn the fully closed position of the throttle valve by monitoring the throttle position sensor output signal. It must be performed each time harness connector of electric throttle control actuator or ECM is disconnected.

### OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch “ON”.
3. Turn ignition switch “OFF” wait at least 10 seconds.  
Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

## Idle Air Volume Learning

UBS006E9

### DESCRIPTION

“Idle Air Volume Learning” is an operation to learn the idle air volume that keeps each engine within the specific range. It must be performed under any of the following conditions:

- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

### PREPARATION

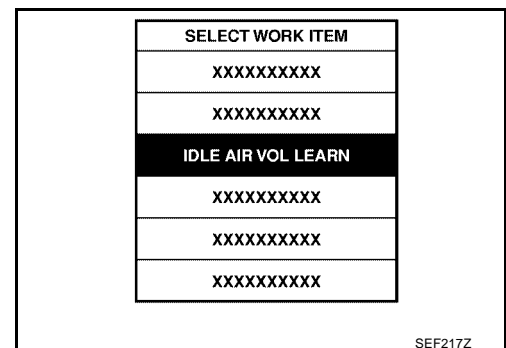
Before performing “Idle Air Volume Learning”, make sure that all of the following conditions are satisfied. Learning will be cancelled if any of the following conditions are missed for even a moment.

- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 100°C (158 - 212°F)
- PNP switch: ON
- Electric load switch: OFF  
(Air conditioner, headlamp, rear window defogger)  
**On models with daytime light systems, set lighting switch to the 1st position to light only small lamps.**
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up  
For models with CONSULT-II, drive vehicle until “FLUID TEMP SE” in “DATA MONITOR” mode of “A/T” system indicates less than 0.9V.  
For models without CONSULT-II, drive vehicle for 10 minutes.

### OPERATION PROCEDURE

#### Ⓟ With CONSULT-II

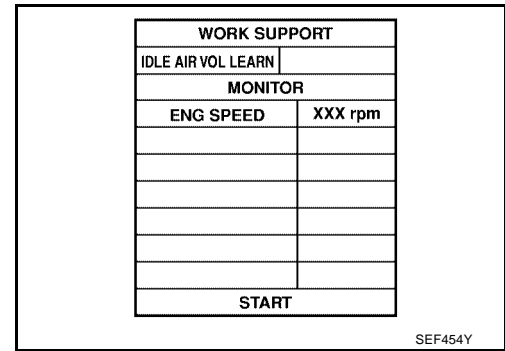
1. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .
2. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic “PREPARATION” (previously mentioned) are in good order.
5. Select “IDLE AIR VOL LEARN” in “WORK SUPPORT” mode.



# BASIC SERVICE PROCEDURE

[QG18DE (ULEV)]

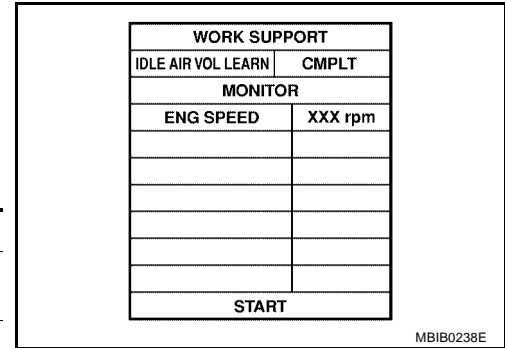
6. Touch "START" and wait 20 seconds.



7. Make sure that "CMPLT" is displayed on CONSULT-II screen. If "CMPLT" is not displayed, "Idle Air Volume Learning" will not be carried out successfully. In this case, find the cause of the incident by referring to the "Diagnostic Procedure" below.

8. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.

ITEM	SPECIFICATION
Idle speed	MT: 650±50 rpm AT: 800±50 rpm (in "P" or "N" position)
Ignition timing	MT: 7±5° BTDC AT: 18±5° BTDC (in "P" or "N" position)

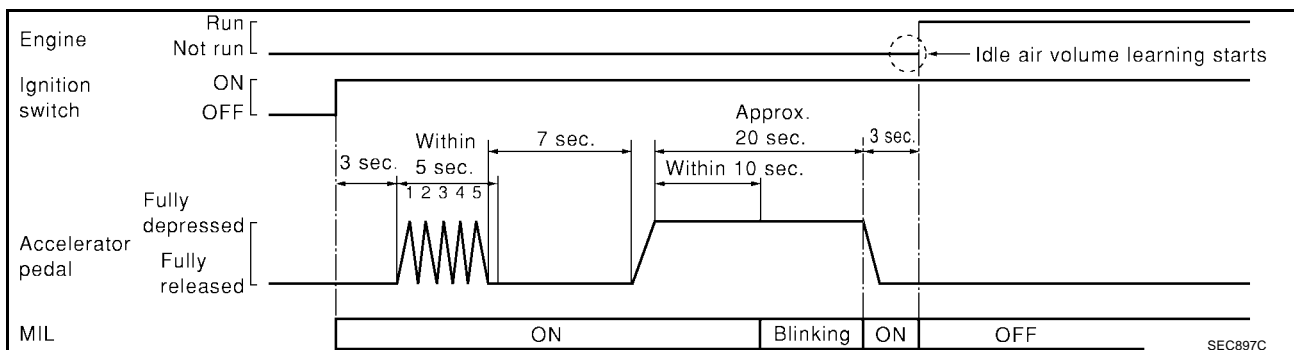


## ⊗ Without CONSULT-II

### NOTE:

- It is better to count the time accurately with a clock.
- It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.

1. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .
2. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic "PREPARATION" (previously mentioned) are in good order.
5. Turn ignition switch "OFF" and wait at least 10 seconds.
6. Confirm that accelerator pedal is fully released, turn ignition switch "ON" and wait 3 seconds.
7. Repeat the following procedure quickly five times within 5 seconds.
  - a. Fully depress the accelerator pedal.
  - b. Fully release the accelerator pedal.
8. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MIL stops blinking and turned ON.
9. Fully release the accelerator pedal within 3 seconds after the MIL goes off.
10. Start engine and let it idle.
11. Wait 20 seconds.



12. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.

ITEM	SPECIFICATION
Idle speed	MT: 650±50 rpm AT: 800±50 rpm (in "P" or "N" position)
Ignition timing	MT: 7±5° BTDC AT: 18±5° BTDC (in "P" or "N" position)

13. If idle speed and ignition timing are not within the specification, the result will be incomplete. In this case, find the cause of the incident by referring to the "DIAGNOSTIC PROCEDURE" below.

## DIAGNOSTIC PROCEDURE

If idle air volume learning cannot be performed successfully, proceed as follows:

1. Check that throttle valve is fully closed.
2. Check PCV valve operation.
3. Check that downstream of throttle valve is free from air leakage.
4. When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.  
It is useful to perform [EC-133. "TROUBLE DIAGNOSIS - SPECIFICATION VALUE"](#) .
5. If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform "Idle air volume learning" all over again:
  - Engine stalls.
  - Erroneous idle.

A  
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## Fuel Pressure Check FUEL PRESSURE RELEASE

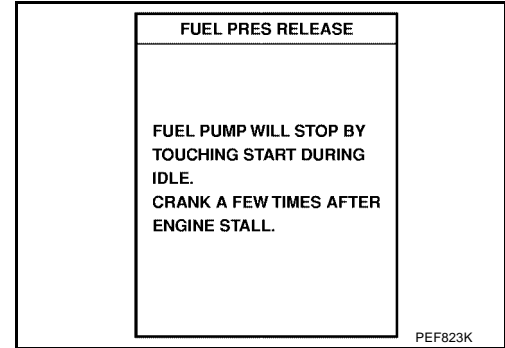
Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.

### NOTE:

Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because B15 models do not have fuel return system.

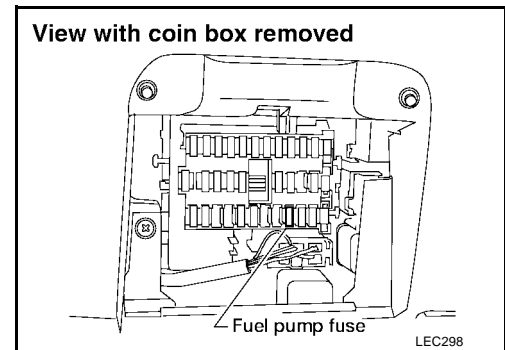
#### ④ With CONSULT-II

1. Turn ignition switch "ON".
2. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT-II.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.



#### ⊗ Without CONSULT-II

1. Remove fuel pump fuse.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF.



## FUEL PRESSURE CHECK

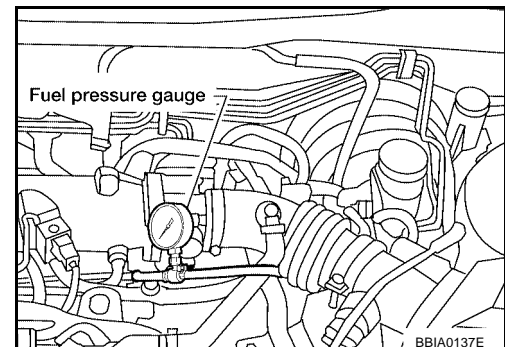
### NOTE:

- When reconnecting fuel line, always use new clamps.
- Make sure that clamp screw does not contact adjacent parts.
- Use a torque driver to tighten clamps.
- Use Pressure Gauge to check fuel pressure.
- Do not perform fuel pressure check with electrical systems operating (i.e. lights, rear defogger, A/C switch, etc.). Fuel pressure gauge may indicate false readings due to varying engine loads and changes in manifold vacuum.

1. Release fuel pressure to zero. Refer to [EC-56](#).
2. Install the fuel pressure gauge into the fuel line as shown in the figure.
3. Turn ignition switch "ON", and check for fuel leakage.
4. Start engine and check for fuel leakage.
5. Read the indication of fuel pressure gauge.

**At idling: Approximately 350 kPa (3.57 kg/cm<sup>2</sup> , 51 psi)**

6. If result is unsatisfactory, go to next step.
7. Check the following.
  - Fuel hoses and fuel tubes for clogging
  - Fuel filter for clogging





- 
- Fuel pump
  - Fuel pressure regulator for clogging
- If OK, replace fuel pressure regulator.  
If NG, repair or replace.

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## ON BOARD DIAGNOSTIC (OBD) SYSTEM

PFP:00028

### Introduction

UBS001CK

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information	SAE Mode
Diagnostic Trouble Code (DTC)	Mode 3 of SAE J1979
Freeze Frame data	Mode 2 of SAE J1979
System Readiness Test (SRT) code	Mode 1 of SAE J1979
1st Trip Diagnostic Trouble Code (1st Trip DTC)	Mode 7 of SAE J1979
1st Trip Freeze Frame data	
Test values and Test limits	Mode 6 of SAE J1979
Calibration ID	Mode 9 of SAE J1979

The above information can be checked using procedures listed in the table below.

X: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT code	Test value
CONSULT-II	X	X	X	X	X	—
GST	X	X*1	X	—	X	X
ECM	X	X*2	—	—	—	—

\*1: 1st trip DTCs for self-diagnoses concerning SRT items cannot be shown on the GST display.

\*2: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other.

The malfunction indicator lamp (MIL) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to [EC-87](#).)

### Two Trip Detection Logic

UBS001CL

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MIL will not light up at this stage. <1st trip>

If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MIL lights up. The MIL lights up at the same time when the DTC is stored. <2nd trip> The “trip” in the “Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation. Specific on board diagnostic items will cause the ECM to light up or blink the MIL, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

X: Applicable —: Not applicable

Items	MIL				DTC		1st trip DTC	
	1st trip		2nd trip		1st trip displaying	2nd trip displaying	1st trip displaying	2nd trip displaying
	Blinking	Lighting up	Blinking	Lighting up				
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	X	—	—	—	X	—	X	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 has been detected	—	—	X	—	—	X	—	—
One trip detection diagnoses (Refer to <a href="#">EC-21</a> .)	—	X	—	—	X	—	—	—
Except above	—	—	—	X	—	X	X	—

When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting MIL up when there is NG on engine control system.

Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5-trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating fail-safe function.

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QG18DE (ULEV)]

The fail-safe function also operates when above diagnoses except MIL circuit and demands the driver to repair the trouble.

Engine operating in fail-safe mode

Engine speed will not rise more than 2,500 rpm due to the fuel cut.

## Emission-related Diagnostic Information EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

UBS001CM

X: Applicable —: Not applicable

Items (CONSULT-II screen terms)	DTC*1 *2		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST	ECM				
CAN COMM CIRCUIT	U1000	1000*4	—	—	—	<a href="#">EC-145</a>
CAN COMM CIRCUIT	U1001	1001*4	—	—	X	<a href="#">EC-145</a>
<b>NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.</b>	<b>P0000</b>	0000	—	—	—	—
INT/V TIM CONT-B1	P0011	0011	—	—	X	<a href="#">EC-148</a>
HO2S1 HTR (B1)	P0031	0031	X	X	X*2	<a href="#">EC-151</a>
HO2S1 HTR (B1)	P0032	0032	X	X	X*2	<a href="#">EC-151</a>
HO2S2 HTR (B1)	P0037	0037	X	X	X*2	<a href="#">EC-157</a>
HO2S2 HTR (B1)	P0038	0038	X	X	X*2	<a href="#">EC-157</a>
MAF SEN/CIRCUIT	P0101	0101	—	—	—	<a href="#">EC-163</a>
MAF SEN/CIRCUIT	P0102	0102	—	—	—	<a href="#">EC-171</a>
MAF SEN/CIRCUIT	P0103	0103	—	—	—	<a href="#">EC-171</a>
IAT SEN/CIRCUIT	P0112	0112	—	—	X	<a href="#">EC-177</a>
IAT SEN/CIRCUIT	P0113	0113	—	—	X	<a href="#">EC-177</a>
ECT SEN/CIRCUIT	P0117	0117	—	—	—	<a href="#">EC-181</a>
ECT SEN/CIRCUIT	P0118	0118	—	—	—	<a href="#">EC-181</a>
TP SEN 2/CIRC	P0122	0122	—	—	—	<a href="#">EC-186</a>
TP SEN 2/CIRC	P0123	0123	—	—	—	<a href="#">EC-186</a>
ECT SENSOR	P0125	0125	—	—	—	<a href="#">EC-193</a>
IAT SENSOR	P0127	0127	—	—	X	<a href="#">EC-196</a>
THERMSTAT FNCTN	P0128	0128	—	—	X	<a href="#">EC-199</a>
HO2S1 (B1)	P0132	0132	X	X	X*3	<a href="#">EC-201</a>
HO2S1 (B1)	P0133	0133	X	X	X*3	<a href="#">EC-207</a>
HO2S1 (B1)	P0134	0134	X	X	X*3	<a href="#">EC-216</a>
HO2S2 (B1)	P0138	0138	X	X	X*3	<a href="#">EC-223</a>
HO2S2 (B1)	P0139	0139	X	X	X*3	<a href="#">EC-230</a>
FUEL SYS-LEAN-B1	P0171	0171	—	—	X	<a href="#">EC-238</a>
FUEL SYS-RICH-B1	P0172	0172	—	—	X	<a href="#">EC-245</a>
FTT SENSOR	P0181	0181	—	—	X	<a href="#">EC-251</a>
FTT SEN/CIRCUIT	P0182	0182	—	—	X	<a href="#">EC-256</a>
FTT SEN/CIRCUIT	P0183	0183	—	—	X	<a href="#">EC-256</a>
TP SEN 1/CIRC	P0222	0222	—	—	—	<a href="#">EC-260</a>
TP SEN 1/CIRC	P0223	0223	—	—	—	<a href="#">EC-260</a>
MULTI CYL MISFIRE	P0300	0300	—	—	X	<a href="#">EC-267</a>
CYL1 MISFIRE	P0301	0301	—	—	X	<a href="#">EC-267</a>
CYL2 MISFIRE	P0302	0302	—	—	X	<a href="#">EC-267</a>

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

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Items (CONSULT-II screen terms)	DTC*1 *2		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST	ECM				
CYL3 MISFIRE	P0303	0303	—	—	X	<a href="#">EC-267</a>
CYL4 MISFIRE	P0304	0304	—	—	X	<a href="#">EC-267</a>
KNOCK SEN/CIRC-B1	P0327	0327	—	—	X	<a href="#">EC-273</a>
KNOCK SEN/CIRC-B1	P0328	0328	—	—	X	<a href="#">EC-273</a>
CKP SEN/CIRCUIT	P0335	0335	—	—	X	<a href="#">EC-277</a>
CMP SEN/CIRCUIT	P0340	0340	—	—	X	<a href="#">EC-283</a>
TW CATALYST SYS-B1	P0420	0420	X	X	X*3	<a href="#">EC-289</a>
EVAP PURG FLOW/MON	P0441	0441	X	X	X*3	<a href="#">EC-294</a>
EVAP SMALL LEAK	P0442	0442	X	X	X*3	<a href="#">EC-301</a>
PURG VOLUME CONT/V	P0444	0444	—	—	X	<a href="#">EC-311</a>
PURG VOLUME CONT/V	P0445	0445	—	—	X	<a href="#">EC-311</a>
VENT CONTROL VALVE	P0447	0447	—	—	X	<a href="#">EC-317</a>
EVAP SYS PRES SEN	P0452	0452	—	—	X	<a href="#">EC-324</a>
EVAP SYS PRES SEN	P0453	0453	—	—	X	<a href="#">EC-330</a>
EVAP GROSS LEAK	P0455	0455	—	X	X*3	<a href="#">EC-338</a>
EVAP VERY SML LEAK	P0456	0456	X*4	X	X*3	<a href="#">EC-346</a>
FUEL LEV SEN SLOSH	P0460	0460	—	—	X	<a href="#">EC-354</a>
FUEL LEVEL SENSOR	P0461	0461	—	—	X	<a href="#">EC-356</a>
FUEL LEVL SEN/CIRC	P0462	0462	—	—	X	<a href="#">EC-359</a>
FUEL LEVL SEN/CIRC	P0463	0463	—	—	X	<a href="#">EC-359</a>
VEH SPEED SEN/CIRC	P0500	0500	—	—	X	<a href="#">EC-361</a>
ISC SYSTEM	P0506	0506	—	—	X	<a href="#">EC-363</a>
ISC SYSTEM	P0507	0507	—	—	X	<a href="#">EC-365</a>
PW ST P SEN/CIRC	P0550	0550	—	—	X	<a href="#">EC-367</a>
ECM	P0605	0605	—	—	X	<a href="#">EC-372</a>
PNP SW/CIRC	P0705	0705	—	—	X	<a href="#">AT-116</a>
ATF TEMP SEN/CIRC	P0710	0710	—	—	X	<a href="#">AT-121</a>
VEH SPD SEN/CIR AT	P0720	0720	—	—	X	<a href="#">AT-127</a>
ENGINE SPEED SIG	P0725	0725	—	—	X	<a href="#">AT-132</a>
A/T 1ST GR FNCTN	P0731	0731	—	—	X	<a href="#">AT-136</a>
A/T 2ND GR FNCTN	P0732	0732	—	—	X	<a href="#">AT-141</a>
A/T 3RD GR FNCTN	P0733	0733	—	—	X	<a href="#">AT-146</a>
A/T 4TH GR FNCTN	P0734	0734	—	—	X	<a href="#">AT-151</a>
TCC SOLENOID/CIRC	P0740	0740	—	—	X	<a href="#">AT-160</a>
A/T TCC S/V FNCTN	P0744	0744	—	—	X	<a href="#">AT-164</a>
L/PRESS SOL/CIRC	P0745	0745	—	—	X	<a href="#">AT-174</a>
SFT SOL A/CIRC	P0750	0750	—	—	—	<a href="#">AT-180</a>
SFT SOL B/CIRC	P0755	0755	—	—	—	<a href="#">AT-184</a>
ECM BACK UP/CIRC	P1065	1065	—	—	X	<a href="#">EC-375</a>
MAF SENSOR	P1102	1102	—	—	—	<a href="#">EC-379</a>
INT/V TIM V/CIR-B1	P1111	1111	—	—	X	<a href="#">EC-385</a>
ETC ACTR	P1121	1121	—	—	X	<a href="#">EC-390</a>

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QG18DE (ULEV)]

Items (CONSULT-II screen terms)	DTC*1 *2		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST	ECM				
ETC FUNCTION/CIRC	P1122	1122	—	—	—	<a href="#">EC-392</a>
ETC MOT PWR	P1124	1124	—	—	—	<a href="#">EC-399</a>
ETC MOT PWR	P1126	1126	—	—	—	<a href="#">EC-399</a>
ETC MOT	P1128	1128	—	—	—	<a href="#">EC-404</a>
HO2S1 (B1)	P1143	1143	X	X	X*3	<a href="#">EC-409</a>
HO2S1 (B1)	P1144	1144	X	X	X*3	<a href="#">EC-415</a>
HO2S2 (B1)	P1146	1146	X	X	X*3	<a href="#">EC-421</a>
HO2S2 (B1)	P1147	1147	X	X	X*3	<a href="#">EC-428</a>
CLOSED LOOP-B1	P1148	1148	—	—	—	<a href="#">EC-436</a>
ENG OVER TEMP	P1217	1217	—	—	—	<a href="#">EC-438</a>
CTP LEARNING	P1225	1225	—	—	X	<a href="#">EC-451</a>
CTP LEARNING	P1226	1226	—	—	X	<a href="#">EC-453</a>
PURG VOLUME CONT/V	P1444	1444	—	—	X	<a href="#">EC-460</a>
VENT CONTROL VALVE	P1446	1446	—	—	X	<a href="#">EC-468</a>
ASCD SW	P1564	1564	—	—	—	<a href="#">EC-474</a>
ASCD BRAKE SW	P1572	1572	—	—	—	<a href="#">EC-481</a>
ASCD VHL SPD SEN	P1574	1574	—	—	—	<a href="#">EC-491</a>
TP SEN/CIRC A/T	P1705	1705	—	—	—	<a href="#">AT-188</a>
P-N POS SW/CIRCUIT	P1706	1706	—	—	X	<a href="#">EC-493</a>
O/R CLTCH SOL/CIRC	P1760	1760	—	—	X	<a href="#">AT-194</a>
BRAKE SW/CIRCUIT	P1805	1805	—	—	X	<a href="#">EC-497</a>
APP SEN 1/CIRC	P2122	2122	—	—	—	<a href="#">EC-503</a>
APP SEN 1/CIRC	P2123	2123	—	—	—	<a href="#">EC-503</a>
APP SEN 2/CIRC	P2127	2127	—	—	—	<a href="#">EC-511</a>
APP SEN 2/CIRC	P2128	2128	—	—	—	<a href="#">EC-511</a>
TP SENSOR	P2135	2135	—	—	—	<a href="#">EC-518</a>
APP SENSOR	P2138	2138	—	—	—	<a href="#">EC-525</a>

\*1: 1st trip DTC No. is the same as DTC No.

\*2: These numbers are prescribed by SAE J2012

\*3: These are not displayed with GST.

\*4: SRT code will not be set if the self-diagnostic result is NG.

## DTC AND 1ST TRIP DTC

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not reoccur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MIL will not light up (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MIL lights up. In other words, the DTC is stored in the ECM memory and the MIL lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored. For malfunctions that blink or light up the MIL during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.

Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in [EC-71, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).

For malfunctions in which 1st trip DTCs are displayed, refer to [EC-59](#) . These items are required by legal regulations to continuously monitor the system/component. In addition, the items monitored non-continuously are also displayed on CONSULT-II.

1st trip DTC is specified in Mode 7 of SAE J1979. 1st trip DTC detection occurs without lighting up the MIL and therefore does not warn the driver of a malfunction. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in “Work Flow” procedure Step II, refer to [EC-82](#) . Then perform “DTC Confirmation Procedure” or “Overall Function Check” to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

## How to Read DTC and 1st Trip DTC

DTC and 1st trip DTC can be read by the following methods.

 **With CONSULT-II**

 **With GST**

CONSULT-II or GST (Generic Scan Tool) Examples: P0340, P1148, P1706, etc.  
These DTCs are prescribed by SAE J2012.

(CONSULT-II also displays the malfunctioning component or system.)

- **1st trip DTC No. is the same as DTC No.**
- **Output of a DTC indicates a malfunction. However, GST does not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-II can identify malfunction status as shown below. Therefore, using CONSULT-II (if available) is recommended.**

A sample of CONSULT-II display for DTC and 1st trip DTC is shown below. DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode of CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

If the DTC is being detected currently, the time data will be “0”.

If a 1st trip DTC is stored in the ECM, the time data will be “[1t]”.

DTC display	SELF DIAG RESULTS		1st trip DTC display	SELF DIAG RESULTS	
	DTC RESULTS			DTC RESULTS	
	MAF SEN/CIRCUIT [P0101]	0		MAF SEN/CIRCUIT [P0101]	1t

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## FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed, throttle valve operating angle, base fuel schedule and intake air temperature at the moment a malfunction is detected.

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For details, see [EC-117](#) .

Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0304 Fuel Injection System Function — DTC: P0171, P0172
2		Except the above items (Includes A/T related items)
3	1st trip freeze frame data	

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored in the 2nd trip. After that when the misfire (Priority: 1) is detected in another trip, the freeze frame data will be updated from the EGR malfunction to the misfire. The 1st trip freeze frame data is updated each time a different malfunction is detected. There is no priority for 1st trip freeze frame data. However, once freeze frame data is stored in the ECM memory, 1st trip freeze data is no longer stored (because only one freeze frame data or 1st trip freeze frame data can be stored in the ECM). If freeze frame data is stored in the ECM memory and freeze frame data with the same priority occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in [EC-71, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).

### SYSTEM READINESS TEST (SRT) CODE

System Readiness Test (SRT) code is specified in Mode 1 of SAE J1979.

As part of an enhanced emissions test for Inspection & Maintenance (I/M), certain states require the status of SRT be used to indicate whether the ECM has completed self-diagnosis of major emission systems and components. Completion must be verified in order for the emissions inspection to proceed.

If a vehicle is rejected for a State emissions inspection due to one or more SRT items indicating "INCMP", use the information in this Service Manual to set the SRT to "CMPLT".

In most cases the ECM will automatically complete its self-diagnosis cycle during normal usage, and the SRT status will indicate "CMPLT" for each application system. Once set as "CMPLT", the SRT status remains "CMPLT" until the self-diagnosis memory is erased.

Occasionally, certain portions of the self-diagnostic test may not be completed as a result of the customer's normal driving pattern; the SRT will indicate "INCMP" for these items.

#### NOTE:

The SRT will also indicate "INCMP" if the self-diagnosis memory is erased for any reason or if the ECM memory power supply is interrupted for several hours.

If, during the state emissions inspection, the SRT indicates "CMPLT" for all test items, the inspector will continue with the emissions test. However, if the SRT indicates "INCMP" for one or more of the SRT items the vehicle is returned to the customer untested.

#### NOTE:

If MIL is "ON" during the state emissions inspection, the vehicle is also returned to the customer untested even though the SRT indicates "CMPLT" for all test items. Therefore, it is important to check SRT ("CMPLT") and DTC (No DTCs) before the inspection.

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# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QG18DE (ULEV)]

## SRT Item

The table below shows required self-diagnostic items to set the SRT to "CMPLT".

SRT item (CONSULT-II indication)	Performance Priority*	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	2	Three way catalyst function	P0420
EVAPORATIVE SYSTEM	1	EVAP control system	P0442
	2	EVAP control system	P0456
		EVAP control system purge flow monitoring	P0441
HO2S	2	Heated oxygen sensor 1	P0132
		Heated oxygen sensor 1	P0133
		Heated oxygen sensor 1	P0134
		Heated oxygen sensor 1	P1143
		Heated oxygen sensor 1	P1144
		Heated oxygen sensor 2	P0138
		Heated oxygen sensor 2	P0139
		Heated oxygen sensor 2	P1146
		Heated oxygen sensor 2	P1147
HO2S HTR	2	Heated oxygen sensor 1 heater	P0031, P0032
		Heated oxygen sensor 2 heater	P0037, P0038

\*: If completion of several SRTs is required, perform driving patterns (DTC confirmation procedure), one by one based on the priority for models with CONSULT-II.



## SRT Set Timing

SRT is set as "CMPLT" after self-diagnosis has been performed one or more times. Completion of SRT is done regardless of whether the result is OK or NG. The set timing is different between OK and NG results and is shown in the table below.

Self-diagnosis result		Example						
		Diagnosis	Ignition cycle					
			← ON →	OFF	← ON →	OFF	← ON →	OFF
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)		
		P0402	OK (1)	— (1)	— (1)	OK (2)		
		P1402	OK (1)	OK (2)	— (2)	— (2)		
		SRT of EGR	"CMPLT"	"CMPLT"	"CMPLT"	"CMPLT"		
	Case 2	P0400	OK (1)	— (1)	— (1)	— (1)		
		P0402	— (0)	— (0)	OK (1)	— (1)		
		P1402	OK (1)	OK (2)	— (2)	— (2)		
		SRT of EGR	"INCMP"	"INCMP"	"CMPLT"	"CMPLT"		
NG exists	Case 3	P0400	OK	OK	—	—		
		P0402	—	—	—	—		
		P1402	NG	—	NG	NG (Consecutive NG)		
		(1st trip) DTC	1st trip DTC	—	1st trip DTC	DTC (= MIL "ON")		
		SRT of EGR	"INCMP"	"INCMP"	"INCMP"	"CMPLT"		

OK: Self-diagnosis is carried out and the result is OK.

NG: Self-diagnosis is carried out and the result is NG.

—: Self-diagnosis is not carried out.

When all SRT related self-diagnoses showed OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate "CMPLT". → Case 1 above

When all SRT related self-diagnoses showed OK results through several different cycles, the SRT will indicate "CMPLT" at the time the respective self-diagnoses have at least one OK result. → Case 2 above

If one or more SRT related self-diagnoses showed NG results in 2 consecutive cycles, the SRT will also indicate "CMPLT". → Case 3 above

The table above shows that the minimum number of cycles for setting SRT as "INCMP" is one (1) for each self-diagnosis (Case 1 & 2) or two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary of each self-diagnosis to be executed twice (Case 3) for the following reasons:

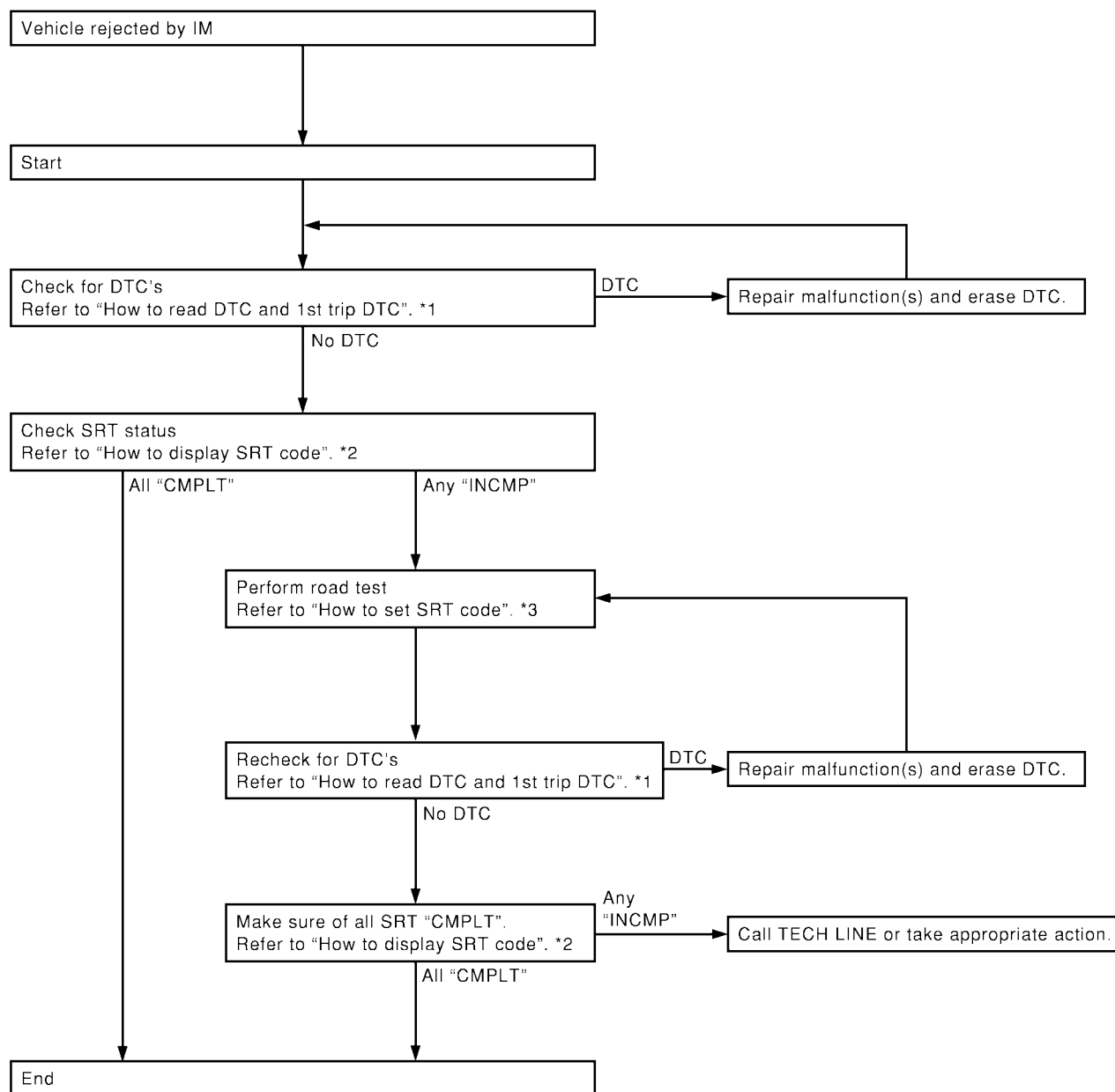
- The SRT will indicate "CMPLT" at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires "CMPLT" of the SRT only with OK self-diagnosis results.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to "CMPLT" of SRT, the self-diagnosis memory must be erased from ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate "INCMP".

**NOTE:**

SRT can be set as "CMPLT" together with the DTC (s). Therefore, DTC check must always be carried out prior to the state emission inspection even though the SRT indicates "CMPLT".

## SRT Service Procedure

If a vehicle has failed the state emissions inspection due to one or more SRT items indicating "INCMP", review the flowchart diagnostic sequence on the next page.



\*1 [EC-62](#)

\*2 [EC-66](#)

\*3 [EC-67](#)

SEF170Z

## How to Display SRT Code

### With CONSULT-II

Selecting "SRT STATUS" in "DTC CONFIRMATION" mode with CONSULT-II.

For items whose SRT codes are set, a "CMPLT" is displayed on the CONSULT-II screen; for items whose SRT codes are not set, "INCMP" is displayed.

SRT STATUS	
CATALYST	CMPLT
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	CMPLT

SEF935Z

### **With GST**

Selecting Mode 1 with GST (Generic Scan Tool)

A sample of CONSULT-II display for SRT code is shown below.

“INCMP” means the self-diagnosis is incomplete and SRT is not set. “CMPLT” means the self-diagnosis is complete and SRT is set.

### **How to Set SRT Code**

To set all SRT codes, self-diagnosis for the items indicated above must be performed one or more times. Each diagnosis may require a long period of actual driving under various conditions.

### **With CONSULT-II**

Perform corresponding DTC Confirmation Procedure one by one based on “Performance Priority” in the table on [EC-64](#).

### **Without CONSULT-II**

The most efficient driving pattern in which SRT codes can be properly set is explained on the next page. The driving pattern should be performed one or more times to set all SRT codes.

A

EC

C

D

E

F

G

H

I

J

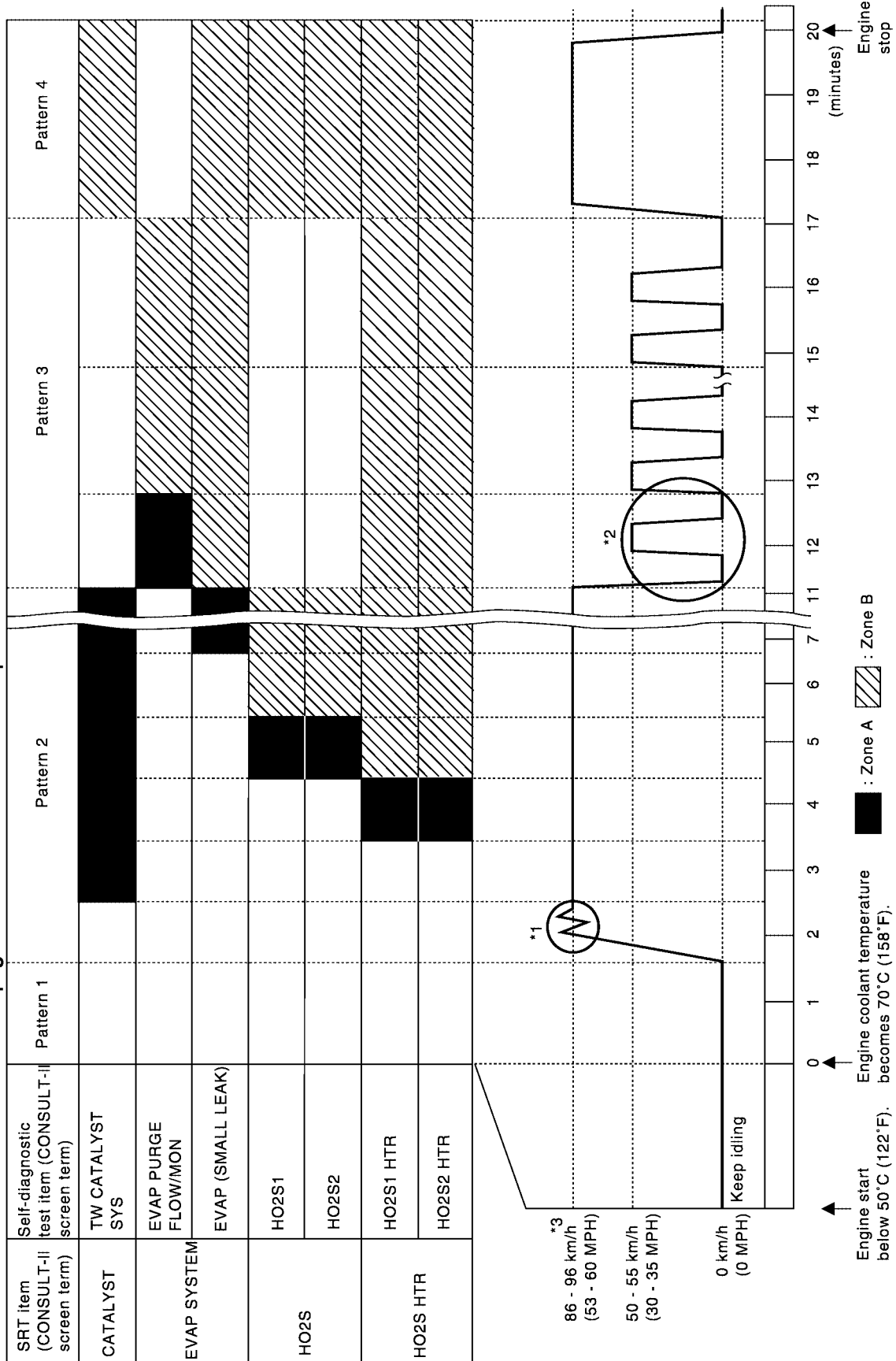
K

L

M

## Driving Pattern

**Note: Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws. Refer to next page for more information and explanation of chart.**



PBIB1053E

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QG18DE (ULEV)]

- The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.  
Zone A refers to the range where the time required, for the diagnosis under normal conditions\*, is the shortest.  
Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

\*: Normal conditions refer to the following:

- Sea level
- Flat road
- Ambient air temperature: 20 - 30°C (68 - 86°F)
- Diagnosis is performed as quickly as possible under normal conditions.  
Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

- **The engine is started at the engine coolant temperature of -10 to 35°C (14 to 95°F) (where the voltage between the ECM terminals 73 and ground is 3.0 - 4.3V).**
- **The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminals 73 and ground is lower than 1.4V).**
- **The engine is started at the fuel tank temperature of warmer than 0°C (32°F) (where the voltage between the ECM terminal 107 and ground is less than 4.1V).**

Pattern 2:

- When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

Pattern 3:

- The driving pattern outlined in \*2 must be repeated at least 3 times.

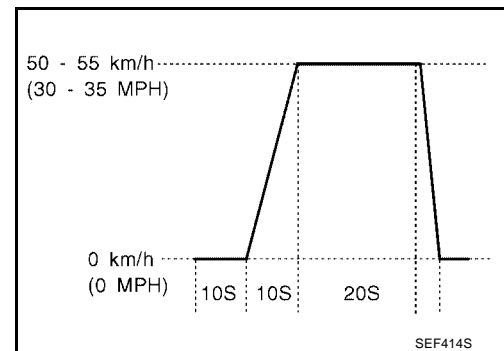
Pattern 4:

- Tests are performed after the engine has been operated for at least 17 minutes.
- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

\*1: Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH), then release the accelerator pedal and keep it released for more than 10 seconds. Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH) again.

\*2: Operate the vehicle in the following driving pattern.

1. Decelerate vehicle to 0 km/h (0 MPH) and let engine idle.
2. Repeat driving pattern shown below at least 10 times.  
- **During acceleration, hold the accelerator pedal as steady as possible.**



\*3: Checking the vehicle speed with GST is advised.

## Suggested Transmission Gear Position for A/T Models

Set the selector lever in the "D" position with the overdrive switch turned ON.

## Suggested upshift speeds for M/T models

Shown below are suggested vehicle speeds for shifting into a higher gear. These suggestions relate to fuel economy and vehicle performance. Actual upshift speeds will vary according to road conditions, the weather and individual driving habits.

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QG18DE (ULEV)]

	For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft)]:	For quick acceleration in low altitude areas and high altitude areas [over 1,219 m (4,000 ft)]:
Gear change	ACCEL shift point km/h (MPH)	km/h (MPH)
1st to 2nd	24 (15)	25 (15)
2nd to 3rd	40 (25)	40 (25)
3rd to 4th	65 (40)	65 (40)
4th to 5th	75 (45)	75 (45)

### Suggested Maximum Speed in Each Gear

Downshift to a lower gear if the engine is not running smoothly, or if you need to accelerate.

Do not exceed the maximum suggested speed (shown below) in any gear. For level road driving, use the highest gear suggested for that speed. Always observe posted speed limits and drive according to the road conditions to ensure safe operation. Do not over-rev the engine when shifting to a lower gear as it may cause engine damage or loss of vehicle control.

Gear	km/h (MPH)
1st	48 (30)
2nd	84 (52)
3rd	128 (80)
4th	—
5th	—

### TEST VALUE AND TEST LIMIT (GST ONLY — NOT APPLICABLE TO CONSULT-II)

The following is the information specified in Mode 6 of SAE J1979.

The test value is a parameter used to determine whether a system/circuit diagnostic test is “OK” or “NG” while being monitored by the ECM during self-diagnosis. The test limit is a reference value which is specified as the maximum or minimum value and is compared with the test value being monitored.

Items for which these data (test value and test limit) are displayed are the same as SRT code items (13 test items).

These data (test value and test limit) are specified by Test ID (TID) and Component ID (CID) and can be displayed on the GST screen.

X: Applicable —: Not applicable

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
CATALYST	Three way catalyst function	02H	81H	Min.	X
EVAP SYSTEM	EVAP control system (Small leak)	05H	03H	Max.	X
	EVAP control system purge flow monitoring	06H	83H	Min.	X
HO2S	Heated oxygen sensor 1	09H	04H	Max.	X
		0AH	84H	Min.	X
		0BH	04H	Max.	X
		0CH	04H	Max.	X
	Heated oxygen sensor 2	0DH	04H	Max.	X
		19H	86H	Min.	X
		1AH	86H	Min.	X
		1BH	06H	Max.	X
HO2S HTR	Heated oxygen sensor 1 heater	1CH	06H	Max.	X
		29H	08H	Max.	X
	Heated oxygen sensor 2 heater	2AH	88H	Min.	X
		2DH	0AH	Max.	X
		2EH	8AH	Min.	X

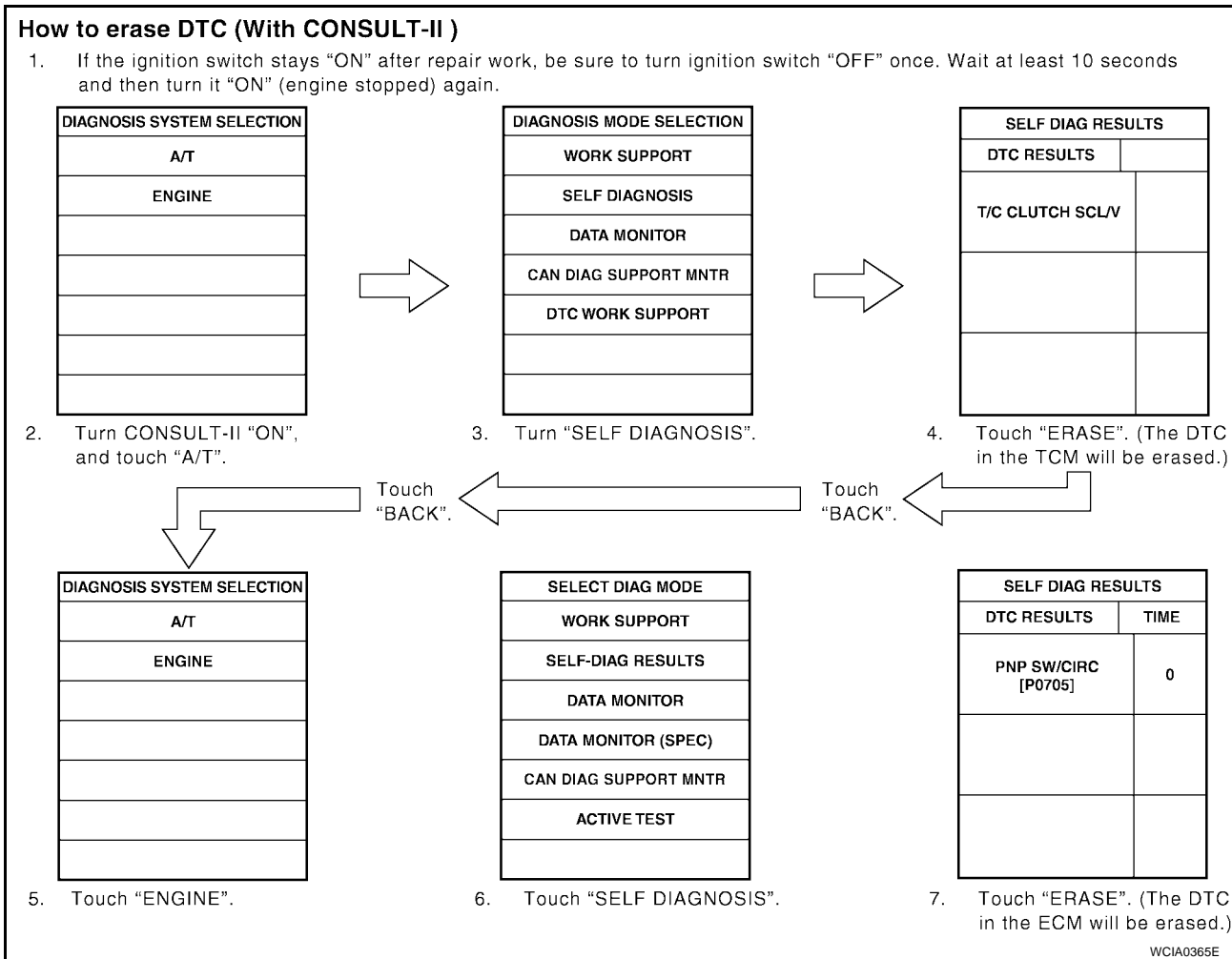
## HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

### How to Erase DTC ( With CONSULT-II)

**NOTE:**

If the DTC is not for A/T related items (see [EC-21](#) ), skip steps 2 through 4.

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
  2. Turn CONSULT-II "ON" and touch "A/T".
  3. Touch "SELF-DIAG RESULTS".
  4. Touch "ERASE". [The DTC in the TCM (Transmission control module) will be erased.] Then touch "BACK" twice.
  5. Touch "ENGINE".
  6. Touch "SELF-DIAG RESULTS".
  7. Touch "ERASE". (The DTC in the ECM will be erased.)
- If DTCs are displayed for both ECM and TCM (Transmission control module), they need to be erased individually from the ECM and TCM (Transmission control module).



### How to Erase DTC ( With GST)

**NOTE:**

If the DTC is not for A/T related items (see [EC-21](#) ), skip step 2.

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
2. Perform "SELF-DIAGNOSTIC PROCEDURE (Without CONSULT-II)" in AT section titled "TROUBLE DIAGNOSIS", "Self-diagnosis". (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)

3. Select Mode 4 with GST (Generic Scan Tool).

**NO TOOLS** **How to Erase DTC ( No Tools)**

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once.
  2. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
  3. Change the diagnostic test mode from Mode II to Mode I by depressing the accelerator pedal. Refer to [EC-73. "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#) .
- **If the battery is disconnected, the emission-related diagnostic information will be lost after approx. 24 hours.**
  - **The following data are cleared when the ECM memory is erased.**
    - Diagnostic trouble codes
    - 1st trip diagnostic trouble codes
    - Freeze frame data
    - 1st trip freeze frame data
    - System readiness test (SRT) codes
    - Test values
    - Others

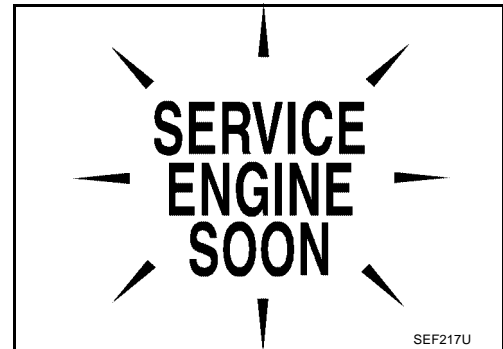
Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

**Malfunction Indicator Lamp (MIL)**  
**DESCRIPTION**

UBS006C3




The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
- If the MIL does not light up, refer to [DI-27. "WARNING LAMPS"](#) .
2. When the engine is started, the MIL should go off.  
If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.



**ON BOARD DIAGNOSTIC SYSTEM FUNCTION**




The on board diagnostic system has the following four functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in "ON" position  Engine stopped 	BULB CHECK	This function checks the MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL circuit.
	Engine running 	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MIL in the 1st trip. <ul style="list-style-type: none"> <li>● "Misfire (Possible three way catalyst damage)"</li> <li>● "One trip detection diagnoses"</li> </ul>



# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QG18DE (ULEV)]

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode II	Ignition switch in "ON" position  Engine stopped 	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.
	Engine running 	HEATED OXYGEN SENSOR 1 MONITOR	This function allows the fuel mixture condition (lean or rich), monitored by heated oxygen sensor 1, to be read.

When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting MIL up when there is NG on engine control system.

Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating fail-safe function.

The fail-safe function also operates when above diagnoses except MIL circuit and demands the driver to repair the trouble.

Engine operating condition in fail-safe mode

Engine speed will not rise more than 2,500 rpm due to the fuel cut

## MIL Flashing without DTC

If the ECM is in Diagnostic Test Mode II, MIL may flash when engine is running. In this case, check ECM diagnostic test mode, [EC-73, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#).

How to switch the diagnostic test (function) modes, and details of the above functions are described later, [EC-73, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#).

The following emission-related diagnostic information is cleared when the ECM memory is erased.

1. Diagnostic trouble codes
2. 1st trip diagnostic trouble codes
3. Freeze frame data
4. 1st trip freeze frame data
5. System readiness test (SRT) codes
6. Test values
7. Others

## HOW TO SWITCH DIAGNOSTIC TEST MODE

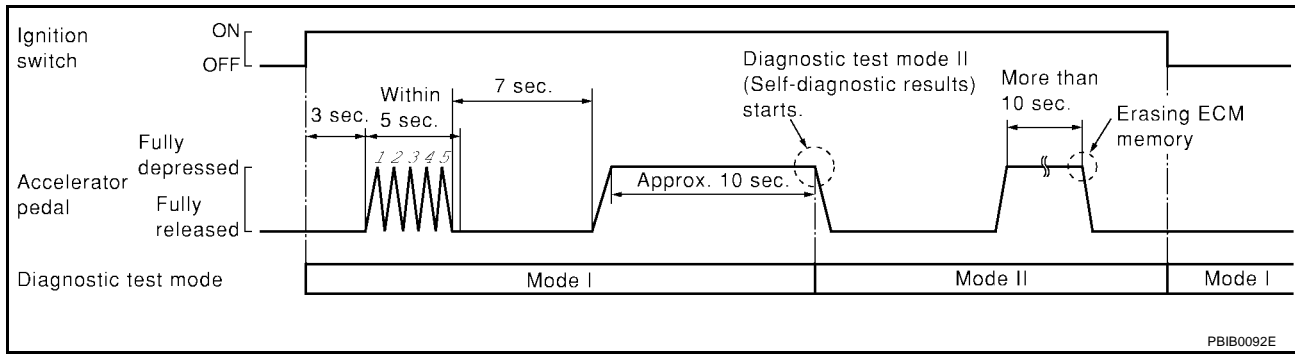
### NOTE:

- It is better to count the time accurately with a clock.
- It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.
- Always ECM returns to Diagnostic Test Mode I after ignition switch is turned "OFF".

### How to Set Diagnostic Test Mode II (Self-diagnostic Results)

1. Confirm that accelerator pedal is fully released, turn ignition switch "ON" and wait 3 seconds.
2. Repeat the following procedure quickly five times within 5 seconds.
  - a. Fully depress the accelerator pedal.
  - b. Fully release the accelerator pedal.
3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MIL starts blinking.
4. Fully release the accelerator pedal.

ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).



### How to Set Diagnostic Test Mode II (Heated Oxygen Sensor 1 Monitor)

1. Set the ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to [EC-73, "How to Set Diagnostic Test Mode II \(Self-diagnostic Results\)"](#) .
2. Start Engine.  
ECM has entered to Diagnostic Test Mode II (Heated oxygen sensor 1 monitor).

### How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to [EC-73, "How to Set Diagnostic Test Mode II \(Self-diagnostic Results\)"](#) .
2. Fully depress the accelerator pedal and keep it for more than 10 seconds.  
The emission-related diagnostic information has been erased from the backup memory in the ECM.
3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

### DIAGNOSTIC TEST MODE I — BULB CHECK

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to [DI-27, "WARNING LAMPS"](#) .

### DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

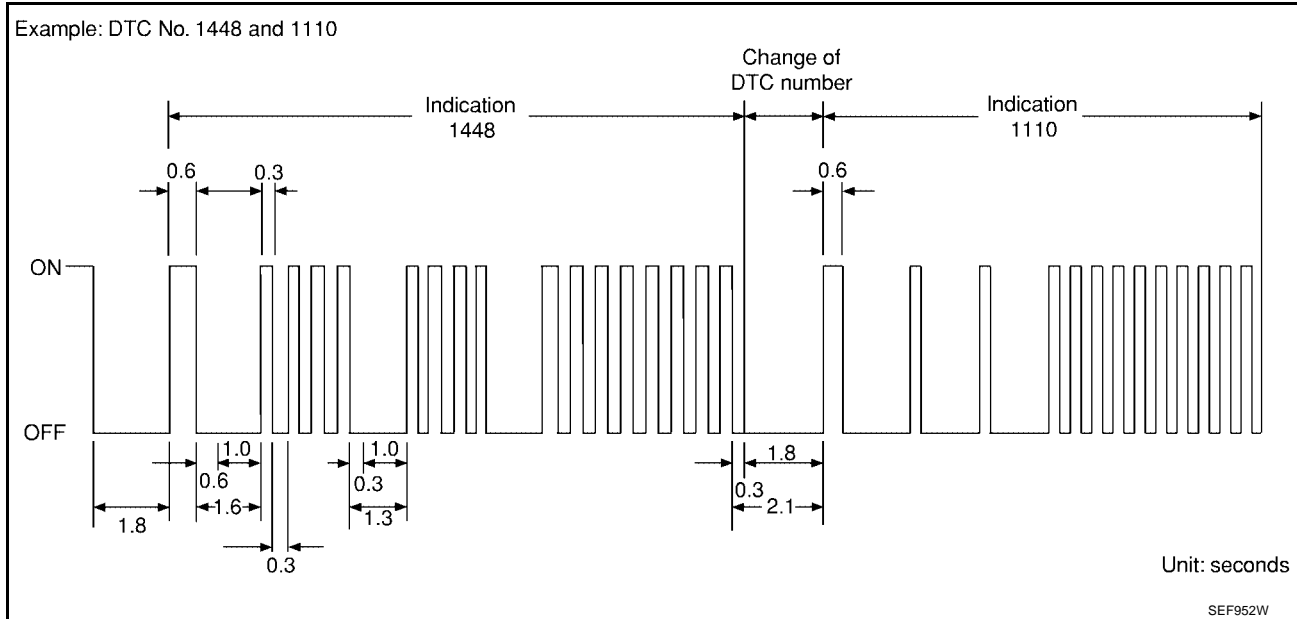
MIL	Condition
ON	When the malfunction is detected.
OFF	No malfunction.

- These DTC numbers are clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS)

### DIAGNOSTIC TEST MODE II — SELF-DIAGNOSTIC RESULTS

In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MIL as shown below. The DTC and 1st trip DTC are displayed at the same time. If the MIL does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MIL illuminates in diagnostic test mode II (SELF-DIAGNOSTIC RESULTS), it is a DTC; if two or more codes are displayed, they may be either DTCs or 1st trip DTCs. DTC No. is same as that of 1st trip DTC. These uniden-

tified codes can be identified by using the CONSULT-II or GST. A DTC will be used as an example for how to read a code.



A particular trouble code can be identified by the number of four-digit numeral flashes. The “zero” is indicated by the number of ten flashes. The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-second) - OFF (0.6-second) cycle.

The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second OFF cycle.

A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared.

A change from one trouble code to another occurs at an interval of 1.8-second OFF.

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC “0000” refers to no malfunction. (See [EC-21, "INDEX FOR DTC"](#) )

### How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to [EC-73, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#) .

- If the battery is disconnected, the DTC will be lost from the backup memory after approx 24 hours.
- Be careful not to erase the stored memory before starting trouble diagnoses.

### DIAGNOSTIC TEST MODE II — HEATED OXYGEN SENSOR 1 MONITOR

In this mode, the MIL displays the condition of the fuel mixture (lean or rich) which is monitored by the heated oxygen sensor 1.

MIL	Fuel mixture condition in the exhaust gas	Air fuel ratio feedback control condition
ON	Lean	Closed loop system
OFF	Rich	
*Remains ON or OFF	Any condition	Open loop system

\*: Maintains conditions just before switching to open loop.

To check the heated oxygen sensor 1 function, start engine in the Diagnostic Test Mode II and warm it up until engine coolant temperature indicator points to the middle of the gauge.

Next run engine at about 2,000 rpm for about 2 minutes under no-load conditions. Then make sure that the MIL comes ON more than 5 times within 10 seconds with engine running at 2,000 rpm under no-load.

## OBD System Operation Chart

UBS001CO

### RELATIONSHIP BETWEEN MIL, 1ST TRIP DTC, DTC, AND DETECTABLE ITEMS

- When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data are stored in the ECM memory.
- When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data are stored in the ECM memory, and the MIL will come on. For details, refer to [EC-58, "Two Trip Detection Logic"](#).
- The MIL will go off after the vehicle is driven 3 times with no malfunction. The drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset.
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (driving pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (driving pattern C) without the same malfunction recurring. The "TIME" in "SELF-DIAGNOSTIC RESULTS" mode of CONSULT-II will count the number of times the vehicle is driven.
- The 1st trip DTC is not displayed when the self-diagnosis results in "OK" for the 2nd trip.

### SUMMARY CHART

Items	Fuel Injection System	Misfire	Other
MIL (goes off)	3 (pattern B)	3 (pattern B)	3 (pattern B)
DTC, Freeze Frame Data (no display)	80 (pattern C)	80 (pattern C)	40 (pattern A)
1st Trip DTC (clear)	1 (pattern C), *1	1 (pattern C), *1	1 (pattern B)
1st Trip Freeze Frame Data (clear)	*1, *2	*1, *2	1 (pattern B)

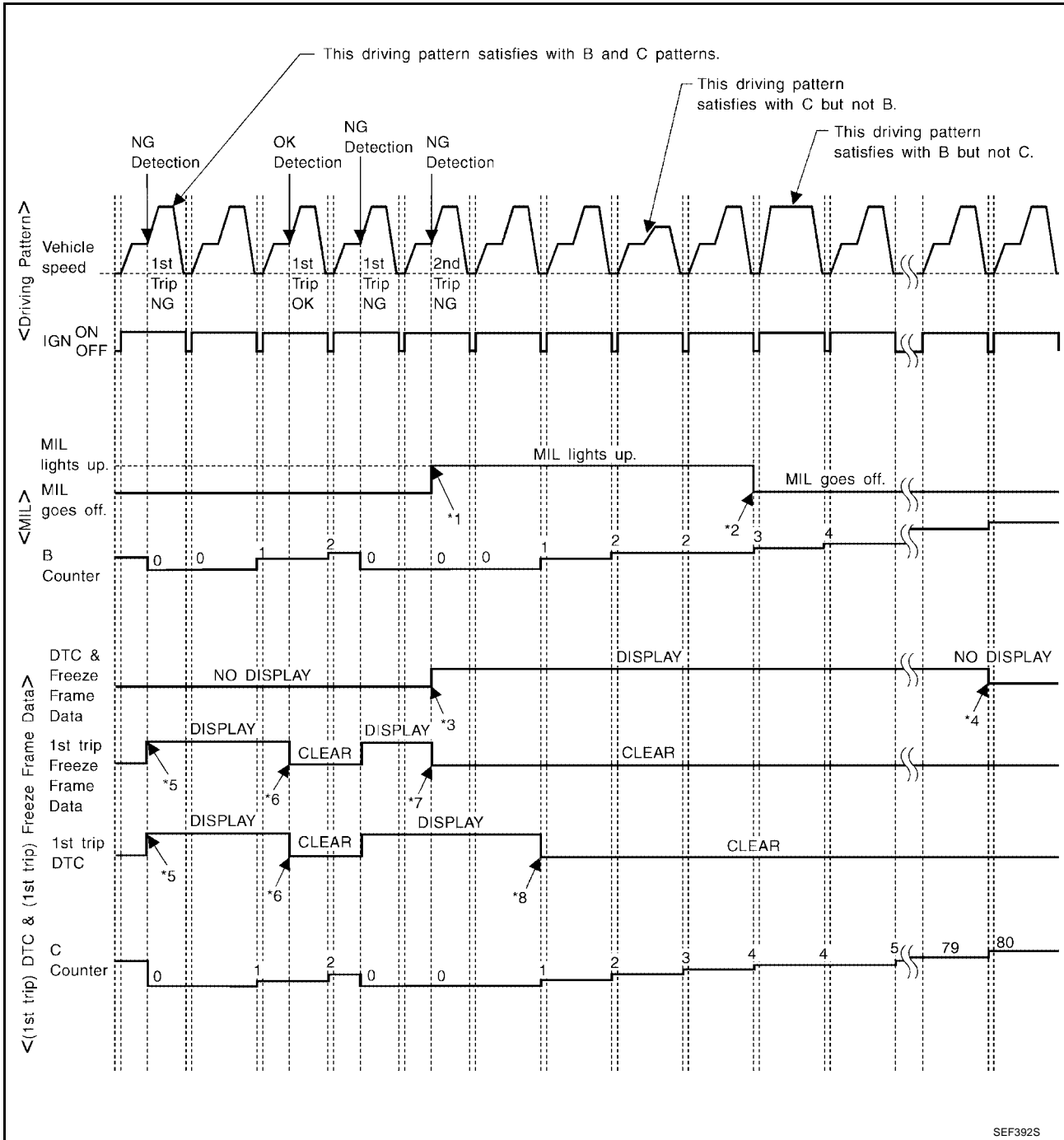
For details about patterns "B" and "C" under "Fuel Injection System" and "Misfire", see [EC-78](#).

For details about patterns "A" and "B" under "Other", see [EC-80](#).

\*1: Clear timing is at the moment OK is detected.

\*2: Clear timing is when the same malfunction is detected in the 2nd trip.

## RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS FOR "MIS-FIRE" <EXHAUST QUALITY DETERIORATION>, "FUEL INJECTION SYSTEM"



\*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

\*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

\*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

\*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

\*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

\*6: The 1st trip DTC and the 1st trip freeze frame data will be cleared at the moment OK is detected.

\*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

\*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

## EXPLANATION FOR DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”

### <Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunction.
- The MIL will go off when the B counter reaches 3. (\*2 in “OBD SYSTEM OPERATION CHART”)

### <Driving Pattern C>

Driving pattern C means the vehicle operation as follows:

The following conditions should be satisfied at the same time:

Engine speed: (Engine speed in the freeze frame data)  $\pm 375$  rpm

Calculated load value: (Calculated load value in the freeze frame data)  $\times (1 \pm 0.1)$  [%]

Engine coolant temperature (T) condition:

- When the freeze frame data shows lower than 70°C (158°F), “T” should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), “T” should be higher than or equal to 70°C (158°F).

Example:

If the stored freeze frame data is as follows:

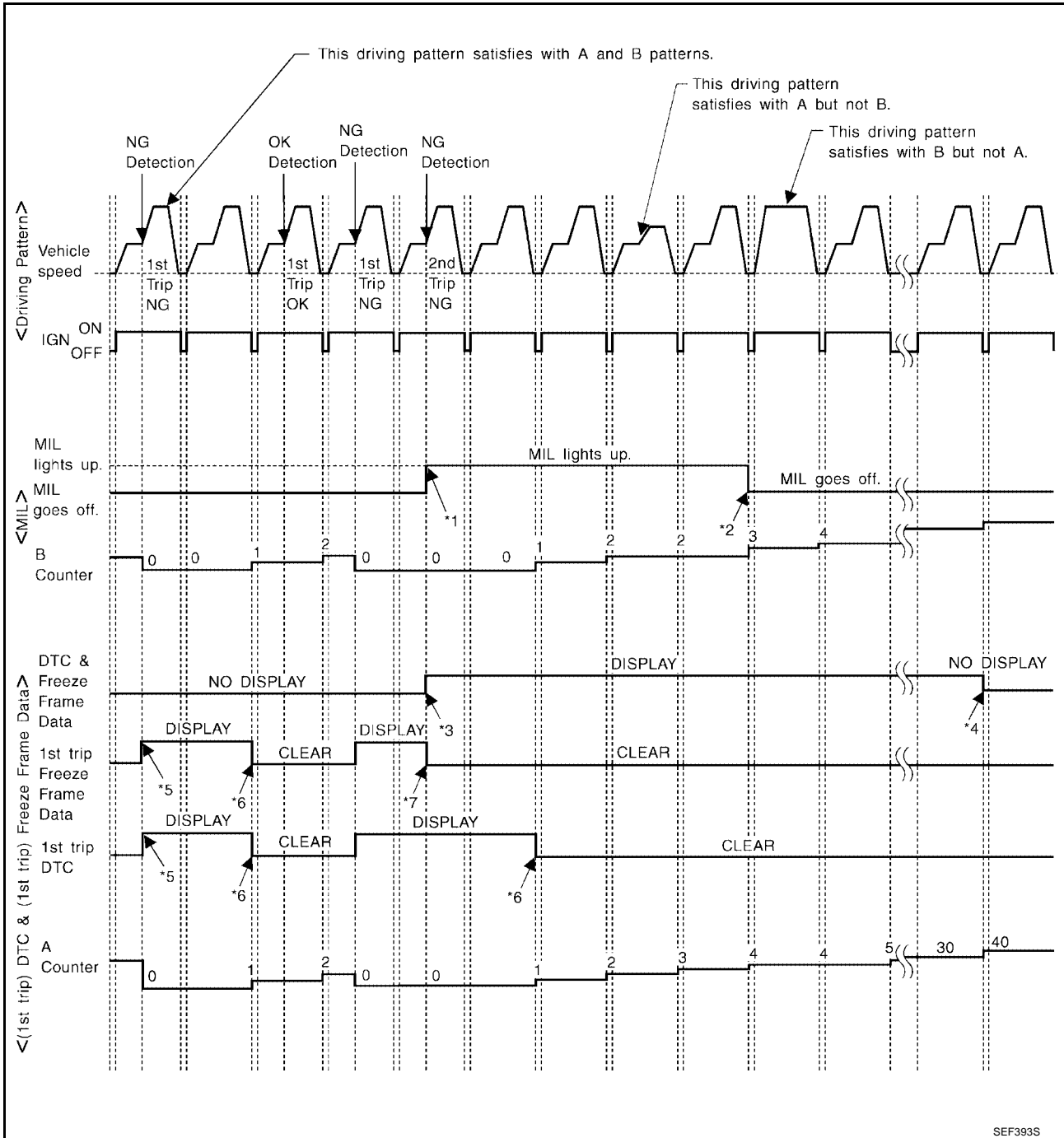
Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F)

To be satisfied with driving pattern C, the vehicle should run under the following conditions:

Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

- The C counter will be cleared when the malfunction is detected regardless of vehicle conditions above.
- The C counter will be counted up when vehicle conditions above is satisfied without the same malfunction.
- The DTC will not be displayed after C counter reaches 80.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

## RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"



\*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

\*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

\*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

\*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

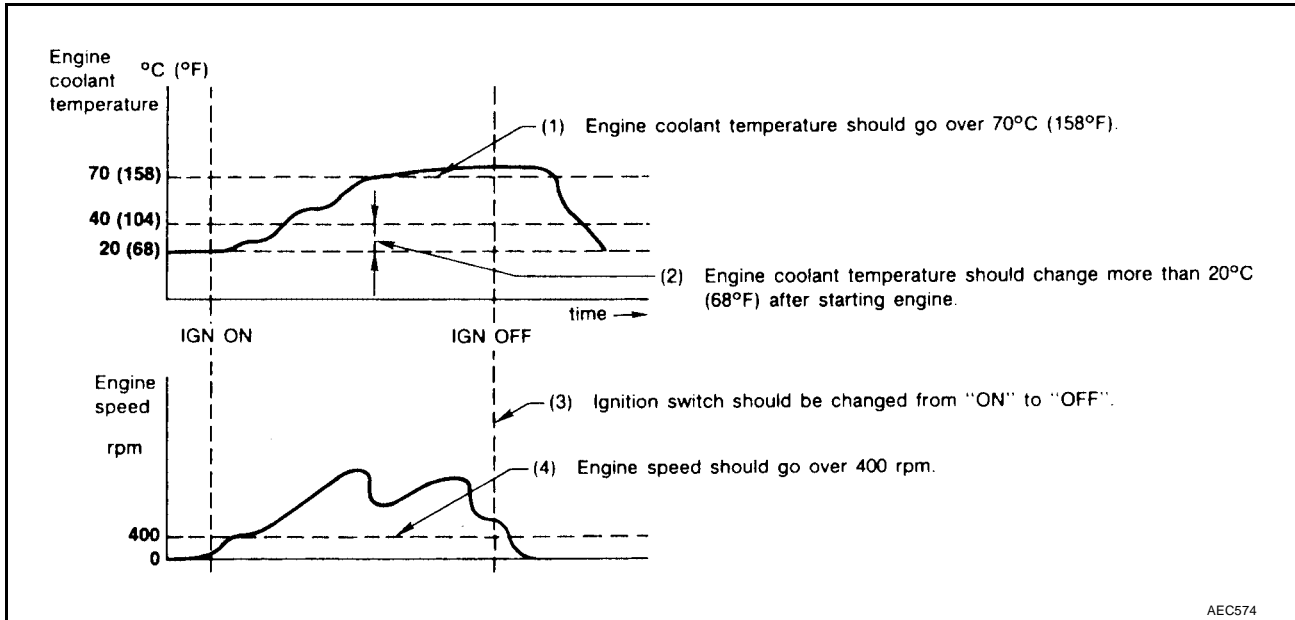
\*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

\*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.

\*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

## EXPLANATION FOR DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

### <Driving Pattern A>



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

### <Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

All components and systems should be monitored at least once by the OBD system.

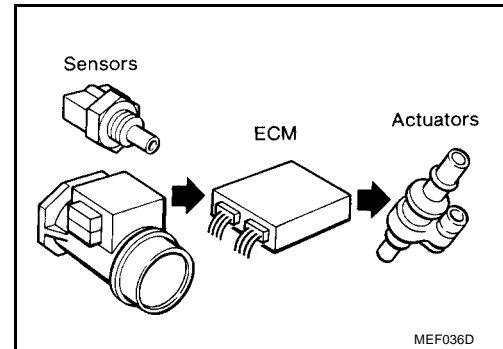
- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunctions.
- The MIL will go off when the B counter reaches 3 (\*2 in "OBD SYSTEM OPERATION CHART").



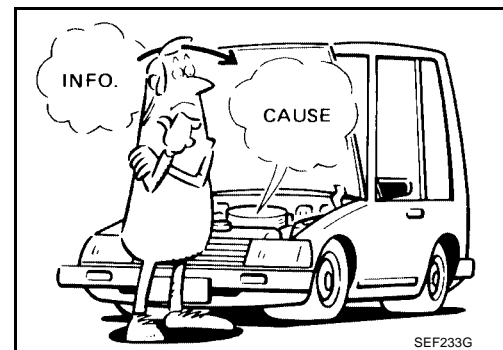
## TROUBLE DIAGNOSIS

Trouble Diagnosis Introduction  
INTRODUCTION

The engine has an ECM to control major systems such as fuel control, ignition control, idle air control system, etc. The ECM accepts input signals from sensors and instantly drives actuators. It is essential that both input and output signals are proper and stable. At the same time, it is important that there are no malfunctions such as vacuum leaks, fouled spark plugs, or other malfunctions with the engine.



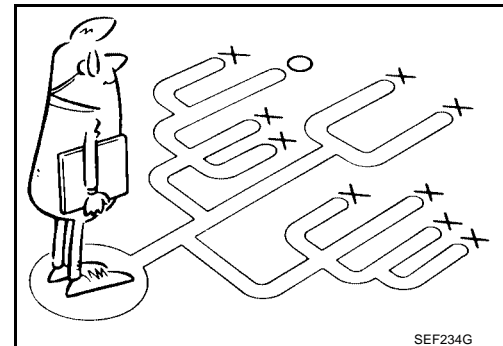
It is much more difficult to diagnose a incident that occurs intermittently rather than continuously. Most intermittent incidents are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.



A visual check only may not find the cause of the incidents. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the "Work Flow" on [EC-82](#).

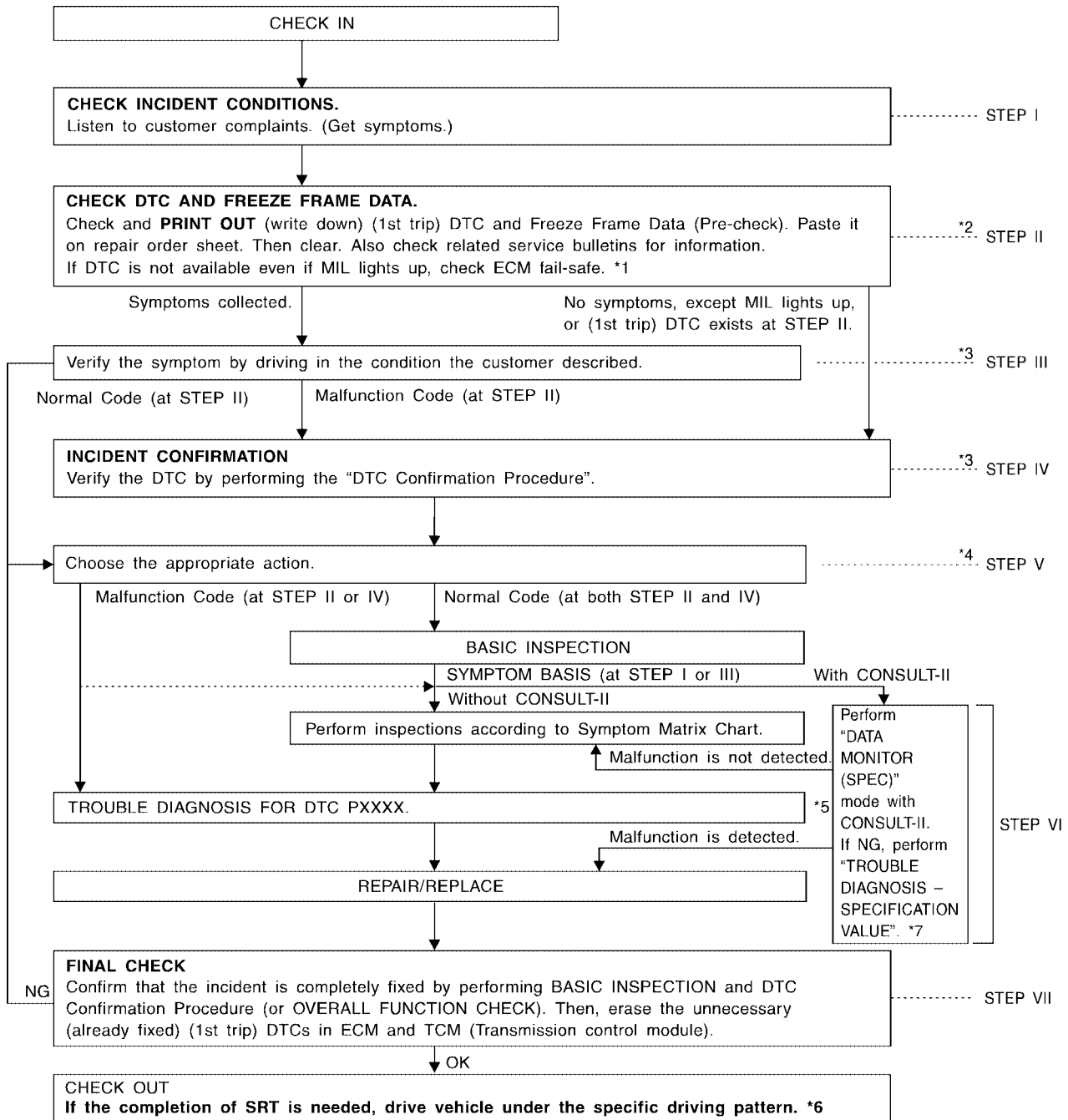
Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such incidents, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "Diagnostic Worksheet" like the example on next page should be used.

Start your diagnosis by looking for "conventional" malfunctions first. This will help troubleshoot driveability malfunctions on an electronically controlled engine vehicle.



## WORK FLOW

### Flow Chart



SEF510ZE

\*1: [EC-87](#)

\*2: If time data of "SELF-DIAG RESULTS" is other than "0" or "1", refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

\*3: If the incident cannot be duplicated, refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

\*4: If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to [EC-138, "POWER SUPPLY CIRCUIT FOR ECM"](#).

\*5: If the malfunctioning part cannot be found, refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

\*6: [EC-68](#)

\*7: [EC-133](#)

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

## Description for Work Flow

STEP	DESCRIPTION
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the <a href="#">EC-84. "DIAGNOSTIC WORKSHEET"</a> .
STEP II	Before confirming the concern, check and write down (print out using CONSULT-II or Generic Scan Tool) the (1st trip) Diagnostic Trouble Code (DTC) and the (1st trip) freeze frame data, then erase the code and the data. (Refer to <a href="#">EC-71</a> .) The (1st trip) DTC and the (1st trip) freeze frame data can be used when duplicating the incident at STEP III & IV. If the incident cannot verified, perform <a href="#">EC-137. "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"</a> . Study the relationship between the cause, specified by (1st trip) DTC, and the symptom described by the customer. (The "Symptom Matrix Chart" will be useful. See <a href="#">EC-93</a> .) Also check related service bulletins for information.
STEP III	Try to confirm the symptom and under what conditions the incident occurs. The "DIAGNOSTIC WORK SHEET" and the freeze frame data are useful to verify the incident. Connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot verified, perform <a href="#">EC-137. "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"</a> . If the malfunction code is detected, skip STEP IV and perform STEP V.
STEP IV	Try to detect the (1st trip) Diagnostic Trouble Code by driving in (or performing) the "DTC Confirmation Procedure". Check and read the (1st trip) DTC and (1st trip) freeze frame data by using CONSULT-II or GST. During the (1st trip) DTC verification, be sure to connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot verified, perform <a href="#">EC-137. "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"</a> . In case the "DTC Confirmation Procedure" is not available, perform the "Overall Function Check" instead. The (1st trip) DTC cannot be displayed by this check, however, this simplified "check" is an effective alternative. The "NG" result of the "Overall function check" is the same as the (1st trip) DTC detection.
STEP V	Take the appropriate action based on the results of STEP I through IV. If the malfunction code is indicated, proceed to trouble diagnosis for DTC PXXXX. If the normal code is indicated, proceed to the BASIC INSPECTION. (Refer to <a href="#">EC-88</a> .) If CONSULT-II is available, perform "DATA MONITOR (SPEC)" mode with CONSULT-II and proceed to the "TROUBLE DIAGNOSIS — SPECIFICATION VALUE". (If malfunction is detected, proceed to "REPAIR/REPLACE".) Then perform inspections according to the Symptom Matrix Chart. (Refer to <a href="#">EC-93</a> .)
STEP VI	Identify where to begin diagnosis based on the relationship study between symptom and possible causes. Inspect the system for mechanical binding, loose connectors or wiring damage using (tracing) "Harness Layouts". Gently shake the related connectors, components or wiring harness with CONSULT-II set in "DATA MONITOR (AUTO TRIG)" mode. Check the voltage of the related ECM terminals or monitor the output data from the related sensors with CONSULT-II. Refer to <a href="#">EC-105</a> , <a href="#">EC-126</a> . The "Diagnostic Procedure" in EC section contains a description based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure. For details, refer to <a href="#">GI-26. "How to Perform Efficient Diagnosis for an Electrical Incident"</a> . Repair or replace the malfunction parts. If malfunctioning part cannot be detected, perform <a href="#">EC-137. "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"</a> .
STEP VII	Once you have repaired the circuit or replaced a component, you need to run the engine in the same conditions and circumstances which resulted in the customer's initial complaint. Perform the "DTC Confirmation Procedure" and confirm the normal code [DTC No. P0000] is detected. If the incident is still detected in the final check, perform STEP VI by using a different method from the previous one. Before returning the vehicle to the customer, be sure to erase the unnecessary (already fixed) (1st trip) DTC in ECM and TCM (Transmission control module). (Refer to <a href="#">EC-71. "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"</a> and <a href="#">AT-40. "HOW TO ERASE DTC"</a> .)

A  
EC  
C  
D  
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L  
M

**DIAGNOSTIC WORKSHEET****Description**

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate.

In general, each customer feels differently about a incident. It is important to fully understand the symptoms or conditions for a customer complaint.

Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.

Some conditions may cause the malfunction indicator lamp to come on steady or blink and DTC to be detected. Examples:

- Vehicle ran out of fuel, which caused the engine to misfire.
- Fuel filler cap was left off or incorrectly screwed on, allowing fuel to evaporate into the atmosphere.

**KEY POINTS**

**WHAT** ..... Vehicle & engine model  
**WHEN** ..... Date, Frequencies  
**WHERE**..... Road conditions  
**HOW** ..... Operating conditions,  
Weather conditions,  
Symptoms

SEF907L



## DTC Inspection Priority Chart

**NOTE:**

If DTC U1000 and/or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-145, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)
1	<ul style="list-style-type: none"> <li>● U1000, U1001 CAN communication</li> <li>● P0101, P0102, P0103, P1102 Mass air flow sensor</li> <li>● P0112, P0113, P0127 Intake air temperature sensor</li> <li>● P0117, P0118, P0125 Engine coolant temperature sensor</li> <li>● P0122, P0123, P0222, P0223, P1225, P1226, P2135 Throttle position sensor</li> <li>● P0128 Thermostat function</li> <li>● P0181, P0182, P0183 Fuel tank temperature sensor</li> <li>● P0327, P0328 Knock sensor</li> <li>● P0335 Crankshaft position sensor (POS)</li> <li>● P0340 Camshaft position sensor (PHASE)</li> <li>● P0460, P0461, P0462, P0463 Fuel level sensor</li> <li>● P0500 Vehicle speed sensor</li> <li>● P0605 ECM</li> <li>● P0705 Park/Neutral position (PNP) switch</li> <li>● P1229 Sensor power supply</li> <li>● P1706 Park/Neutral position (PNP) switch</li> <li>● P2122, P2123, P2127, P2128, P2138 Accelerator pedal position sensor</li> </ul>
2	<ul style="list-style-type: none"> <li>● P0031, P0032 Heated oxygen sensor 1 heater</li> <li>● P0037, P0038 Heated oxygen sensor 2 heater</li> <li>● P0132, P0133, P0134, P1143, P1144 Heated oxygen sensor 1</li> <li>● P0138, P0139, P1146, P1147 Heated oxygen sensor 2</li> <li>● P0441 EVAP control system purge flow monitoring</li> <li>● P0444, P0445, P1444 EVAP canister purge volume control solenoid valve</li> <li>● P0447, P1446, P1448 EVAP canister vent control valve</li> <li>● P0452, P0453 EVAP system pressure sensor</li> <li>● P0550 Power steering pressure sensor</li> <li>● P0710-P0725, P0740-P0755, P1705, P1760 A/T related sensors and solenoid valves</li> <li>● P1065 ECM power supply</li> <li>● P112 Electric throttle control function</li> <li>● P1124, P1126, P1128 Electric throttle control actuator</li> <li>● P1805 Brake switch</li> </ul>
3	<ul style="list-style-type: none"> <li>● P0011 Intake valve timing control</li> <li>● P0171, P0172 Fuel injection system function</li> <li>● P0300-P0304 Misfire</li> <li>● P0420 Three way catalyst function</li> <li>● P0442, P0455, P0456 EVAP control system</li> <li>● P0506, P0507 Idle speed control system</li> <li>● P0731-P0734 A/T function</li> <li>● P1111 Intake valve timing control solenoid valve</li> <li>● P1121 Electric throttle control</li> <li>● P1148 Closed loop control</li> <li>● P1217 Engine over temperature</li> <li>● P1564 ASCD steering switch</li> <li>● P1572 ASCD brake switch</li> <li>● P1574 ASCD vehicle speed sensor</li> </ul>

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

UBS006C4

## Fail-safe Chart

- When the DTC listed below is detected, the ECM enters fail-safe mode and the MIL lights up.

DTC No.	Detected items	Engine operating condition in fail-safe mode								
P0102 P0103 P1102	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.								
P0117 P0118	Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch "ON" or "START". CONSULT-II displays the engine coolant temperature decided by ECM.								
		<table border="1"> <thead> <tr> <th>Condition</th> <th>Engine coolant temperature decided (CONSULT-II display)</th> </tr> </thead> <tbody> <tr> <td>Just as ignition switch is turned ON or Start</td> <td>40°C (104°F)</td> </tr> <tr> <td>More than approx. 4 minutes after ignition ON or Start</td> <td>80°C (176°F)</td> </tr> <tr> <td>Except as shown above</td> <td>40 - 80°C (104 - 176°F) (Depends on the time)</td> </tr> </tbody> </table>	Condition	Engine coolant temperature decided (CONSULT-II display)	Just as ignition switch is turned ON or Start	40°C (104°F)	More than approx. 4 minutes after ignition ON or Start	80°C (176°F)	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
Condition	Engine coolant temperature decided (CONSULT-II display)									
Just as ignition switch is turned ON or Start	40°C (104°F)									
More than approx. 4 minutes after ignition ON or Start	80°C (176°F)									
Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)									
		When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.								
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.								
P1121	Electric throttle control actuator (ECM detect the throttle valve is stuck open.)	While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in "N" or "P" position, and engine speed will not exceed 1,000 rpm or more.								
P1122	Electric throttle control function	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
P1124 P1126	Throttle control motor relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
P1128	Throttle control motor	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring								
P1229	Sensor power supply	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
P2122 P2123 P2127 P2128 P2138	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.								

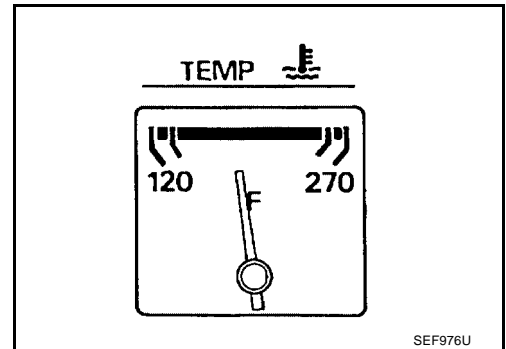
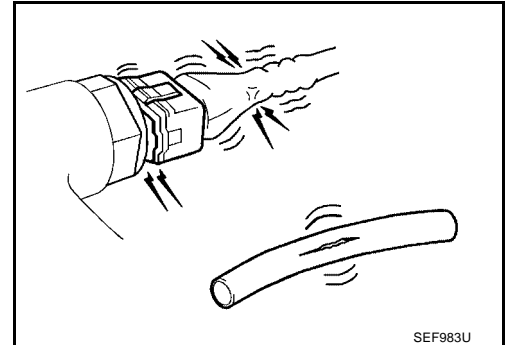
- When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting MIL up when there is NG on engine control system.  
Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating fail-safe function.  
The fail-safe function also operates when above diagnoses except MIL circuit and demands the driver to repair the trouble.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut
--	--

## Basic Inspection

### 1. INSPECTION START

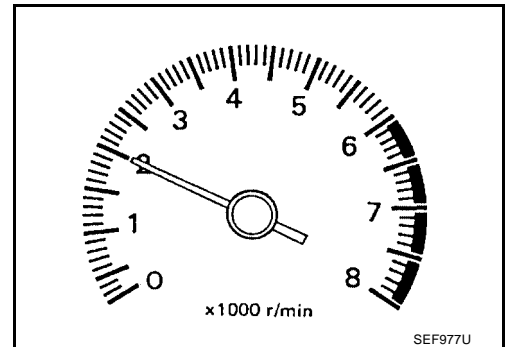
1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
  - Harness connectors for improper connections
  - Wiring harness for improper connections, pinches and cut
  - Vacuum hoses for splits, kinks and improper connections
  - Hoses and ducts for leaks
  - Air cleaner clogging
  - Gasket
3. Confirm that electrical or mechanical loads are not applied.
  - Headlamp switch is OFF.
  - Air conditioner switch is OFF.
  - Rear window defogger switch is OFF.
  - Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge. Ensure engine stays below 1,000 rpm.



5. Run engine at about 2,000 rpm for about 2 minutes under no-load.
6. Make sure that no DTC is displayed with CONSULT-II or GST.

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. REPAIR OR REPLACE

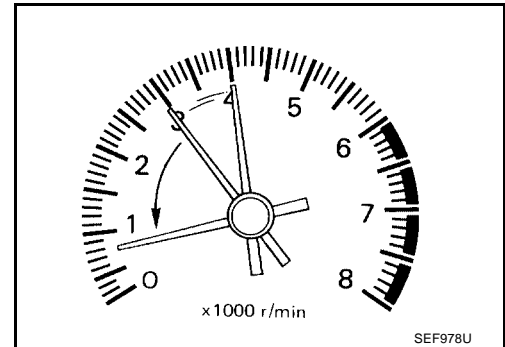
Repair or replace components as necessary according to corresponding "Diagnostic Procedure".

>> GO TO 3.



**3. CHECK TARGET IDLE SPEED****Ⓟ With CONSULT-II**

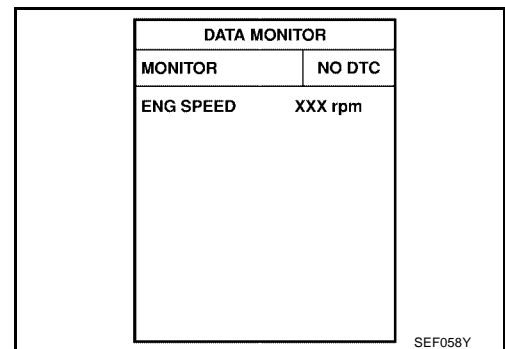
1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.



3. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

**ⓧ Without CONSULT-II**

1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.
3. Check idle speed.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

OK or NG

OK >> GO TO 10.

NG >> GO TO 4.

**4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING**

1. Stop engine.
2. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#).

>> GO TO 5.

**5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING**

Perform [EC-53, "Throttle Valve Closed Position Learning"](#).

>> GO TO 6.

## 6. PERFORM IDLE AIR VOLUME LEARNING

---

Refer to [EC-53, "Idle Air Volume Learning"](#) .

**Is "Idle Air Volume Learning" carried out successfully?**

Yes or No

- Yes >> GO TO 7.  
 No >> 1. Follow the instruction of "Idle Air Volume Learning".  
 2. GO TO 4.

## 7. CHECK TARGET IDLE SPEED AGAIN

---

 **With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

 **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

OK or NG

- OK >> GO TO 10.  
 NG >> GO TO 8.

## 8. DETECT MALFUNCTIONING PART

---

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-283](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-277](#) .

OK or NG

- OK >> GO TO 9.  
 NG >> 1. Repair or replace.  
 2. GO TO 4.

## 9. CHECK ECM FUNCTION

---

Substitute another known-good ECM to check ECM function. (ECM may be the cause of a incident, but this is the rarely the case.)

>> GO TO 4.

## 10. CHECK IGNITION TIMING

---

1. Run engine at idle.
2. Check ignition timing with a timing light.

**M/T: 7 ± 5° BTDC**

**A/T: 18 ± 5° BTDC (in "P" or "N" position)**

OK or NG

- OK >> **INSPECTION END**  
 NG >> GO TO 11.

**11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING**

1. Stop engine.
2. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 12.

**12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING**

Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 13.

**13. PERFORM IDLE AIR VOLUME LEARNING**

Refer to [EC-53, "Idle Air Volume Learning"](#) .

**Is "Idle Air Volume Learning" carried out successfully?**

Yes or No

- Yes >> GO TO 14.  
 No >> 1. Follow the instruction of "Idle Air Volume Learning".  
 2. GO TO 4.

**14. CHECK TARGET IDLE SPEED AGAIN**

**☑ With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 650 ± 50 rpm**  
**A/T: 800 ± 50 rpm (in "P" or "N" position)**

**☒ Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

**M/T: 650 ± 50 rpm**  
**A/T: 800 ± 50 rpm (in "P" or "N" position)**

OK or NG

- OK >> GO TO 15.  
 NG >> GO TO 17.

**15. CHECK IGNITION TIMING AGAIN**

1. Run engine at idle.
2. Check ignition timing with a timing light.

**M/T: 7 ± 5° BTDC**  
**A/T: 18 ± 5° BTDC (in "P" or "N" position)**

OK or NG

- OK >> **INSPECTION END**  
 NG >> GO TO 16.

A

EC

C

D

E

F

G

H

I

J

K

L

M

---

## 16. CHECK TIMING CHAIN INSTALLATION

---

Check timing chain installation. Refer to [EM-39, "TIMING CHAIN"](#) .

OK or NG

- OK >> GO TO 17.  
NG >> 1. Repair the timing chain installation.  
2. GO TO 4.

---

## 17. DETECT MALFUNCTIONING PART

---

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-283](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-277](#) .

OK or NG

- OK >> GO TO 18.  
NG >> 1. Repair or replace.  
2. GO TO 4.

---

## 18. CHECK ECM FUNCTION

---

Substitute another known-good ECM to check ECM function. (ECM may be the cause of a incident, but this is the rarely the case.)

- >> GO TO 4.

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

UBS001CT

## Symptom Matrix Chart SYSTEM — ENGINE CONTROL SYSTEM

		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	A C	A D	AE	AF	A G	A H	AJ	AK	AL	A M	H A	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3			<a href="#">EC-553</a>
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			<a href="#">EC-56</a>
	Injector circuit	1	1	2	3	2		2	2			2			<a href="#">EC-547</a>
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			<a href="#">EC-583</a>
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		<a href="#">EC-596</a>
	Incorrect idle speed adjustment	3	3				1	1	1	1		1			<a href="#">EC-88</a>
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	<a href="#">EC-390</a> , <a href="#">EC-392</a>
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			<a href="#">EC-88</a>
	Ignition circuit	1	1	2	2	2		2	2			2			<a href="#">EC-535</a>
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3		2	<a href="#">EC-138</a>
Air conditioner circuit		2	2	3	3	3	3	3	3	3		3		2	<a href="#">MTC-19</a>

1 - 6: The numbers refer to the order of inspection.  
(continued on next page)

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

	SYMPTOM													Reference page
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATSWATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Crankshaft position sensor (POS) circuit	2	2	3	3	3		3	3			3			<a href="#">EC-277</a>
Camshaft position sensor (PHASE) circuit	2	2	3	3	3		3	3			3			<a href="#">EC-283</a>
Mass air flow sensor circuit	1	1	2	2	2		2	2			2			<a href="#">EC-163,EC-171,EC-379</a>
Heated oxygen sensor 1 circuit		1	2	3	2		2	2			2			<a href="#">EC-201,EC-207,EC-216,EC-409,EC-415</a>
Engine coolant temperature sensor circuit	1	1	2	3	2	3	2	2	3		2			<a href="#">EC-181,EC-193</a>
Throttle position sensor circuit		1	2		2	2	2	2	2		2			<a href="#">EC-186,EC-260,EC-451,EC-453,EC-518</a>
Accelerator pedal position sensor circuit			3	2	1	2			2					<a href="#">EC-455,EC-503,EC-511,EC-525</a>
Intake valve timing control system		3	3		3		3				3			<a href="#">EC-385</a>
Vehicle speed signal circuit		2	3		3						3			<a href="#">EC-361</a>
Knock sensor circuit			2								3			<a href="#">EC-273</a>
ECM	2	2	3	3	3	3	3	3	3	3	3			<a href="#">EC-372</a>
PNP switch circuit			3		3		3	3			3			<a href="#">EC-493</a>
Power steering pressure sensor circuit		2				3	3	3	3					<a href="#">EC-367</a>
Electrical load signal circuit							3	3						<a href="#">EC-564</a>

1 - 6: The numbers refer to the order of inspection.  
(continued on next page)

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

## SYSTEM — ENGINE MECHANICAL & OTHER

		SYMPTOM											Reference page			
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION		EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	A C	A D	AE	AF	A G	A H	AJ	AK	AL	A M	H A		
Fuel	Fuel tank	5	5												<a href="#">FL-7,EM-19</a>	
	Fuel piping			5	5	5		5	5			5				
	Vapor lock	5														—
	Valve deposit															
	Poor fuel (Heavy weight gasoline, Low octane)			5	5	5	5		5	5			5			
Air	Air duct	5	5	5	5	5	5	5	5	5	5	5	5	5	—	
	Air cleaner															
	Air leakage from air duct (Mass air flow sensor — throttle body)															
	Electric throttle control actuator															
	Air leakage from intake manifold/Collector/Gasket															
Cranking	Battery	1	1	1		1		1	1					1	<a href="#">SC-4</a>	
	Generator circuit														<a href="#">SC-22</a>	
	Starter circuit	3										1			<a href="#">SC-9</a>	
	Flywheel/Drive plate/Signal plate	6													<a href="#">EM-67</a>	
	PNP switch	4													<a href="#">MT-13</a> or <a href="#">AT-116</a>	

1 - 6: The numbers refer to the order of inspection.  
(continued on next page)

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# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	A C	A D	AE	AF	A G	A H	AJ	AK	AL	A M	H A	
Engine	Cylinder head	5	5	5	5	5		5	5			5			<a href="#">EM-52</a>
	Cylinder head gasket										4	5	3		
	Cylinder block														<a href="#">EM-67</a>
	Piston												4		
	Piston ring	6	6	6	6	6		6	6			6			
	Connecting rod														
	Bearing														
	Crankshaft														
Valve mechanism	Timing chain														<a href="#">EM-39</a>
	Camshaft														<a href="#">EM-26</a>
	Intake valve	5	5	5	5	5		5	5			5			<a href="#">EM-52</a>
	Exhaust valve												3		
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5		5	5			5			<a href="#">EM-12,EX-3</a>
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5		5	5			5			<a href="#">EM-16,LU-8,LU-7,LU-4</a>
	Oil level (Low)/Filthy oil														<a href="#">LU-5</a>
Cooling	Radiator/Hose/Radiator filler cap														<a href="#">CO-13</a>
	Thermostat										5				<a href="#">CO-11</a>
	Water pump														<a href="#">CO-9</a>
	Water gallery	5	5	5	5	5		5	5		4	5			<a href="#">CO-6</a>
	Cooling fan													5	<a href="#">EC-438</a>
	Coolant level (low)/Contaminated coolant														<a href="#">CO-7</a>

1 - 6: The numbers refer to the order of inspection.



## Engine Control Component Parts Location

UBS001CU

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**EC**

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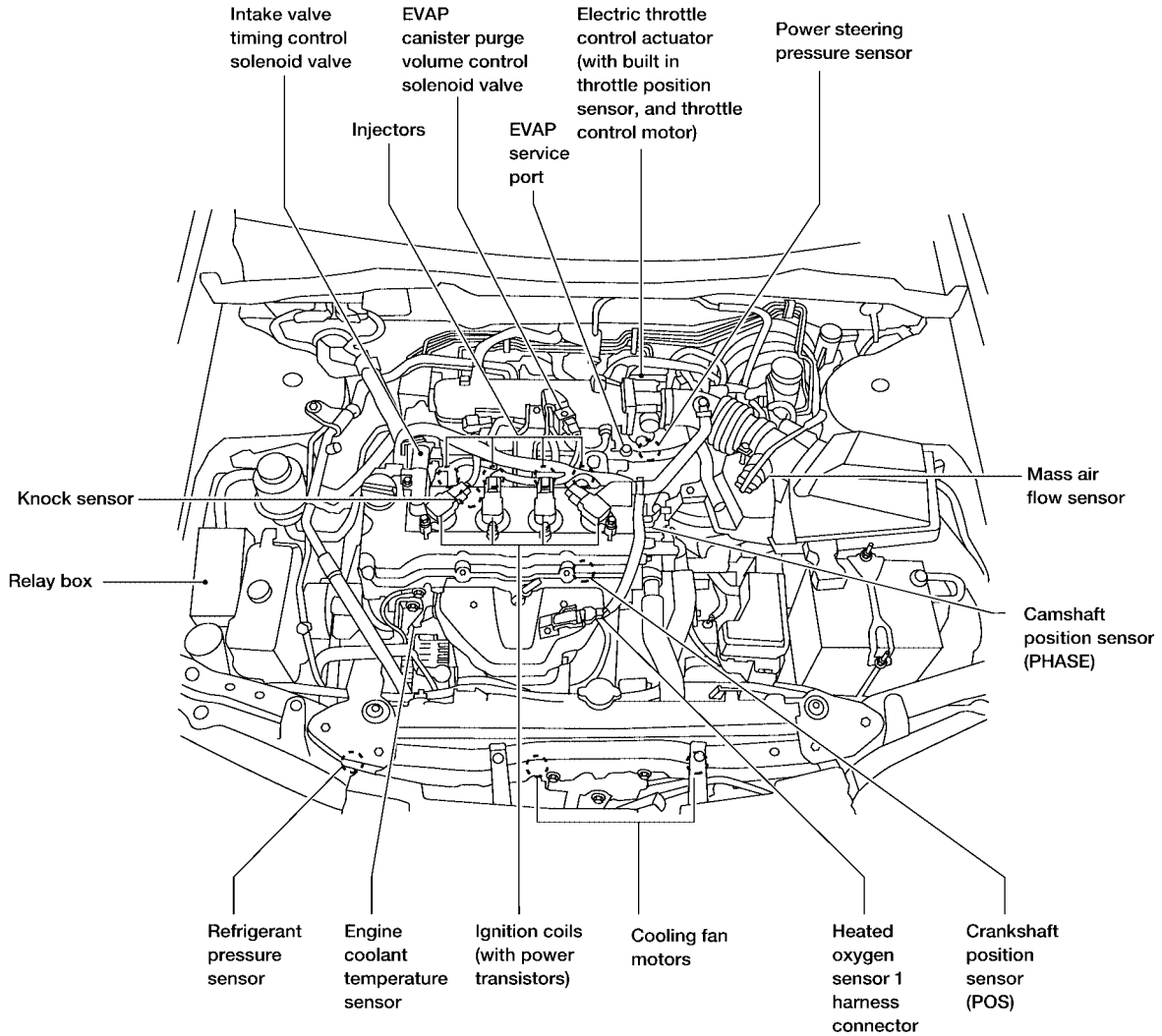
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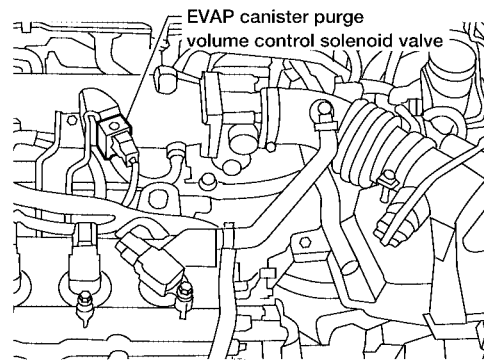
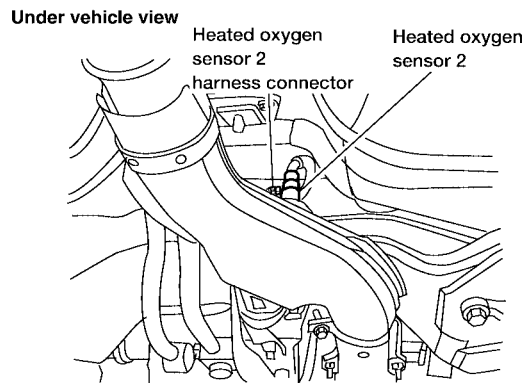
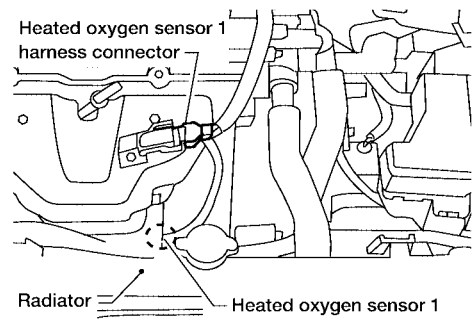
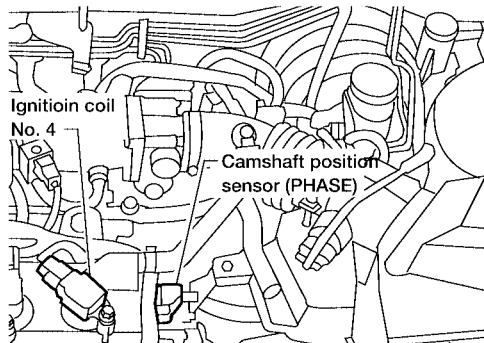
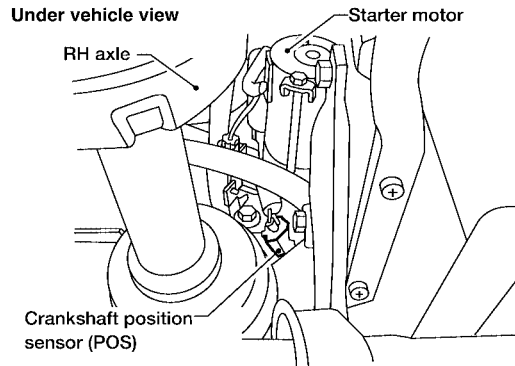
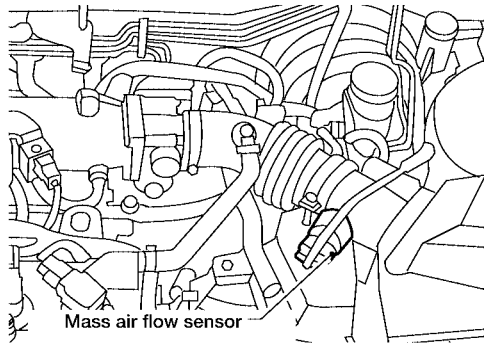
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BBIA0146E

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]



BBIA0142E

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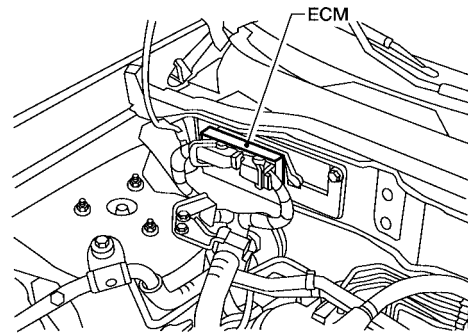
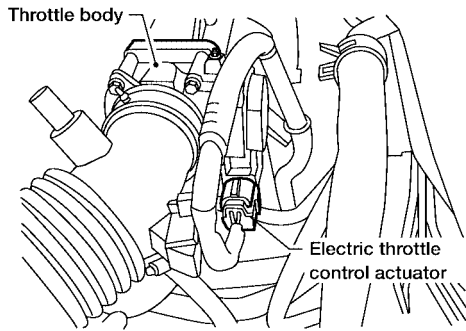
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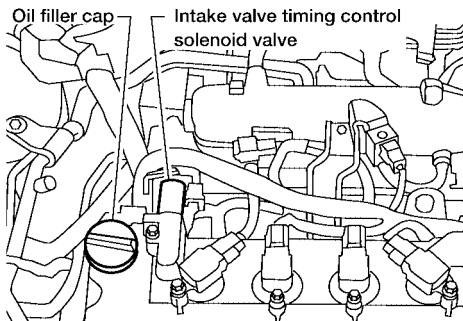
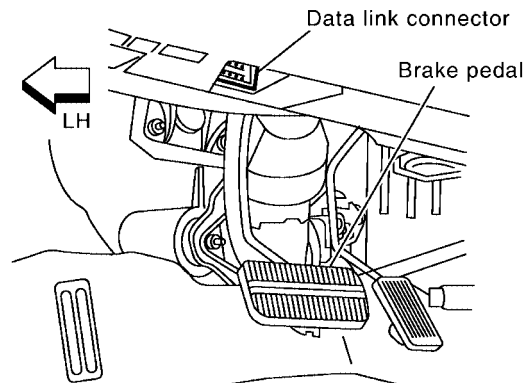
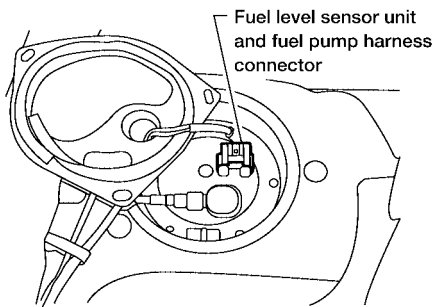
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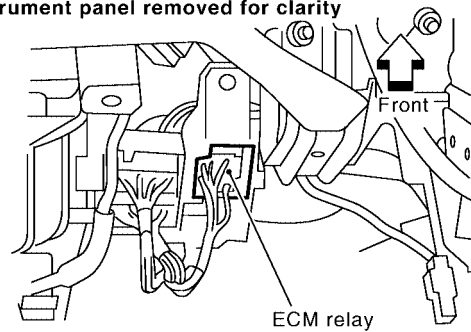
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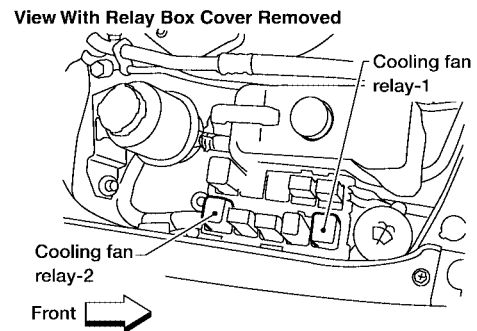
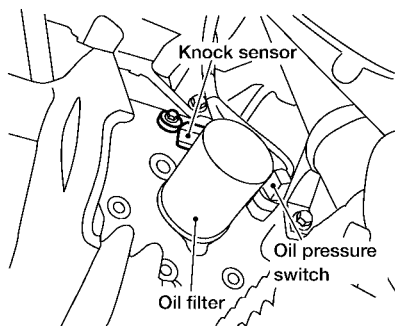
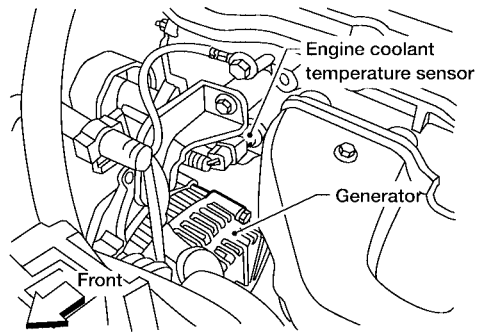
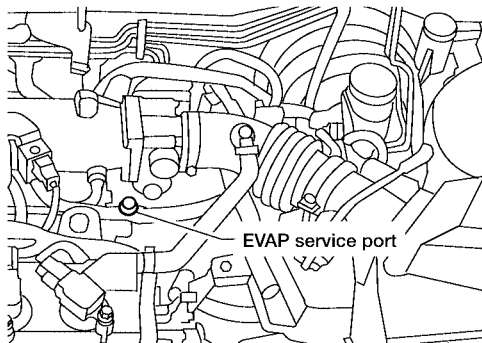
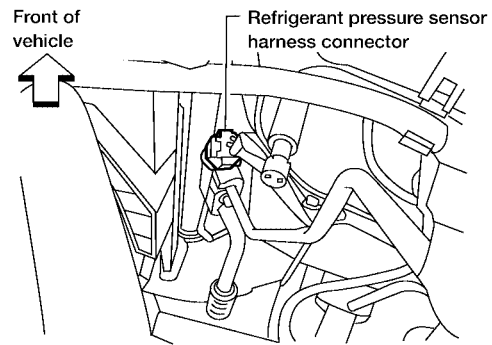
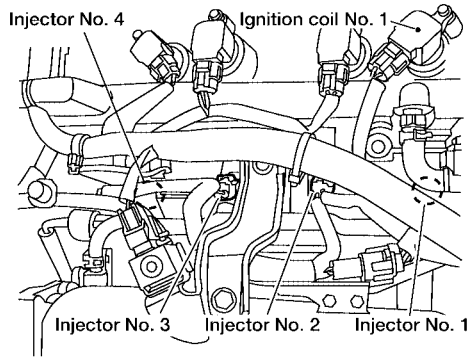
Rear seat access



Instrument panel removed for clarity



B8IA0143E



BBIA0144E

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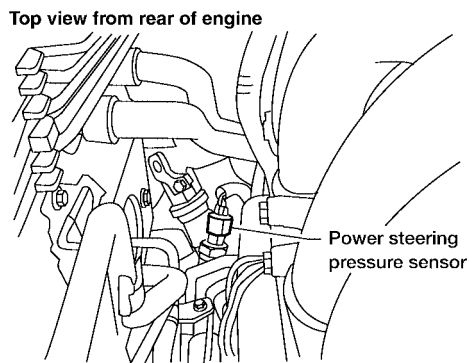
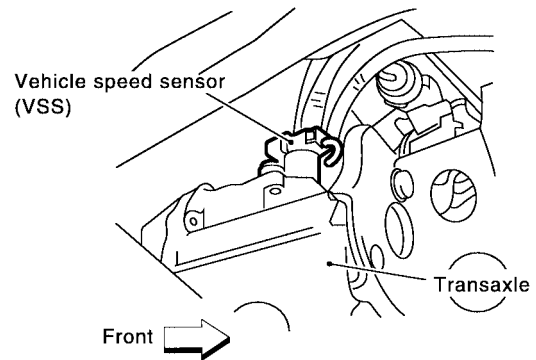
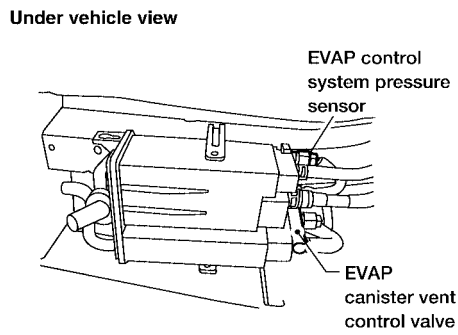
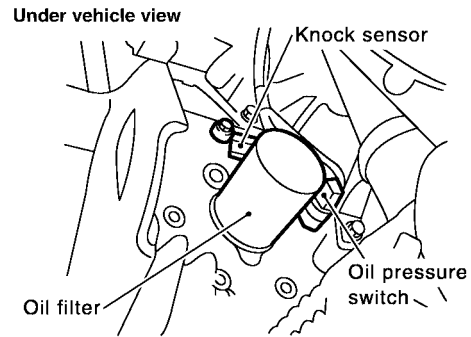
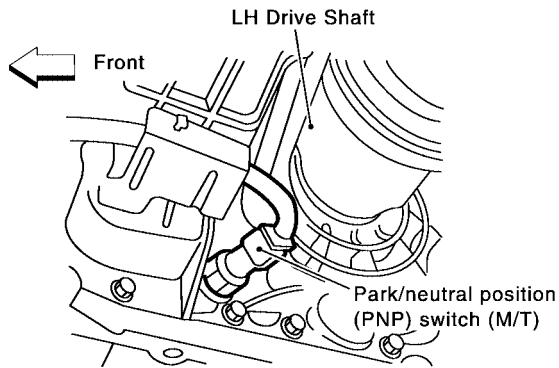
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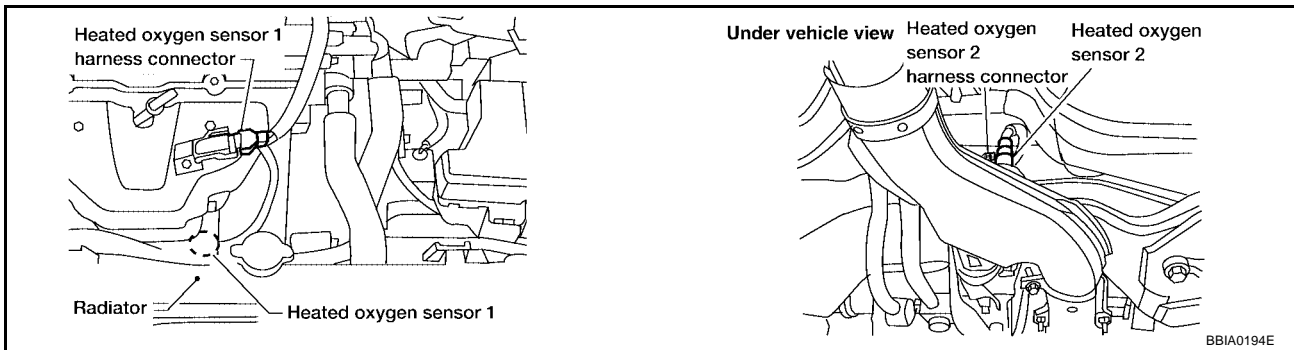
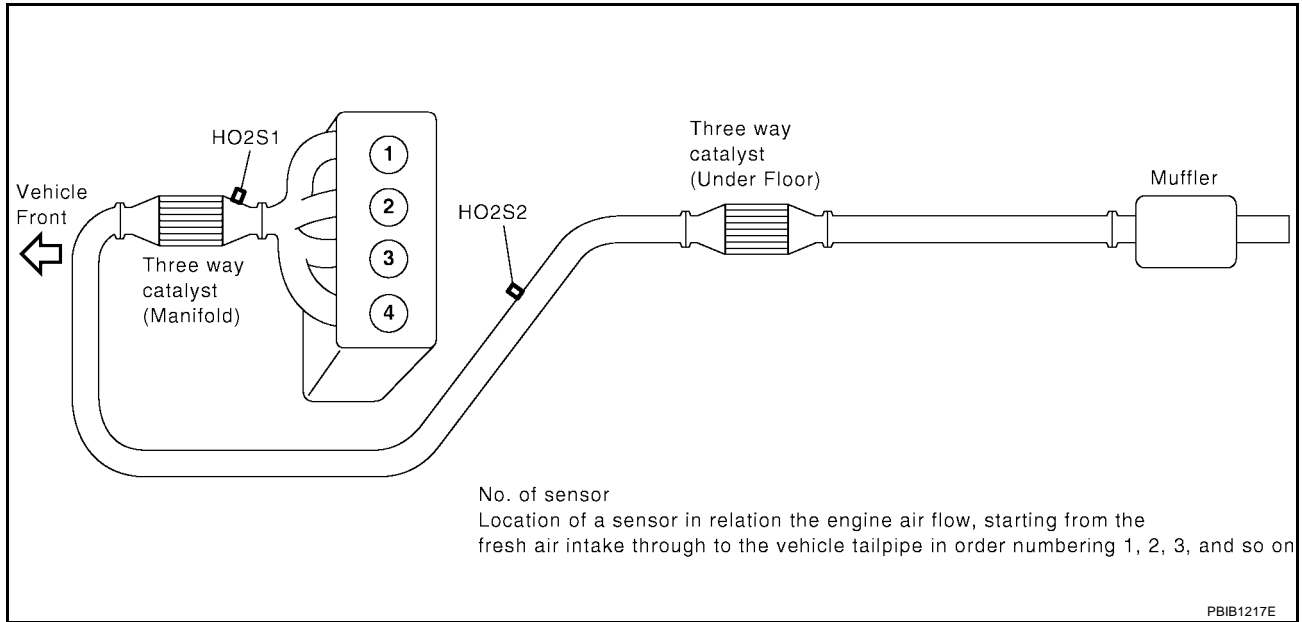
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BBIA0145E

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

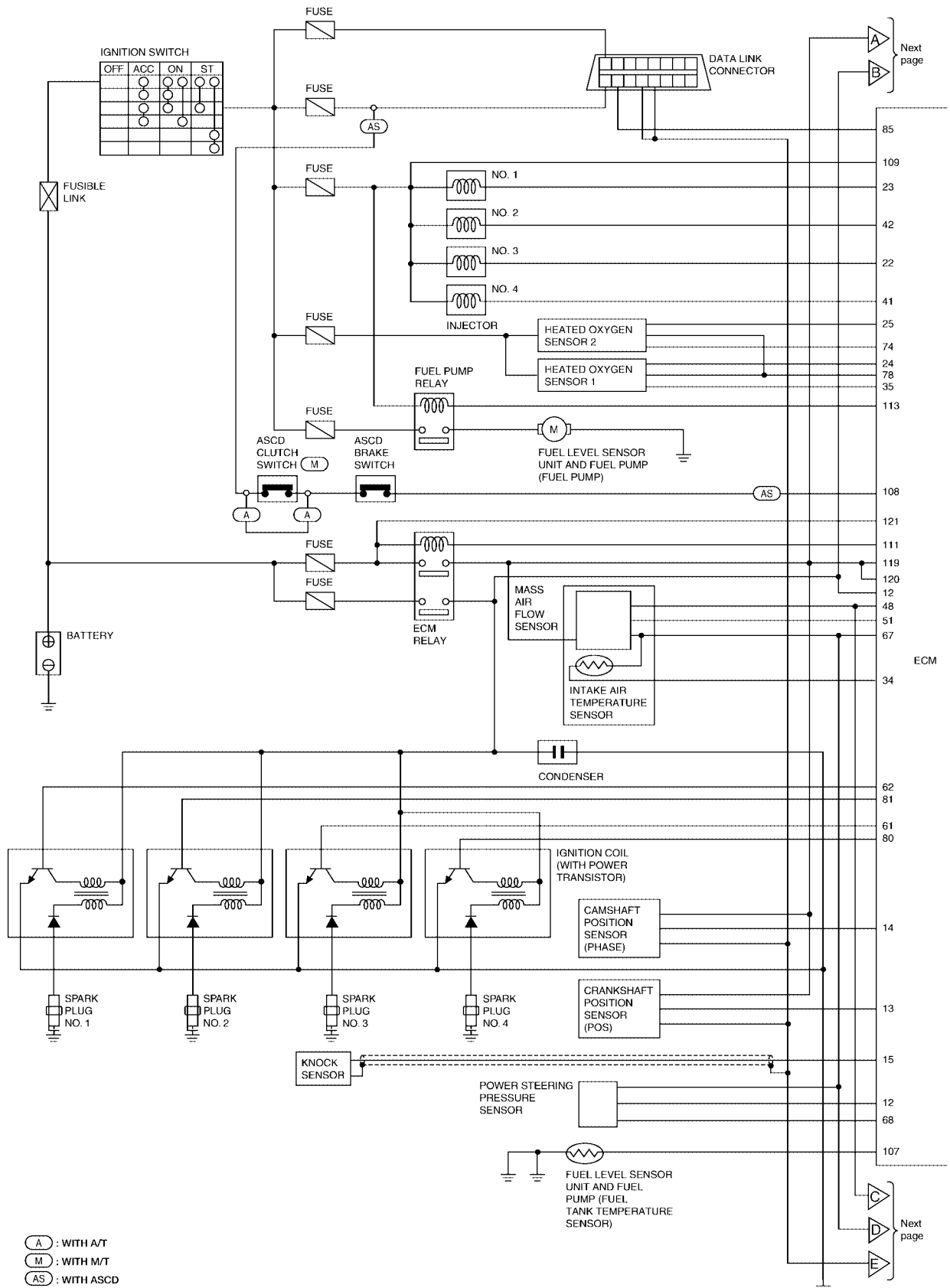


# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

## Circuit Diagram

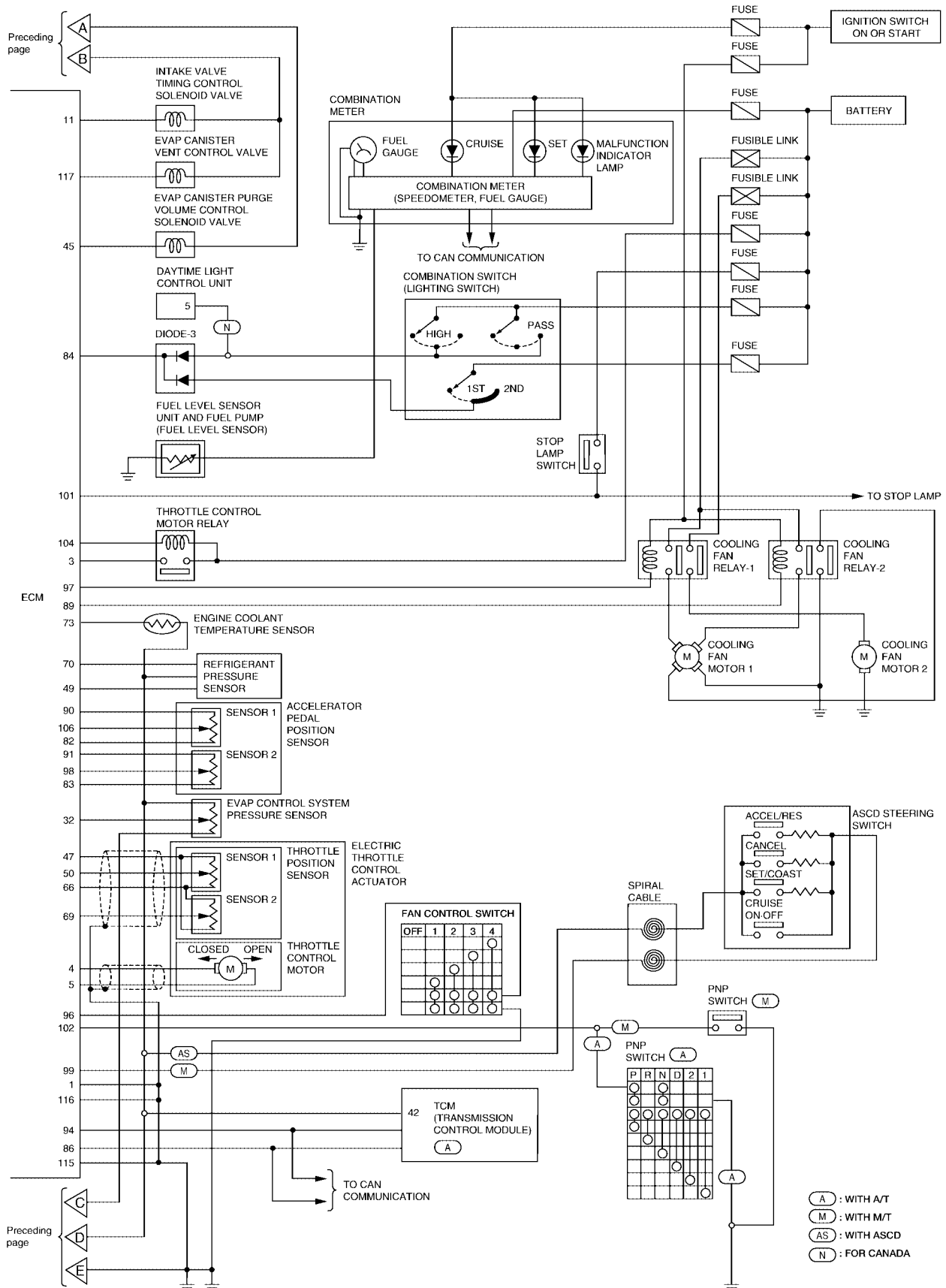
UBS001CV



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# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

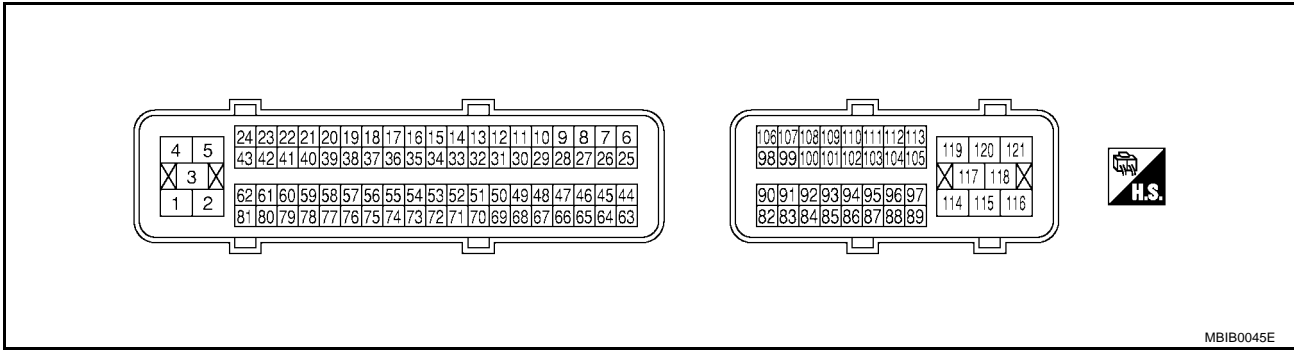


BBWA0272E



ECM Harness Connector Terminal Layout

UBS001CW

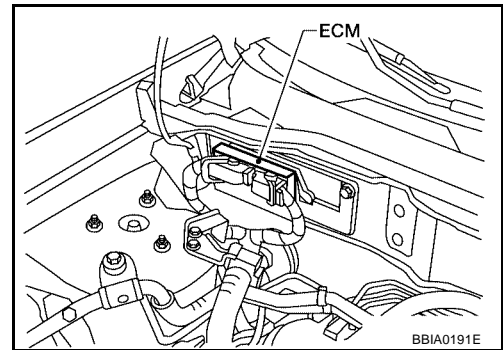


MBIB0045E

ECM Terminals and Reference Value  
PREPARATION

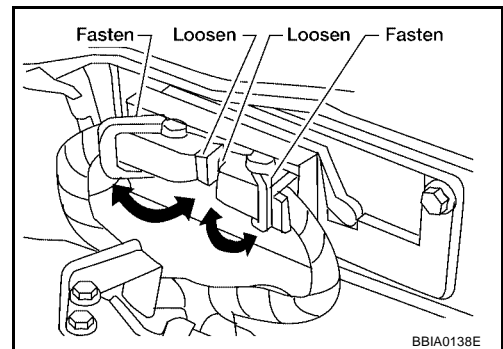
UBS001CX

1. ECM is located in the right side of the cowl top (behind the strut tower).
2. Remove ECM harness connector.



BBAI0191E

3. When disconnecting ECM harness connector, loosen it with levers as far as they will go as shown at right.
4. Connect a bread-out box (SST) and Y-cable adapter (SST) between the ECM and ECM harness connector.
  - Use extreme care not to touch 2 pins at one time.
  - Data is for comparison and may not be exact.



BBAI0138E

ECM INSPECTION TABLE

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-II.

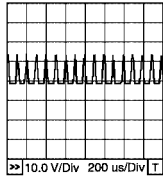
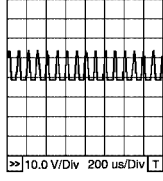
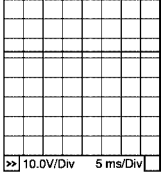
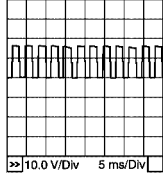
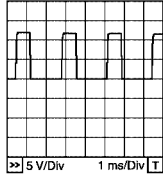
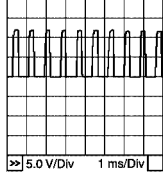
**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	B	ECM ground	<b>[Engine is running]</b> ● Idle speed	Engine ground
3	R/W	Throttle control motor power supply	<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)

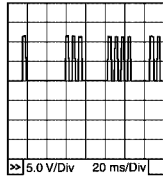
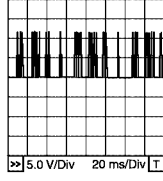
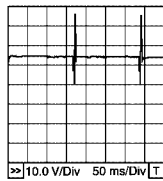
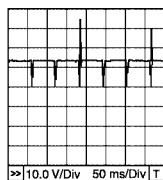
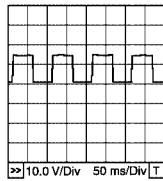
# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	P	Throttle control motor (Close)	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal is releasing</li> </ul>	0 - 14V★  <small>10.0 V/Div 200 us/Div</small>
5	L	Throttle control motor (Open)	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal is depressing</li> </ul>	0 - 14V★  <small>10.0 V/Div 200 us/Div</small>
11	G/Y	Intake valve timing control solenoid valve	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<b>BATTERY VOLTAGE</b> (11 - 14V)★  <small>10.0V/Div 5 ms/Div</small>
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed 2,500 rpm</li> </ul>	7 - 10V★  <small>10.0 V/Div 5 ms/Div</small>
12	P	Power steering pressure sensor	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Steering wheel is being turned</li> </ul>	0.5 - 4.0V
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Steering wheel is not being turned</li> </ul>	0.4 - 0.8V
13	Y	Crankshaft position sensor (POS)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 3.0V★  <small>5 V/Div 1 ms/Div</small>
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is 2,000 rpm</li> </ul>	Approximately 3.0V★  <small>5.0 V/Div 1 ms/Div</small>

# TROUBLE DIAGNOSIS

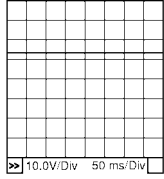
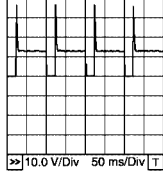
[QG18DE (ULEV)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	W/R	Camshaft position sensor (PHASE)	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>1.0 - 4.0V★</p>  <p style="text-align: right; font-size: small;">PBIB0525E</p>
			<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Engine speed is 2,000 rpm.</li> </ul>	<p>1.0 - 4.0V★</p>  <p style="text-align: right; font-size: small;">PBIB0526E</p>
15	W	Knock sensor	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	<p>Approximately 2.5V</p>
22 23 41 42	G/B R/B L/B Y/B	Injector No. 3 Injector No. 1 Injector No. 4 Injector No. 2	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right; font-size: small;">PBIB0529E</p>
			<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right; font-size: small;">PBIB0530E</p>
24	G/W	Heated oxygen sensor 1 heater	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is below 3,600 rpm</li> </ul>	<p>Approximately 7.0V★</p>  <p style="text-align: right; font-size: small;">PBIB0519E</p>
			<p><b>[Ignition switch "ON"]</b></p> <ul style="list-style-type: none"> <li>● Engine stopped</li> </ul> <p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Engine speed is above 3,600 rpm</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)</p>

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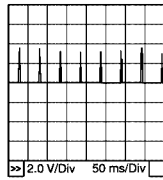
# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
25	W/B	Heated oxygen sensor 2 heater	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Engine speed: Below 3,600 rpm after the following conditions are met.</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	0 - 1.0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> </ul> <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is above 3,600 rpm</li> </ul>	BATTERY VOLTAGE (11 - 14V)
32	L	EVAP control system pressure sensor	<b>[Ignition switch "ON"]</b>	Approximately 1.8 - 4.8V
34	Y/G	Intake air temperature sensor	<b>[Engine is running]</b>	Approximately 0 - 4.8V Output voltage varies with intake air temperature.
35	G	Heated oxygen sensor 1	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Engine speed is 2,000 rpm.</li> </ul>	0 - Approximately 1.0V (Periodically change)
45	GY/L	EVAP canister purge volume control solenoid valve	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	BATTERY VOLTAGE (11 - 14V)★   <small>PBIB0050E</small>
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine)</li> </ul>	Approximately 10V★   <small>PBIB0520E</small>
47	B	Sensor power supply (Throttle position sensor)	<b>[Ignition switch "ON"]</b>	Approximately 5V
48	R/W	Sensor's power supply	<b>[Ignition switch "ON"]</b>	Approximately 5V
49	R/Y	Sensor power supply (Refrigerant pressure sensor)	<b>[Ignition switch "ON"]</b>	Approximately 5V
50	W	Throttle position sensor 1	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully released</li> </ul>	More than 0.36V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully depressed</li> </ul>	Less than 4.75V

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	A
51	L/R	Mass air flow sensor	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	1.0 - 1.7V	EC
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,500 rpm</li> </ul>	1.5 - 2.1V	C
61 62 80 81	L/W BR GY/R PU	Ignition signal No. 3 Ignition signal No. 1 Ignition signal No. 4 Ignition signal No. 2	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	0 - 0.1V★  <small>PBIB0521E</small>	D
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm</li> </ul>	0 - 0.2V★  <small>PBIB0522E</small>	E
66	R	Sensor ground (Throttle position sensor)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 0V	F
67	B/W	Sensor ground (Mass air flow sensor)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 0V	G
68	G/R	Sensor power supply (Power steering pressure sensor)	<b>[Ignition switch "ON"]</b>	Approximately 5V	H
69	G	Throttle position sensor 2	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully released</li> </ul>	Less than 4.75V	I
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully depressed</li> </ul>	More than 0.36V	J
70	L	Refrigerant pressure sensor	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Both A/C switch and blower switch are "ON" (Compressor operates.)</li> </ul>	1.0 - 4.0V	K
73	BR/W	Engine coolant temperature sensor	<b>[Engine is running]</b>	Approximately 0 - 4.8V Output voltage varies with engine coolant temperature.	L

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	R/L	Heated oxygen sensor 2	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Engine speed is 2,000 rpm after the following conditions are met.</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	0 - Approximately 1.0V
78	B	Sensor ground (Heated oxygen sensor)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Idle speed</li> </ul>	Approximately 0V
82	B/Y	Sensor ground (Accelerator pedal position sensor 1)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Idle speed</li> </ul>	Approximately 0V
83	G	Sensor ground (Accelerator pedal position sensor 2)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Idle speed</li> </ul>	Approximately 0V
84	PU	Electrical load signal (Headlamp signal)	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Lighting switch is "2ND" position</li> </ul>	BATTERY VOLTAGE (11 - 14V)
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Lighting switch is "OFF"</li> </ul>	Approximately 0V
85	LG	DATA link connector	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● CONSULT-II or GST is disconnected.</li> </ul>	BATTERY VOLTAGE (11 - 14V)
86	Y	CAN communication line	<b>[Ignition switch "ON"]</b>	Approximately 2.3V
89	LG/B	Cooling fan relay (High)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Cooling fan is not operating</li> </ul>	BATTERY VOLTAGE (11 - 14V)
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Cooling fan is high speed operating</li> </ul>	0 - 1.0V
90	R	Sensor power supply (Accelerator pedal position sensor 1)	<b>[Ignition switch "ON"]</b>	Approximately 5V
91	R/G	Sensor power supply (Accelerator pedal position sensor 2)	<b>[Ignition switch "ON"]</b>	Approximately 5V
94	L	CAN communication line	<b>[Ignition switch "ON"]</b>	Approximately 2.8V
96	Y/G	Electrical load signal (Heater fan signal)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Heater fan switch "ON"</li> </ul>	Approximately 0V
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Heater fan switch "OFF"</li> </ul>	Approximately 5V
97	LG/R	Cooling fan relay (Low)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Cooling fan is not operating.</li> </ul>	BATTERY VOLTAGE (11 - 14V)
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Cooling fan is operating.</li> </ul>	0 - 1.0V
98	R/B	Accelerator pedal position sensor 2	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Accelerator pedal fully released</li> </ul>	0.28 - 0.48V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Accelerator pedal fully depressed</li> </ul>	More than 2.0V

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	A
99	W/R	ASCD steering switch	[Ignition switch "ON"] ● ASCD steering switch is "OFF".	Approximately 4.0V	EC
			[Ignition switch "ON"] ● CRUISE switch is "ON".	Approximately 0V	
			[Ignition switch "ON"] ● CANCEL switch is "ON".	Approximately 1V	C
			[Ignition switch "ON"] ● COAST/SET switch is "ON".	Approximately 2V	D
			[Ignition switch "ON"] ● ACCEL/RESUME switch is "ON".	Approximately 3V	E
101	R/G	Stop lamp switch	[Ignition switch "ON"] ● Brake pedal fully released	Approximately 0V	
			[Ignition switch "ON"] ● Brake pedal fully depressed	BATTERY VOLTAGE (11 - 14V)	F
102	G/OR	PNP switch	[Ignition switch "ON"] ● Gear position is "P" or "N"	Approximately 0V	G
			[Ignition switch "ON"] ● Except the above gear position	<b>A/T models</b> BATTERY VOLTAGE (11 - 14V) <b>M/T models</b> Approximately 5V	H
104	P	Throttle control motor relay	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)	I
			[Ignition switch "ON"]	0 - 1.0V	
106	W	Accelerator pedal position sensor 1	[Ignition switch "ON"] ● Engine stopped ● Accelerator pedal fully released	0.65 - 0.87V	J
			[Ignition switch "ON"] ● Engine stopped ● Accelerator pedal fully depressed	More than 4.3V	K
107	OR	Fuel tank temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with fuel tank temperature.	L
108	P/L	ASCD brake switch	[Ignition switch "ON"] ● Brake pedal is depressed	Approximately 0V	M
			[Ignition switch "ON"] ● Brake pedal is fully released	BATTERY VOLTAGE (11 - 14V)	
109	B/R	Ignition switch	[Ignition switch "OFF"]	0V	
			[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)	
111	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For 5 seconds after turning ignition switch "OFF"	0 - 1.0V	
			[Ignition switch "OFF"] ● 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)	

# TROUBLE DIAGNOSIS

**[QG18DE (ULEV)]**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
113	B/P	Fuel pump relay	<b>[Ignition switch "ON"]</b> ● For 1 second after turning ignition switch "ON"	0 - 1.0V
			<b>[Engine is running]</b> <b>[Ignition switch "ON"]</b> ● More than 1 second after turning ignition switch "ON".	BATTERY VOLTAGE (11 - 14V)
115 116	B B	ECM ground	<b>[Engine is running]</b> ● Idle speed	Engine ground
117	L/Y	EVAP canister vent control valve	<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)
119 120	R/G R/G	Power supply for ECM	<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)
121	W/L	Power supply for ECM (Buck-up)	<b>[Ignition switch "OFF"]</b>	BATTERY VOLTAGE (11 - 14V)

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)



# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

UBS001CY

## CONSULT-II Function FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-II unit.
Self-diagnostic results	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*1
Data monitor	Input/Output data in the ECM can be read.
Data monitor (SPEC)	Input/Output specification of the Basic fuel schedule, AFM, A/F feedback control value and the other data monitor items can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.
Active test	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
DTC & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
Function test	This mode is used to inform customers of their vehicle condition of periodic maintenance.
ECM part number	ECM part number can be read.

\*1 The following emission-related diagnostic information is cleared when the ECM memory is erased.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values
- Others

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

## ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

Item		DIAGNOSTIC TEST MODE							
		WORK SUP-PORT	SELF-DIAGNOS-TIC RESULTS		DATA MONI-TOR	DATA MONI-TOR (SPEC)	ACTIVE TEST	DTC & SRT CON-FIRMATION	
			DTC*1	FREEZE FRAME DATA*2				SRT STA-TUS	DTC WORK SUP-PORT
<b>ENGINE CONTROL COMPONENT PARTS</b>	<b>INPUT</b>	Camshaft position sensor (PHASE)		X	X				
	Crankshaft position sensor (POS)		X			X			
	Mass air flow sensor		X		X	X			
	Engine coolant temperature sensor		X	X	X	X	X		
	Heated oxygen sensor 1		X		X	X		X	
	Heated oxygen sensor 2		X		X	X		X	
	Vehicle speed sensor		X	X	X	X			
	Throttle position sensor		X		X	X			
	Fuel tank temperature sensor		X		X	X	X		
	EVAP control system pressure sensor		X		X	X			
	Intake air temperature sensor		X	X	X	X			
	Knock sensor		X						
	Air conditioner switch				X	X			
	Park/neutral position (PNP) switch		X		X	X			
	Power steering pressure sensor		X		X	X			
	Battery voltage				X	X			
	Load signal				X	X			
	Fuel level sensor		X		X	X			
	Stop lamp switch		X		X	X			
	ASCD steering switch		X		X	X			
ASCD brake switch		X		X	X				
Accelerator pedal position sensor		X		X	X				
Refrigerant pressure sensor									
<b>ENGINE CONTROL COMPONENT PARTS</b>	<b>OUTPUT</b>	Injectors				X	X	X	
	Power transistor (Ignition timing)	X				X	X	X	
	Throttle control motor relay		X			X	X		
	Throttle control motor		X						
	EVAP canister purge volume control solenoid valve		X			X	X	X	X
	Air conditioner relay					X	X		
	Fuel pump relay	X				X	X	X	
	Cooling fan relay		X			X	X	X	
	Heated oxygen sensor 1 heater		X			X	X		X
	Heated oxygen sensor 2 heater		X			X	X		X
	EVAP canister vent control valve		X			X	X	X	
	Intake valve timing control solenoid valve		X			X	X	X	
	Calculated load value				X	X	X		

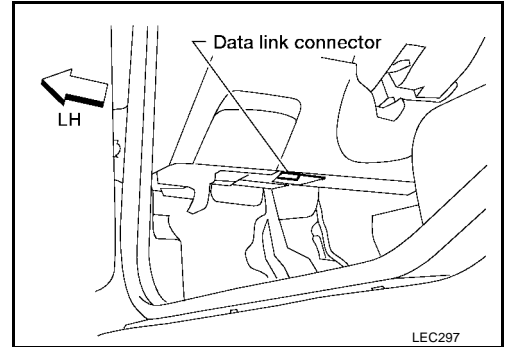
X: Applicable

\*1: This item includes 1st trip DTCs.

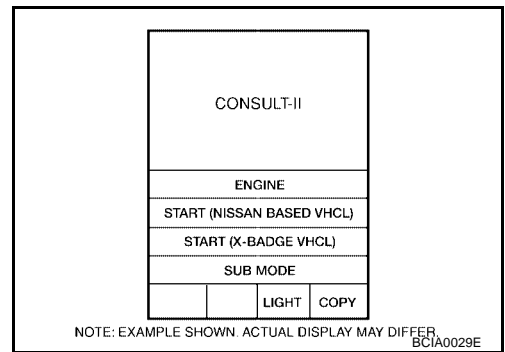
\*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-II screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to [EC-62. "FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA"](#).

### CONSULT-II INSPECTION PROCEDURE

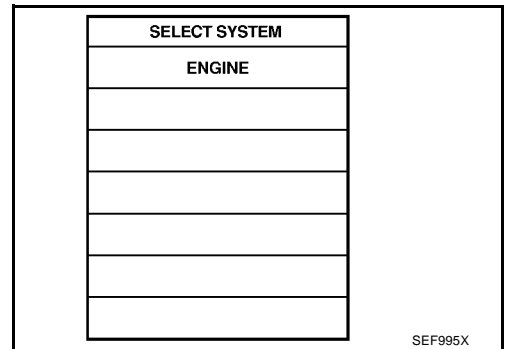
1. Turn ignition switch OFF.
2. Connect "CONSULT-II" to data link connector, which is located under LH dash panel near the fuse box cover.
3. Turn ignition switch ON.



4. Touch "START (NISSAN BASED VHCL)".

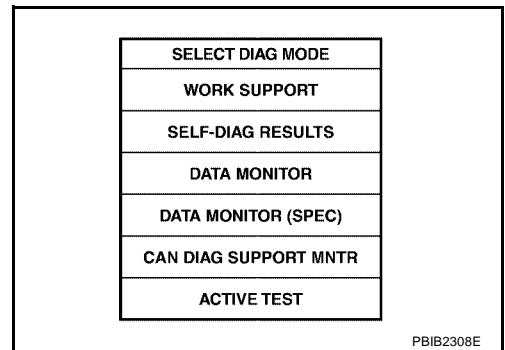


5. Touch "ENGINE".



6. Perform each diagnostic test mode according to each service procedure.

**For further information, see the CONSULT-II Operation Manual.**



# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

## WORK SUPPORT MODE

### Work Item

WORK ITEM	CONDITION	USAGE
FUEL PRESSURE RELEASE	<ul style="list-style-type: none"> <li>● FUEL PUMP WILL STOP BY TOUCHING "START" DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS.</li> </ul>	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	<ul style="list-style-type: none"> <li>● THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM.</li> </ul>	When learning the idle air volume
SELF-LEARNING CONT	<ul style="list-style-type: none"> <li>● THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT.</li> </ul>	When clearing the coefficient of self-learning control value
EVAP SYSTEM CLOSE	<p>CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS.</p> <ul style="list-style-type: none"> <li>● IGN SW "ON"</li> <li>● ENGINE NOT RUNNING</li> <li>● AMBIENT TEMPERATURE IS ABOVE 0°C (32°F).</li> <li>● NO VACUUM AND NO HIGH PRESSURE IN EVAP SYSTEM</li> <li>● TANK FUEL TEMP. IS MORE THAN 0°C (32°F).</li> <li>● WITHIN 10 MINUTES AFTER STARTING "EVAP SYSTEM CLOSE"</li> <li>● WHEN TRYING TO EXECUTE "EVAP SYSTEM CLOSE" UNDER THE CONDITION EXCEPT ABOVE, CONSULT-II WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTION.</li> </ul> <p><b>NOTE:</b> <b>WHEN STARTING ENGINE, CONSULT-II MAY DISPLAY "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", EVEN IN USING CHARGED BATTERY.</b></p>	When detecting EVAP vapor leak point of EVAP system
TARGET IDLE RPM ADJ*	<ul style="list-style-type: none"> <li>● IDLE CONDITION</li> </ul>	When setting target idle speed
TARGET IGNITION TIMING ADJ*	<ul style="list-style-type: none"> <li>● IDLE CONDITION</li> </ul>	<ul style="list-style-type: none"> <li>● When adjusting target ignition timing After adjustment, confirm target ignition timing with a timing light.</li> <li>● If once the "TARGET IDLE RPM ADJ" has been done, the Idle Air Volume Learning procedure will not be completed.</li> </ul>

\*: This function is not necessary in the usual service procedure.

## SELF-DIAG RESULTS MODE

### Self Diagnostic Item

Regarding items of “DTC and 1st trip DTC”, refer to “TROUBLE DIAGNOSIS — INDEX” (See [EC-21](#) .)

### Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*1	Description
DIAG TROUBLE CODE [PXXXX]	<ul style="list-style-type: none"> <li>The engine control component part/control system has a trouble code, it is displayed as “PXXXX”. (Refer to “TROUBLE DIAGNOSIS — INDEX”, <a href="#">EC-21</a> .)</li> </ul>
FUEL SYS-B1	<ul style="list-style-type: none"> <li>“Fuel injection system status” at the moment a malfunction is detected is displayed.</li> <li>One mode in the following is displayed.                             <ul style="list-style-type: none"> <li>“MODE 2”: Open loop due to detected system malfunction</li> <li>“MODE 3”: Open loop due to driving conditions (power enrichment, deceleration enrichment)</li> <li>“MODE 4”: Closed loop - using oxygen sensor(s) as feedback for fuel control</li> <li>“MODE 5”: Open loop - has not yet satisfied condition to go to closed loop</li> </ul> </li> </ul>
CAL/LD VALUE [%]	<ul style="list-style-type: none"> <li>The calculated load value at the moment a malfunction is detected is displayed.</li> </ul>
COOLANT TEMP [°C] or [°F]	<ul style="list-style-type: none"> <li>The engine coolant temperature at the moment a malfunction is detected is displayed.</li> </ul>
S-FUEL TRIM-B1 [%]	<ul style="list-style-type: none"> <li>“Short-term fuel trim” at the moment a malfunction is detected is displayed.</li> <li>The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.</li> </ul>
L-FUEL TRIM-B1 [%]	<ul style="list-style-type: none"> <li>“Long-term fuel trim” at the moment a malfunction is detected is displayed.</li> <li>The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.</li> </ul>
ENGINE SPEED [rpm]	<ul style="list-style-type: none"> <li>The engine speed at the moment a malfunction is detected is displayed.</li> </ul>
VEHICLE SPEED [km/h] or [mph]	<ul style="list-style-type: none"> <li>The vehicle speed at the moment a malfunction is detected is displayed.</li> </ul>
B/FUEL SCHDL [msec]	<ul style="list-style-type: none"> <li>The base fuel schedule at the moment a malfunction is detected is displayed.</li> </ul>
INT/A TEMP SE [°C] or [°F]	<ul style="list-style-type: none"> <li>The intake air temperature at the moment a malfunction is detected is displayed.</li> </ul>

\*1: The items are the same as those of 1st trip freeze frame data.

## DATA MONITOR MODE

### Monitored Item

×: Applicable

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	Description	Remarks
ENG SPEED [rpm]	×	×	<ul style="list-style-type: none"> <li>Indicates the engine speed computed from the signals of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).</li> </ul>	<ul style="list-style-type: none"> <li>Accuracy becomes poor if engine speed drops below the idle rpm.</li> <li>If the signal is interrupted while the engine is running, an abnormal value may be indicated.</li> </ul>
MAS A/F SE-B1 [V]	×	×	<ul style="list-style-type: none"> <li>The signal voltage of the mass air flow sensor is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> </ul>
B/FUEL SCHDL [msec]		×	<ul style="list-style-type: none"> <li>“Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.</li> </ul>	

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	Description	Remarks
A/F ALPHA-B1 [%]		×	<ul style="list-style-type: none"> <li>The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> <li>This data also includes the data for the air-fuel ratio learning control.</li> </ul>
COOLAN TEMP/S [°C] or [°F]	×	×	<ul style="list-style-type: none"> <li>The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.</li> </ul>
HO2S1 (B1) [V]	×	×	<ul style="list-style-type: none"> <li>The signal voltage of the heated oxygen sensor 1 is displayed.</li> </ul>	
HO2S2 (B1) [V]	×		<ul style="list-style-type: none"> <li>The signal voltage of the heated oxygen sensor 2 is displayed.</li> </ul>	
HO2S1 MNTR (B1) [RICH/LEAN]	×	×	<ul style="list-style-type: none"> <li>Display of heated oxygen sensor 1 signal during air-fuel ratio feedback control: RICH ... means the mixture became "rich", and control is being affected toward a leaner mixture. LEAN ... means the mixture became "lean", and control is being affected toward a rich mixture.</li> </ul>	<ul style="list-style-type: none"> <li>After turning ON the ignition switch, "RICH" is displayed until air-fuel mixture ratio feedback control begins.</li> <li>When the air-fuel ratio feedback is clamped, the value just before the clamping is displayed continuously.</li> </ul>
HO2S2 MNTR (B1) [RICH/LEAN]	×		<ul style="list-style-type: none"> <li>Display of heated oxygen sensor 2 signal: RICH ... means the amount of oxygen after three way catalyst is relatively small. LEAN ... means the amount of oxygen after three way catalyst is relatively large.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> </ul>
VHCL SPEED SE [km/h] or [mph]	×	×	<ul style="list-style-type: none"> <li>The vehicle speed computed from the vehicle speed signal is displayed.</li> </ul>	
BATTERY VOLT [V]	×	×	<ul style="list-style-type: none"> <li>The power supply voltage of ECM is displayed.</li> </ul>	
ACCEL SEN 1 [V]	×	×	<ul style="list-style-type: none"> <li>The accelerator pedal position sensor signal voltage is displayed.</li> </ul>	
ACCEL SEN 2 [V]	×			
THRTL SEN 1 [V]	×	×	<ul style="list-style-type: none"> <li>The throttle position sensor signal voltage is displayed.</li> </ul>	
THRTL SEN 2 [V]	×			
FUEL T/TEMP SE [°C] or [°F]	×		<ul style="list-style-type: none"> <li>The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed.</li> </ul>	
INT/A TEMP SE [°C] or [°F]	×	×	<ul style="list-style-type: none"> <li>The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated.</li> </ul>	
EVAP SYS PRES [V]	×		<ul style="list-style-type: none"> <li>The signal voltage of EVAP control system pressure sensor is displayed.</li> </ul>	
FUEL LEVEL SE [V]	×		<ul style="list-style-type: none"> <li>The signal voltage of the fuel level sensor is displayed.</li> </ul>	
START SIGNAL [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the starter signal.</li> </ul>	<ul style="list-style-type: none"> <li>After starting the engine, [OFF] is displayed regardless of the starter signal.</li> </ul>

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	Description	Remarks
CLSD THL POS [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal.</li> </ul>	
AIR COND SIG [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal.</li> </ul>	
P/N POSI SW [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal.</li> </ul>	
PW/ST SIGNAL [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>[ON/OFF] condition of the power steering oil pressure switch as determined by the power steering oil pressure signal is indicated.</li> </ul>	
LOAD SIGNAL [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the electrical load signal.</li> <li>ON ... Rear window defogger switch is ON and/or lighting switch is in 2nd position.</li> <li>OFF ... Both rear window defogger switch and lighting switch are OFF.</li> </ul>	
IGNITION SW [ON/OFF]	×		<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from ignition switch.</li> </ul>	
HEATER FAN SW [ON/OFF]	×		<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the heater fan switch signal.</li> </ul>	
BRAKE SW [ON/OFF]	×		<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the stop lamp switch signal.</li> </ul>	
INJ PULSE-B1 [msec]		×	<ul style="list-style-type: none"> <li>Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain computed value is indicated.</li> </ul>
IGN TIMING [BTDC]		×	<ul style="list-style-type: none"> <li>Indicates the ignition timing computed by ECM according to the input signals.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> </ul>
CAL/LD VALUE [%]			<ul style="list-style-type: none"> <li>"Calculated load value" indicates the value of the current airflow divided by peak airflow.</li> </ul>	
MASS AIRFLOW [g·m/s]			<ul style="list-style-type: none"> <li>Indicates the mass airflow computed by ECM according to the signal voltage of the mass air flow sensor.</li> </ul>	
PURG VOL C/V [%]			<ul style="list-style-type: none"> <li>Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals.</li> <li>The opening becomes larger as the value increases.</li> </ul>	
INT/V TIM (B1) [°CA]			<ul style="list-style-type: none"> <li>Indicates [°CA] of intake camshaft advanced angle.</li> </ul>	
INT/V SOL (B1) [%]			<ul style="list-style-type: none"> <li>The control condition of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated.</li> <li>ON ... intake valve timing control is operating.</li> <li>OFF ... Intake valve timing control is not operating.</li> </ul>	

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# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	Description	Remarks
AIR COND RLY [ON/OFF]		×	<ul style="list-style-type: none"> <li>The air conditioner relay control condition (determined by ECM according to the input signals) is indicated.</li> </ul>	
FUEL PUMP RLY [ON/OFF]		×	<ul style="list-style-type: none"> <li>Indicates the fuel pump relay control condition determined by ECM according to the input signals.</li> </ul>	
VENT CONT/V [ON/OFF]			<ul style="list-style-type: none"> <li>The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated. ON ... Closed OFF ... Open</li> </ul>	
THRTL RELAY [ON/OFF]		×	<ul style="list-style-type: none"> <li>Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.</li> </ul>	
COOLING FAN [HI/LOW/OFF]			<ul style="list-style-type: none"> <li>Indicates the condition of the cooling fan (determined by ECM according to the input signals). HI ... High speed operation LOW ... Low speed operation OFF ... Stop</li> </ul>	
HO2S1 HTR (B1) [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of heated oxygen sensor 1 heater determined by ECM according to the input signals.</li> </ul>	
HO2S2 HTR (B1) [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals.</li> </ul>	
IDL A/V LEARN [YET/CMPLT/ INCMP]			<ul style="list-style-type: none"> <li>Display the condition of idle air volume learning YET ... Idle air volume learning has not been performed yet. CMPLT ... Idle air volume learning has already been performed successfully. INCMP ... Idle air volume learning has not been performed successfully.</li> </ul>	
TRVL AFTER MIL [km] or [mile]			<ul style="list-style-type: none"> <li>Distance traveled while MIL is activated.</li> </ul>	
O2SEN HTR DTY [%]			<ul style="list-style-type: none"> <li>Indicates the heated oxygen sensor 1 heater control value computed by the ECM according to the input signals.</li> </ul>	
AC PRESS SEN [V]			<ul style="list-style-type: none"> <li>The signal voltage from the refrigerant pressure sensor is displayed.</li> </ul>	
VHCL SPEED SE [km/h] or [mph]			<ul style="list-style-type: none"> <li>The vehicle speed computed from the vehicle speed signal sent from TCM is displayed.</li> </ul>	
SET VHCL SPD [km/h] or [mph]			<ul style="list-style-type: none"> <li>The preset vehicle speed is displayed.</li> </ul>	
MAIN SW [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from CRUISE switch signal.</li> </ul>	
CANCEL SW [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from CANCEL switch signal.</li> </ul>	
RESUME/ACC SW [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from ACCEL/RES switch signal.</li> </ul>	
SET SW [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from COAST/SET switch signal.</li> </ul>	



# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	Description	Remarks	
BRAKE SW1 SW [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from ASCD brake switch signal, and ASCD clutch switch signal (M/T models).</li> </ul>		A <b>EC</b>
BRAKE SW2 SW [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of stop lamp switch signal.</li> </ul>		C
VHCL SPD CUT [NON/CUT]			<ul style="list-style-type: none"> <li>Indicates the vehicle cruise condition. NON ... Vehicle speed is maintained at the ASCD set speed. CUT ... Vehicle speed increased to excessively high compared with the ASCD set speed, and ASCD operation is cut off.</li> </ul>		D
LO SPEED CUT [NON/CUT]			<ul style="list-style-type: none"> <li>Indicates the vehicle cruise condition. NON ... Vehicle speed is maintained at the ASCD set speed. CUT ... Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off.</li> </ul>		E F G
AT OD MONITOR [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of A/T O/D according to the input signal from the TCM.</li> </ul>		H
AT OD CANCEL [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of A/T O/D cancel signal sent from the TCM.</li> </ul>		I
CRUISE LAMP [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals.</li> </ul>		J
SET LAMP [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals.</li> </ul>		K
Voltage [V]			<ul style="list-style-type: none"> <li>Voltage, frequency, duty cycle or pulse width measured by the probe.</li> </ul>	<ul style="list-style-type: none"> <li>Only “#” is displayed if item is unable to be measured.</li> <li>Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.</li> </ul>	L
Frequency [msec], [Hz] or [%]					M
DUTY-HI					
DUTY-LOW					
PLS WIDTH-HI					
PLS WIDTH-LOW					

**NOTE:**

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

## DATA MONITOR (SPEC) MODE

### Monitored Item

X: Applicable

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
ENG SPEED [rpm]	×	×	<ul style="list-style-type: none"> <li>Indicates the engine speed computed from the signal of the camshaft position sensor (PHASE).</li> </ul>	
MAS A/F SE-B1 [V]	×	×	<ul style="list-style-type: none"> <li>The signal voltage of the mass air flow sensor specification is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>When engine is running, specification range is indicated.</li> </ul>
B/FUEL SCHDL [msec]			<ul style="list-style-type: none"> <li>"Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.</li> </ul>	<ul style="list-style-type: none"> <li>When engine is running, specification range is indicated.</li> </ul>
A/F ALPHA-B1 [%]		×	<ul style="list-style-type: none"> <li>The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.</li> </ul>	<ul style="list-style-type: none"> <li>When engine is running, specification range is indicated.</li> <li>This data also includes the data for the air-fuel ratio learning control.</li> </ul>

## ACTIVE TEST MODE

### Test Item

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	<ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Change the amount of fuel injection using CONSULT-II.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>Harness and connector</li> <li>Fuel injectors</li> <li>Heated oxygen sensor 1</li> </ul>
IGNITION TIMING	<ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Timing light: Set</li> <li>Retard the ignition timing using CONSULT-II.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>Adjust initial ignition timing</li> </ul>
POWER BALANCE	<ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine.</li> <li>A/C switch "OFF"</li> <li>Shift lever: N (A/T models) Neutral (M/T models)</li> <li>Cut off each injector signal one at a time using CONSULT-II.</li> </ul>	Engine runs rough or dies.	<ul style="list-style-type: none"> <li>Harness and connector</li> <li>Compression</li> <li>Injectors</li> <li>Power transistor</li> <li>Spark plugs</li> <li>Ignition coils</li> </ul>
COOLING FAN*	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> <li>Turn the cooling fan "ON" and "OFF" using CONSULT-II.</li> </ul>	Cooling fan moves and stops.	<ul style="list-style-type: none"> <li>Harness and connector</li> <li>Cooling fan motor</li> <li>Cooling fan relay</li> </ul>
ENG COOLANT TEMP	<ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Change the engine coolant temperature using CONSULT-II.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>Harness and connector</li> <li>Engine coolant temperature sensor</li> <li>Fuel injectors</li> </ul>
FUEL PUMP RELAY	<ul style="list-style-type: none"> <li>Ignition switch: ON (Engine stopped)</li> <li>Turn the fuel pump relay "ON" and "OFF" using CONSULT-II and listen to operating sound.</li> </ul>	Fuel pump relay makes the operating sound.	<ul style="list-style-type: none"> <li>Harness and connector</li> <li>Fuel pump relay</li> </ul>

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
PURG VOL CONT/V	<ul style="list-style-type: none"> <li>● Engine: After warming up, run engine at 1,500 rpm.</li> <li>● Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-II.</li> </ul>	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> <li>● Harness and connector</li> <li>● Solenoid valve</li> </ul>
FUEL/T TEMP SEN	<ul style="list-style-type: none"> <li>● Change the fuel tank temperature using CONSULT-II.</li> </ul>		
VENT CONTROL/V	<ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> <li>● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound.</li> </ul>	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> <li>● Harness and connector</li> <li>● Solenoid valve</li> </ul>
V/T ASSIGN ANGLE	<ul style="list-style-type: none"> <li>● Engine: Return to the original trouble condition</li> <li>● Change intake valve timing using CONSULT-II.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>● Harness and connectors</li> <li>● Intake valve timing control solenoid valve</li> </ul>

\*: Leaving cooling fan "OFF" with CONSULT-II while engine is running may cause the engine to overheat.

## DTC & SRT CONFIRMATION MODE

### SRT Status Mode

For details, refer to [EC-63, "SYSTEM READINESS TEST \(SRT\) CODE"](#) .

### SRT Work Support Mode

This mode enables a technician to drive a vehicle to set the SRT while monitoring the SRT status.

### DTC Work Support Mode

Test mode	Test item	Condition	Reference page
EVAPORATIVE SYSTEM	PURG FLOW P0441	Refer to corresponding trouble diagnosis for DTC.	<a href="#">EC-294</a>
	EVAP SML LEAK P0442		<a href="#">EC-301</a>
	EVAP V/S LEAK P0456		<a href="#">EC-346</a>
	PURG VOL CN/V P1444		<a href="#">EC-460</a>
HO2S1	HO2S1 (B1) P0133		<a href="#">EC-207</a>
	HO2S1 (B1) P0134		<a href="#">EC-216</a>
	HO2S1 (B1) P1143		<a href="#">EC-409</a>
	HO2S1 (B1) P1144		<a href="#">EC-415</a>
HO2S2	HO2S2 (B1) P0139		<a href="#">EC-230</a>
	HO2S2 (B1) P1146		<a href="#">EC-421</a>
	HO2S2 (B1) P1147		<a href="#">EC-428</a>

## REAL TIME DIAGNOSIS IN DATA MONITOR MODE (RECORDING VEHICLE DATA)

### Description

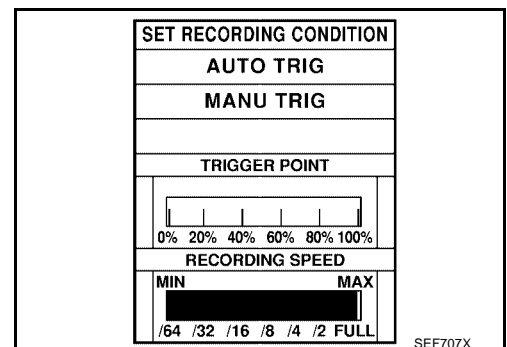
CONSULT-II has two kinds of triggers and they can be selected by touching "SETTING" in "DATA MONITOR" mode.

#### 1. "AUTO TRIG" (Automatic trigger):

The malfunction will be identified on the CONSULT-II screen in real time.

In other words, DTC/1st trip DTC and malfunction item will be displayed if the malfunction is detected by ECM.

At the moment a malfunction is detected by ECM, "MONITOR" in "DATA MONITOR" screen is changed to "Recording Data ... xx%" as shown at left, and the data after the malfunction detection is recorded. Then when the percentage reached 100%,



# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

“REAL-TIME DIAG” screen is displayed. If “STOP” is touched on the screen during “Recording Data ... xx%”, “REAL-TIME DIAG” screen is also displayed.

The recording time after the malfunction detection and the recording speed can be changed by “TRIGGER POINT” and “Recording Speed”. Refer to CONSULT-II OPERATION MANUAL.

## 2. “MANU TRIG” (Manual trigger):

- DTC/1st trip DTC and malfunction item will not be displayed automatically on CONSULT-II screen even though a malfunction is detected by ECM.  
DATA MONITOR can be performed continuously even though a malfunction is detected.

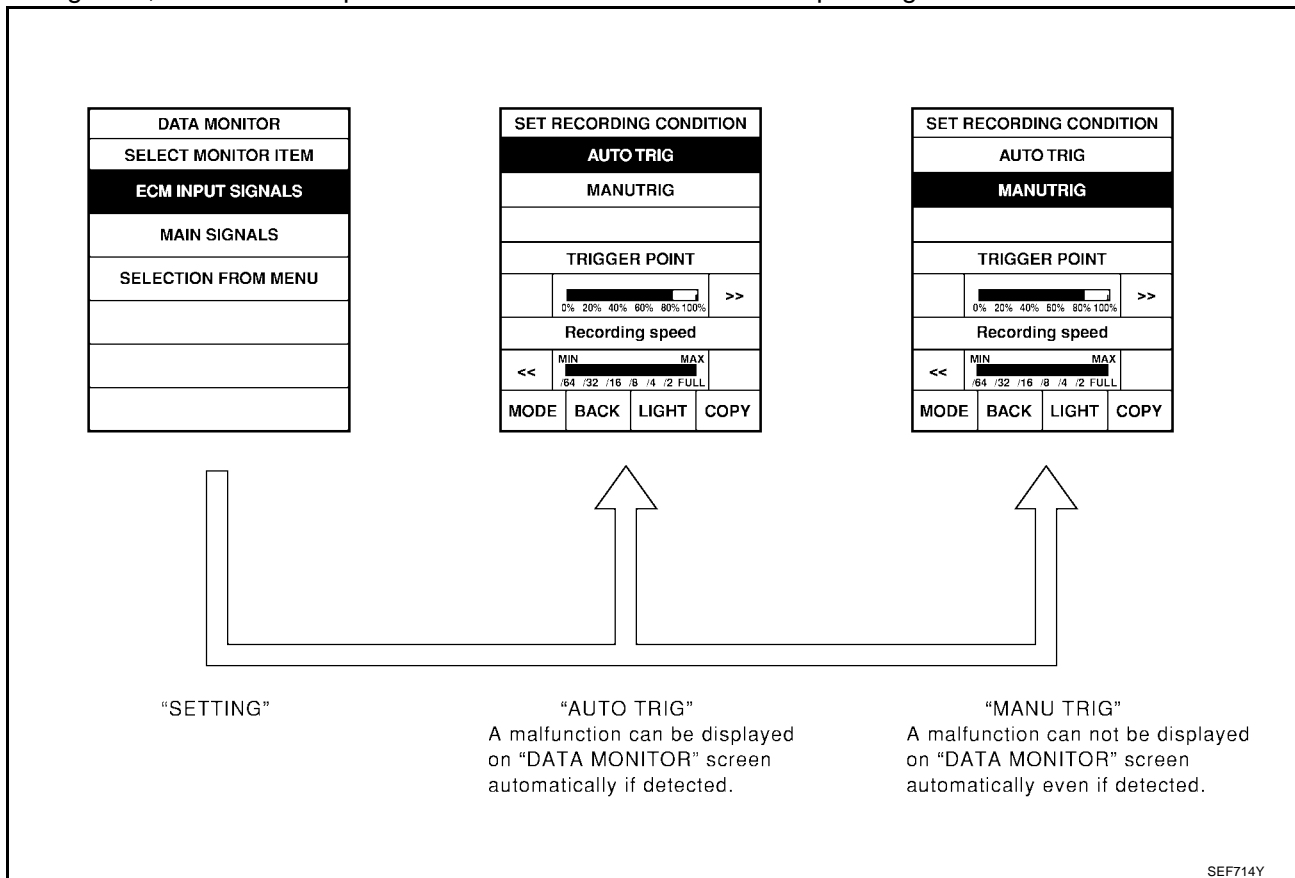
## Operation

### 1. “AUTO TRIG”

- While trying to detect the DTC/1st trip DTC by performing the “DTC Confirmation Procedure”, be sure to select “DATA MONITOR (AUTO TRIG)” mode. You can confirm the malfunction at the moment it is detected.
- While narrowing down the possible causes, CONSULT-II should be set in “DATA MONITOR (AUTO TRIG)” mode, especially in case the incident is intermittent.  
When you are inspecting the circuit by gently shaking (or twisting) the suspicious connectors, components and harness in the “DTC Confirmation Procedure”, the moment a malfunction is found the DTC/1st trip DTC will be displayed. (Refer to [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#), “Incident Simulation Tests”.)

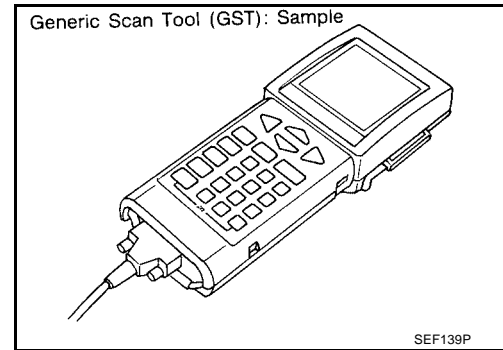
### 2. “MANU TRIG”

- If the malfunction is displayed as soon as “DATA MONITOR” is selected, reset CONSULT-II to “MANU TRIG”. By selecting “MANU TRIG” you can monitor and store the data. The data can be utilized for further diagnosis, such as a comparison with the value for the normal operating condition.



## Generic Scan Tool (GST) Function DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 8 different functions explained on the next page. ISO9141 is used as the protocol. The name "GST" or "Generic Scan Tool" is used in this service manual.



## FUNCTION

Diagnostic test mode		Function
MODE 1	READINESS TESTS	This mode gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
MODE 2	(FREEZE DATA)	This mode gains access to emission-related data value which were stored by ECM during the freeze frame. For details, refer to <a href="#">EC-62, "FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA"</a> .
MODE 3	DTCs	This mode gains access to emission-related power train trouble codes which were stored by ECM.
MODE 4	CLEAR DIAG INFO	This mode can clear all emission-related diagnostic information. This includes: <ul style="list-style-type: none"> <li>● Clear number of diagnostic trouble codes (MODE 1)</li> <li>● Clear diagnostic trouble codes (MODE 3)</li> <li>● Clear trouble code for freeze frame data (MODE 1)</li> <li>● Clear freeze frame data (MODE 2)</li> <li>● Reset status of system monitoring test (MODE 1)</li> <li>● Clear on board monitoring test results (MODE 6 and 7)</li> </ul>
MODE 6	(ON BOARD TESTS)	This mode accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
MODE 7	(ON BOARD TESTS)	This mode enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
MODE 8	—	This mode can close EVAP system in ignition switch "ON" position (Engine stopped). When this mode is performed, following parts can be opened or closed. <ul style="list-style-type: none"> <li>● EVAP canister vent control valve open</li> </ul> In the following conditions, this mode cannot function. <ul style="list-style-type: none"> <li>● Low ambient temperature</li> <li>● Low battery voltage</li> <li>● Engine running</li> <li>● Ignition switch "OFF"</li> <li>● Low fuel temperature</li> <li>● Too much pressure is applied to EVAP system</li> </ul>
MODE 9	(CALIBRATION ID)	This mode enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.

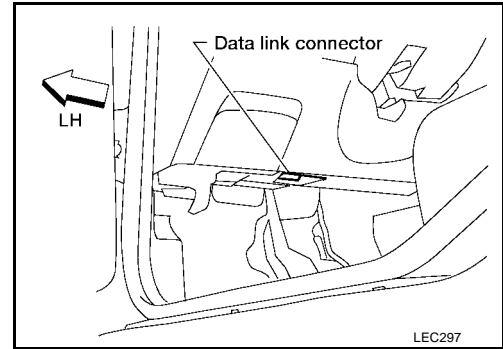
## GST INSPECTION PROCEDURE

1. Turn ignition switch OFF.

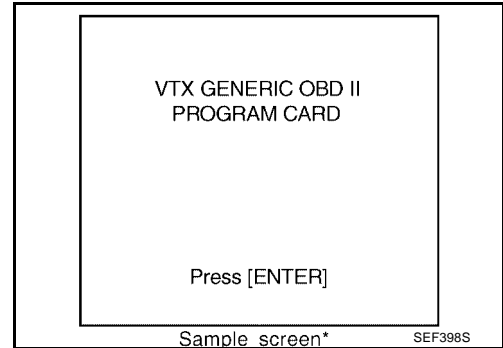
# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

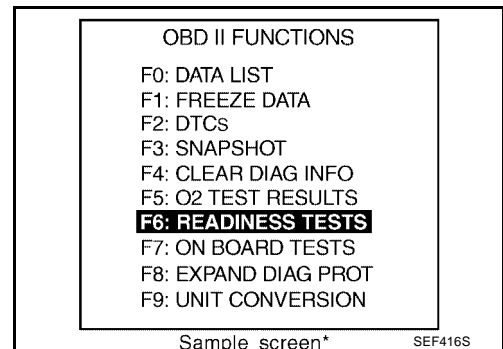
- Connect "GST" to data link connector. (Data link connector is located under LH dash panel near the fuse box cover.)



- Turn ignition switch ON.
  - Enter the program according to instruction on the screen or in the operation manual.
- (\*: Regarding GST screens in this section, sample screens are shown.)



- Perform each diagnostic mode according to each service procedure.
- For further information, see the GST Operation Manual of the tool maker.**



## CONSULT-II Reference Value in Data Monitor Mode

UBS001D0

Remarks:

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.
- \* Specification data may not be directly related to their components signals/values/operations. (i.e., Adjust ignition timing with a timing light before monitoring IGN TIMING. Specification data might be displayed even when ignition timing is not adjusted to specification. This IGN TIMING monitors the data calculated by the ECM according to the input signals from the camshaft position sensor and other ignition timing related sensors.)
- If the real-time diagnosis results are NG, and the on board diagnostic system results are OK, when diagnosing the mass air flow sensor, first check to see if the fuel pump control circuit is normal.

MONITOR ITEM	CONDITION		SPECIFICATION
ENG SPEED	<ul style="list-style-type: none"> <li>● Tachometer: Connect</li> <li>● Run engine and compare tachometer indication with the CONSULT-II value.</li> </ul>		Almost the same speed as the CONSULT-II value.
MAS A/F SE-B1	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> </ul>	Idle	1.0 - 1.7V
	<ul style="list-style-type: none"> <li>● Shift lever: N (A/T models) Neutral (M/T models)</li> <li>● No-load</li> </ul>	2,500 rpm	1.5 - 2.4V

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

MONITOR ITEM	CONDITION	SPECIFICATION
B/FUEL SCHDL	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> </ul>	Idle 1.0 - 1.6 msec
	<ul style="list-style-type: none"> <li>● Shift lever: N (A/T models) Neutral (M/T models)</li> <li>● No-load</li> </ul>	2,000 rpm 0.7 - 1.3 msec
A/F ALPHA-B1	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> </ul>	Maintaining engine speed at 2,000 rpm 53 - 155%
COOLAN TEMP/S	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> </ul>	More than 70°C (158°F)
HO2S1 (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> </ul>	Maintaining engine speed at 2,000 rpm 0 - 0.3V ↔ 0.6 - 1.0V
HO2S2 (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	Revving engine from idle to 3,000 rpm quickly 0 - 0.3V ↔ 0.6 - 1.0V
HO2S1 MNTR (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> </ul>	Maintaining engine speed at 2,000 rpm LEAN ↔ RICH Changes more than 5 times during 10 seconds.
HO2S2 MNTR (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	Revving engine from idle to 3,000 rpm quickly LEAN ↔ RICH
VHCL SPEED SE	<ul style="list-style-type: none"> <li>● Turn drive wheels and compare speedometer indication with the CONSULT-II value</li> </ul>	Almost the same speed as the CONSULT-II value
BATTERY VOLT	<ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> </ul>	11 - 14V
ACCEL SEN1	<ul style="list-style-type: none"> <li>● Ignition switch: ON (engine stopped)</li> </ul>	Accelerator pedal: Fully released 0.65 - 0.87V
		Accelerator pedal: Fully depressed More than 4.3V
ACCEL SEN2*	<ul style="list-style-type: none"> <li>● Ignition switch: ON (engine stopped)</li> </ul>	Accelerator pedal: Fully released 0.56 - 0.96V
		Accelerator pedal: Fully depressed More than 4.0V
THRTL SEN1 THRTL SEN2*	<ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> <li>● Shift lever: D (A/T), 1st (M/T)</li> </ul>	Accelerator pedal: Fully released More than 0.36V
		Accelerator pedal: Fully depressed Less than 4.75V
EVAP SYS PRES	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	Approx. 1.8 - 4.8V
START SIGNAL	<ul style="list-style-type: none"> <li>● Ignition switch: ON → START → ON</li> </ul>	OFF → ON → OFF
CLSD THL POS	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	Accelerator pedal: Fully released ON
		Accelerator pedal: Slightly depressed OFF
AIR COND SIG	<ul style="list-style-type: none"> <li>● Engine: After warming up, idle the engine</li> </ul>	A/C switch "OFF" OFF
		A/C switch "ON" (Compressor operates) ON
P/N POSI SW	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	Shift lever "P" or "N" ON
		Except above OFF

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

MONITOR ITEM	CONDITION	SPECIFICATION
PW/ST SIGNAL	<ul style="list-style-type: none"> <li>● Engine: After warming up, idle the engine</li> </ul>	Steering wheel in neutral position (forward direction)
		The steering wheel is turned
LOAD SIGNAL	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	Rear window defogger switch is ON and/or lighting switch is in 2nd.
		Rear window defogger switch is OFF and lighting switch is OFF.
IGNITION SW	<ul style="list-style-type: none"> <li>● Ignition switch: ON → OFF</li> </ul>	ON → OFF
HEATER FAN SW	<ul style="list-style-type: none"> <li>● Engine: After warming up, idle the engine</li> </ul>	Heater fan is operating.
		Heater fan is not operating
BRAKE SW	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	Brake pedal: Fully released
		Brake pedal: Slightly depressed
INJ PULSE-B1	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: N (A/T models) Neutral (M/T models)</li> <li>● No-load</li> </ul>	Idle
		2,000 rpm
IGN TIMING	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: N (A/T models) Neutral (M/T models)</li> <li>● No-load</li> </ul>	Idle
		2,000 rpm
CAL/LD VALUE	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: N (A/T models) Neutral (M/T models)</li> <li>● No-load</li> </ul>	Idle
		2,500 rpm
MASS AIRFLOW	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: N (A/T models) Neutral (M/T models)</li> <li>● No-load</li> </ul>	Idle
		2,500 rpm
PURG VOL C/V	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: "OFF"</li> <li>● Shift lever: N (A/T models) Neutral (M/T models)</li> <li>● No-load</li> </ul>	Idle
		2,000 rpm
AIR COND RLY	<ul style="list-style-type: none"> <li>● Air conditioner switch: OFF → ON</li> </ul>	OFF → ON
FUEL PUMP RLY	<ul style="list-style-type: none"> <li>● Ignition switch is turned to ON (Operates for 5 seconds)</li> <li>● Engine running and cranking</li> <li>● When engine is stopped (stops in 1.0 seconds)</li> </ul>	ON
	<ul style="list-style-type: none"> <li>● Except as shown above</li> </ul>	OFF
THRTL RELAY	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	ON



# TROUBLE DIAGNOSIS

[QG18DE (ULEV)]

MONITOR ITEM	CONDITION	SPECIFICATION
INT/V TIM (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N (A/T models) Neutral (M/T models)</li> <li>● Air conditioner switch: OFF</li> <li>● No-load</li> </ul>	Idle -5° - 5°C
		When revving engine up to 2,000 rpm quickly Approx. 0° - 30°C
INT/V SOL (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N (A/T models) Neutral (M/T models)</li> <li>● Air conditioner switch: OFF</li> <li>● No-load</li> </ul>	Idle 0% - 2%
		When revving engine up to 2,000 rpm quickly Approx. 0% - 50%
VENT CONT/V	● Ignition switch: ON	OFF
COOLING FAN	<ul style="list-style-type: none"> <li>● After warming up engine, idle the engine.</li> <li>● Air conditioner switch: OFF</li> </ul>	Engine coolant temperature is 94°C (201°F) or less OFF
		Engine coolant temperature is between 95°C (203°F) and 104°C (219°F) LOW
		Engine coolant temperature is 105°C (221°F) or more HIGH
HO2S1 HTR (B1) HO2S1 HTR (B2)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Engine speed: Below 3,600 rpm</li> </ul>	ON
	● Engine speed: Above 3,600 rpm	OFF
HO2S2 HTR (B1) HO2S2 HTR (B2)	<ul style="list-style-type: none"> <li>● Engine speed is below 3,600 rpm after the following conditions are met.                             <ul style="list-style-type: none"> <li>- Engine: After warming up</li> <li>- Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul> </li> </ul>	ON
	● Engine speed: Above 3,600 rpm	OFF
VEHICLE SPEED	● Turn drive wheels and compare speedometer indication with the CONSULT-II value.	Almost the same speed as the CONSULT-II value
TRVL AFTER MIL	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	Vehicle has traveled after MIL has turned ON. 0 - 65,535 km (0 - 40,723 mile)
O2SEN HTR DTY	<ul style="list-style-type: none"> <li>● Engine coolant temperature when engine started: More than 80°C (176°F)</li> <li>● Engine speed: Below 3,600 rpm</li> </ul>	Approx. 40%
AC PRESS SEN	● Ignition switch: ON (Engine stopped)	Approx. 0V
	<ul style="list-style-type: none"> <li>● Engine: Idle</li> <li>● Air conditioner switch: OFF</li> </ul>	1.0 - 4.0V
VEH SPEED SE	● Turn drive wheels and compare speedometer indication with the CONSULT-II value.	Almost the same speed as the CONSULT-II value
SET VHCL SPD	● Engine: Running	ASCD: Operating. The preset vehicle speed is displayed.
MAIN SW	● Ignition switch: ON	CRUISE switch: Depressed ON
		CRUISE switch: Released OFF
CANCEL SW	● Ignition switch: ON	CANCEL switch: Depressed ON
		CANCEL switch: Released OFF
RESUME/ACC SW	● Ignition switch: ON	ACCEL/RES switch: Depressed ON
		ACCEL/RES switch: Released OFF

# TROUBLE DIAGNOSIS

**[QG18DE (ULEV)]**

MONITOR ITEM	CONDITION		SPECIFICATION
SET SW	● Ignition switch: ON	COAST/SET switch: Depressed	ON
		COAST/SET switch: Released	OFF
BRAKE SW1	● Ignition switch: ON	Brake pedal and clutch pedal (M/T): Fully released	ON
		Brake pedal and/or clutch pedal (M/T): Slightly depressed	OFF
BRAKE SW2	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
CRUISE LAMP	● Ignition switch: ON	CRUISE lamp: Illuminated	ON
		CRUISE lamp: Not illuminated	OFF
SET LAMP	● Ignition switch: ON	SET lamp: Illuminated	ON
		SET lamp: Not illuminated	OFF

\*: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

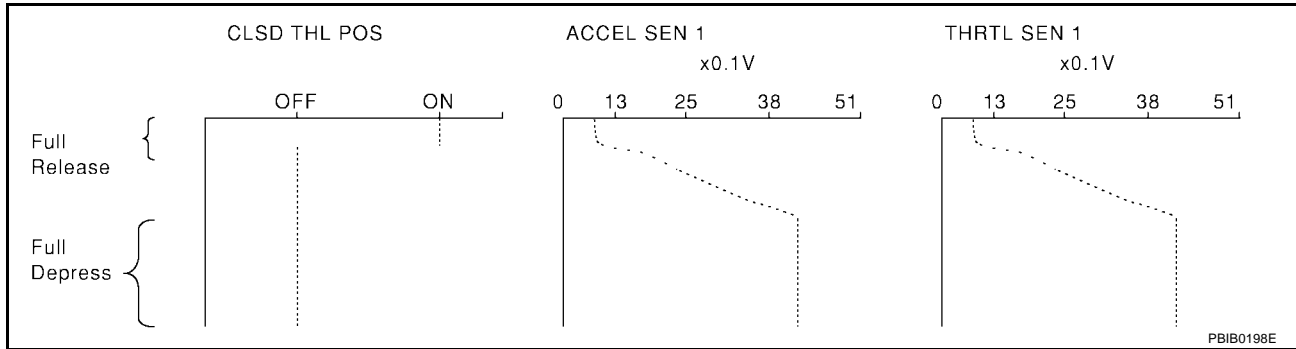
**Major Sensor Reference Graph in Data Monitor Mode**

The following are the major sensor reference graphs in "DATA MONITOR" mode.

**CLSD THL POS, ACCEL SEN1, THRTL SEN1-**

Below is the data for "CLSD THL POS", "ACCEL SEN1", and "THRTL SEN1" when depressing the accelerator pedal with the ignition switch "ON" and with selector lever in "D" position (A/T models) or with shift lever in "1st" position (M/T models).

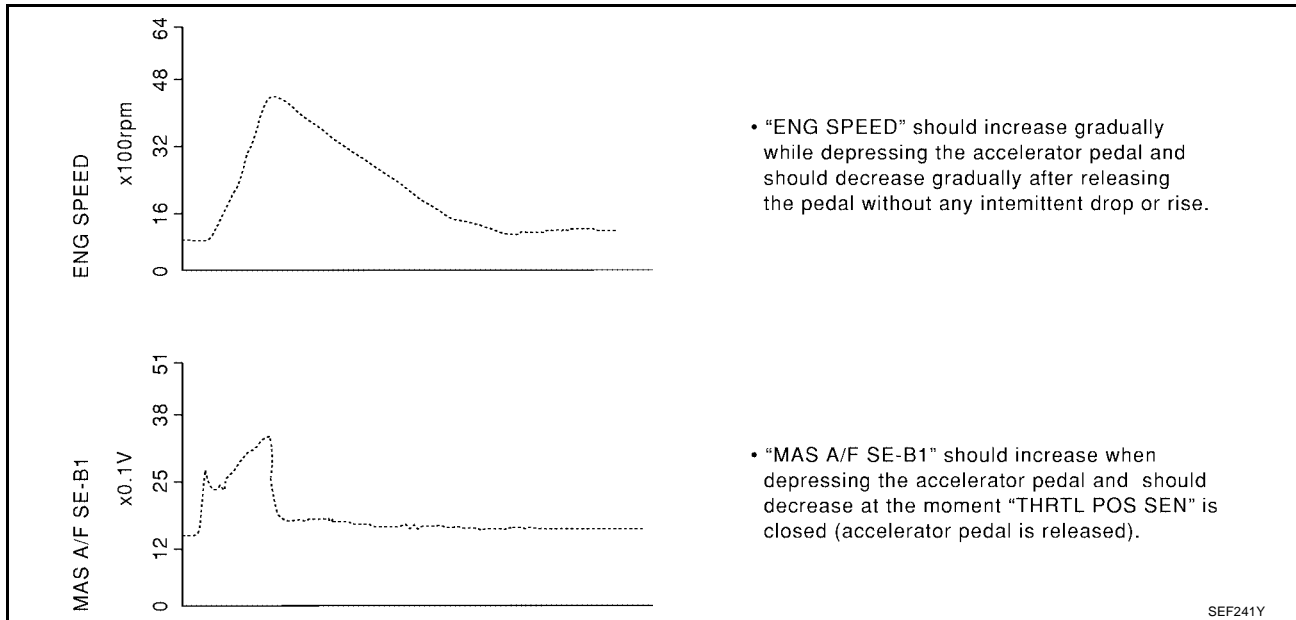
The signal of "ACCEL SEN1" and "THRTL SEN1" should rise gradually without any intermittent drop or rise after "CLSD THL/P SW" is changed from "ON" to "OFF".

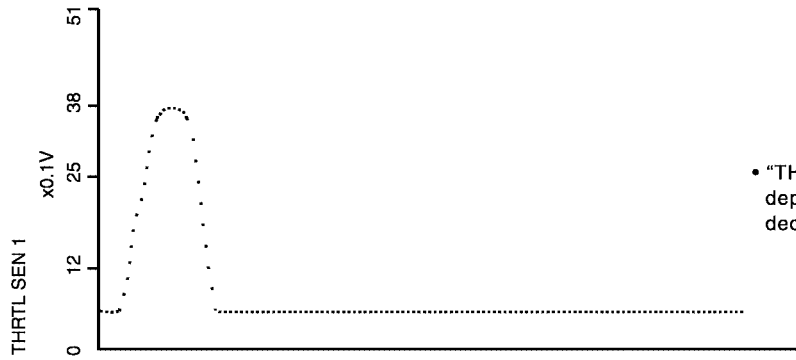


**ENG SPEED, MAS A/F SE-B1, THRTL POS SEN, HO2S2 (B1), HO2S1 (B1), INJ PULSE-B1**

Below is the data for "ENG SPEED", "MAS A/F SE-B1", "THRTL POS SEN", "HO2S2 (B1)", "HO2S1 (B1)" and "INJ PULSE-B1" when revving engine quickly up to 4,800 rpm under no load after warming up engine to normal operating temperature.

Each value is for reference, the exact value may vary.

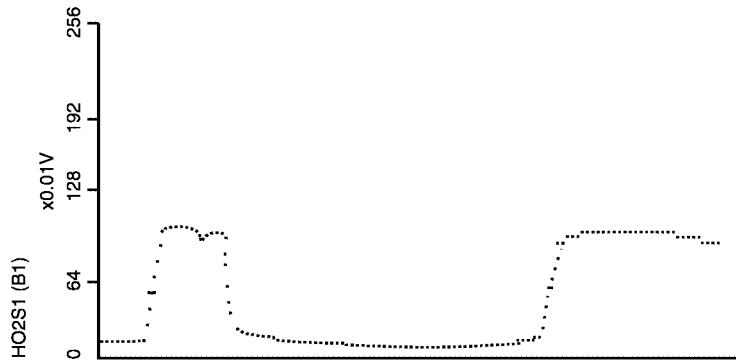




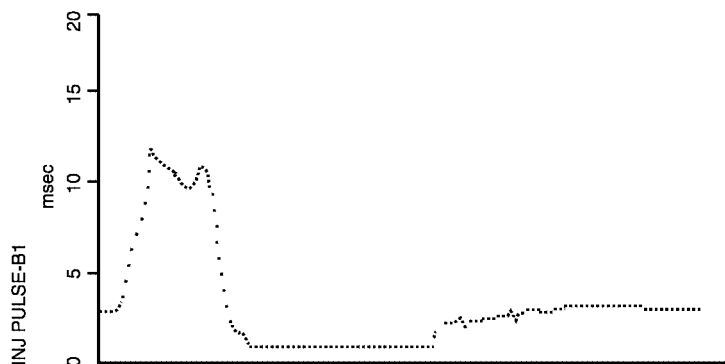
- "THRTL SEN 1" should increase while depressing the accelerator pedal and should decrease while releasing it.



- "HO2S2 (B1)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



- "HO2S1 (B1)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



- "INJ PULSE-B1" should increase when depressing the accelerator pedal and should decrease when the pedal is released.

TRUBLE DIAGNOSIS - SPECIFICATION VALUE

PFP:00031

Description

UBS001D2

The specification (SP) value indicates the tolerance of the value that is displayed in "DATA MONITOR (SPEC)" mode of CONSULT-II during normal operation of engine control system. When the value in "DATA MONITOR (SPEC)" mode is within the SP value, the engine control system is confirmed OK. When the value in "DATA MONITOR (SPEC)" mode is NOT within the SP value, the engine control system may have one or more malfunctions.

The SP value is used to detect malfunctions that may affect the engine control system, but will not light the MIL.

The SP value will be displayed for the following three items:

- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction.)
- A/F ALPHA-B1 (The mean value of air/fuel ratio feedback correction factor per cycle.)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor.)

Testing Condition

UBS001D3

- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 - 104.3 kPa (1.003 - 1.064 kg/cm<sup>2</sup> , 14.25 - 15.12 psi)
- Atmosphere temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up \*1
- Electrical load: Not applied \*2
- Engine speed: Idle

\*1: For A/T models, after the engine is warmed-up to normal operating temperature, drive vehicle until "FLUID TEMP SE" (A/T fluid temperature sensor signal) indicates less than 0.9V. For M/T models, drive vehicle for 5 minutes after the engine is warmed-up to normal operating temperature.

\*2: Rear window defogger switch, air conditioner switch, and lighting switch are "OFF". Cooling fans are not operating. Steering wheel straight ahead.

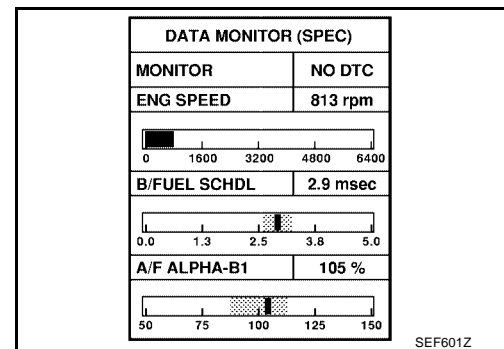
Inspection Procedure

UBS001D4

NOTE:

Perform "DATA MONITOR (SPEC)" mode in maximum scale display.

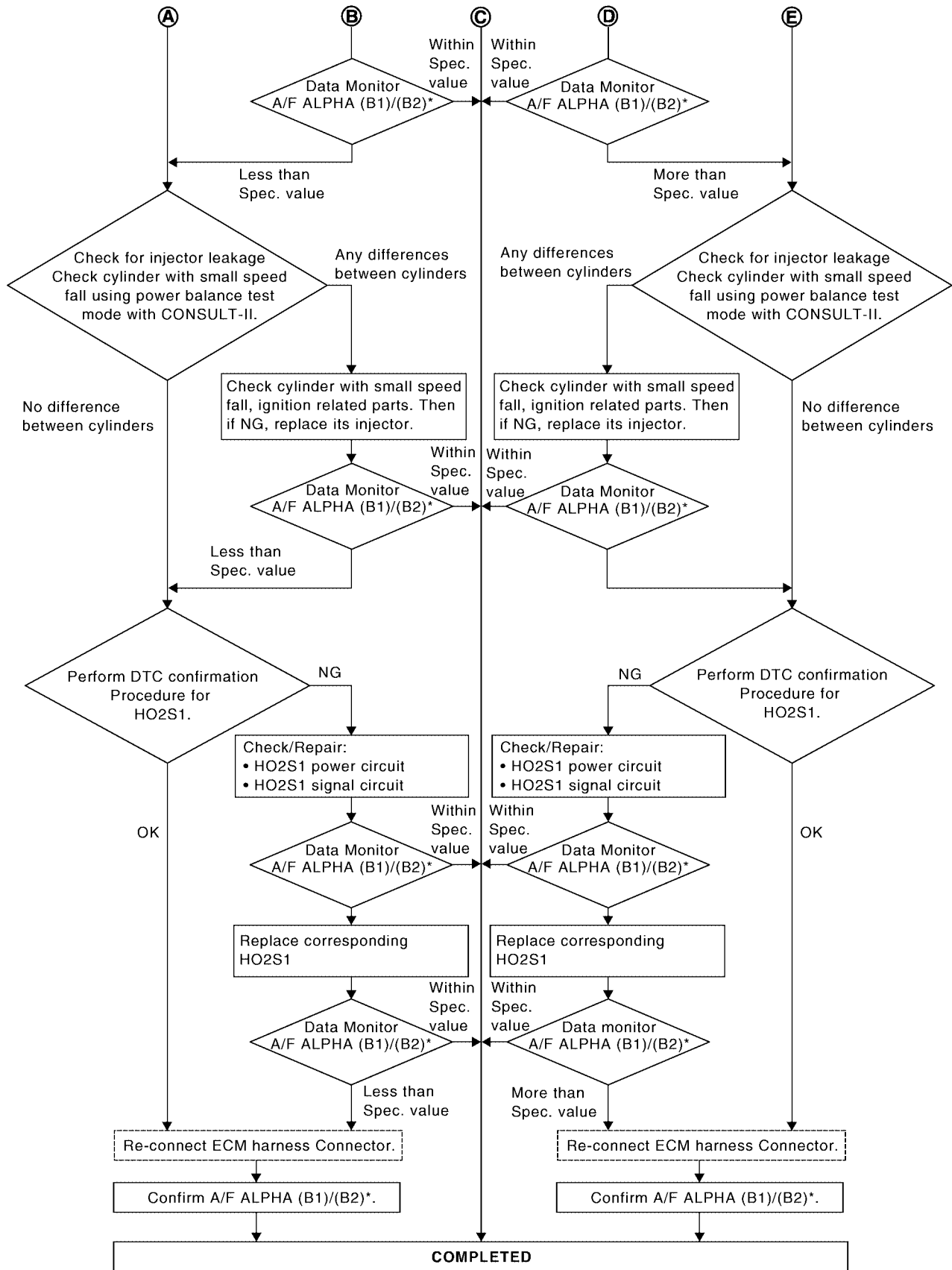
1. Perform "Basic Inspection". Refer to [EC-88](#) .
2. Confirm that the testing conditions indicated above are met.
3. Select "B/FUEL SCHDL", "A/F ALPHA-B1", and "MAS A/F SE-B1" in "DATA MONITOR (SPEC)" mode with CONSULT-II.
4. Make sure that monitor items are within the SP value.
5. If NG, go to [EC-134, "Diagnostic Procedure"](#) .





# TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[QG18DE (ULEV)]



SEF768Z





# TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

[QG18DE (ULEV)]

## TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

PFP:00006

### Description

UBS001D6

Intermittent incidents (I/I) may occur. In many cases, the malfunction resolves itself (the part or circuit function returns to normal without intervention). It is important to realize that the symptoms described in the customer's complaint often do not recur on DTC (1st trip) visits. Realize also that the most frequent cause of I/I occurrences is poor electrical connections. Because of this, the conditions under which the incident occurred may not be clear. Therefore, circuit checks made as part of the standard diagnostic procedure may not indicate the specific malfunctioning area.

#### COMMON I/I REPORT SITUATIONS

STEP in Work Flow	Situation
II	The CONSULT-II is used. The SELF-DIAG RESULTS screen shows time data other than "0" or "1t".
III	The symptom described by the customer does not recur.
IV	(1st trip) DTC data does not appear during the DTC CONFIRMATION PROCEDURE.
VI	The TROUBLE DIAGNOSIS for PXXXX does not indicate the malfunctioning area.

### Diagnostic Procedure

UBS001D7

#### 1. INSPECTION START

Erase (1st trip) DTCs. Refer to [EC-71, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).

>> GO TO 2.

#### 2. CHECK GROUND TERMINALS

Check ground terminals for corroding or loose connection. Refer to [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#), "CIRCUIT INSPECTION", "Ground Inspection".

OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

#### 3. SEARCH FOR ELECTRICAL INCIDENT

Refer to [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#), "INCIDENT SIMULATION TEST".

OK or NG

OK >> GO TO 4.

NG >> Repair or replace.

#### 4. CHECK CONNECTOR TERMINALS

Refer to [GI-23, "How to Check Terminal"](#), "HOW TO PROBE CONNECTORS", "How to Check Enlarged Contact Spring of Terminal".

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace connector.



# POWER SUPPLY CIRCUIT FOR ECM

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	B	ECM ground	[Engine is running] ● Idle speed	Engine ground
109	B/R	Ignition switch	[Ignition switch "OFF"]	0V
			[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
111	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For 5 seconds after turning ignition switch "OFF"	0 - 1.0V
			[Ignition switch "OFF"] ● 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
115 116	B B	ECM ground	[Engine is running] ● Idle speed	Engine ground
119 120	W W	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
121	W/L	Power supply for ECM (Back-up)	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS006GB

### 1. INSPECTION START

Start engine.

**Is engine running?**

Yes or No

Yes >> GO TO 9.

No >> GO TO 2.

### 2. CHECK ECM POWER SUPPLY CIRCUIT-I

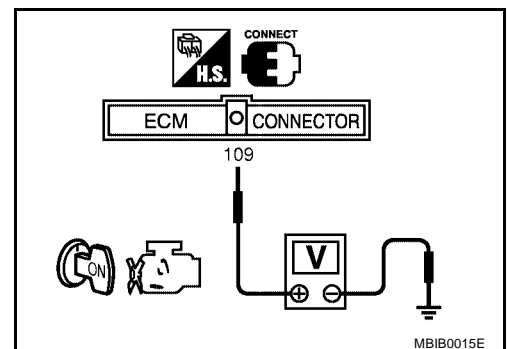
1. Turn ignition switch "OFF" and then "ON".
2. Check voltage between ECM terminal 109 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

OK >> GO TO 4.

NG >> GO TO 3.



---

## 3. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M19, E108
- Harness connectors E9, F47
- Fuse block (J/B) connector M1
- 10A fuse
- Harness for open or short between ECM and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 4. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 1, 115, 116 and engine ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

OK >> GO TO 6.

NG >> GO TO 5.

---

## 5. DETECT MALFUNCTIONING PART

---

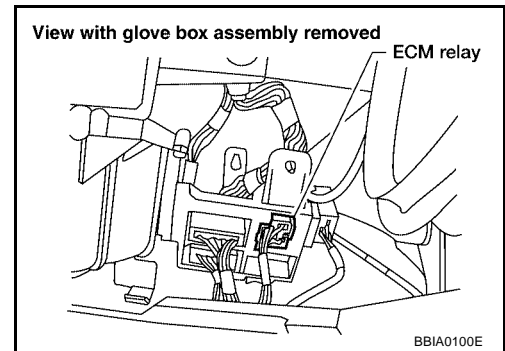
Check the following.

- Harness connectors F26, M58
- Joint connector-1
- Harness for open or short between ECM and ground

>> Repair open circuit or short to power in harness or connectors.

**6. CHECK ECM POWER SUPPLY CIRCUIT-II**

1. Disconnect ECM relay.

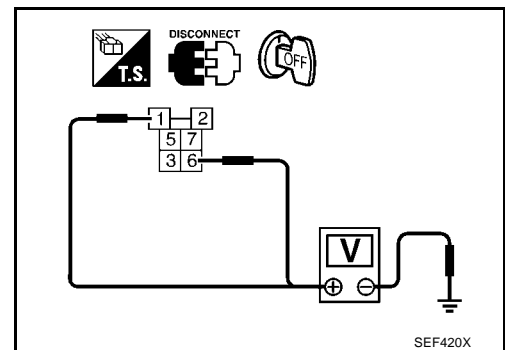


2. Check voltage between ECM relay terminals 1 and 6 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 8.  
NG >> GO TO 7.

**7. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors E9, F47
- 10A fuse
- 15A fuse
- Harness for open or short between ECM relay and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Check harness continuity between ECM terminal 111 and ECM relay terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

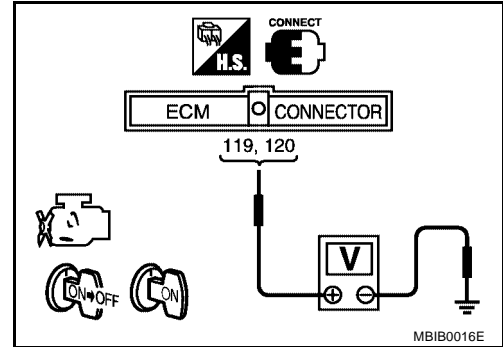
OK or NG

- OK >> Go to [EC-535, "IGNITION SIGNAL"](#) .  
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**9. CHECK ECM POWER SUPPLY CIRCUIT-III**

1. Stop engine and wait at least 10 seconds.
2. Turn ignition switch "ON" and then "OFF".
3. Check voltage between ECM terminals 119, 120 and ground with CONSULT-II or tester.

**Voltage:** After turning ignition switch "OFF", battery voltage will exist for a few seconds, then drop approximately 0V.



OK or NG

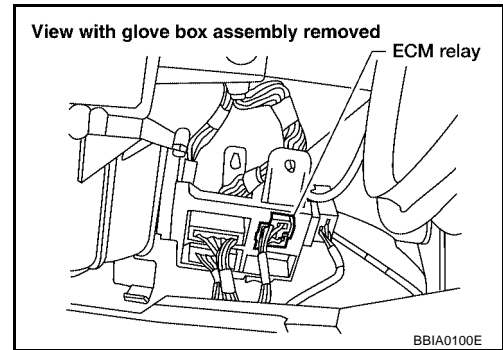
OK >> GO TO 14.

NG (Battery voltage does not exist.)>>GO TO 10.

NG (Battery voltage exists for more than a few seconds.)>>GO TO 12.

**10. CHECK ECM POWER SUPPLY CIRCUIT-IV**

1. Disconnect ECM relay.



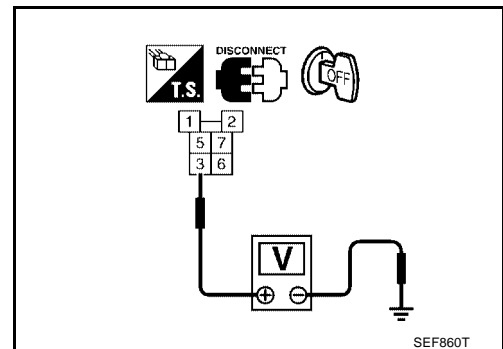
2. Check voltage between ECM relay terminal 3 and ground with CONSULT-II or tester.

**Voltage:** Battery voltage

OK or NG

OK >> GO TO 12.

NG >> GO TO 11.



**11. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors E9, F47
- Harness for open or short between ECM relay and

>> Repair open circuit or short to ground or short to power in harness or connectors.

**12. CHECK ECM POWER SUPPLY CIRCUIT-V**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 119, 120 and ECM relay terminal 5.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 13.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**13. CHECK ECM RELAY**

Refer to [EC-144, "Component Inspection"](#) .

OK or NG

OK >> GO TO 14.

NG >> Replace ECM relay.

**14. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 1, 115, 116 and engine ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

OK >> GO TO 16.

NG >> GO TO 15.

**15. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors F26, M58
- Joint connector-1
- Harness for open or short between ECM and ground

>> Repair open circuit or short to power in harness or connectors.

**16. CHECK INTERMITTENT INCIDENT**

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

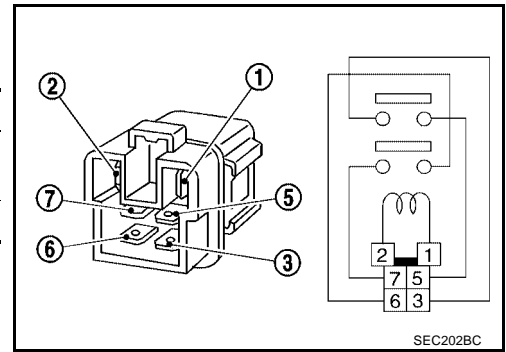
OK or NG

OK >> **INSPECTION END**

**Component Inspection**  
**ECM RELAY**

1. Apply 12V direct current between ECM relay terminals 1 and 2.
2. Check continuity between ECM relay terminals 3 and 5, 6 and 7.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No





# DTC U1000, U1001 CAN COMMUNICATION LINE

[QG18DE (ULEV)]

## DTC U1000, U1001 CAN COMMUNICATION LINE

PF:23710

### Description

UBS003PG

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

### On Board Diagnosis Logic

UBS003PH

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1000*1 1000*1	CAN communication line	<ul style="list-style-type: none"><li>● ECM can not communicate to other control units.</li><li>● ECM can not communicate for more than the specified time.</li></ul>	<ul style="list-style-type: none"><li>● Harness or connectors (CAN communication line is open or shorted).</li></ul>
U1001*2 1001*2			

\*1: This self-diagnosis has the one trip detection logic.

\*2: The MIL will not light up for this diagnosis.

### DTC Confirmation Procedure

UBS003PI

1. Turn ignition switch "ON" and wait at least 3 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If 1st trip DTC is detected, go to [EC-147, "Diagnostic Procedure"](#).

# DTC U1000, U1001 CAN COMMUNICATION LINE

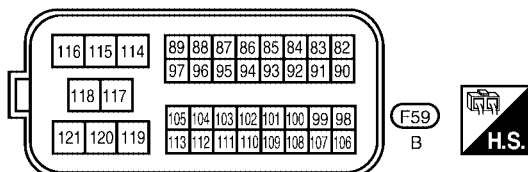
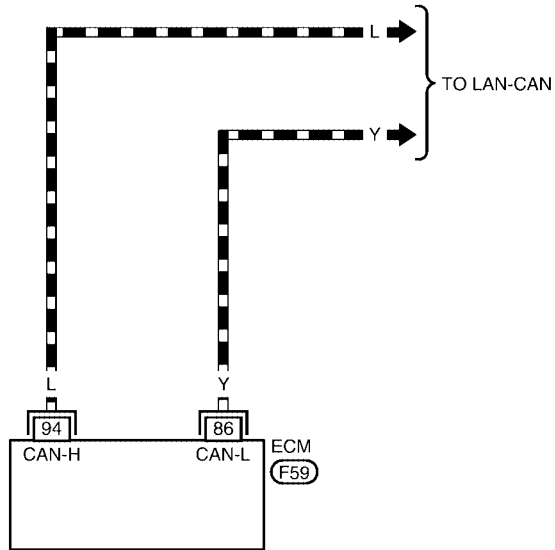
[QG18DE (ULEV)]

## Wiring Diagram

UBS003PJ

### EC-CAN-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- ▬ : DATA LINE



BBWA0274E

**Diagnostic Procedure**

UBS003PK

Go to [LAN-3, "CAN COMMUNICATION"](#) .

A

**EC**

C

D

E

F

G

H

I

J

K

L

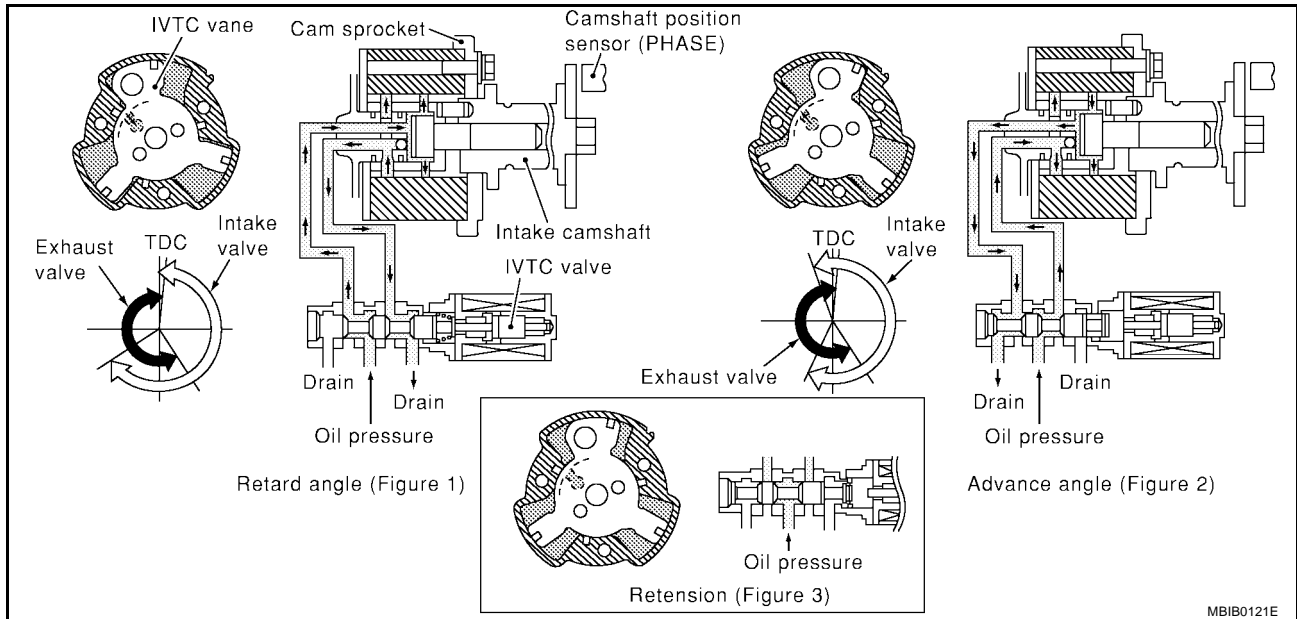
M

DTC P0011 IVT CONTROL

Description  
SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS)	Engine speed	Intake valve timing control	Intake valve timing control solenoid valve
Camshaft position sensor (PHASE)			
Engine coolant temperature sensor	Engine coolant temperature		
Vehicle speed signal*	Vehicle speed		

\*: This signal is sent to the ECM through CAN communication line.



MBIB0121E

This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

CONSULT-II Reference Value in Data Monitor Mode

UBS0057I

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION	
INT/V TIM (B1)	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T models) ● Air conditioner switch: OFF ● No-load	Idle When revving engine up to 2,000 rpm quickly	-5° - 5°CA Approx. 0° - 30°CA
	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T models) ● Air conditioner switch: OFF ● No-load	Idle When revving engine up to 2,000 rpm quickly	0% - 2% Approx. 0% - 50%

**On Board Diagnosis Logic**

DTC No.	Trouble diagnosis name	Detecting condition	Possible cause
P0011 0011	Intake valve timing control performance	There is a gap between angle of target and phase-control angle.	<ul style="list-style-type: none"> <li>● Crankshaft position sensor (POS)</li> <li>● Camshaft position sensor (PHASE)</li> <li>● Accumulation of debris to the signal pick-up portion of the camshaft</li> </ul>

**FAIL-SAFE MODE**

When the malfunction is detected, the ECM enters fail-safe mode.

Detected items	Engine operating condition in fail-safe mode
Intake valve timing control	The signal is not energized to the solenoid valve and the valve control does not function

**DTC Confirmation Procedure**

**CAUTION:**

Always drive at a safe speed.

**NOTE:**

- If DTC P0011 is displayed with DTC P1111, first perform trouble diagnosis for “DTC P1111”. See [EC-385, "DTC P1111 IVT CONTROL SOLENOID VALVE"](#) .
- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is between 10V and 16V at idle.

**WITH CONSULT-II**

1. Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Maintain the following conditions for at least 6 consecutive seconds. Hold the accelerator pedal as steady as possible.

VHCL SPEED SE	100 - 120 km/h (63 - 75 MPH)
ENG SPEED	2,000 - 4,000 rpm
COOLAN TEMP/S	60 - 120°C (140 - 248°F)
B/FUEL SCHDL	More than 3.38 msec
Selector lever	A/T models: D position M/T models: 5th position

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

PBIB0164E

4. Stop vehicle with engine running and let engine idle for 10 seconds.
5. If 1st trip DTC is detected, go to [EC-150, "Diagnostic Procedure"](#) .  
If 1st trip DTC is not detected, go to next step.
6. Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	1,700 - 3,175 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	70 - 105°C (176 - 194°F)
Selector lever	1st or 2nd position
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions required for this test.)

7. If 1st trip DTC is detected, go to [EC-150, "Diagnostic Procedure"](#) .

**WITH GST**

Follow the procedure “WITH CONSULT-II” above.

## Diagnostic Procedure

### 1. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-282, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 2.
- NG >> Replace crankshaft position sensor (POS).

### 2. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-287, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 3.
- NG >> Replace camshaft position sensor (PHASE).

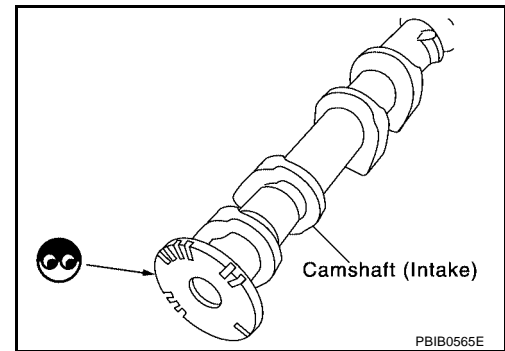
### 3. CHECK CAMSHAFT (INTAKE)

Check the following.

- Accumulation of debris to the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end

OK or NG

- OK >> GO TO 4.
- NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



### 4. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

For wiring diagram refer to [EC-279, "Wiring Diagram"](#) for CKP sensor (POS) and [EC-284, "Wiring Diagram"](#) for CMP sensor (PHASE).

>> INSPECTION END

**DTC P0031, P0032 HO2S1 HEATER**

PF2:22690

**Description  
SYSTEM DESCRIPTION**

UBS0037A

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater
Engine coolant temperature sensor	Engine coolant temperature		

The ECM performs ON/OFF duty control of the heated oxygen sensor 1 heater corresponding to the engine speed and engine coolant temperature. The duty percent varies with engine coolant temperature when engine is started.

**OPERATION**

Engine speed rpm	Heated oxygen sensor 1 heater
Above 3,600	OFF
Below 3,600	ON

**CONSULT-II Reference Value in Data Monitor Mode**

UBS0037B

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S1 HTR (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Engine speed: Below 3,600 rpm</li> </ul>	ON
	<ul style="list-style-type: none"> <li>● Engine speed: Above 3,600 rpm</li> </ul>	OFF
O2SEN HTR DTY	<ul style="list-style-type: none"> <li>● Engine coolant temperature when engine started: More than 80°C (176°F)</li> <li>● Engine speed: Below 3,600 rpm</li> </ul>	Approx. 40%

**On Board Diagnosis Logic**

UBS0037C

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0031 0031	Heated oxygen sensor 1 heater control circuit low	The current amperage in the heated oxygen sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 1 heater.)	<ul style="list-style-type: none"> <li>● Harness or connectors (The heated oxygen sensor 1 heater circuit is open or shorted.)</li> <li>● Heater oxygen sensor 1 heater</li> </ul>
P0032 0032	Heated oxygen sensor 1 heater control circuit high	The current amperage in the heated oxygen sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 1 heater.)	<ul style="list-style-type: none"> <li>● Harness or connectors (The heated oxygen sensor 1 heater circuit is shorted.)</li> <li>● Heater oxygen sensor 1 heater</li> </ul>

**DTC Confirmation Procedure**

UBS0037D

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V at idle.

**Ⓟ WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.

## DTC P0031, P0032 HO2S1 HEATER

[QG18DE (ULEV)]

3. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
4. Start engine and run it for at least 6 seconds at idle speed.
5. If 1st trip DTC is detected, go to [EC-154, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

### WITH GST

1. Start engine and warm it up to normal operating temperature.
  2. Turn ignition switch "OFF" and wait at least 10 seconds.
  3. Start engine and run it for at least 6 seconds at idle speed.
  4. Turn ignition switch "OFF" and wait at least 10 seconds.
  5. Start engine and run it for at least 6 seconds at idle speed.
  6. Select "MODE 3" with GST.
  7. If DTC is detected, go to [EC-154, "Diagnostic Procedure"](#).
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**



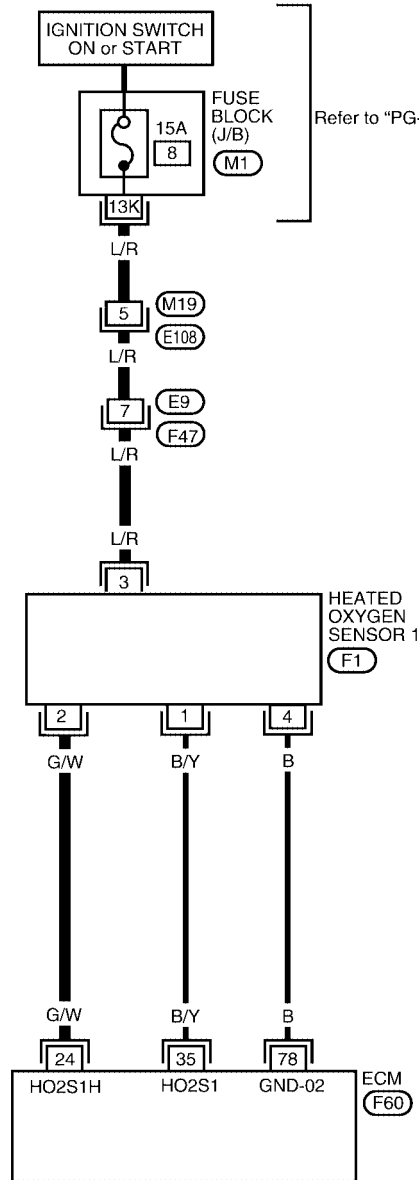
# DTC P0031, P0032 HO2S1 HEATER

[QG18DE (ULEV)]

UBS003TE

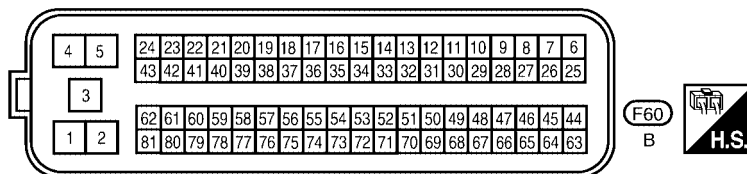
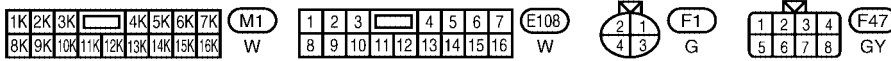
## Wiring Diagram

EC-HO2S1H-01



— : DETECTABLE LINE FOR DTC  
— : NON-DETECTABLE LINE FOR DTC

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



BBWA0772E

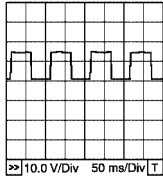
# DTC P0031, P0032 HO2S1 HEATER

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
24	G/W	Heated oxygen sensor 1 heater	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition.</li> <li>● Engine speed is below 3,600 rpm.</li> </ul>	Approximately 7.0V  PBIB0519E
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is above 3,600 rpm.</li> </ul>	BATTERY VOLTAGE (11 - 14V)

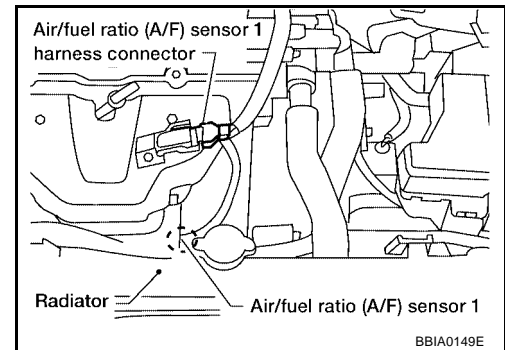
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS003TF

### 1. CHECK HO2S1 POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 1 harness connector.
3. Turn ignition switch "ON".

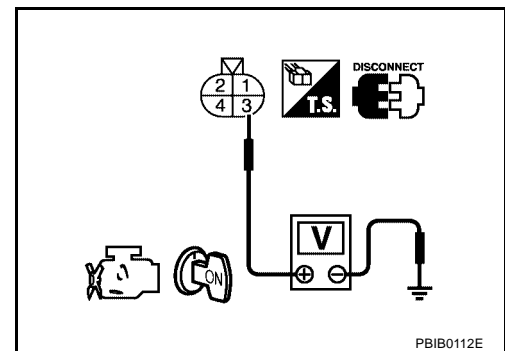


4. Check voltage between HO2S1 terminal 3 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



---

## 2. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M19, E108
- Harness connectors E9, F47
- Fuse block (J/B) connector M1
- 15A fuse
- Harness for open or short between heated oxygen sensor 1 and fuse

>> Repair harness or connectors.

---

## 3. CHECK HO2S1 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 24 and HO2S1 terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 4. CHECK HEATED OXYGEN SENSOR 1 HEATER

---

Refer to [EC-156, "Component Inspection"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace heated oxygen sensor 1.

---

## 5. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Component Inspection****HEATED OXYGEN SENSOR 1 HEATER**

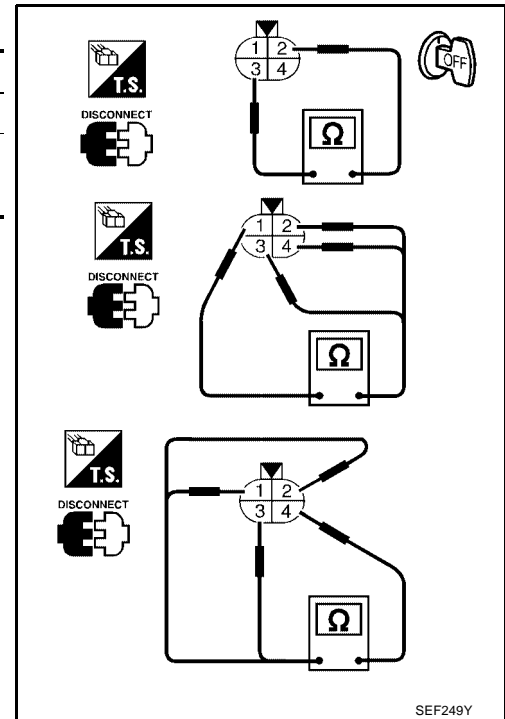
1. Check resistance between HO2S1 terminals as follows.

Terminal No.	Resistance
2 and 3	2.3 - 4.3 $\Omega$ at 25°C (77°F)
1 and 2, 3, 4	$\infty \Omega$
4 and 1, 2, 3	(Continuity should not exist)

2. If NG, replace heated oxygen sensor 1.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation**  
**HEATED OXYGEN SENSOR 1**

Refer to [EM-12, "Removal and Installation"](#).

**DTC P0037, P0038 HO2S2 HEATER**

PF:226A0

**Description  
SYSTEM DESCRIPTION**

UBS006C5

Sensor	Input Signal to ECM	ECM Function	Actuator
Camshaft position sensor (PHASE)	Engine speed	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
Crankshaft position sensor (POS)			
Engine coolant temperature sensor	Engine coolant temperature		
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater corresponding to the engine speed, amount of intake air and engine coolant temperature.

**OPERATION**

Engine speed rpm	Heated oxygen sensor 2 heater
Above 3,600	OFF
<ul style="list-style-type: none"> <li>Below 3,600 rpm after the following conditions are met.</li> <li>Engine: After warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	ON

**CONSULT-II Reference Value in Data Monitor Mode**

UBS006C6

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 HTR (B1)	<ul style="list-style-type: none"> <li>Engine speed: Below 3,600 rpm after the following conditions are met.</li> <li>Engine: After warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	ON
	<ul style="list-style-type: none"> <li>Engine speed: Above 3,600 rpm</li> </ul>	OFF

**On Board Diagnosis Logic**

UBS006C7

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0037 0037 (Bank 1)	Heated oxygen sensor 2 heater control circuit low	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	<ul style="list-style-type: none"> <li>Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.)</li> <li>Heater oxygen sensor 2 heater</li> </ul>
P0038 0038 (Bank 1)	Heated oxygen sensor 2 heater control circuit high	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	<ul style="list-style-type: none"> <li>Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.)</li> <li>Heater oxygen sensor 2 heater</li> </ul>

**DTC Confirmation Procedure**

UBS006C8

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V at idle.

**WITH CONSULT-II**

- Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- Start engine and warm it up to the normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.

## DTC P0037, P0038 HO2S2 HEATER

[QG18DE (ULEV)]

4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
5. Let engine idle for one minute.
6. If 1st trip DTC is detected, go to [EC-160, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEP174Y

### WITH GST

1. Start engine and warm it up to the normal operating temperature.
  2. Turn ignition switch "OFF" and wait at least 10 seconds.
  3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
  4. Let engine idle for one minute.
  5. Turn ignition switch "OFF" and wait at least 10 seconds.
  6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
  7. Let engine idle for one minute.
  8. Select "MODE 3" with GST.
  9. If DTC is detected, go to [EC-160, "Diagnostic Procedure"](#).
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

# DTC P0037, P0038 HO2S2 HEATER

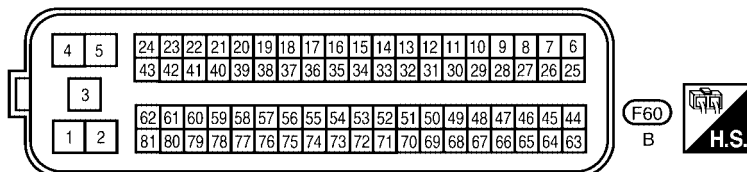
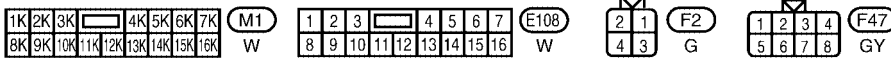
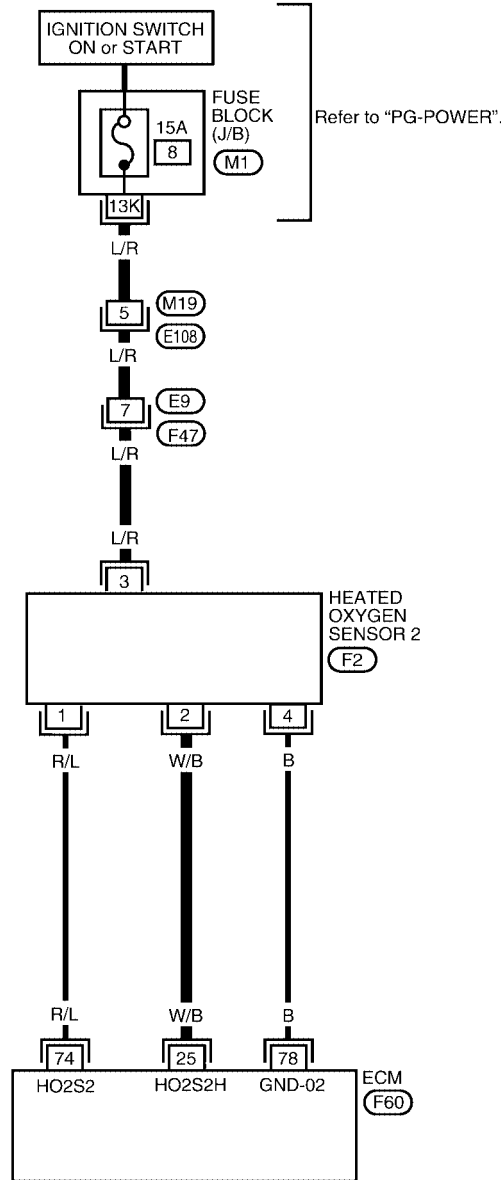
[QG18DE (ULEV)]

UBS006C9

## Wiring Diagram

EC-HO2S2H-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



BBWA0773E

# DTC P0037, P0038 HO2S2 HEATER

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

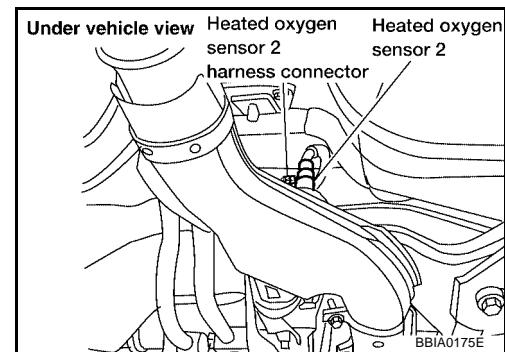
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
25	W/B	Heated oxygen sensor 2 heater	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Engine speed: Below 3,600 rpm after the following conditions are met.</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	0 - 1.0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> </ul> <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is above 3,600 rpm.</li> </ul>	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS006CA

### 1. CHECK HO2S2 POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Turn ignition switch "ON".

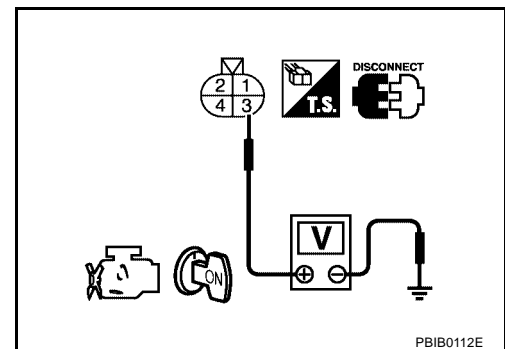


4. Check voltage between HO2S2 terminal 3 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.





---

## 2. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M19, E108
- Harness connectors E9, F47
- Fuse block (J/B) connector M1
- 15A fuse
- Harness for open or short between heated oxygen sensor 2 and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 3. CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 25 and HO2S2 terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 4. CHECK HEATED OXYGEN SENSOR 2 HEATER

---

Refer to [EC-162, "Component Inspection"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace malfunctioning heated oxygen sensor 2.

---

## 5. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Component Inspection**  
**HEATED OXYGEN SENSOR 2 HEATER**

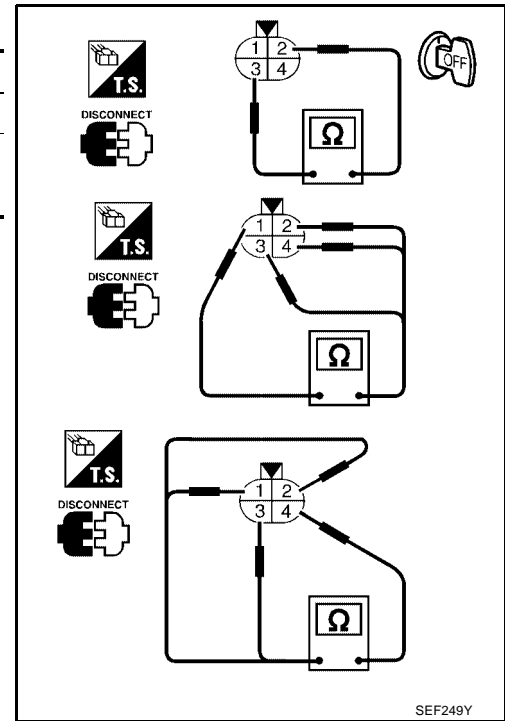
1. Check resistance between HO2S2 terminals as follows.

Terminal No.	Resistance
2 and 3	2.3 - 4.3 $\Omega$ at 25°C (77°F)
1 and 2, 3, 4	$\infty \Omega$
4 and 1, 2, 3	(Continuity should not exist)

2. If NG, replace heated oxygen sensor 2.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



SEF249Y

**Removal and Installation**  
**HEATED OXYGEN SENSOR 2**

Refer to [EX-3, "EXHAUST SYSTEM"](#) .

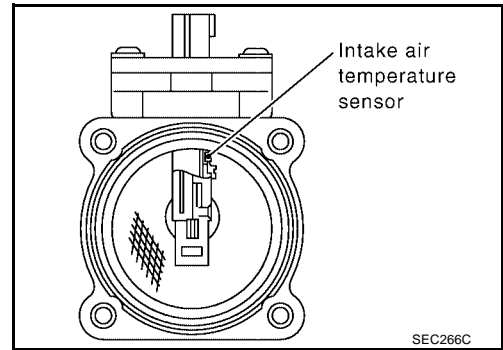
**DTC P0101 MAF SENSOR**

PF2:22680

**Component Description**

UBS003PL

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss. Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.



SEC266C

**CONSULT-II Reference Value in Data Monitor Mode**

UBS003PM

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS A/F SE-B1	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No-load	Idle 1.0 - 1.7V
		2,500 rpm 1.5 - 2.4V
CAL/LD VALUE	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No-load	Idle 20.0 - 35.5%
		2,500 rpm 12.0 - 27.0%
MASS AIRFLOW	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No-load	Idle 1.4 - 4.0 g-m/s
		2,500 rpm 5.0 - 10.0 g-m/s

**On Board Diagnosis Logic**

UBS003PN

This self-diagnosis has the one trip detection logic.

**NOTE:**

If DTC P0101 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-455, "DTC P1229 SENSOR POWER SUPPLY"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0101 0101	Mass air flow sensor circuit range/performance problem	A) A high voltage from the sensor is sent to ECM under light load driving condition.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Mass air flow sensor</li> </ul>
		B) A low voltage from the sensor is sent to ECM under heavy load driving condition.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Intake air leaks</li> <li>● Mass air flow sensor</li> </ul>

**DTC Confirmation Procedure**

UBS003PO

Perform "PROCEDURE FOR MALFUNCTION A" first.



# DTC P0101 MAF SENSOR

[QG18DE (ULEV)]

7. Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	More than 2,000 rpm
THRTL SEN 1	More than 3V
THRTL SEN 2	More than 3V
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
VHCL SPEED SE	XXX km/h
THRTL SEN 1	XXX V
THRTL SEN 2	XXX V

PBIB0199E

8. If 1st trip DTC is detected, go to [EC-167, "Diagnostic Procedure"](#)

## Overall Function Check PROCEDURE FOR MALFUNCTION B

UBS003PP

Use this procedure to check the overall function of the mass air flow sensor circuit. During this check, a 1st trip DTC might not be confirmed.

### With GST

1. Start engine and warm it up to normal operating temperature.
2. Select "MODE 1" with GST.
3. Check the mass air flow sensor signal with "MODE 1".
4. Check for linear mass air flow sensor signal value rise in response to increases to about 4,000 rpm in engine speed.
5. If NG, go to [EC-167, "Diagnostic Procedure"](#).

CALC LOAD	20%
COOLANT TEMP	95°C
SHORT FT #1	2%
LONG FT #1	0%
SHORT FT #2	4%
LONG FT #2	0%
ENGINE SPD	2637RPM
VEHICLE SPD	0MPH
IGN ADVANCE	41.0°
INTAKE AIR	41°C
<b>MAF</b>	<b>14.1gm/sec</b>
THROTTLE POS	3%

SEF534P

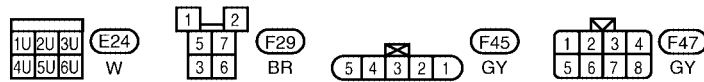
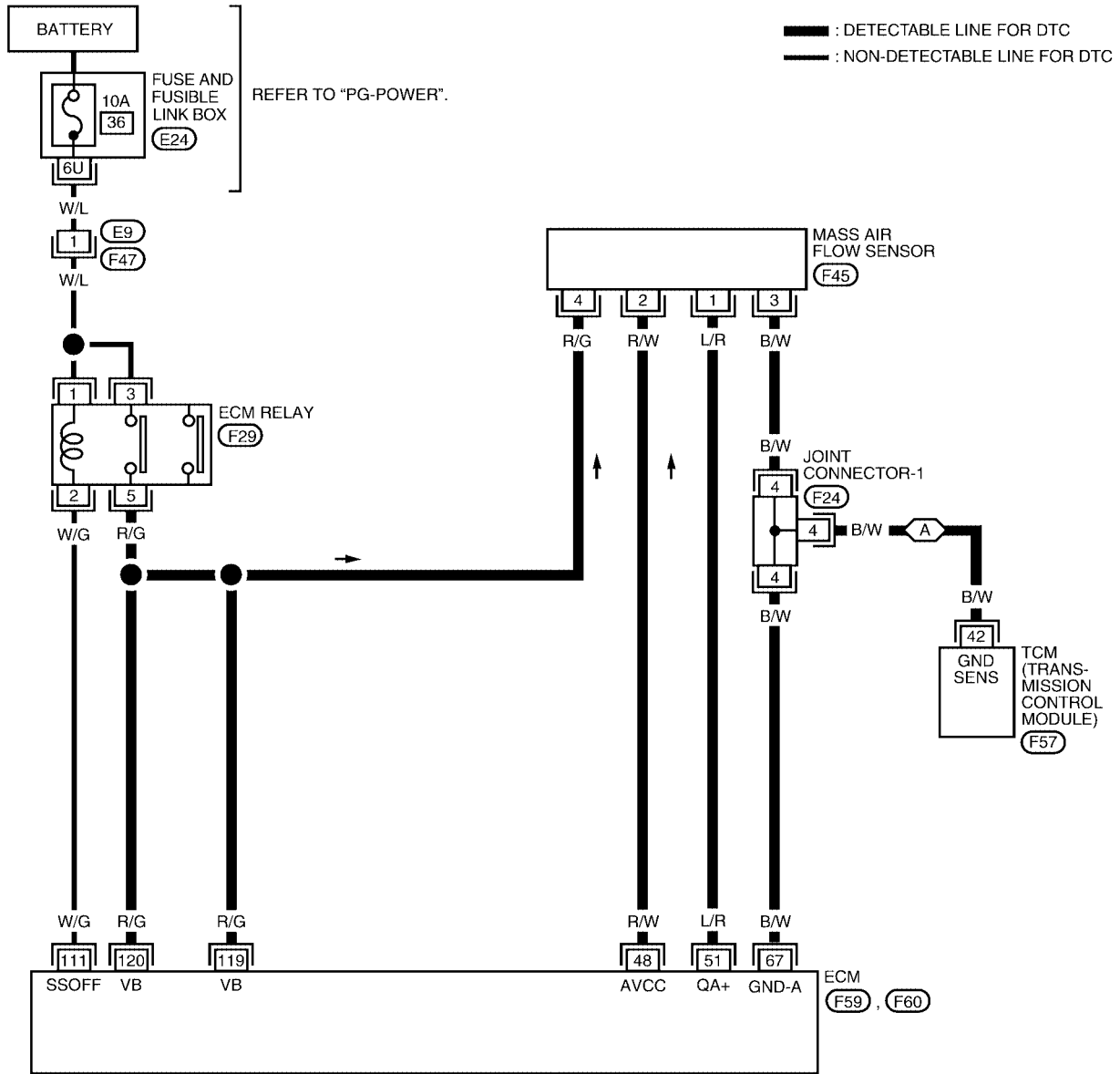
# DTC P0101 MAF SENSOR

[QG18DE (ULEV)]

UBS003PQ

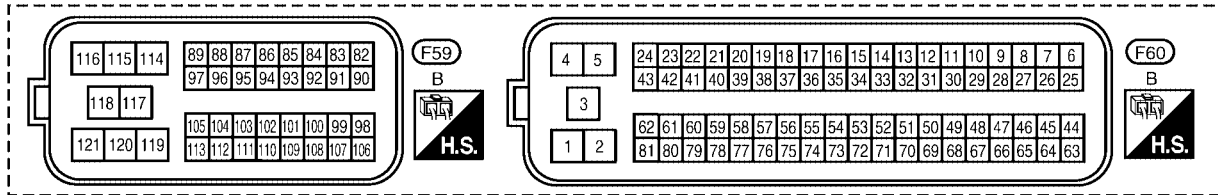
## Wiring Diagram

### EC-MAFS-01



Refer to the following.

- F24** - JOINT CONNECTOR
- F57** - ELECTRICAL UNITS



BBWA0774E

# DTC P0101 MAF SENSOR

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
48	R/W	Sensors' power supply	[Ignition switch "ON"]	Approximately 5V
51	L/R	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.0 - 1.7V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm	1.5 - 2.1V
67	B/W	Mass air flow sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
111	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For 5 seconds after turning ignition switch "OFF"	0 - 1.0V
			[Ignition switch "OFF"] ● 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
119 120	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS003PR

### 1. INSPECTION START

Which malfunction (A or B) is duplicated?

A or B

- A >> GO TO 3.
- B >> GO TO 2.

### 2. CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses
- Intake air passage between air duct and intake manifold

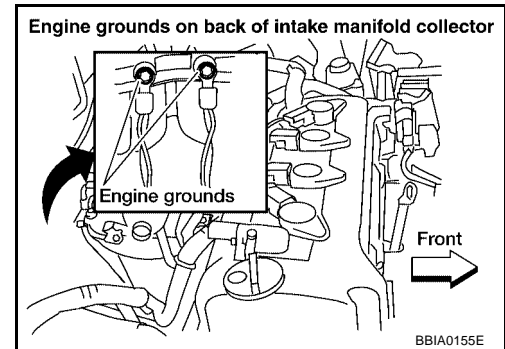
OK or NG

- OK >> GO TO 3.
- NG >> Reconnect the parts.

### 3. RETIGHTEN GROUND SCREWS

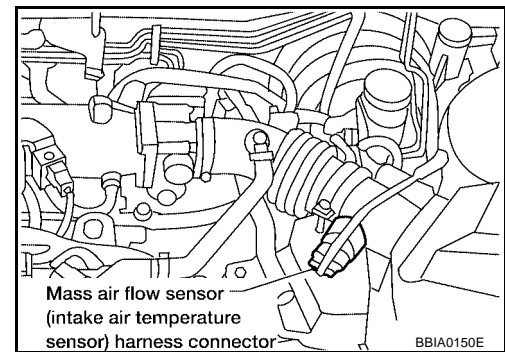
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 4.



### 4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor harness connector.
2. Turn ignition switch "ON".

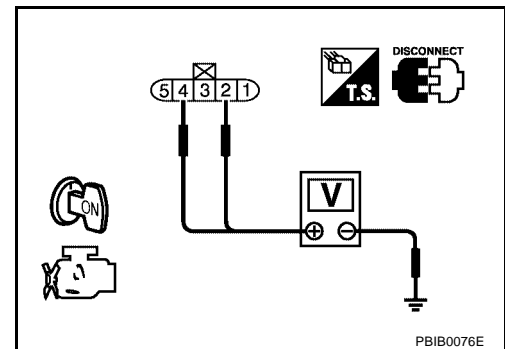


3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.

Terminal	Voltage
2	Approximately 5V
4	Battery voltage

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.



### 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between mass air flow sensor and ECM
- Harness for open or short between mass air flow sensor and ECM relay

>> Repair harness or connectors.



**6. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and engine ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.  
NG >> GO TO 7.

**7. DETECT MALFUNCTIONING PART**

Check the following.

- Joint connector-1
- Harness for open or short between mass air flow sensor and ECM
- Harness for open or short between mass air flow sensor and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Check harness continuity between MAF sensor terminal 1 and ECM terminal 51.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.  
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**9. CHECK MASS AIR FLOW SENSOR**

Refer to [EC-170, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.  
NG >> Replace mass air flow sensor.

**10. CHECK INTERMITTENT INCIDENT**

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

## Component Inspection

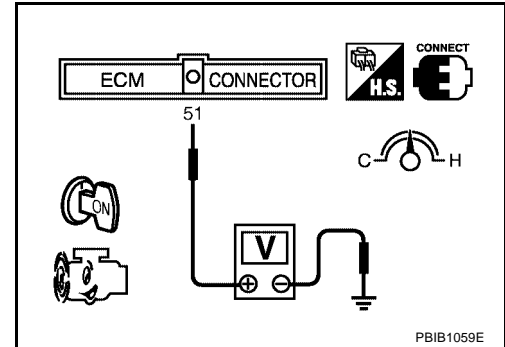
### MASS AIR FLOW SENSOR

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 51 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.7
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 2.1
Idle to about 4,000 rpm*	1.0 - 1.7 to Approx. 4.0

\*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

4. If the voltage is out of specification, proceed the following.
  - Turn ignition switch "OFF".
  - Disconnect mass air flow sensor harness connector and reconnect it again.
  - Perform steps 2 and 3 again.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.
6. If NG, clean or replace mass air flow sensor.



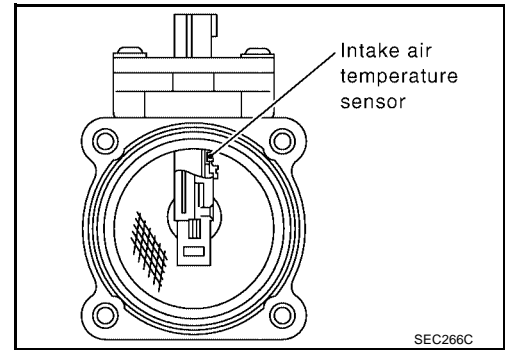
DTC P0102, P0103 MAF SENSOR

PF:22680

Component Description

UBS003PU

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss. Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.



CONSULT-II Reference Value in Data Monitor Mode

UBS003PV

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS A/F SE-B1	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No-load	Idle 1.0 - 1.7V
		2,500 rpm 1.5 - 2.4V
CAL/LD VALUE	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No-load	Idle 20.0 - 35.5%
		2,500 rpm 12.0 - 27.0%
MASS AIRFLOW	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No-load	Idle 1.4 - 4.0 g-m/s
		2,500 rpm 5.0 - 10.0 g-m/s

On Board Diagnosis Logic

UBS003PW

These self-diagnoses have the one trip detection logic.

NOTE:

If DTC P0101 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-455, "DTC P1229 SENSOR POWER SUPPLY"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0102 0102	Mass air flow sensor circuit low input	An excessively low voltage from the sensor is sent to ECM when engine is running.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Intake air leaks</li> <li>● Mass air flow sensor</li> </ul>
P0103 0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Mass air flow sensor</li> </ul>

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

# DTC P0102, P0103 MAF SENSOR

[QG18DE (ULEV)]

Detected items	Engine operating condition in fail-safe mode
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

## DTC Confirmation Procedure

UBS003PX

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### PROCEDURE FOR DTC P0102

#### With CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait at least 5 seconds.
4. If DTC is detected, go to [EC-174, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### With GST

Follow the procedure "With CONSULT-II" above.

### PROCEDURE FOR DTC P0103

#### With CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-174, "Diagnostic Procedure"](#).  
If DTC is not detected, go to next step.
5. Start engine and wait at least 5 seconds.
6. If DTC is detected, go to [EC-174, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### With GST

Follow the procedure "With CONSULT-II" above.

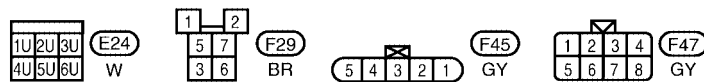
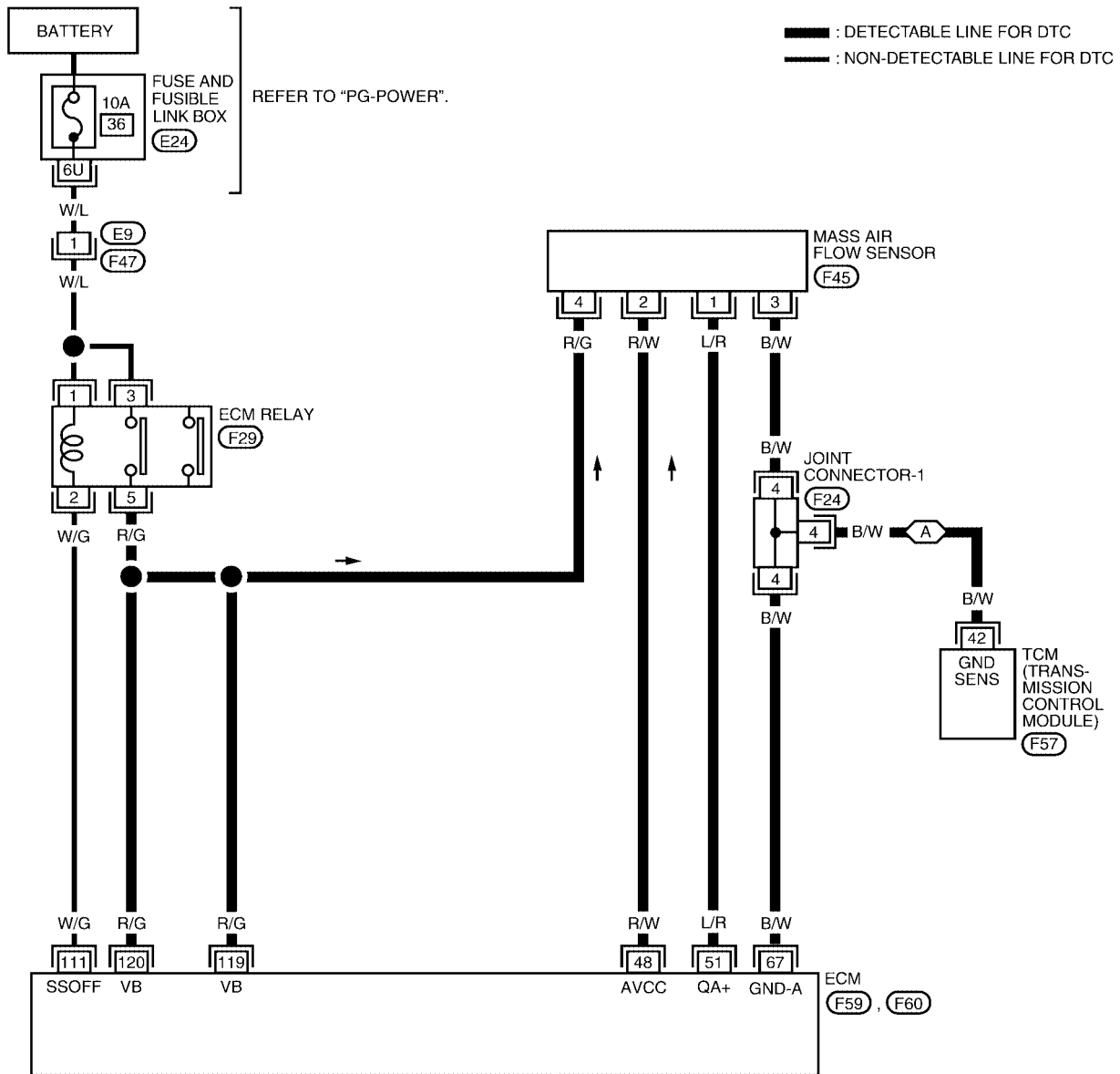
# DTC P0102, P0103 MAF SENSOR

[QG18DE (ULEV)]

UBS003PY

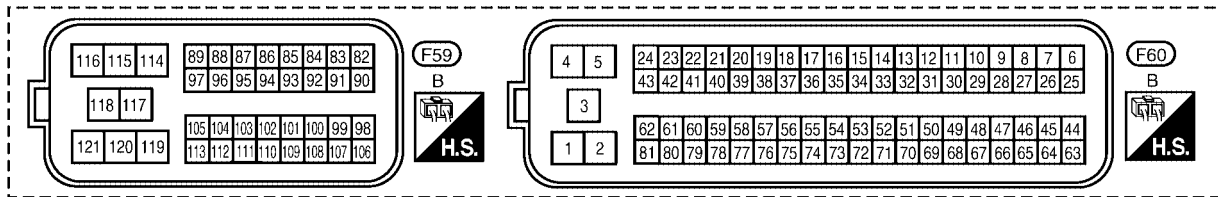
## Wiring Diagram

### EC-MAFS-01



Refer to the following.

(F24) - JOINT CONNECTOR  
 (F57) - ELECTRICAL UNITS



BBWA0774E

# DTC P0102, P0103 MAF SENSOR

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
48	R/W	Sensor power supply (Mass air flow sensor)	[Ignition switch "ON"]	Approximately 5V
51	L/R	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.0 - 1.7V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.5 - 2.1V
67	B/W	Sensor ground (Mass air flow sensor)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V

## Diagnostic Procedure

UBS003PZ

### 1. INSPECTION START

Which malfunction (P0102 or P0103) is duplicated?

P0102 or P0103

P0102 >> GO TO 2.

P0103 >> GO TO 3.

### 2. CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses
- Intake air passage between air duct to intake manifold

OK or NG

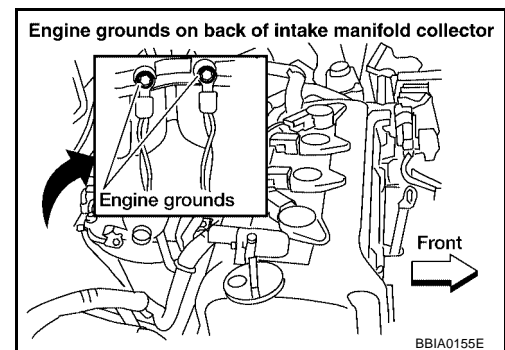
OK >> GO TO 3.

NG >> Reconnect the parts.

### 3. RETIGHTEN GROUND SCREWS

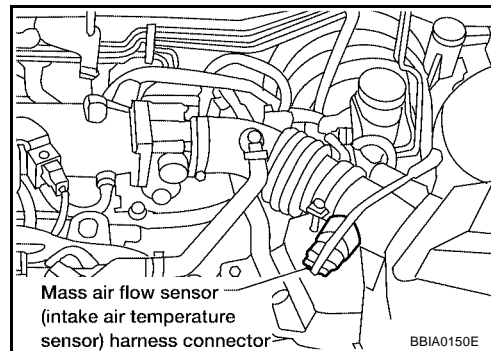
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 4.



#### 4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect MAF sensor harness connector.
2. Turn ignition switch "ON".

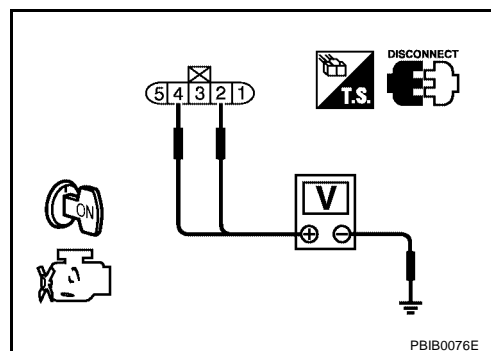


3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.

Terminal	Voltage
2	Approximately 5V
4	Battery voltage

**OK or NG**

- OK >> GO TO 6.
- NG >> GO TO 5.



#### 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between mass air flow sensor and ECM
- Harness for open or short between mass air flow sensor and ECM relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

#### 6. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

**OK or NG**

- OK >> GO TO 8.
- NG >> GO TO 7.

#### 7. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-1
- Harness for open or short between mass air flow sensor and ECM
- Harness for open or short between mass air flow sensor and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Check harness continuity between MAF sensor terminal 1 and ECM terminal 51.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**9. CHECK MASS AIR FLOW SENSOR**

Refer to [EC-176, "Component Inspection"](#) .

OK or NG

OK >> GO TO 10.

NG >> Replace mass air flow sensor.

**10. CHECK INTERMITTENT INCIDENT**

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Component Inspection  
MASS AIR FLOW SENSOR**

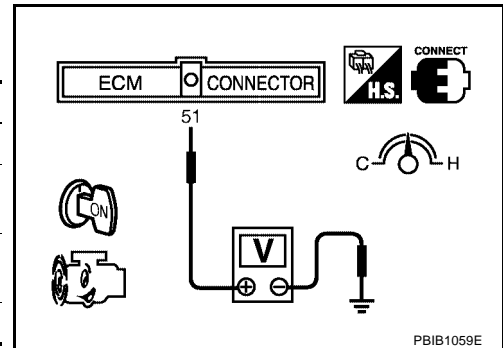
UBS003Q0

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 51 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.7
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 2.1
Idle to about 4,000 rpm*	1.0 - 1.7 to Approx. 4.0

\*: Check for liner voltage rise in response to engine being increased to about 4,000 rpm.

4. If the voltage is out of specification, proceed the following.
  - a. Turn ignition switch "OFF".
  - b. Disconnect mass air flow sensor harness connector and reconnect it again.
  - c. Perform steps 2 and 3 again.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.
6. If NG, clean or replace mass air flow sensor.





DTC P0112, P0113 IAT SENSOR

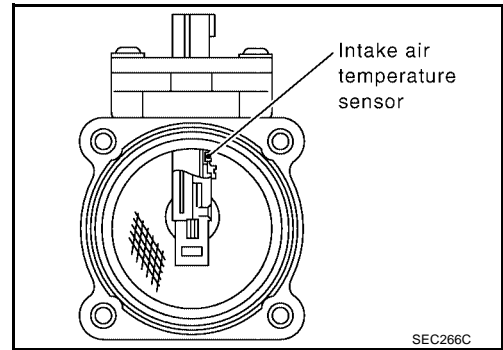
PF2:22630

Component Description

UBS003Q2

The intake air temperature sensor is built into mass air flow sensor. The sensor detects intake air temperature and transmits a signal to the ECM.

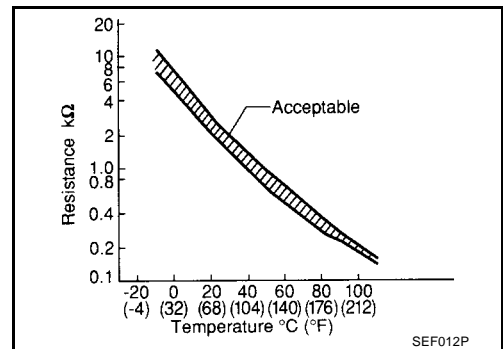
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.43	7.9 - 9.3
25 (77)	3.32	1.9 - 2.1
80 (176)	1.23	0.31 - 0.37

\*: These data are reference values and are measured between ECM terminal 34 (Intake air temperature sensor) and ground.



**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

UBS003Q3

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0112 0112	Intake air temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Intake air temperature sensor</li> </ul>
P0113 0113	Intake air temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

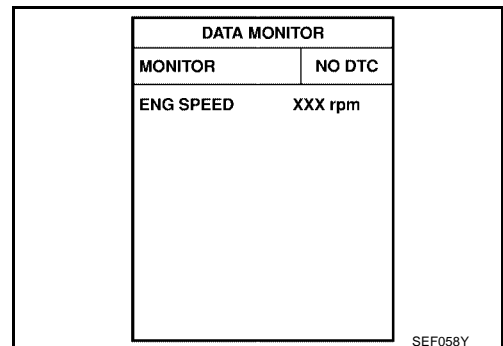
UBS003Q4

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-179, "Diagnostic Procedure"](#)



**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

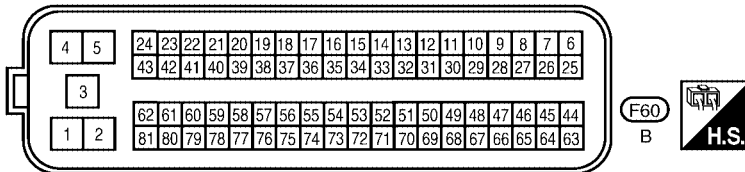
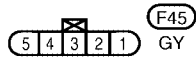
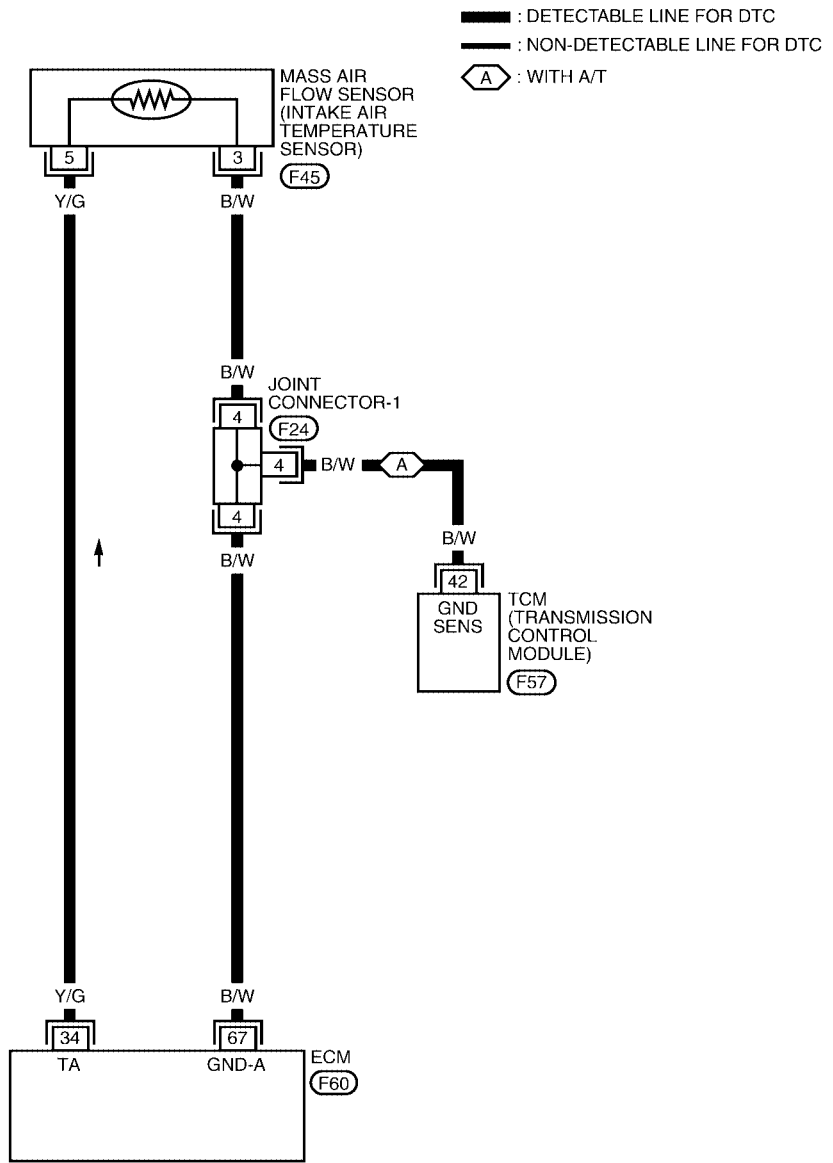
# DTC P0112, P0113 IAT SENSOR

[QG18DE (ULEV)]

UBS003Q5

## Wiring Diagram

EC-IATS-01



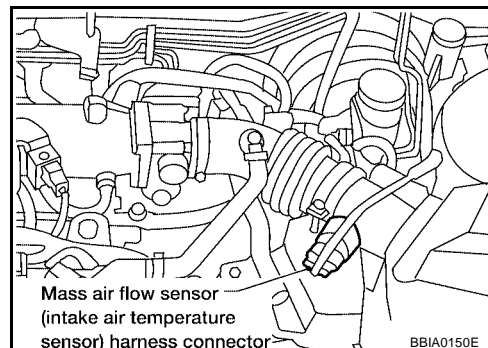
Refer to the following.

- (F24) - JOINT CONNECTOR
- (F57) - ELECTRICAL UNITS

BBWA0775E

**Diagnostic Procedure****1. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT**

1. Turn ignition switch "OFF".
2. Disconnect mass air flow sensor (intake air temperature sensor is built-into) harness connector.
3. Turn ignition switch "ON".



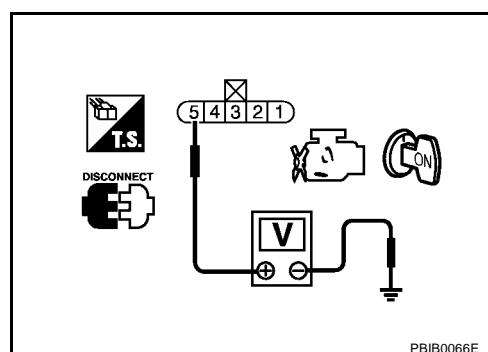
4. Check voltage between MAF sensor terminal 5 and ground.

**Voltage: Approximately 5V**

OK or NG

OK >> GO TO 2.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**2. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.

NG >> GO TO 3.

**3. DETECT MALFUNCTIONING PART**

Check the following.

- Joint connector-1
- Harness for open or short between TCM and intake air temperature sensor
- Harness for open or short between ECM and intake air temperature sensor

>> Repair open circuit or short to power in harness or connectors.

**4. CHECK INTAKE AIR TEMPERATURE SENSOR**

Refer to [EC-180, "Component Inspection"](#).

OK or NG

OK >> GO TO 5.

NG >> Replace mass air flow sensor (with intake air temperature sensor).

**5. CHECK INTERMITTENT INCIDENT**

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

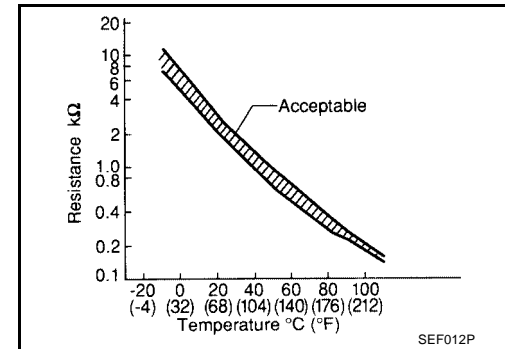
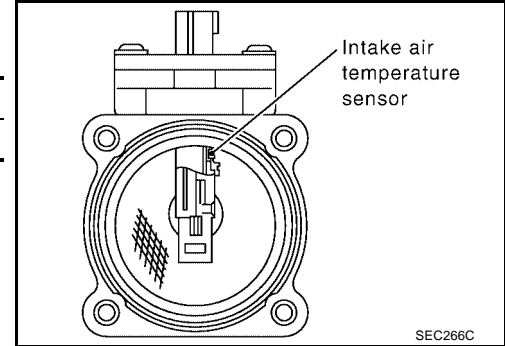
**Component Inspection  
INTAKE AIR TEMPERATURE SENSOR**

UBS003Q7

1. Check resistance between mass air flow sensor terminals 3 and 5 under the following conditions.

Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

2. If NG, replace mass air flow sensor (with intake air temperature sensor).



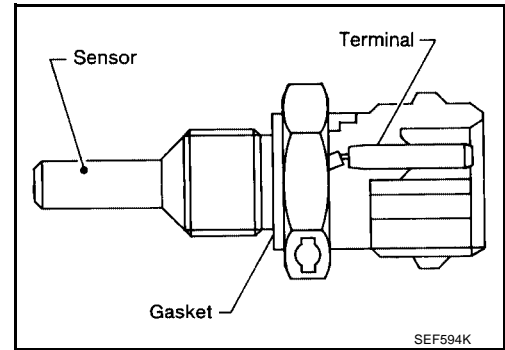
DTC P0117, P0118 ECT SENSOR

PF2:22630

UBS001EF

Component Description

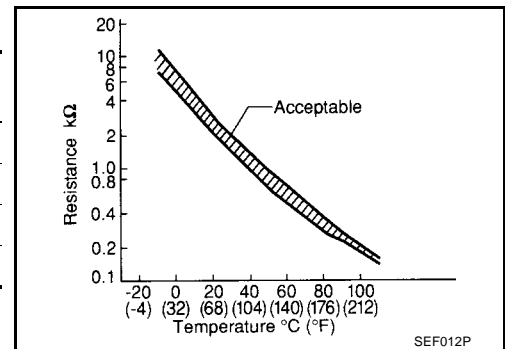
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

\*: These data are reference values and are measured between ECM terminal 73 (Engine coolant temperature sensor) and ground.



**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may lead to ECM's transistor damage. Use ground other than ECM, such as engine ground.

On Board Diagnosis Logic

UBS006GC

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0117 0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Engine coolant temperature sensor</li> </ul>
P0118 0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

## FAIL-SAFE MODE

When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode	
Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch "ON" or "START". CONSULT-II displays the engine coolant temperature decided by ECM.	
	Condition	Engine coolant temperature decided (CONSULT-II display)
	Just as ignition switch is turned ON or Start	40°C (104°F)
	More than approx. 4 minutes after ignition ON or Start	80°C (176°F)
	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.		

## DTC Confirmation Procedure

UBS001E1

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-184, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

### WITH GST

Follow the procedure "With CONSULT-II" above.

# DTC P0117, P0118 ECT SENSOR

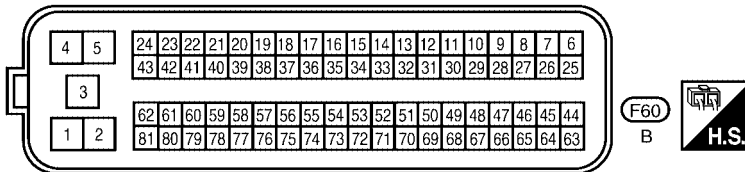
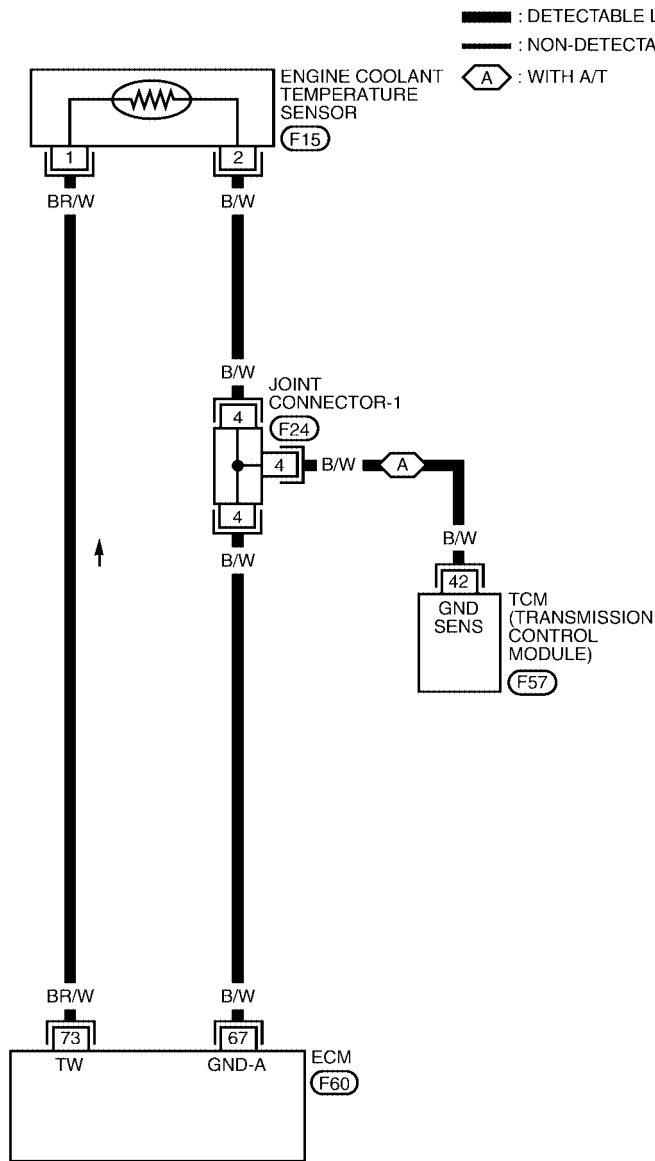
[QG18DE (ULEV)]

UBS001EJ

## Wiring Diagram

EC-ECTS-01

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



Refer to the following.

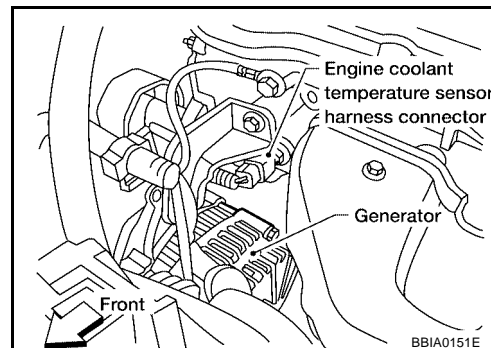
- (F24) - JOINT CONNECTOR
- (F57) - ELECTRICAL UNITS

BBWA0776E

## Diagnostic Procedure

### 1. CHECK POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect engine coolant temperature sensor (ECTS) harness connector.
3. Turn ignition switch "ON".

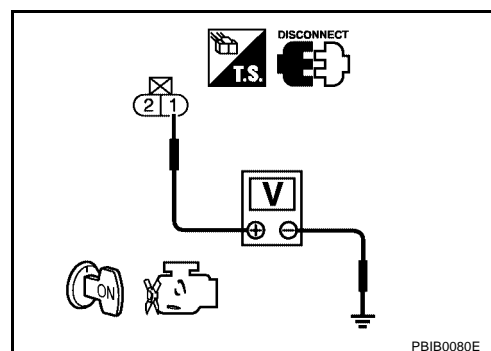


4. Check voltage between ECTS terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 2.  
 NG >> Repair harness or connectors.



### 2. CHECK GROUND CIRCUIT

1. Turn ignition switch "OFF".
2. Check harness continuity between ECTS terminal 2 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.  
 NG >> GO TO 3.

### 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between ECM and engine coolant temperature sensor
- Harness for open or short between TCM (Transmission control module) and engine coolant temperature sensor.
- Joint connector-1

>> Repair open circuit or short to power in harness or connectors.

### 4. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-185, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.  
 NG >> Replace engine coolant temperature sensor.



**5. CHECK INTERMITTENT INCIDENT**

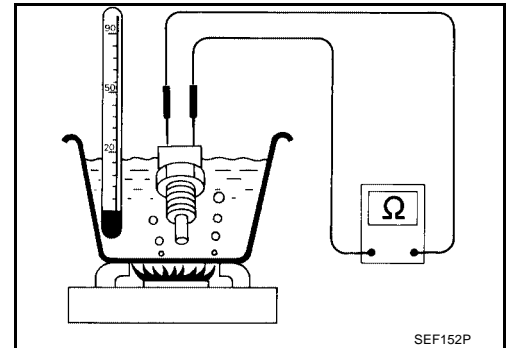
Perform [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection  
ENGINE COOLANT TEMPERATURE SENSOR**

Check resistance as shown in the figure.

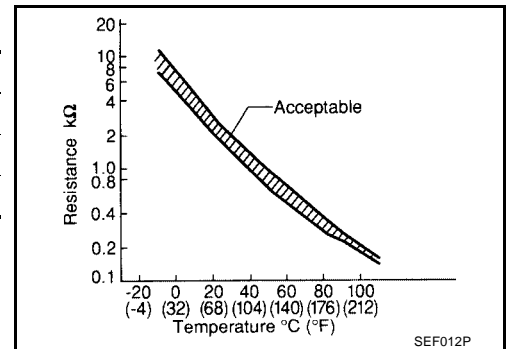
UBS001EL



**<Reference data>**

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

If NG, replace engine coolant temperature sensor.



UBS001EM

**Removal and Installation  
ENGINE COOLANT TEMPERATURE SENSOR**

Refer to [EM-12, "OUTER COMPONENT PARTS"](#) .

A  
EC  
C  
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J  
K  
L  
M

**DTC P0122, P0123 TP SENSOR**

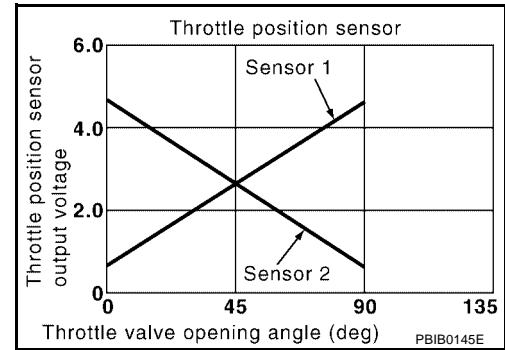
PF16119

**Component Description**

UBS003ZS

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS003ZT

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	<ul style="list-style-type: none"> <li>Ignition switch: ON (Engine stopped)</li> <li>Shift lever: D (A/T), 1st (M/T)</li> </ul>	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

\*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

**On Board Diagnosis Logic**

UBS003ZU

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122 0122	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	<ul style="list-style-type: none"> <li>Harness or connectors (The TP sensor 2 circuit is open or shorted.) (APP sensor 2 circuit is shorted.)</li> <li>Electric throttle control actuator (TP sensor 2)</li> <li>Accelerator pedal position sensor (APP sensor)</li> </ul>
P0123 0123	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

**FAIL-SAFE MODE**

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

**DTC Confirmation Procedure**

UBS003ZV

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-189, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

A  
EC  
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D  
E  
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G  
H  
I  
J  
K  
L  
M

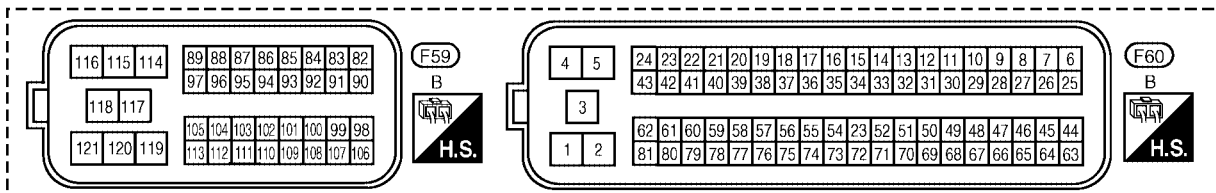
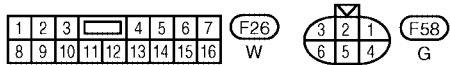
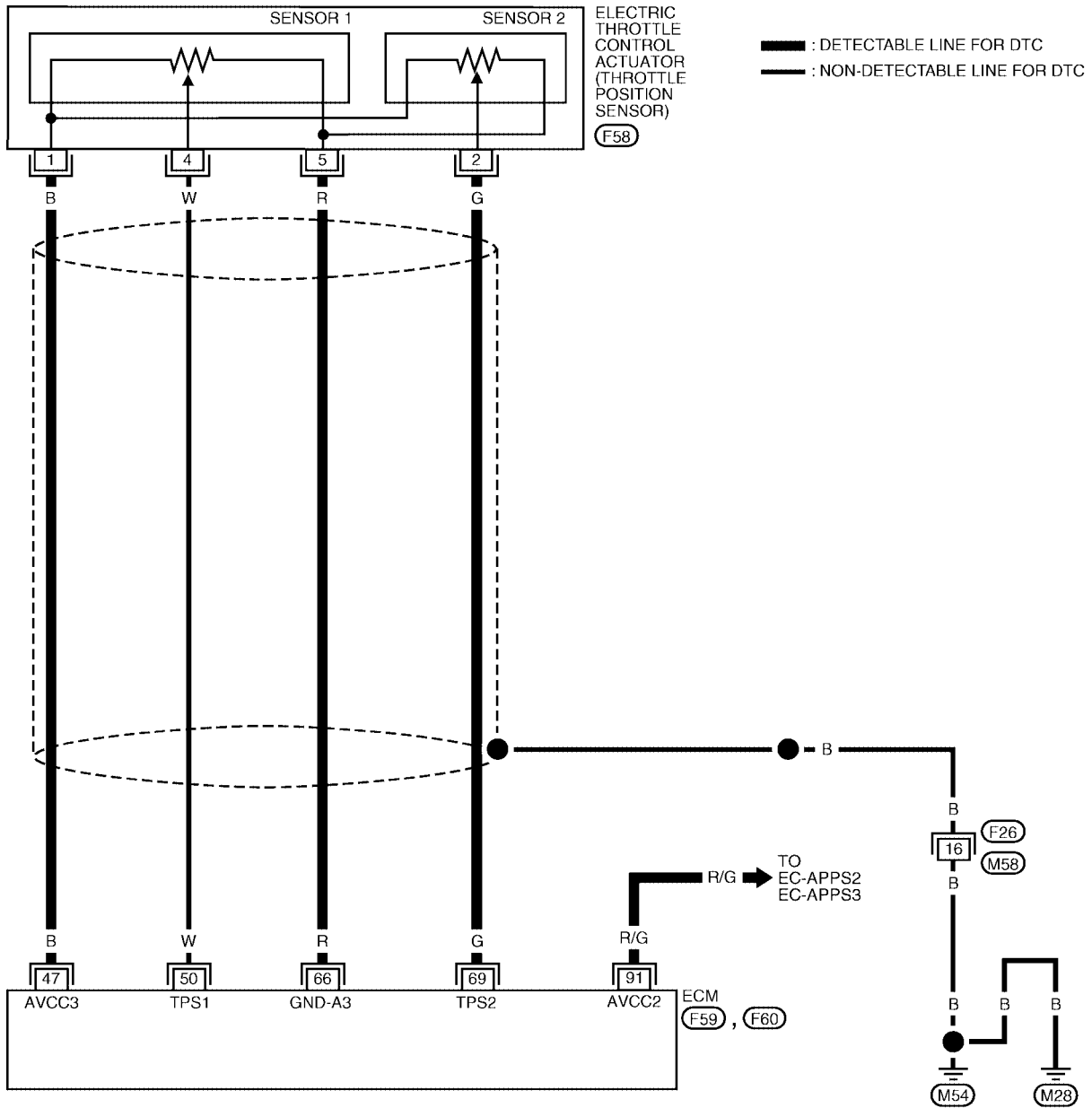
# DTC P0122, P0123 TP SENSOR

[QG18DE (ULEV)]

## Wiring Diagram

UBS003ZW

### EC-TPS2-01



BBWA1380E

# DTC P0122, P0123 TP SENSOR

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	B	Sensor power supply (Throttle position sensor)	[Ignition switch "ON"]	Approximately 5V
50	W	Throttle position sensor 1	[Ignition switch "ON"] <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully released</li> </ul>	More than 0.36V
			[Ignition switch "ON"] <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully depressed</li> </ul>	Less than 4.75V
66	R	Sensor ground (Throttle position sensor)	[Engine is running] <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 0V
69	G	Throttle position sensor 2	[Ignition switch "ON"] <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully released</li> </ul>	Less than 4.75V
			[Ignition switch "ON"] <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully depressed</li> </ul>	More than 0.36V
91	R/G	Sensor power supply (Accelerator pedal position sensor 2)	[Ignition switch "ON"]	Approximately 5V

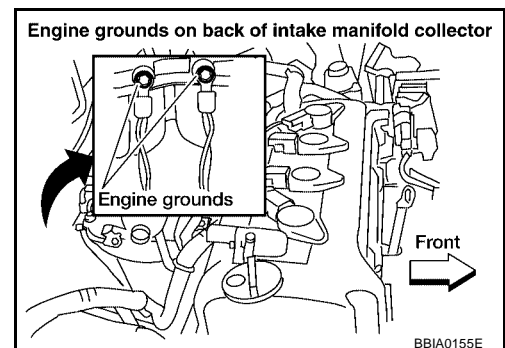
## Diagnostic Procedure

UBS003ZX

### 1. RETIGHTEN GROUND SCREWS

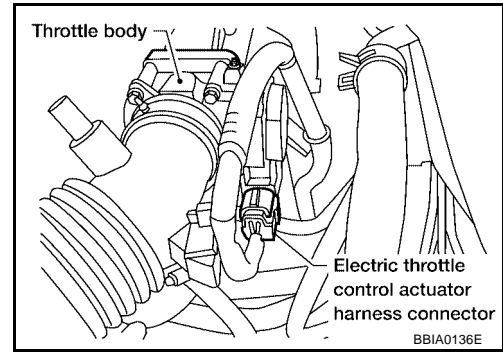
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

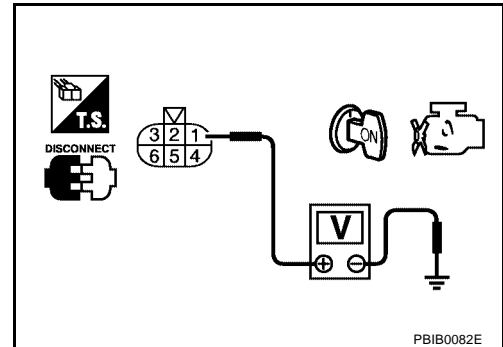


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 7.  
 NG >> GO TO 3.



## 3. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 1 and ECM terminal 47. Refer to Wiring Diagram.

**Continuity should exist.**

OK or NG

- OK >> GO TO 4.  
 NG >> Repair or replace open circuit.

## 4. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT-III

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Electric throttle control actuator terminal 1	<a href="#">EC-186</a>
91	APP sensor terminal 1	<a href="#">EC-511</a>

OK or NG

- OK >> GO TO 5.  
 NG >> Repair short to ground or short to power in harness or connectors.

## 5. CHECK APP SENSOR

Refer to [EC-511, "DTC P2127, P2128 APP SENSOR"](#) .

OK or NG

- OK >> GO TO 11.  
 NG >> GO TO 6.

**6. REPLACE ACCELERATOR PEDAL ASSEMBLY**

1. Replace accelerator pedal assembly.
2. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**7. CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Check harness continuity between ECM terminal 66 and electric throttle control actuator terminal 5. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 69 and electric throttle control actuator terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**9. CHECK THROTTLE POSITION SENSOR**

Refer to [EC-192, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> GO TO 10.

**10. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**11. CHECK INTERMITTENT INCIDENT**

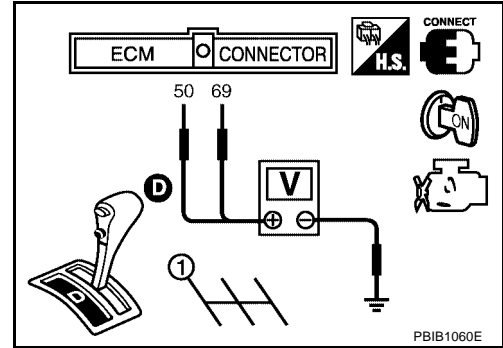
Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection**  
**THROTTLE POSITION SENSOR**

1. Reconnect all harness connectors disconnected.
2. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 50 (TP sensor 1signal), 69 (TP sensor 2signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
50 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
69 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



PBIB1060E

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-53, "Idle Air Volume Learning"](#) .

**Removal and Installation**  
**ELECTRIC THROTTLE CONTROL ACTUATOR**

Refer to [EM-12, "Removal and Installation"](#) .



DTC P0125 ECT SENSOR

PF2:22630

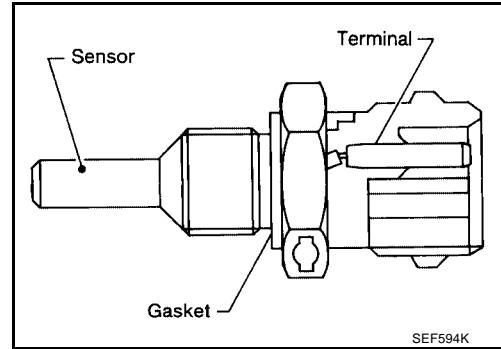
Component Description

UBS001EV

NOTE:

If DTC P0125 is displayed with P0117 or P0118, first perform trouble diagnosis for DTC P0117 or P0118, [EC-181](#).

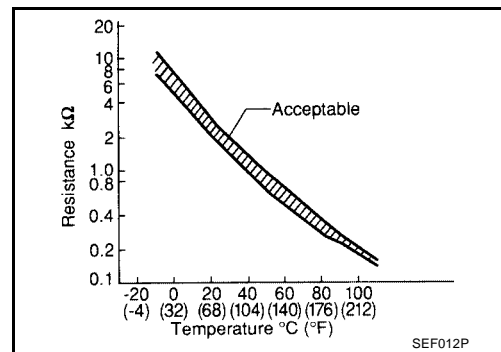
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

\*: These data are reference values and are measured between ECM terminal 73 (Engine coolant temperature sensor) and ground.



CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may lead to ECM's transistor damage. Use ground other than ECM, such as engine ground.

On Board Diagnosis Logic

UBS001EX

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0125 0125	Insufficient engine coolant temperature for closed loop fuel control	<ul style="list-style-type: none"> <li>● Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine.</li> <li>● Engine coolant temperature is insufficient for closed loop fuel control.</li> </ul>	<ul style="list-style-type: none"> <li>● Harness or connectors (High resistance in the circuit)</li> <li>● Engine coolant temperature sensor</li> <li>● Thermostat</li> </ul>

DTC Confirmation Procedure

UBS001EY

CAUTION:

Be careful not to overheat engine.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch "ON".

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Check that "COOLAN TEMP/S" is above 10°C (50°F).  
**If it is above 10°C (50°F), the test result will be OK. If it is below 10°C (50°F), go to following step.**
4. Start engine and run it for 65 minutes at idle speed.  
**If "COOLAN TEMP/S" increases to more than 10°C (50°F) within 65 minutes, stop engine because the test result will be OK.**
5. If 1st trip DTC is detected, go to [EC-194, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

### WITH GST

Follow the procedure "With CONSULT-II" above.

## Diagnostic Procedure

UBS001F0

### 1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-194, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 2.
- NG >> Replace engine coolant temperature sensor.

### 2. CHECK THERMOSTAT OPERATION

When the engine is cooled [lower than 82°C (180°F)], grasp lower radiator hose and confirm the engine coolant does not flow.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace thermostat. Refer to [CO-11, "THERMOSTAT AND THERMOSTAT HOUSING"](#) .

### 3. CHECK INTERMITTENT INCIDENT

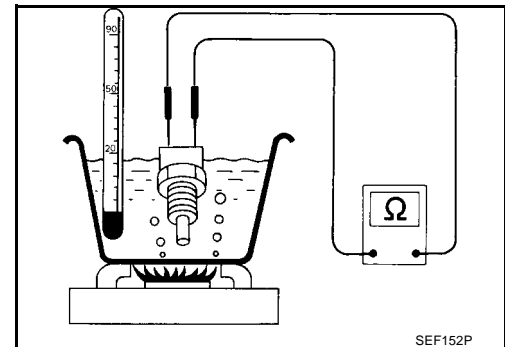
Perform [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

## Component Inspection ENGINE COOLANT TEMPERATURE SENSOR

UBS001F1

Check resistance as shown in the figure.



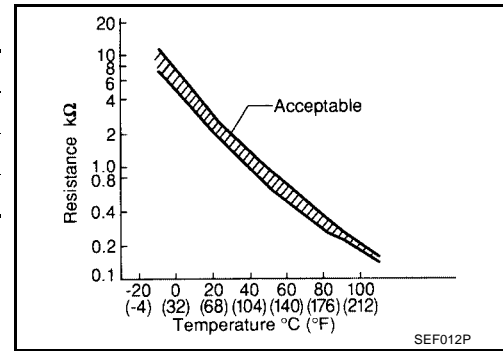
# DTC P0125 ECT SENSOR

[QG18DE (ULEV)]

## <Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.0
90 (194)	0.236 - 0.260

If NG, replace engine coolant temperature sensor.



## Removal and Installation ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EM-12, "OUTER COMPONENT PARTS"](#) .

UBS001F2

A  
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DTC P0127 IAT SENSOR

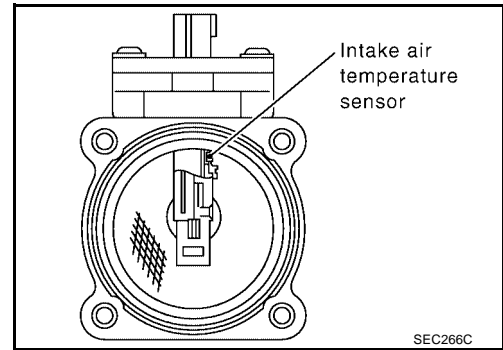
PF0:22630

Component Description

UBS003QI

The intake air temperature sensor is built into mass air flow sensor. The sensor detects intake air temperature and transmits a signal to the ECM.

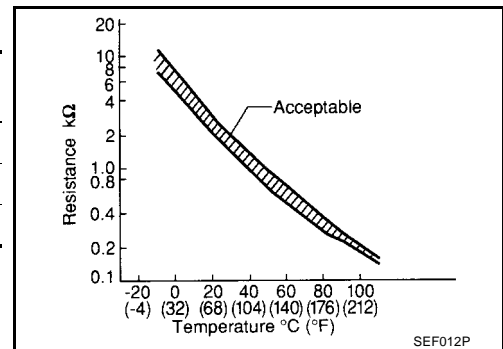
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.43	7.9 - 9.3
25 (77)	3.32	1.9 - 2.1
80 (176)	1.23	0.31 - 0.37

\*: These data are reference values and are measured between ECM terminal 34 (Intake air temperature sensor) and ground.



**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

UBS003QJ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0127 0127	Intake air temperature too high	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Intake air temperature sensor</li> </ul>

DTC Confirmation Procedure

UBS003QK

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**CAUTION:**

Always drive vehicle at a safe speed.

**TESTING CONDITION:**

This test may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

**WITH CONSULT-II**

1. Wait until engine coolant temperature is less than 90°C (194°F)
  - a. Turn ignition switch "ON".
  - b. Select "DATA MONITOR" mode with CONSULT-II.
  - c. Check the engine coolant temperature.
  - d. If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch "OFF" and cool down engine.
    - Perform the following steps before engine coolant temperature is above 90°C (194°F).
2. Turn ignition switch "ON".
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Start engine.
5. Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.
6. If 1st trip DTC is detected, go to [EC-197, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

**Diagnostic Procedure****1. CHECK INTAKE AIR TEMPERATURE SENSOR**

Refer to [EC-197, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 2.  
 NG >> Replace mass air flow sensor (with intake air temperature sensor).

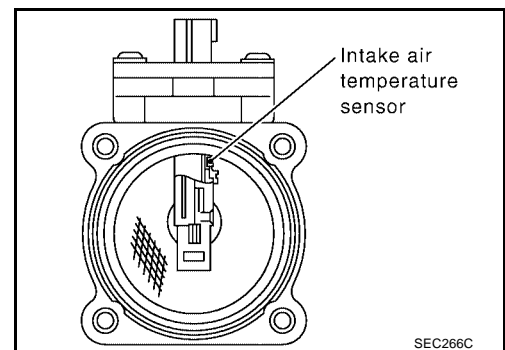
**2. CHECK INTERMITTENT INCIDENT**

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection  
INTAKE AIR TEMPERATURE SENSOR**

1. Check resistance between intake air temperature sensor terminals 3 and 5 under the following conditions.

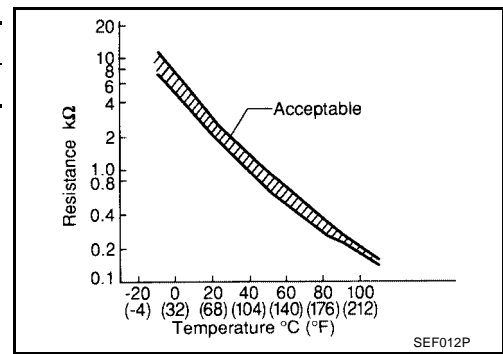


# DTC P0127 IAT SENSOR

[QG18DE (ULEV)]

Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

- If NG, replace mass air flow sensor (with intake air temperature sensor).



**DTC P0128 THERMOSTAT FUNCTION**

PF2:21200

**On Board Diagnosis Logic**

UBS006GD

Engine coolant temperature has not risen enough to open the thermostat even though the engine has run long enough.

This is due to a leak in the seal or the thermostat stuck open.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0128 0128	Thermostat function	The engine coolant temperature does not reach to specified temperature even though the engine has run long enough.	<ul style="list-style-type: none"> <li>● Thermostat</li> <li>● Leakage from sealing portion of thermostat</li> <li>● Engine coolant temperature sensor</li> </ul>

**DTC Confirmation Procedure**

UBS001F5

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- For best results, perform at ambient temperature of **-10°C (14°F) or higher.**
- For best results, perform at engine coolant temperature of **-10°C (14°F) to 60°C (140°F).**

**WITH CONSULT-II**

1. Replace thermostat with new one. Refer to [CO-11, "THERMOSTAT AND THERMOSTAT HOUSING"](#) . Use only a genuine NISSAN thermostat as a replacement. If an incorrect thermostat is used, the MIL may come on.
2. Turn ignition switch "ON".
3. Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-II.
4. Check that the "COOLAN TEMP/S" is above 60°C (140°F).  
If it is below 60°C (140°F), go to following step.  
If it is above 60°C (140°F), stop engine and cool down the engine to less than 60°C (140°F), then retry from step 1.
5. Drive vehicle for 10 consecutive minutes under the following conditions.

VHCL SPEED SE	80 - 120 km/h (50 - 75 MPH)
---------------	-----------------------------

If 1st trip DTC is detected, go to [EC-199, "Diagnostic Procedure"](#) .

**WITH GST**

1. Follow the procedure "WITH CONSULT-II" above.

**Diagnostic Procedure**

UBS001F6

**1. CHECK ENGINE COOLANT TEMPERATURE SENSOR**

Refer to [EC-200, "Component Inspection"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> Replace engine coolant temperature sensor.

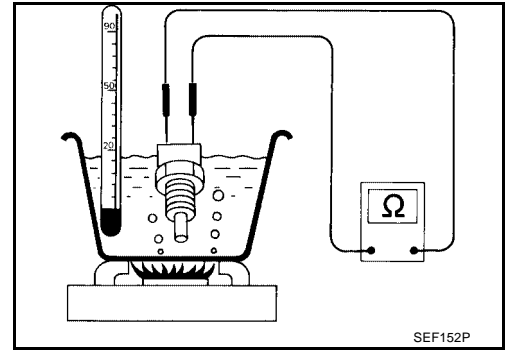
# DTC P0128 THERMOSTAT FUNCTION

[QG18DE (ULEV)]

UBS001F7

## Component Inspection ENGINE COOLANT TEMPERATURE SENSOR

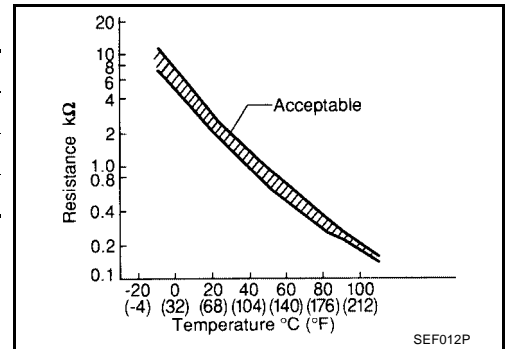
Check resistance as shown in the figure.



### <Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.0
90 (194)	0.236 - 0.260

If NG, replace engine coolant temperature sensor.



UBS001F8

## Removal and Installation ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EM-12, "OUTER COMPONENT PARTS"](#).



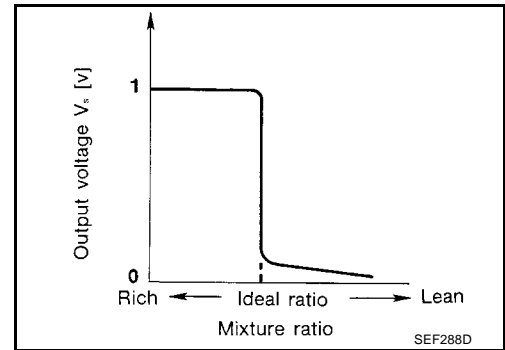
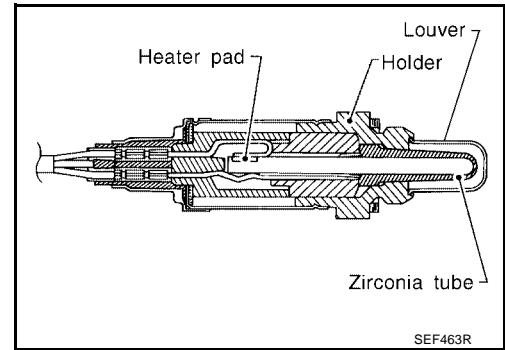
**DTC P0132 HO2S1**

PFP:22690

**Component Description**

UBS003TQ

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS003TR

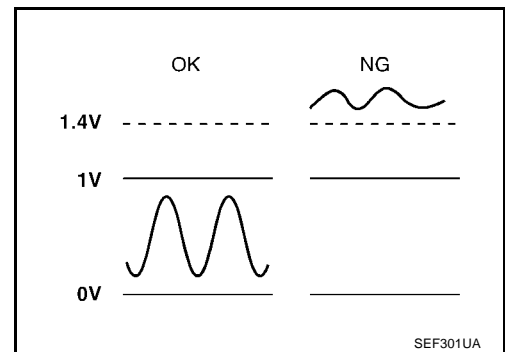
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

**On Board Diagnosis Logic**

UBS003TS

To judge the malfunction, the diagnosis checks that the heated oxygen sensor 1 output is not inordinately high.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0132 0132	Heated oxygen sensor 1 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Heated oxygen sensor 1</li> </ul>

**DTC Confirmation Procedure****NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Restart engine and let it idle for 2 minutes.
6. If 1st trip DTC is detected, go to [EC-204, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANT TEMP/S	XXX °C

SEF174Y

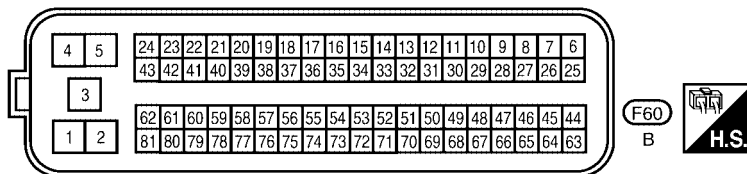
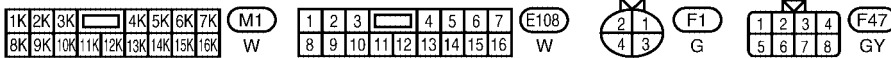
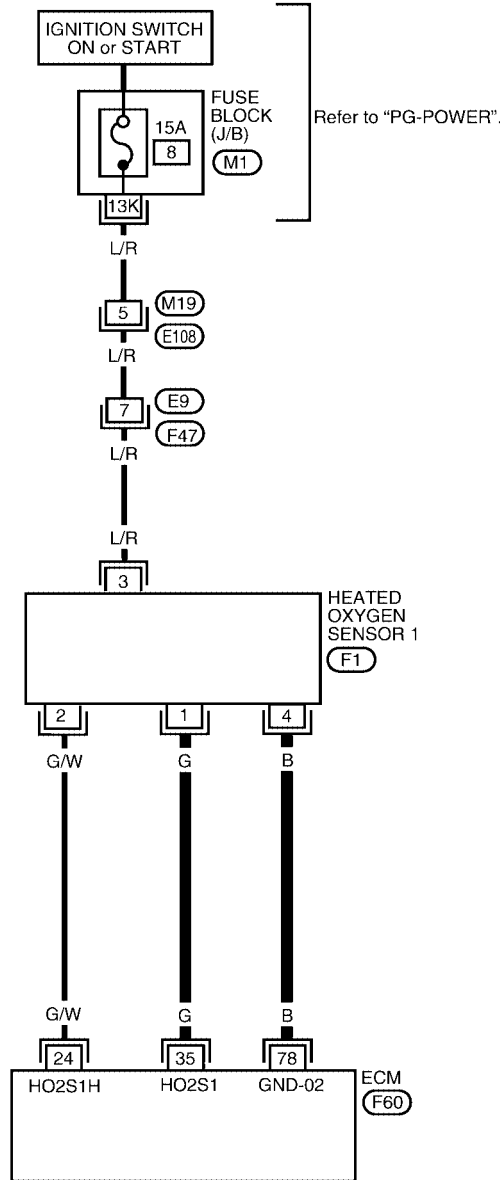
**WITH GST**

1. Start engine and warm it up to normal operating temperature.
  2. Turn ignition switch "OFF" and wait at least 10 seconds.
  3. Restart engine and let it idle for 2 minutes.
  4. Turn ignition switch "OFF" and wait at least 10 seconds.
  5. Restart engine and let it idle for 2 minutes.
  6. Select "MODE 3" with GST.
  7. If DTC is detected, go to [EC-204, "Diagnostic Procedure"](#) .
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

Wiring Diagram

EC-HO2S1-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
35	G	Heated oxygen sensor 1	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm.</li> </ul>	0 - Approximately 1.0V (Periodically change)
78	B	Heated oxygen sensor ground	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	Approximately 0V

**Diagnostic Procedure**

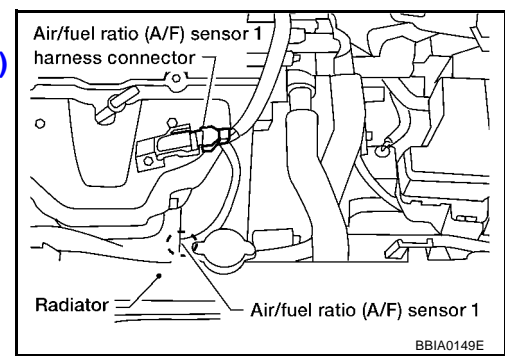
UBS003TV

**1. RETIGHTEN HEATED OXYGEN SENSOR 1**

1. Turn ignition switch "OFF".
2. Loosen and retighten heated oxygen sensor 1.

**Tightening torque: 40 - 60 N·m (4.1 - 6.1 kg·m, 30 - 44 ft·lb)**

>> GO TO 2.

**2. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT**

1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 78 HO2S1 terminal 4.  
Refer to Wiring Diagram.

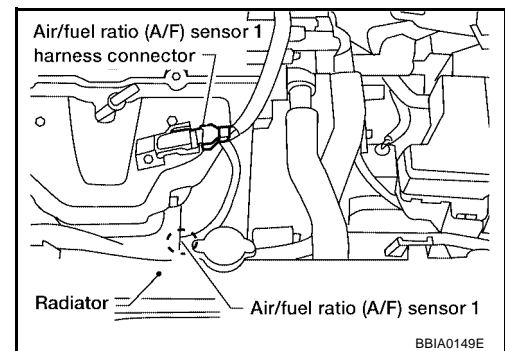
**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to power in harness or connectors.

**3. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Check harness continuity between ECM terminal 35 and HO2S1 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Check harness continuity between ECM terminal 35 or HO2S1 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

3. Also check harness for short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

#### 4. CHECK HO2S1 CONNECTOR FOR WATER

Check connectors for water.

**Water should not exist.**

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace harness or connectors.

#### 5. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-205, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Replace heated oxygen sensor 1.

#### 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection HEATED OXYGEN SENSOR 1

UBS003TW

#### With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

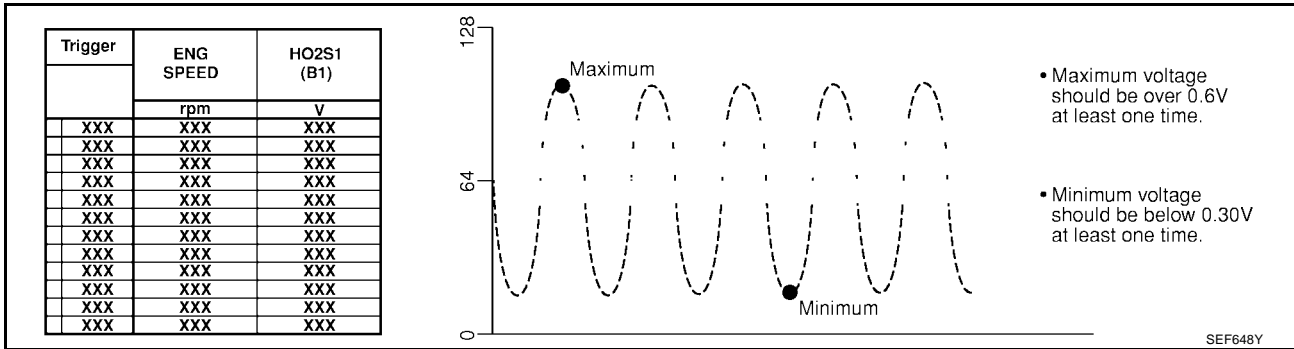
DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

6. Check the following.
  - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown at right.
  - "HO2S1 (B1)" voltage goes above 0.6V at least once.
  - "HO2S1 (B1)" voltage goes below 0.3V at least once.
  - "HO2S1 (B1)" voltage never exceeds 1.0V.

cycle	1   2   3   4   5
HO2S1 MNTR (B1)	R-L-R-L-R-L-R-L-R-L-R
R means HO2S1 MNTR (B1) indicates RICH L means HO2S1 MNTR (B1) indicates LEAN	

SEF217YA



**CAUTION:**

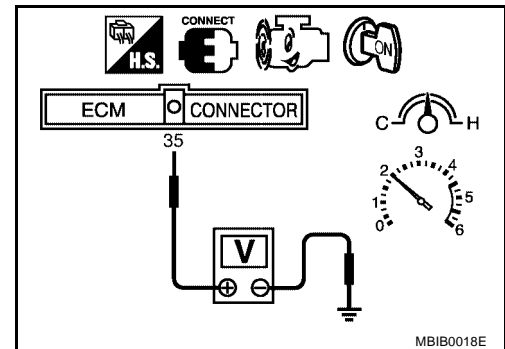
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**⊗ Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1 (B1) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.

- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V  
 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V



**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation  
 HEATED OXYGEN SENSOR 1**

UBS003TX

Refer to [EM-12, "Removal and Installation"](#).

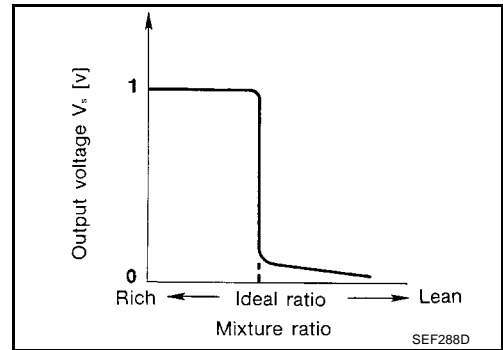
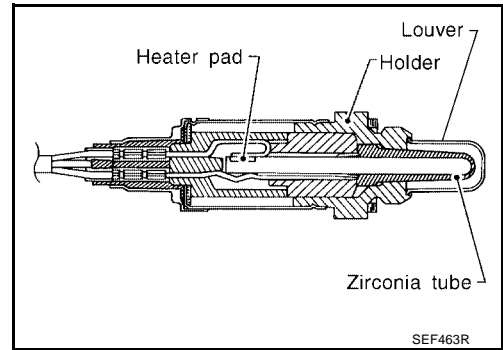
**DTC P0133 HO2S1**

PFP:22690

**Component Description**

UBS003TY

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS003TZ

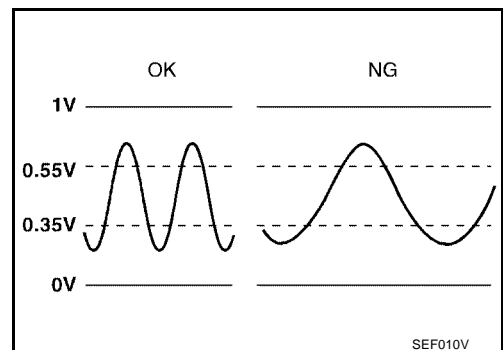
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

**On Board Diagnosis Logic**

UBS003U0

To judge the malfunction of heated oxygen sensor 1, this diagnosis measures response time of heated oxygen sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and heated oxygen sensor 1 temperature index. Judgment is based on whether the compensated time (heated oxygen sensor 1 cycling time index) is inordinately long or not.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0133 0133	Heated oxygen sensor 1 circuit slow response	The response of the voltage signal from the sensor takes more than the specified time.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Heated oxygen sensor 1</li> <li>● Heated oxygen sensor 1 heater</li> <li>● Fuel pressure</li> <li>● Injectors</li> <li>● Intake air leaks</li> <li>● Exhaust gas leaks</li> <li>● PCV valve</li> <li>● Mass air flow sensor</li> </ul>

**DTC Confirmation Procedure**

UBS003U1

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- Always perform at a temperature above **-10°C (14°F)**.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch “ON” and select “HO2S1 (B1) P0133” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

**NOTE:**

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.

HO2S1 (B1) P0133	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

SEF338Z

6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 20 to 50 seconds.)

ENG SPEED	1,950 - 3,200 rpm (A/T models) 2,300 - 3,750 rpm (M/T models)
Vehicle speed	More than 80 km/h (50 MPH)
B/FUEL SCHDL	3.5 - 12.5 msec (A/T models) 3.0 - 10.0 msec (M/T models)
Selector lever	Suitable position

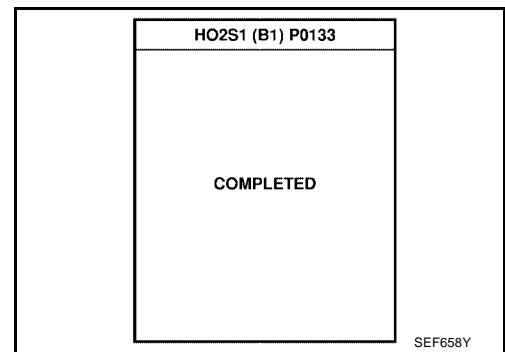
HO2S1 (B1) P0133	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

SEF339Z

If “TESTING” is not displayed after 5 minutes, retry from step 2.



7. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to [EC-211, "Diagnostic Procedure"](#).



UBS003U2

## Overall Function Check

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a DTC might not be confirmed.

### WITH GST

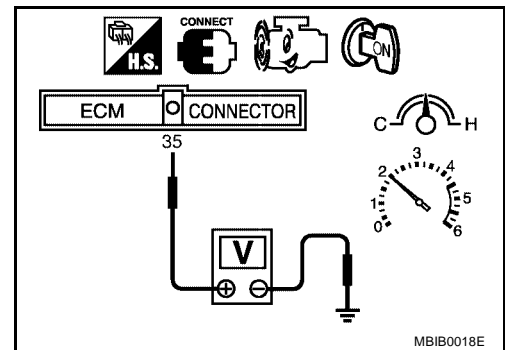
1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1(B1) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
  - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.

**1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V**

**2 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V**

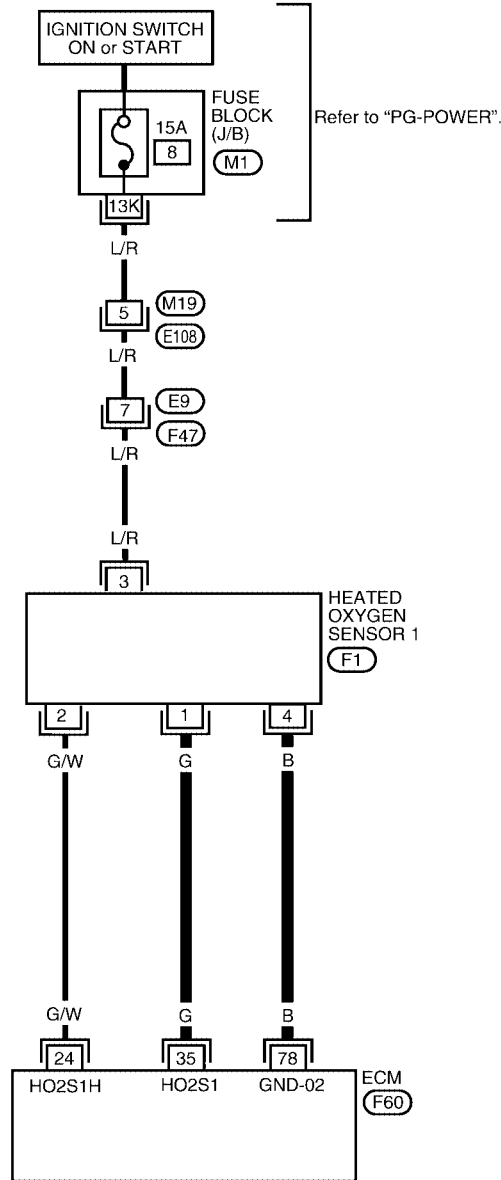
**times: → 0 - 0.3V**

4. If NG, go to [EC-211, "Diagnostic Procedure"](#).

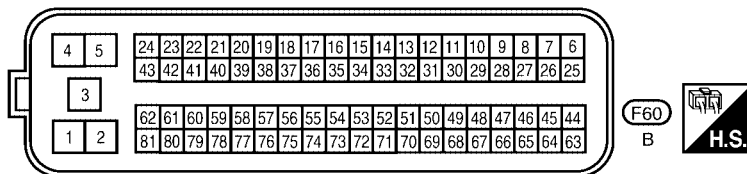
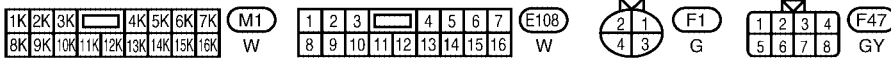


Wiring Diagram

EC-HO2S1-01



— : DETECTABLE LINE FOR DTC  
— : NON-DETECTABLE LINE FOR DTC



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
35	G	Heated oxygen sensor 1	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>• Warm-up condition</li> <li>• Engine speed is 2,000 rpm.</li> </ul>	0 - Approximately 1.0V (Periodically change)

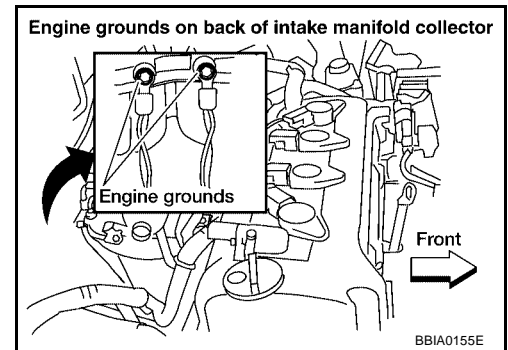
**Diagnostic Procedure**

UBS003U4

**1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.

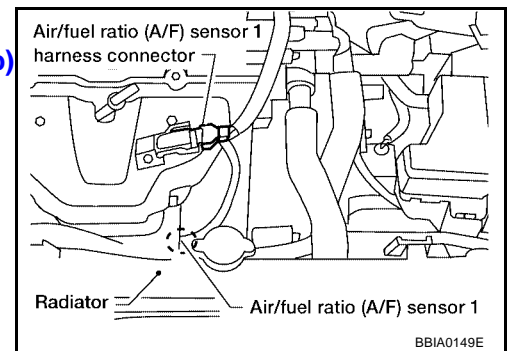


**2. RETIGHTEN HEATED OXYGEN SENSOR 1**

Loosen and retighten heated oxygen sensor 1.

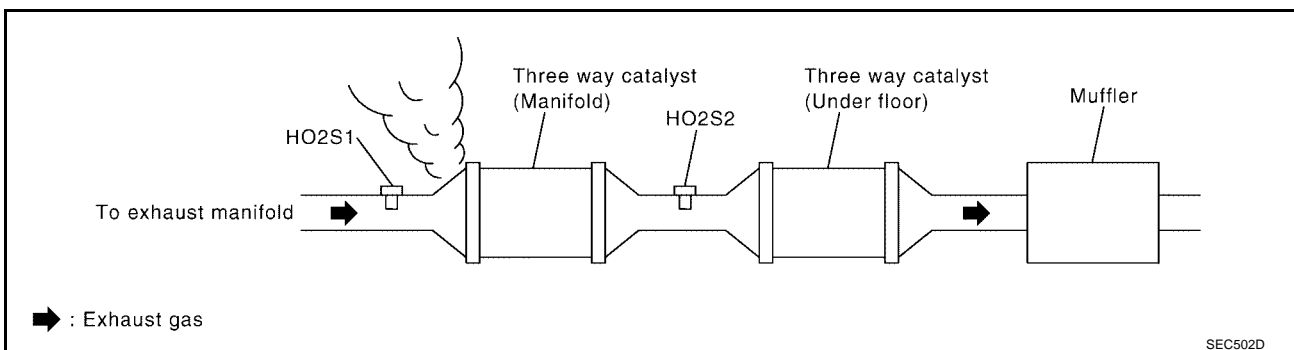
**Tightening torque: 40 - 60 N·m (4.1 - 6.1 kg·m, 30 - 44 ft·lb)**

>> GO TO 3.



**3. CHECK FOR EXHAUST GAS LEAK**

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (Manifold).



OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace.

## 4. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

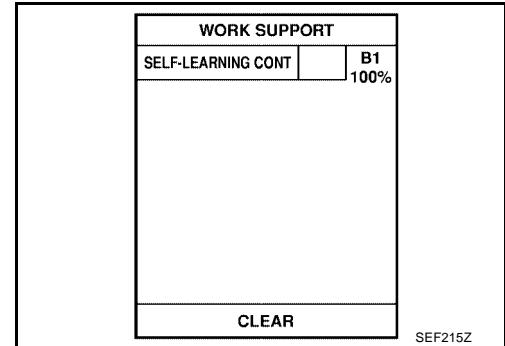
OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace.

## 5. CLEAR THE SELF-LEARNING DATA

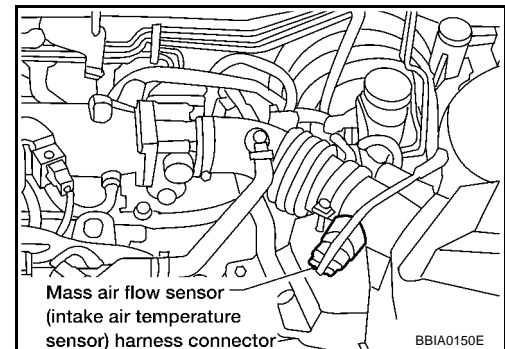
### With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 or P0172 detected?**  
**Is it difficult to start engine?**



### Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-71, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 or P0172 detected?**  
**Is it difficult to start engine?**



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171 or DTC P0172 (Refer to [EC-238](#) or [EC-245](#)).
- No >> GO TO 6.

## 6. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 78 HO2S1 terminal 4.  
Refer to Wiring Diagram.

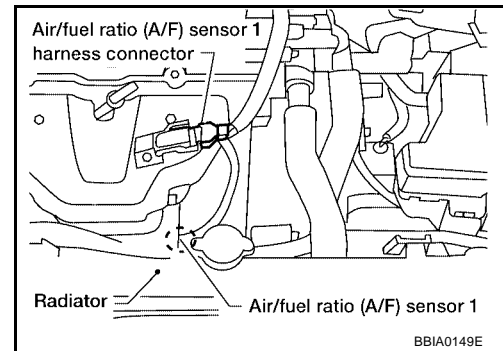
**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to power in harness or connectors.



## 7. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 35 and HO2S1 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Check harness continuity between ECM terminal 35 or HO2S1 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

3. Also check harness for short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 8. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to [EC-156, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace malfunctioning heated oxygen sensor 1.

## 9. CHECK MASS AIR FLOW SENSOR

Refer to [EC-170, "Component Inspection"](#) .

OK or NG

OK >> GO TO 10.

NG >> Replace mass air flow sensor.

## 10. CHECK PCV VALVE

Refer to [EC-596, "Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> Replace PCV valve.

## 11. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-214, "Component Inspection"](#) .

OK or NG

OK >> GO TO 12.

NG >> Replace heated oxygen sensor 1.

## 12. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection HEATED OXYGEN SENSOR 1

UBS003U5

#### With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLANT TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

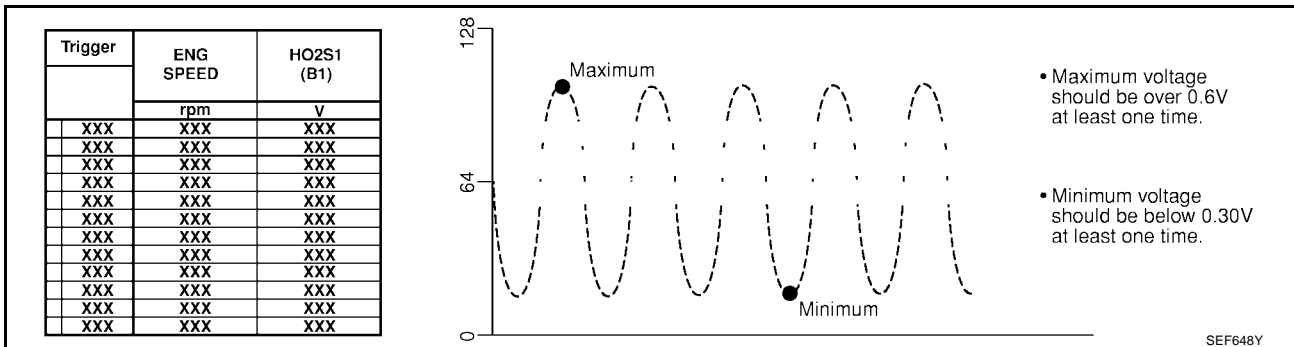
SEF646Y

6. Check the following.
  - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown at right.
  - "HO2S1 (B1)" voltage goes above 0.6V at least once.
  - "HO2S1 (B1)" voltage goes below 0.3V at least once.
  - "HO2S1 (B1)" voltage never exceeds 1.0V.

cycle	1	2	3	4	5
HO2S1 MNTR (B1)	R-L	R-L	R-L	R-L	R-L

R means HO2S1 MNTR (B1) indicates RICH  
L means HO2S1 MNTR (B1) indicates LEAN

SEF217YA



#### CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

#### Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1 (B1) signal] and engine ground.

3. Check the following with engine speed held at 2,000 rpm constant under no load.

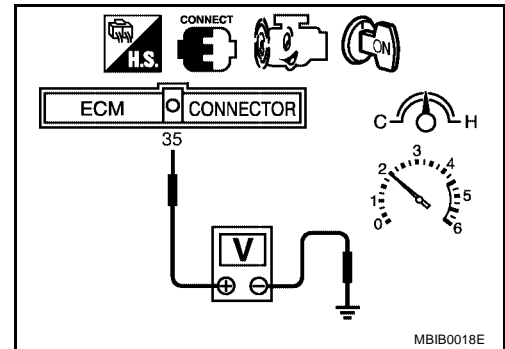
- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



## Removal and Installation HEATED OXYGEN SENSOR 1

UBS003U6

Refer to [EM-12, "Removal and Installation"](#).

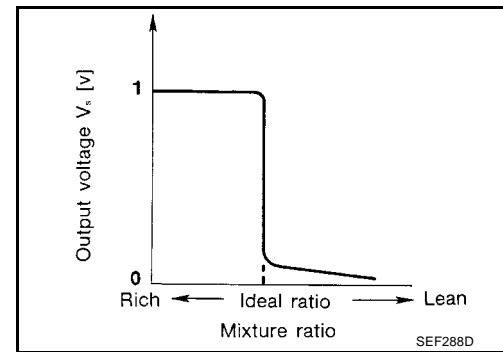
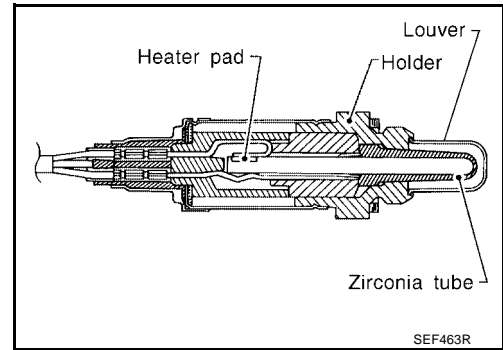
**DTC P0134 HO2S1**

PFP:22690

**Component Description**

UBS003U7

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS003U8

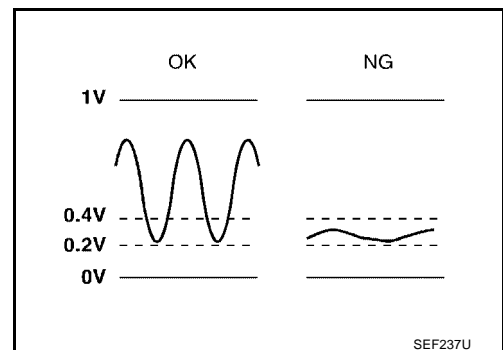
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

**On Board Diagnosis Logic**

UBS003U9

Under the condition in which the heated oxygen sensor 1 signal is not input, the ECM circuits will read a continuous approximately 0.3V. Therefore, for this diagnosis, the time that output voltage is within 200 to 400 mV range is monitored, and the diagnosis checks that this time is not inordinately long.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0134 0134	Heated oxygen sensor 1 circuit no activity detected	The voltage from the sensor is constantly approx. 0.3V.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Heated oxygen sensor 1</li> </ul>



**DTC Confirmation Procedure**

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Select “HO2S1 (B1) P0134” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
3. Touch “START”.
4. Let it idle for at least 3 minutes.

**NOTE:**

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 4.

HO2S1 (B1) P0134	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0544E

5. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 10 to 60 seconds.)

ENG SPEED	1,550 - 3,450 rpm (A/T models) 1,850 - 4,100 rpm (M/T models)
Vehicle speed	More than 64 km/h (40 MPH)
B/FUEL SCHDL	2.4 - 12.5 msec (A/T models) 2 - 10 msec (M/T models)
Selector lever	Suitable position

HO2S1 (B1) P0134	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0545E

If “TESTING” is not displayed after 5 minutes, retry from step 2.

6. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to [EC-220, "Diagnostic Procedure"](#).

HO2S1 (B1) P0134	
COMPLETED	

SEC750C

**Overall Function Check**

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a DTC might not be confirmed.

**WITH GST**

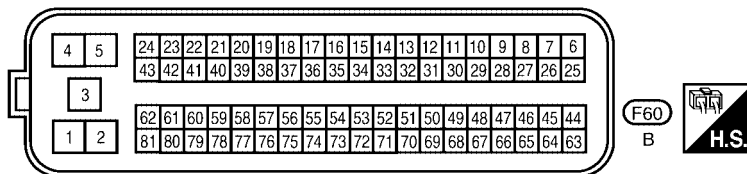
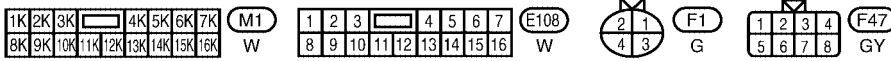
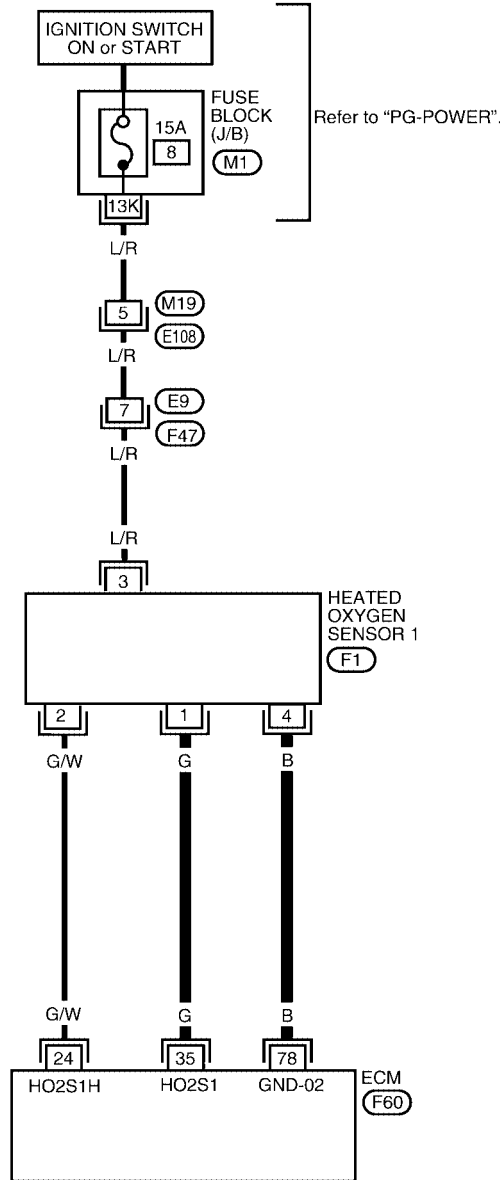
1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1 (B1) signal] and engine ground.



Wiring Diagram

EC-HO2S1-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
35	G	Heated oxygen sensor 1	[Engine is running] <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm.</li> </ul>	0 - Approximately 1.0V (Periodically change)

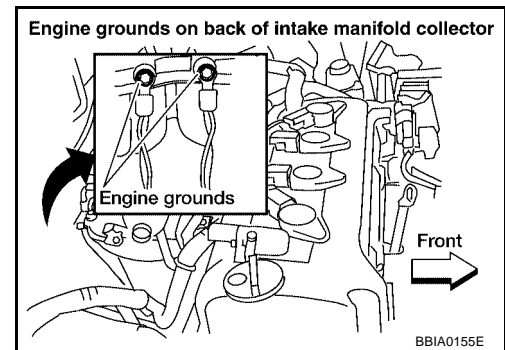
**Diagnostic Procedure**

UBS003UD

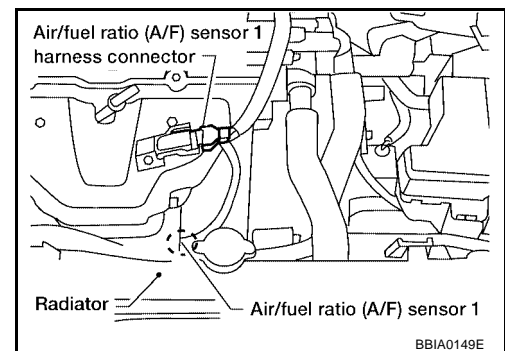
**1. INSPECTION START**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.

**2. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT**

1. Disconnect heated oxygen sensor 1 harness connector.



2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 78 HO2S1 terminal 4. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to power in harness or connectors.

### 3. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 35 and HO2S1 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Check harness continuity between ECM terminal 35 or HO2S1 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

3. Also check harness for short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

### 4. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-221, "Component Inspection"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace heated oxygen sensor 1.

### 5. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection HEATED OXYGEN SENSOR 1

UBS003UE

#### With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

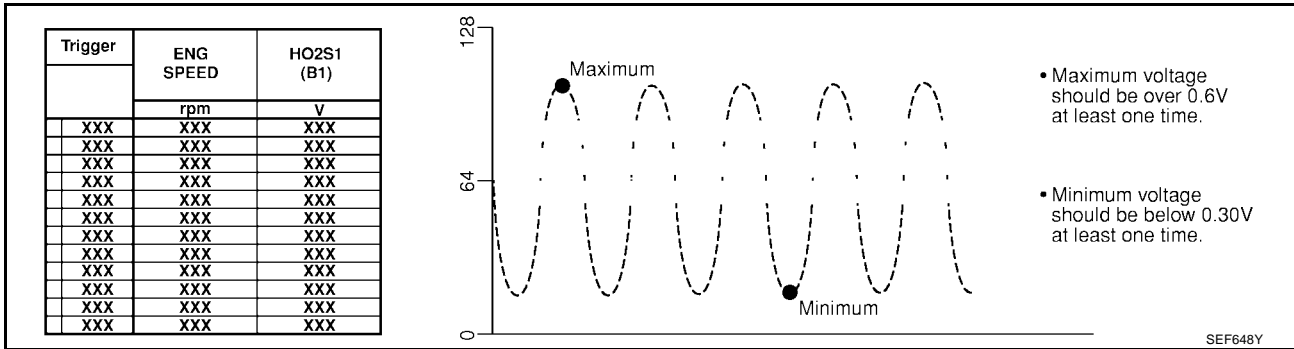
DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

6. Check the following.
  - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds.  
5 times (cycles) are counted as shown at right.
  - "HO2S1 (B1)" voltage goes above 0.6V at least once.
  - "HO2S1 (B1)" voltage goes below 0.3V at least once.
  - "HO2S1 (B1)" voltage never exceeds 1.0V.

cycle	1   2   3   4   5
HO2S1 MNTR (B1)	R-L-R-L-R-L-R-L-R-L-R
R means HO2S1 MNTR (B1) indicates RICH	
L means HO2S1 MNTR (B1) indicates LEAN	

SEF217YA



**CAUTION:**

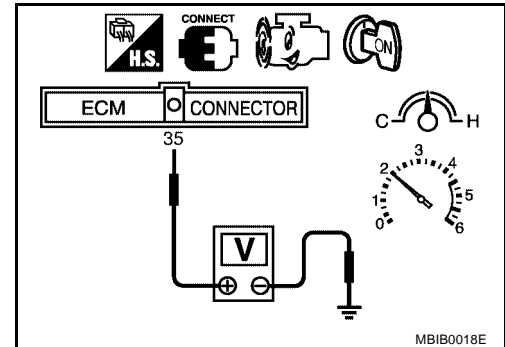
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1 (B1) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.

- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V  
 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V



**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation  
 HEATED OXYGEN SENSOR 1**

UBS003UF

Refer to [EM-12, "Removal and Installation"](#).

**DTC P0138 HO2S2**

PF2:226A0

**Component Description**

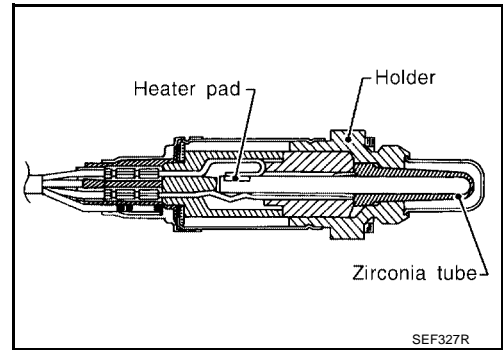
UBS006CD

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS006CE

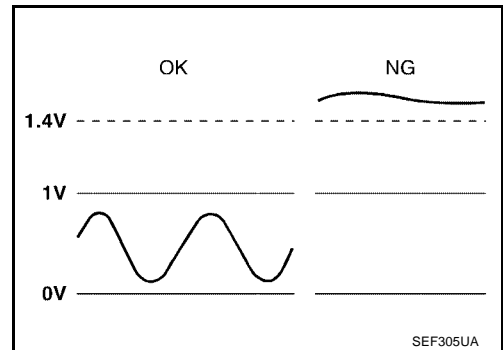
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	Revving engine from idle to 3,000 rpm quickly	0 - 0.3V ↔ 0.6 - 1.0V
HO2S2 MNTR (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	Revving engine from idle to 3,000 rpm quickly.	LEAN ↔ RICH

**On Board Diagnosis Logic**

UBS006CF

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0138 0138	Heated oxygen sensor 2 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Heated oxygen sensor 2</li> </ul>

## DTC Confirmation Procedure

### CAUTION:

Always drive vehicle at a safe speed.

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### WITH CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
5. Let engine idle for two minutes.
6. If 1st trip DTC is detected, go to [EC-226, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

#### WITH GST

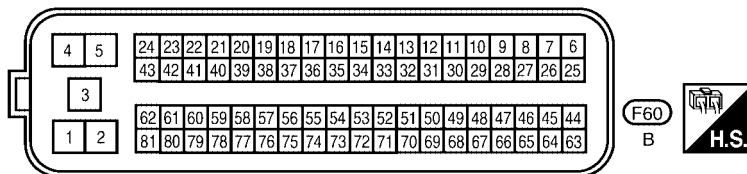
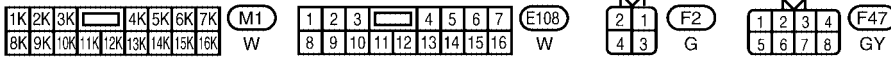
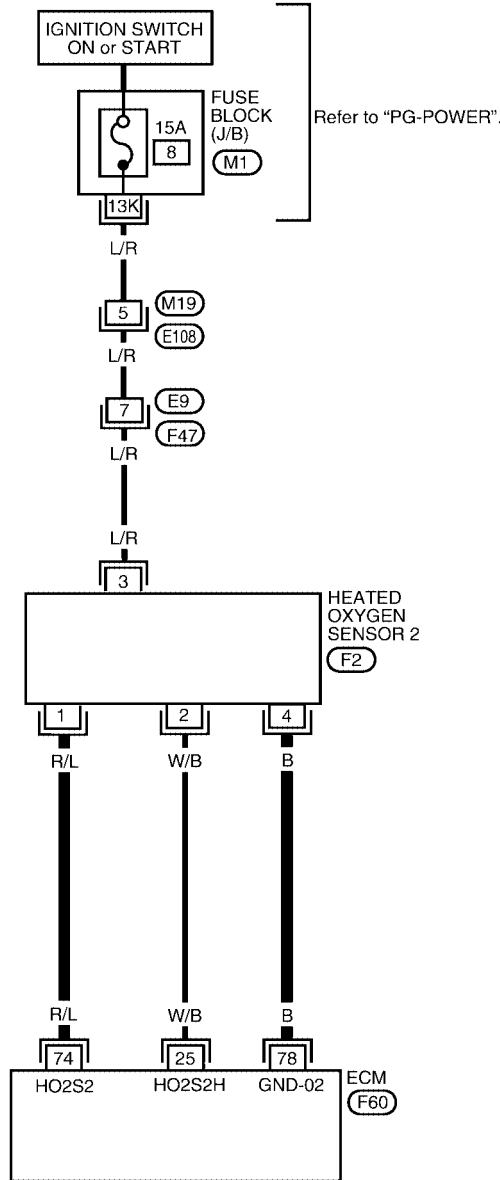
1. Start engine and warm it up to the normal operating temperature.
  2. Turn ignition switch "OFF" and wait at least 10 seconds.
  3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
  4. Let engine idle for two minutes.
  5. Turn ignition switch "OFF" and wait at least 10 seconds.
  6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
  7. Let engine idle for two minutes.
  8. Select "Mode 3" with GST.
  9. If NG, go to [EC-226, "Diagnostic Procedure"](#) .
- When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.



Wiring Diagram

EC-HO2S2-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	R/L	Heated oxygen sensor 2	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm after the following conditions are met.</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	0 - Approximately 1.0V
78	B	Heated oxygen sensor ground	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	Approximately 0V

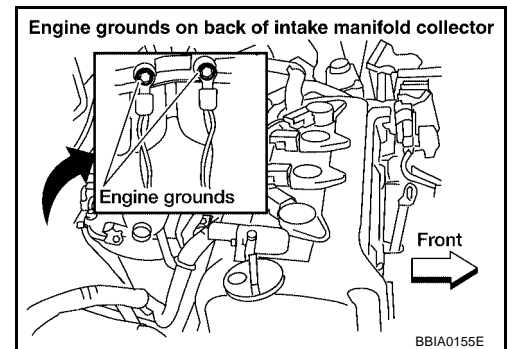
**Diagnostic Procedure**

UBS006CI

**1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

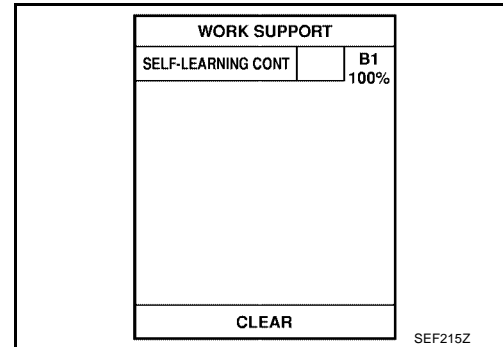
>> GO TO 2.



## 2. CLEAR THE SELF-LEARNING DATA

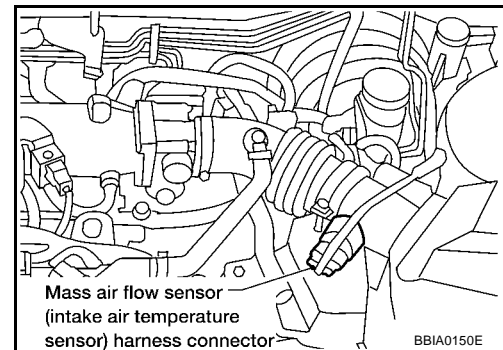
### ④ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0172 detected?  
Is it difficult to start engine?**



### ⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-71, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0172 detected?  
Is it difficult to start engine?**



#### Yes or No

- Yes >> Perform trouble diagnosis for DTC P0172. Refer to [EC-245](#) .  
No >> GO TO 3.

## 3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

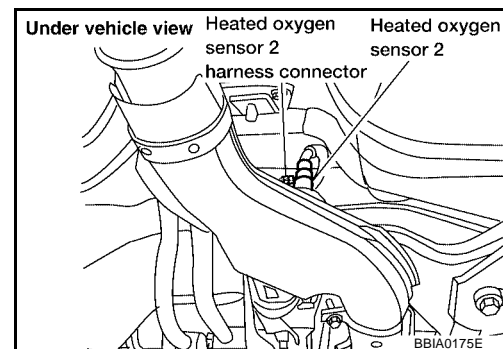
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 78 and HO2S2 terminal 4.  
Refer to Wiring Diagram.

**Continuity should exist.**

5. Also check harness for short to ground and short to power.

#### OK or NG

- OK >> GO TO 4.  
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



#### 4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 74 and HO2S2 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Check harness continuity between ECM terminal 74 or HO2S2 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

#### 5. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-228, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace heated oxygen sensor 2.

#### 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection HEATED OXYGEN SENSOR 2

UBS006CJ

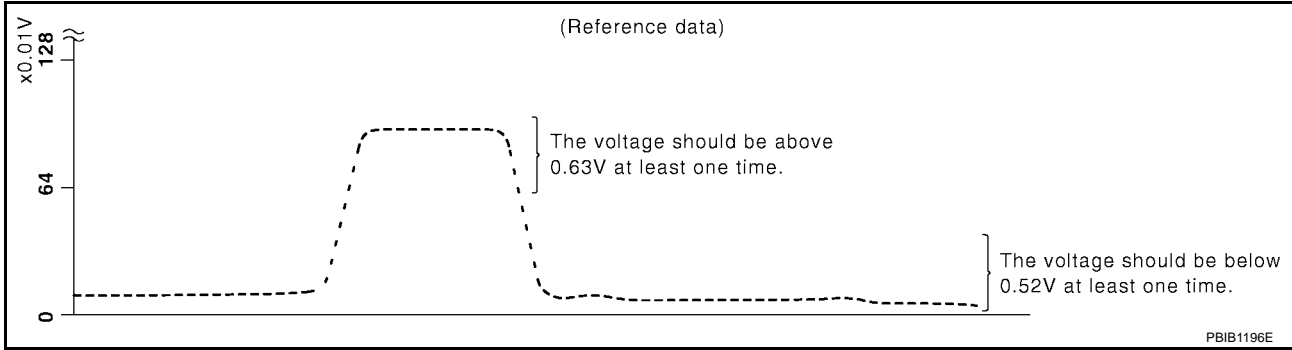
#### With CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

6. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .



"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.  
 "HO2S2 (B1)" should be below 0.52V at least once when the "FUEL INJECTION" is -25%.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

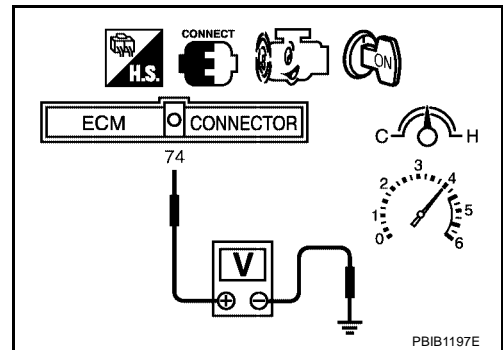
⊗ **Without CONSULT-II**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.

(Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.63V at least once during this procedure.**

**If the voltage is above 0.63V at step 6, step 7 is not necessary.**

7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).  
**The voltage should be below 0.52V at least once during this procedure.**



8. If NG, replace heated oxygen sensor 2.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation  
 HEATED OXYGEN SENSOR 2**

Refer to [EX-3. "EXHAUST SYSTEM"](#) .

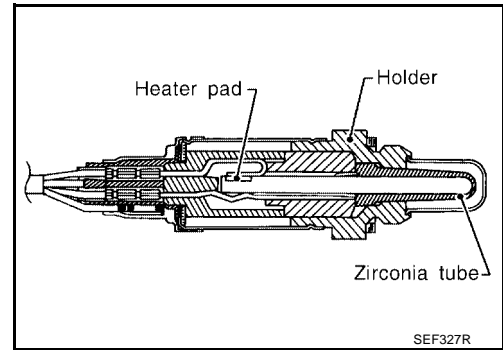
UBS006CK

**DTC P0139 HO2S2**

**Component Description**

UBS006CL

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas. Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2. This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS006CM

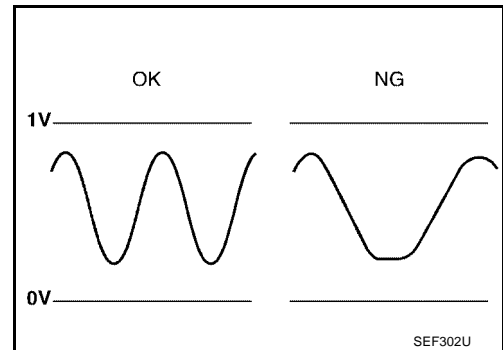
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	Revsing engine from idle to 3,000 rpm quickly	0 - 0.3V ↔ 0.6 - 1.0V
HO2S2 MNTR (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	Revsing engine from idle to 3,000 rpm quickly.	LEAN ↔ RICH

**On Board Diagnosis Logic**

UBS006CN

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the switching response of the sensor's voltage is faster than specified during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0139 0139	Heated oxygen sensor 2 circuit slow response	It takes more time for the sensor to respond between rich and lean than the specified time.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Heated oxygen sensor 2</li> <li>● Fuel pressure</li> <li>● Injectors</li> <li>● Intake air leaks</li> </ul>

**DTC Confirmation Procedure**

UBS006FL

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

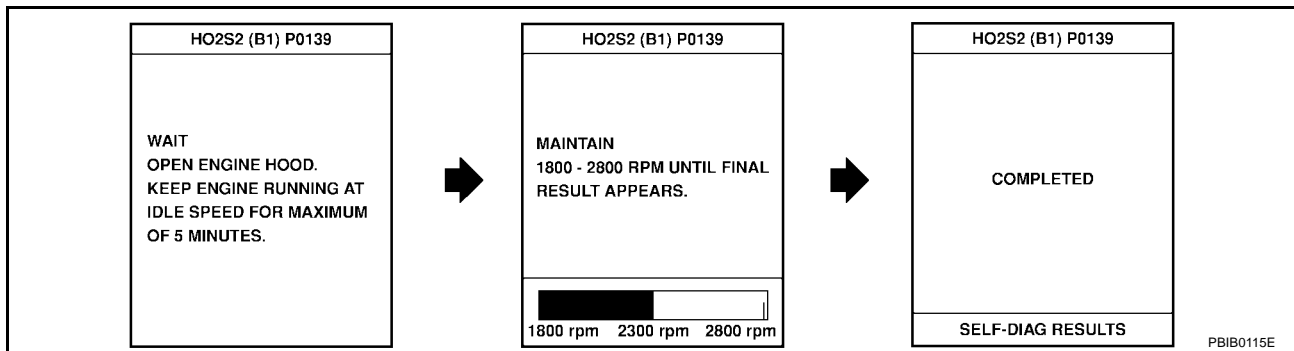
**TESTING CONDITION:**

For better results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30 °C (32 to 86 °F).

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
5. Let engine idle for one minutes.
6. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).  
If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches to 70°C (158°F).
7. Select "HO2S2 (B1) P0139" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
8. Start engine and following the instruction of CONSULT-II.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

SEF189Y



9. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".  
If "NG" is displayed, refer to [EC-234, "Diagnostic Procedure"](#).  
If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
  - a. Turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle).
  - b. Return to step 1.

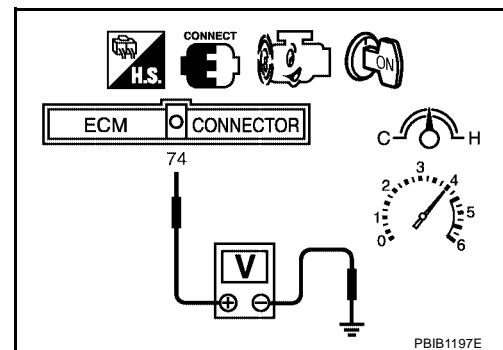
**Overall Function Check**

UBS006FM

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a DTC might not be confirmed.

**WITH GST**

1. Start engine and warm it up to the normal operating.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minutes.
5. Set voltmeter probes between ECM terminal 74 and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
(Depress and release accelerator pedal as soon as possible.)  
**A change of voltage should be more than 0.06V for 1 second during this procedure.**  
**If the voltage can be confirmed in step 6, step 7 is not necessary.**
7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).



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A change of voltage should be more than 0.06V for 1 second during this procedure.

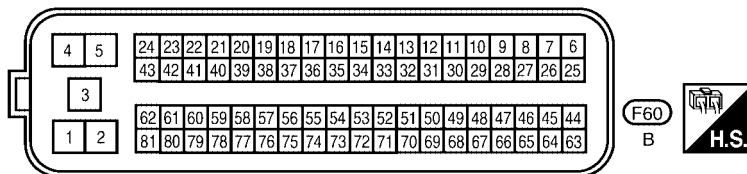
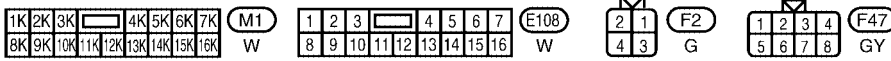
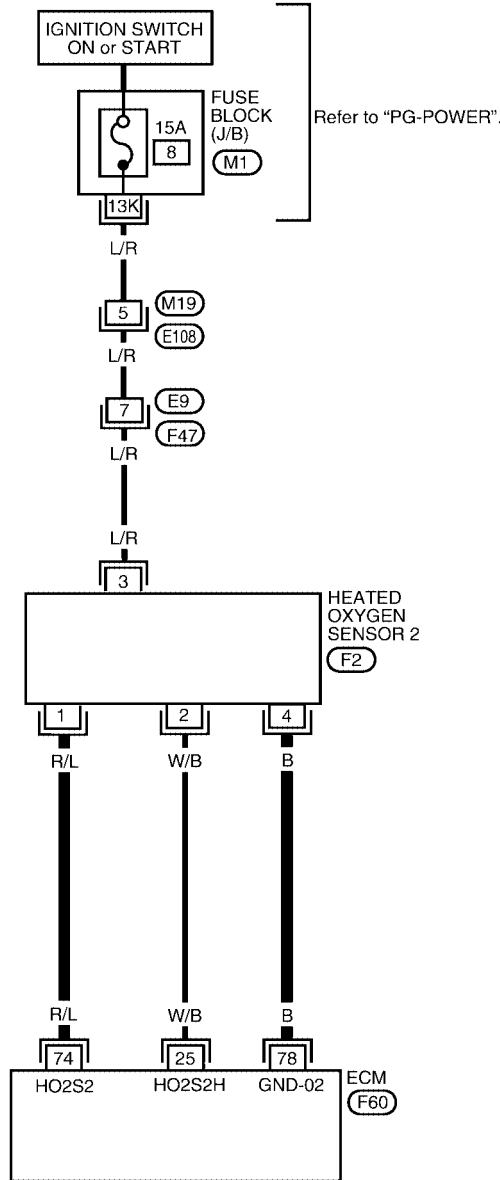
8. If NG, go to [EC-234, "Diagnostic Procedure"](#) .



Wiring Diagram

EC-HO2S2-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	R/L	Heated oxygen sensor 2	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Engine speed is 2,000 rpm after the following conditions are met.</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	0 - Approximately 1.0V
78	B	Heated oxygen sensor ground	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	Approximately 0V

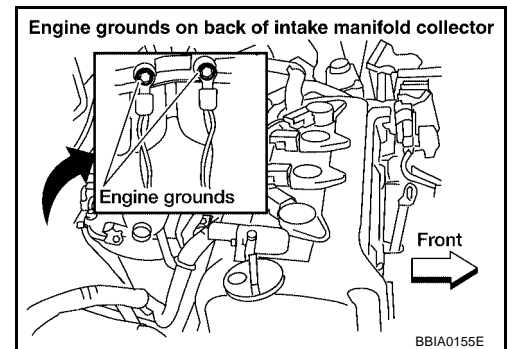
**Diagnostic Procedure**

UBS006CR

**1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

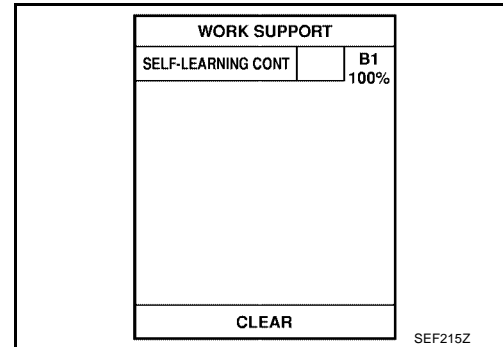
>> GO TO 2.



## 2. CLEAR THE SELF-LEARNING DATA

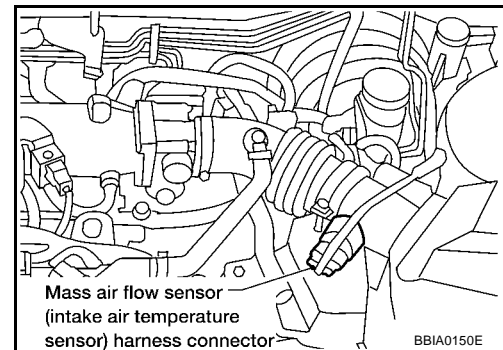
### Ⓟ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 or P0172 detected?  
Is it difficult to start engine?**



### ⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-71, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 or P0172 detected?  
Is it difficult to start engine?**



#### Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to [EC-238](#) or [EC-245](#).
- No >> GO TO 3.

## 3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

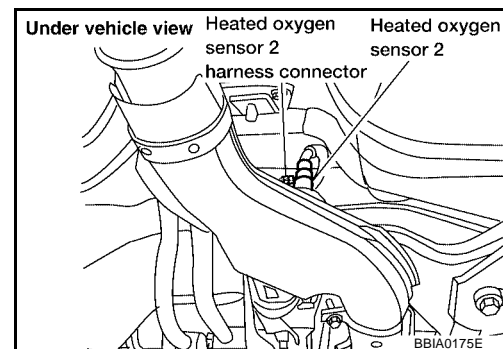
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 78 and HO2S2 terminal 4.  
Refer to Wiring Diagram.

**Continuity should exist.**

5. Also check harness for short to ground and short to power.

#### OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



#### 4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 74 and HO2S2 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Check harness continuity between ECM terminal 74 or HO2S2 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

#### 5. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-236, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace heated oxygen sensor 2.

#### 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection HEATED OXYGEN SENSOR 2

UBS006CS

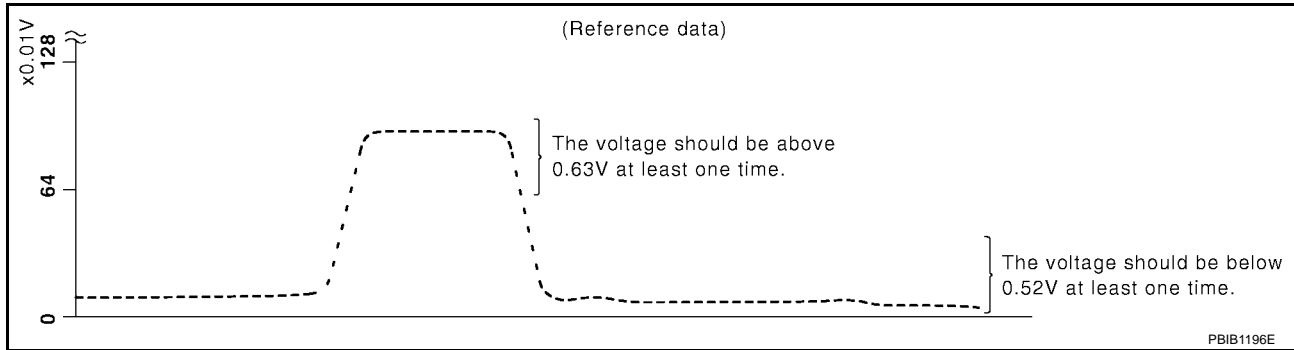
#### With CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

6. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .



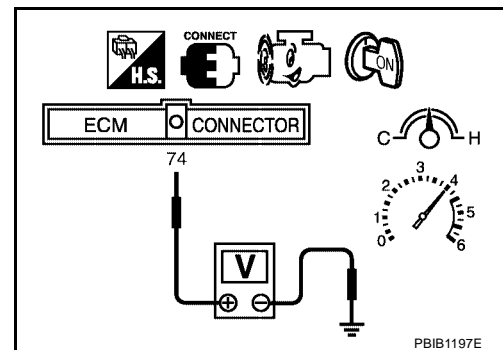
"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.  
 "HO2S2 (B1)" should be below 0.52V at least once when the "FUEL INJECTION" is -25%.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ **Without CONSULT-II**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
 (Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.63V at least once during this procedure.**  
**If the voltage is above 0.63V at step 6, step 7 is not necessary.**
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).  
**The voltage should be below 0.52V at least once during this procedure.**
8. If NG, replace heated oxygen sensor 2.



**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation**  
**HEATED OXYGEN SENSOR 2**

Refer to [EX-3. "EXHAUST SYSTEM"](#) .

UBS006CT

# DTC P0171 FUEL INJECTION SYSTEM FUNCTION

[QG18DE (ULEV)]

## DTC P0171 FUEL INJECTION SYSTEM FUNCTION

PF1:16600

### On Board Diagnosis Logic

UBS003UY

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.

In case the amount of the compensation value is extremely large (The actual mixture ratio is too lean.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injectors

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0171 0171	Fuel injection system too lean	<ul style="list-style-type: none"> <li>Fuel injection system does not operate properly.</li> <li>The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)</li> </ul>	<ul style="list-style-type: none"> <li>Intake air leaks</li> <li>Heated oxygen sensor 1</li> <li>Injectors</li> <li>Exhaust gas leaks</li> <li>Incorrect fuel pressure</li> <li>Lack of fuel</li> <li>Mass air flow sensor</li> <li>Incorrect PCV hose connection</li> </ul>

### DTC Confirmation Procedure

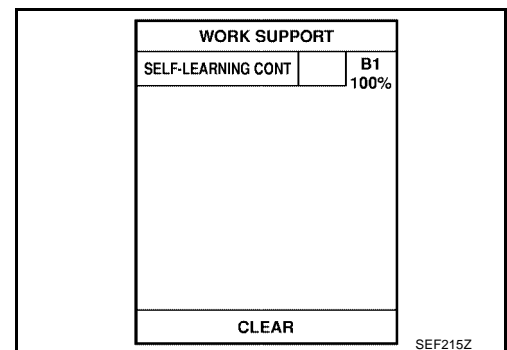
UBS003UZ

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### WITH CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Turn ignition switch "ON" and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
- Clear the self-learning control coefficient by touching "CLEAR".
- Select "DATA MONITOR" mode with CONSULT-II.
- Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to [EC-241, "Diagnostic Procedure"](#).
- If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.
- Crank engine while depressing accelerator pedal. If engine starts, go to [EC-241, "Diagnostic Procedure"](#). If engine does not start, check exhaust and intake air leak visually.



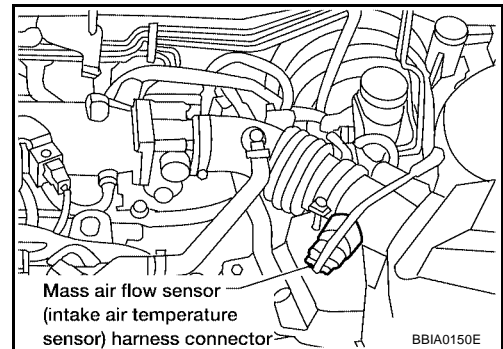
#### WITH GST

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.

## DTC P0171 FUEL INJECTION SYSTEM FUNCTION

[QG18DE (ULEV)]

3. Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Select "MODE 3" with GST. Make sure DTC P0102 is detected.
6. Select "MODE 4" with GST and erase the DTC P0102.
7. Start engine again and let it idle for at least 10 minutes.
8. Select "MODE 7" with GST. The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to [EC-241, "Diagnostic Procedure"](#).
9. If it is difficult to start engine at step 7, the fuel injection system has a malfunction.
10. Crank engine while depressing accelerator pedal. If engine starts, go to [EC-241, "Diagnostic Procedure"](#). If engine does not start, check exhaust and intake air leak visually.



A

EC

C

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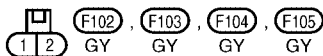
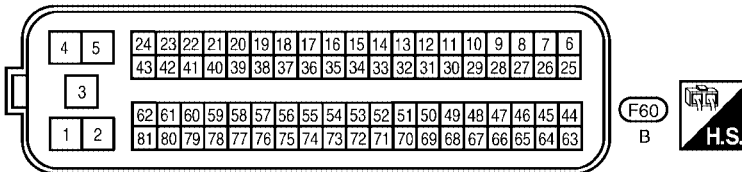
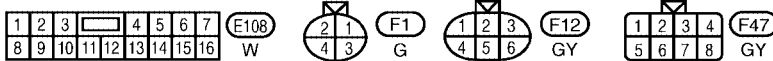
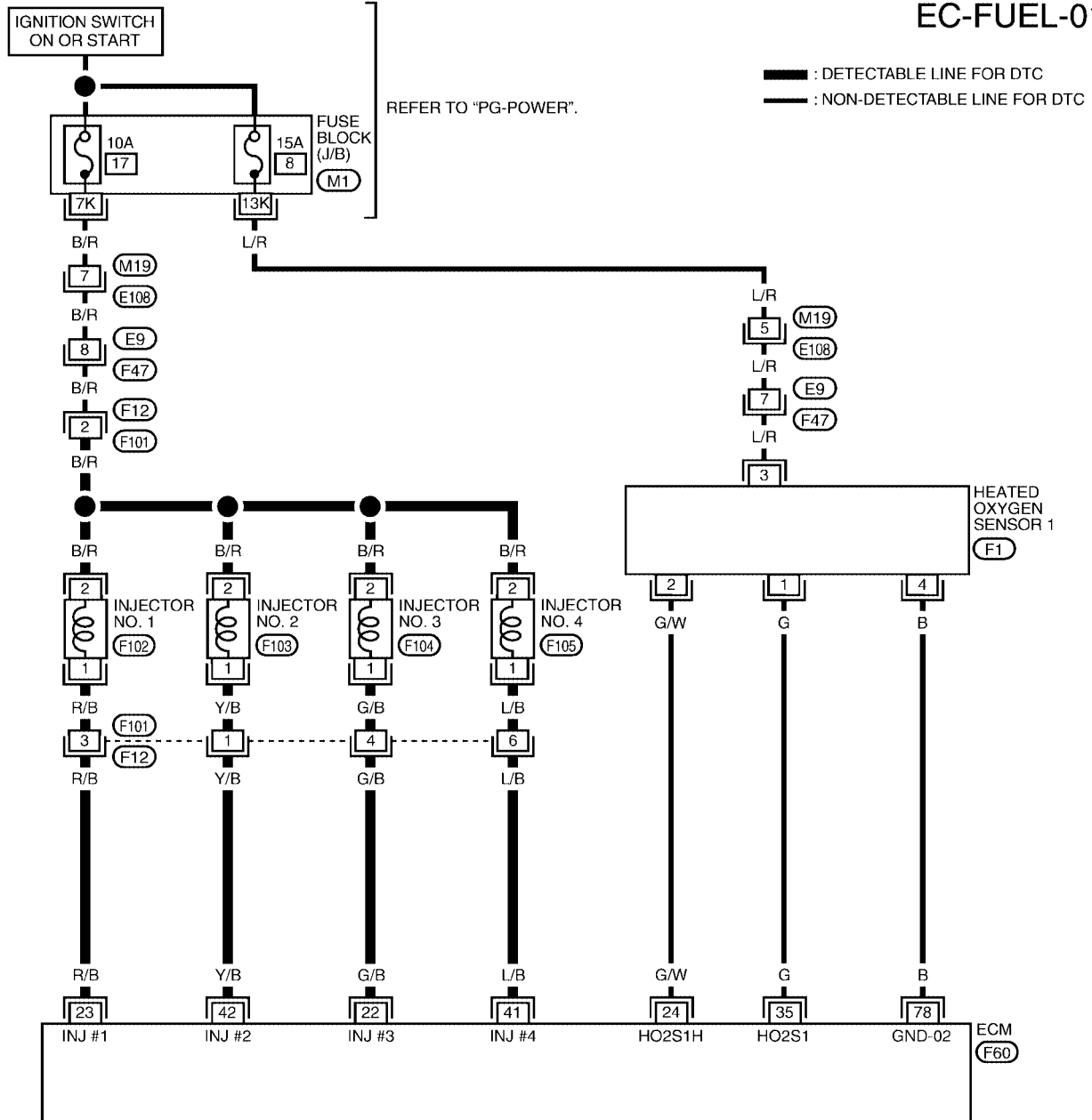
# DTC P0171 FUEL INJECTION SYSTEM FUNCTION

[QG18DE (ULEV)]

UBS003V0

## Wiring Diagram

EC-FUEL-01



Refer to the following.  
 (M1) - FUSE BLOCK - JUNCTION BOX (J/B)

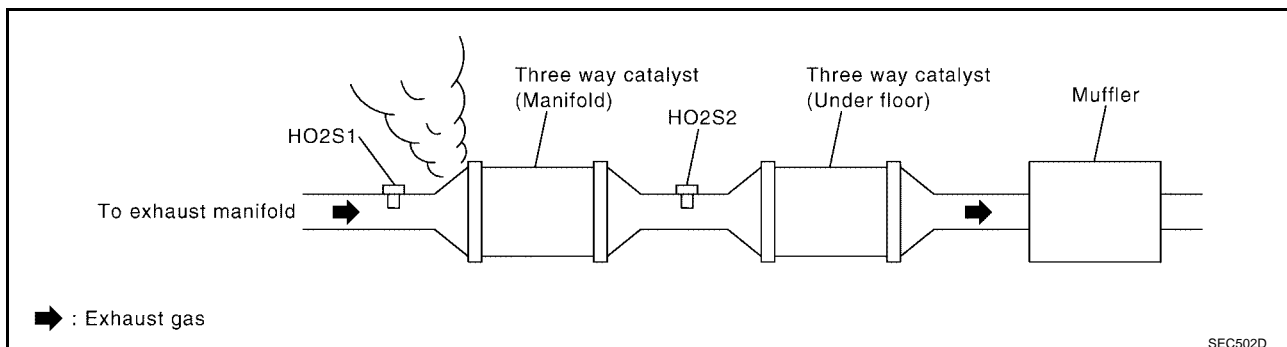
BBWA0780E



### Diagnostic Procedure

#### 1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



#### OK or NG

- OK    >> GO TO 2.
- NG    >> Repair or replace.

#### 2. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Listen for an intake air leak after the mass air flow sensor.
2. Check PCV hose connection.

#### OK or NG

- OK    >> GO TO 3.
- NG    >> Repair or replace.

#### 3. CHECK HEATED OXYGEN SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 1 (HO2S1) harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 35 and HO2S1 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

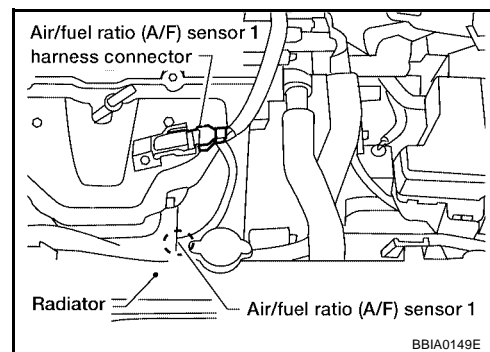
5. Check harness continuity between ECM terminal 35 or HO2S1 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

6. Also check harness for short to power.

#### OK or NG

- OK    >> GO TO 4.
- NG    >> Repair open circuit or short to ground or short to power in harness or connectors.



## 4. CHECK FUEL PRESSURE

---

1. Release fuel pressure to zero. Refer to [EC-56, "FUEL PRESSURE RELEASE"](#) .
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-56, "Fuel Pressure Check"](#) .

**At idling: Approximately 350 kPa (3.57 kg/cm<sup>2</sup> , 51 psi)**

OK or NG

- OK >> GO TO 5.  
NG >> Follow the construction of "FUEL PRESSURE CHECK".

## 5. CHECK MASS AIR FLOW SENSOR

---

 **With CONSULT-II**

1. Install all removed parts.
2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.

**1.4 - 4.0 g-m/sec: at idling**

**5.0 - 10 g-m/sec: at 2,500 rpm**

 **With GST**

1. Install all removed parts.
2. Check mass air flow sensor signal in MODE 1 with GST.

**1.4 - 4.0 g-m/sec: at idling**

**5.0 - 10 g-m/sec: at 2,500 rpm**

OK or NG

- OK >> GO TO 6.  
NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-163, "DTC P0101 MAF SENSOR"](#) .

**6. CHECK FUNCTION OF INJECTORS**

**Ⓟ With CONSULT-II**

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

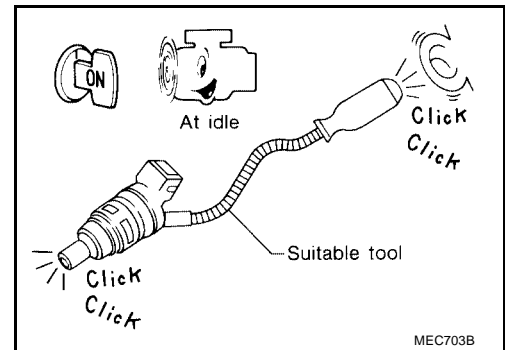
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

**ⓧ Without CONSULT-II**

1. Start engine.
2. Listen to each injector operating sound.

**Clicking noise should be heard.**



**OK or NG**

- OK >> GO TO 7.
- NG >> Perform trouble diagnosis for [EC-547, "INJECTOR"](#).

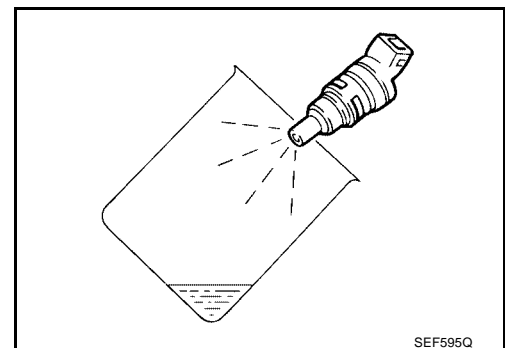
**7. CHECK INJECTOR**

1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch "OFF".
3. Disconnect injector harness connectors.
4. Remove injector gallery assembly. Refer to [EM-19, "FUEL INJECTOR AND FUEL TUBE"](#). Keep fuel hose and all injectors connected to injector gallery. The injector harness connectors should remain connected.
5. Disconnect all ignition coil harness connectors.
6. Prepare pans or saucers under each injector.
7. Crank engine for about 3 seconds. Make sure that fuel sprays out from injectors.

**Fuel should be sprayed evenly for each injector.**

**OK or NG**

- OK >> GO TO 8.
- NG >> Replace injectors from which fuel does not spray out. Always replace O-ring with new ones.



## DTC P0171 FUEL INJECTION SYSTEM FUNCTION

[QG18DE (ULEV)]

---

### 8. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

# DTC P0172 FUEL INJECTION SYSTEM FUNCTION

[QG18DE (ULEV)]

## DTC P0172 FUEL INJECTION SYSTEM FUNCTION

PF16600

### On Board Diagnosis Logic

UBS003V2

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensors 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.

In case the amount of the compensation value is extremely large (The actual mixture ratio is too rich.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injectors

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0172 0172	Fuel injection system too rich	<ul style="list-style-type: none"> <li>Fuel injection system does not operate properly.</li> <li>The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)</li> </ul>	<ul style="list-style-type: none"> <li>Heated oxygen sensor 1</li> <li>Injectors</li> <li>Exhaust gas leaks</li> <li>Incorrect fuel pressure</li> <li>Mass air flow sensor</li> </ul>

### DTC Confirmation Procedure

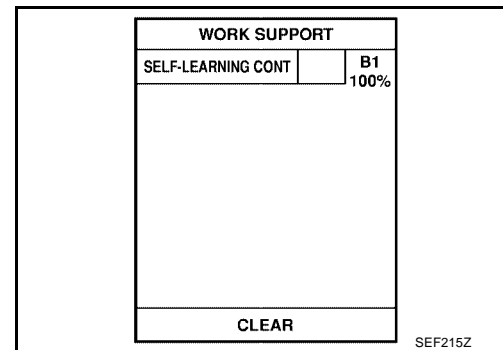
UBS003V3

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### WITH CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Turn ignition switch "ON" and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
- Clear the self-learning control coefficient by touching "CLEAR".
- Select "DATA MONITOR" mode with CONSULT-II.
- Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to [EC-248, "Diagnostic Procedure"](#).
- If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.
- Crank engine while depressing accelerator pedal. If engine starts, go to [EC-248, "Diagnostic Procedure"](#). If engine does not start, remove ignition plugs and check for fouling, etc.



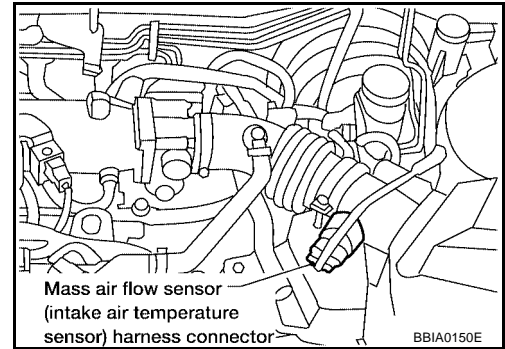
#### WITH GST

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.

## DTC P0172 FUEL INJECTION SYSTEM FUNCTION

[QG18DE (ULEV)]

3. Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Select "MODE 3" with GST. Make sure DTC P0102 is detected.
6. Select "MODE 4" with GST and erase the DTC P0102.
7. Start engine again and let it idle for at least 10 minutes.
8. Select "MODE 7" with GST. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to [EC-248, "Diagnostic Procedure"](#).
9. If it is difficult to start engine at step 7, the fuel injection system has a malfunction.
10. Crank engine while depressing accelerator pedal. If engine starts, go to [EC-248, "Diagnostic Procedure"](#). If engine does not start, check exhaust and intake air leak visually.



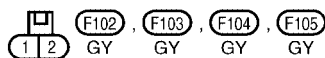
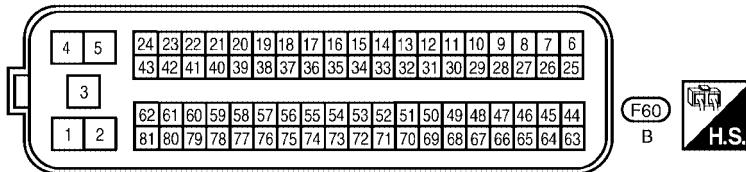
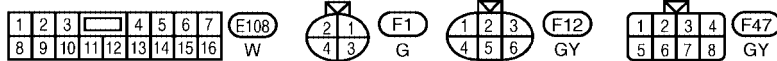
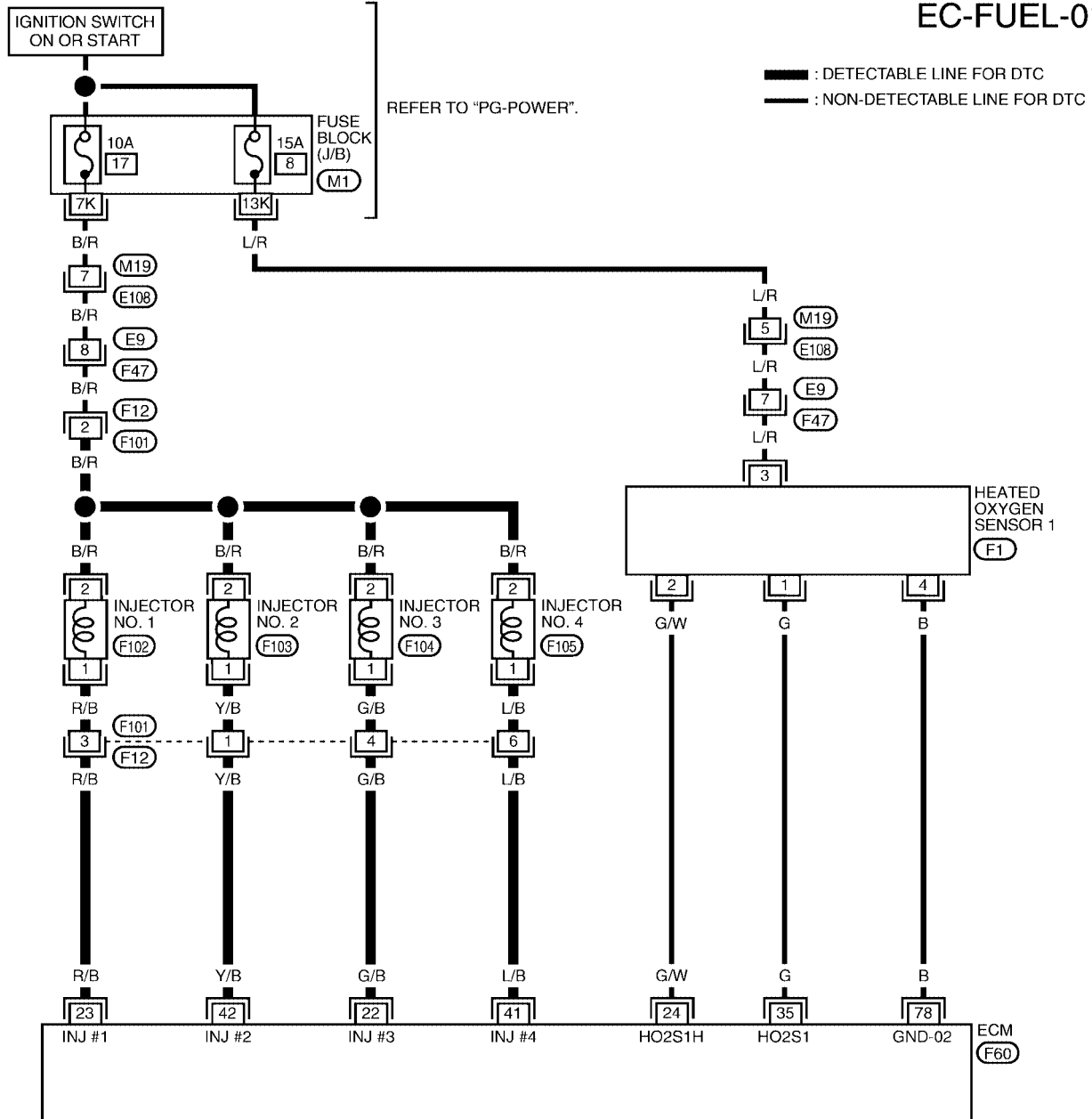
# DTC P0172 FUEL INJECTION SYSTEM FUNCTION

[QG18DE (ULEV)]

UBS003V4

## Wiring Diagram

EC-FUEL-01



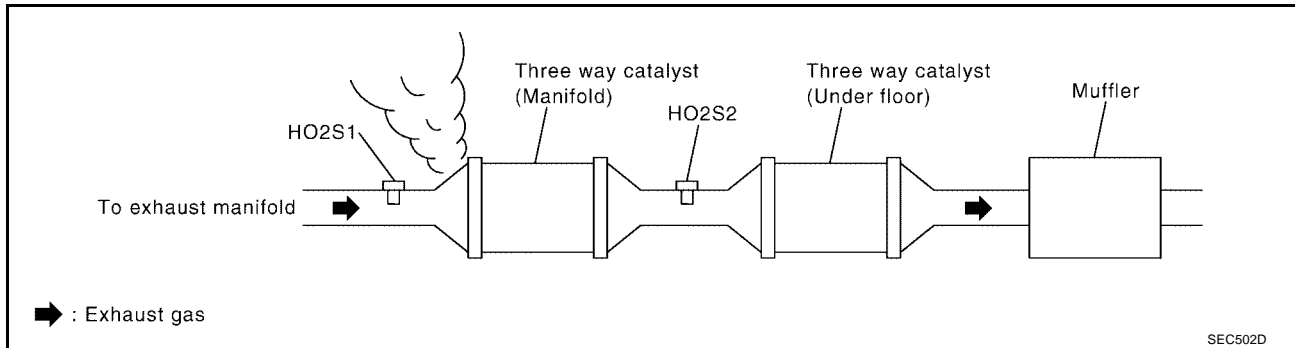
Refer to the following.  
 (M1) - FUSE BLOCK - JUNCTION BOX (J/B)

BBWA0780E

## Diagnostic Procedure

### 1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

- OK    >> GO TO 2.  
 NG    >> Repair or replace.

### 2. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK    >> GO TO 3.  
 NG    >> Repair or replace.

### 3. CHECK HEATED OXYGEN SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 1 (HO2S1) harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 35 and HO2S1 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

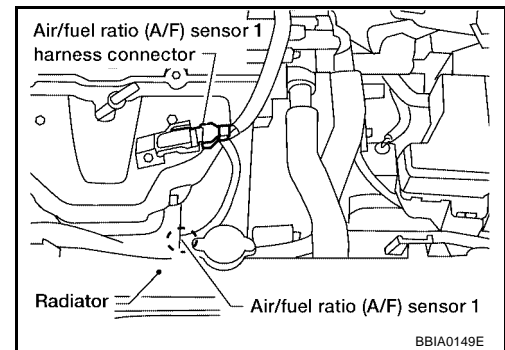
5. Check harness continuity between ECM terminal 35 or HO2S1 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

6. Also check harness for short to power.

OK or NG

- OK    >> GO TO 4.  
 NG    >> Repair open circuit or short to ground or short to power in harness or connectors.



### 4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-56, "FUEL PRESSURE RELEASE"](#).
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-56, "Fuel Pressure Check"](#).

**At idling: 350 kPa (3.57 kg/cm<sup>2</sup> , 51 psi)**

OK or NG

- OK    >> GO TO 5.  
 NG    >> Follow the construction of "FUEL PRESSURE CHECK".



## 5. CHECK MASS AIR FLOW SENSOR

### With CONSULT-II

1. Install all removed parts.
2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.

**1.4 - 4.0 g-m/sec: at idling**

**5.0 - 10 g-m/sec: at 2,500 rpm**

### With GST

1. Install all removed parts.
2. Check mass air flow sensor signal in MODE 1 with GST.

**1.4 - 4.0 g-m/sec: at idling**

**5.0 - 10 g-m/sec: at 2,500 rpm**

#### OK or NG

OK >> GO TO 6.

NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-163, "DTC P0101 MAF SENSOR"](#) .

## 6. CHECK FUNCTION OF INJECTORS

### With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

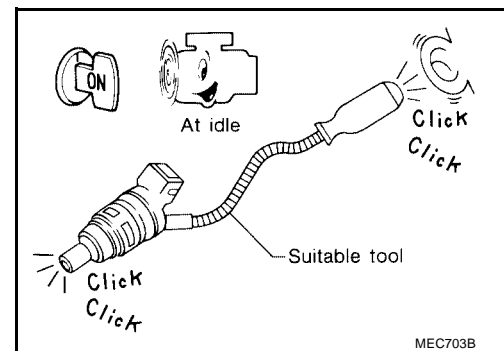
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

### Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.

**Clicking noise should be heard.**



#### OK or NG

OK >> GO TO 7.

NG >> Perform trouble diagnosis for [EC-547, "INJECTOR"](#) .

## 7. CHECK INJECTOR

---

1. Remove injector assembly. Refer to [EM-19, "FUEL INJECTOR AND FUEL TUBE"](#) .  
Keep fuel hose and all injectors connected to injector gallery.  
The injector harness connectors should remain connected.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
3. Disconnect all ignition coil harness connectors.
4. Prepare pans or saucers under each injectors.
5. Crank engine for about 3 seconds.  
Make sure fuel does not drip from injector.

### OK or NG

OK (Does not drip.)>>GO TO 8.

NG (Drips.)>>Replace the injectors from which fuel is dripping. Always replace O-ring with new one.

## 8. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

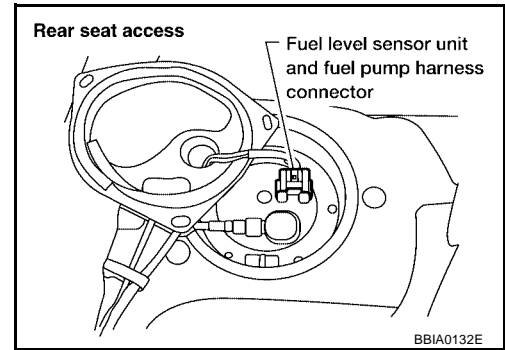
DTC P0181 FTT SENSOR

PFP:22630

Component Description

UBS003QP

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



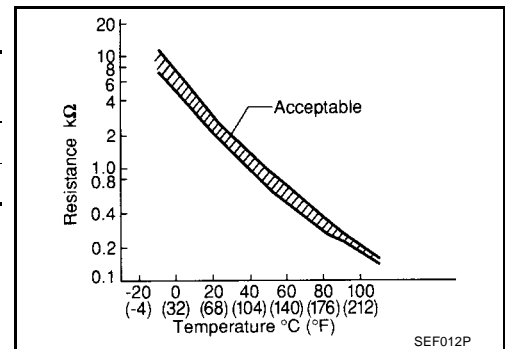
<Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

\*: These data are reference values and are measured between ECM terminal 107 (Fuel tank temperature sensor) and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



On Board Diagnosis Logic

UBS003QQ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0181 0181	Fuel tank temperature sensor circuit range/performance	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Fuel tank temperature sensor</li> </ul>

DTC Confirmation Procedure

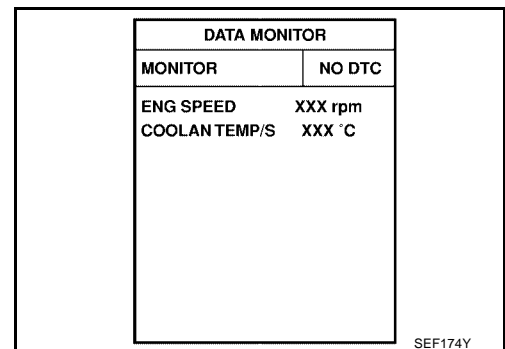
UBS003QR

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 10 seconds.  
If the result is NG, go to [EC-254, "Diagnostic Procedure"](#).  
If the result is OK, go to following step.
4. Check "COOLAN TEMP/S" value.  
If "COOLAN TEMP/S" is less than 60°C (140°F), the result will be OK.  
If "COOLAN TEMP/S" is above 60°C (140°F), go to the following step.
5. Cool engine down until "COOLAN TEMP/S" is less than 60°C (140°F).
6. Wait at least 10 seconds.
7. If 1st trip DTC is detected, go to [EC-254, "Diagnostic Procedure"](#).





**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

# DTC P0181 FTT SENSOR

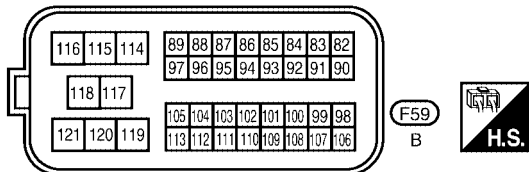
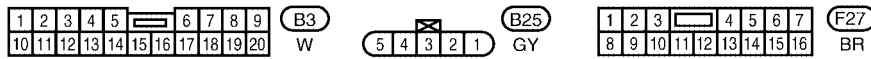
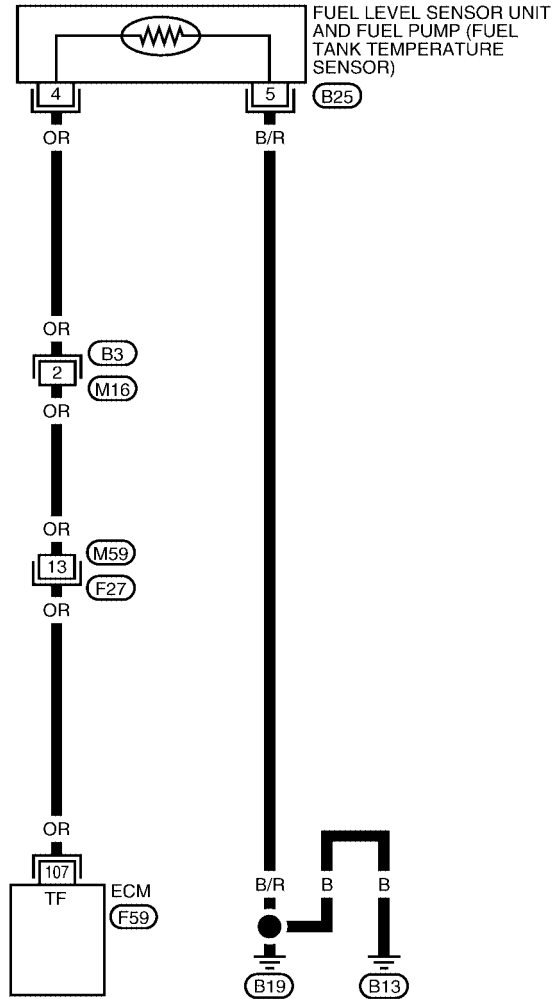
[QG18DE (ULEV)]

UBS003QS

## Wiring Diagram

EC-FTTS-01

— : DETECTABLE LINE FOR DTC  
 - - - : NON-DETECTABLE LINE FOR DTC

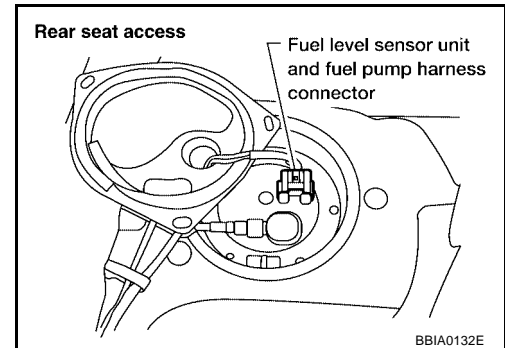


BBWA0285E

## Diagnostic Procedure

### 1. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Turn ignition switch "ON".

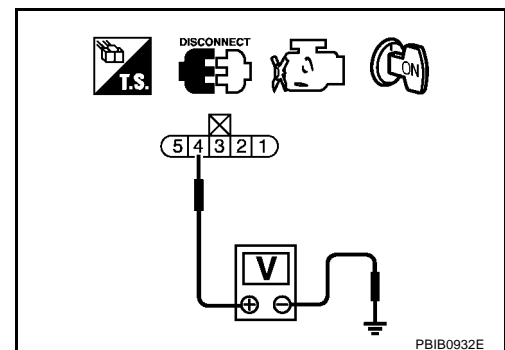


4. Check voltage between fuel level sensor unit and fuel pump terminal 4 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 3.  
NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B3, M16
- Harness connectors M59, F27
- Harness for open or short between ECM and fuel level sensor unit and fuel pump

>> Repair harness or connector.

### 3. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between fuel level sensor unit and fuel pump terminal 5 and body ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.  
NG >> Repair open circuit or short to power in harness or connector.

### 4. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-255, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.  
NG >> Replace fuel level sensor unit.

**5. CHECK INTERMITTENT INCIDENT**

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

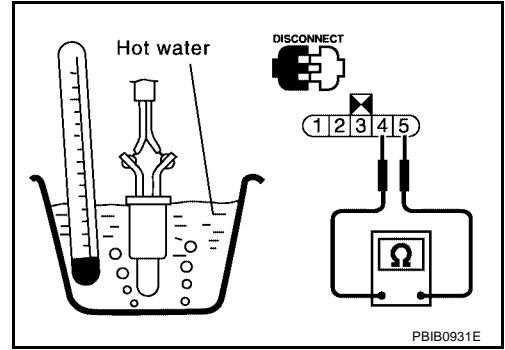
>> INSPECTION END

**Component Inspection**  
**FUEL TANK TEMPERATURE SENSOR**

UBS003QU

1. Remove fuel level sensor unit.
2. Check resistance between fuel level sensor unit and fuel pump terminals 4 and 5 by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90



UBS003QV

**Removal and Installation**  
**FUEL TANK TEMPERATURE SENSOR**

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

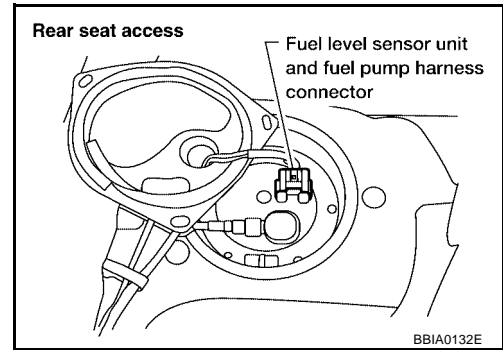
DTC P0182, P0183 FTT SENSOR

PF2:22630

Component Description

UBS003QW

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



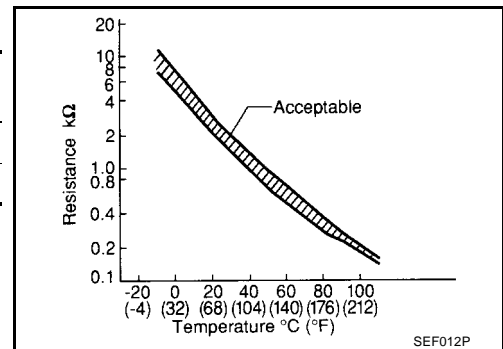
<Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

\*: These data are reference values and are measured between ECM terminal 107 (Fuel tank temperature sensor) and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



On Board Diagnosis Logic

UBS003QX

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0182 0182	Fuel tank temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Fuel tank temperature sensor</li> </ul>
P0183 0183	Fuel tank temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

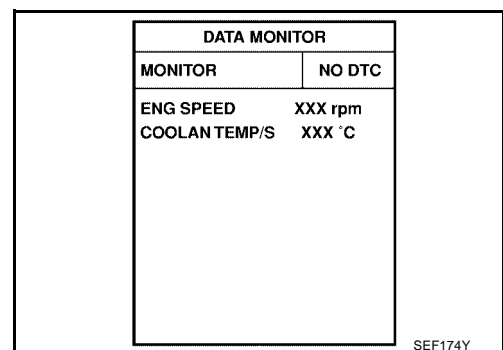
UBS003QY

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-258, "Diagnostic Procedure"](#)



**WITH GST**

Follow the procedure "With CONSULT-II" above.



# DTC P0182, P0183 FTT SENSOR

[QG18DE (ULEV)]

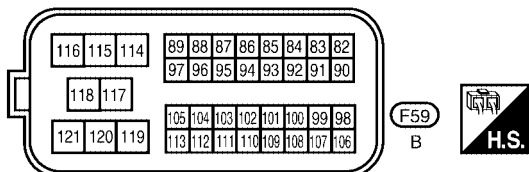
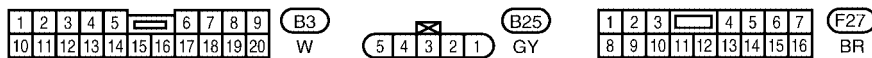
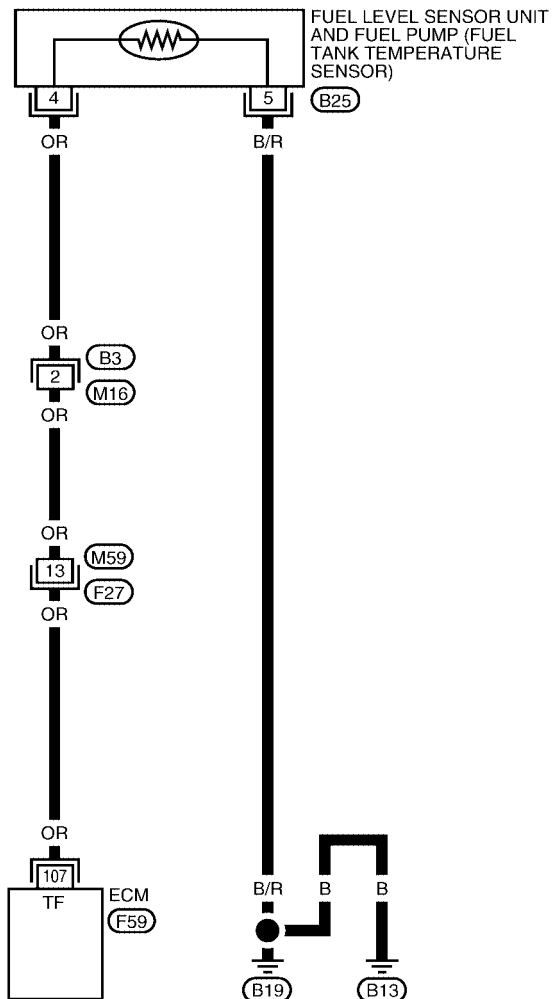
## Wiring Diagram

UBS003QZ

EC-FTTS-01

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

— : DETECTABLE LINE FOR DTC  
— : NON-DETECTABLE LINE FOR DTC

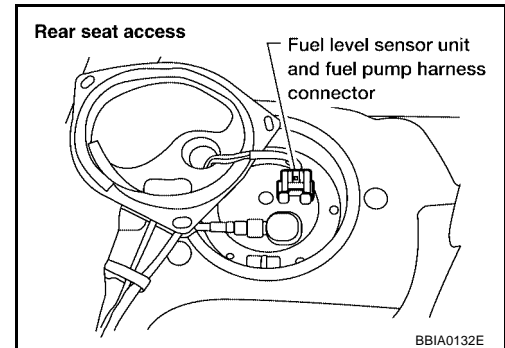


BBWA0285E

## Diagnostic Procedure

### 1. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Turn ignition switch "ON".

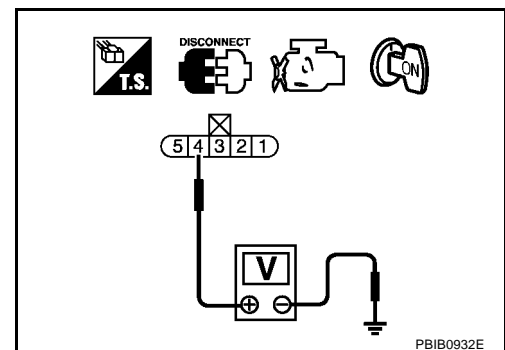


4. Check voltage between fuel level sensor unit and fuel pump terminal 4 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

#### OK or NG

- OK >> GO TO 3.  
NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B3, M16
- Harness connectors M59, F27
- Harness for open or short between ECM and fuel level sensor unit and fuel pump

>> Repair harness or connector.

### 3. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between fuel level sensor unit and fuel pump terminal 5 and body ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

#### OK or NG

- OK >> GO TO 4.  
NG >> Repair open circuit or short to power in harness or connector.

### 4. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-259, "Component Inspection"](#).

#### OK or NG

- OK >> GO TO 5.  
NG >> Replace fuel level sensor unit.

**5. CHECK INTERMITTENT INCIDENT**

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

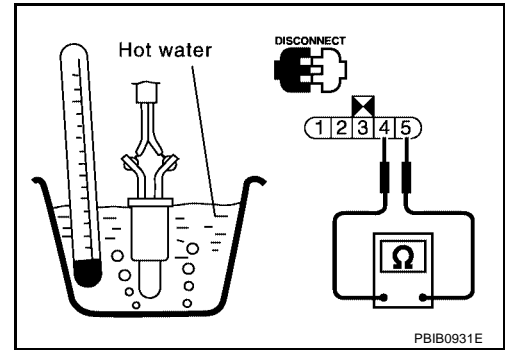
>> INSPECTION END

**Component Inspection**  
**FUEL TANK TEMPERATURE SENSOR**

UBS003R1

1. Remove fuel level sensor unit.
2. Check resistance between fuel level sensor unit and fuel pump terminals 4 and 5 by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90



UBS003R2

**Removal and Installation**  
**FUEL TANK TEMPERATURE SENSOR**

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

DTC P0222, P0223 TP SENSOR

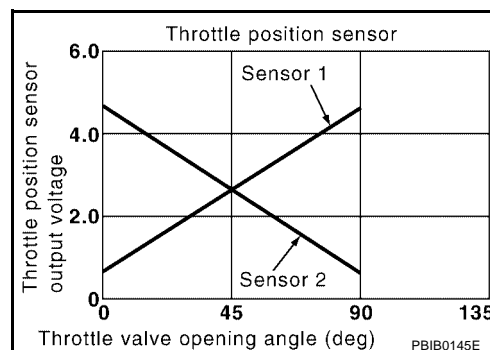
PF16119

Component Description

UBS003RB

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

UBS003RC

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	<ul style="list-style-type: none"> <li>Ignition switch: ON (Engine stopped)</li> <li>Shift lever: D (A/T model) 1st (M/T model)</li> </ul>	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

\*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

UBS003RD

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222 0222	Throttle position sensor 1 circuit low input	An excessively low voltage from the TP sensor 1 is sent to ECM.	<ul style="list-style-type: none"> <li>Harness or connectors (The TP sensor 1 circuit is open or shorted.) (APP sensor 2 circuit is shorted.)</li> <li>Electric throttle control actuator (TP sensor 1)</li> <li>Accelerator pedal position sensor (APP sensor 2)</li> </ul>
P0223 0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

DTC Confirmation Procedure

UBS003RE

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".

# DTC P0222, P0223 TP SENSOR

[QG18DE (ULEV)]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-263, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

A

EC

C

D

E

F

G

H

I

J

K

L

M

## WITH GST

Follow the procedure "WITH CONSULT-II" above.

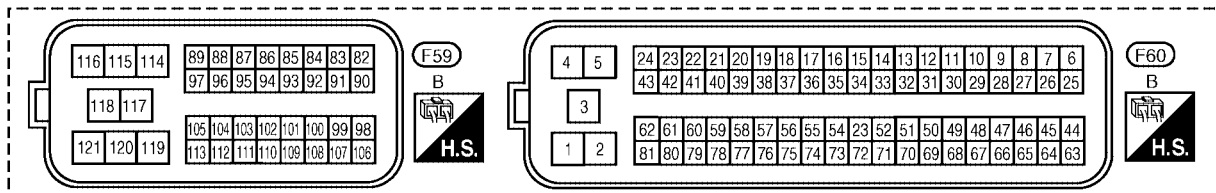
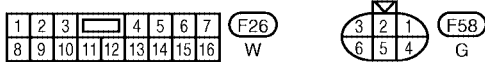
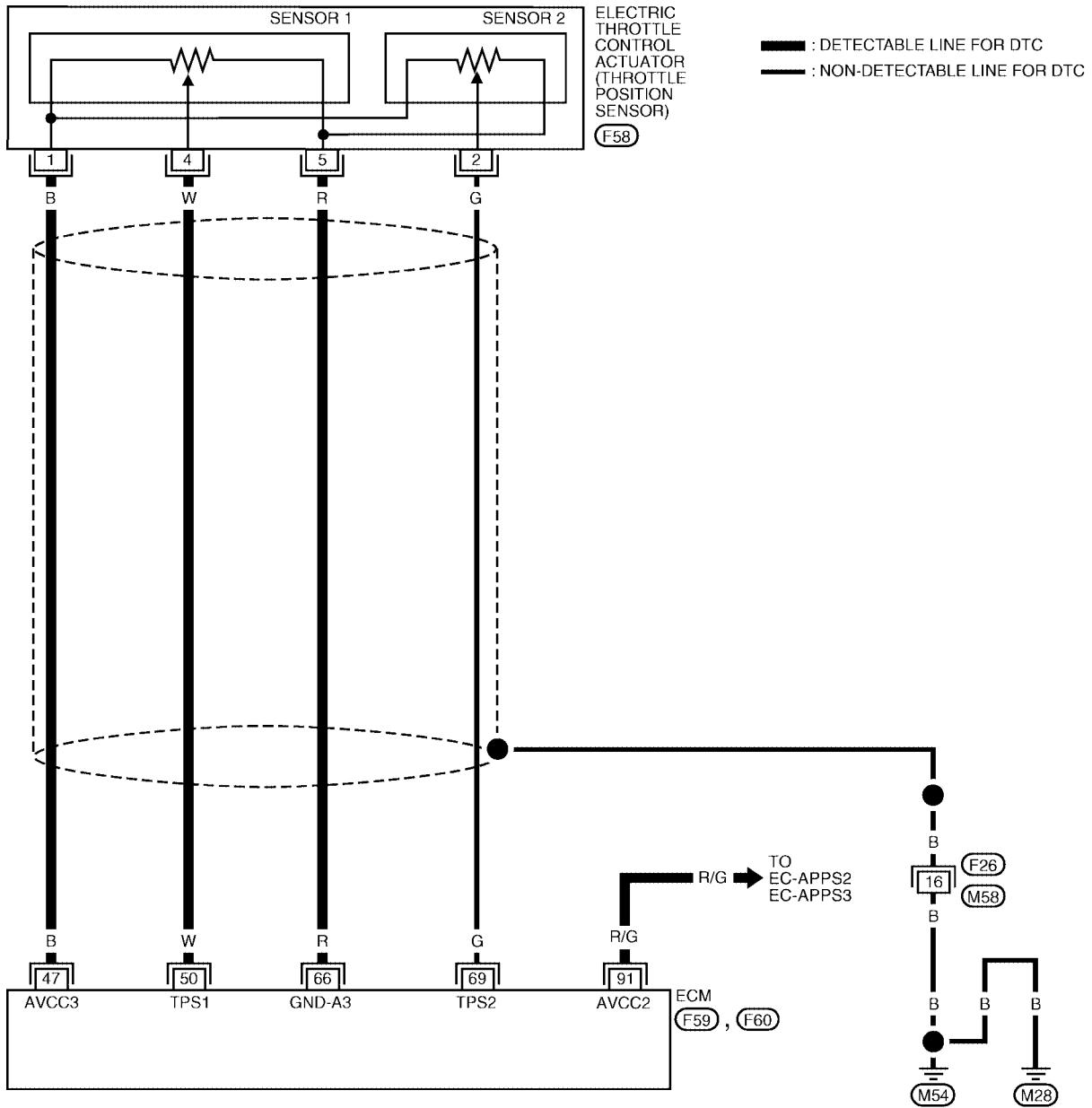
# DTC P0222, P0223 TP SENSOR

[QG18DE (ULEV)]

UBS003RF

## Wiring Diagram

EC-TPS1-01



BBWA1381E

# DTC P0222, P0223 TP SENSOR

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	B	Sensor power supply (Throttle position sensor)	[Ignition switch "ON"]	Approximately 5V
50	W	Throttle position sensor 1	[Ignition switch "ON"] ● Engine stopped ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released	More than 0.36V
			[Ignition switch "ON"] ● Engine stopped ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed	Less than 4.75V
66	R	Sensor ground (Throttle position sensor)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
69	G	Throttle position sensor 2	[Ignition switch "ON"] ● Engine stopped ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released	Less than 4.75V
			[Ignition switch "ON"] ● Engine stopped ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed	More than 0.36V
91	R/G	Sensor power supply (Accelerator pedal posi- tion sensor)	[Ignition switch "ON"]	Approximately 5V

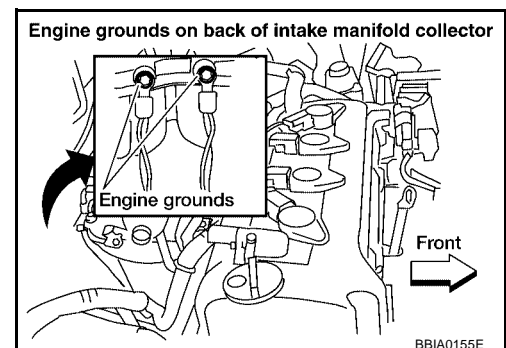
## Diagnostic Procedure

### 1. RETIGHTEN GROUND SCREWS

UBS003RG

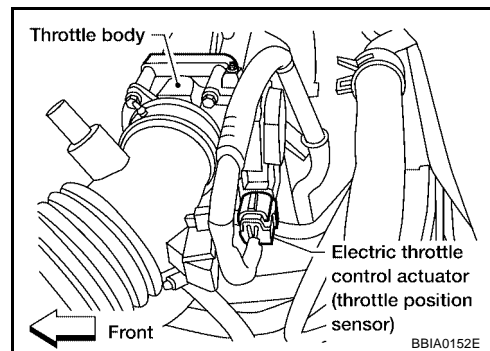
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

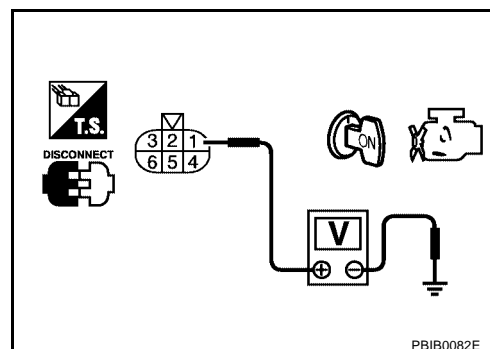


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 7.  
 NG >> GO TO 3.



## 3. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 1 and ECM terminal 47. Refer to Wiring Diagram.

**Continuity should exist.**

OK or NG

- OK >> GO TO 4.  
 NG >> Repair or replace open circuit.

## 4. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT-III

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Electric throttle control actuator terminal 1	<a href="#">EC-262</a>
91	APP sensor terminal 1	<a href="#">EC-513</a>

OK or NG

- OK >> GO TO 5.  
 NG >> Repair short to ground or short to power in harness or connectors.

## 5. CHECK APP SENSOR

Refer to [EC-517](#).

OK or NG

- OK >> GO TO 11.  
 NG >> GO TO 6.



**6. REPLACE ACCELERATOR PEDAL ASSEMBLY**

1. Replace accelerator pedal assembly.
2. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**7. CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and electric throttle control actuator terminal 5.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Check harness continuity between ECM terminal 50 and electric throttle control actuator terminal 4.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**9. CHECK THROTTLE POSITION SENSOR**

Refer to [EC-266, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> GO TO 10.

**10. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**11. CHECK INTERMITTENT INCIDENT**

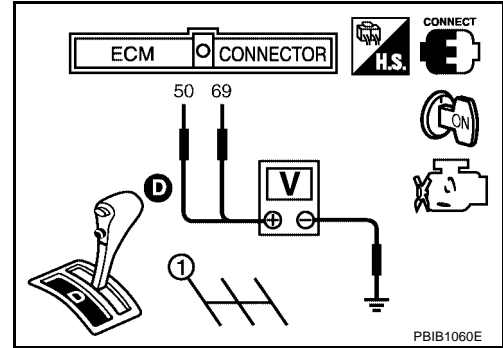
Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection**  
**THROTTLE POSITION SENSOR**

1. Reconnect all harness connectors disconnected.
2. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 50 (TP sensor 1 signal), 69 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
50 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
69 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-53, "Idle Air Volume Learning"](#) .

**Remove and Installation**  
**ELECTRIC THROTTLE CONTROL ACTUATOR**

Refer to [EM-12, "Removal and Installation"](#) .

# DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

[QG18DE (ULEV)]

## DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

PFP:00000

### On Board Diagnosis Logic

UBS001H5

When a misfire occurs, engine speed will fluctuate (vary). If the engine speed fluctuates enough to cause the crankshaft position sensor (POS) signal to vary, ECM can determine that a misfire is occurring.

Sensor	Input Signal to ECM	ECM function
Crankshaft position sensor (POS)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

- One Trip Detection Logic (Three Way Catalyst Damage)**  
 On the first trip that a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.  
 When a misfire condition occurs, the ECM monitors the crankshaft position sensor (POS) signal every 200 engine revolutions for a change.  
 When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off.  
 If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink.  
 When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on.  
 If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.
- Two Trip Detection Logic (Exhaust quality deterioration)**  
 For misfire conditions that will not cause damage to the TWC (but will affect vehicle emissions), the MIL will only light when the misfire is detected on a second trip. During this condition, the ECM monitors the crankshaft position sensor (POS) signal every 1,000 engine revolutions.  
 A misfire malfunction can be detected on any one cylinder or on multiple cylinders.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0300 0300	Multiple cylinder misfire detected	Multiple cylinder misfire.	<ul style="list-style-type: none"> <li>● Improper spark plug</li> <li>● Insufficient compression</li> </ul>
P0301 0301	No.1 cylinder misfire detected	No. 1 cylinder misfires.	<ul style="list-style-type: none"> <li>● Incorrect fuel pressure</li> <li>● The injector circuit is open or shorted</li> </ul>
P0302 0302	No. 2 cylinder misfire detected	No. 2 cylinder misfires.	<ul style="list-style-type: none"> <li>● Fuel injectors</li> <li>● Intake air leak</li> </ul>
P0303 0303	No. 3 cylinder misfire detected	No. 3 cylinder misfires.	<ul style="list-style-type: none"> <li>● The ignition signal circuit is open or shorted</li> </ul>
P0304 0304	No. 4 cylinder misfire detected	No. 4 cylinder misfires.	<ul style="list-style-type: none"> <li>● Lack of fuel</li> <li>● Drive plate or flywheel</li> <li>● Heated oxygen sensor 1</li> <li>● Incorrect PCV hose connection</li> </ul>

### On Board Diagnosis Logic

UBS001H6

### DTC Confirmation Procedure

UBS001H7

#### CAUTION:

Always drive vehicle at a safe speed.

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

## WITH CONSULT-II

1. Turn ignition switch "ON", and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine again and drive at 1,500 to 3,000 rpm for at least 3 minutes.  
Hold the accelerator pedal as steady as possible.

### NOTE:

Refer to the freeze frame data for the test driving conditions.

5. If 1st trip DTC is detected, go to [EC-268, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

## WITH GST

Follow the procedure "With CONSULT-II" above.

## Diagnostic Procedure

UBS001H8

### 1. CHECK FOR INTAKE AIR LEAK

1. Start engine and run it at idle speed.
2. Listen for the sound of the intake air leak.
3. Check PCV hose connection.

#### OK or NG

OK >> GO TO 2.

NG >> Discover air leak location and repair.

### 2. CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.

#### OK or NG

OK >> GO TO 3.

NG >> Repair or replace it.

### 3. PERFORM POWER BALANCE TEST

 **With CONSULT-II**

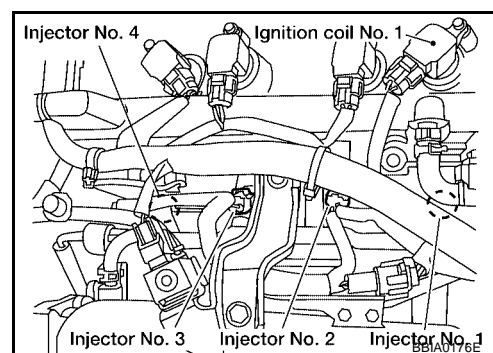
1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

 **Without CONSULT-II**

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?



Yes or No

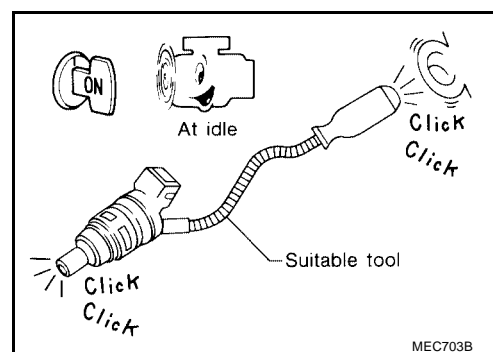
- Yes >> GO TO 4.
- No >> GO TO 7.

### 4. CHECK INJECTOR

Does each injector make an operating sound at idle?

Yes or No

- Yes >> GO TO 5.
- No >> Check injector(s) and circuit(s). Refer to [EC-547](#).

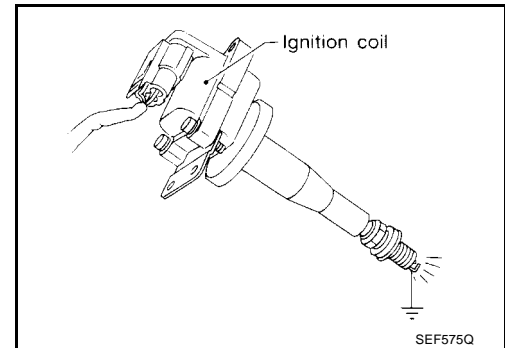


## 5. CHECK IGNITION SPARK

1. Turn Ignition switch "OFF".
2. Disconnect ignition wire from spark plug.
3. Connect a known-good spark plug to the ignition wire.
4. Place end of spark plug against a suitable ground and crank engine.
5. Check for spark.

### OK or NG

- OK >> GO TO 7.  
NG >> GO TO 6.

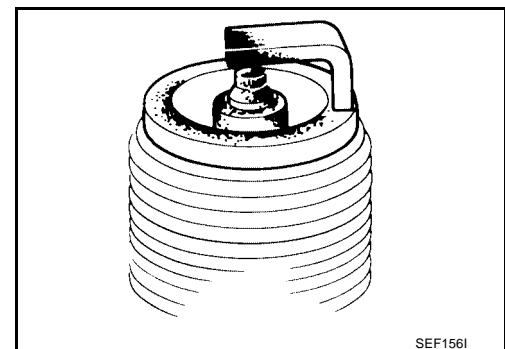


## 6. CHECK SPARK PLUGS

Remove the spark plugs and check for fouling, etc.

### OK or NG

- OK >> GO TO 7.  
NG >> Repair or replace spark plug(s) with standard type one(s). For spark plug type, refer to [MA-16, "ENGINE MAINTENANCE \(QG18DE ENGINE\)"](#).



## 7. CHECK COMPRESSION PRESSURE

Refer to [EM-52, "CHECKING COMPRESSION PRESSURE"](#).

Check compression pressure.

**Standard:** 1,324 kPa (13.5 kg/cm<sup>2</sup> , 192 psi)/300 rpm

**Minimum:** 1,157 kPa (11.8 kg/cm<sup>2</sup> , 168 psi)/300 rpm

**Difference between each cylinder:** 98 kPa (1.0 kg/cm<sup>2</sup> , 14 psi)/300 rpm

### OK or NG

- OK >> GO TO 8.  
NG >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

## 8. CHECK FUEL PRESSURE

1. Install any parts removed.
2. Release fuel pressure to zero. Refer to [EC-56, "FUEL PRESSURE RELEASE"](#).
3. Install fuel pressure gauge and check fuel pressure.

**At idle:** **Approx. 350 kPa (3.57 kg/cm<sup>2</sup> , 51 psi)**

### OK or NG

- OK >> GO TO 10.  
NG >> GO TO 9.

## 9. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit Refer to [EC-553, "FUEL PUMP"](#) .
- Fuel pressure regulator Refer to [EC-56, "Fuel Pressure Check"](#) .
- Fuel lines.
- Fuel filter for clogging

>> Repair or replace.

## 10. CHECK IGNITION TIMING

Check the following items. Refer to [EC-88, "Basic Inspection"](#) .

Items	Specifications
Target idle speed	M/T: 650 ± 50 rpm
	A/T: 800 ± 50 rpm (in "P" or "N" position)
Ignition timing	M/T: 7 ± 5° BTDC
	A/T: 18 ± 5° BTDC (in "P" or "N" position)

OK or NG

OK >> GO TO 11.

NG >> Adjust ignition timing.

## 11. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-205, "Component Inspection"](#) .

OK or NG

OK >> GO TO 12.

NG >> Replace heated oxygen sensor 1.

## 12. CHECK MASS AIR FLOW SENSOR

 **With CONSULT-II**

Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.

**at idling: 1.4 - 4.0 g-m/sec**

**at 2,500 rpm: 5.0 - 10.0 g-m/sec**

 **With GST**

Check mass air flow sensor signal in MODE 1 with GST.

**at idling: 1.4 - 4.0 g-m/sec**

**at 2,500 rpm: 5.0 - 10.0 g-m/sec**

**rpm:**

OK or NG

OK >> GO TO 13.

NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-163, "DTC P0101 MAF SENSOR"](#) .

## 13. CHECK SYMPTOM MATRIX CHART

Check items on the rough idle symptom in [EC-93, "Symptom Matrix Chart"](#) .

OK or NG

OK >> GO TO 14.

NG >> Repair or replace.

---

**14. ERASE THE 1ST TRIP DTC**

---

Some tests may cause a 1st trip DTC to be set.

Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to [EC-71, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) .

>> GO TO 15.

---

**15. CHECK INTERMITTENT INCIDENT**

---

Perform [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END



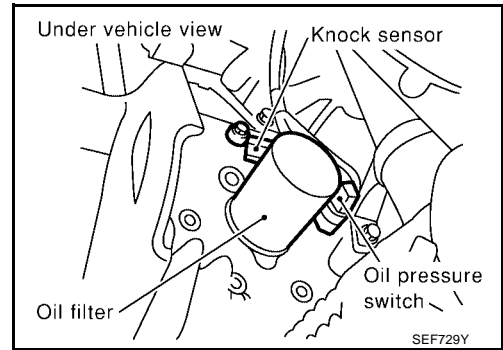
**DTC P0327, P0328 KS**

PF2:22060

**Component Description**

UBS001H9

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.



**On Board Diagnosis Logic**

UBS006GE

The MIL will not light up for these diagnosis.

DTC No.	Trouble Diagnosis Name	DTC Detected Condition	Possible Cause
P0327 0327	Knock sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Knock sensor</li> </ul>
P0328 0328	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

**DTC Confirmation Procedure**

UBS001HB

**NOTE:**

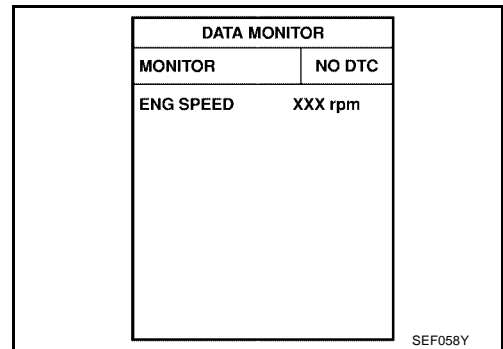
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and run it for at least 5 seconds at idle speed.
3. If DTC is detected, go to [EC-275, "Diagnostic Procedure"](#).

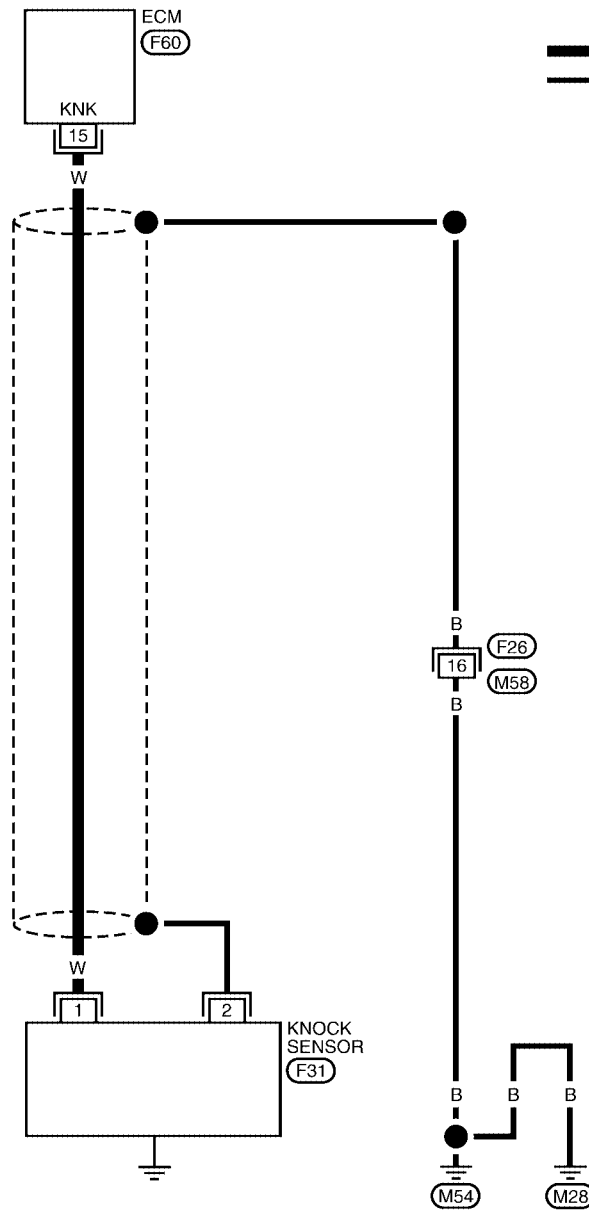


**WITH GST**

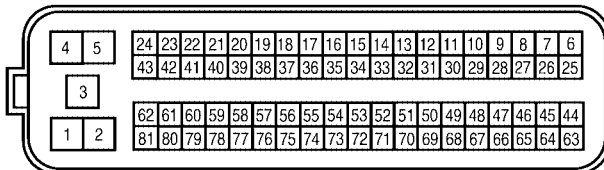
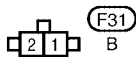
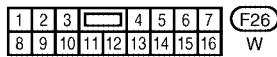
Follow the procedure "With CONSULT-II" above.

Wiring Diagram

EC-KS-01



: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
15	W	Knock sensor	[Engine is running] ● Idle speed	Approximately 2.5V

**Diagnostic Procedure**

UBS001HD

**1. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-I**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check resistance between ECM terminal 15 and engine ground. Refer to Wiring Diagram.

**NOTE:**

It is necessary to use an ohmmeter which can measure more than 10 MΩ.

**Resistance: Approximately 530 - 590kΩ [at 20°C (68°F)]**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 2.

**2. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-II**

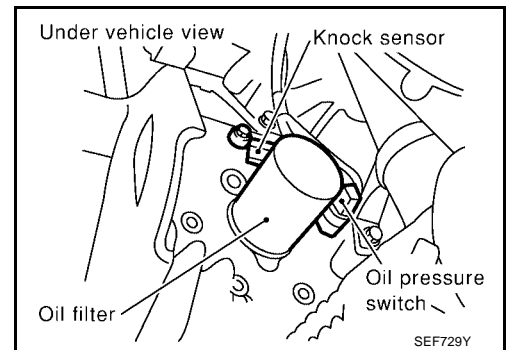
1. Disconnect knock sensor harness connector.
2. Check harness continuity between ECM terminal 15 and knock sensor terminal 1. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



**3. CHECK KNOCK SENSOR**

Refer to [EC-276, "Component Inspection"](#) .

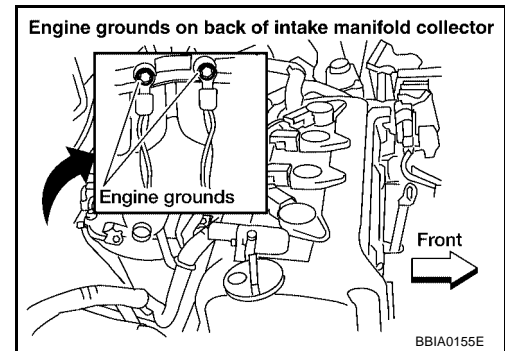
OK or NG

- OK >> GO TO 5.
- NG >> Replace knock sensor.

#### 4. RETIGHTEN GROUND SCREWS

Loosen and retighten engine ground screws.

>> GO TO 5.



#### 5. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

#### Component Inspection KNOCK SENSOR

UBS001HE

1. Disconnect knock sensor harness connector.
2. Check resistance between terminal 1 and ground.

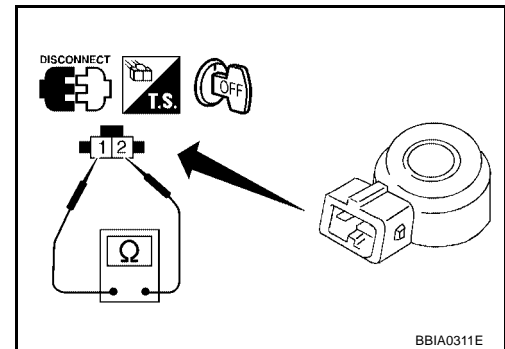
**NOTE:**

Use an ohmmeter which can measure more than 10 MΩ.

**Resistance:** 530 - 590 kΩ [at 20°C (68°F)]

**CAUTION:**

Discard any knock sensors that have been dropped or physically damaged. Use only new ones.



UBS001HF

#### Removal and Installation KNOCK SENSOR

Refer to [EM-67, "CYLINDER BLOCK"](#) .

**DTC P0335 CKP SENSOR (POS)**

PF:23731

**Component Description**

UBS001HG

The crankshaft position sensor (POS) is located on the cylinder block rear housing facing the gear teeth (cogs) of the signal plate at the end of the crankshaft. It detects the fluctuation of the engine revolution.

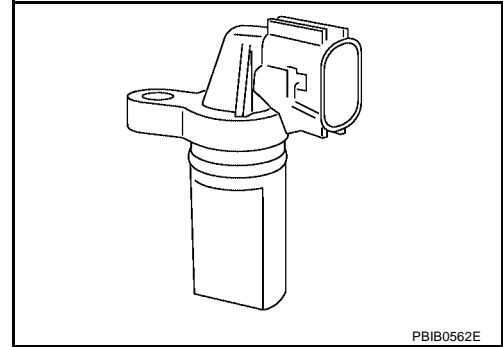
The sensor consists of a permanent magnet and Hall IC.

When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

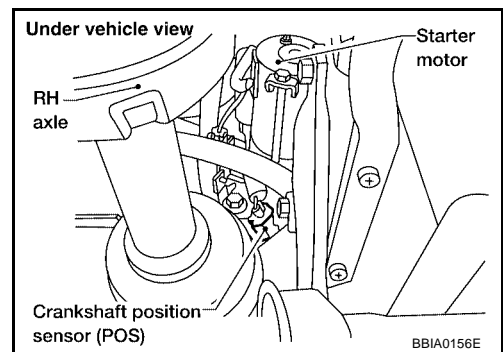
The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.



PBIB0562E



BBA10156E

**CONSULT-II Reference Value in Data Monitor Mode**

UBS006GF

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
ENG SPEED	<ul style="list-style-type: none"> <li>Tachometer: Connect</li> <li>Run engine and compare tachometer indication with the CONSULT-II value.</li> </ul>	Almost the same speed as the CONSULT-II value.

**On Board Diagnosis Logic**

UBS006GG

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335 0335	Crankshaft position sensor (POS) circuit	<ul style="list-style-type: none"> <li>The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking.</li> <li>The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running.</li> <li>The crankshaft position sensor (POS) signal is not in the normal pattern during engine running.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Crankshaft position sensor (POS)</li> <li>Signal plate</li> </ul>

**DTC Confirmation Procedure**

UBS001HI

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that the battery voltage is more than 10.5V and the ignition switch is "ON".

**WITH CONSULT-II**

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
3. If 1st trip DTC is detected, go to [EC-280. "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**WITH GST**

Follow the procedure "With CONSULT-II" above.

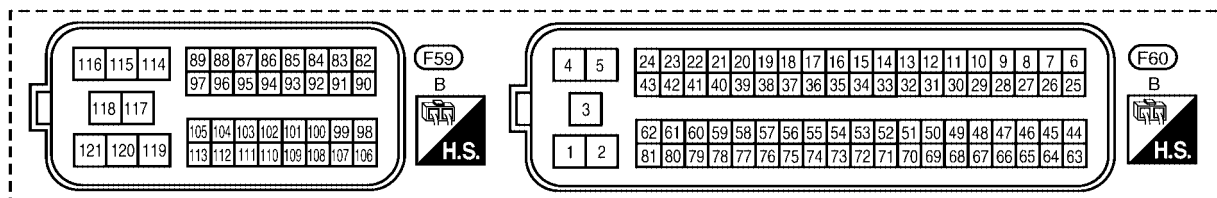
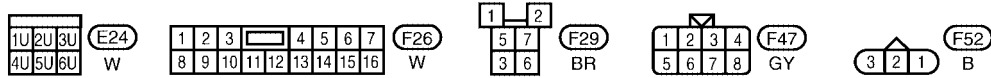
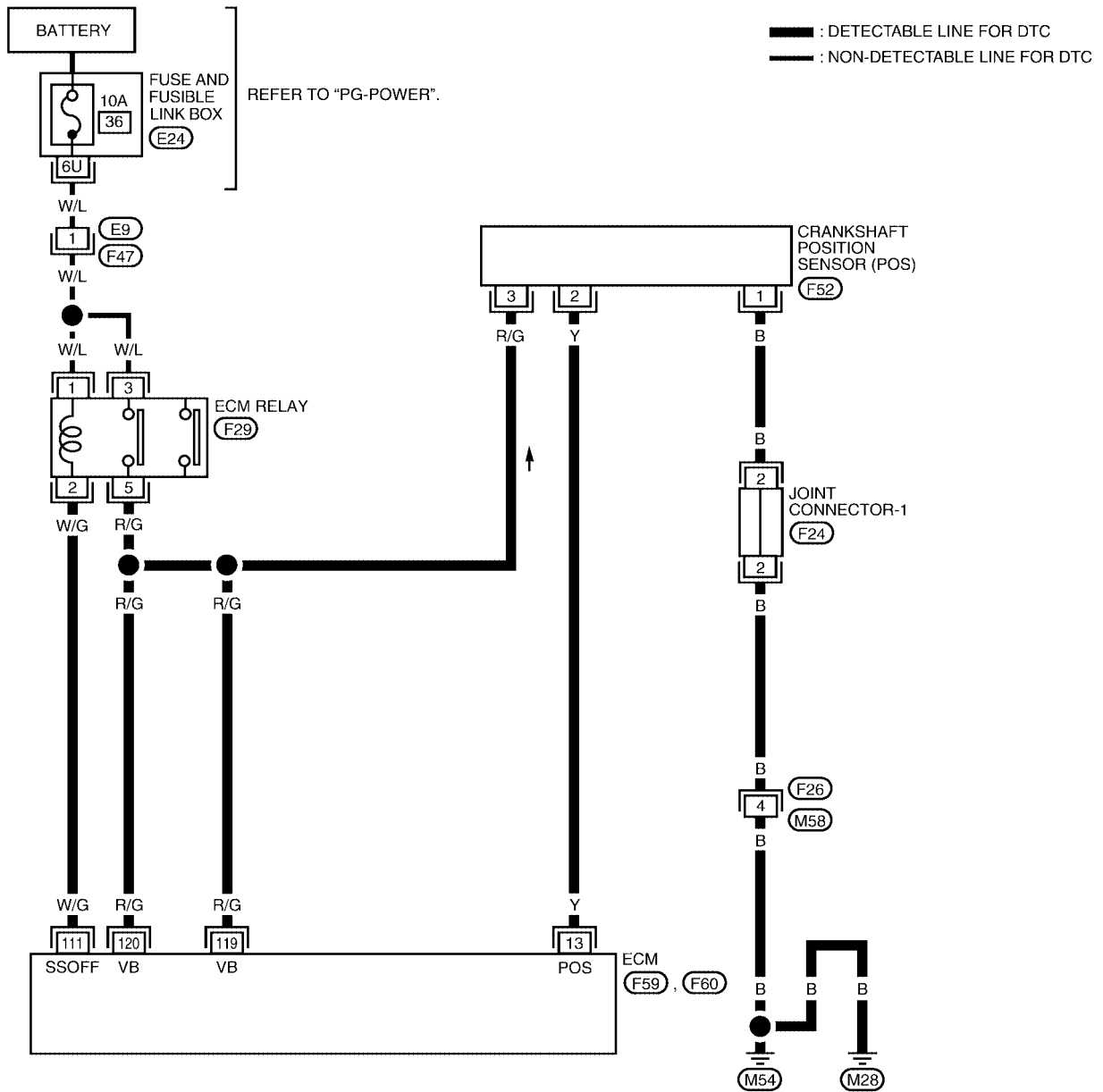
# DTC P0335 CKP SENSOR (POS)

[QG18DE (ULEV)]

UBS001HJ

## Wiring Diagram

EC-POS-01



BBWA0783E

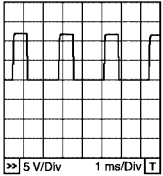
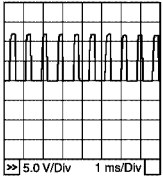
# DTC P0335 CKP SENSOR (POS)

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
13	Y	Crankshaft position sensor (POS)	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>Approximately 3V★</p>  <p>PBIB0527E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Engine speed is 2,000 rpm</li> </ul>	<p>Approximately 3V★</p>  <p>PBIB0528E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

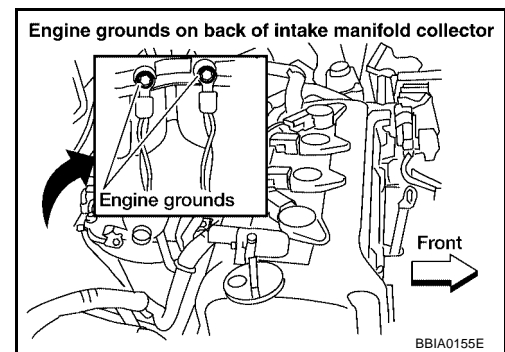
## Diagnostic Procedure

UBS006FQ

### 1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

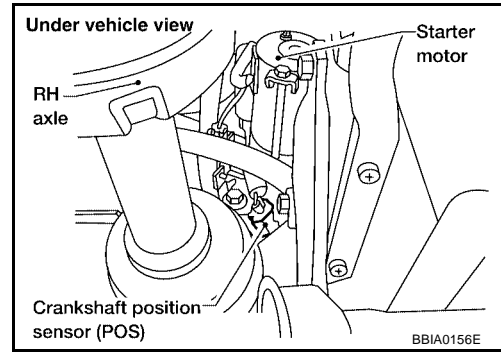
>> GO TO 2.





## 2. CHECK POWER SUPPLY

1. Disconnect crankshaft position sensor (POS) harness connector.
2. Turn ignition switch "ON".



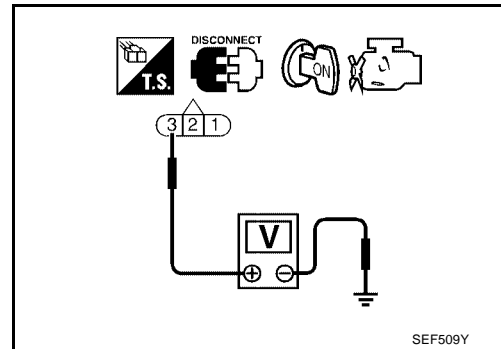
3. Check voltage between crankshaft position sensor (POS) terminal 3 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between crankshaft position sensor (POS) and ECM
- Harness for open or short between crankshaft position sensor (POS) and ECM relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between crankshaft position sensor (POS) terminal and ground. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for and short to ground and short to power.

OK or NG

- OK >> GO TO 5.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 5. CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 13 and crankshaft position sensor (POS) terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK CRANKSHAFT POSITION SENSOR (POS)**

Refer to [EC-282, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace crankshaft position sensor (POS).

**7. CHECK GEAR TOOTH**

Visually check for chipping signal plate gear tooth.

OK or NG

- OK >> GO TO 8.
- NG >> Replace the signal plate.

**8. CHECK INTERMITTENT INCIDENT**

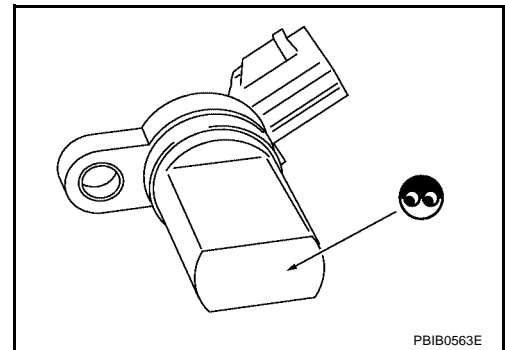
Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection  
CRANKSHAFT POSITION SENSOR (POS)**

UBS006FR

1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor (POS) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.

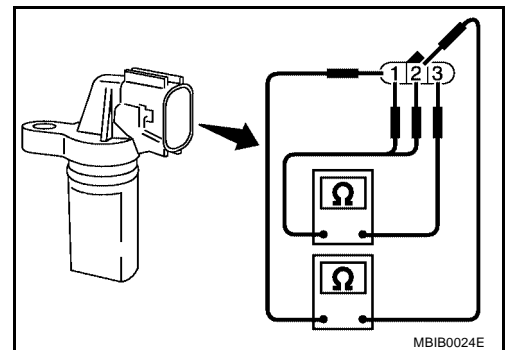


PBIB0563E

5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance $\Omega$ [at 25°C (77°F)]
3 (+) - 1 (-)	Except 0 or $\infty$
3 (+) - 2 (-)	
2 (+) - 1 (-)	

6. If NG, replace crankshaft position sensor (POS).



MBIB0024E

**Removal and Installation  
CRANKSHAFT POSITION SENSOR (POS)**

UBS006FS

Refer to [EM-67, "CYLINDER BLOCK"](#) .

DTC P0340 CMP SENSOR (PHASE)

PF2:23731

Component Description

UBS001HN

The camshaft position sensor (PHASE) senses the retraction with intake valve camshaft to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.

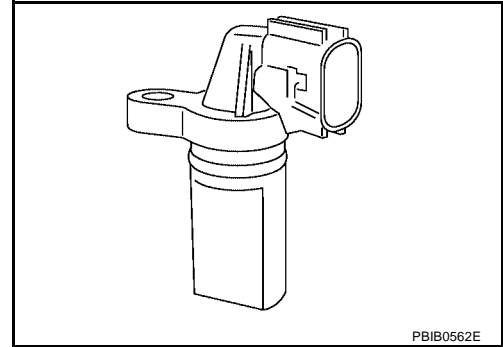
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.



PBIB0562E

On Board Diagnosis Logic

UBS006GH

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340 0340	Camshaft position sensor (PHASE) circuit	<ul style="list-style-type: none"> <li>The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking.</li> <li>The cylinder No. signal is not set to ECM during engine running.</li> <li>The cylinder No. signal is not in the normal pattern during engine running.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Camshaft position sensor (PHASE)</li> <li>Camshaft (Intake)</li> <li>Starter motor (Refer to <a href="#">SC-9</a>.)</li> <li>Starting system circuit (Refer to <a href="#">SC-9</a>.)</li> <li>Dead (Weak) battery</li> </ul>

DTC Confirmation Procedure

UBS001HP

NOTE:

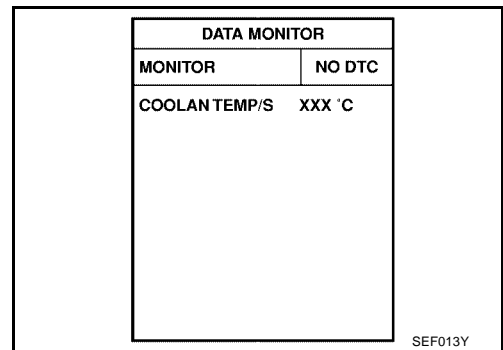
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V.

WITH CONSULT-II

- Turn ignition switch "ON".
- Select "DATA MONITOR" mode with CONSULT-II.
- Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
- If 1st trip DTC is detected, go to [EC-285, "Diagnostic Procedure"](#).  
If 1st trip DTC is not detected, go to next step.
- Maintain engine speed at more than 800 rpm for at least 5 seconds.
- If 1st trip DTC is detected, go to [EC-285, "Diagnostic Procedure"](#).



SEF013Y

WITH GST

Follow the procedure "With CONSULT-II" above.

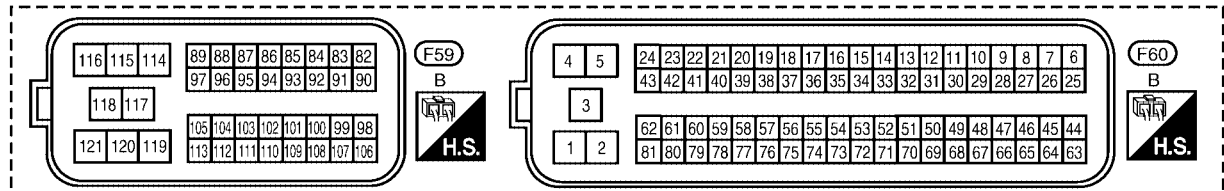
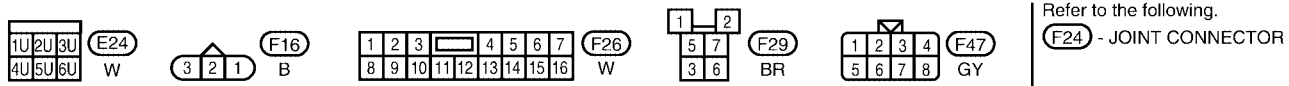
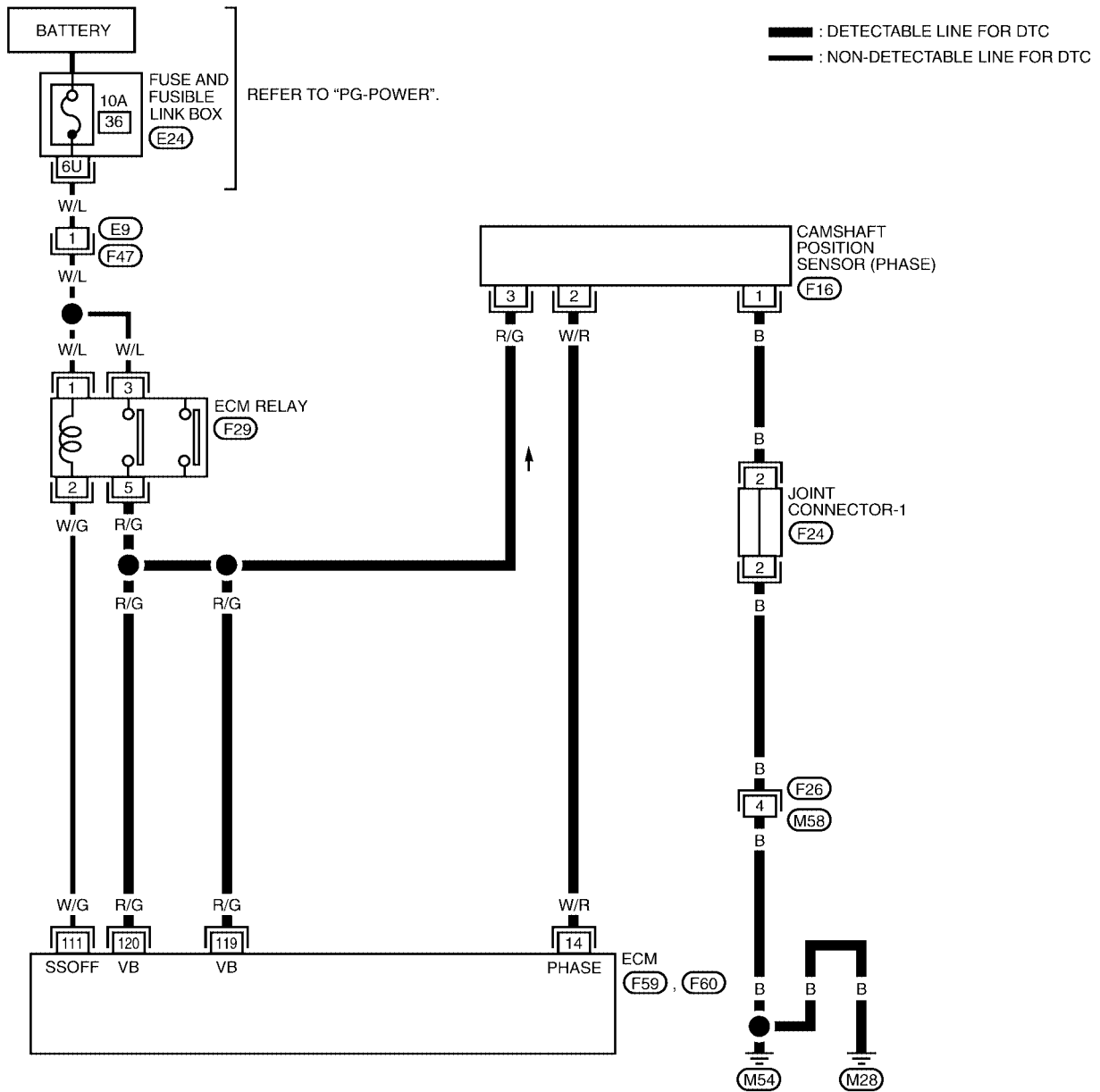
# DTC P0340 CMP SENSOR (PHASE)

[QG18DE (ULEV)]

UBS001HQ

## Wiring Diagram

### EC-PHASE-01



BBWA0784E

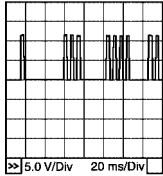
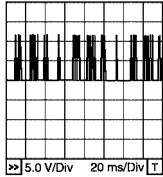
# DTC P0340 CMP SENSOR (PHASE)

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	W/R	Camshaft position sensor (PHASE)	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>1.0 - 4.0V★</p>  <p>PBIB0525E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Engine speed is 2,000 rpm.</li> </ul>	<p>1.0 - 4.0V★</p>  <p>PBIB0526E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS001HR

### 1. CHECK STARTING SYSTEM

Does the engine turn over?  
(Does the starter motor operate?)

Yes or No

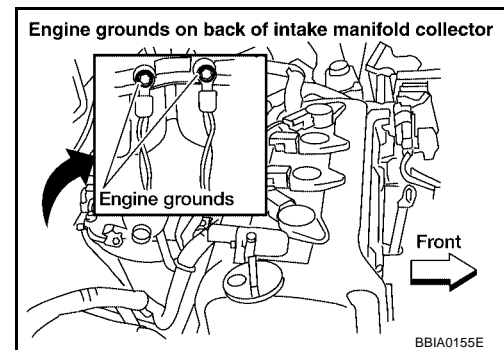
Yes >> GO TO 2.

No >> Check starting system. (Refer to [SC-9, "STARTING SYSTEM"](#) .)

### 2. RETIGHTEN GROUND SCREWS

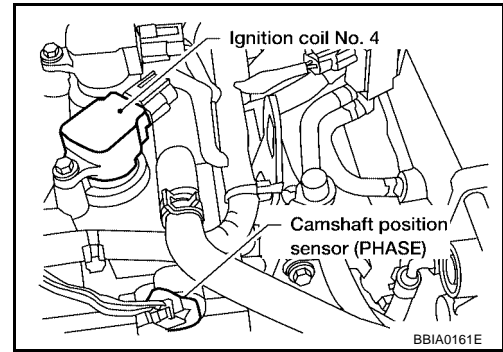
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 3.



### 3. CHECK POWER SUPPLY

1. Disconnect camshaft position sensor (PHASE) harness connector.
2. Turn ignition switch "ON".

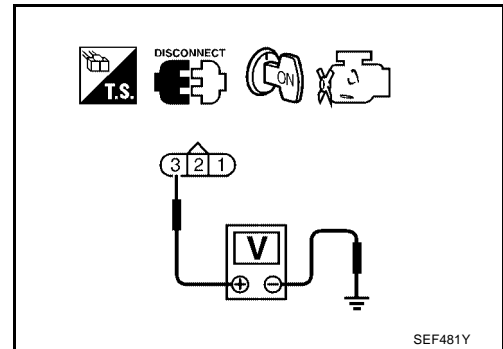


3. Check voltage between camshaft position sensor (PHASE) terminal 3 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



### 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between camshaft position sensor (PHASE) and ECM relay
- Harness for open or short between camshaft position sensor (PHASE) and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

### 5. CHECK INPUT SIGNAL CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between camshaft position sensor (PHASE) terminal 2 and ECM terminal 14. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK GROUND CIRCUIT**

1. Turn ignition switch "OFF".
2. Check harness continuity between camshaft position sensor (PHASE) terminal 1 and engine ground. Refer to the Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to power in harness or connectors.

**7. CHECK CAMSHAFT POSITION SENSOR (PHASE)**

Refer to [EC-287, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace camshaft position sensor (PHASE).

**8. CHECK CAMSHAFT (INTAKE)**

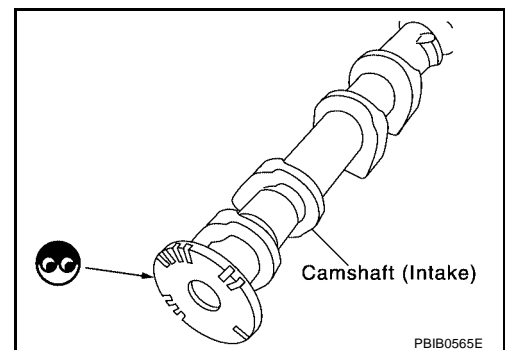
Check the following.

- Accumulation of debris to the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end

OK or NG

OK >> GO TO 9.

NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.

**9. CHECK INTERMITTENT INCIDENT**

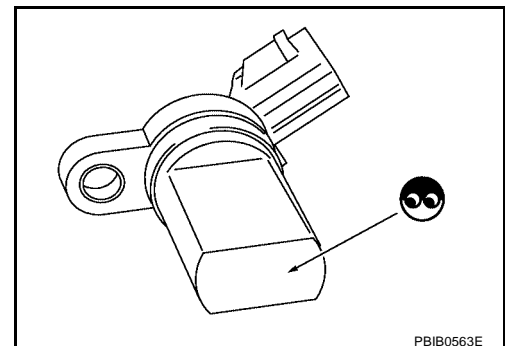
Perform [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection  
CAMSHAFT POSITION SENSOR (PHASE)**

UBS006FT

1. Loosen the fixing bolt of the sensor.
2. Disconnect camshaft position sensor (PHASE) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.

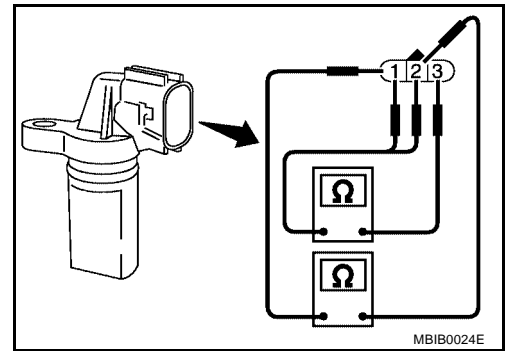


## DTC P0340 CMP SENSOR (PHASE)

[QG18DE (ULEV)]

5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance $\Omega$ [at 25°C (77°F)]
3 (+) - 1 (-)	Except 0 or $\infty$
3 (+) - 2 (-)	
2 (+) - 1 (-)	



UBS001HT

### Removal and Installation CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EM-39, "TIMING CHAIN"](#) .



# DTC P0420 THREE WAY CATALYST FUNCTION

[QG18DE (ULEV)]

## DTC P0420 THREE WAY CATALYST FUNCTION

PFP:20905

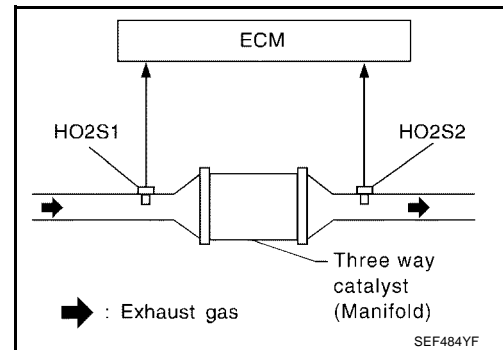
### On Board Diagnosis Logic

UBS006CU

The ECM monitors the switching frequency ratio of heated oxygen sensors 1 and 2.

A three way catalyst (manifold) with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2. As oxygen storage capacity decreases, the heated oxygen sensor 2 switching frequency will increase.

When the frequency ratio of heated oxygen sensors 1 and 2 approaches a specified limit value, the three way catalyst (manifold) malfunction is diagnosed.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0420 0420	Catalyst system efficiency below threshold	<ul style="list-style-type: none"> <li>● Three way catalyst (manifold) does not operate properly.</li> <li>● Three way catalyst (manifold) does not have enough oxygen storage capacity.</li> </ul>	<ul style="list-style-type: none"> <li>● Three way catalyst (Manifold)</li> <li>● Exhaust tube</li> <li>● Intake air leaks</li> <li>● Fuel injectors</li> <li>● Fuel injector leaks</li> <li>● Spark plug</li> <li>● Improper ignition timing</li> </ul>

### DTC Confirmation Procedure

UBS006CV

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### WITH CONSULT-II

#### TESTING CONDITION:

- Open engine hood before conducting the following procedure.
  - Do not hold engine speed for more than the specified minutes below.
1. Start engine and warm it up to the normal operating temperature.
  2. Turn ignition switch "OFF" and wait at least 10 seconds.
  3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
  4. Let engine idle for one minute.
  5. Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-II.
  6. Start engine.
  7. Rev engine up to 2,000 to 3,000 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely. If "INCMP" of "CATALYST" changed to "COMPLT", go to step 7.
  8. Wait 5 seconds at idle.

SRT WORK SUPPORT	
CATALYST	INCMP
HO2S HTR	COMPLT
HO2S	INCMP
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec

PBIB0566E

# DTC P0420 THREE WAY CATALYST FUNCTION

[QG18DE (ULEV)]

9. Rev engine up to 2,000 to 3,000 rpm and maintain it until "INCMP" of "CATALYST" changes to "CMPLT" (It will take approximately 5 minutes).  
If not "CMPLT", stop engine and cool it down to less than 70°C (158°F) and then retest from step 1.

SRT WORK SUPPORT	
CATALYST	CMPLT
HO2S HTR	CMPLT
HO2S	INCMP
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec

PBIB0567E

- a. Turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle)  
b. Turn ignition switch "ON" and select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-II.  
c. Start engine and warm it up while monitoring "COOLAN TEMP/S" indication on CONSULT-II.  
d. When "COOLAN TEMP/S" indication reaches to 70°C(158°F), go to step 3.

DATA MONITOR	
MONITOR	NO DTC
COOLAN TEMP/S	XXX °C

SEF013Y

10. Select "SELF-DIAG RESULTS" mode with CONSULT-II.  
11. Confirm that the 1st trip DTC is not detected.  
If the 1st trip DTC is detected, go to [EC-291, "Diagnostic Procedure"](#).

SELF DIAG RESULTS	
DTC RESULTS	TIME
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	

SEF535Z

## Overall Function Check

UBS006CW

Use this procedure to check the overall function of the three way catalyst (Manifold). During this check, a DTC might not be confirmed.

### CAUTION:

Always drive vehicle at a safe speed.

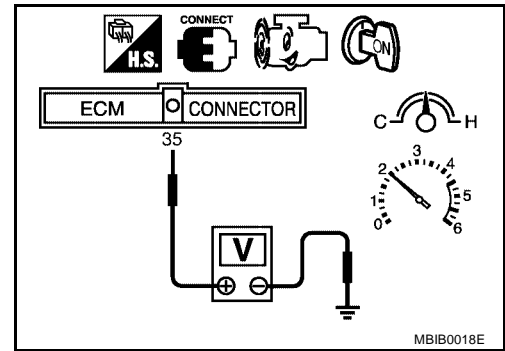
### WITH GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.

# DTC P0420 THREE WAY CATALYST FUNCTION

[QG18DE (ULEV)]

- Set voltmeters probes between ECM terminal 35 (HO2S1 signal) and engine ground, and ECM terminal 74 (HO2S2 signal) and engine ground.
- Keep engine speed at 2,000 rpm constant under no load.



- Make sure that the voltage switching frequency (high & low) between ECM terminal 74 and engine ground is very less than that of ECM terminal 35 and engine ground.

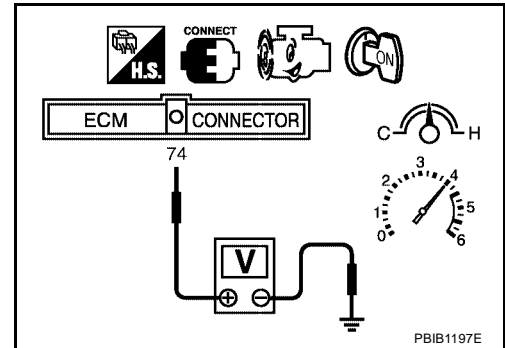
**Switching frequency ratio = A/B**

**A: Heated oxygen sensor 2 voltage switching frequency**

**B: Heated oxygen sensor 1 voltage switching frequency**

**This ratio should be less than 0.75.**

If the ratio is greater than above, it means three way catalyst does not operate properly. Go to [EC-291, "Diagnostic Procedure"](#).



**NOTE:**

If the voltage at terminal 35 does not switch periodically more than 5 times within 10 seconds at step 7, perform trouble diagnosis for "DTC P0133" first. (See [EC-211](#).)

## Diagnostic Procedure

### 1. CHECK EXHAUST SYSTEM

Visually check exhaust tubes and muffler for dent.

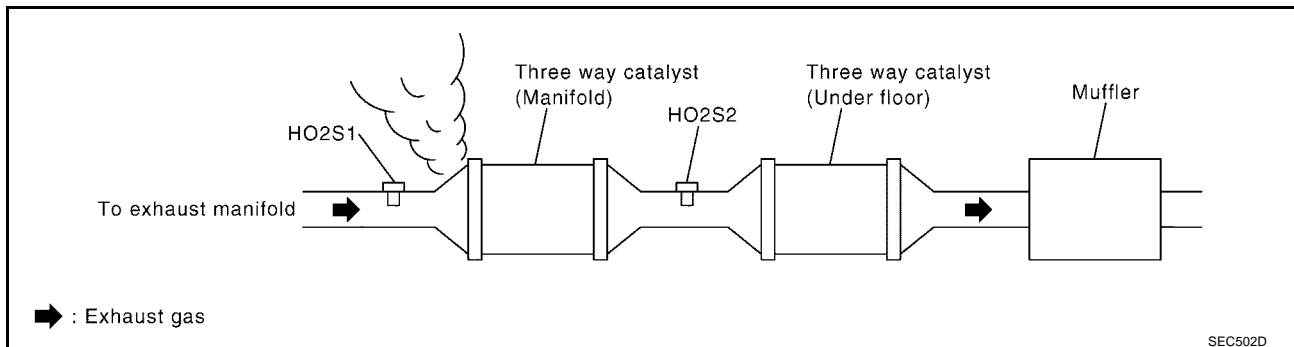
OK or NG

OK >> GO TO 2.

NG >> Repair or replace.

### 2. CHECK EXHAUST GAS LEAK

- Start engine and run it at idle.
- Listen for an exhaust gas leak before the three way catalyst (manifold).



OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

## 3. CHECK INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace.

## 4. CHECK IGNITION TIMING

Check the following items. Refer to [EC-88, "Basic Inspection"](#) .

Items	Specifications	
Ignition timing	A/T	$18^{\circ} \pm 5^{\circ}$ BTDC (in "P" or "N" position)
	M/T	$7^{\circ} \pm 5^{\circ}$ BTDC
Target idle speed	A/T	$800 \pm 50$ rpm (in "P" or "N" position)
	M/T	$650 \pm 50$ rpm

OK or NG

- OK >> GO TO 5.
- NG >> Follow the "Basic Inspection".

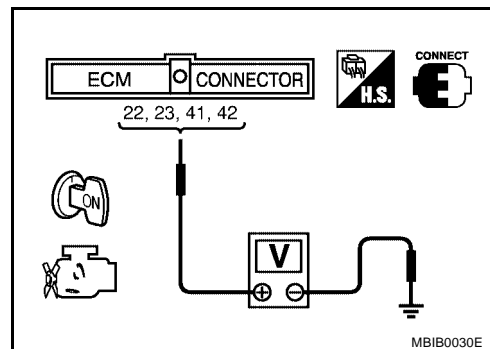
## 5. CHECK INJECTORS

1. Refer to Wiring Diagram for Injectors, [EC-548](#) .
2. Stop engine and then turn ignition switch "ON".
3. Check voltage between ECM terminals 22, 23, 41, 42 and ground with CONSULT-II or tester.

**Battery voltage should exist.**

OK or NG

- OK >> GO TO 6.
- NG >> Perform [EC-550, "Diagnostic Procedure"](#) .

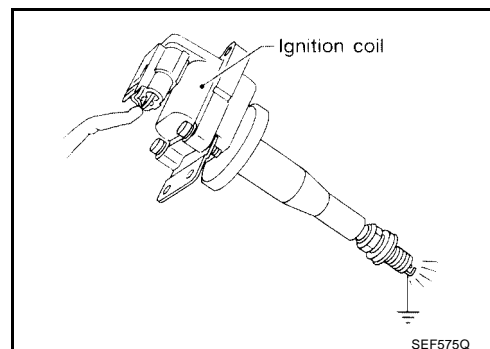


## 6. CHECK IGNITION SPARK

1. Turn ignition switch "OFF".
2. Disconnect ignition coil assembly from rocker cover.
3. Connect a known-good spark plug to the ignition coil assembly.
4. Place end of spark plug against a suitable ground and crank engine.
5. Check for spark.

OK or NG

- OK >> GO TO 7.
- NG >> Check ignition coil with power transistor and their circuit. Refer to [EC-535, "IGNITION SIGNAL"](#) .



# DTC P0420 THREE WAY CATALYST FUNCTION

[QG18DE (ULEV)]

## 7. CHECK INJECTOR

1. Turn ignition switch "OFF".
2. Remove injector assembly.  
Refer to [EM-19, "FUEL INJECTOR AND FUEL TUBE"](#) .  
Keep fuel hose and all injectors connected to injector gallery.
3. Disconnect all ignition coil harness connectors.
4. Turn ignition switch "ON".  
Make sure fuel does not drip from injector.

### OK or NG

OK (Does not drip.)>>GO TO 8.

NG (Drips.)>>Replace the injector(s) from which fuel is dripping.

## 8. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

Trouble is fixed.>>**INSPECTION END**

Trouble is not fixed.>>Replace three way catalyst (manifold).

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DTC P0441 EVAP CONTROL SYSTEM

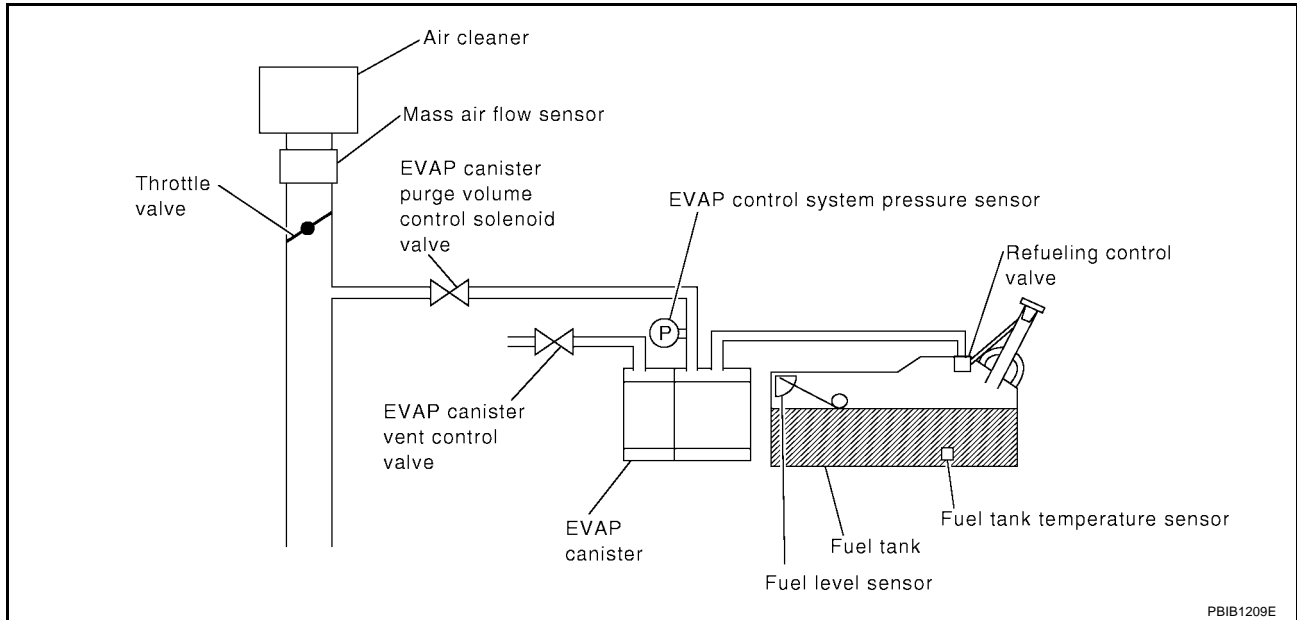
PF1:14950

System Description

UBS001IU

NOTE:

If DTC P0441 is displayed with other DTC such as P2122, P2123, P2127, P2128, P2138 first perform trouble diagnosis for other DTC.



PBIB1209E

In this evaporative emission (EVAP) control system, purge flow occurs during non-closed throttle conditions. Purge volume is related to air intake volume. Under normal purge conditions (non-closed throttle), the EVAP canister purge volume control solenoid valve is open to admit purge flow. Purge flow exposes the EVAP control system pressure sensor to intake manifold vacuum.

On Board Diagnosis Logic

UBS006GI

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, malfunction is determined.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0441 0441	EVAP control system incorrect purge flow	EVAP control system does not operate properly, EVAP control system has a leak between intake manifold and EVAP control system pressure sensor.	<ul style="list-style-type: none"> <li>● EVAP canister purge volume control solenoid valve stuck closed</li> <li>● EVAP control system pressure sensor and the circuit</li> <li>● Loose, disconnected or improper connection of rubber tube</li> <li>● Blocked rubber tube</li> <li>● Cracked EVAP canister</li> <li>● EVAP canister purge volume control solenoid valve circuit</li> <li>● Accelerator pedal position sensor</li> <li>● Blocked purge port</li> <li>● EVAP canister vent control valve</li> </ul>

DTC Confirmation Procedure

UBS001IX

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

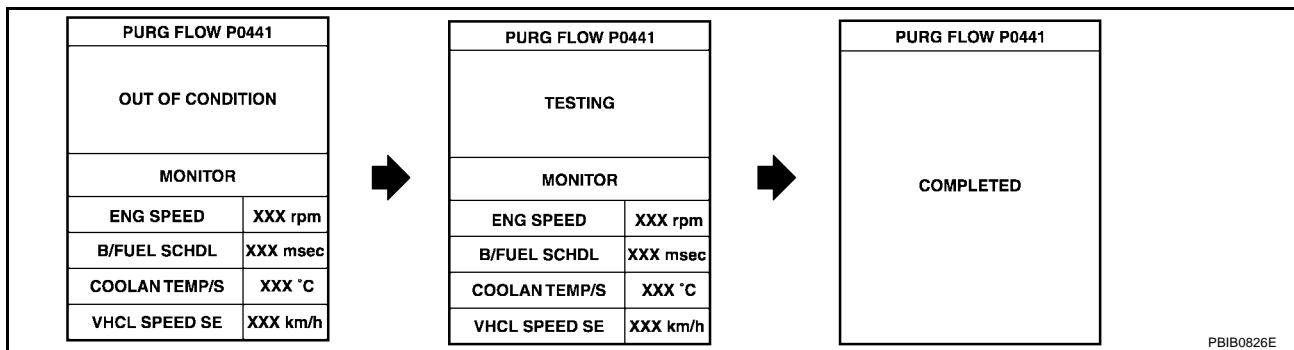
**TESTING CONDITION:**

For best results, perform test at a temperature of 0°C (32°F) or more.

**Ⓢ WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and let it idle for at least 70 seconds.
4. Select "PURG FLOW P0441" of "EVAPORATIVE SYSTEM" in "DTC CONFIRMATION" mode with CONSULT-II.
5. Touch "START".  
If "COMPLETED" is displayed, go to step 7.
6. When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 35 seconds.)

Selector lever	Suitable position
Vehicle speed	32 - 120 km/h (20 - 75 MPH)
ENG SPEED	500 - 3,800 rpm
B/FUEL SCHDL	1.0 - 8.2 msec
Engine coolant temperature	More than 70°C (158°F)



If "TESTING" is not changed for a long time, retry from step 2.

7. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to [EC-297, "Diagnostic Procedure"](#).

## Overall Function Check

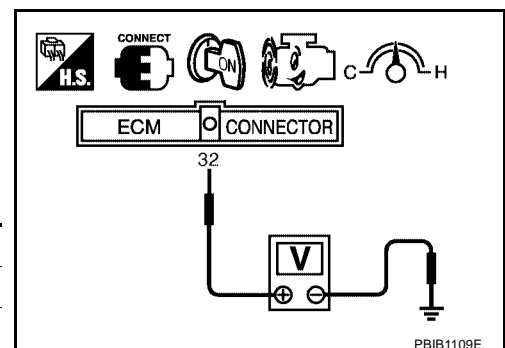
UBS0011Y

Use this procedure to check the overall monitoring function of the EVAP control system purge flow monitoring. During this check, a DTC might not be confirmed.

**Ⓢ WITH GST**

1. Lift up drive wheels.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF", wait at least 10 seconds.
4. Start engine and wait at least 70 seconds.
5. Set voltmeter probes to ECM terminals 32 (EVAP control system pressure sensor signal) and ground.
6. Check EVAP control system pressure sensor value at idle speed and note it.
7. Establish and maintain the following conditions for at least 1 minute.

Air conditioner switch	ON
Headlamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Gear position	Any position other than "P", "N" or "R"



## DTC P0441 EVAP CONTROL SYSTEM

[QG18DE (ULEV)]

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8. Verify that EVAP control system pressure sensor value stays 0.1V less than the value at idle speed (measured at step 6) for at least 1 second.
9. If NG, go to [EC-297, "Diagnostic Procedure"](#) .



**Diagnostic Procedure**

**1. CHECK EVAP CANISTER**

1. Turn ignition switch "OFF".
2. Check EVAP canister for cracks.

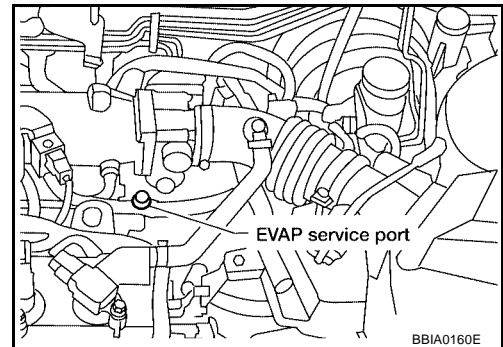
**OK or NG**

- OK (With CONSULT-II)>>GO TO 2.
- OK (Without CONSULT-II)>>GO TO 3.
- NG >> Replace EVAP canister.

**2. CHECK PURGE FLOW**

**Ⓜ With CONSULT-II**

1. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.
2. Start engine and let it idle.



3. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.
4. Rev engine up to 2,000 rpm.
5. Touch "Qd" and "Qu" on CONSULT-II screen to adjust "PURG VOL CONT/V" opening and check vacuum existence.

PURG VOL CONT/V	VACUUM
100.0%	Should exist
0.0%	Should not exist

**OK or NG**

- OK >> GO TO 7.
- NG >> GO TO 4.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

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### 3. CHECK PURGE FLOW

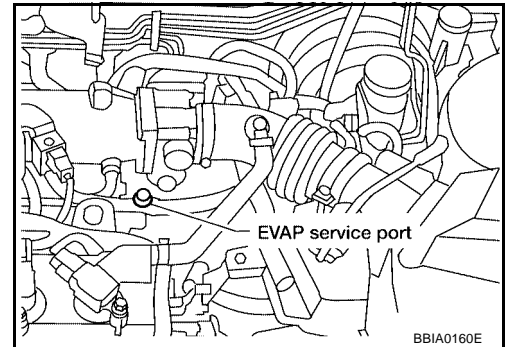
⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum gauge indication when revving engine up to 2,000 rpm.

Vacuum should exist.

6. Release the accelerator pedal fully and let idle.

Vacuum should not exist.



OK or NG

- OK >> GO TO 7.
- NG >> GO TO 4.

### 4. CHECK EVAP PURGE LINE

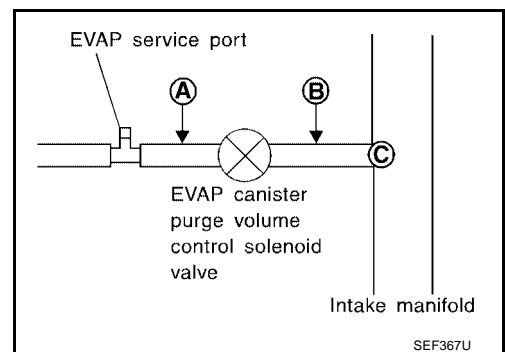
1. Turn ignition switch "OFF".
2. Check EVAP purge line for improper connection or disconnection. Refer to [EC-584, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK >> GO TO 5.
- NG >> Repair it.

### 5. CHECK EVAP PURGE HOSE AND PURGE PORT

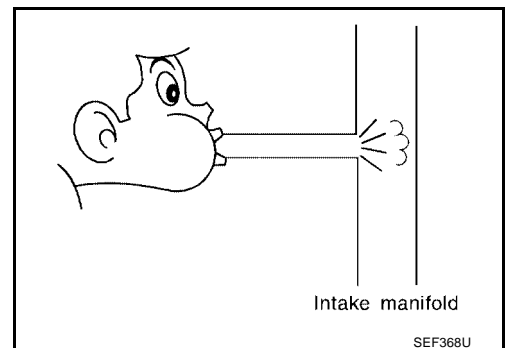
1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B** .
2. Blow air into each hose and EVAP purge port **C** .



3. Check that air flows freely.

OK or NG

- OK (With CONSULT-II)>>GO TO 6.
- OK (Without CONSULT-II)>>GO TO 7.
- NG >> Repair or clean hoses and/or purge port.



**6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

 **With CONSULT-II**

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

**7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

Refer to [EC-316, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace EVAP canister purge volume control solenoid valve.

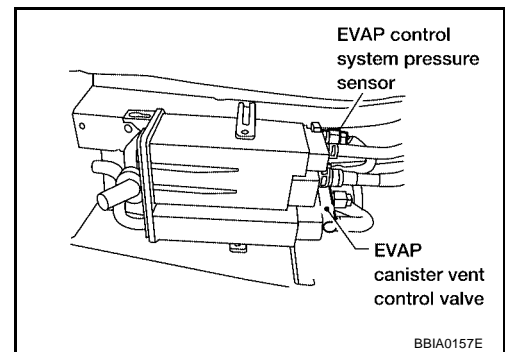
**8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR**

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

**Water should not exist.**

OK or NG

- OK >> GO TO 9.
- NG >> Replace EVAP control system pressure sensor.



**9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION**

Refer to "DTC Confirmation Procedure" for DTC P0452 [EC-324](#) , P0453 [EC-330](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace EVAP control system pressure sensor.

**10. CHECK RUBBER TUBE FOR CLOGGING**

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 11.
- NG >> Clean the rubber tube using an air blower.

**11. CHECK EVAP CANISTER VENT CONTROL VALVE**

Refer to [EC-322, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 12.
- NG >> Replace EVAP canister vent control valve.

## 12. CHECK EVAP PURGE LINE

---

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.  
Refer to [EC-584, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK >> GO TO 13.
- NG >> Replace it.

## 13. CLEAN EVAP PURGE LINE

---

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 14.

## 14. CHECK INTERMITTENT INCIDENT

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Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

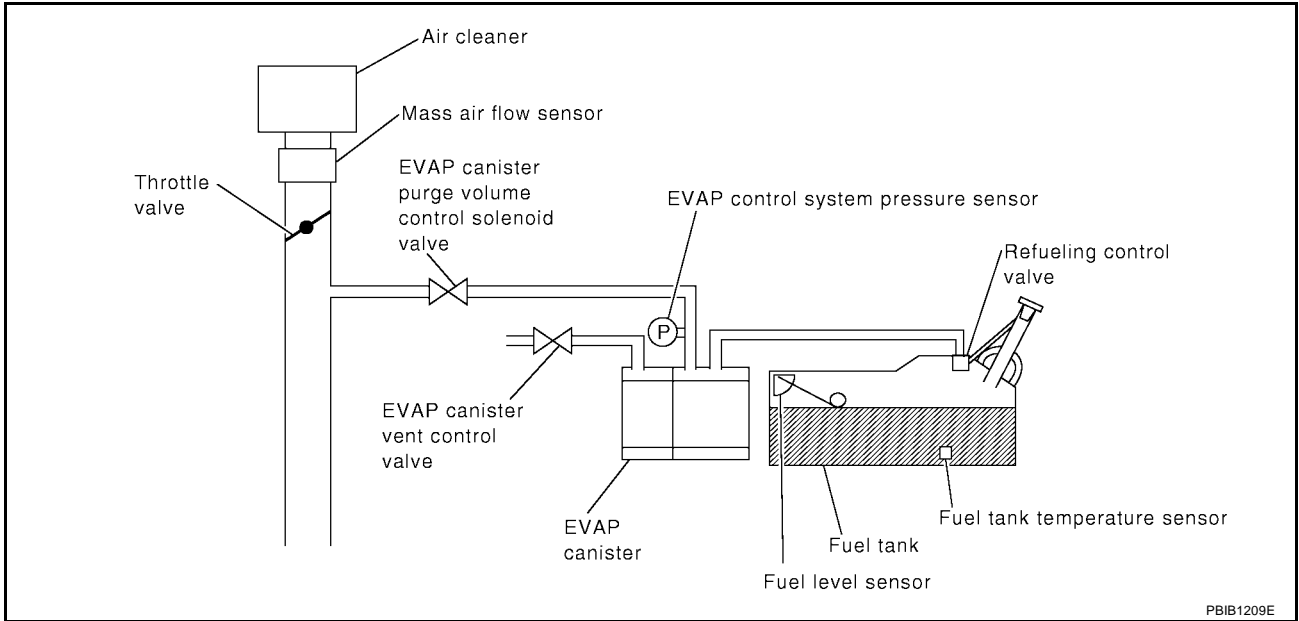
DTC P0442 EVAP CONTROL SYSTEM

PF14950

On Board Diagnosis Logic

UBS001J0

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum. If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following "Vacuum test" conditions. The EVAP canister vent control valve is closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve will then be opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.



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# DTC P0442 EVAP CONTROL SYSTEM

[QG18DE (ULEV)]

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0442 0442	EVAP control system small leak detected (negative pressure)	EVAP control system has a leak, EVAP control system does not operate properly.	<ul style="list-style-type: none"> <li>● Incorrect fuel tank vacuum relief valve</li> <li>● Incorrect fuel filler cap used</li> <li>● Fuel filler cap remains open or fails to close.</li> <li>● Foreign matter caught in fuel filler cap.</li> <li>● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>● Foreign matter caught in EVAP canister vent control valve.</li> <li>● EVAP canister or fuel tank leaks</li> <li>● EVAP purge line (pipe and rubber tube) leaks</li> <li>● EVAP purge line rubber tube bent</li> <li>● Loose or disconnected rubber tube</li> <li>● EVAP canister vent control valve and the circuit</li> <li>● EVAP canister purge volume control solenoid valve and the circuit</li> <li>● Fuel tank temperature sensor</li> <li>● O-ring of EVAP canister vent control valve is missing or damaged</li> <li>● EVAP canister is saturated with water</li> <li>● EVAP control system pressure sensor</li> <li>● Fuel level sensor and the circuit</li> <li>● Refueling control valve</li> <li>● ORVR system leaks</li> </ul>

**CAUTION:**

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

## DTC Confirmation Procedure

UBS001J2

**CAUTION:**

Never remove fuel filler cap during the DTC confirmation procedure.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Open engine hood before conducting following procedure.
- Always perform test at a temperature of 0 to 30°C (32 to 86°F).

 **WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
4. Check the following conditions are met.

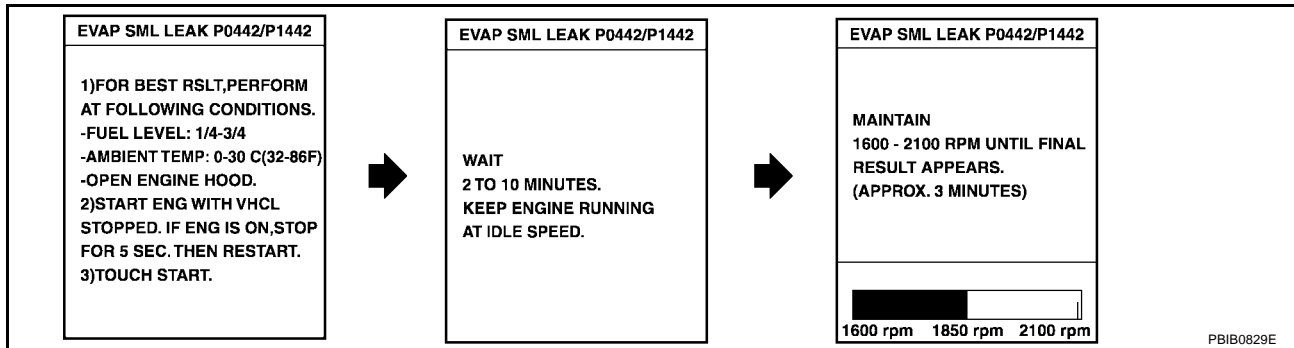
**COOLANT TEMP/S: 0 - 70°C (32 - 158°F)**

**INT/A TEMP SE: More than -20°C (-4°F)**

# DTC P0442 EVAP CONTROL SYSTEM

[QG18DE (ULEV)]

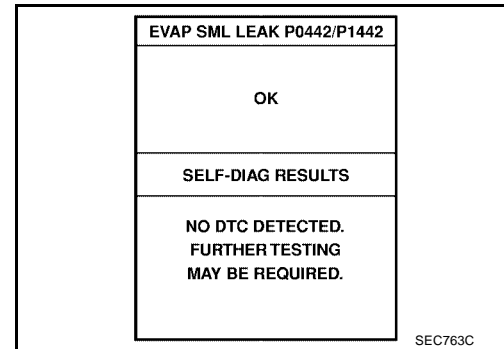
5. Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.  
Follow the instruction displayed.



## NOTE:

- If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to [EC-88, "Basic Inspection"](#).
- Make sure that EVAP hoses are connected to the EVAP canister purge volume control solenoid valve properly.

6. Make sure that "OK" is displayed.  
If "NG" is displayed, refer to [EC-304, "Diagnostic Procedure"](#).



## WITH GST

### NOTE:

Be sure to read the explanation of "Driving Pattern" on [EC-68](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to [EC-68, "Driving Pattern"](#).
3. Stop vehicle.
4. Select "MODE 1" with GST.
  - If SRT of EVAP system is not set yet, go to the following step.
  - If SRT of EVAP system is set, the result will be OK.
5. Turn ignition switch "OFF" and wait at least 10 seconds.
6. Start engine.  
**It is not necessary to cool engine down before driving.**
7. Drive vehicle again according to the [EC-68, "Driving Pattern"](#).
8. Stop vehicle.
9. Select "MODE 3" with GST.
  - If P0442 is displayed on the screen, go to [EC-304, "Diagnostic Procedure"](#).
  - If P0441 is displayed on the screen, go to "Diagnostic Procedure" for DTC P0441, [EC-297](#).
  - If P0441, P0442 are not displayed on the screen, go to the following step.
10. Select "MODE 1" with GST.
  - If SRT of EVAP system is set, the result will be OK.
  - If SRT of EVAP system is not set, go to step 6.

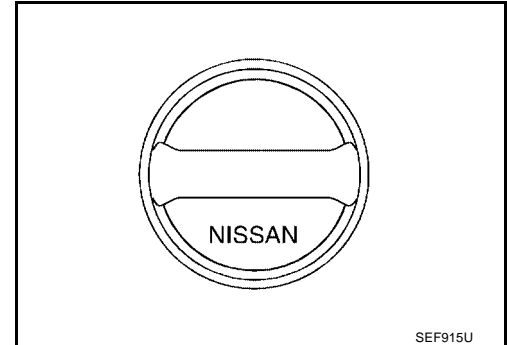
## Diagnostic Procedure

### 1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch "OFF".
2. Check for genuine NISSAN fuel filler cap design.

#### OK or NG

- OK >> GO TO 2.  
NG >> Replace with genuine NISSAN fuel filler cap.



### 2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

#### OK or NG

- OK >> GO TO 3.  
NG >> ● Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.  
● Retighten until ratcheting sound is heard.

### 3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

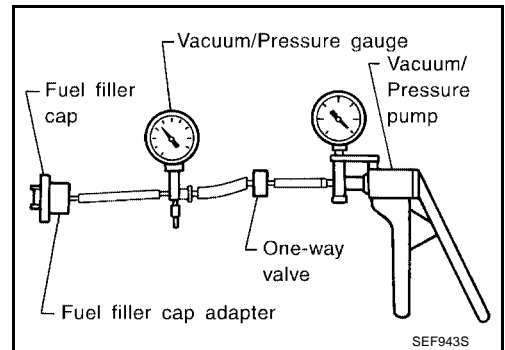
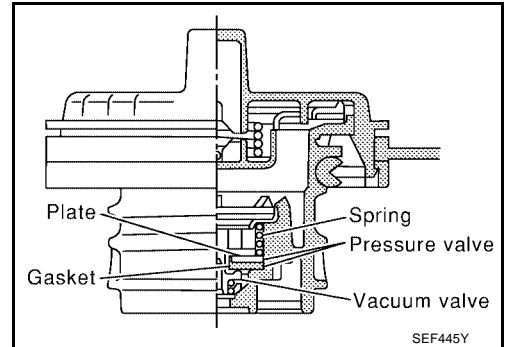
#### OK or NG

- OK >> GO TO 5.  
NG >> GO TO 4.



**4. CHECK FUEL TANK VACUUM RELIEF VALVE**

1. Wipe valve housing clean.
2. Check valve opening pressure and vacuum.



**Pressure:** 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm<sup>2</sup> , 2.22 - 2.90 psi)

**Vacuum:** -6.0 to -3.4 kPa (-0.061 to -0.035 kg/cm<sup>2</sup> , -0.87 to -0.48 psi)

**CAUTION:**

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.

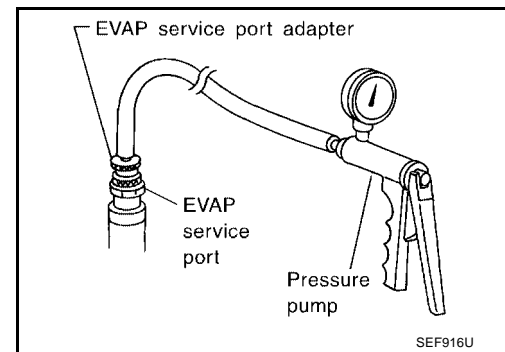
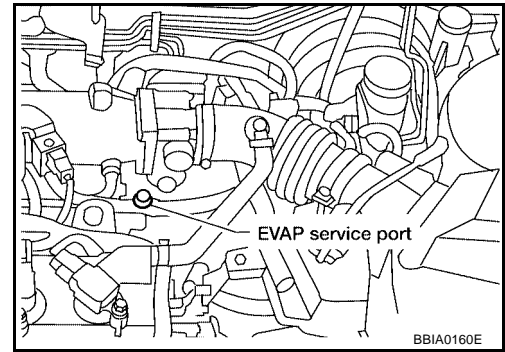
OK or NG

OK >> GO TO 5.

NG >> Replace fuel filler cap with a genuine one.

### 5. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.



**NOTE:**

**Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.**

Models with CONSULT-II>>GO TO 6.

Models without CONSULT-II>>GO TO 7.

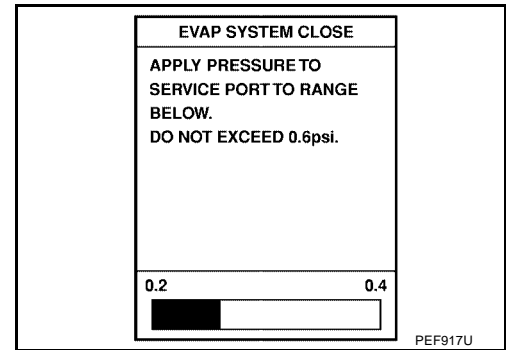
**6. CHECK FOR EVAP LEAK**

**With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

**NOTE:**

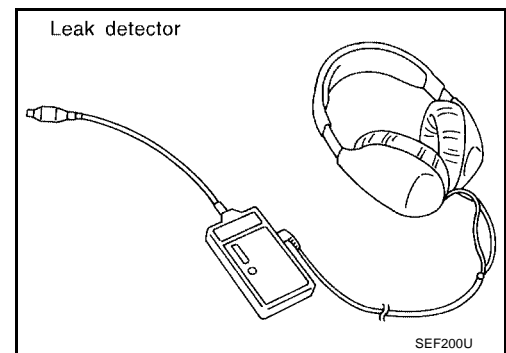
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-584, "EVAPORATIVE EMISSION LINE DRAWING"](#)

**OK or NG**

- OK >> GO TO 8.
- NG >> Repair or replace.



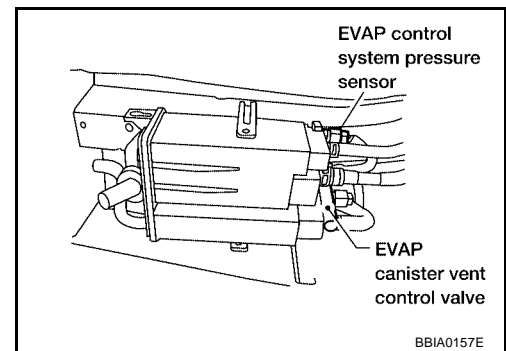
**7. CHECK FOR EVAP LEAK**

**Without CONSULT-II**

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

**NOTE:**

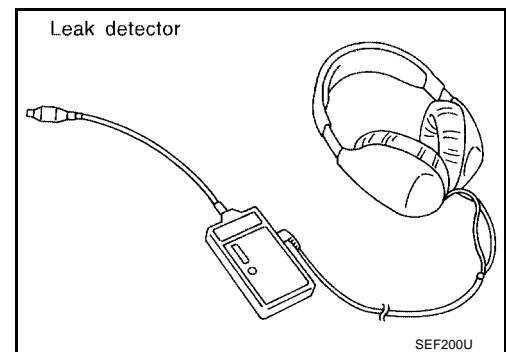
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-584, "EVAPORATIVE EMISSION LINE DRAWING"](#).

**OK or NG**

- OK >> GO TO 8.
- NG >> Repair or replace.



**8. CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT**

Refer to [EC-312, "DTC Confirmation Procedure"](#) .

OK or NG

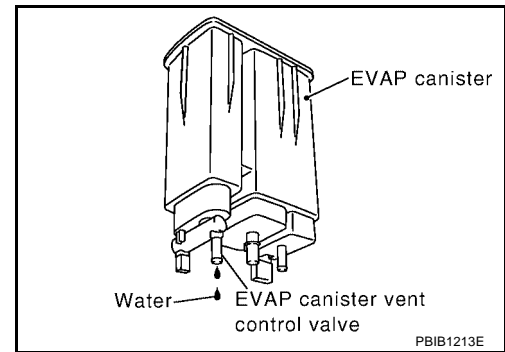
- OK >> GO TO 9.
- NG >> Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

**9. CHECK IF EVAP CANISTER SATURATED WITH WATER**

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 10.
- No (With CONSULT-II)>>GO TO 12.
- No (Without CONSULT-II)>>GO TO 13.



**10. CHECK EVAP CANISTER**

Weigh the EVAP canister with the EVAP canister vent control valve attached.  
**The weight should be less than 1.9 kg (4.2 lb).**

OK or NG

- OK (With CONSULT-II)>>GO TO 12.
- OK (Without CONSULT-II)>>GO TO 13.
- NG >> GO TO 11.

**11. DETECT MALFUNCTIONING PART**

Check the following.

- EVAP canister for damage
- >> Repair hose or replace EVAP canister.

**12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION**

Ⓟ **With CONSULT-II**

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

**Vacuum should exist.**

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

**13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION**

**⊗ Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

**Vacuum should exist.**

OK or NG

- OK >> GO TO 17.
- NG >> GO TO 14.

**14. CHECK VACUUM HOSE**

Check vacuum hoses for clogging or disconnection. Refer to [EC-34, "Vacuum Hose Drawing"](#).

OK or NG

- OK (With CONSULT-II)>>GO TO 15.
- OK (Without CONSULT-II)>>GO TO 16.
- NG >> Repair or reconnect the hose.

**15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

**Ⓜ With CONSULT-II**

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 17.
- NG >> GO TO 16.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

**16. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

Refer to [EC-316, "Component Inspection"](#).

OK or NG

- OK >> GO TO 17.
- NG >> Replace EVAP canister purge volume control solenoid valve.

**17. CHECK FUEL TANK TEMPERATURE SENSOR**

Refer to [EC-255, "Component Inspection"](#).

OK or NG

- OK >> GO TO 18.
- NG >> Replace fuel level sensor unit.

---

**18. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR**

---

Refer to [EC-329, "Component Inspection"](#) .

**OK or NG**

- OK >> GO TO 19.
- NG >> Replace EVAP control system pressure sensor.

---

**19. CHECK EVAP PURGE LINE**

---

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to [EC-583, "EVAPORATIVE EMISSION SYSTEM"](#) .

**OK or NG**

- OK >> GO TO 20.
- NG >> Repair or reconnect the hose.

---

**20. CLEAN EVAP PURGE LINE**

---

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 21.

---

**21. CHECK EVAP/ORVR VAPOR LINE**

---

Check EVAP/ORVR vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-590, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#) .

**OK or NG**

- OK >> GO TO 22.
- NG >> Repair or replace hoses and tubes.

---

**22. CHECK SIGNAL LINE AND RECIRCULATION LINE**

---

Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

**OK or NG**

- OK >> GO TO 23.
- NG >> Repair or replace hoses, tubes or filler neck tube.

---

**23. CHECK REFUELING EVAP VAPOR CUT VALVE**

---

Refer to [EC-593, "Component Inspection"](#) .

**OK or NG**

- OK >> GO TO 24.
- NG >> Replace refueling EVAP vapor cut valve with fuel tank.

---

**24. CHECK FUEL LEVEL SENSOR**

---

Refer to [DI-26, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

**OK or NG**

- OK >> GO TO 25.
- NG >> Replace fuel level sensor unit.

---

**25. CHECK INTERMITTENT INCIDENT**

---

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

# DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QG18DE (ULEV)]

## DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

PFP:14920

### Description SYSTEM DESCRIPTION

UBS001J5

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*2	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*2		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Closed throttle position		
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Vehicle speed signal*1	Vehicle speed		

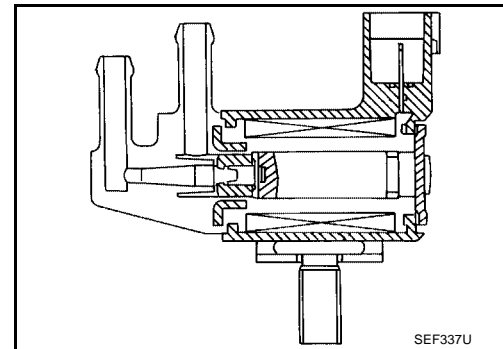
\*1: This signal is sent to the ECM through CAN communication line.

\*2: The ECM determines the start signal status by the signals of engine speed and battery voltage.

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

### COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



### CONSULT-II Reference Value in Data Monitor Mode

UBS001J6

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
PURG VOL C/V	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: "OFF"</li> </ul>	Idle
	<ul style="list-style-type: none"> <li>● Shift lever: N (A/T models) Neutral (M/T models)</li> <li>● No-load</li> </ul>	2,000 rpm
		0%
		—

# DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QG18DE (ULEV)]

## On Board Diagnosis Logic

*UBS006GJ*

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0444 0444	EVAP canister purge volume control solenoid valve circuit open	An excessively low voltage signal is sent to ECM through the valve	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● EVAP canister purge volume control solenoid valve</li> </ul>
P0445 0445	EVAP canister purge volume control solenoid valve circuit shorted	An excessively high voltage signal is sent to ECM through the valve	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is shorted.)</li> <li>● EVAP canister purge volume control solenoid valve</li> </ul>

## DTC Confirmation Procedure

*UBS001J9*

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

**Before performing the following procedure, confirm battery voltage is more than 11V at idle.**

### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 13 seconds.
4. If 1st trip DTC is detected, go to [EC-314, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

### WITH GST

Follow the procedure "WITH CONSULT-II" above.



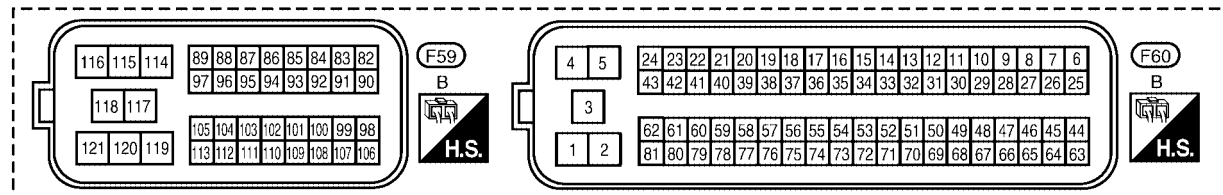
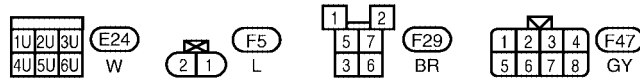
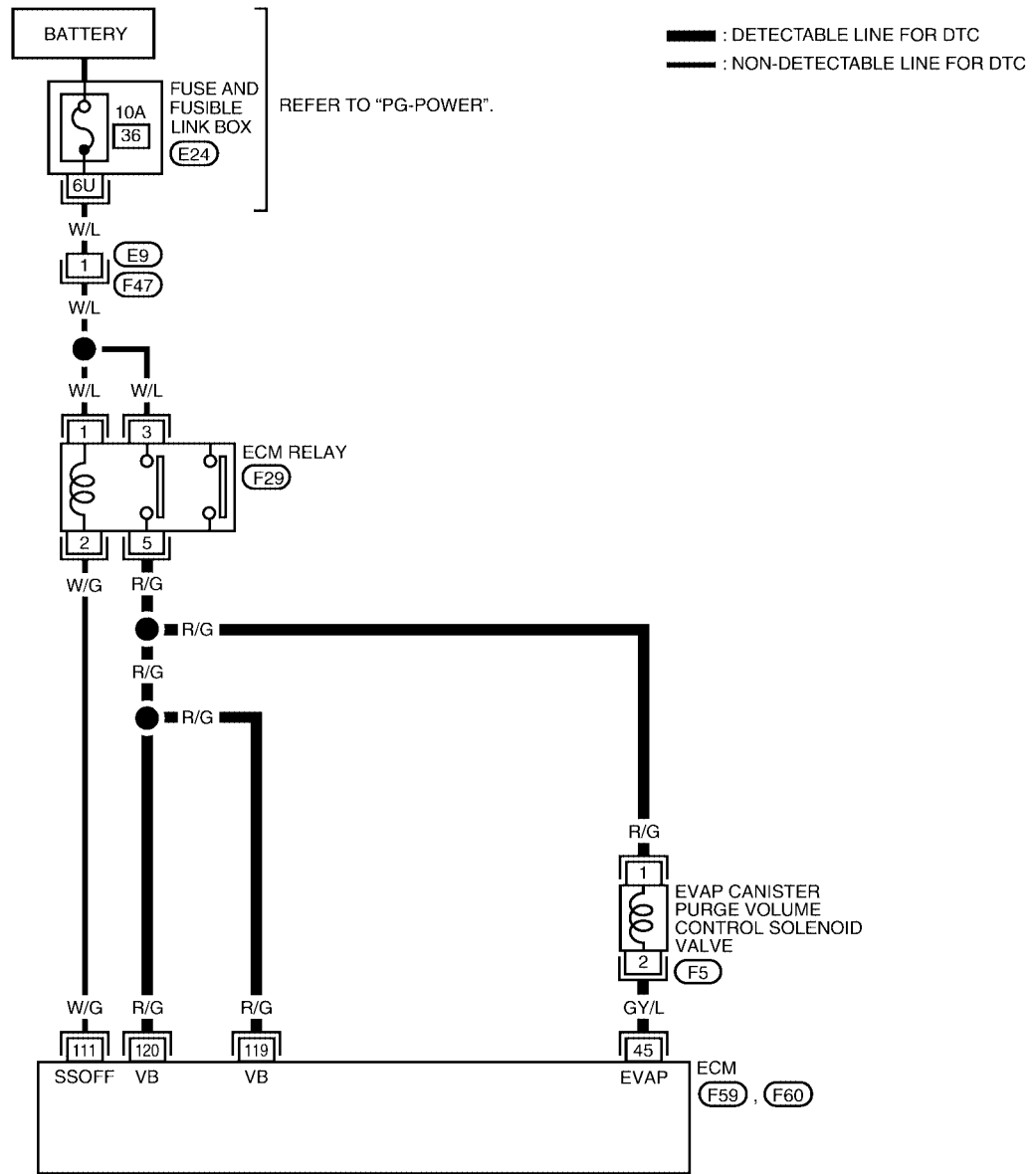
# DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QG18DE (ULEV)]

UBS001JA

## Wiring Diagram

EC-PGC/V-01



BBWA0785E

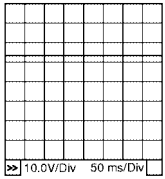
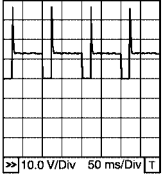
# DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
45	GY/L	EVAP canister purge volume control solenoid valve	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>PBIB0050E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine)</li> </ul>	<p>Approximately 10V★</p>  <p>PBIB0520E</p>

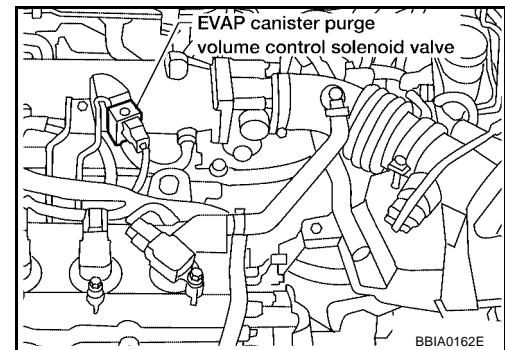
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS001JB

### 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Turn ignition switch "ON".

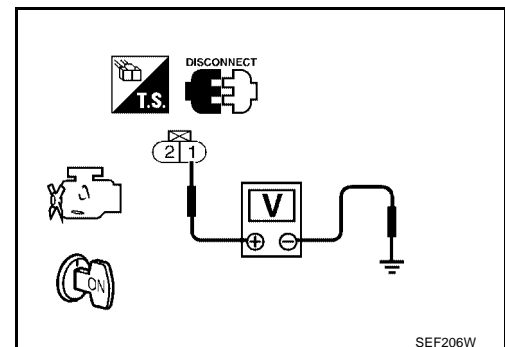


4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



## 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM relay

>> Repair harness or connectors.

## 3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 45 and EVAP canister purge volume control solenoid valve terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK (With CONSULT-II)>>GO TO 4.

OK (Without CONSULT-II)>>GO TO 5.

NG >> Repair open circuit or short to ground and short to power in harness or connectors.

## 4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

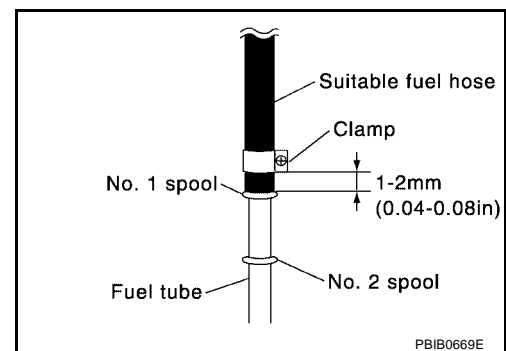
 **With CONSULT-II**

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

OK >> GO TO 6.

NG >> GO TO 5.



## 5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-316, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace EVAP canister purge volume control solenoid valve.

## 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

# DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QG18DE (ULEV)]

UBS001JC

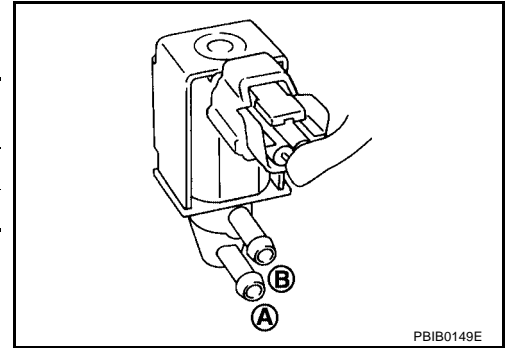
## Component Inspection

### EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

#### ④ With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100.0%	Yes
0.0%	No

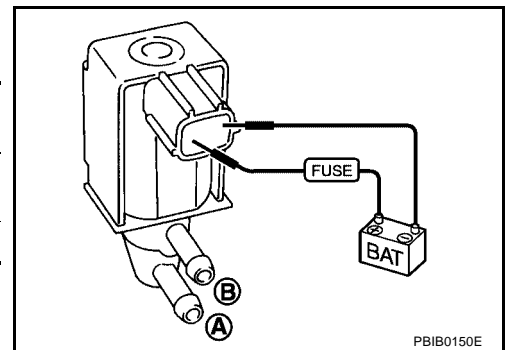


PBIB0149E

#### ⊗ Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No



PBIB0150E

# DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (ULEV)]

## DTC P0447 EVAP CANISTER VENT CONTROL VALVE

PF14935

### Component Description

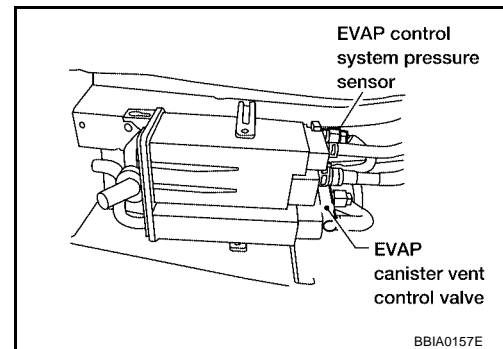
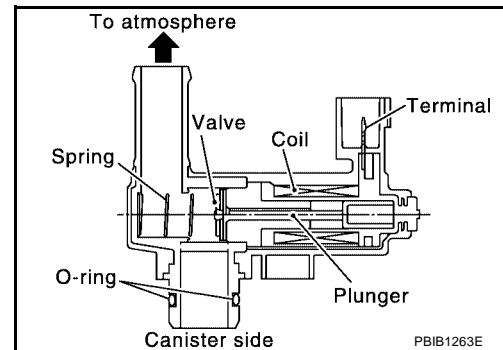
UBS001JD

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System" diagnoses.



### CONSULT-II Reference Value in Data Monitor Mode

UBS001JE

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

### On Board Diagnosis Logic

UBS006GK

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0447 0447	EVAP canister vent control valve circuit open	An improper voltage signal is sent to ECM through EVAP canister vent control valve.	<ul style="list-style-type: none"> <li>● Harness or connectors (The valve circuit is open or shorted.)</li> <li>● EVAP canister vent control valve</li> </ul>

### DTC Confirmation Procedure

UBS001JH

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

#### Ⓟ WITH CONSULT-II

1. Turn ignition switch "ON".

# DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (ULEV)]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait at least 8 seconds.
4. If 1st trip DTC is detected, go to [EC-320, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



## WITH GST

Follow the procedure "WITH CONSULT-II" above.

# DTC P0447 EVAP CANISTER VENT CONTROL VALVE

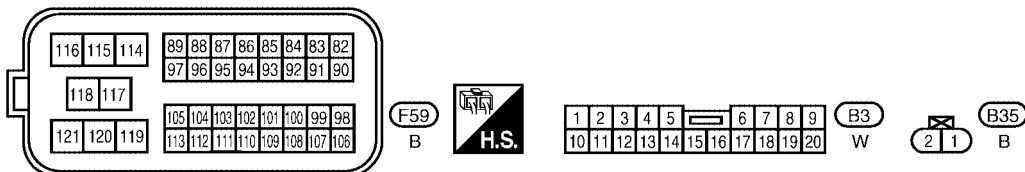
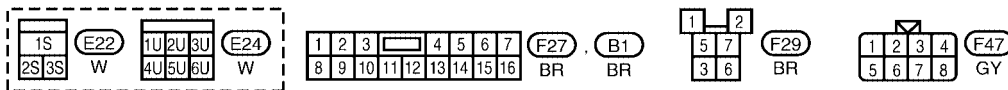
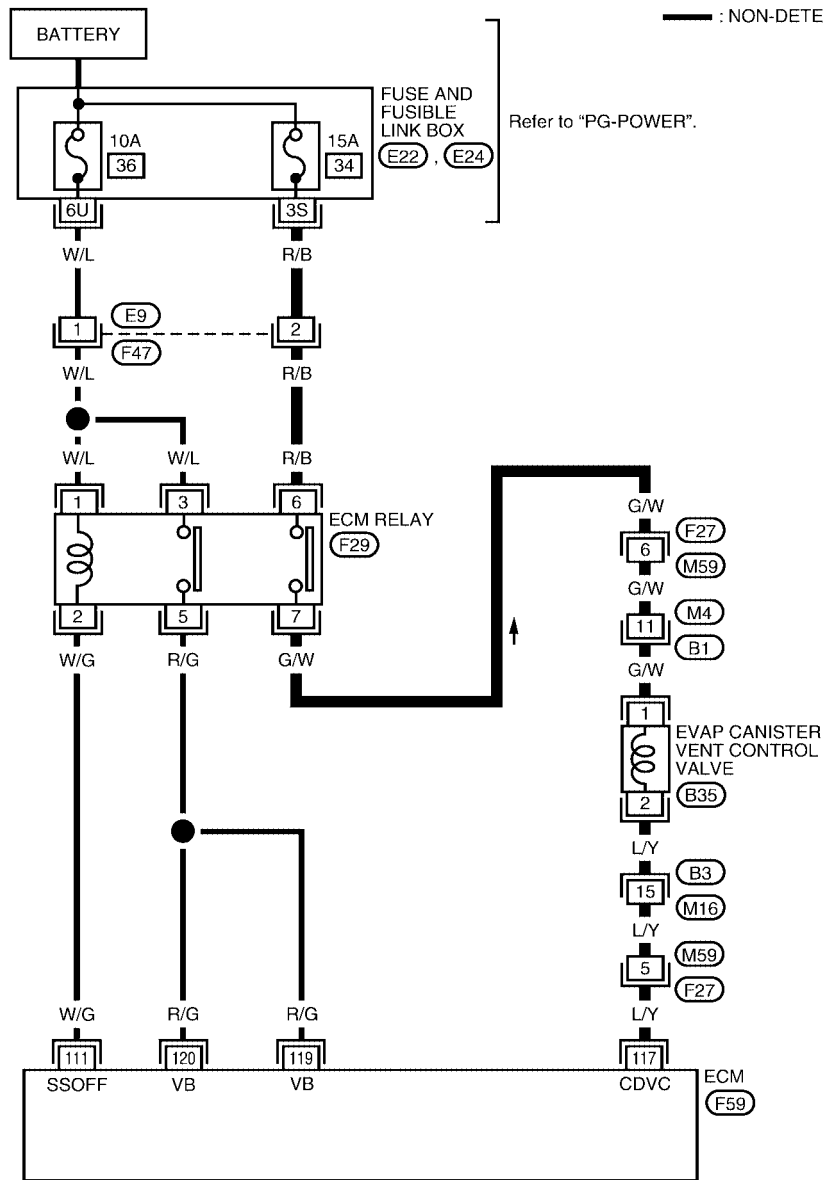
[QG18DE (ULEV)]

## Wiring Diagram

UBS001J1

### EC-VENT/V-01

— : DETECTABLE LINE FOR DTC  
 — : NON-DETECTABLE LINE FOR DTC



BBWA0291E

# DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For 5 seconds after turning ignition switch "OFF"	0 - 1.0V
			[Ignition switch "OFF"] ● 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
117	L/Y	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
119 120	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS001JJ

### 1. INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes >> GO TO 2.

No >> GO TO 3.

### 2. CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

Ⓢ **With CONSULT-II**

- Turn ignition switch "OFF" and then turn "ON".
- Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-II.
- Touch "ON/OFF" on CONSULT-II screen.
- Check for operating sound of the valve.  
**Clicking noise should be heard.**

OK or NG

OK >> GO TO 7.

NG >> GO TO 3.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 (B1)	XXX V

PBIB0834E

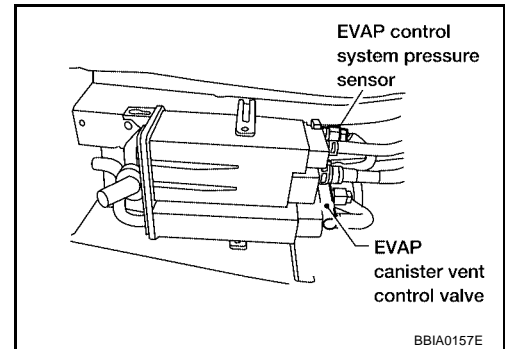


# DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (ULEV)]

## 3. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect EVAP canister vent control valve harness connector.
3. Turn ignition switch "ON".

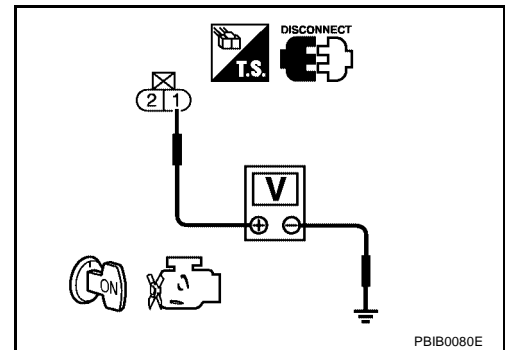


4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



## 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M59, F27
- Harness connectors M14, B1
- Fuse block (J/B) connector E22
- 15A fuse
- Harness for open or short between EVAP canister vent control valve and fuse

>> Repair harness or connectors.

## 5. CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 117 and EVAP canister vent control valve terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

# DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (ULEV)]

## 6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B3, M16
- Harness connectors M59, F27
- Harness for open or short between EVAP canister vent control valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

OK >> GO TO 8.

NG >> Clean the rubber tube using an air blower.

## 8. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-322, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace EVAP canister vent control valve.

## 9. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

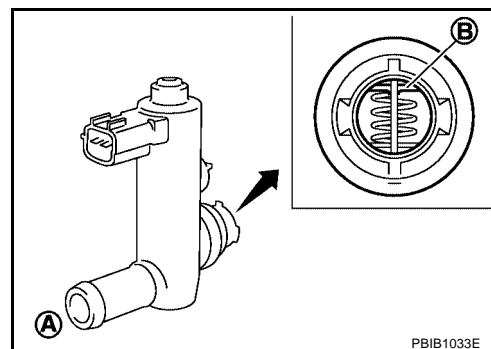
>> INSPECTION END

### Component Inspection EVAP CANISTER VENT CONTROL VALVE

UBS001JK

#### Ⓟ With CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.
3. Reconnect harness connectors disconnected.
4. Turn ignition switch "ON".
5. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.



PBIB1033E

# DTC P0447 EVAP CANISTER VENT CONTROL VALVE [QG18DE (ULEV)]

6. Check air passage continuity and operation delay time.

Condition	Air passage continuity between <b>A</b> and <b>B</b>
ON	No
OFF	Yes

7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.

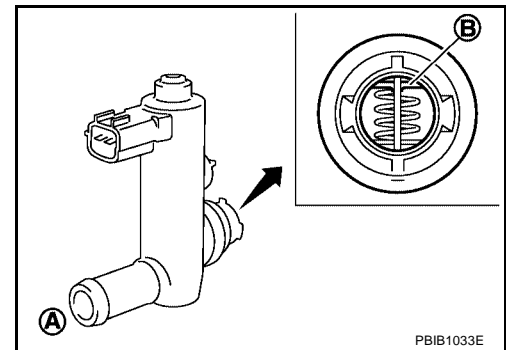
8. Perform Test No. 5 again.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
H02S1 (B1)	XXX V

PBIB0834E

**⊗ Without CONSULT-II**

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.

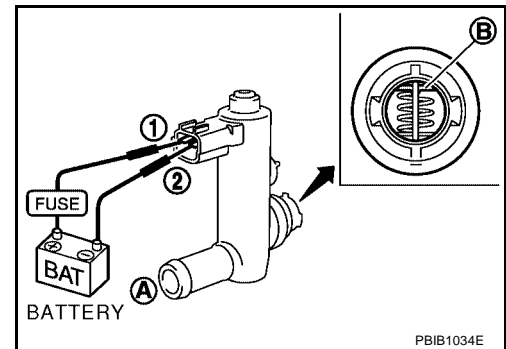


3. Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between <b>A</b> and <b>B</b>
12V direct current supply between terminals 1 and 2	No
OFF	Yes

4. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.

5. Perform Test No. 3 again.



# DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (ULEV)]

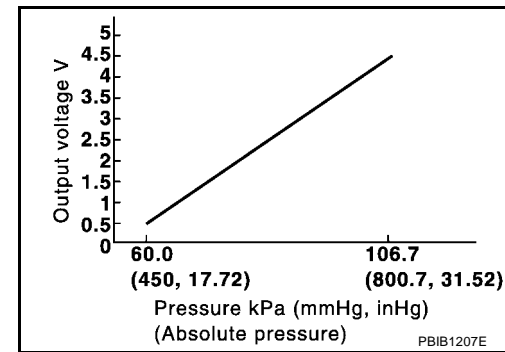
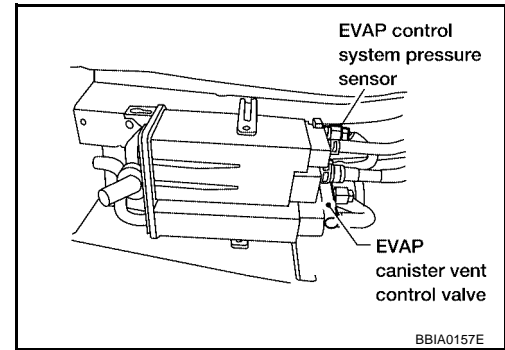
## DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

PFV:25085

### Component Description

UBS003RJ

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.



### CONSULT-II Reference Value in Data Monitor Mode

UBS003RK

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 1.8 - 4.8V

### On Board Diagnosis Logic

UBS003RL

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0452 0452	EVAP control system pressure sensor low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● EVAP control system pressure sensor</li> </ul>

**NOTE:**

If DTC P0452 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-455](#).

### DTC Confirmation Procedure

UBS003RM

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Always perform test at a temperature of 5°C (41°F) or more.

# DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (ULEV)]

## WITH CONSULT-II

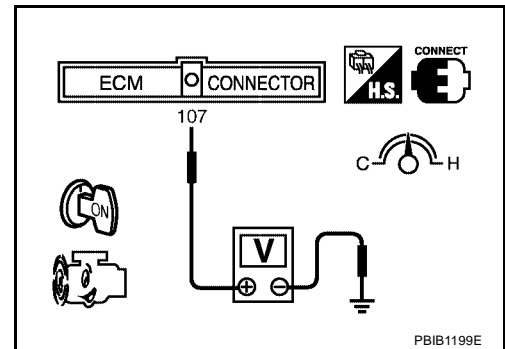
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.  
If 1st trip DTC is detected, go to [EC-327, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y

## WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 107 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and wait at least 20 seconds.
5. Select "MODE 7" with GST.  
If 1st trip DTC is detected, go to [EC-327, "Diagnostic Procedure"](#)

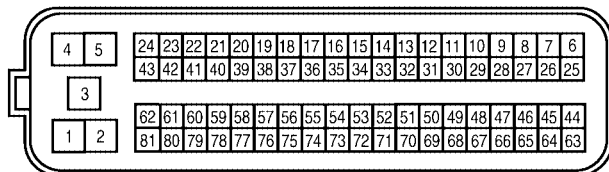
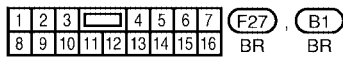
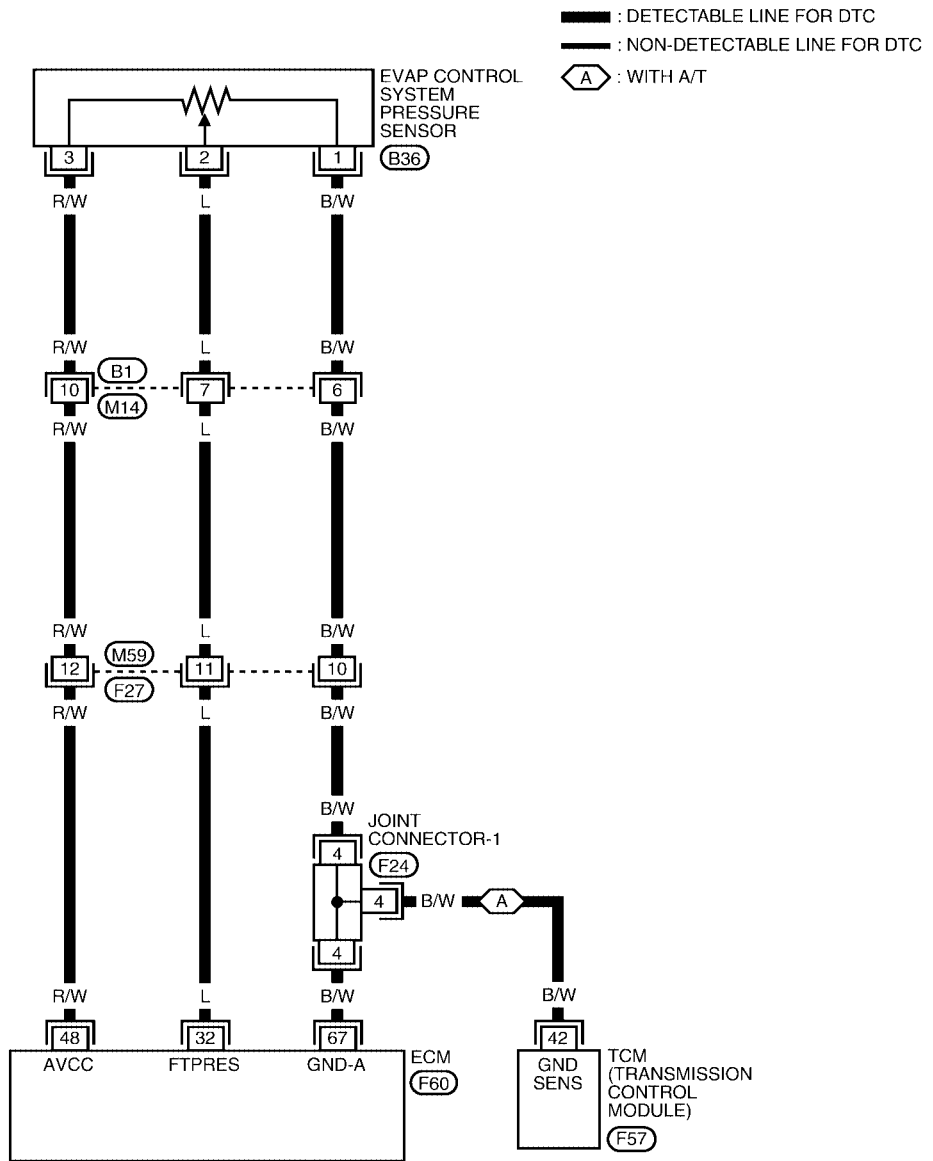


# DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (ULEV)]

UBS003RN

## Wiring Diagram

EC-PRE/SE-01



Refer to the following.

- F24 - JOINT CONNECTOR
- F57 - ELECTRICAL UNITS

BBWA0786E

# DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	L	EVAP control system pressure sensor	[Ignition switch "ON"]	Approximately 4.4V
48	R/W	Sensors' power supply	[Ignition switch "ON"]	Approximately 5V
67	B/W	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V

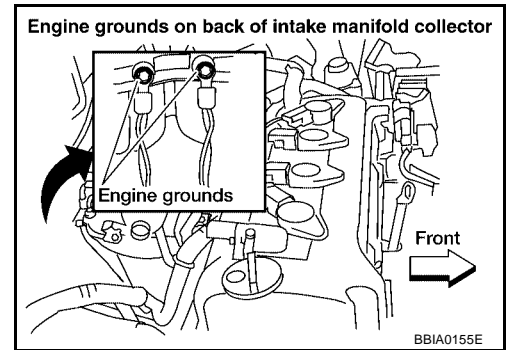
## Diagnostic Procedure

UBS003RO

### 1. RETIGHTEN GROUND SCREWS

Loosen and retighten engine ground screws.

>> GO TO 2.



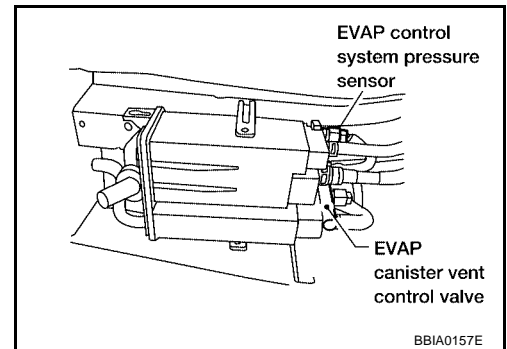
### 2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check sensor harness connector for water.

**Water should not exist.**

OK or NG

- OK >> GO TO 3.  
 NG >> Repair or replace harness connector.



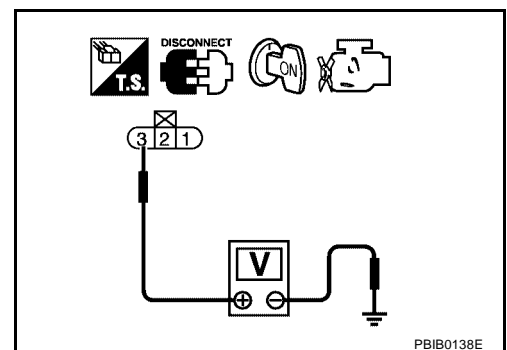
### 3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "ON".
2. Check voltage between EVAP control system pressure sensor terminal 3 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 5.  
 NG >> GO TO 4.



# DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (ULEV)]

---

## 4. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair harness or connectors.

## 5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Check harness continuity between EVAP control system pressure sensor terminal 1 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

## 6. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Joint connector-1
- Harness for open or short between EVAP control system pressure sensor and ECM
- Harness for open or short between EVAP control system pressure sensor and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 32 and EVAP control system pressure sensor terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 8.

## 8. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.



# DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (ULEV)]

## 9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-329, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace EVAP control system pressure sensor.

## 10. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection EVAP CONTROL SYSTEM PRESSURE SENSOR

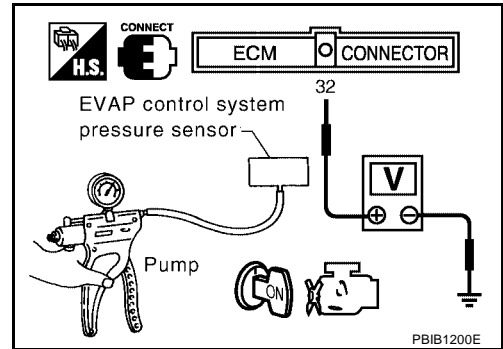
UBS003RP

1. Remove EVAP control system pressure sensor with its harness connector connected.
2. Remove EVAP control system pressure sensor from EVAP canister.  
**Do not reuse the O-ring, replace it with a new one.**
3. Install a vacuum pump to EVAP control system pressure sensor.
4. Turn ignition switch "ON" and check output voltage between ECM terminal 32 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 to 2.5V lower than above value

**CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
  - Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).
5. If NG, replace EVAP control system pressure sensor.



# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (ULEV)]

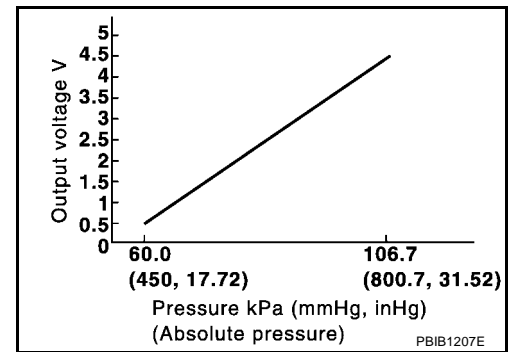
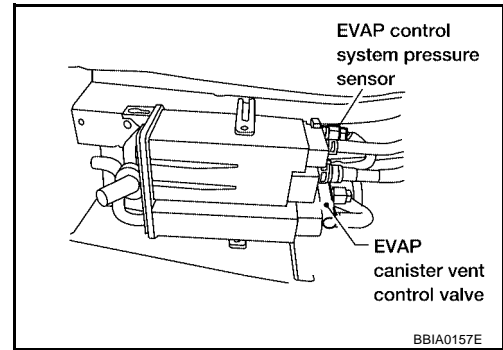
## DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

PF P:25085

### Component Description

UBS003RQ

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.



### CONSULT-II Reference Value in Data Monitor Mode

UBS003RR

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 1.8 - 4.8V

### On Board Diagnosis Logic

UBS003RS

#### NOTE:

If DTC P0453 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-455](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0453 0453	EVAP control system pressure sensor high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● EVAP control system pressure sensor</li> <li>● EVAP canister vent control valve</li> <li>● EVAP canister</li> </ul>

### DTC Confirmation Procedure

UBS003RT

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (ULEV)]

## WITH CONSULT-II

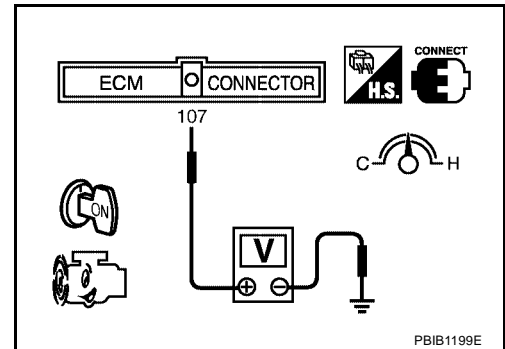
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
7. If 1st trip DTC is detected, go to [EC-333, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y

## WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 107 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and wait at least 20 seconds.
5. Select "MODE 7" with GST.  
If 1st trip DTC is detected, go to [EC-333, "Diagnostic Procedure"](#)

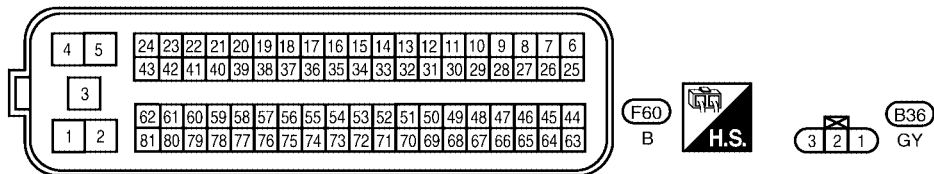
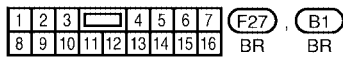
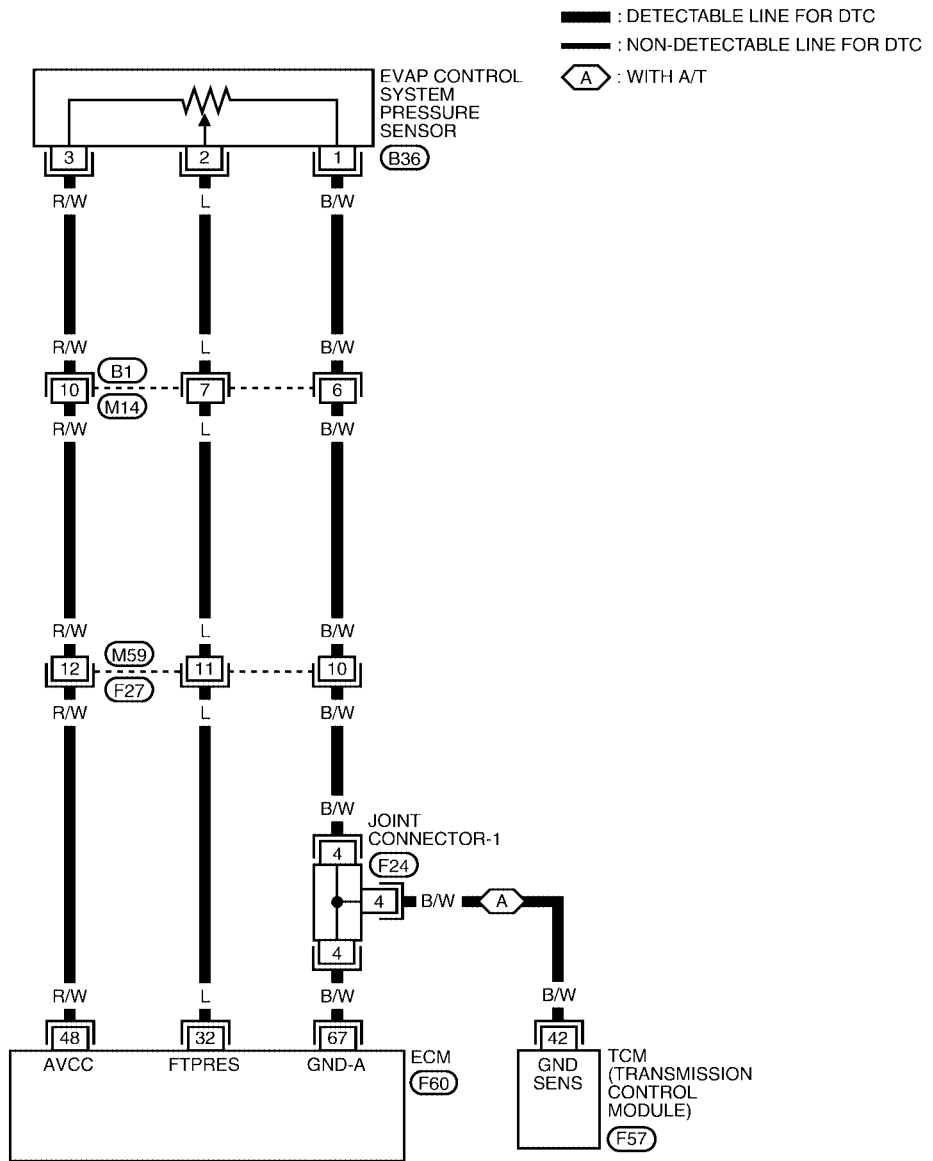


# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (ULEV)]

UBS003RU

## Wiring Diagram

EC-PRE/SE-01



Refer to the following.

- (F24) - JOINT CONNECTOR
- (F57) - ELECTRICAL UNITS

BBWA0786E

# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	L	EVAP control system pressure sensor	[Ignition switch "ON"]	Approximately 1.8 - 4.8V
48	R/W	Sensors' power supply	[Ignition switch "ON"]	Approximately 5V
67	B/W	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V

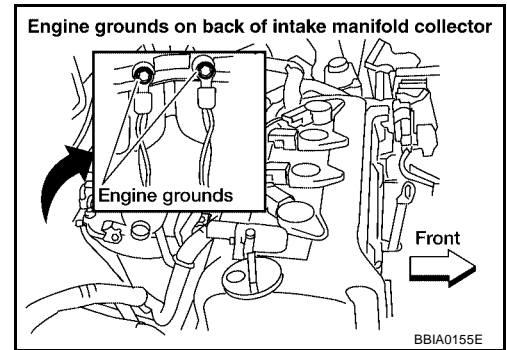
## Diagnostic Procedure

UBS003RV

### 1. RETIGHTEN GROUND SCREWS

Loosen and retighten engine ground screws.

>> GO TO 2.



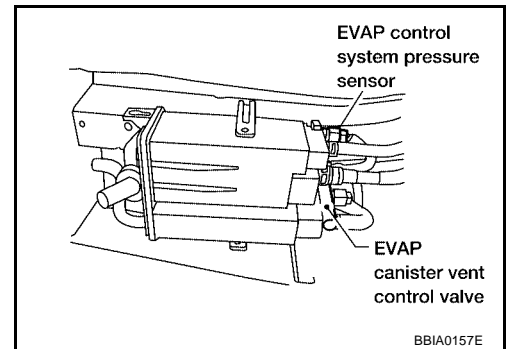
### 2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check sensor harness connector for water.

**Water should not exist.**

OK or NG

- OK >> GO TO 3.  
NG >> Repair or replace harness connector.



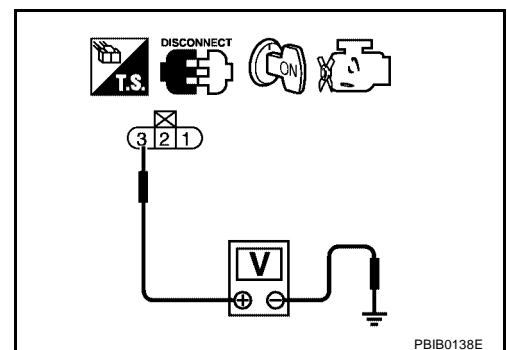
### 3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "ON".
2. Check voltage between EVAP control system pressure sensor terminal 3 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 5.  
NG >> GO TO 4.



#### **4. DETECT MALFUNCTIONING PART**

---

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair harness or connectors.

#### **5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT**

---

1. Turn ignition switch "OFF".
2. Check harness continuity between EVAP control system pressure sensor terminal 1 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

#### **6. DETECT MALFUNCTIONING PART**

---

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Joint connector-1
- Harness for open or short between EVAP control system pressure sensor and ECM
- Harness for open or short between EVAP control system pressure sensor and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

#### **7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 32 and EVAP control system pressure sensor terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 8.

#### **8. DETECT MALFUNCTIONING PART**

---

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

## [QG18DE (ULEV)]

### 9. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

OK >> GO TO 10.

NG >> Clean the rubber tube using an air blower.

### 10. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-322, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> Replace EVAP canister vent control valve.

### 11. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-337, "Component Inspection"](#) .

OK or NG

OK >> GO TO 12.

NG >> Replace EVAP control system pressure sensor.

### 12. CHECK RUBBER TUBE

Check obstructed rubber tube connected to EVAP canister vent control valve.

OK or NG

OK >> GO TO 13.

NG >> Clean rubber tube using an air blower, repair or replace rubber tube.

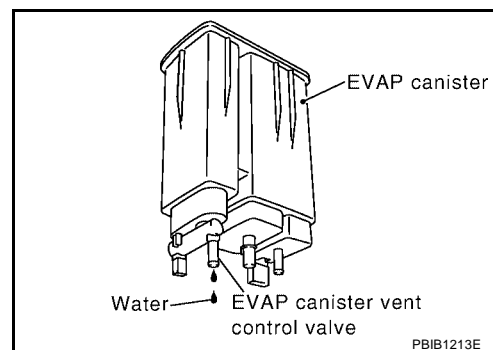
### 13. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will drain from the EVAP canister.

OK or NG

OK >> GO TO 14.

NG >> GO TO 16.



### 14. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.

**The weight should be less than 1.9 kg (4.2 lb).**

OK or NG

OK >> GO TO 16.

NG >> GO TO 15.

**15. DETECT MALFUNCTIONING PART**

---

Check the following.

- EVAP canister for damage

>> Repair hose or replace EVAP canister.

**16. CHECK INTERMITTENT INCIDENT**

---

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**



# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (ULEV)]

UBS003RW

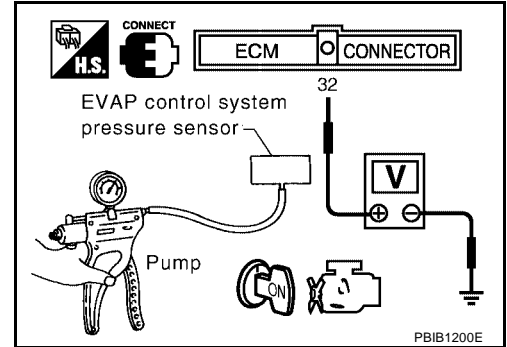
## Component Inspection EVAP CONTROL PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.
2. Remove EVAP control system pressure sensor from EVAP canister.  
**Do not reuse the O-ring, replace it with a new one.**
3. Install a vacuum pump to EVAP control system pressure sensor.
4. Turn ignition switch "ON" and check output voltage between ECM terminal 32 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 to 2.5V lower than above value

**CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
  - Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).
5. If NG, replace EVAP control system pressure sensor.



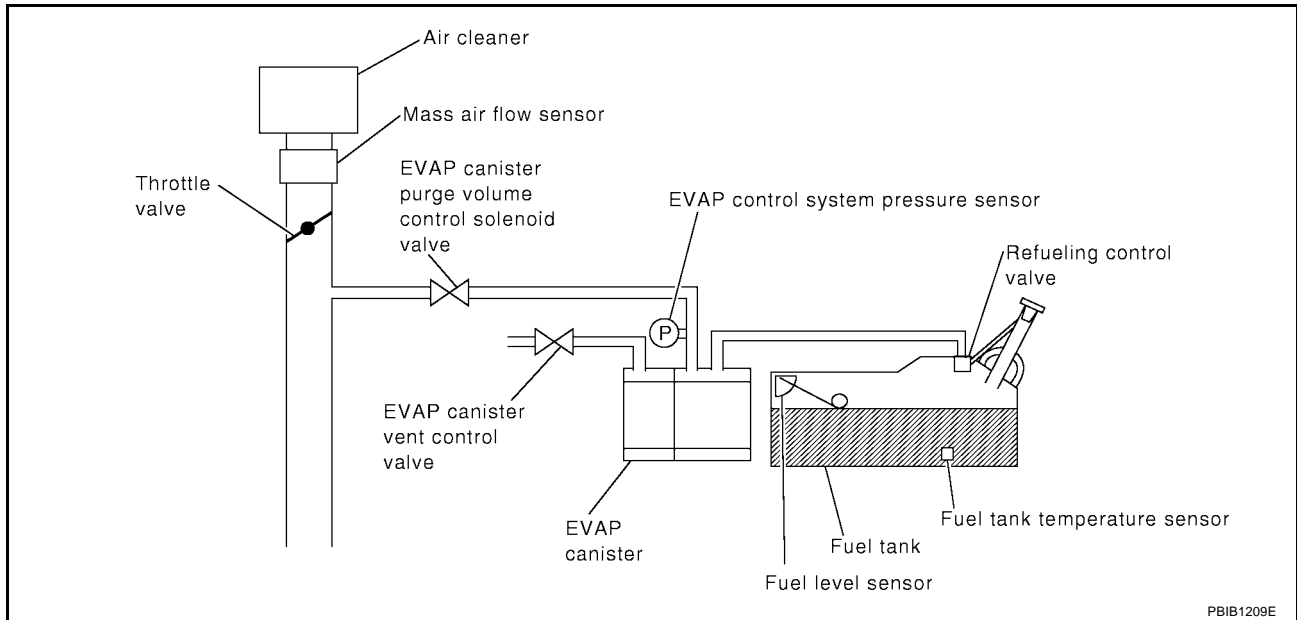
DTC P0455 EVAP CONTROL SYSTEM

PF1:14950

On Board Diagnosis Logic

UBS001JT

This diagnosis detects a very large leak (fuel filler cap fell off, etc.) in the EVAP system between the fuel tank and the EVAP canister purge volume control solenoid valve.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0455 0455	EVAP control system gross leak detected	EVAP control system has a very large leak such as fuel filler cap fell off, EVAP control system does not operate properly.	<ul style="list-style-type: none"> <li>● Fuel filler cap remains open or fails to close.</li> <li>● Incorrect fuel tank vacuum relief valve</li> <li>● Incorrect fuel filler cap used</li> <li>● Foreign matter caught in fuel filler cap.</li> <li>● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>● Foreign matter caught in EVAP canister vent control valve.</li> <li>● EVAP canister or fuel tank leaks</li> <li>● EVAP purge line (pipe and rubber tube) leaks</li> <li>● EVAP purge line rubber tube bent.</li> <li>● Loose or disconnected rubber tube</li> <li>● EVAP canister vent control valve and the circuit</li> <li>● EVAP canister purge volume control solenoid valve and the circuit</li> <li>● Fuel tank temperature sensor</li> <li>● O-ring of EVAP canister vent control valve is missing or damaged.</li> <li>● EVAP control system pressure sensor</li> <li>● Refueling EVAP vapor cut valve</li> <li>● ORVR system leaks</li> </ul>

**CAUTION:**

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

## DTC Confirmation Procedure

**CAUTION:**

Never remove fuel filler cap during the DTC Confirmation Procedure.

**NOTE:**

- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

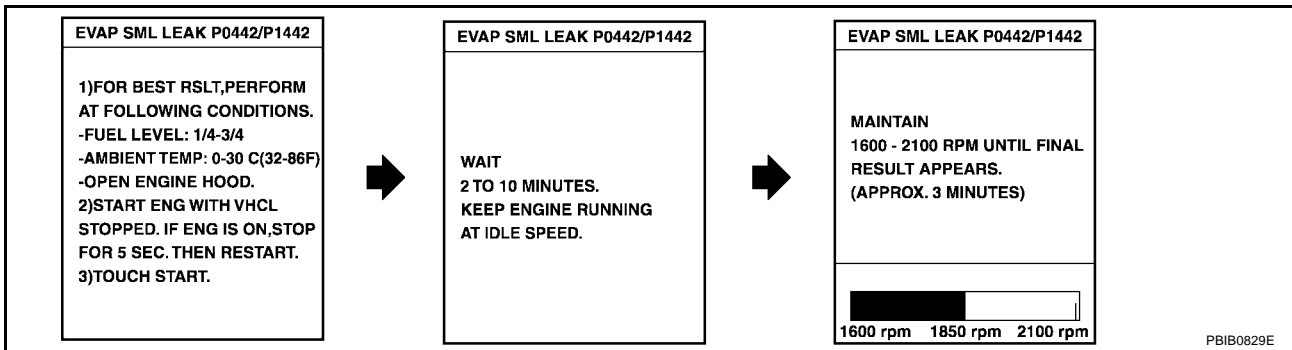
- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Open engine hood before conducting the following procedure.

**WITH CONSULT-II**

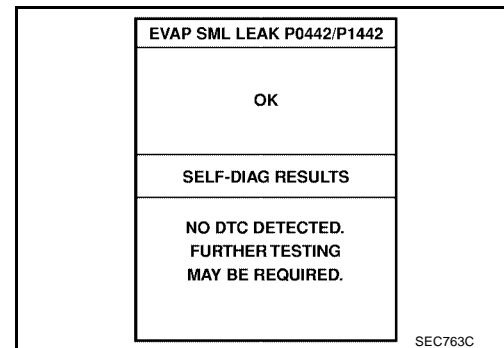
1. Tighten fuel filler cap securely until ratcheting sound is heard.
2. Turn ignition switch "ON".
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that the following conditions are met.  
**COOLAN TEMP/S: 0 - 70°C (32 - 158°F)**  
**INT/A TEMP SE: 0 - 60°C (32 - 140°F)**
6. Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.  
 Follow the instruction displayed.

**NOTE:**

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to [EC-88, "Basic Inspection"](#).



7. Make sure that "OK" is displayed.  
 If "NG" is displayed, select "SELF-DIAG RESULTS" mode with CONSULT-II and make sure that "EVAP GROSS LEAK [P0455]" is displayed. If it is displayed, refer to [EC-340, "Diagnostic Procedure"](#).  
 If P0442 is displayed, perform "Diagnostic Procedure" for DTC P0442, [EC-304](#).



**WITH GST**

**NOTE:**

Be sure to read the explanation of "Driving Pattern" on [EC-68](#) before driving vehicle.

1. Start engine.

2. Drive vehicle according to [EC-68, "Driving Pattern"](#) .
3. Stop vehicle.
4. Select "MODE 1" with GST.
  - If SRT of EVAP system is not set yet, go to the following step.
  - If SRT of EVAP system is set, the result will be OK.
5. Turn ignition switch "OFF" and wait at least 10 seconds.
6. Start engine.  
**It is not necessary to cool engine down before driving.**
7. Drive vehicle again according to the [EC-68, "Driving Pattern"](#) .
8. Stop vehicle.
9. Select "MODE 3" with GST.
  - If P0455 is displayed on the screen, go to [EC-340, "Diagnostic Procedure"](#) .
  - If P0442 is displayed on the screen, go to "Diagnostic Procedure", for DTC P0442, [EC-304](#) .
  - If P0441 is displayed on the screen, go to "Diagnostic Procedure" for DTC P0441, [EC-297](#) .
  - If P0441, P0442 and P0455 are not displayed on the screen, go to the following step.
10. Select "MODE 1" with GST.
  - If SRT of EVAP system is set, the result will be OK.
  - If SRT of EVAP system is not set, go to step 6.

## Diagnostic Procedure

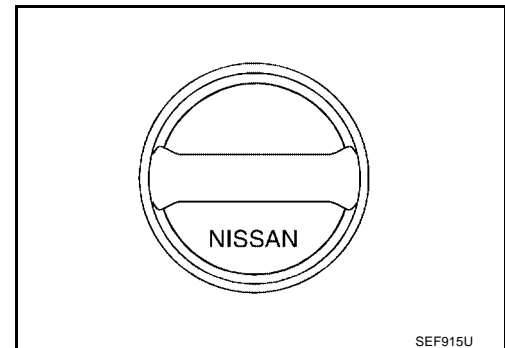
UBS001JW

### 1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch "OFF".
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK >> GO TO 2.  
 NG >> Replace with genuine NISSAN fuel filler cap.



### 2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

- OK >> GO TO 3.  
 NG >> ● Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.  
 ● Retighten until ratcheting sound is heard.

### 3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

- OK >> GO TO 5.  
 NG >> GO TO 4.

#### 4. CHECK FUEL TANK VACUUM RELIEF VALVE

1. Wipe clean valve housing.
2. Check valve opening pressure and vacuum.

**Pressure:**

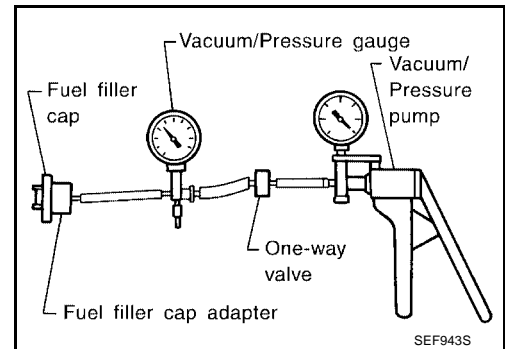
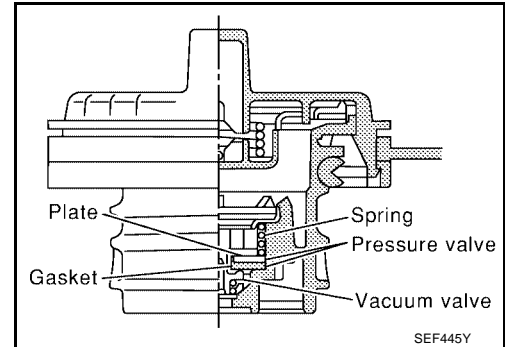
**15.3 - 20.0 kPa**

**(0.156 - 0.204 kg/cm<sup>2</sup> , 2.22 - 2.90 psi)**

**Vacuum:**

**-6.0 to -3.4 kPa**

**(-0.061 to -0.035 kg/cm<sup>2</sup> , -0.87 to -0.48 psi)**



**CAUTION:**

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.

OK or NG

- OK >> GO TO 5.
- NG >> Replace fuel filler cap with a genuine one.

#### 5. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks, improper connection or disconnection.

Refer to [EC-583, "EVAPORATIVE EMISSION SYSTEM"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Repair or reconnect the hose.

#### 6. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 7.

#### 7. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

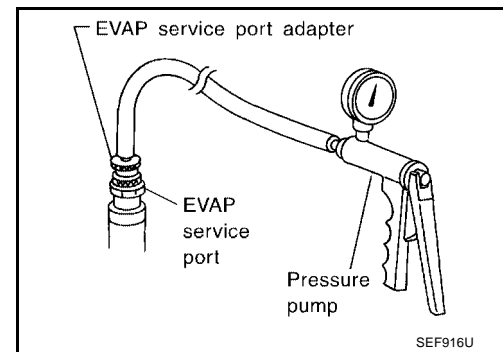
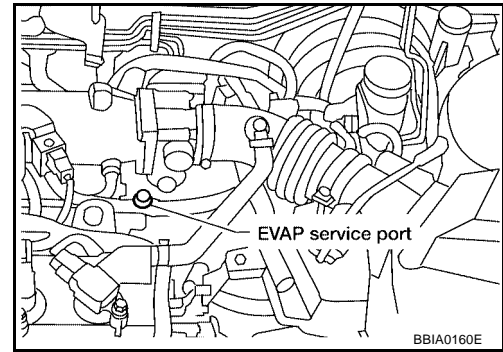
- EVAP canister vent control is installed properly.  
Refer to [EC-587, "Removal and Installation"](#) .
- EVAP canister vent control valve.  
Refer to [EC-322, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Repair or replace EVAP canister vent control valve and O-ring.

## 8. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.



**NOTE:**

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

Models with CONSULT-II>>>GO TO 9.

Models without CONSULT-II>>>GO TO 10.

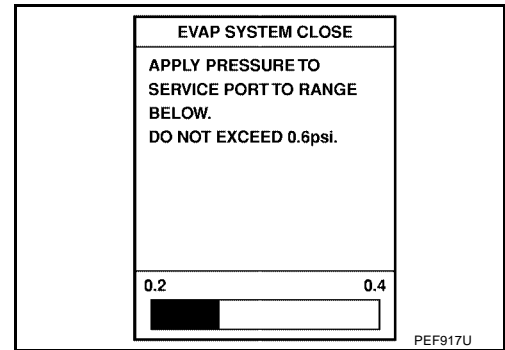
9. CHECK FOR EVAP LEAK

 With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

**NOTE:**

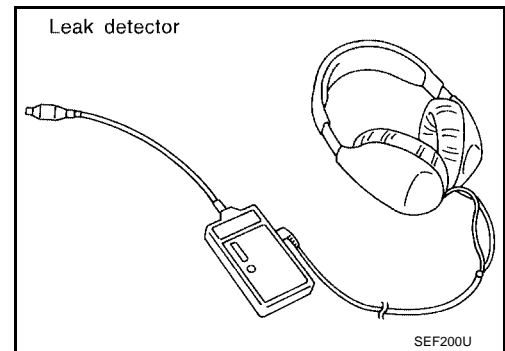
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-584, "EVAPORATIVE EMISSION LINE DRAWING"](#)

OK or NG

- OK >> GO TO 11.
- NG >> Repair or replace.



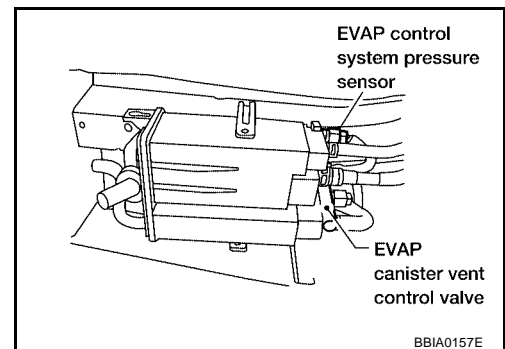
10. CHECK FOR EVAP LEAK

 Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

**NOTE:**

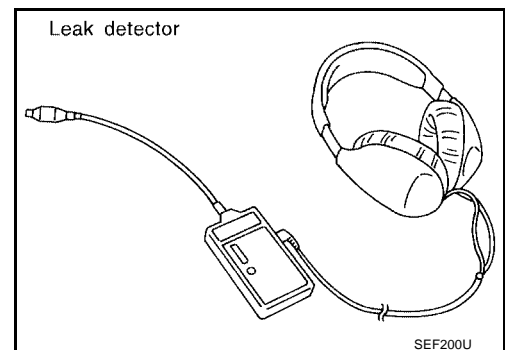
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-584, "EVAPORATIVE EMISSION LINE DRAWING"](#).

OK or NG

- OK >> GO TO 12.
- NG >> Repair or replace.



A  
EC  
C  
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## 11. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

 **With CONSULT-II**

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

**Vacuum should exist.**

OK or NG

- OK >> GO TO 14.  
 NG >> GO TO 15.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

## 12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

 **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

**Vacuum should exist.**

OK or NG

- OK >> GO TO 15.  
 NG >> GO TO 13.

## 13. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-34, "Vacuum Hose Drawing"](#) .

OK or NG

- OK (With CONSULT-II)>>GO TO 14.  
 OK (Without CONSULT-II)>>GO TO 15.  
 NG >> Repair or reconnect the hose.

## 14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

 **With CONSULT-II**

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 16.  
 NG >> GO TO 15.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E



---

**15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

---

Refer to [EC-316, "Component Inspection"](#) .

OK or NG

OK >> GO TO 16.

NG >> Replace EVAP canister purge volume control solenoid valve.

---

**16. CHECK FUEL TANK TEMPERATURE SENSOR**

---

Refer to [EC-255, "Component Inspection"](#) .

OK or NG

OK >> GO TO 17.

NG >> Replace fuel level sensor unit.

---

**17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR**

---

Refer to [EC-337, "Component Inspection"](#) .

OK or NG

OK >> GO TO 18.

NG >> Replace EVAP control system pressure sensor.

---

**18. CHECK EVAP/ORVR LINE.**

---

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-590, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#) .

OK or NG

OK >> GO TO 19.

NG >> Repair or replace hoses and tubes.

---

**19. CHECK SIGNAL LINE AND RECIRCULATION LINE**

---

Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 20.

NG >> Repair or replace hoses, tubes or filler neck tube.

---

**20. CHECK REFUELING EVAP VAPOR CUT VALVE**

---

Refer to [EC-593, "Component Inspection"](#) .

OK or NG

OK >> GO TO 21.

NG >> Replace refueling EVAP vapor cut valve with fuel tank.

---

**21. CHECK INTERMITTENT INCIDENT**

---

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

DTC P0456 EVAP CONTROL SYSTEM

PF14950

On Board Diagnosis Logic

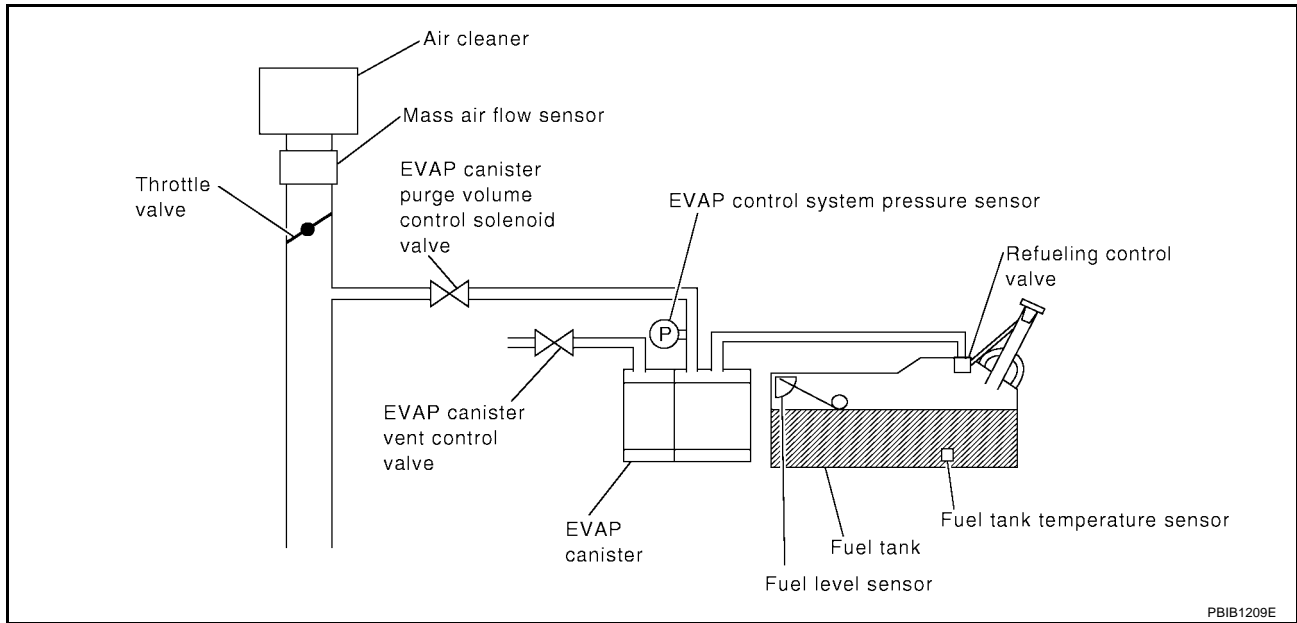
UBS003V6

This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the intake manifold vacuum in the same way as conventional EVAP small leak diagnosis.

If ECM judges a leak which corresponds to a very small leak, the very small leak P0456 will be detected.

If ECM judges a leak equivalent to a small leak, EVAP small leak P0442 will be detected.

If ECM judges there are no leaks, the diagnosis will be OK.



PBIB1209E

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0456 0456	Evaporative emission control system very small leak (negative pressure check)	<ul style="list-style-type: none"> <li>● EVAP system has a very small leak.</li> <li>● EVAP system does not operate properly.</li> </ul>	<ul style="list-style-type: none"> <li>● Incorrect fuel tank vacuum relief valve</li> <li>● Incorrect fuel filler cap used</li> <li>● Fuel filler cap remains open or fails to close.</li> <li>● Foreign matter caught in fuel filler cap.</li> <li>● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>● Foreign matter caught in EVAP canister vent control valve.</li> <li>● EVAP canister or fuel tank leaks</li> <li>● EVAP purge line (pipe and rubber tube) leaks</li> <li>● EVAP purge line rubber tube bent</li> <li>● Loose or disconnected rubber tube</li> <li>● EVAP canister vent control valve and the circuit</li> <li>● EVAP canister purge volume control solenoid valve and the circuit</li> <li>● Fuel tank temperature sensor</li> <li>● O-ring of EVAP canister vent control valve is missing or damaged</li> <li>● EVAP canister is saturated with water</li> <li>● EVAP control system pressure sensor</li> <li>● Refueling EVAP vapor cut valve</li> <li>● ORVR system leaks</li> <li>● Fuel level sensor and the circuit</li> <li>● Foreign matter caught in EVAP canister purge volume control solenoid valve</li> </ul>

**CAUTION:**

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

## DTC Confirmation Procedure

UBS003V7

**NOTE:**

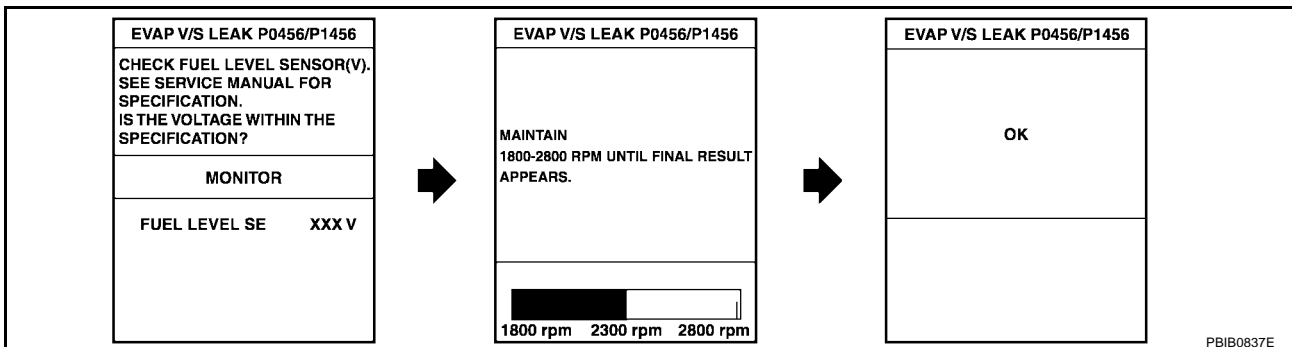
- If DTC P0456 is displayed with P0442, first perform trouble diagnosis for DTC P0456.
- After repair, make sure that the hoses and clips are installed properly.
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- Open engine hood before conducting following procedure.
- If any of following conditions are met just before the DTC confirmation procedure, leave the vehicle for more than 1 hour.
  - Fuel filler cap is removed.
  - Refilled or drained the fuel.
  - EVAP component parts is/are removed.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Make sure the following conditions are met.
  - FUEL LEVEL SE: 0.25 - 1.15V**
  - COOLAN TEMP/S: 0 - 32°C (32 - 90°F)**
  - FUEL T/TMP SE: 0 - 35°C (32 - 95°F)**
  - INT A/TEMP SE: More than 0°C (32°F)**
 If NG, turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle) or refilling/draining fuel until the output voltage condition of the "FUEL LEVEL SE" meets within the range above and leave the vehicle for more than 1 hour. Then start from step 1).
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Turn ignition switch "ON".
5. Select "EVAP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.  
Follow the instruction displayed.



6. Make sure that "OK" is displayed. If "NG" is displayed, refer to [EC-348, "Diagnostic Procedure"](#).

**NOTE:**

- If the engine speed cannot be maintained within the range displayed on CONSULT-II screen, go to [EC-88, "Basic Inspection"](#).
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

## Overall Function Check

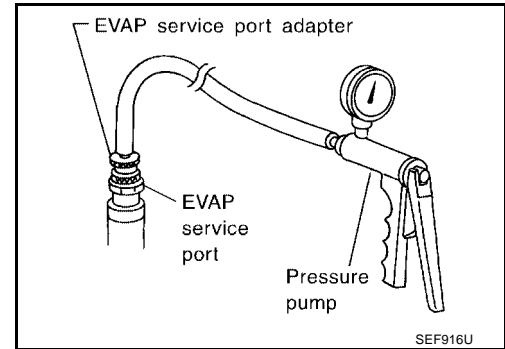
### WITH GST

Use this procedure to check the overall function of the EVAP very small leak function. During this check, a DTC might not be confirmed.

**CAUTION:**

- Never use compressed air, doing so may damage the EVAP system.
- Do not start engine.
- Do not exceeded 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi).

1. Attach the EVAP service port adapter securely to the EVAP service port.
2. Set the pressure pump and a hose.
3. Also set a vacuum gauge via 3-way connector and a hose.
4. Turn ignition switch "ON".
5. Connect GST and select MODE 8.
6. Using MODE 8 control the EVAP canister vent control valve (close) and vacuum cut valve bypass valve (open).
7. Apply pressure and make sure the following conditions are satisfied.



**Pressure to be applied: 2.7 kPa (20 mmHg, 0.79 inHg)**

**Time to be waited after the pressure drawn in to the EVAP system and the pressure to be dropped: 60 seconds and the pressure should not be dropped more than 0.4 kPa (3 mmHg, 0.12 inHg).**

If NG, go to [EC-348, "Diagnostic Procedure"](#) .

If OK, go to next step.

8. Disconnect GST.
9. Start engine and warm it up to normal operating temperature.
10. Turn ignition switch "OFF" and wait at least 10 seconds.
11. Restart engine and let it idle for 90 seconds.
12. Keep engine speed at 2,000 rpm for 30 seconds.
13. Turn ignition switch "OFF".

**NOTE:**

For more information, refer to GST instruction manual.

## Diagnostic Procedure

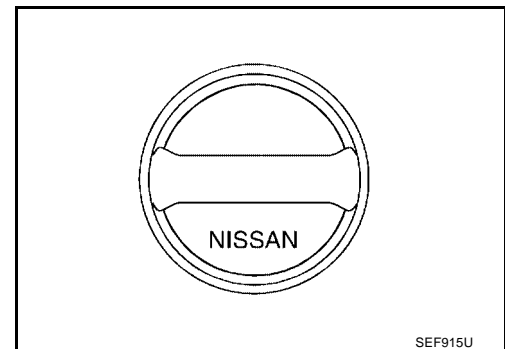
### 1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch "OFF".
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

OK >> GO TO 2.

NG >> Replace with genuine NISSAN fuel filler cap.



### 2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

OK >> GO TO 3.

- NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
2. Retighten until ratcheting sound is heard.

**3. CHECK FUEL FILLER CAP FUNCTION**

Check for air releasing sound while opening the fuel filler cap.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.

**4. CHECK FUEL TANK VACUUM RELIEF VALVE**

Refer to [EC-1849, "Component Inspection"](#) .

OK or NG

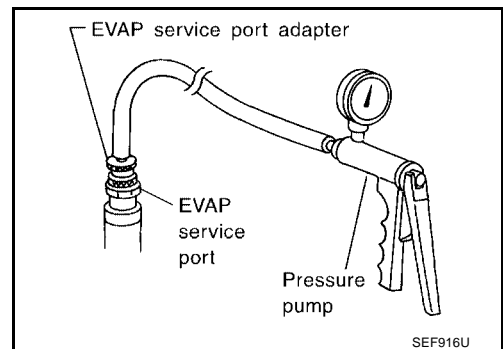
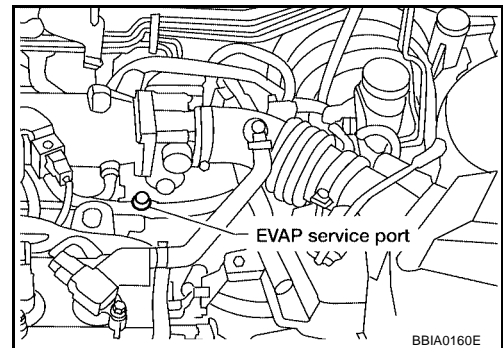
- OK >> GO TO 5.
- NG >> Replace fuel filler cap with a genuine one.

**5. INSTALL THE PRESSURE PUMP**

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.

**NOTE:**

**Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.**



- Models with CONSULT-II >> GO TO 6.
- Models without CONSULT-II >> GO TO 7.

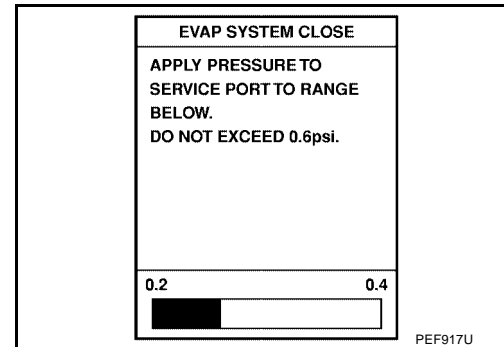
## 6. CHECK FOR EVAP LEAK

### With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

#### NOTE:

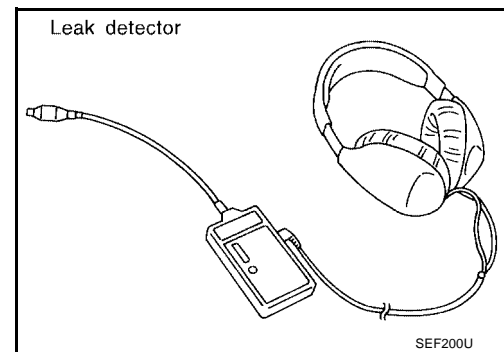
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#).

#### OK or NG

- OK >> GO TO 8.  
NG >> Repair or replace.



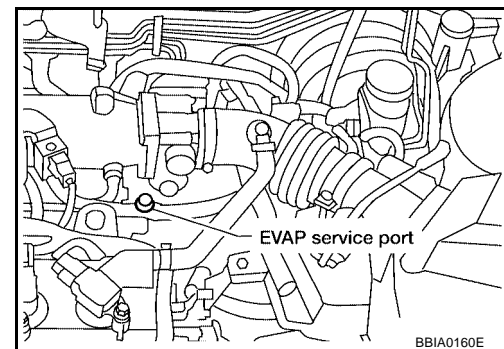
## 7. CHECK FOR EVAP LEAK

### Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

#### NOTE:

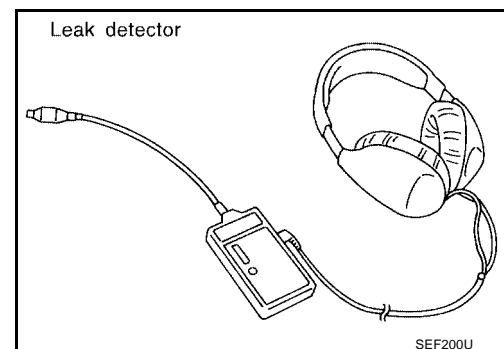
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#).

#### OK or NG

- OK >> GO TO 8.  
NG >> Repair or replace.



**8. CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT**

Refer to [EC-1693, "Component Inspection"](#) .

OK or NG

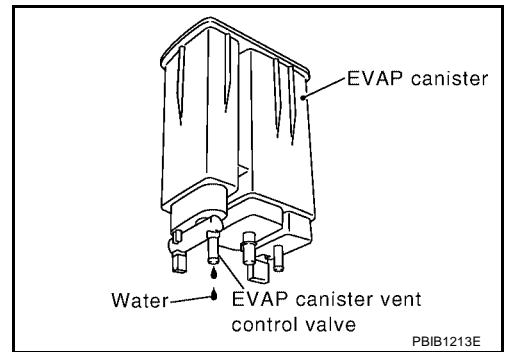
- OK >> GO TO 9.
- NG >> Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

**9. CHECK IF EVAP CANISTER SATURATED WITH WATER**

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 10.
- No (With CONSULT-II)>>GO TO 12.
- No (Without CONSULT-II)>>GO TO 13.



**10. CHECK EVAP CANISTER**

Weigh the EVAP canister with the EVAP canister vent control valve attached.  
**The weight should be less than 1.9 kg (4.2 lb).**

OK or NG

- OK (With CONSULT-II)>>GO TO 12.
- OK (Without CONSULT-II)>>GO TO 13.
- NG >> GO TO 11.

**11. DETECT MALFUNCTIONING PART**

Check the following.

- EVAP canister for damage
- >> Repair hose or replace EVAP canister.

**12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION**

**Ⓟ With CONSULT-II**

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

---

### 13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

---

⊗ **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

**Vacuum should exist.**

OK or NG

- OK >> GO TO 16.  
NG >> GO TO 14.

---

### 14. CHECK VACUUM HOSE

---

Check vacuum hoses for clogging or disconnection. Refer to [EC-1237, "Vacuum Hose Drawing"](#) .

OK or NG

- OK >> GO TO 15.  
NG >> Repair or reconnect the hose.

---

### 15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

---

Refer to [EC-316, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 16.  
NG >> Replace EVAP canister purge volume control solenoid valve.

---

### 16. CHECK FUEL TANK TEMPERATURE SENSOR

---

Refer to [EC-255, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 17.  
NG >> Replace fuel level sensor unit.

---

### 17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

---

Refer to [EC-329, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 18.  
NG >> Replace EVAP control system pressure sensor.

---

### 18. CHECK EVAP PURGE LINE

---

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to [EC-583, "EVAPORATIVE EMISSION SYSTEM"](#) .

OK or NG

- OK >> GO TO 19.  
NG >> Repair or reconnect the hose.

---

### 19. CLEAN EVAP PURGE LINE

---

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 20.



---

**20. CHECK EVAP/ORVR LINE**

---

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-590, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#) .

**OK or NG**

- OK >> GO TO 21.
- NG >> Repair or replace hoses and tubes.

---

**21. CHECK SIGNAL LINE AND RECIRCULATION LINE**

---

Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

**OK or NG**

- OK >> GO TO 22.
- NG >> Repair or replace hoses, tubes or filler neck tube.

---

**22. CHECK REFUELING EVAP VAPOR CUT VALVE**

---

Refer to [EC-593, "Component Inspection"](#) .

**OK or NG**

- OK >> GO TO 23.
- NG >> Replace refueling EVAP vapor cut valve with fuel tank.

---

**23. CHECK FUEL LEVEL SENSOR**

---

Refer to [DI-26, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

**OK or NG**

- OK >> GO TO 24.
- NG >> Replace fuel level sensor unit.

---

**24. CHECK INTERMITTENT INCIDENT**

---

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

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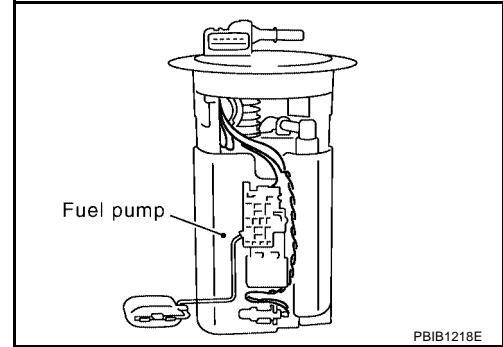
**DTC P0460 FUEL LEVEL SENSOR**

**Component Description**

UBS001K1

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal according to the ECM through CAN communication line.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



PBIB1218E

**On Board Diagnosis Logic**

UBS006GL

**NOTE:**

If DTC P0460 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-145, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

When the vehicle is parked, naturally the fuel level in the fuel tank is stable. It means that output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0460 0460	Fuel level sensor circuit noise	Even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Fuel level sensor</li> </ul>

**DTC Confirmation Procedure**

UBS001K4

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait maximum of 2 consecutive minutes.
4. If 1st trip DTC is detected, go to [EC-355, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF563X

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

**Diagnostic Procedure**

A

**1. CHECK FUEL GAUGE OPERATION**

Refer to [DI-16, "Meter/Gauge Operation and Odo/Trip Meter Segment Check in Diagnosis Mode"](#) .

OK or NG

OK >> GO TO 2.

NG >> Follow the instruction of [DI-16, "Meter/Gauge Operation and Odo/Trip Meter Segment Check in Diagnosis Mode"](#) .

EC

C

**2. CHECK FUEL LEVEL SENSOR AND CIRCUIT**

Refer to [DI-26, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace malfunctioning parts.

D

E

**3. CHECK INTERMITTENT INCIDENT**

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

F

G

>> INSPECTION END

**Removal and Installation  
FUEL LEVEL SENSOR**

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

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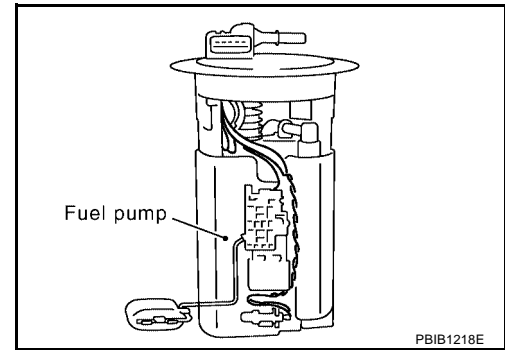
**DTC P0461 FUEL LEVEL SENSOR**

**Component Description**

UBS001K7

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal according to the ECM through CAN communication line.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



PBIB1218E

**On Board Diagnosis Logic**

UBS006GM

**NOTE:**

If DTC P0461 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-145, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

Driving long distances naturally affect fuel gauge level.

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0461 0461	Fuel level sensor circuit range/performance	The output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Fuel level sensor</li> </ul>

**Overall Function Check**

UBS001KA

Use this procedure to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed.

**WARNING:**

When performing following procedure, be sure to observe the handling of the fuel. Refer to [FL-2, "FUEL SYSTEM"](#).

**TESTING CONDITION:**

Before starting overall function check, preparation of draining fuel and refilling fuel is required.

**WITH CONSULT-II**

**NOTE:**

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line, refer to [EC-56, "FUEL PRESSURE RELEASE"](#).
3. Remove the fuel feed hose on the fuel level sensor unit.
4. Connect a spare fuel hose where the fuel feed hose was removed.
5. Turn ignition switch "OFF" and wait at least 10 seconds then turn "ON".
6. Select "FUEL LEVEL SE" in "DATA MONITOR" mode with CONSULT-II.
7. Check "FUEL LEVEL SE" output voltage and note it.
8. Select "FUEL PUMP" in "ACTIVE TEST" mode with CONSULT-II.
9. Touch "ON" and drain fuel approximately 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it.
10. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
11. Check "FUEL LEVEL SE" output voltage and note it.

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

# DTC P0461 FUEL LEVEL SENSOR

[QG18DE (ULEV)]

12. Check "FUEL LEVEL SE" output voltage and confirm whether the voltage changes more than 0.03V during step 7 to 11.  
If NG, go to [EC-358, "Diagnostic Procedure"](#) .

 **WITH GST**

**NOTE:**

Start from step 8, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line, refer to [EC-56, "FUEL PRESSURE RELEASE"](#) .
3. Remove the fuel feed hose on the fuel level sensor unit.
4. Connect a spare fuel hose where the fuel feed hose was removed.
5. Turn ignition switch "ON".
6. Drain fuel by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.
7. Confirm that the fuel gauge indication varies.
8. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
9. Confirm that the fuel gauge indication varies.
10. If NG, go to [EC-358, "Diagnostic Procedure"](#) .

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**Diagnostic Procedure****1. CHECK FUEL GAUGE OPERATION**

---

Refer to [DI-16, "Meter/Gauge Operation and Odo/Trip Meter Segment Check in Diagnosis Mode"](#) .

OK or NG

OK >> GO TO 2.

NG >> Follow the instruction of [DI-16, "Meter/Gauge Operation and Odo/Trip Meter Segment Check in Diagnosis Mode"](#) .

**2. CHECK FUEL LEVEL SENSOR AND CIRCUIT**

---

Refer to [DI-26, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace malfunctioning parts.

**3. CHECK INTERMITTENT INCIDENT**

---

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Removal and Installation  
FUEL LEVEL SENSOR**

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

DTC P0462, P0463 FUEL LEVEL SENSOR

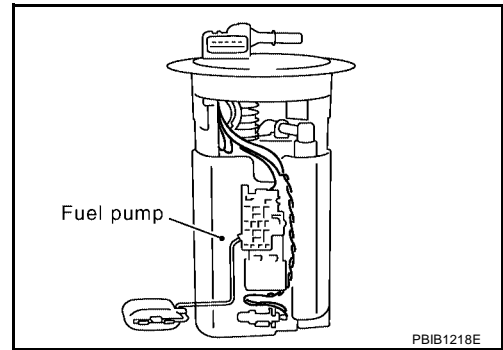
PFP:25060

Component Description

UBS001KB

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal according to the ECM through CAN communication line.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



On Board Diagnosis Logic

UBS006GN

NOTE:

If DTC P0462, P0463 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-145, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

ECM receives two signals from the fuel level sensor circuit.

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the former, to detect open or short circuit malfunction.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0462 0462	Fuel level sensor circuit low input	An excessively low voltage is sent from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Fuel level sensor</li> </ul>
P0463 0463	Fuel level sensor circuit high input	An excessively high voltage is sent from the sensor is sent to ECM.	

DTC Confirmation Procedure

UBS001KE

NOTE:

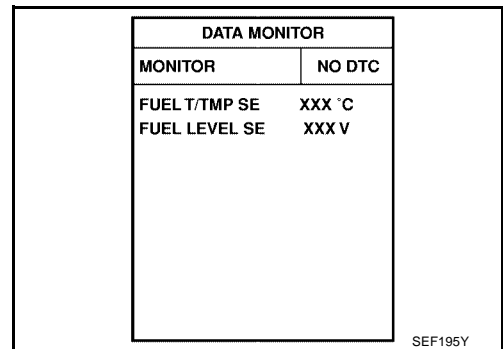
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at ignition switch "ON".

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-360, "Diagnostic Procedure"](#)



WITH GST

Follow the procedure "WITH CONSULT-II" above.

## Diagnostic Procedure

UBS001KG

### 1. CHECK FUEL GAUGE OPERATION

---

Refer to [DI-16, "Meter/Gauge Operation and Odo/Trip Meter Segment Check in Diagnosis Mode"](#) .

OK or NG

OK >> GO TO 2.

NG >> Follow the instruction of [DI-16, "Meter/Gauge Operation and Odo/Trip Meter Segment Check in Diagnosis Mode"](#) .

### 2. CHECK FUEL LEVEL SENSOR AND CIRCUIT

---

Refer to [DI-26, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace malfunctioning parts.

### 3. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

## Removal and Installation FUEL LEVEL SENSOR

UBS006IT

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .



**DTC P0500 VSS**

PF:32702

**Description**

UBS001KH

**NOTE:**

If DTC P0500 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-145, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

The vehicle speed sensor is installed in the transaxle. It contains a pulse generator which provides a vehicle speed signal to the combination meter. The combination meter then sends a signal to the ECM through CAN communication line.

**On Board Diagnosis Logic**

UBS006GO

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0500 0500	Vehicle speed sensor	The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven.	<ul style="list-style-type: none"> <li>● Harness or connectors (The vehicle speed sensor circuit is open or shorted)</li> <li>● Harness or connectors (The CAN communication line is open or shorted.)</li> <li>● Vehicle speed sensor</li> </ul>

**DTC Confirmation Procedure**

UBS001KJ

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

This procedure may be conducted in the shop with the drive wheels lifted or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

**WITH CONSULT-II**

1. Start engine
2. Read "VHCL SPEED SE" in "DATA MONITOR" mode with CONSULT-II. The vehicle speed on CONSULT-II should exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
3. If NG, go to [EC-362, "Diagnostic Procedure"](#). If OK, go to following step.
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Warm engine up to normal operating temperature.
6. Maintain the following conditions for at least 60 consecutive seconds.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
B/FUEL SCHDL	XXX msec
PW/ST SIGNAL	OFF
VHCL SPEED SE	XXX km/h

SEF196Y

ENG SPEED	1,800 rpm (A/T models) 2,200 rpm (M/T models)
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	More than 4.8 msec
Selector lever	Suitable position
PW/ST SIGNAL	OFF

7. If 1st trip DTC is detected, go to [EC-362, "Diagnostic Procedure"](#).

**Overall Function Check**

UBS001KK

Use this procedure to check the overall function of the vehicle speed signal circuit. During this check, a 1st trip DTC might not be confirmed.

**WITH GST**

1. Lift up drive wheels.

- 
2. Start engine.
  3. Read vehicle speed sensor signal in "MODE 1" with GST.  
The vehicle speed sensor on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
  4. If NG, go to [EC-362, "Diagnostic Procedure"](#) .

## **Diagnostic Procedure**

UBS001KM

### **1. CHECK VEHICLE SPEED SENSOR CIRCUIT**

---

Refer to [DI-3, "METERS AND GAUGES"](#) .

#### OK or NG

- OK >> GO TO 2.  
NG >> Repair or replace.

### **2. CHECK COMBINATION METER**

---

Check combination meter function.  
Refer to [DI-8, "Combination Meter"](#) .

>> **INSPECTION END**

**DTC P0506 ISC SYSTEM**

**Description**

UBS006CY

**NOTE:**

**If DTC P0506 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.**

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

**On Board Diagnosis Logic**

UBS006CZ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0506 0506	Idle speed control system RPM lower than expected	The idle speed is less than the target idle speed by 100 rpm or more.	<ul style="list-style-type: none"> <li>● Electric throttle control actuator</li> <li>● Intake air leak</li> </ul>

**DTC Confirmation Procedure**

UBS006D0

**NOTE:**

- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.
- **If the target idle speed is out of the specified value, perform “Idle Air Volume Learning”, [EC-53](#) , before conducting “DTC Confirmation Procedure”. For the target idle speed, refer to the “Service Data and Specifications (SDS)”, [EC-600](#) .**

**TESTING CONDITION:**

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C (14°F).

**WITH CONSULT-II**

1. Open engine hood.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch “OFF” and wait at least 10 seconds.
4. Turn ignition switch “ON” again and select “DATA MONITOR” mode with CONSULT-II.
5. Start engine and run it for at least 1 minute at idle speed.
6. If 1st trip DTC is detected, go to [EC-364, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

**WITH GST**

Follow the procedure “WITH CONSULT-II” above.

---

**Diagnostic Procedure****1. CHECK INTAKE AIR LEAK**

---

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

**OK or NG**

- OK >> GO TO 2.  
NG >> Discover air leak location and repair.

**2. REPLACE ECM**

---

1. Stop engine.
2. Replace ECM.
3. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .
4. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

**DTC P0507 ISC SYSTEM**

PFP:23781

**Description**

UBS006D2

**NOTE:**

**If DTC P0507 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.**

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

**On Board Diagnosis Logic**

UBS006D3

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0507 0507	Idle speed control system RPM higher than expected	The idle speed is more than the target idle speed by 200 rpm or more.	<ul style="list-style-type: none"> <li>● Electric throttle control actuator</li> <li>● Intake air leak</li> <li>● PCV system</li> </ul>

**DTC Confirmation Procedure**

UBS006D4

**NOTE:**

- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.
- **If the target idle speed is out of the specified value, perform "Idle Air Volume Learning", [EC-53](#), before conducting "DTC Confirmation Procedure". For the target idle speed, refer to the "Service Data and Specifications (SDS)", [EC-600](#).**

**TESTING CONDITION:**

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C (14°F).

**WITH CONSULT-II**

1. Open engine hood.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Turn ignition switch "ON" again and select "DATA MONITOR" mode with CONSULT-II.
5. Start engine and run it for at least 1 minute at idle speed.
6. If 1st trip DTC is detected, go to [EC-366, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

---

**Diagnostic Procedure****1. CHECK PCV HOSE CONNECTION**

---

Confirm that PCV hose is connected correctly.

OK or NG

OK >> GO TO 2.

NG >> Repair or replace.

**2. CHECK INTAKE AIR LEAK**

---

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

OK >> GO TO 3.

NG >> Discover air leak location and repair.

**3. REPLACE ECM**

---

1. Stop engine.
2. Replace ECM.
3. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .
4. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

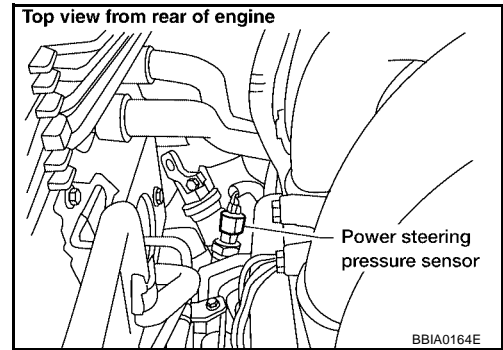
**DTC P0550 PSP SENSOR**

PFP:49763

**Component Description**

UBS003RX

Power steering pressure (PSP) sensor is installed to the power steering high-pressure tube and detects a power steering load. This sensor is a potentiometer which transforms the power steering load into output voltage, and emits the voltage signal to the ECM. The ECM controls the electric throttle control actuator and adjusts the throttle valve opening angle to increase the engine speed and adjusts the idle speed for the increased load.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS003RY

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PW/ST SIGNAL	<ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine</li> </ul>	Steering wheel is in neutral position. (Forward direction)	OFF
		Steering wheel is turned.	ON

**On Board Diagnosis Logic**

UBS003RZ

The MIL will not light up for this diagnosis.

**NOTE:**

If DTC P0550 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-455](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0550 0550	Power steering pressure sensor circuit	An excessively low or high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Power steering pressure sensor</li> </ul>

**DTC Confirmation Procedure**

UBS003S0

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-369, "Diagnostic Procedure"](#).

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.




# DTC P0550 PSP SENSOR

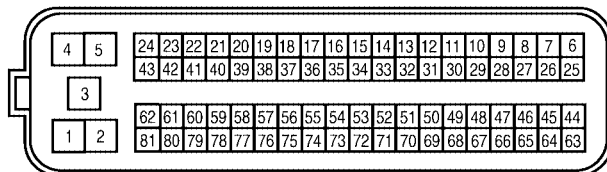
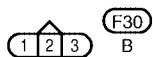
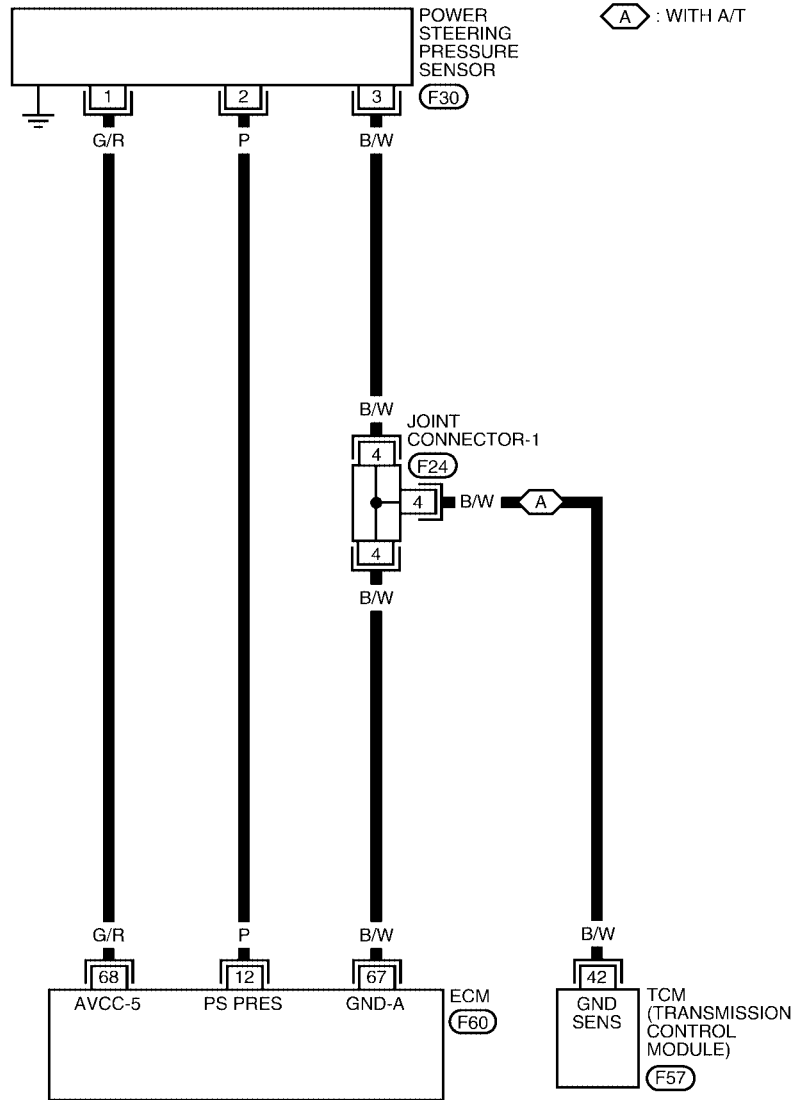
[QG18DE (ULEV)]

UBS003S1


## Wiring Diagram

EC-PS/SEN-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : WITH A/T



Refer to the following.

-  - JOINT CONNECTOR
-  - ELECTRICAL UNITS

BBWA0787E



# DTC P0550 PSP SENSOR

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
12	P	Power steering pressure sensor	[Engine is running] ● Steering wheel is being turned.	0.5 - 4.0V
			[Engine is running] ● Steering wheel is not being turned.	0.4 - 0.8V
67	B/W	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
68	G/R	Sensors' power supply	[Ignition switch "ON"]	Approximately 5V

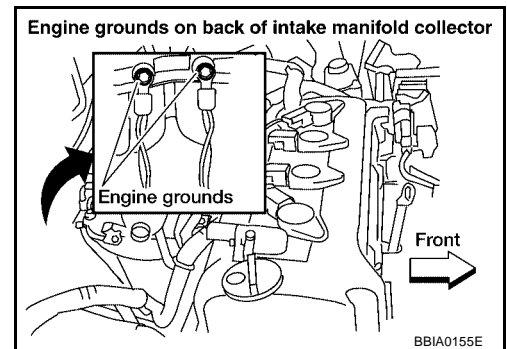
## Diagnostic Procedure

UBS003S2

### 1. RETIGHTEN GROUND SCREWS

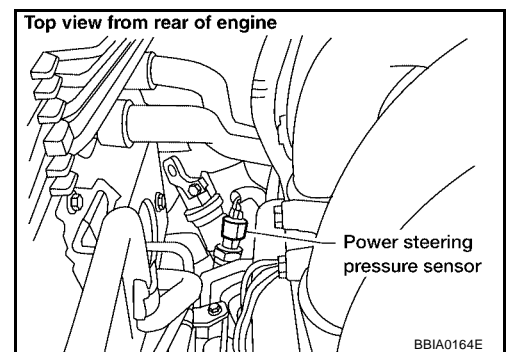
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



### 2. CHECK PSP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect PSP sensor harness connector.
2. Turn ignition switch "ON".



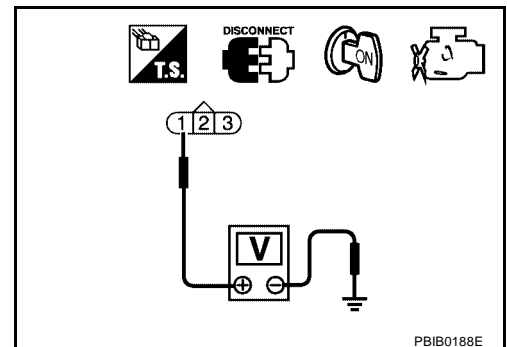
3. Check voltage between PSP sensor terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness connectors.



---

### 3. CHECK PSP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Check harness continuity between PSP sensor terminal 3 and engine ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- |    |             |
|----|-------------|
| OK | >> GO TO 5. |
| NG | >> GO TO 4. |

---

### 4. DETECT MALFUNCTIONING PART

---

Check the following.

- Joint connector-1
- Harness for open or short between power steering pressure sensor and ECM
- Harness for open or short between power steering pressure sensor and TCM

>> Repair open circuit or short to power in harness or connectors.

---

### 5. CHECK PSP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 12 and PSP sensor terminal 2.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- |    |   |
|----|---|
| OK | >> GO TO 6.   |
| NG | >> Repair open circuit or short to ground or short to power in harness or connectors. |

---

### 6. CHECK PSP SENSOR

---

Refer to [EC-371, "Component Inspection"](#) .

OK or NG

- |    |                        |
|----|------------------------|
| OK | >> GO TO 7.            |
| NG | >> Replace PSP sensor. |

---

### 7. CHECK INTERMITTENT INCIDENT

---

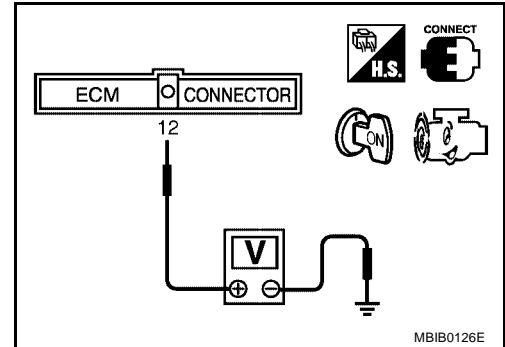
Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

### Component Inspection POWER STEERING PRESSURE SENSOR

1. Reconnect all harness connectors disconnected.
2. Start engine and let it idle.
3. Check voltage between ECM terminal 12 and ground under the following conditions.

Condition	Voltage
Steering wheel is being turned fully.	0.5 - 4.0V
Steering wheel is not being turned.	0.4 - 0.8V



A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

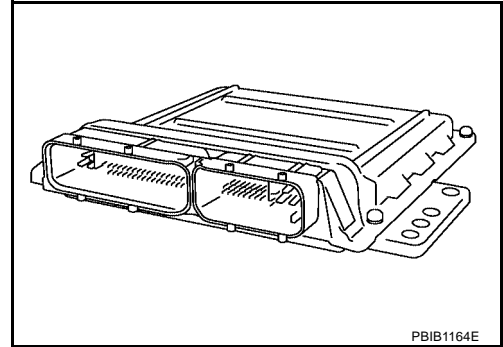
**DTC P0605 ECM**

PF2:23710

**Component Description**

UBS001L9

The ECM consists of a microcomputer and connector for signal input and output and for power supply. The ECM controls the engine.



**On Board Diagnosis Logic**

UBS006GP

This self-diagnosis has one or two trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0605 0605	Engine control module	A)	ECM calculation function is malfunctioning.	● ECM
		B)	ECM EEP-ROM system is malfunctioning.	
		C)	ECM self shut-off function is malfunctioning.	

**FAIL-SAFE MODE**

ECM enters fail-safe mode when malfunction A is detected.

Detected items	Engine operation condition in fail-safe mode
Malfunction A	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

**DTC Confirmation Procedure**

UBS006GQ

Perform "PROCEDURE FOR MALFUNCTION A" first. If the DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B". If there is no problem on "PROCEDURE FOR MALFUNCTION B", perform "PROCEDURE FOR MALFUNCTION C".

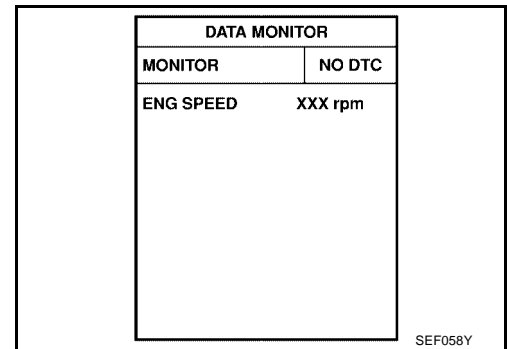
**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**PROCEDURE FOR MALFUNCTION A**

**With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If DTC is detected, go to [EC-373, "Diagnostic Procedure"](#) .



**With GST**

Follow the procedure "With CONSULT-II" above.

**PROCEDURE FOR MALFUNCTION B**

**With CONSULT-II**

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
4. If 1st trip DTC is detected, go to [EC-373, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**With GST**

Follow the procedure "With CONSULT-II" above.

**PROCEDURE FOR MALFUNCTION C**

**With CONSULT-II**

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
4. Repeat step 3 for, 32 times.
5. If 1st trip DTC is detected, go to [EC-373, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**With GST**

Follow the procedure "With CONSULT-II" above.

**Diagnostic Procedure**

**1. INSPECTION START**

**With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "SELF DIAG RESULTS" mode with CONSULT-II.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure"**. See [EC-372](#).
5. Is the 1st trip DTC P0605 displayed again?

**With GST**

1. Turn ignition switch "ON".
2. Select MODE 4 with GST.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure"**. See [EC-372](#).
5. Is the 1st trip DTC P0605 displayed again?

Yes or No

Yes >> GO TO 2.

No >> **INSPECTION END**

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

---

## 2. REPLACE ECM

---

1. Replace ECM.
2. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

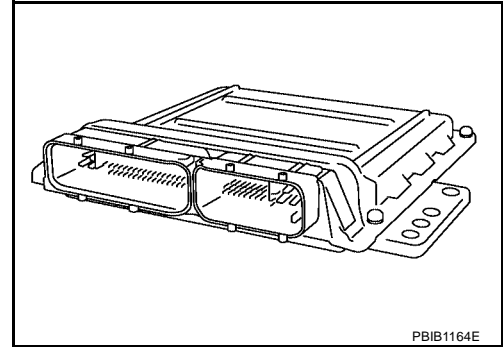
**DTC P1065 ECM POWER SUPPLY**

PF2:23710

**Component Description**

UBS003S4

Battery voltage is supplied to the ECM even when the ignition switch is turned OFF for the ECM memory function of the DTC memory, the air-fuel ratio feedback compensation value memory, the idle air volume learning value memory, etc.



**On Board Diagnosis Logic**

UBS003S5

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1065 1065	ECM power supply circuit	ECM back-up RAM system does not function properly.	<ul style="list-style-type: none"> <li>● Harness or connectors [ECM power supply (back-up) circuit is open or shorted.]</li> <li>● ECM</li> </ul>

**DTC Confirmation Procedure**

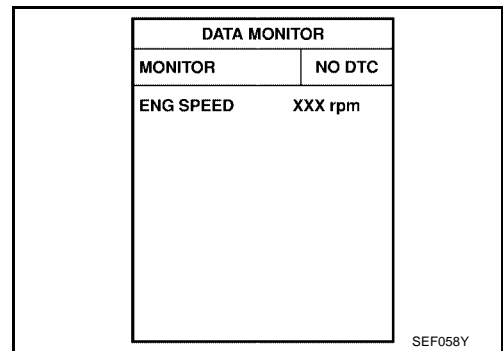
UBS003S6

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch “ON” and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. Turn ignition switch “OFF”, wait at least 10 seconds, and then turn “ON”.
5. Repeat steps 3 and 4 four times.
6. If 1st trip DTC is detected, go to [EC-377, "Diagnostic Procedure"](#)



**WITH GST**

Follow the procedure “WITH CONSULT-II” above.

# DTC P1065 ECM POWER SUPPLY

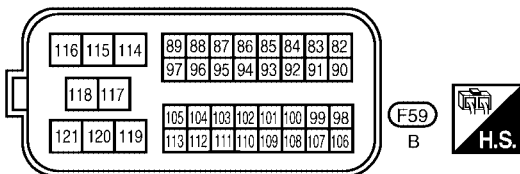
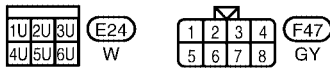
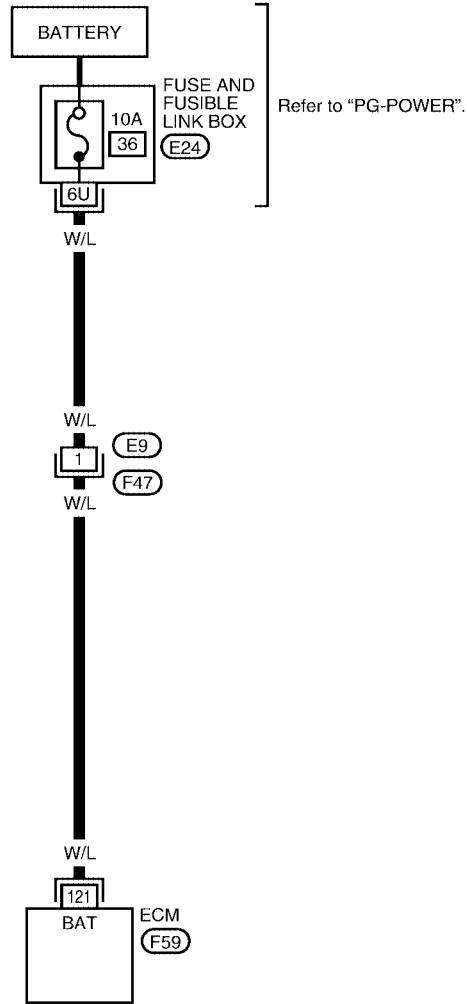
[QG18DE (ULEV)]

UBS003S7

## Wiring Diagram

### EC-ECM/PW-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



BBWA0294E



# DTC P1065 ECM POWER SUPPLY

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
121	W/L	Power supply for ECM (Buck-up)	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS003S8

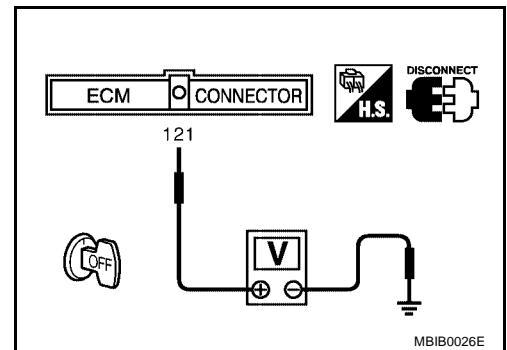
### 1. CHECK ECM POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check voltage between ECM terminal 121 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E9, F47
- 10A fuse
- Harness for open or short between ECM and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

### 3. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

#### 4. PERFORM DTC CONFIRMATION PROCEDURE

---

##### With CONSULT-II

1. Turn ignition switch "ON".
2. Select "SELF DIAG RESULTS" mode with CONSULT-II.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure"**.  
See [EC-375](#) .
5. Is the 1st trip DTC P1065 displayed again?

##### With GST

1. Turn ignition switch "ON".
2. Select MODE 4 with GST.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure"**.  
See [EC-375](#) .
5. Is the 1st trip DTC P1065 displayed again?

Yes or No

Yes >> GO TO 5.

No >> **INSPECTION END**

---

#### 5. REPLACE ECM

---

1. Replace ECM.
2. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

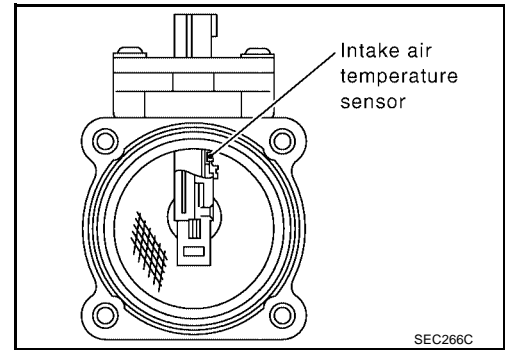
**DTC P1102 MAF SENSOR**

PF2:22680

**Component Description**

UBS003S9

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss. Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS003SA

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS A/F SE-B1	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No-load	Idle 1.0 - 1.7V
		2,500 rpm 1.5 - 2.4V
CAL/LD VALUE	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No-load	Idle 20.0 - 35.5%
		2,500 rpm 12.0 - 27.0%
MASS AIRFLOW	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No-load	Idle 1.4 - 4.0 g-m/s
		2,500 rpm 5.0 - 10.0 g-m/s

**On Board Diagnosis Logic**

UBS003SB

This self-diagnosis has the one trip detection logic.

**NOTE:**

If DTC P1102 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-455](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1102 1102	Mass air flow sensor circuit range/performance problem	A voltage from the sensor is constantly approx.1.0V when engine is running.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Mass air flow sensor</li> </ul>

**FAIL-SAFE MODE**

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

**DTC Confirmation Procedure****NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**④ WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait at least 5 seconds.
4. If DTC is detected, go to [EC-382, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**④ WITH GST**

Follow the procedure "With CONSULT-II" above.

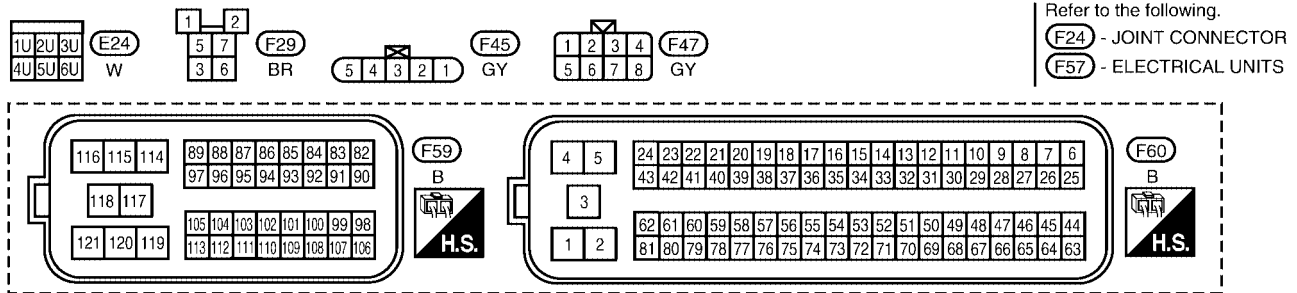
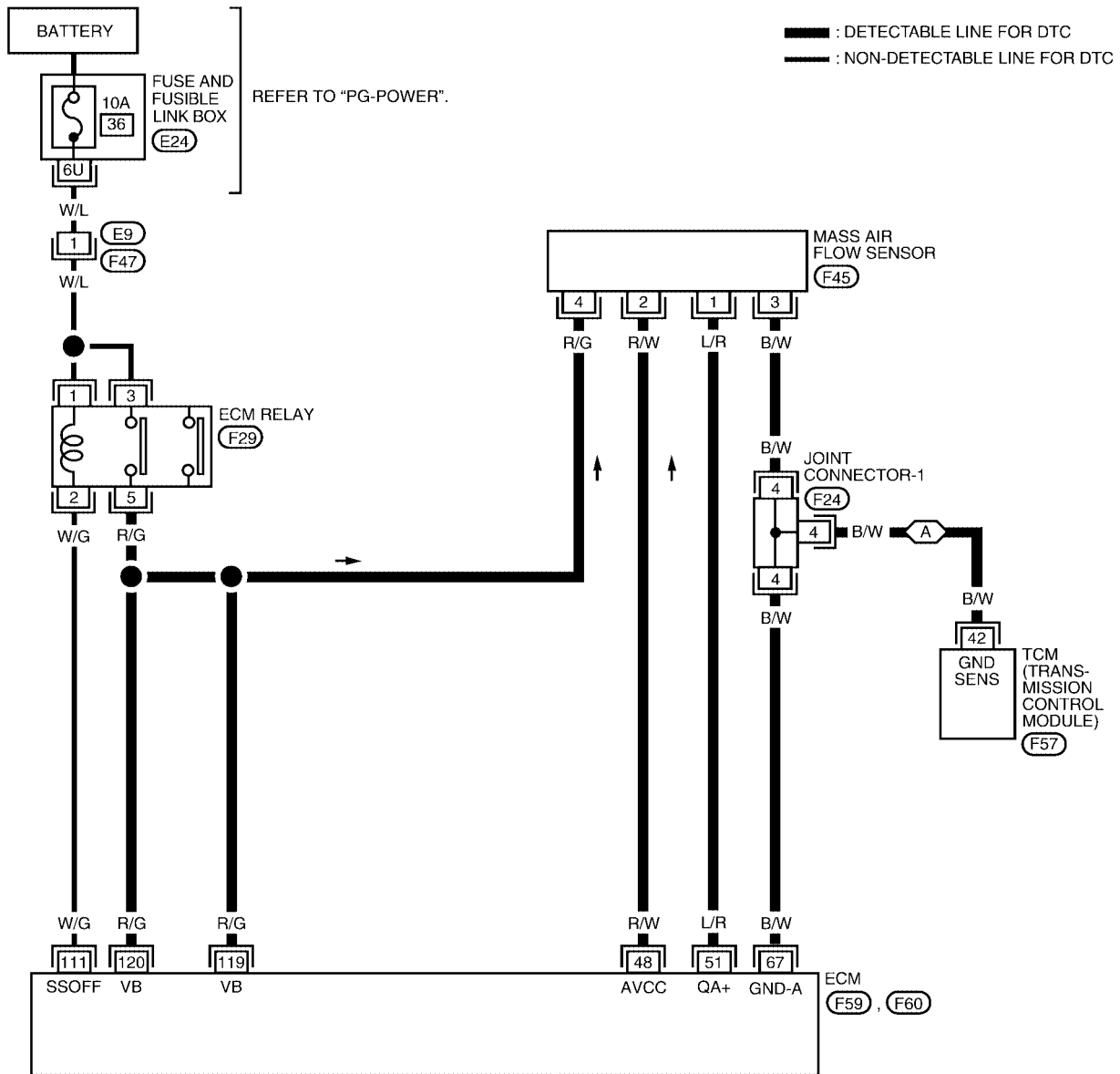
# DTC P1102 MAF SENSOR

[QG18DE (ULEV)]

UBS003SD

## Wiring Diagram

EC-MAFS-01



BBWA0774E

# DTC P1102 MAF SENSOR

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
48	R/W	Sensor power supply (Mass air flow sensor)	[Ignition switch "ON"]	Approximately 5V
51	L/R	Mass air flow sensor	[Engine is running] <ul style="list-style-type: none"><li>● Warm-up condition</li><li>● Idle speed</li></ul>	1.0 - 1.7V
			[Engine is running] <ul style="list-style-type: none"><li>● Warm-up condition</li><li>● Engine speed is 2,500 rpm.</li></ul>	1.5 - 2.1V
67	B/W	Sensor ground (Mass air flow sensor)	[Engine is running] <ul style="list-style-type: none"><li>● Warm-up condition</li><li>● Idle speed</li></ul>	Approximately 0V

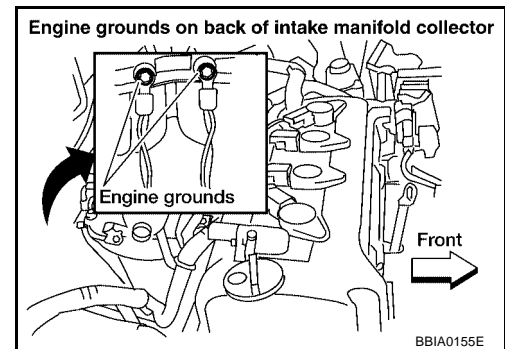
## Diagnostic Procedure

UBS003SE

### 1. RETIGHTEN GROUND SCREWS

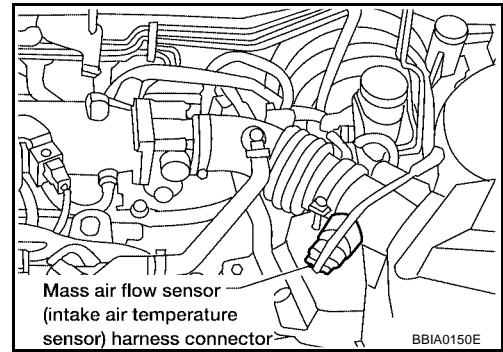
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



**2. CHECK MAF SENSOR POWER SUPPLY CIRCUIT**

1. Disconnect MAF sensor harness connector.
2. Turn ignition switch "ON".

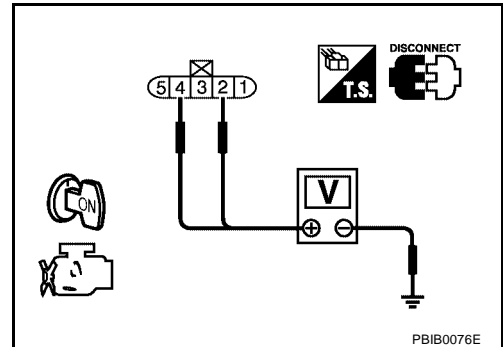


3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.

Terminal	Voltage
2	Approximately 5V
4	Battery voltage

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



**3. DETECT MALFUNCTIONING PART**

Check the following.

- Harness for open or short between mass air flow sensor and ECM
- Harness for open or short between mass air flow sensor and ECM relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

**4. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

**5. DETECT MALFUNCTIONING PART**

Check the following.

- Joint connector-1.
- Harness for open or short between mass air flow sensor and ECM.
- Harness for open or short between mass air flow sensor and TCM.

>> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Check harness continuity between ECM terminal 51 and MAF sensor terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**7. CHECK MASS AIR FLOW SENSOR**

Refer to [EC-384, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace mass air flow sensor.

**8. CHECK INTERMITTENT INCIDENT**

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Component Inspection  
MASS AIR FLOW SENSOR**

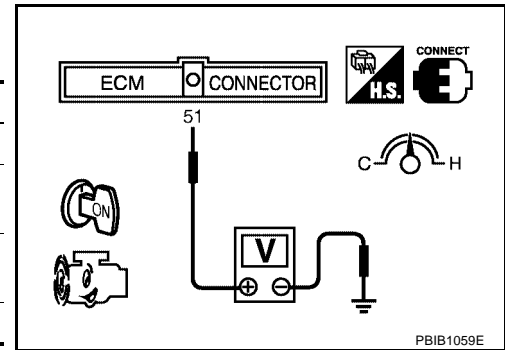
UBS003SF

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 51 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.7
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 2.1
Idle to about 4,000 rpm*	1.0 - 1.7 to Approx. 4.0

\*: Check for liner voltage rise in response to engine being increased to about 4,000 rpm.

4. If the voltage is out of specification, proceed the following.
  - a. Turn ignition switch "OFF".
  - b. Disconnect mass air flow sensor harness connector and reconnect it again.
  - c. Perform steps 2 and 3 again.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.
6. If NG, clean or replace mass air flow sensor.





DTC P1111 IVT CONTROL SOLENOID VALVE

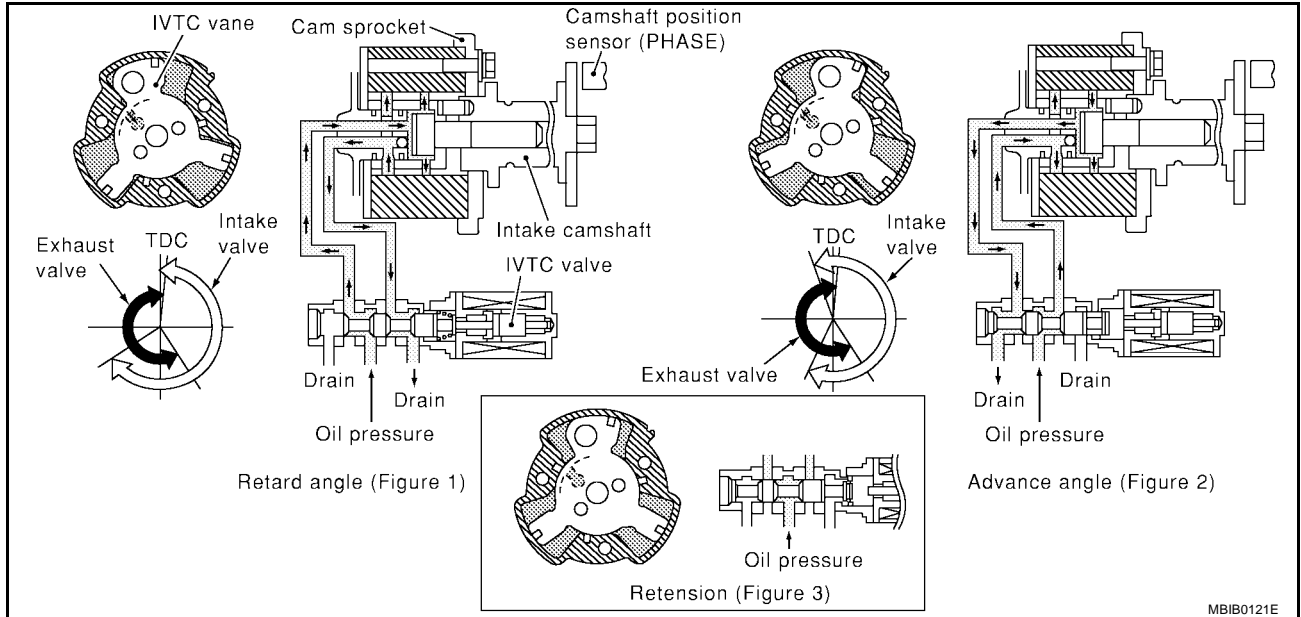
PF:23796

Description  
SYSTEM DESCRIPTION

UBS0057M

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS)	Engine speed	Intake valve timing control	Intake valve timing control solenoid valve
Camshaft position sensor (PHASE)			
Engine coolant temperature sensor	Engine coolant temperature		
Vehicle speed signal*	Vehicle speed		

\*: This signal is sent to the ECM through CAN communication line.



This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

COMPONENT DESCRIPTION

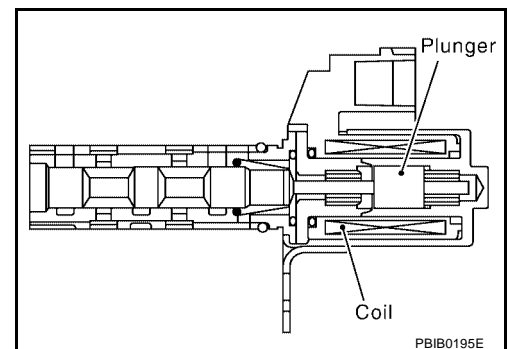
Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

The intake valve timing control solenoid valve changes the oil amount and direction of flow through intake valve timing control unit or stops oil flow.

The longer pulse width advances valve angle.

The shorter pulse width retards valve angle.

When ON and OFF pulse widths become equal, the solenoid valve stops oil pressure flow to fix the intake valve angle at the control position.



CONSULT-II Reference Value in Data Monitor Mode

UBS0057N

Specification data are reference values.

# DTC P1111 IVT CONTROL SOLENOID VALVE

[QG18DE (ULEV)]

MONITOR ITEM	CONDITION		SPECIFICATION
INT/V SOL (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N</li> <li>● Air conditioner switch: OFF</li> <li>● No-load</li> </ul>	Idle	0% - 2%
		2,000 rpm	Approx. 0% - 60%

## On Board Diagnosis Logic

UBS00570

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1111 1111	Intake valve timing control solenoid valve circuit	An improper voltage is sent to the ECM through intake valve timing control solenoid valve.	<ul style="list-style-type: none"> <li>● Harness or connectors (Solenoid valve circuit is open or shorted.)</li> <li>● Intake valve timing control solenoid valve</li> </ul>

## DTC Confirmation Procedure

UBS0057P

### NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

### ④ WITH CONSULT-II

1. Turn ignition switch “ON”.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If 1st trip DTC is detected, go to [EC-388, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

### ④ WITH GST

Following the procedure “WITH CONSULT-II” above.

# DTC P1111 IVT CONTROL SOLENOID VALVE

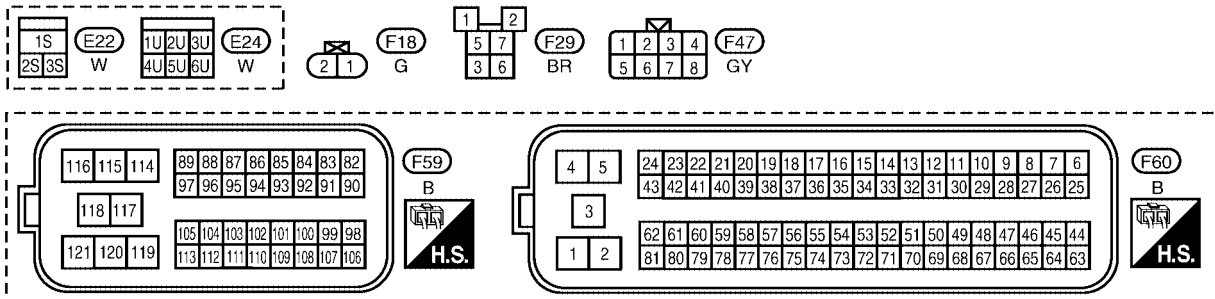
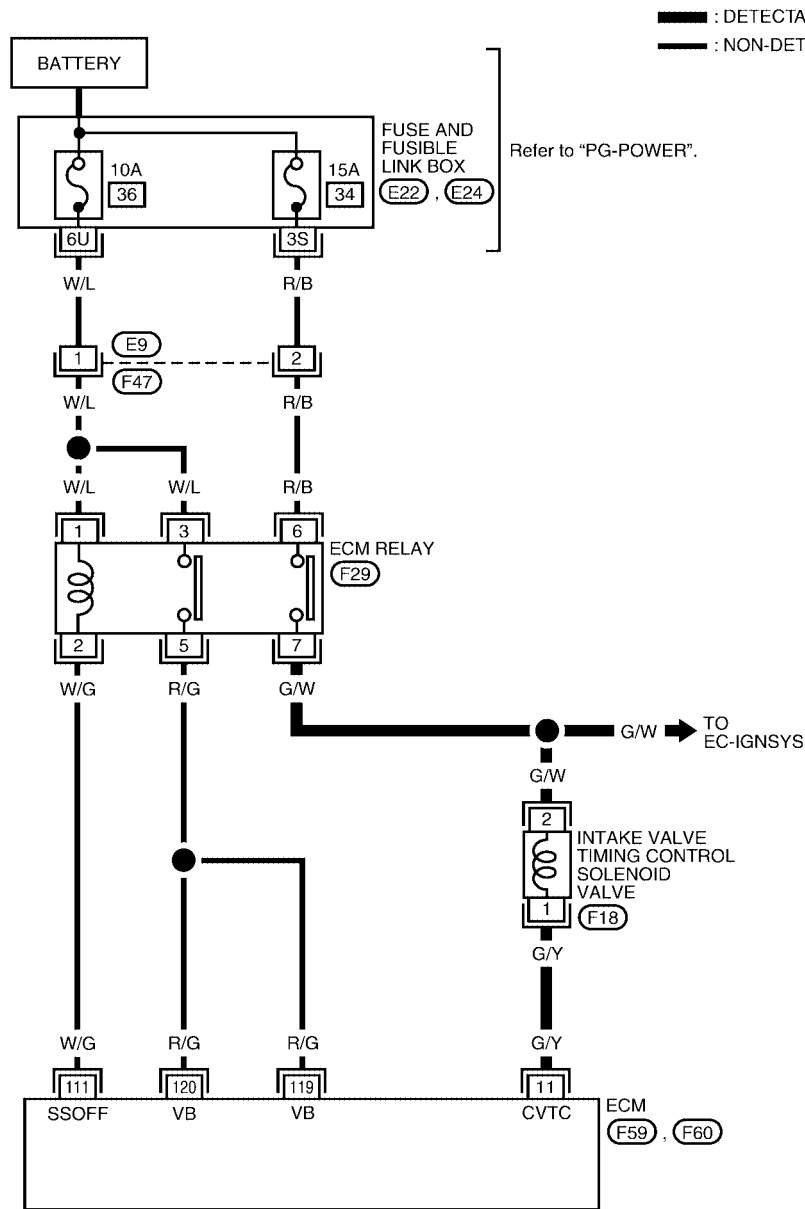
[QG18DE (ULEV)]

## Wiring Diagram

UBS0057Q

EC-IVC-01

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



BBWA0788E

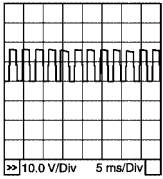
# DTC P1111 IVT CONTROL SOLENOID VALVE

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
11	Y/R	Intake valve timing control solenoid valve	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	BATTERY VOLTAGE (11 - 14V)
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,500 rpm</li> </ul>	<p>Approximately 7 - 10V★</p>  <p>10.0 V/Div 5 ms/Div</p>

PBIB0532E

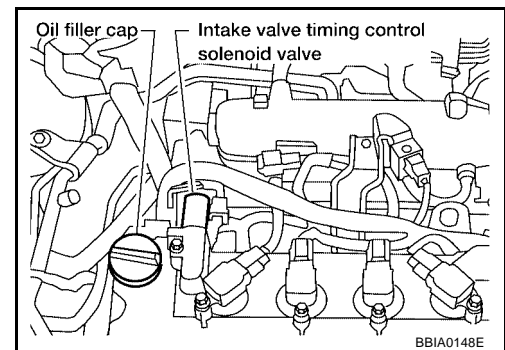
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS0057R

### 1. CHECK IVT CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Turn ignition switch "ON".

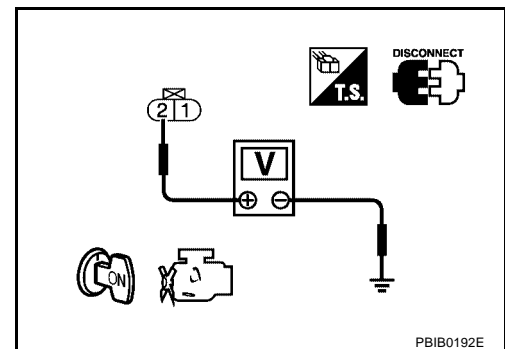


4. Check voltage between intake valve timing control solenoid valve terminal 2 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. DETECT MALFUNCTION PART

Check the following.

- Harness for open or short between intake valve timing control solenoid valve and ECM relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

# DTC P1111 IVT CONTROL SOLENOID VALVE

[QG18DE (ULEV)]

## 3. CHECK IVT CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 11 and intake valve timing control solenoid valve terminal 1. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-389, "Component Inspection"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace intake valve timing control solenoid valve.

## 5. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

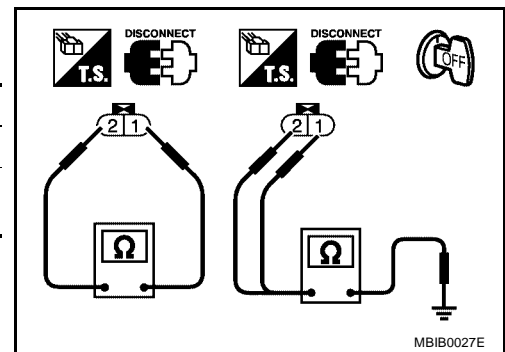
>> INSPECTION END

### Component Inspection INTAKE VALVE TIMING CONTROL SOLENOID VALVE

UBS0057S

1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve terminals 1 and 2 under the following conditions.

Terminals	Resistance
1 and 2	Approximately 8Ω at 20°C (68°F)
1 or 2 and ground	$\infty\Omega$ (Continuity should not exist)



UBS0057T

### Removal and Installation INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EM-39, "TIMING CHAIN"](#) .

# DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

[QG18DE (ULEV)]

## DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

PF16119

### Component Description

UBS003SH

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc. The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

### On Board Diagnosis Logic

UBS003SI

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1121 1121	Electric throttle control actuator	A)	Electric throttle control actuator does not function properly due to the return spring malfunction.	● Electric throttle control actuator
		B)	Throttle valve opening angle in fail-safe mode is not in specified range.	
		C)	ECM detects the throttle valve is stuck open. <b>This self-diagnosis has the one trip detection logic.</b>	

### FAIL-SAFE MODE

When the malfunction A or B is detected in the two consecutive trips, the ECM enters fail-safe mode and MIL lights up.

When the malfunction C is detected even in the 1st trip, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Malfunction A	The ECM controls the electric throttle control actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.
Malfunction B	ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.
Malfunction C	While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in "N" or "P" position, and engine speed will not exceed 1,000 rpm or more.

### DTC Confirmation Procedure

UBS003SJ

#### NOTE:

- Perform "PROCEDURE FOR MALFUNCTION A AND B" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION C".
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### PROCEDURE FOR MALFUNCTION A AND B

##### With CONSULT-II

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Shift selector lever to "D" position (A/T), "1st" position (M/T) and wait at least 2 seconds.
4. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
5. If 1st trip DTC is detected, go to [EC-391, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

##### With GST

Follow the procedure "With CONSULT-II" above.

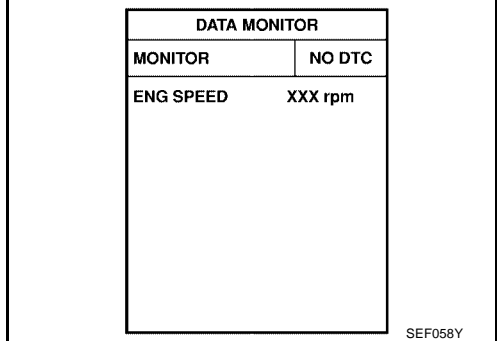
# DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

## [QG18DE (ULEV)]

### PROCEDURE FOR MALFUNCTION C

#### With CONSULT-II

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Shift selector lever to "D" position (A/T), "1st" position (M/T) and wait at least 2 seconds.
4. Shift selector lever to "N" or "P" position (A/T), Neutral position (M/T).
5. Start engine and let it idle for 3 seconds.
6. If DTC is detected, go to [EC-391, "Diagnostic Procedure"](#) .



DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### With GST

Follow the procedure "With CONSULT-II" above.

### Diagnostic Procedure

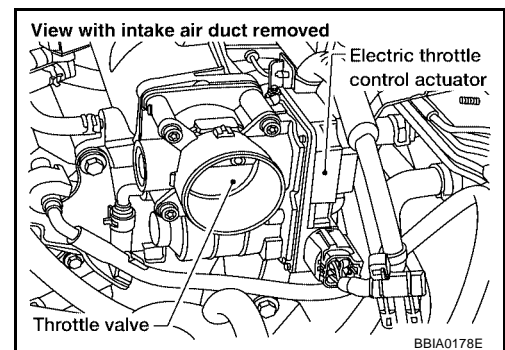
UBS003SK

#### 1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if a foreign matter is caught between the throttle valve and the housing.

#### OK or NG

- OK >> GO TO 2.  
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



#### 2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

# DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

[QG18DE (ULEV)]

## DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

PF16119

### Description

UBS003SM

#### NOTE:

If DTC P1122 is displayed with DTC P1121 or 1126, first perform the trouble diagnosis for DTC P1121 or P1126. Refer to [EC-390](#) or [EC-399](#).

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc.

The throttle control motor is operated by the ECM and it opens and closes the throttle valve.

The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

### On Board Diagnosis Logic

UBS003SN

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1122 1122	Electric throttle control performance problem	Electric throttle control function does not operate properly.	<ul style="list-style-type: none"><li>● Harness or connectors (Throttle control motor circuit is open or shorted.)</li><li>● Harness or connectors (Throttle control motor relay circuit is open or shorted.)</li><li>● Electric throttle control actuator</li><li>● Throttle control motor relay</li></ul>

### FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

### DTC Confirmation Procedure

UBS003SO

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### WITH CONSULT-II

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-394, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### WITH GST

Follow the procedure "WITH CONSULT-II" above.



# DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

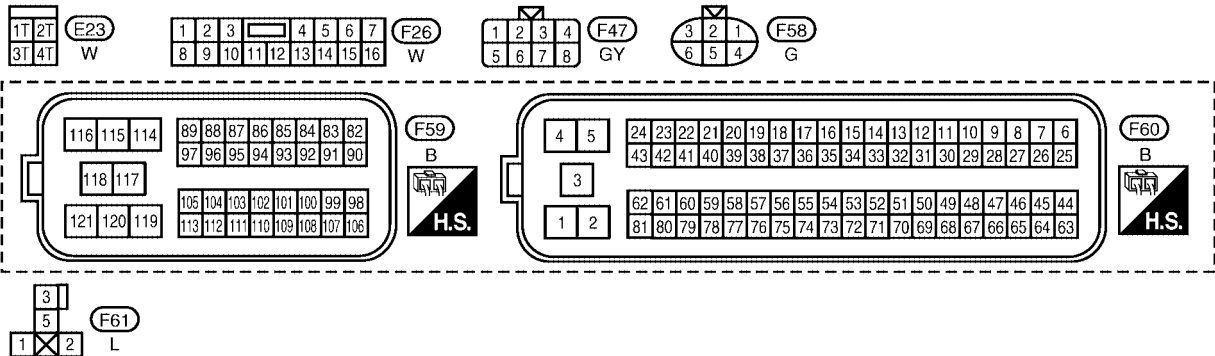
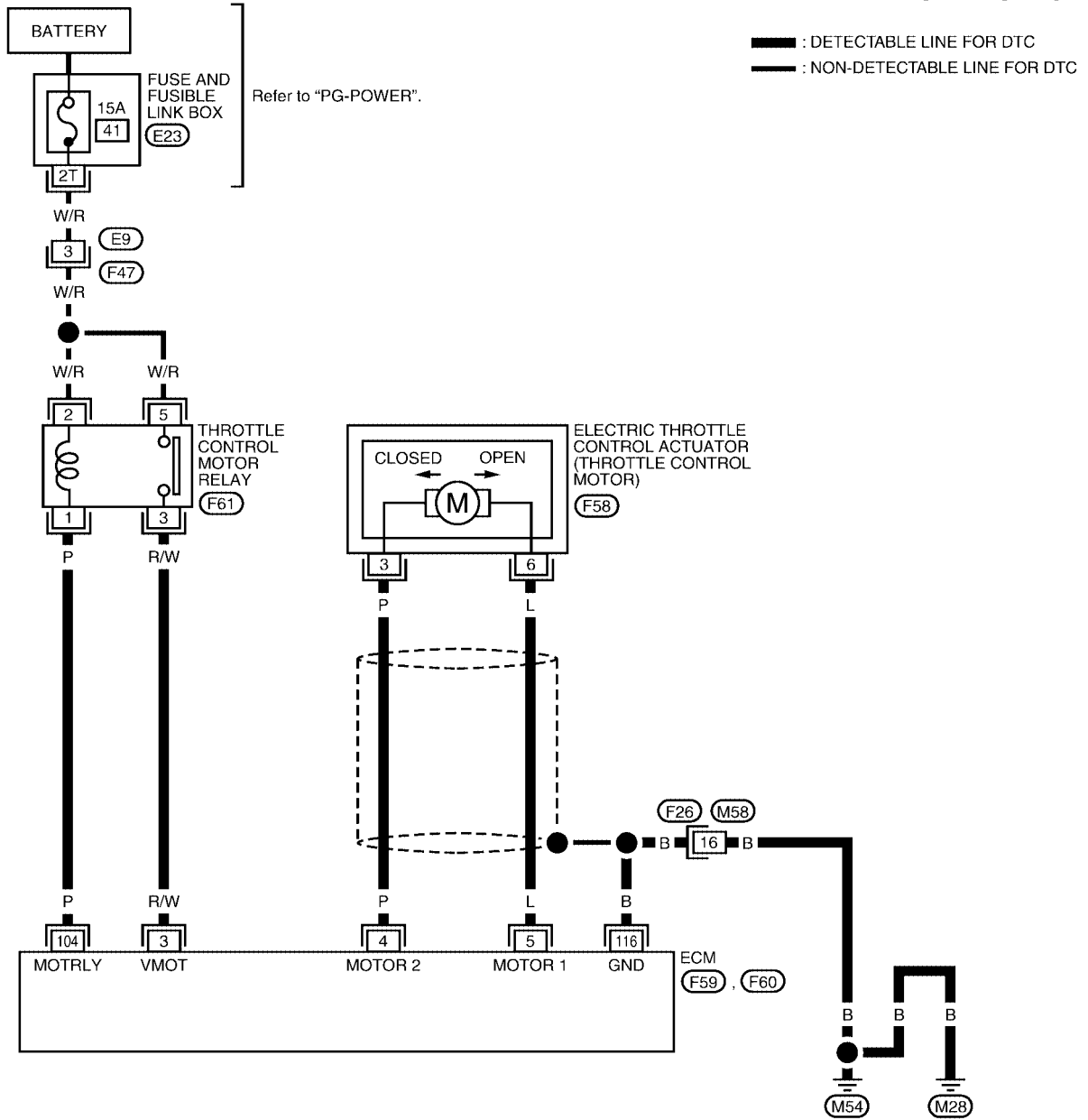
[QG18DE (ULEV)]

## Wiring Diagram

UBS003SP

EC-ETC1-01

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



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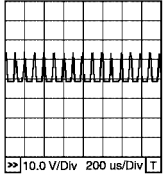
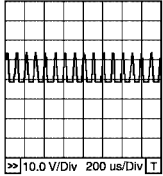
# DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	R/W	Throttle control motor power supply	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
4	P	Throttle control motor (Close)	[Ignition switch "ON"] <ul style="list-style-type: none"> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal is releasing</li> </ul>	0 - 14V★  PBIB0534E
5	L	Throttle control motor (Open)	[Ignition switch "ON"] <ul style="list-style-type: none"> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal is depressing</li> </ul>	0 - 14V★  PBIB0533E
104	P	Throttle control motor relay	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

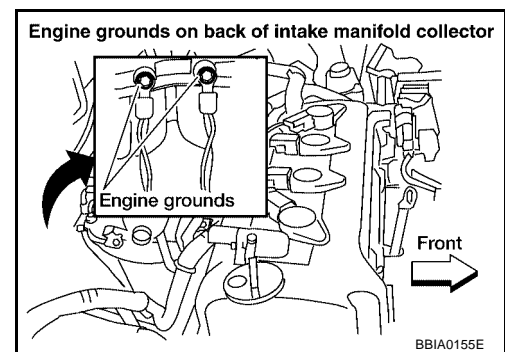
## Diagnostic Procedure

UBS003SQ

### 1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



# DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

[QG18DE (ULEV)]

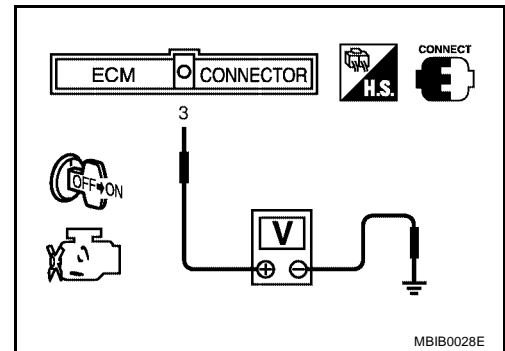
## 2. CHECK THROTTLE CONTROL MOTOR RELAY SIGNAL CIRCUIT

Check voltage between ECM terminal 3 and ground under the following conditions with CONSULT-II or tester.

Ignition switch	Voltage
OFF	Approximately 0V
ON	Battery voltage (11 - 14V)

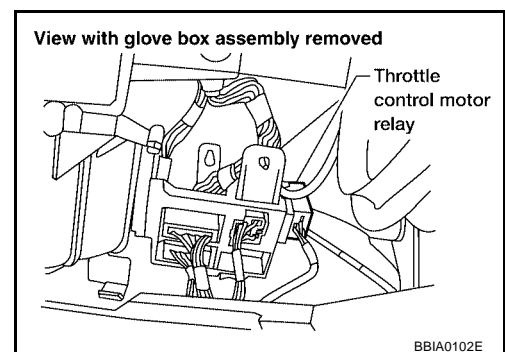
OK or NG

- OK >> GO TO 8.
- NG >> GO TO 3.



## 3. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect throttle control motor relay.

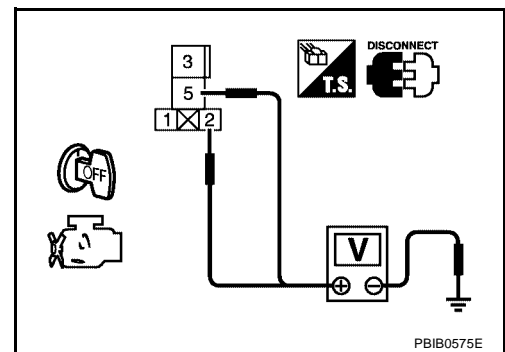


3. Check voltage between throttle control motor relay terminals 2, 5 and ground.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



## 4. DETECT MALFUNCTIONING PART

Check the following.

- 15A fuse
- Harness for open or short between throttle control motor relay and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 5. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 3 and throttle control motor relay terminal 3.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.

NG >> Repair open circuit or short to power in harness or connectors.

## 6. CHECK THROTTLE CONTROL MOTOR RELAY OUTPUT SIGNAL CIRCUIT

1. Check continuity between ECM terminal 104 and throttle control motor relay terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK THROTTLE CONTROL MOTOR RELAY

Refer to [EC-397, "Component Inspection"](#) .

OK or NG

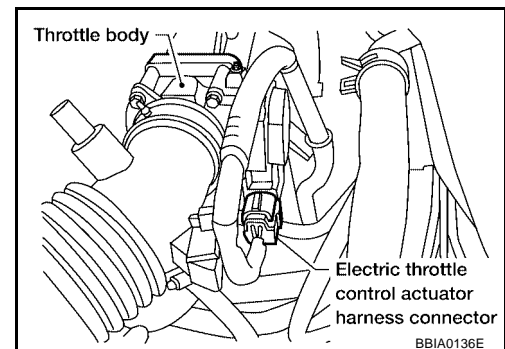
OK >> GO TO 8.

NG >> Replace throttle control motor relay.

## 8. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch "OFF".
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals.  
Refer to Wiring Diagram.

Electric throttle control actuator terminal	ECM terminal	Continuity
3	4	Should exist
	5	Should not exist
6	4	Should not exist
	5	Should exist



5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

# DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

[QG18DE (ULEV)]

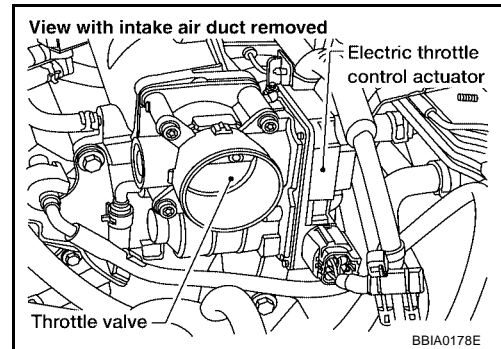
## 9. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve and the housing.

OK or NG

OK >> GO TO 10.

NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



## 10. CHECK THROTTLE CONTROL MOTOR

Refer to [EC-397, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> GO TO 12.

## 11. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> GO TO 12.

NG >> Repair or replace harness or connectors.

## 12. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

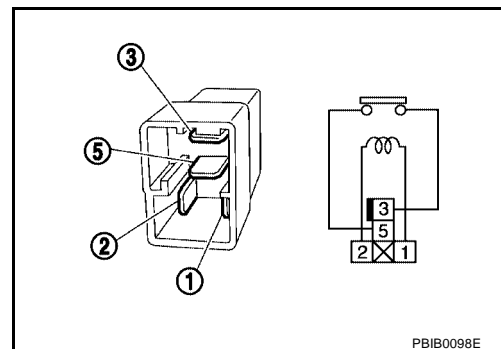
### Component Inspection THROTTLE CONTROL MOTOR RELAY

UBS003SR

1. Apply 12V direct current between relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

3. If NG, replace throttle control motor relay.



# DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

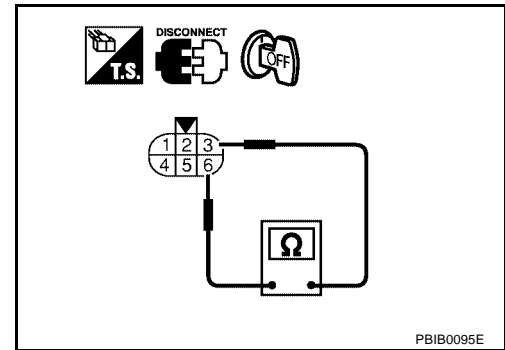
[QG18DE (ULEV)]

## THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 and 6.

**Resistance: Approximately 1 - 15  $\Omega$  [at 25 °C (77°F)]**

3. If NG, replace electric throttle control actuator and go to next step.
4. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-53, "Idle Air Volume Learning"](#) .



UBS003SS

## Removal and Installation ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EM-12, "Removal and Installation"](#) .

# DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY [QG18DE (ULEV)]

## DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

PF16119

### Component Description

UBS003ST

Power supply for the Throttle Control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

### CONSULT-II Reference Value in Data Monitor Mode

UBS003SU

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL RELAY	● Ignition switch: ON	ON

### On Board Diagnosis Logic

UBS003SV

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1124 1124	Throttle control motor relay circuit short	ECM detects the throttle control motor relay is stuck ON.	<ul style="list-style-type: none"> <li>● Harness or connectors (Throttle control motor relay circuit is shorted.)</li> <li>● Throttle control motor relay</li> </ul>
P1126 1126	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low.	<ul style="list-style-type: none"> <li>● Harness or connectors (Throttle control motor relay circuit is open.)</li> <li>● Throttle control motor relay</li> </ul>

### FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

### DTC Confirmation Procedure

UBS003SW

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### PROCEDURE FOR DTC P1124

##### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

##### Ⓟ With CONSULT-II

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If 1st trip DTC is detected, go to [EC-402, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

##### Ⓞ With GST

Follow the procedure "With CONSULT-II" above.

# DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

## [QG18DE (ULEV)]

### PROCEDURE FOR DTC P1126

#### With CONSULT-II

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-402, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### With GST

Follow the procedure "With CONSULT-II" above.

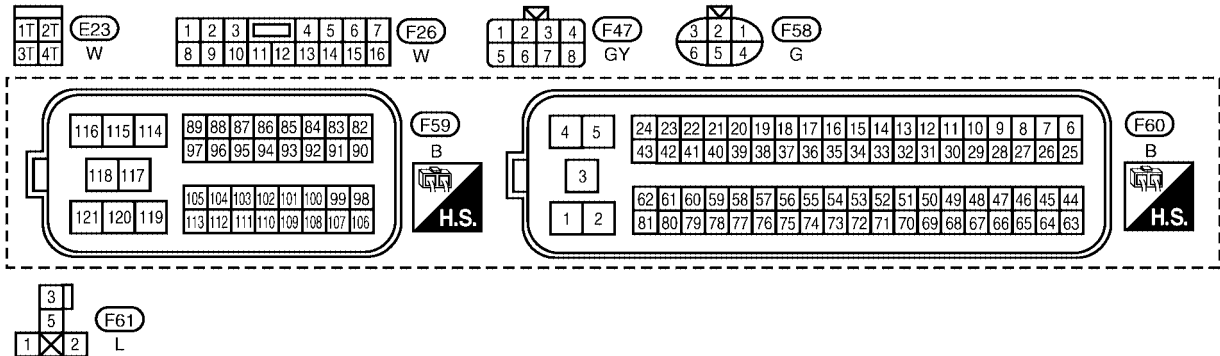
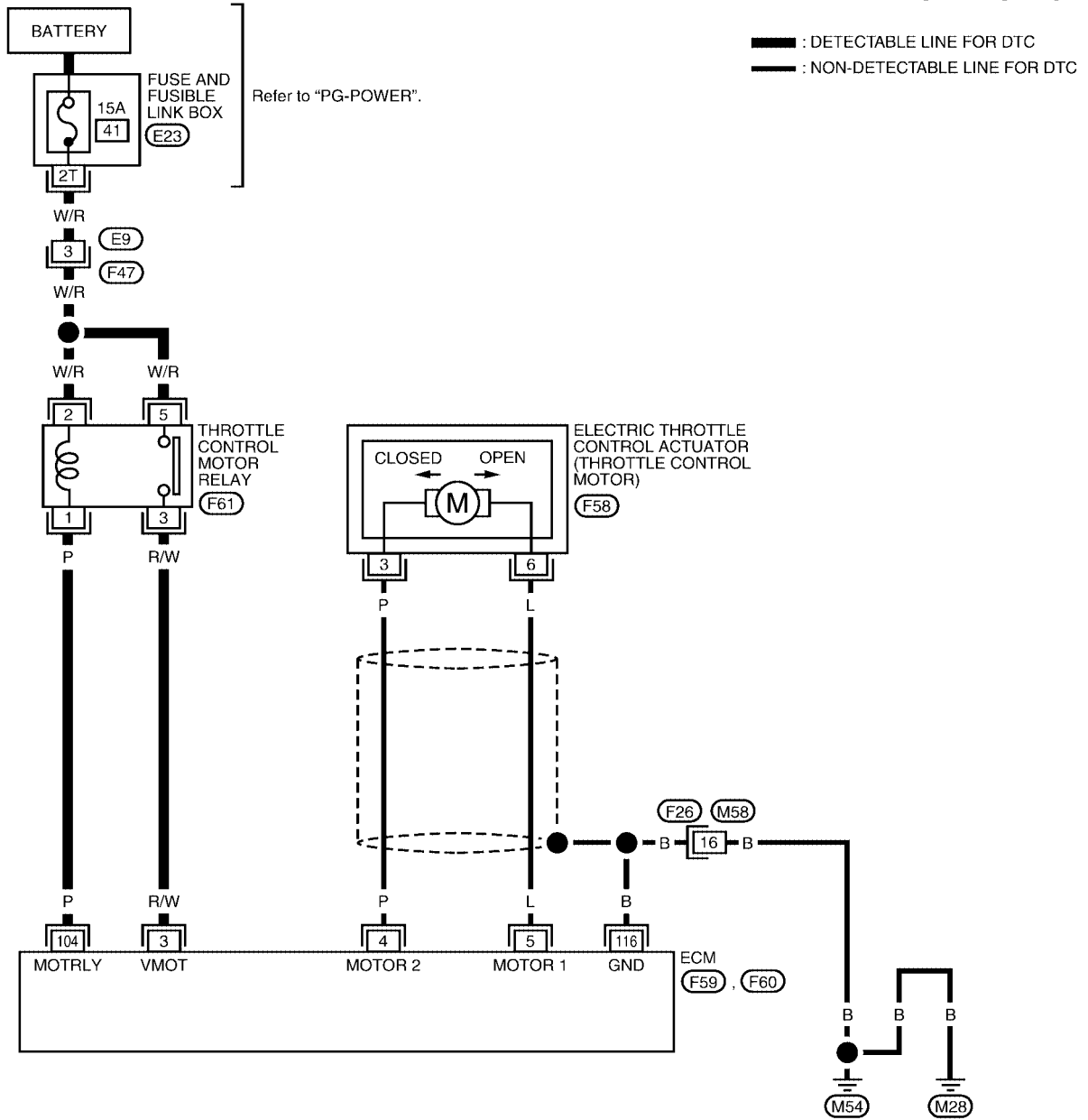


# DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY [QG18DE (ULEV)]

UBS003SX

## Wiring Diagram

EC-ETC2-01



BBWA0790E

# DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY [QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

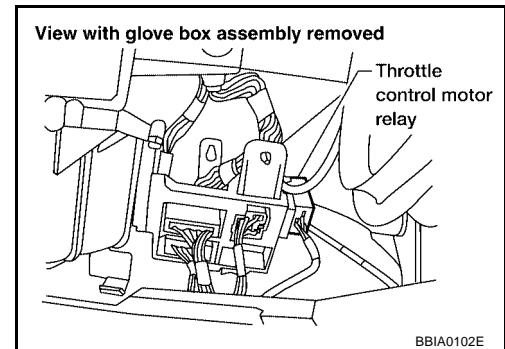
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	R/W	Throttle control motor power supply	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
104	P	Throttle control motor relay	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V

## Diagnostic Procedure

UBS003SY

### 1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect throttle control motor relay.

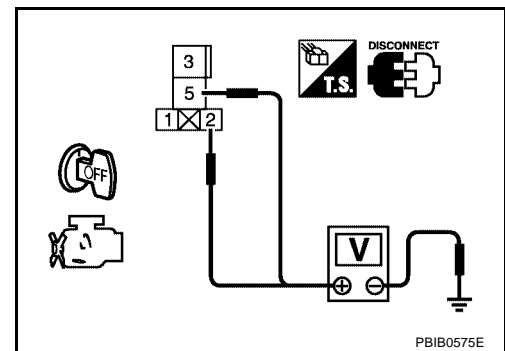


3. Check voltage between throttle control motor relay terminals 2, 5 and ground.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- 15A fuse
- Harness for open or short between throttle control motor relay and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

# DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY [QG18DE (ULEV)]

## 3. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 3 and throttle control motor relay terminal 3.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK THROTTLE CONTROL MOTOR RELAY OUTPUT SIGNAL CIRCUIT

1. Check continuity between ECM terminal 104 and throttle control motor relay terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 5. CHECK THROTTLE CONTROL MOTOR RELAY

Refer to [EC-403, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace throttle control motor relay.

## 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

**>> INSPECTION END**

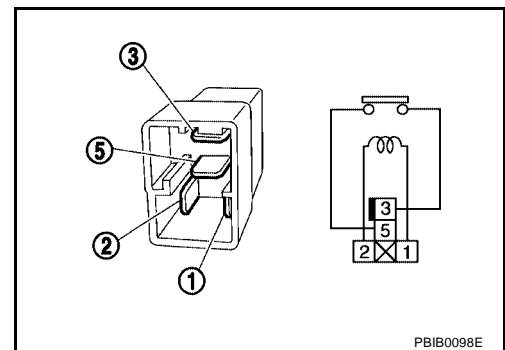
### Component Inspection THROTTLE CONTROL MOTOR RELAY

UBS003SZ

1. Apply 12V direct current between relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

3. If NG, replace throttle control motor relay.



PBIB0098E

### Removal and Installation ELECTRIC THROTTLE CONTROL ACTUATOR

UBS006IN

Refer to [EM-12, "Removal and Installation"](#) .

## DTC P1128 THROTTLE CONTROL MOTOR

PFP:16119

### Component Description

UBS003T0

The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

### On Board Diagnosis Logic

UBS003T1

**This self-diagnosis has the one trip detection logic.**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1128 1128	Throttle control motor circuit short	ECM detects short in both circuits between ECM and throttle control motor.	<ul style="list-style-type: none"> <li>● Harness or connectors (Throttle control motor circuit is shorted.)</li> <li>● Electric throttle control actuator (Throttle control motor)</li> </ul>

### FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

### DTC Confirmation Procedure

UBS003T2

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### WITH CONSULT-II

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-406, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### WITH GST

Follow the procedure "WITH CONSULT-II" above.

# DTC P1128 THROTTLE CONTROL MOTOR

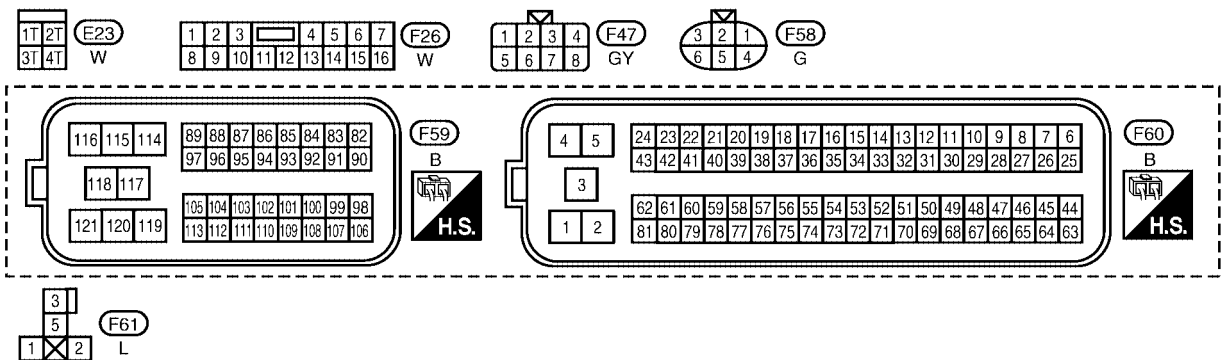
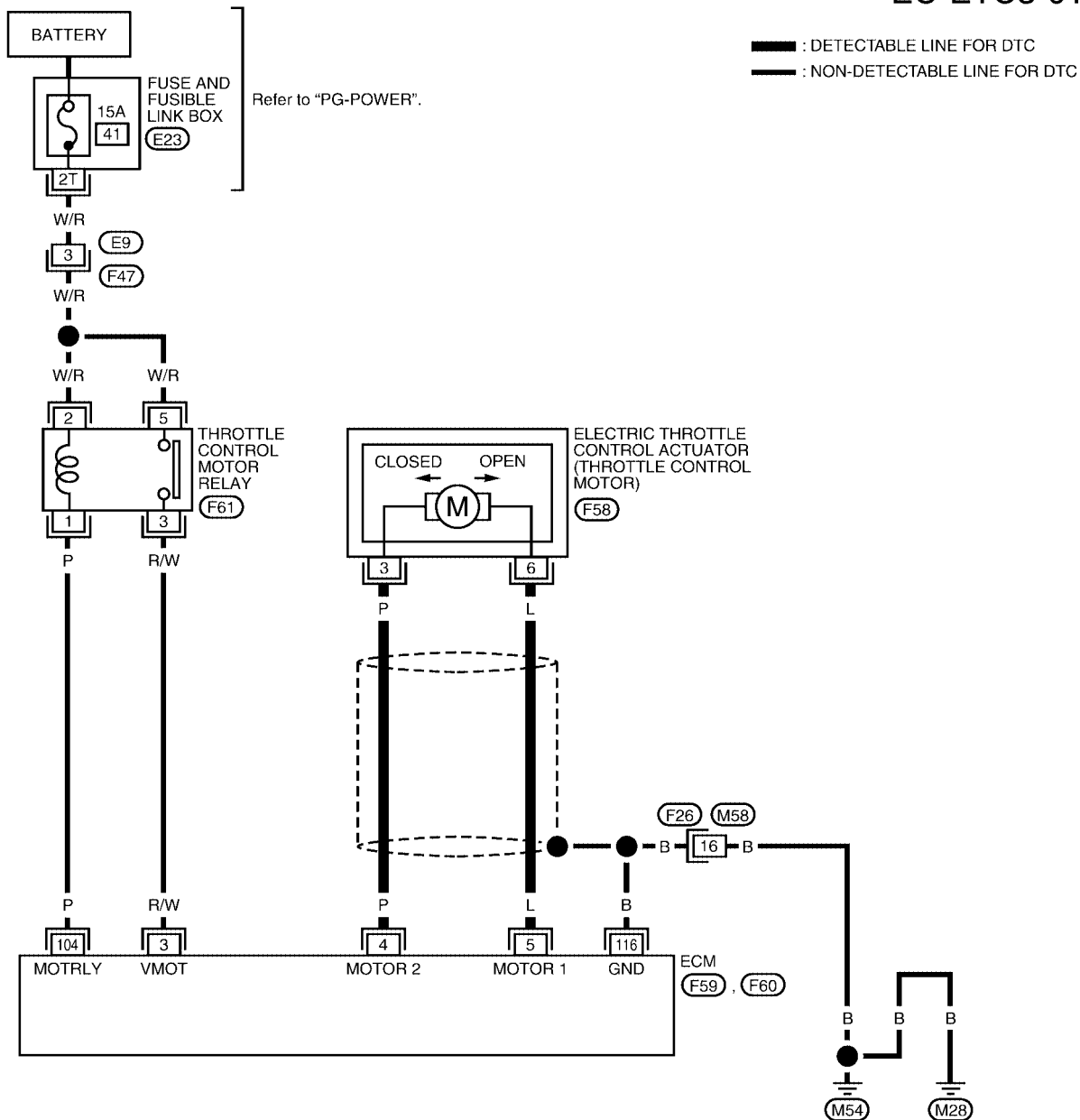
[QG18DE (ULEV)]

UBS00373

## Wiring Diagram

EC-ETC3-01

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



BBWA0791E

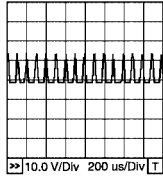
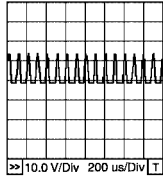
# DTC P1128 THROTTLE CONTROL MOTOR

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	P	Throttle control motor (Close)	<p><b>[Ignition switch "ON"]</b></p> <ul style="list-style-type: none"> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal is releasing</li> </ul>	<p>0 - 14V★</p>  <p>PBIB0534E</p>
5	L	Throttle control motor (Open)	<p><b>[Ignition switch "ON"]</b></p> <ul style="list-style-type: none"> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal is depressing</li> </ul>	<p>0 - 14V★</p>  <p>PBIB0533E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

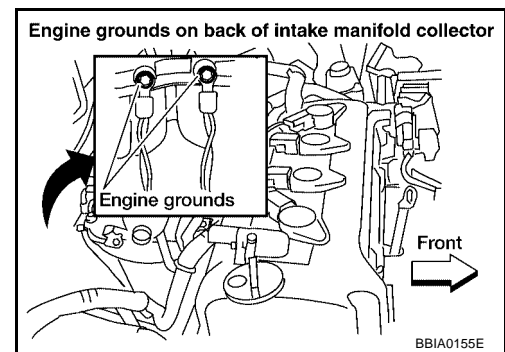
## Diagnostic Procedure

UBS00374

### 1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



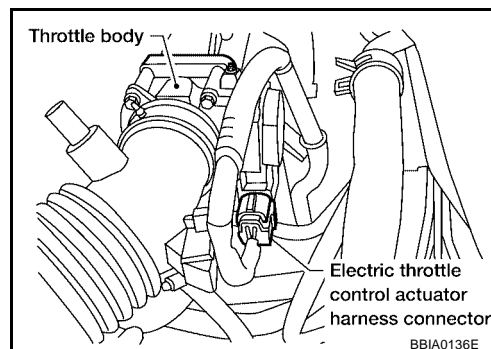
# DTC P1128 THROTTLE CONTROL MOTOR

[QG18DE (ULEV)]

## 2. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch "OFF".
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

Electric throttle control actuator terminal	ECM terminal	Continuity
3	4	Should exist
	5	Should not exist
6	4	Should not exist
	5	Should exist



5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 3. CHECK THROTTLE CONTROL MOTOR

Refer to [EC-407, "Component Inspection"](#) .

OK or NG

OK >> GO TO 4.

NG >> GO TO 5.

## 4. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> GO TO 5.

NG >> Repair or replace harness or connectors.

## 5. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

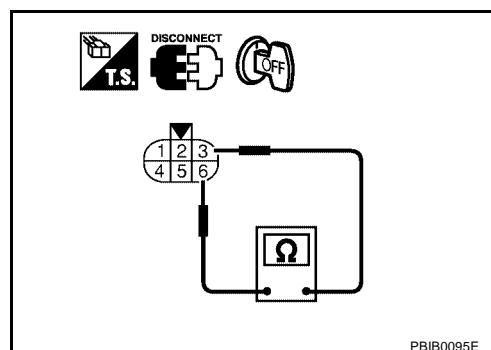
### Component Inspection THROTTLE CONTROL MOTOR

UBS00375

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 and 6.

**Resistance: Approximately 1 - 15  $\Omega$  [at 25 °C (77°F)]**

3. If NG, replace electric throttle control actuator and go to next step.
4. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-53, "Idle Air Volume Learning"](#) .



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**Removal and Installation**  
**ELECTRIC THROTTLE CONTROL ACTUATOR**

UBS003T6

Refer to [EM-12, "Removal and Installation"](#) .



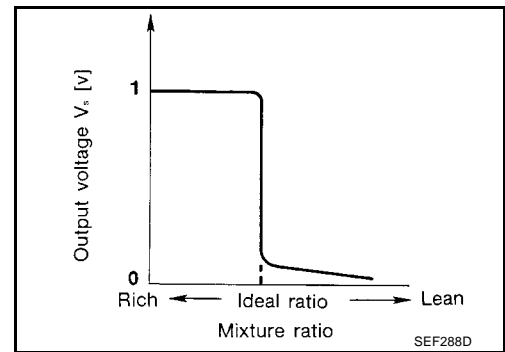
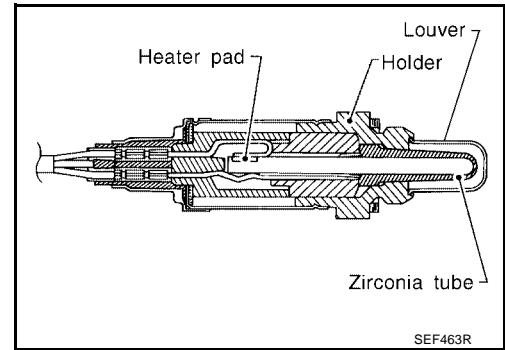
**DTC P1143 HO2S1**

PFP:22690

UBS003VB

**Component Description**

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS003VC

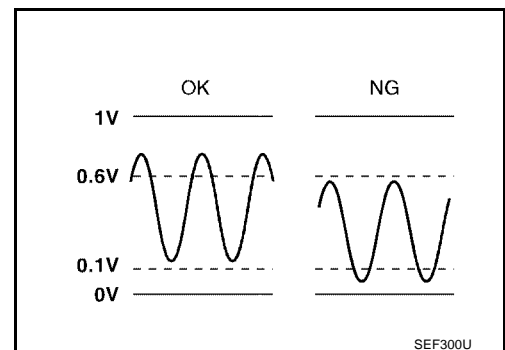
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

**On Board Diagnosis Logic**

UBS003VD

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the “rich” output is sufficiently high and whether the “lean” output is sufficiently low. When both the outputs are shifting to the lean side, the malfunction will be detected.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1143 1143	Heated oxygen sensor 1 lean shift monitoring	The maximum and minimum voltage from the sensor are not reached to the specified voltages.	<ul style="list-style-type: none"> <li>● Heated oxygen sensor 1</li> <li>● Heated oxygen sensor 1 heater</li> <li>● Fuel pressure</li> <li>● Injectors</li> <li>● Intake air leaks</li> </ul>

**DTC Confirmation Procedure**

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

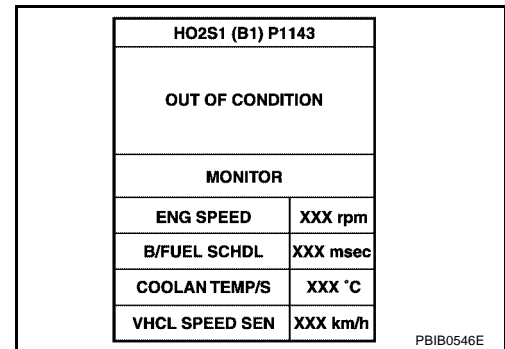
- Always perform at a temperature above –10°C (14°F).
- Before performing following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch “ON” and select “HO2S1 (B1) P1143” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

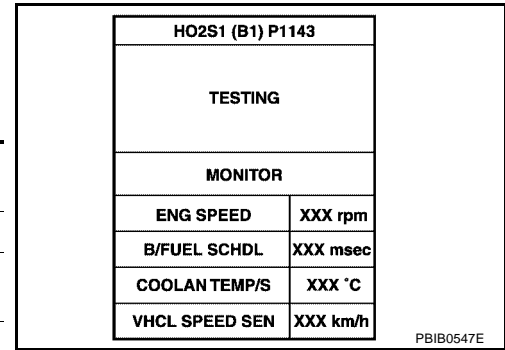
**NOTE:**

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.



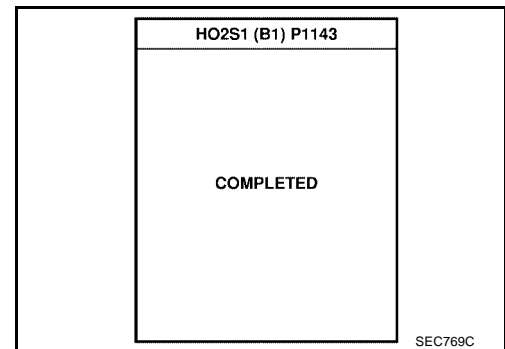
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 50 seconds or more.)

ENG SPEED	1,350 - 2,700 rpm (A/T models) 1,450 - 3,200 rpm (M/T models)
Vehicle speed	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	2.4 - 12.5 msec (A/T models) 2.0 - 10.0 msec (M/T models)
Selector lever	Suitable position



If “TESTING” is not displayed after 5 minutes, retry from step 2.

7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to [EC-411, "Diagnostic Procedure"](#).

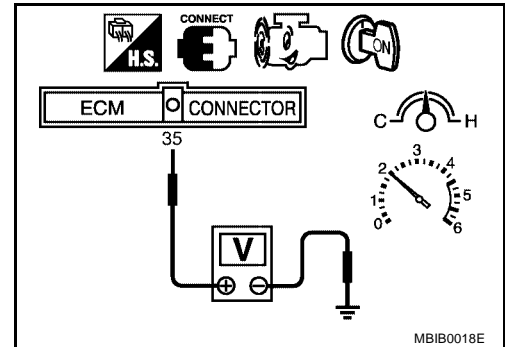


**Overall Function Check**

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a DTC might not be confirmed.

**WITH GST**

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1(B1) signal] and engine ground.
3. Check one of the following with engine speed held at 2,000 rpm constant under no load.
  - The maximum voltage is over 0.6V at least one time.
  - The minimum voltage is over 0.1V at least one time.
4. If NG, go to [EC-411, "Diagnostic Procedure"](#) .

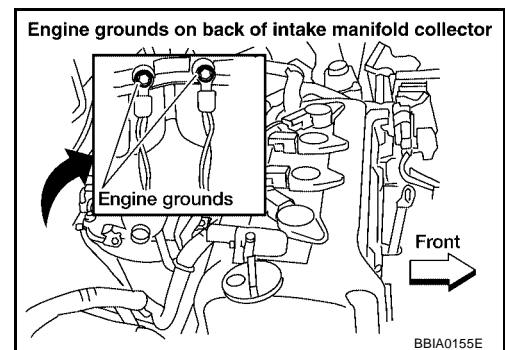


UBS003VG

**Diagnostic Procedure****1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

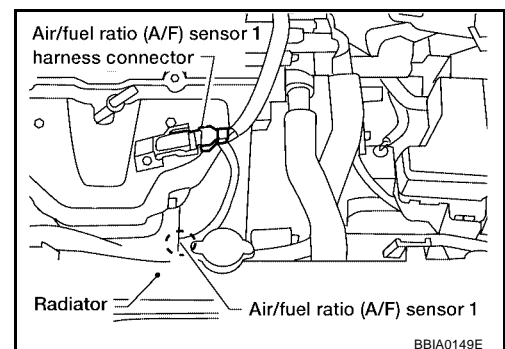
&gt;&gt; GO TO 2.

**2. RETIGHTEN HEATED OXYGEN SENSOR 1**

Loosen and retighten heated oxygen sensor 1.

**Tightening torque:****40 - 60 N·m (4.1 - 6.1 kg·m, 30 - 44 ft·lb)**

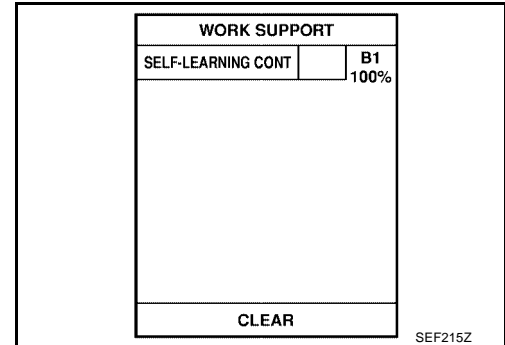
&gt;&gt; GO TO 3.



### 3. CLEAR THE SELF-LEARNING DATA

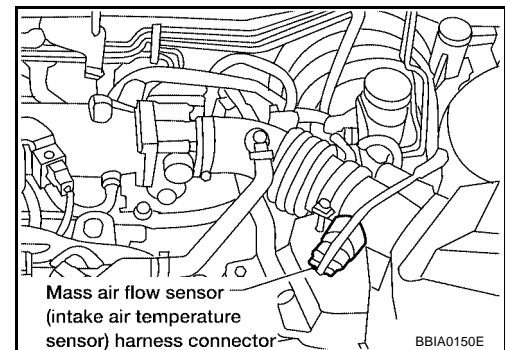
#### ④ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 detected?**  
**Is it difficult to start engine?**



#### ⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-71, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 detected?**  
**Is it difficult to start engine?**



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171. Refer to [EC-238](#).
- No >> GO TO 4.

### 4. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to [EC-156, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace heated oxygen sensor 1.

### 5. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-413, "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace heated oxygen sensor 1.

### 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

For circuit, refer to [EC-203, "Wiring Diagram"](#).

>> INSPECTION END

**Component Inspection**  
**HEATED OXYGEN SENSOR 1**

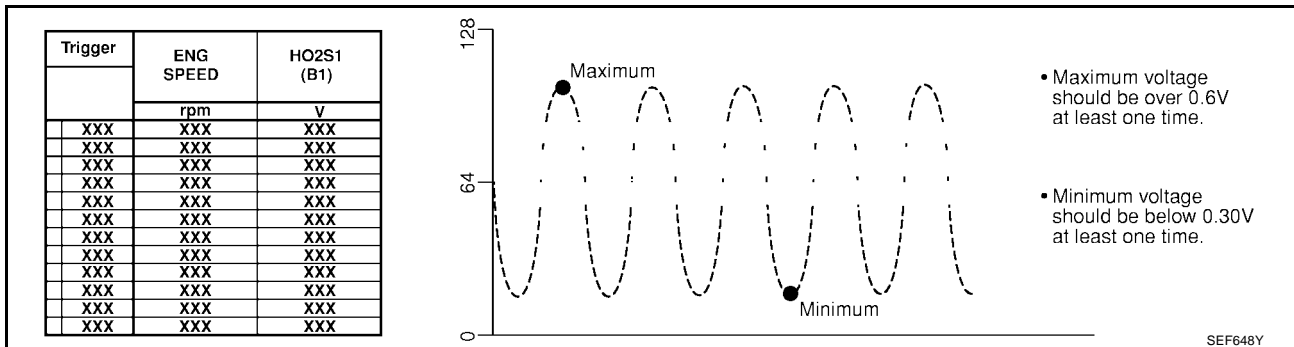
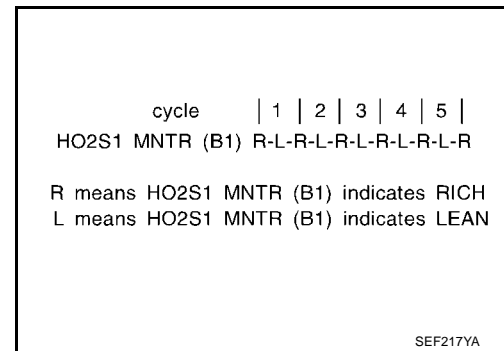
**With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

6. Check the following.
  - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown at right.
  - "HO2S1 (B1)" voltage goes above 0.6V at least once.
  - "HO2S1 (B1)" voltage goes below 0.3V at least once.
  - "HO2S1 (B1)" voltage never exceeds 1.0V.



**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Without CONSULT-II**

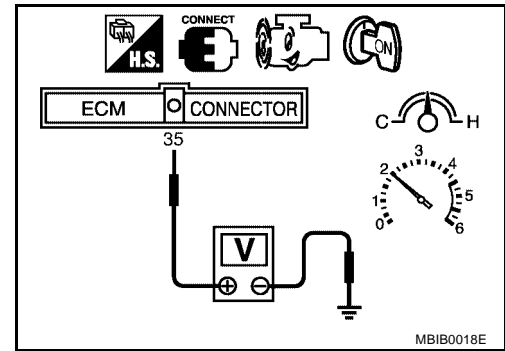
1. Start engine and warm it up to normal operating temperature.

## DTC P1143 HO2S1

[QG18DE (ULEV)]

2. Set voltmeter probes between ECM terminal 35 [HO2S1 (B1) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
  - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
  - The maximum voltage is over 0.6V at least one time.
  - The minimum voltage is below 0.3V at least one time.
  - The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V  
2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V



### CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

### Removal and Installation HEATED OXYGEN SENSOR 1

UBS003VI

Refer to [EM-12, "Removal and Installation"](#) .

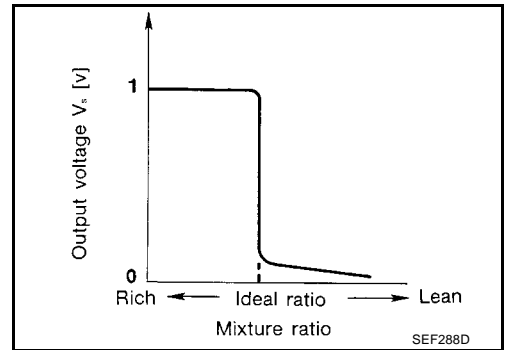
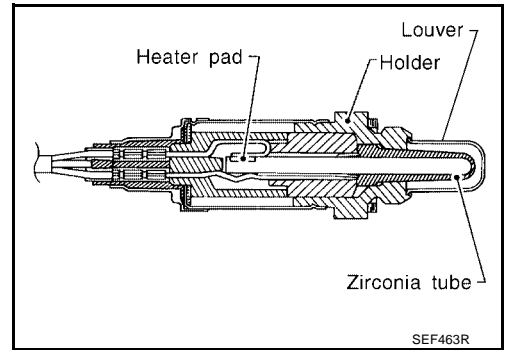
**DTC P1144 HO2S1**

PFP:22690

**Component Description**

UBS003VJ

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS003VK

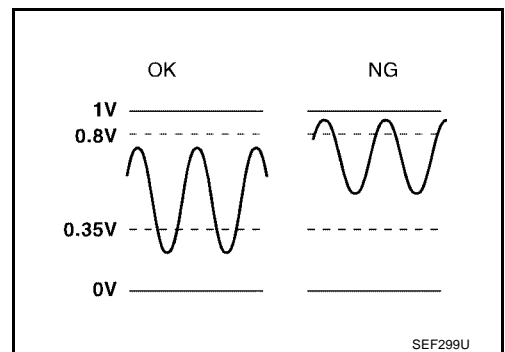
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

**On Board Diagnosis Logic**

UBS003VL

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the “rich” output is sufficiently high. The “lean” output is sufficiently low. When both the outputs are shifting to the rich side, the malfunction will be detected.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1144 1144	Heated oxygen sensor 1 rich shift monitoring	The maximum and minimum voltages from the sensor are beyond the specified voltages.	<ul style="list-style-type: none"> <li>● Heated oxygen sensor 1</li> <li>● Heated oxygen sensor 1 heater</li> <li>● Fuel pressure</li> <li>● Injectors</li> </ul>

**DTC Confirmation Procedure**

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

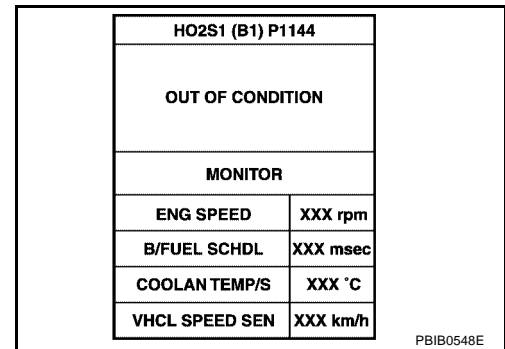
- Always perform at a temperature above –10°C (14°F).
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 5 seconds.
3. Turn ignition switch “ON” and select “HO2S1 (B1) P1144” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

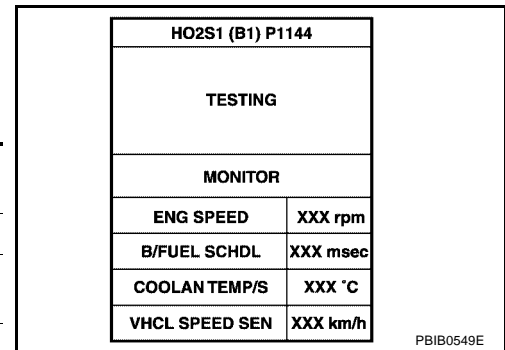
**NOTE:**

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.



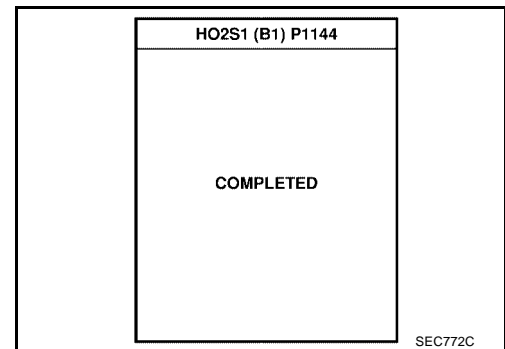
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 50 seconds or more.)

ENG SPEED	1,350 - 2,700 rpm (A/T models) 1,450 - 3,200 rpm (M/T models)
Vehicle speed	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	2.4 - 12.5 msec (A/T models) 2.0 - 10.0 msec (M/T models)
Selector lever	Suitable position



If “TESTING” is not displayed after 5 minutes, retry from step 2.

7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to [EC-417, "Diagnostic Procedure"](#).



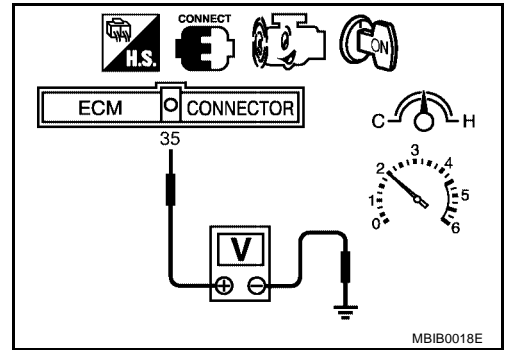
**Overall Function Check**

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a DTC might not be confirmed.



**WITH GST**

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1(B1) signal] and engine ground.
3. Check one of the following with engine speed held at 2,000 rpm constant under no load.
  - The maximum voltage is below 0.8V at least one time.
  - The minimum voltage is below 0.35V at least one time.
4. If NG, go to [EC-417, "Diagnostic Procedure"](#) .



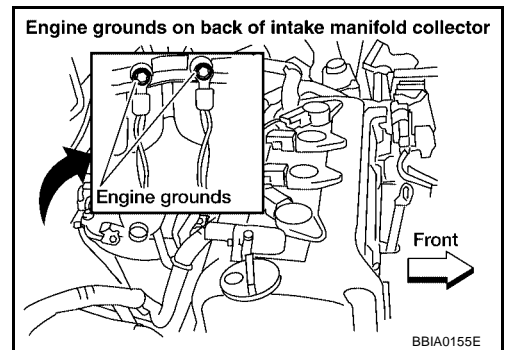
UBS003VO

**Diagnostic Procedure**

**1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.

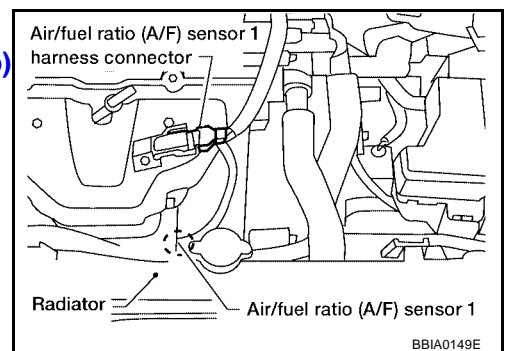


**2. RETIGHTEN HEATED OXYGEN SENSOR 1**

Loosen and retighten heated oxygen sensor 1.

**Tightening torque: 40 - 60 N·m (4.1 - 6.1 kg·m, 30 - 44 ft·lb)**

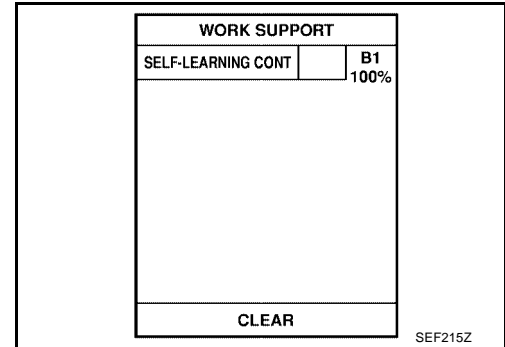
>> GO TO 3.



### 3. CLEAR THE SELF-LEARNING DATA

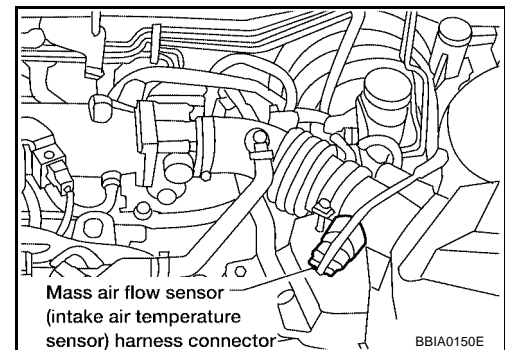
**With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0172 detected?**  
**Is it difficult to start engine?**



**Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-71, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0172 detected?**  
**Is it difficult to start engine?**



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0172. Refer to [EC-245](#).
- No >> GO TO 4.

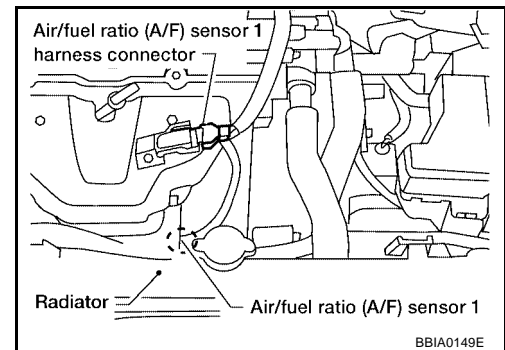
### 4. CHECK HO2S1 CONNECTOR FOR WATER

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 1 harness connector.
3. Check connectors for water.

**Water should not exist.**

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace harness or connectors.



### 5. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to [EC-156, "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace heated oxygen sensor 1.

## 6. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-419, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace heated oxygen sensor 1.

## 7. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

For circuit, refer to [EC-203, "Wiring Diagram"](#) .

>> INSPECTION END

### Component Inspection HEATED OXYGEN SENSOR 1

UBS003VP

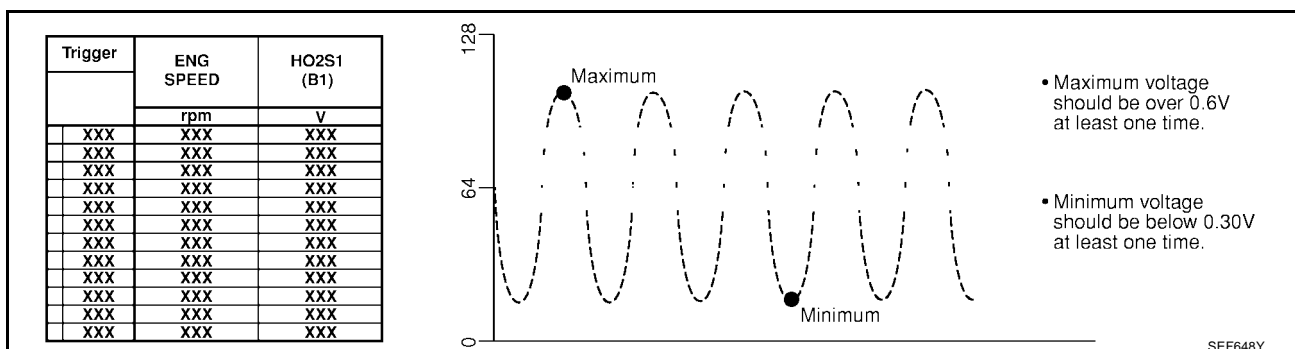
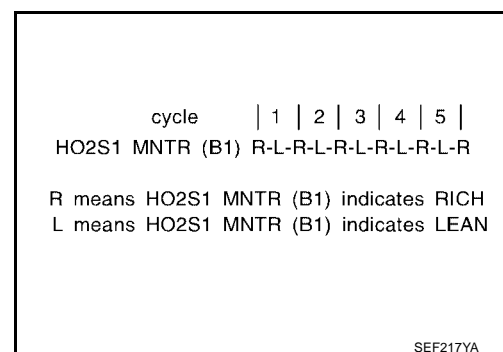
#### With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

6. Check the following.
  - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown at right.
  - "HO2S1 (B1)" voltage goes above 0.6V at least once.
  - "HO2S1 (B1)" voltage goes below 0.3V at least once.
  - "HO2S1 (B1)" voltage never exceeds 1.0V.



**CAUTION:**

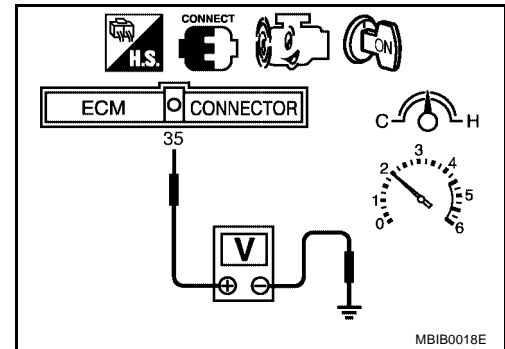
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1 (B1) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
  - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
  - The maximum voltage is over 0.6V at least one time.
  - The minimum voltage is below 0.3V at least one time.
  - The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V  
 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V



**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation  
HEATED OXYGEN SENSOR 1**

Refer to [EM-12, "Removal and Installation"](#).

UBS003VQ

**DTC P1146 HO2S2**

PF2:226A0

**Component Description**

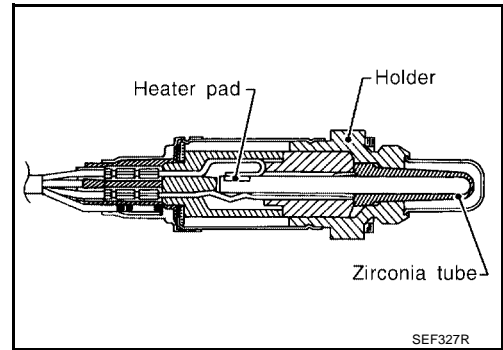
UBS006D6

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS006D7

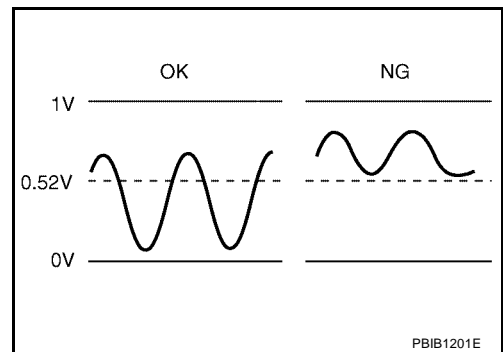
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	Revving engine from idle to 3,000 rpm quickly	0 - 0.3V ↔ 0.6 - 1.0V
HO2S2 MNTR (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	Revving engine from idle to 3,000 rpm quickly	LEAN ↔ RICH

**On Board Diagnosis Logic**

UBS006D8

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the minimum voltage of sensor is sufficiently low during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1146 1146	Heated oxygen sensor 2 minimum voltage monitoring	The minimum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Heated oxygen sensor 2</li> <li>● Fuel pressure</li> <li>● Injectors</li> </ul>

**DTC Confirmation Procedure**

UBS006D9

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

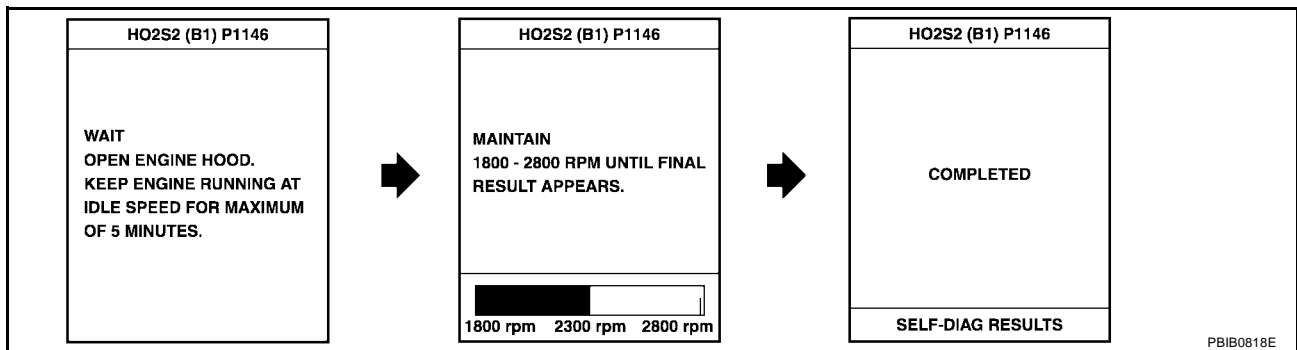
Open engine hood before conducting following procedure.

**WITH CONSULT-II**

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
5. Let engine idle for one minutes.
6. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).  
If not, warm up engine and go to next step when "COOLAN TEMP/S" indication reaches to 70°C (158°F).
7. Open engine hood.
8. Select "HO2S2 (B1) P1146" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
9. Start engine and following the instruction of CONSULT-II.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

SEF189Y



10. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".  
If "NG" is displayed, go to [EC-424, "Diagnostic Procedure"](#).  
If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
  - a. Turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle).
  - b. Return to step 1.

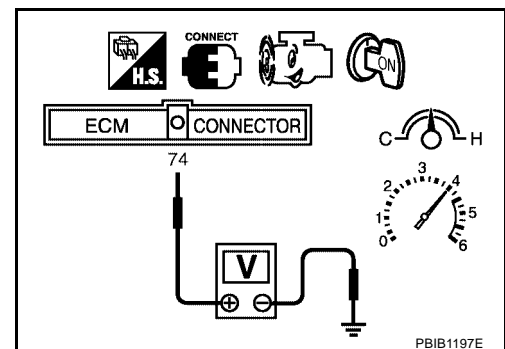
**Overall Function Check**

UBS006DA

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a DTC might not be confirmed.

**WITH GST**

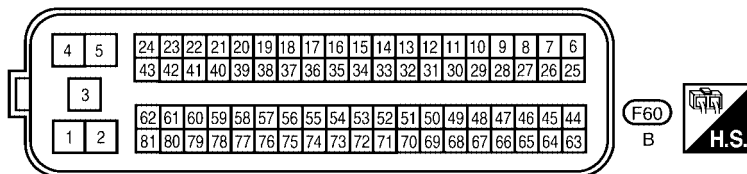
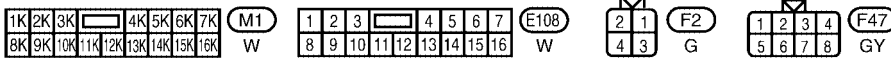
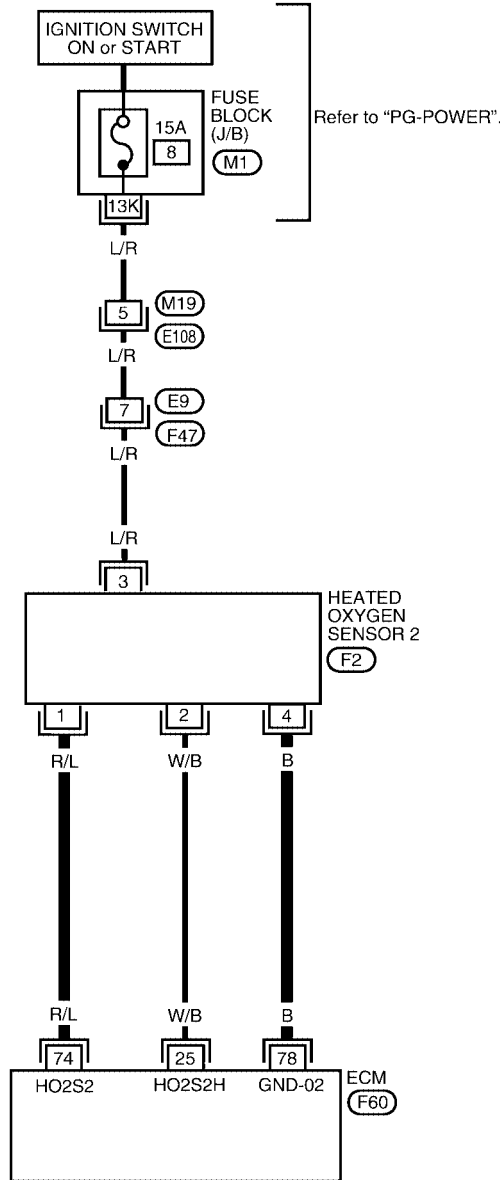
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minutes.
5. Set voltmeter probes between ECM terminal 74 [HO2S2 (B1) signal] and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
(Depress and release accelerator pedal as soon as possible.)  
**The voltage should be below 0.52V at least once during this procedure.**  
**If the voltage can be confirmed in step 6, step 7 is not necessary.**
7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).  
**The voltage should be below 0.52V at least once during this procedure.**
8. If NG, go to [EC-424, "Diagnostic Procedure"](#).



Wiring Diagram

EC-HO2S2-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	R/L	Heated oxygen sensor 2	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Engine speed is 2,000 rpm after the following conditions are met.</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	0 - Approximately 1.0V
78	B	Heated oxygen sensor ground	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	Approximately 0V

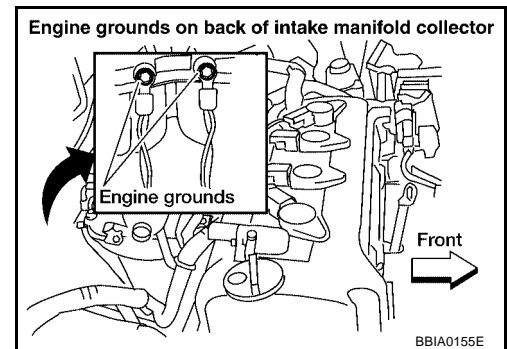
**Diagnostic Procedure**

UBS006DC

**1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.

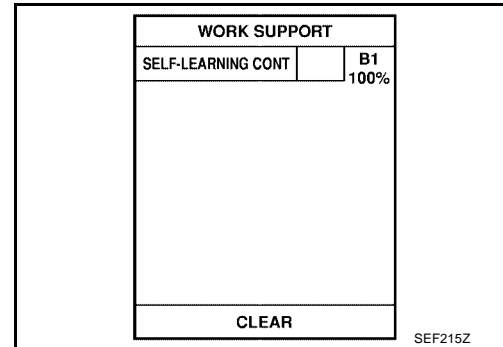




## 2. CLEAR THE SELF-LEARNING DATA

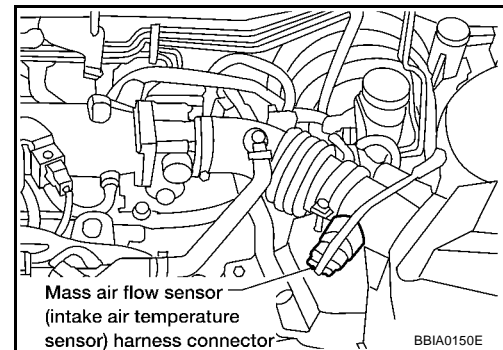
### ④ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0172 detected?  
Is it difficult to start engine?**



### ⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-71, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0172 detected?  
Is it difficult to start engine?**



#### Yes or No

- Yes >> Perform trouble diagnosis for DTC P0172. Refer to [EC-245](#) .  
No >> GO TO 3.

## 3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

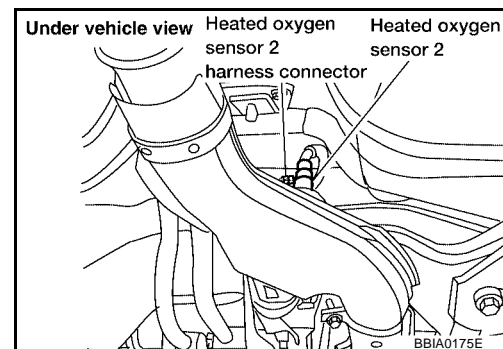
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 78 and HO2S2 terminal 4.  
Refer to Wiring Diagram.

**Continuity should exist.**

5. Also check harness for short to ground and short to power.

#### OK or NG

- OK >> GO TO 4.  
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



#### 4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 74 and HO2S2 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Check harness continuity between ECM terminal 74 or HO2S2 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

#### 5. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-426, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace heated oxygen sensor 2.

#### 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection HEATED OXYGEN SENSOR 2

UBS006DD

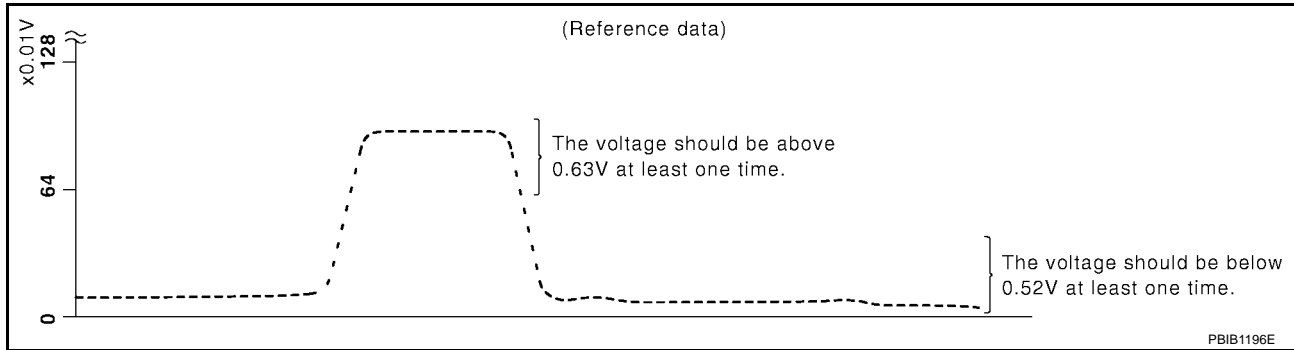
#### With CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle and wait until 2 minutes have passed from starting the engine.
5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

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6. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .



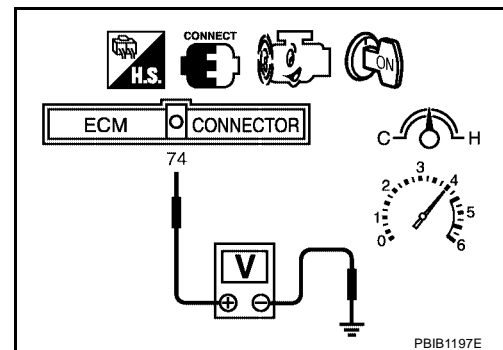
"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.  
 "HO2S2 (B1)" should be below 0.52V at least once when the "FUEL INJECTION" is -25%.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ **Without CONSULT-II**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
 (Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.63V at least once during this procedure.**  
**If the voltage is above 0.63V at step 6, step 7 is not necessary.**
7. Keep vehicle at idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).  
**The voltage should be below 0.52V at least once during this procedure.**
8. If NG, replace heated oxygen sensor 2.



**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation**  
**HEATED OXYGEN SENSOR 2**

Refer to [EX-3. "EXHAUST SYSTEM"](#) .

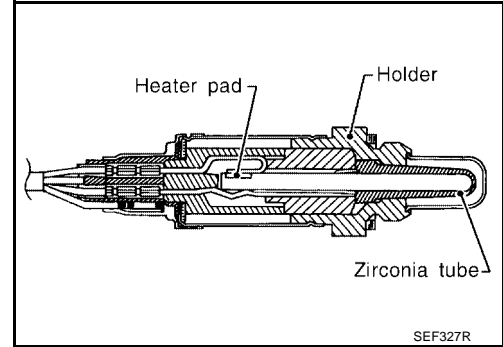
UBS006DE

**DTC P1147 HO2S2**

**Component Description**

UBS006DF

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas. Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2. This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS006DG

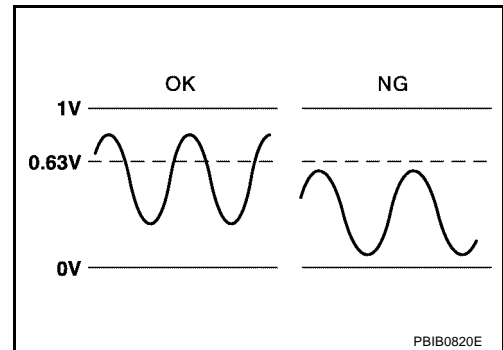
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	Revving engine from idle to 3,000 rpm quickly	0 - 0.3V ↔ 0.6 - 1.0V
HO2S2 MNTR (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	Revving engine from idle to 3,000 rpm quickly	LEAN ↔ RICH

**On Board Diagnosis Logic**

UBS006DH

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1147 1147	Heated oxygen sensor 2 maximum voltage monitoring	The maximum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit open or shorted.)</li> <li>● Heated oxygen sensor 2</li> <li>● Fuel pressure</li> <li>● Injectors</li> <li>● Intake air leaks</li> </ul>

## DTC Confirmation Procedure

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

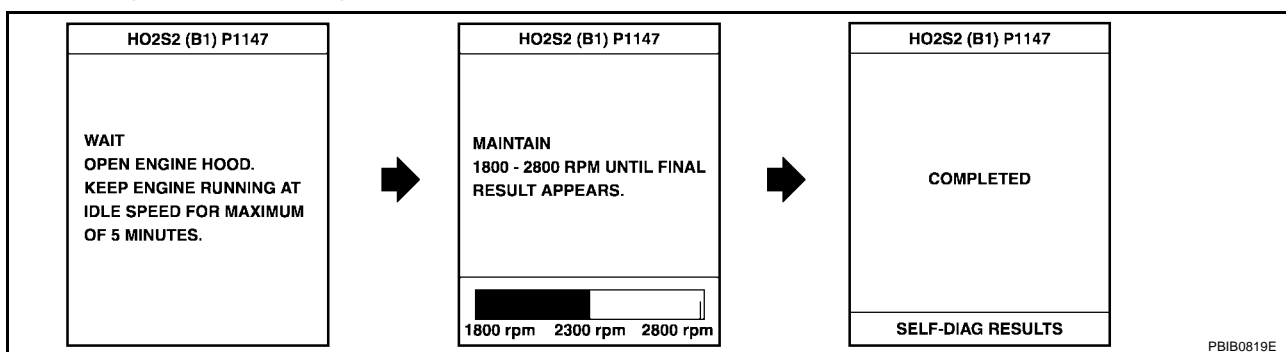
Open engine hood before conducting following procedure.

### WITH CONSULT-II

- Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
- Let engine idle for one minute.
- Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).  
If not, warm up engine and go to next step when "COOLANT TEMP/S" indication reaches to 70°C (158°F)
- Select "HO2S2 (B1) P1147" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
- Start engine and following the instruction of CONSULT-II.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

SEF189Y



- Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".  
If "NG" is displayed, go to [EC-432, "Diagnostic Procedure"](#).  
If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
  - Turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle).
  - Return to step 1.

## Overall Function Check

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a DTC might not be confirmed.

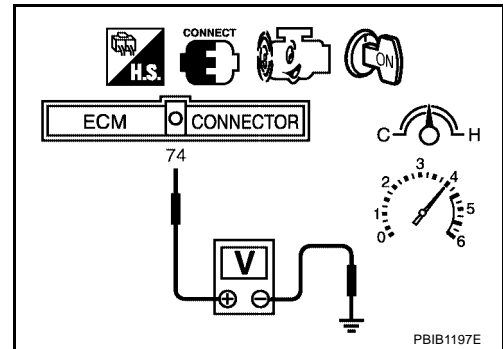
### WITH GST

- Start engine and warm it up to the normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
- Let engine idle for one minute.
- Set voltmeter probes between ECM terminal 74 [HO2S2 (B1) signal] and engine ground.

## DTC P1147 HO2S2

[QG18DE (ULEV)]

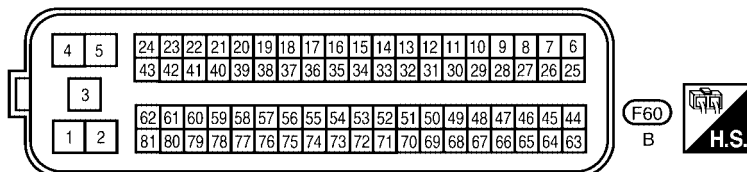
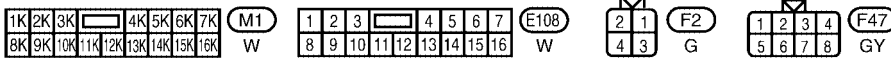
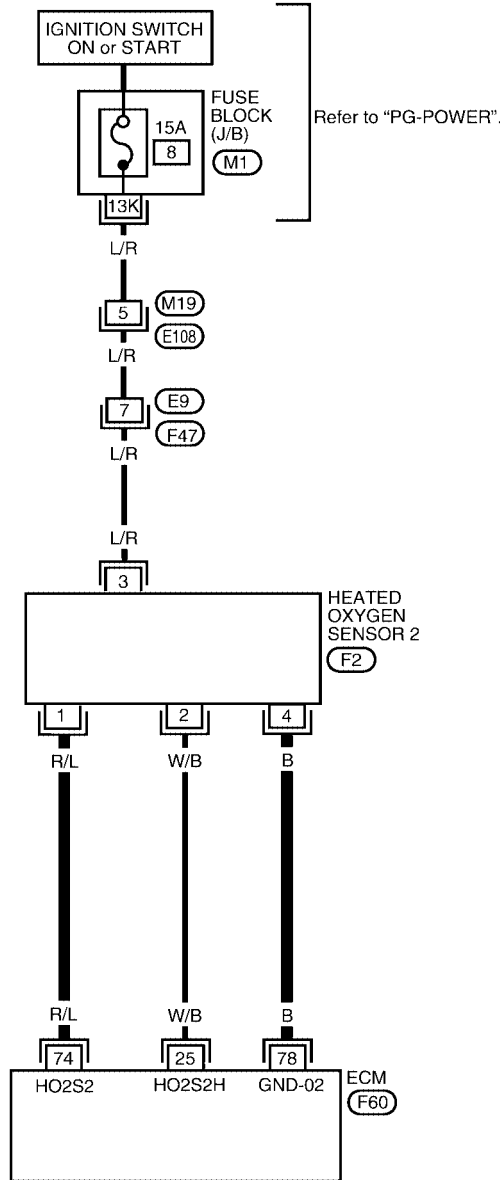
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
(Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.63V at least once during this procedure.**  
**If the voltage can be confirmed in step 6, step 7 is not necessary.**
7. Keep vehicle idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).  
**The voltage should be above 0.63V at least once during this procedure.**
8. If NG, go to [EC-432, "Diagnostic Procedure"](#) .



Wiring Diagram

EC-HO2S2-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	R/L	Heated oxygen sensor 2	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm after the following conditions are met.</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	0 - Approximately 1.0V
78	B	Heated oxygen sensor ground	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	Approximately 0V

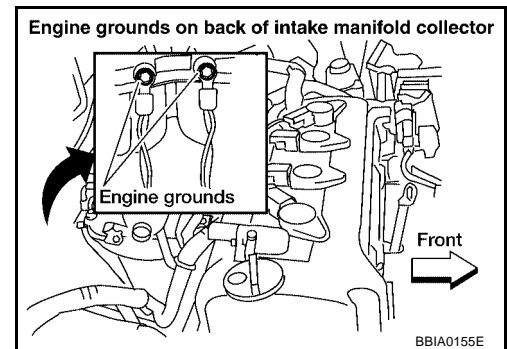
**Diagnostic Procedure**

UBS006DL

**1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.

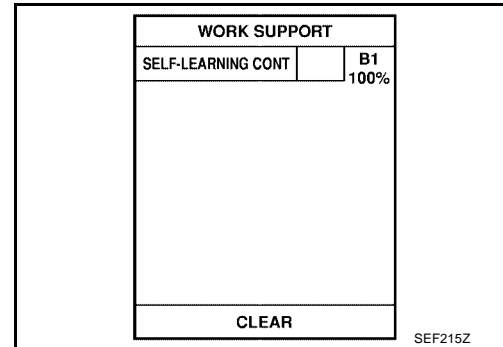




## 2. CLEAR THE SELF-LEARNING DATA

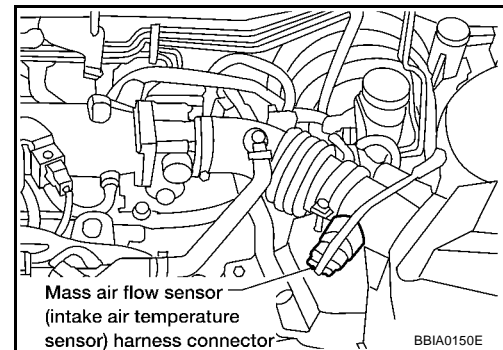
### Ⓟ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 detected?  
Is it difficult to start engine?**



### ⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-71, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 detected?  
Is it difficult to start engine?**



#### Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171. Refer to [EC-238](#) .  
No >> GO TO 3.

## 3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

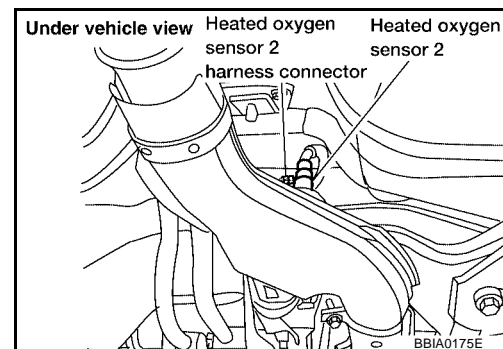
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 78 and HO2S2 terminal 4.  
Refer to Wiring Diagram.

**Continuity should exist.**

5. Also check harness for short to ground and short to power.

#### OK or NG

- OK >> GO TO 4.  
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



**4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Check harness continuity between ECM terminal 74 and HO2S2 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Check harness continuity between ECM terminal 74 or HO2S2 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**5. CHECK HEATED OXYGEN SENSOR 2**

Refer to [EC-434, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace heated oxygen sensor 2.

**6. CHECK INTERMITTENT INCIDENT**

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection  
HEATED OXYGEN SENSOR 2**

UBS006DM

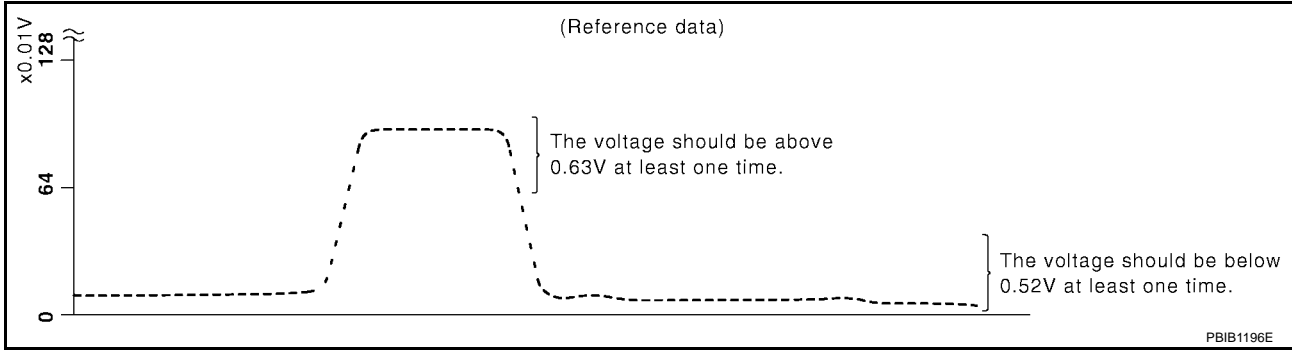
**With CONSULT-II**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle one minute.
5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

6. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .



"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.  
 "HO2S2 (B1)" should be below 0.52V at least once when the "FUEL INJECTION" is -25%.

**CAUTION:**

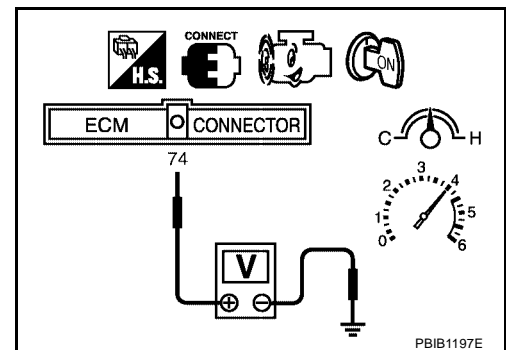
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ **Without CONSULT-II**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
 (Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.63V at least once during this procedure.**

**If the voltage is above 0.63V at step 6, step 7 is not necessary.**

7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).  
**The voltage should be below 0.52V at least once during this procedure.**



8. If NG, replace heated oxygen sensor 2.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation  
 HEATED OXYGEN SENSOR 2**

Refer to [EX-3. "EXHAUST SYSTEM"](#) .

UBS006DN

## DTC P1148 CLOSED LOOP CONTROL

PFP:22690

### On Board Diagnosis Logic

UBS0057U

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1148 1148	Closed loop control function	The closed loop control function does not operate even when vehicle is driving in the specified condition.	<ul style="list-style-type: none"> <li>● The heated oxygen sensor 1 circuit is open or shorted.</li> <li>● Heated oxygen sensor 1</li> <li>● Heated oxygen sensor heater</li> </ul>

### DTC Confirmation Procedure

UBS0057V

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- Never raise engine speed above 3,600 rpm during the "DTC Confirmation Procedure". If the engine speed limit is exceeded, retry the procedure from step 2.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Hold engine speed at 2,000 rpm and check one of the following.
  - "HO2S1 (B1)" voltage should go above 0.70V at least once.
  - "HO2S1 (B1)" voltage should go below 0.21V at least once.
 If the check result is NG, perform [EC-437, "Diagnostic Procedure"](#).  
 If the check result is OK, perform the following step.
4. Let engine idle at least 5 minutes.
5. Maintain the following condition at least 50 consecutive seconds.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLANT TEMP/S	XXX °C
HO2S1 (B1)	XXX V
VHCL SPEED SE	XXX km/h

SEF682Y

B/FUEL SCHDL	2.4 msec or more (A/T models) 2.0 msec or more (M/T models)
ENG SPEED	More than 1,700 rpm (A/T models) More than 2,050 rpm (M/T models)
Selector lever	Suitable position
VHCL SPEED SE	More than 70 km/h (43 MPH)

During this test, P0134 may be displayed on CONSULT-II screen.

6. If DTC is detected, go to [EC-437, "Diagnostic Procedure"](#).

### Overall Function Check

UBS0057W

Use this procedure to check the overall function of the closed loop control. During this check, a DTC might not be confirmed.

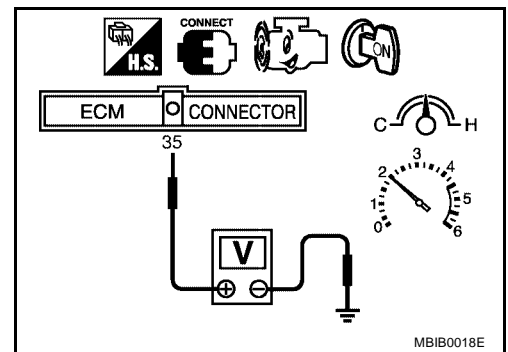
**WITH GST**

1. Start engine and warm it up to normal operating temperature.

# DTC P1148 CLOSED LOOP CONTROL

[QG18DE (ULEV)]

2. Set voltmeter probes between ECM terminal 35 [HO2S1 (B1) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no-load.
  - The voltage should go above 0.70V at least once.
  - The voltage should go below 0.21V at least once.
4. If NG, go to [EC-437, "Diagnostic Procedure"](#) .



UBS0057X

## Diagnostic Procedure

Perform trouble diagnosis for "DTC P0133", [EC-211](#) .

# DTC P1217 ENGINE OVER TEMPERATURE

[QG18DE (ULEV)]

## DTC P1217 ENGINE OVER TEMPERATURE

PF0:00000

### System Description COOLING FAN CONTROL

UBS001MV

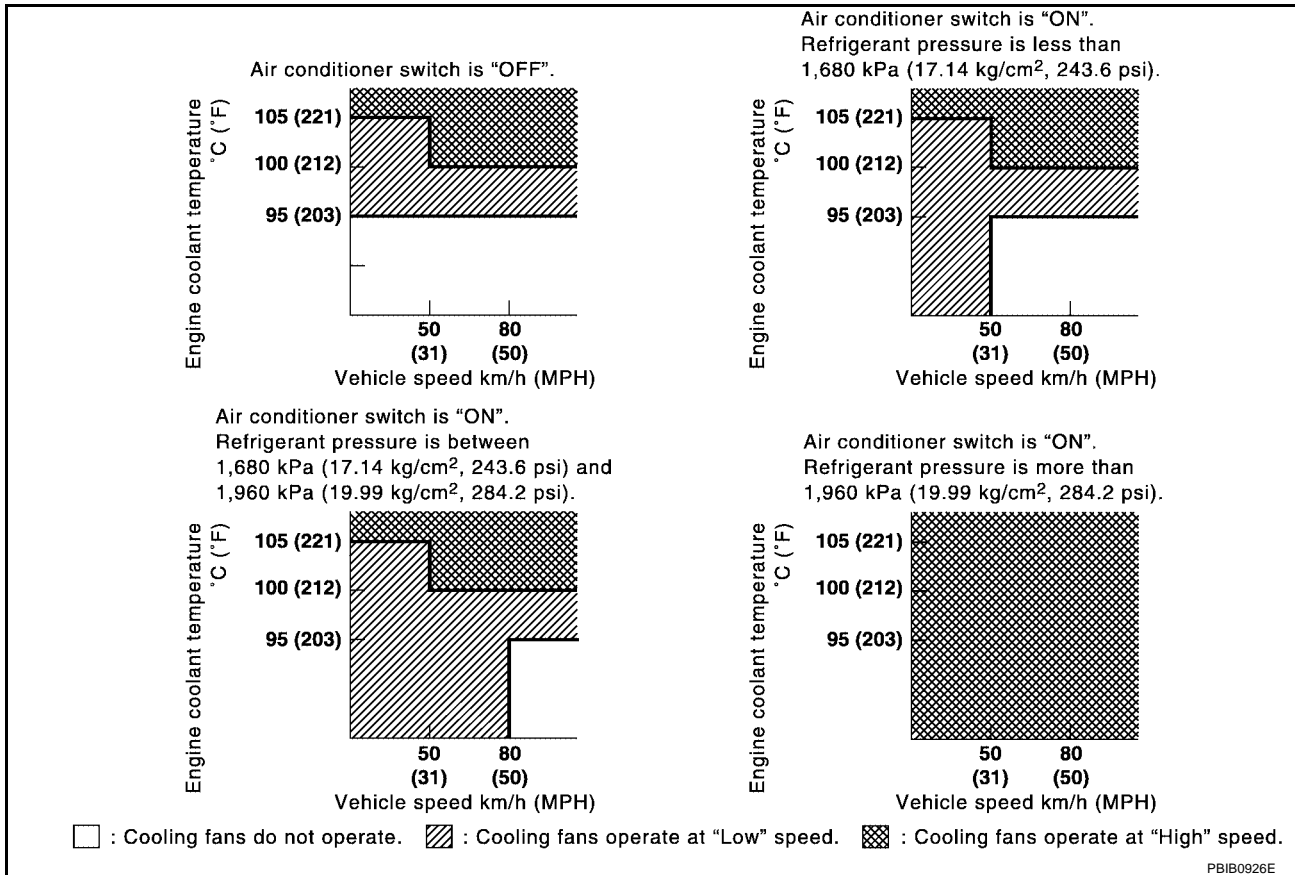
Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1		
Battery	Battery voltage*1		
Vehicle speed signal	Vehicle speed*2	Cooling fan control	Cooling fan relay(s)
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner "ON" signal		
Refrigerant pressure sensor	Refrigerant pressure		

\*1: The ECM determines the start signal status by the signals of engine speed and battery voltage.

\*2: These signals are sent to the ECM through CAN communication line.

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

### OPERATION



### CONSULT-II Reference Value in Data Monitor Mode

UBS001MV

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF
		Air conditioner switch: ON (Compressor operates)
		OFF
		ON

# DTC P1217 ENGINE OVER TEMPERATURE

[QG18DE (ULEV)]

MONITOR ITEM	CONDITION		SPECIFICATION
COOLING FAN	<ul style="list-style-type: none"> <li>After warming up engine, idle the engine.</li> <li>Air conditioner switch: OFF</li> </ul>	Engine coolant temperature is 94°C (201°F) or less	OFF
		Engine coolant temperature is between 95°C (203°F) and 104°C (219°F)	LOW
		Engine coolant temperature is 105°C (221°F) or more	HIGH

## On Board Diagnosis Logic

UBS006GS

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise. When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

**This self-diagnosis has the one trip detection logic.**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217 1217	Engine over temperature (Overheat)	<ul style="list-style-type: none"> <li>Cooling fan does not operate properly (Overheat).</li> <li>Cooling fan system does not operate properly (Overheat).</li> <li>Engine coolant was not added to the system using the proper filling method.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (The cooling fan circuit is open or shorted.)</li> <li>Cooling fan</li> <li>Radiator hose</li> <li>Radiator</li> <li>Radiator cap</li> <li>Water pump</li> <li>Thermostat</li> </ul> <p>For more information, refer to <a href="#">EC-1662</a>, "Main 12 Causes of Overheating".</p>

### CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to [MA-16, "Changing Engine Coolant"](#). Also, replace the engine oil. Refer to [LU-17, "Changing Engine Oil"](#).

- Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to [MA-14, "Anti-freeze Coolant Mixture Ratio"](#).
- After refilling coolant, run engine to ensure that no water-flow noise is emitted.

## Overall Function Check

UBS001MY

Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

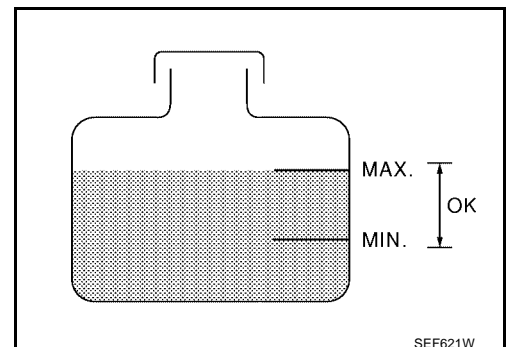
### WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.

Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

### WITH CONSULT-II

- Check the coolant level in the reservoir tank and radiator.  
**Allow engine to cool before checking coolant level.**  
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to [EC-442, "Diagnostic Procedure"](#).
- Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-442, "Diagnostic Procedure"](#).
- Turn ignition switch "ON".



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# DTC P1217 ENGINE OVER TEMPERATURE

[QG18DE (ULEV)]

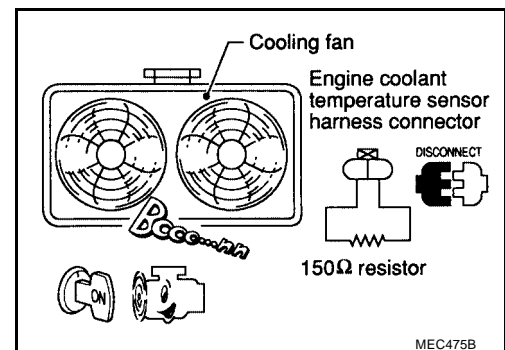
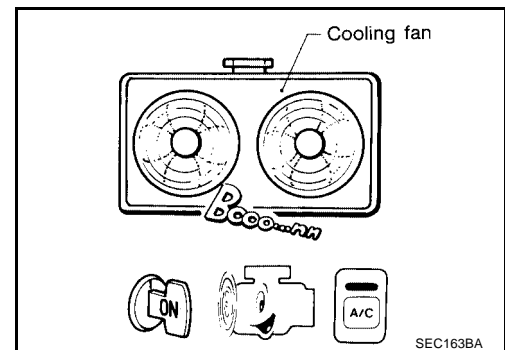
4. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
5. If the results are NG, go to [EC-442, "Diagnostic Procedure"](#).

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLANT TEMP/S	XXX °C

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## WITH GST

1. Check the coolant level in the reservoir tank and radiator.  
**Allow engine to cool before checking coolant level.**  
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to [EC-442, "Diagnostic Procedure"](#).
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-442, "Diagnostic Procedure"](#).
3. Start engine.  
**Be careful not to overheat engine.**
4. Set temperature control lever to full cold position.
5. Turn air conditioner switch "ON".
6. Turn blower fan switch "ON".
7. Run engine at idle for a few minutes with air conditioner operating.  
**Be careful not to overheat engine.**
8. Make sure that cooling fan operates at low speed.  
If NG, go to [EC-442, "Diagnostic Procedure"](#).  
If OK, go to the following step.
9. Turn ignition switch "OFF".
10. Turn air conditioner switch and blower fan switch "OFF".
11. Disconnect engine coolant temperature sensor harness connector.
12. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
13. Restart engine and make sure that cooling fan operates at higher speed than low speed.  
**Be careful not to overheat engine.**
14. If NG, go to [EC-442, "Diagnostic Procedure"](#).





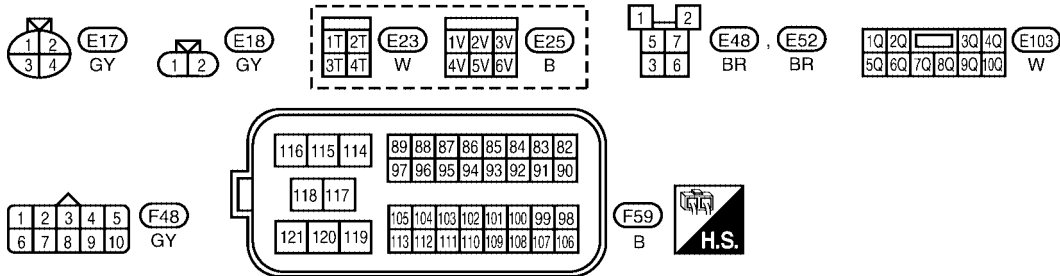
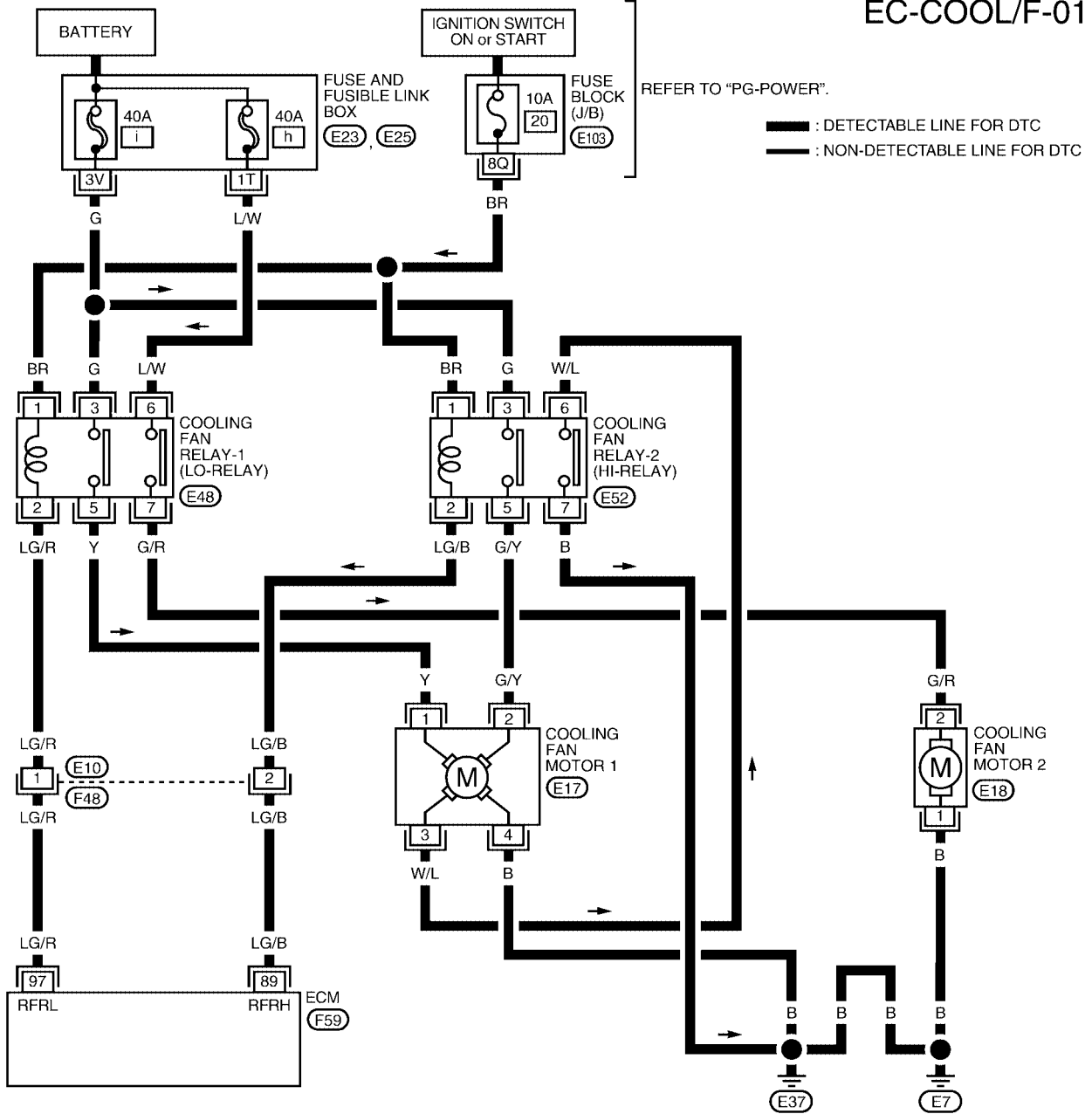
# DTC P1217 ENGINE OVER TEMPERATURE

[QG18DE (ULEV)]

UBS001M2

## Wiring Diagram

EC-COOL/F-01



BBWA0300E

## Diagnostic Procedure

### 1. INSPECTION START

Do you have CONSULT-II?

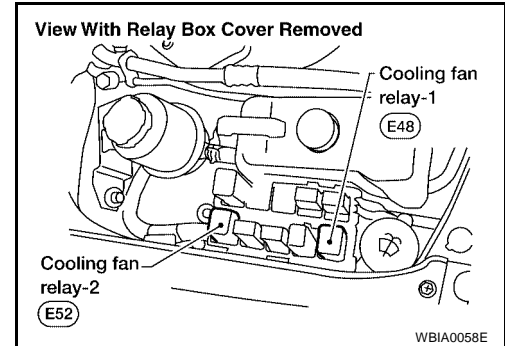
Yes or No

- Yes >> GO TO 2.
- No >> GO TO 4.

### 2. CHECK COOLING FAN LOW SPEED OPERATION

 **With CONSULT-II**

1. Disconnect cooling fan relay-2.
2. Turn ignition switch "ON".



3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
4. Make sure that cooling fans-1 and -2 operate at low speed.

OK or NG

- OK >> GO TO 3.
- NG >> Check cooling fan low speed control circuit. (Go to [EC-446, "PROCEDURE A"](#) .)

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLAN TEMP/S	XXX °C

SEF646X

### 3. CHECK COOLING FAN HIGH SPEED OPERATION

 **With CONSULT-II**

1. Turn ignition switch "OFF".
2. Reconnect cooling fan relay-2.
3. Disconnect cooling fan relay-1.
4. Turn ignition switch "ON".
5. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
6. Make sure that cooling fan-1 operates at higher speed than low speed.

OK or NG

- OK >> GO TO 6.
- NG >> Check cooling fan high speed control circuit. (Go to [EC-448, "PROCEDURE B"](#) .)

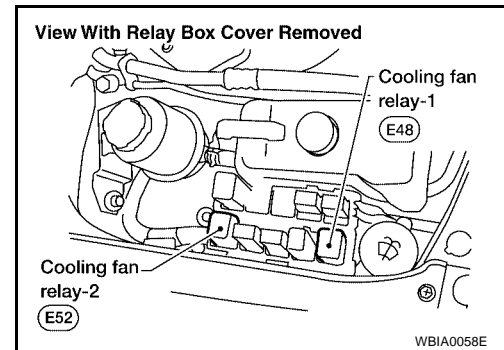
ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLAN TEMP/S	XXX °C

SEF646X

## 4. CHECK COOLING FAN LOW SPEED OPERATION

⊗ **Without CONSULT-II**

1. Disconnect cooling fan relay-2.
2. Start engine and let it idle.
3. Set temperature lever at full cold position.
4. Turn air conditioner switch "ON".
5. Turn blower fan switch "ON".

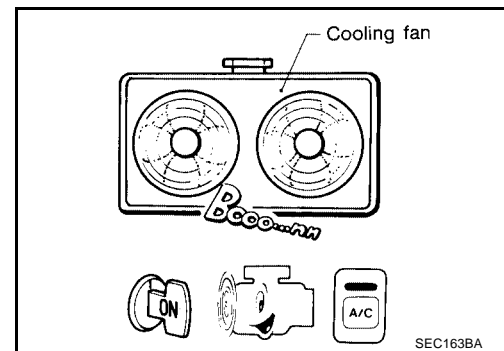


6. Make sure that cooling fans-1 and -2 operate at low speed.

OK or NG

OK >> GO TO 5.

NG >> Check cooling fan low speed control circuit. (Go to [EC-446, "PROCEDURE A"](#) .)



## 5. CHECK COOLING FAN HIGH SPEED OPERATION

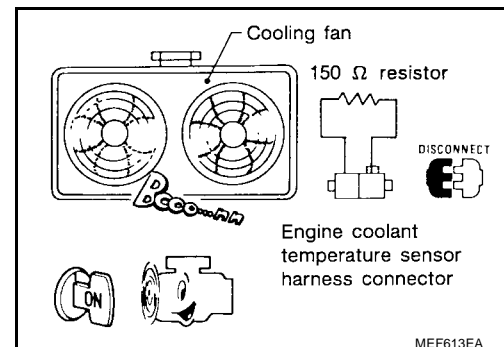
⊗ **Without CONSULT-II**

1. Turn ignition switch "OFF".
2. Reconnect cooling fan relay-2.
3. Disconnect cooling fan relay-1.
4. Turn air conditioner switch and blower fan switch "OFF".
5. Disconnect engine coolant temperature sensor harness connector.
6. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
7. Restart engine and make sure that cooling fan-1 operate at higher speed than low speed.

OK or NG

OK >> GO TO 6.

NG >> Check cooling fan high speed control circuit. (Go to [EC-448, "PROCEDURE B"](#) .)



## 6. CHECK COOLING SYSTEM FOR LEAK

Apply pressure to the cooling system with a tester, and check if the pressure drops.

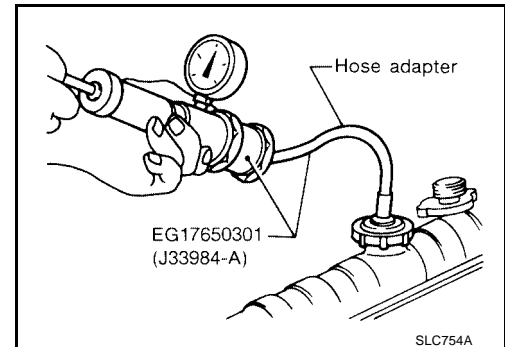
**Testing pressure:** 157 kPa (1.6 kg/cm<sup>2</sup> , 23 psi)

**CAUTION:**

Higher than the specified pressure may cause radiator damage.  
Pressure should not drop.

OK or NG

- OK >> GO TO 8.  
NG >> GO TO 7.



## 7. DETECT MALFUNCTIONING PART

Check the following for leaks.

- Hose
- Radiator
- Water pump (Refer to [CO-9, "WATER PUMP"](#) .)

>> Repair or replace.

## 8. CHECK RADIATOR CAP

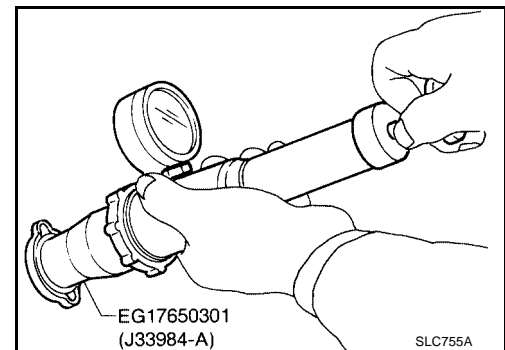
Apply pressure to cap with a tester and check radiator cap relief pressure.

**Radiator cap relief pressure:**

59 - 98 kPa (0.6 - 1.0 kg/cm<sup>2</sup> , 9 - 14 psi)

OK or NG

- OK >> GO TO 9.  
NG >> Replace radiator cap.



**9. CHECK THERMOSTAT**

1. Remove thermostat.
2. Check valve seating condition at normal room temperatures.  
**It should seat tightly.**
3. Check valve opening temperature and valve lift.

**Valve opening temperature:**

**76.5°C (170°F) [standard]**

**Valve lift:**

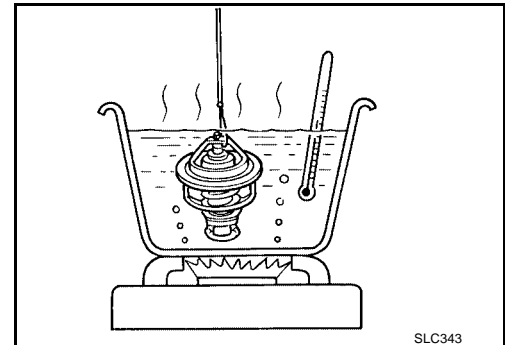
**More than 9 mm/90°C (0.35 in/194°F)**

4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to [CO-11. "THERMOSTAT AND THERMOSTAT HOUSING"](#).

OK or NG

OK >> GO TO 10.

NG >> Replace thermostat

**10. CHECK ENGINE COOLANT TEMPERATURE SENSOR**

Refer to [EC-185. "Component Inspection"](#).

OK or NG

OK >> GO TO 11.

NG >> Replace engine coolant temperature sensor.

**11. CHECK MAIN 12 CAUSES**

If the cause cannot be isolated, go to [EC-449. "Main 12 Causes of Overheating"](#).

>> **INSPECTION END**

## PROCEDURE A

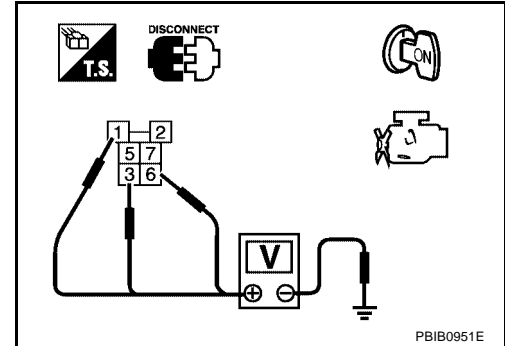
### 1. CHECK COOLING FAN POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan relay-1.
3. Turn ignition switch "ON".
4. Check voltage between cooling fan relay-1 terminals 1, 3, 6 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- 40A fusible links
- Harness for open or short between cooling fan relay-1 and fuse
- Harness for open or short between cooling fan relay-1 and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

### 3. CHECK COOLING FAN GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
3. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-1 terminal 1, cooling fan motor-1 terminal 4 and ground. Refer to Wiring Diagram.

**Continuity should exist.**

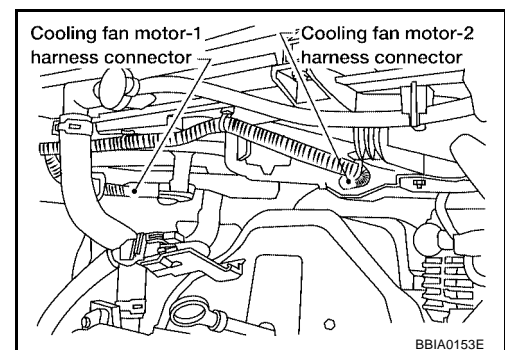
4. Also check harness for short to ground and short to power.
5. Check harness continuity between cooling fan relay-1 terminal 7 and cooling fan motor-2 terminal 2, cooling fan motor-2 terminal 1 and ground. Refer to Wiring Diagram.

**Continuity should exist.**

6. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



**4. CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 13 and cooling fan relay-1 terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
NG >> GO TO 5.

**5. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors E10, F48
- Harness for open or short between cooling fan relay-1 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK COOLING FAN RELAY-1**

Refer to [EC-450, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.  
NG >> Replace cooling fan relay.

**7. CHECK COOLING FAN MOTORS-1 AND -2**

Refer to [EC-450, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.  
NG >> Replace cooling fan motors.

**8. CHECK INTERMITTENT INCIDENT**

Perform [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

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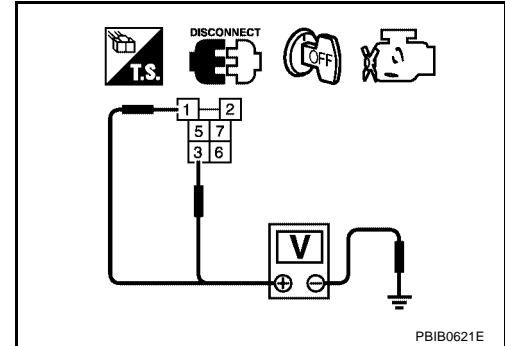
## PROCEDURE B

### 1. CHECK COOLING FAN POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan relay-2.
3. Turn ignition switch "ON".
4. Check voltage between cooling fan relay-2 terminals 1, 3 and ground with CONSULT-II or tester.

OK or NG

- OK    >> GO TO 3.  
 NG    >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- 40A fusible link
- Harness for open or short between cooling fan relay-2 and fuse
- Harness for open or short between cooling fan relay-2 and fusible link

>> Repair harness or connectors.

### 3. CHECK COOLING FAN GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-2 harness connector.
3. Check harness continuity between cooling fan relay-2 terminal 5 and cooling fan motor-1 terminal 2, cooling fan relay-2 terminal 6 and cooling fan motor-1 terminal 3, cooling fan relay-2 terminal 7 and ground. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK    >> GO TO 4.  
 NG    >> Repair open circuit or short to ground or short to power in harness or connectors.

### 4. CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 12 and cooling fan relay-2 terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK    >> GO TO 6.  
 NG    >> GO TO 5.



**5. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors E10, F48
- Harness for open or short between cooling fan relay-2 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK COOLING FAN RELAY-2**

Refer to [EC-450, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace cooling fan relays.

**7. CHECK COOLING FAN MOTORS-1 AND -2**

Refer to [EC-450, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace cooling fan motors.

**8. CHECK INTERMITTENT INCIDENT**

Perform [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Main 12 Causes of Overheating**

UBS001N1

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> <li>● Blocked radiator</li> <li>● Blocked condenser</li> <li>● Blocked radiator grille</li> <li>● Blocked bumper</li> </ul>	<ul style="list-style-type: none"> <li>● Visual</li> </ul>	No blocking	—
	2	<ul style="list-style-type: none"> <li>● Coolant mixture</li> </ul>	<ul style="list-style-type: none"> <li>● Coolant tester</li> </ul>	50 - 50% coolant mixture	See <a href="#">MA-13, "RECOMMENDED FLUIDS AND LUBRICANTS"</a> .
	3	<ul style="list-style-type: none"> <li>● Coolant level</li> </ul>	<ul style="list-style-type: none"> <li>● Visual</li> </ul>	Coolant up to MAX level in reservoir tank and radiator filler neck	See <a href="#">MA-16, "Changing Engine Coolant"</a> .
	4	<ul style="list-style-type: none"> <li>● Radiator cap</li> </ul>	<ul style="list-style-type: none"> <li>● Pressure tester</li> </ul>	59 - 98 kPa (0.6 - 1.0 kg/cm <sup>2</sup> , 9 - 14 psi) (Limit)	See <a href="#">CO-7, "System Check"</a> .
ON*2	5	<ul style="list-style-type: none"> <li>● Coolant leaks</li> </ul>	<ul style="list-style-type: none"> <li>● Visual</li> </ul>	No leaks	See <a href="#">CO-7, "System Check"</a> .
ON*2	6	<ul style="list-style-type: none"> <li>● Thermostat</li> </ul>	<ul style="list-style-type: none"> <li>● Touch the upper and lower radiator hoses</li> </ul>	Both hoses should be hot	See <a href="#">CO-11, "THERMOSTAT AND THERMOSTAT HOUSING"</a> , and <a href="#">CO-13, "RADIATOR"</a> .
ON*1	7	<ul style="list-style-type: none"> <li>● Cooling fan</li> </ul>	<ul style="list-style-type: none"> <li>● CONSULT-II</li> </ul>	Operating	See trouble diagnosis for <a href="#">EC-438, "DTC P1217 ENGINE OVER TEMPERATURE"</a>
OFF	8	<ul style="list-style-type: none"> <li>● Combustion gas leak</li> </ul>	<ul style="list-style-type: none"> <li>● Color checker chemical tester 4 Gas analyzer</li> </ul>	Negative	—

# DTC P1217 ENGINE OVER TEMPERATURE

[QG18DE (ULEV)]

Engine	Step	Inspection item	Equipment	Standard	Reference page
ON*3	9	● Coolant temperature gauge	● Visual	Gauge less than 3/4 when driving	—
		● Coolant overflow to reservoir tank	● Visual	No overflow during driving and idling	See <a href="#">MA-16, "Changing Engine Coolant"</a> .
OFF*4	10	● Coolant return from reservoir tank to radiator	● Visual	Should be initial level in reservoir tank	See <a href="#">CO-7, "System Check"</a> .
OFF	11	● Cylinder head	● Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See <a href="#">EM-58, "Inspection after Disassembly"</a> .
	12	● Cylinder block and pistons	● Visual	No scuffing on cylinder walls or piston	See <a href="#">EM-69, "Inspection"</a> .

\*1: Turn the ignition switch ON.

\*2: Engine running at 3,000 rpm for 10 minutes.

\*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

\*4: After 60 minutes of cool down time.

For more information, refer to [CO-5, "OVERHEATING CAUSE ANALYSIS"](#) .

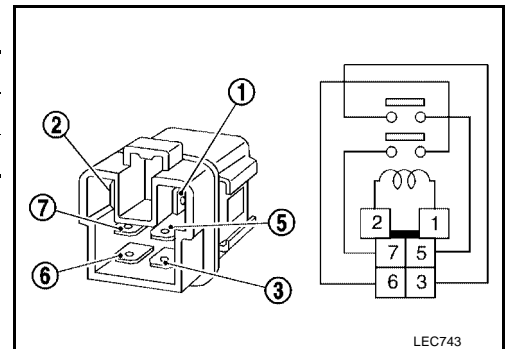
## Component Inspection COOLING FAN RELAYS-1 AND -2

UBS001N2

Check continuity between terminals 3 and 5, 6 and 7.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

If NG, replace relay.



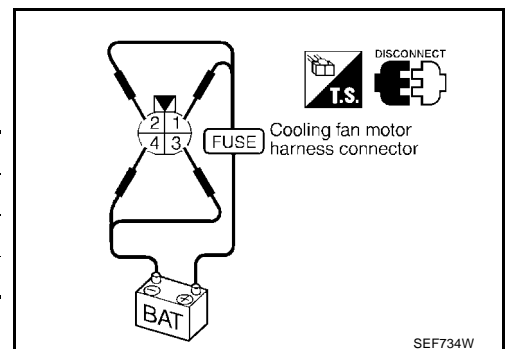
### COOLING FAN MOTOR-1

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

	Speed	Terminals	
		(+)	(-)
Cooling fan motor	Low	1	4
	High	1, 2	3, 4

Cooling fan motor should operate.

If NG, replace cooling fan motor.



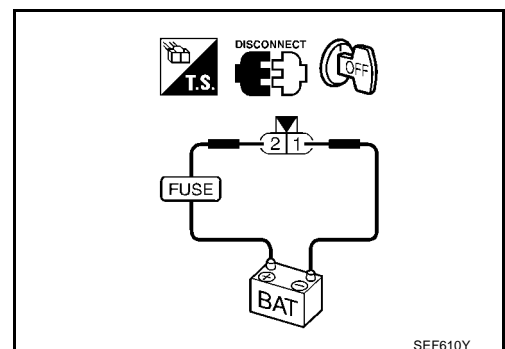
### COOLING FAN MOTOR-2

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

	Terminals	
	(+)	(-)
Cooling fan motor	2	1

Cooling fan motor should operate.

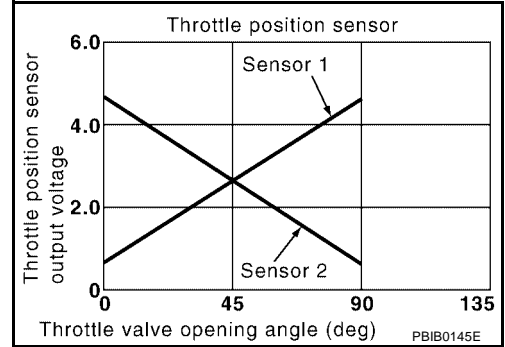
If NG, replace cooling fan motor.



**DTC P1225 TP SENSOR**

**Component Description**

Electric Throttle Control Actuator consists of throttle control motor, acceleration pedal position sensor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement. The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



**On Board Diagnosis Logic**

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225 1225	Closed throttle position learning performance problem	Closed throttle position learning value is excessively low.	<ul style="list-style-type: none"> <li>Electric throttle control actuator (TP sensor 1 and 2)</li> </ul>

**DTC Confirmation Procedure**

**NOTE:**

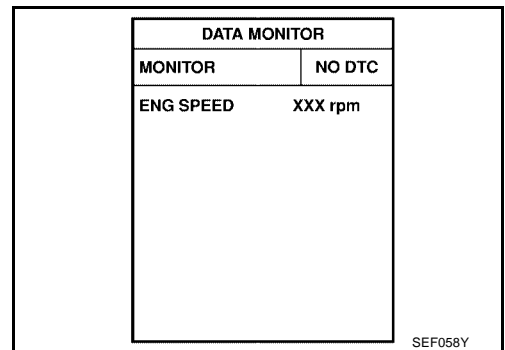
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds.
4. Turn ignition switch "ON".
5. If 1st trip DTC is detected, go to [EC-452, "Diagnostic Procedure"](#)



**WITH GST**

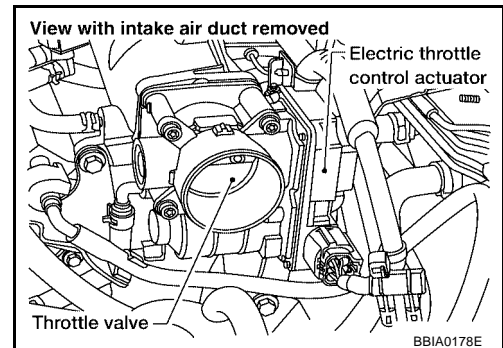
Follow the procedure "WITH CONSULT-II" above.

**Diagnostic Procedure****1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY**

1. Turn ignition switch "OFF".
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve and the housing.

**OK or NG**

- OK >> GO TO 2.  
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

**2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

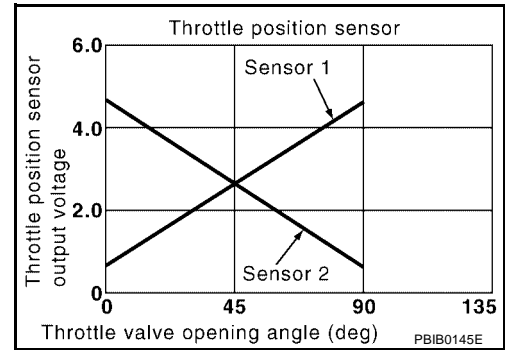
**Removal and Installation  
ELECTRIC THROTTLE CONTROL ACTUATOR**

Refer to [EM-12, "Removal and Installation"](#) .

**DTC P1226 TP SENSOR**

**Component Description**

Electric Throttle Control Actuator consists of throttle control motor, acceleration pedal position sensor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement. The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



**On Board Diagnosis Logic**

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226 1226	Closed throttle position learning performance problem	Closed throttle position learning is not performed successfully, repeatedly.	<ul style="list-style-type: none"> <li>Electric throttle control actuator (TP sensor 1 and 2)</li> </ul>

**DTC Confirmation Procedure**

**NOTE:**

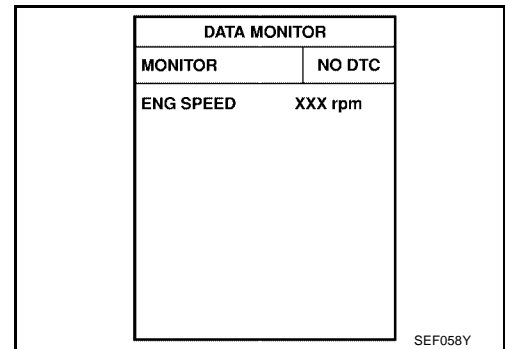
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds.
4. Turn ignition switch "ON".
5. Repeat steps 3 and 4, 32 times.
6. If 1st trip DTC is detected, go to [EC-454, "Diagnostic Procedure"](#)



**WITH GST**

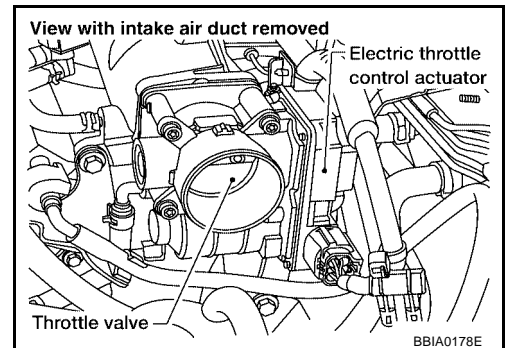
Follow the procedure "With CONSULT-II" above.

**Diagnostic Procedure****1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY**

1. Turn ignition switch "OFF".
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve and the housing.

**OK or NG**

- OK >> GO TO 2.  
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

**2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**Removal and Installation  
ELECTRIC THROTTLE CONTROL ACTUATOR**

Refer to [EM-12, "Removal and Installation"](#) .

## DTC P1229 SENSOR POWER SUPPLY

PFP:16119

### On Board Diagnosis Logic

UBS0040I

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1229 1229	Sensor power supply circuit short	ECM detects a voltage of power source for sensor is excessively low or high.	<ul style="list-style-type: none"> <li>● Harness or connectors (APP sensor 1 circuit is shorted.) (Mass air flow sensor is shorted.) (PSP sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.)</li> <li>● Accelerator pedal position sensor (APP sensor 1)</li> <li>● Power steering pressure sensor</li> <li>● Mass air flow sensor</li> <li>● Refrigerant pressure sensor</li> <li>● EVAP control system pressure sensor</li> </ul>

### FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

### DTC Confirmation Procedure

UBS0040J

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

#### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-457, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### WITH GST

Follow the procedure "WITH CONSULT-II" above.

# DTC P1229 SENSOR POWER SUPPLY

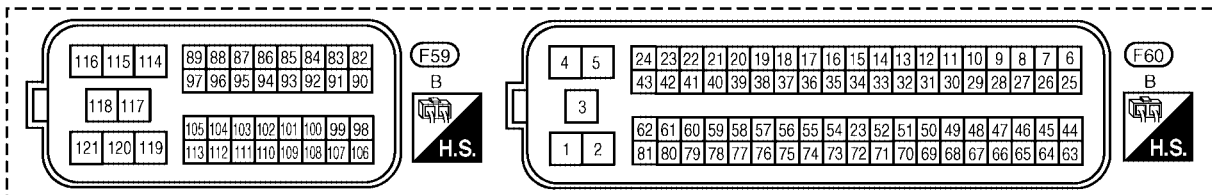
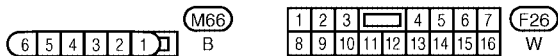
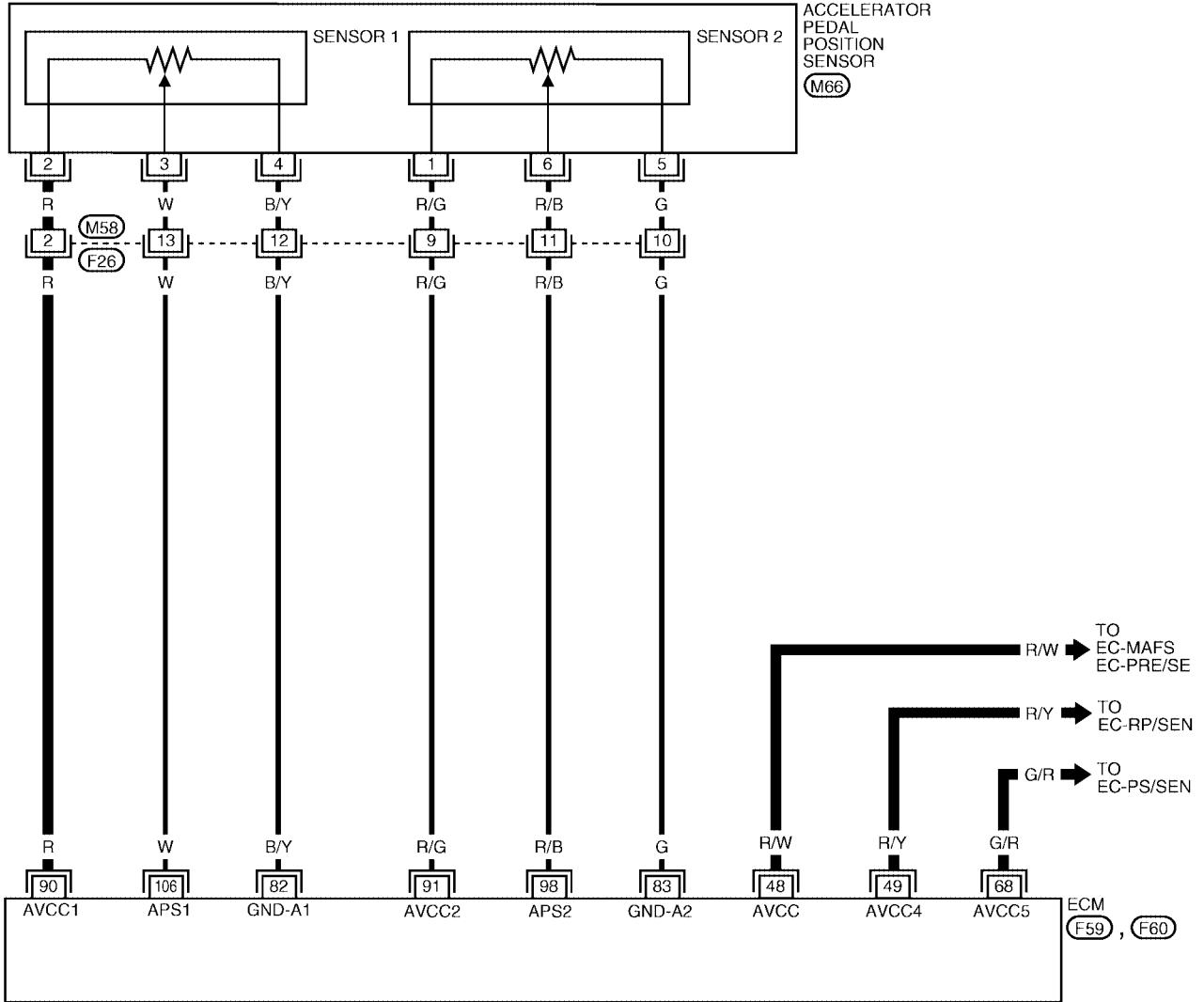
[QG18DE (ULEV)]

UBS0040K

## Wiring Diagram

EC-APPS1-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



BBWA1385E



# DTC P1229 SENSOR POWER SUPPLY

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
48	R/W	Sensor power supply	[Ignition switch "ON"]	Approximately 5V
49	R/Y	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch "ON"]	Approximately 5V
68	G/R	Sensor power supply (Power steering pressure sensor)	[Ignition switch "ON"]	Approximately 5V
90	R	Sensor power supply (Accelerator pedal position sensor 1)	[Ignition switch "ON"]	Approximately 5V

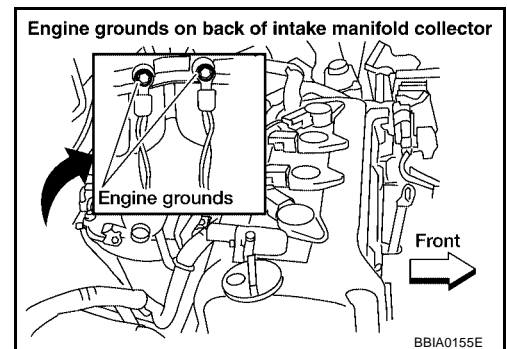
## Diagnostic Procedure

UBS0040L

### 1. RETIGHTEN GROUND SCREWS

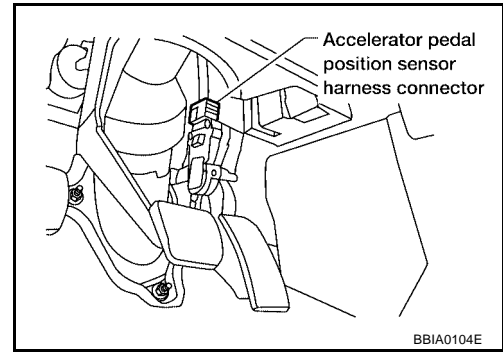
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

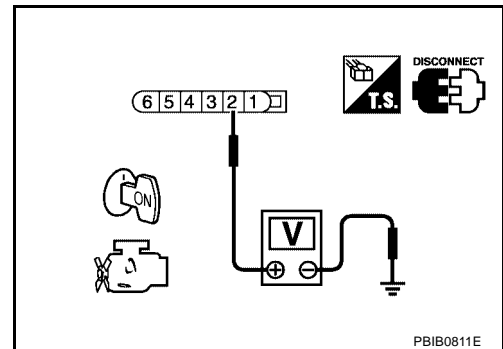


3. Check voltage between APP sensor terminal 2 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 3.



## 3. CHECK SENSOR POWER SUPPLY CIRCUITS

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
90	APP sensor terminal 2	<a href="#">EC-506</a>
48	Mass air flow sensor terminal 2	<a href="#">EC-166</a>
48	EVAP control system pressure sensor terminal 3	<a href="#">EC-326</a>
49	Refrigerant pressure sensor terminal 1	<a href="#">EC-560</a>
68	PSP sensor terminal 1	<a href="#">EC-368</a>

OK or NG

- OK >> GO TO 4.
- NG >> Repair short to ground or short to power in harness or connectors.

## 4. CHECK COMPONENTS

Check the following.

- Refrigerant pressure sensor (Refer to [MTC-55, "Electrical Component Inspection"](#) .)
- Power steering pressure sensor (Refer to [EC-371, "Component Inspection"](#) .)
- EVAP control system pressure sensor (Refer to [EC-329, "Component Inspection"](#) .)
- Mass air flow sensor (Refer to [EC-170, "Component Inspection"](#) .)

OK or NG

- OK >> GO TO 7.
- NG >> Replace malfunctioning component.

---

**5. CHECK APP SENSOR**

---

Refer to [EC-509, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

---

**6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

---

1. Replace electric throttle control actuator.
2. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

---

**7. CHECK INTERMITTENT INCIDENT**

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Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

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# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QG18DE (ULEV)]

## DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

PFP:14920

### Description SYSTEM DESCRIPTION

UBS001NE

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*1		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Vehicle speed signal*2	Vehicle speed		

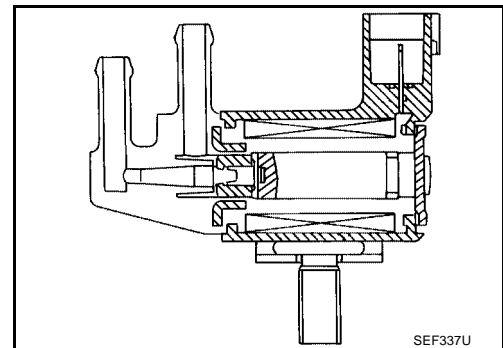
\*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

\*2: This signal is sent to the ECM through CAN communication line.

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor bypass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

### COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



### CONSULT-II Reference Value in Data Monitor Mode

UBS001NF

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PURG VOL C/V	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch "OFF"</li> <li>● Shift lever: "N"</li> <li>● No-load</li> </ul>	Idle (Vehicle stopped)	0%
		2,000 rpm	—

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QG18DE (ULEV)]

UBS006GT

## On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1444 1444	EVAP canister purge volume control solenoid valve	The canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed.	<ul style="list-style-type: none"> <li>● EVAP control system pressure sensor</li> <li>● EVAP canister purge volume control solenoid valve (The valve is stuck open.)</li> <li>● EVAP canister vent control valve</li> <li>● EVAP canister</li> <li>● Hoses (Hoses are connected incorrectly or clogged.)</li> </ul>

## DTC Confirmation Procedure

UBS001NI

### NOTE:

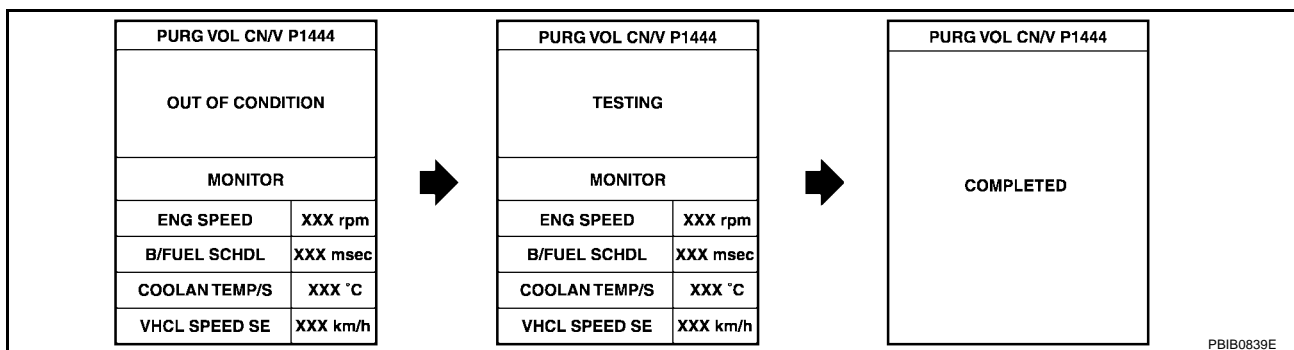
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

**For best results, perform test at a temperature of 0°C (32°F) or more.**

### WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
5. Touch "START".



6. Start engine and let it idle until "TESTING" on CONSULT-II changes to "COMPLETED". (It will take for approximately 10 seconds.)

**If "TESTING" is not displayed after 5 minutes, retry from step 2.**

7. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to [EC-464, "Diagnostic Procedure"](#).

### WITH GST

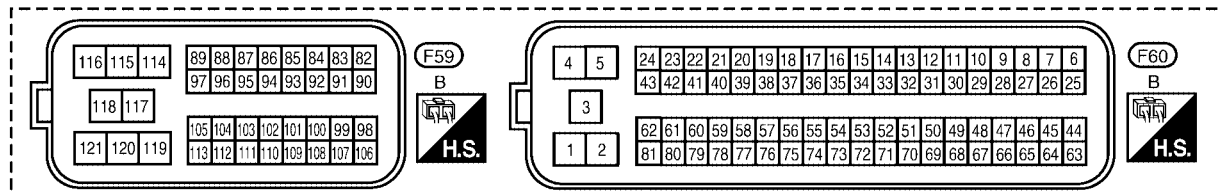
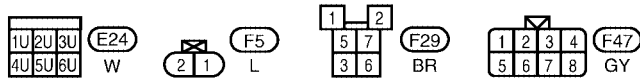
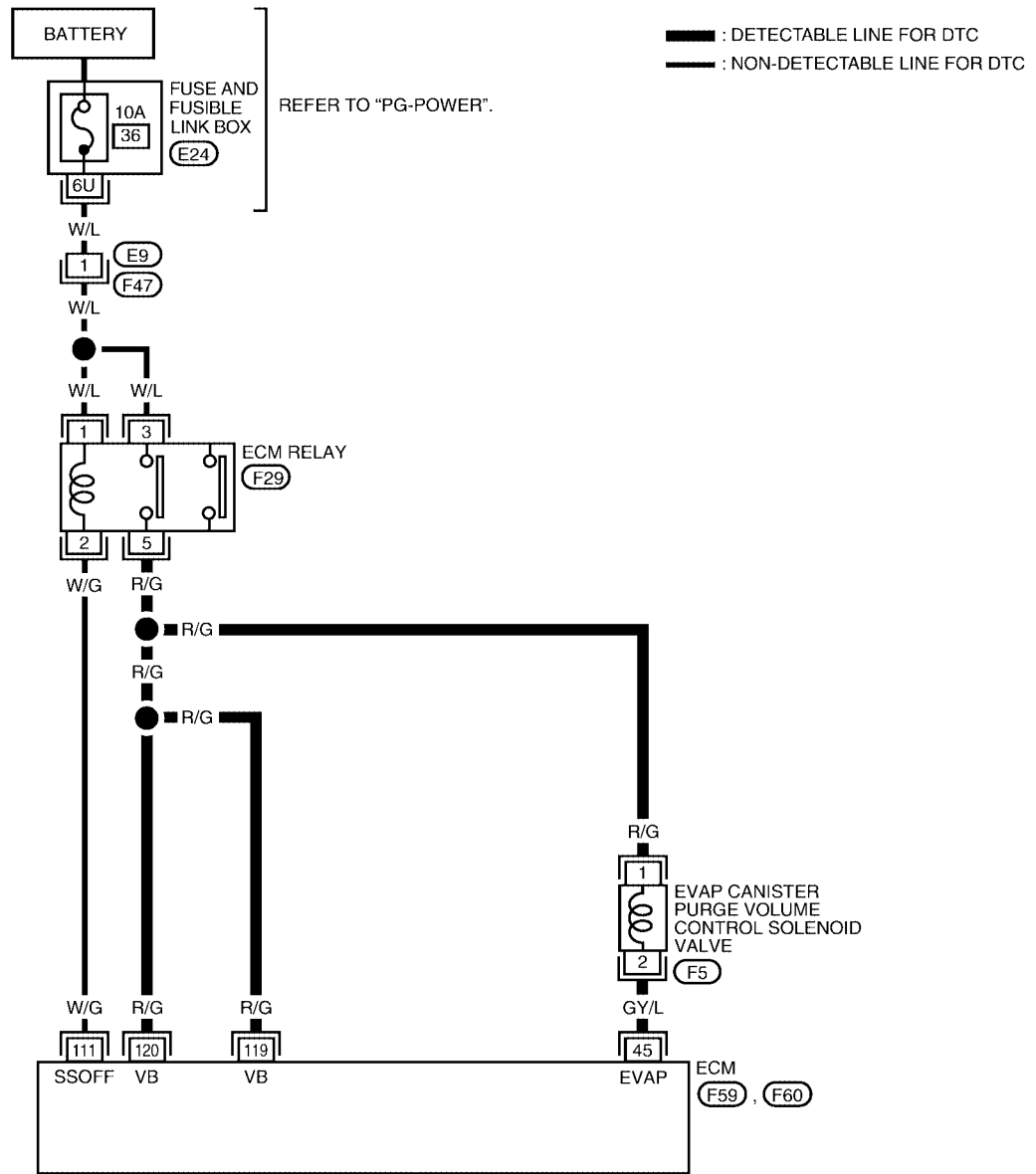
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and let it idle for at least 20 seconds.
4. Select "MODE 7" with GST.
5. If 1st trip DTC is detected, go to [EC-464, "Diagnostic Procedure"](#).

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QG18DE (ULEV)]

UBS001NJ

## Wiring Diagram

EC-PGC/V-01



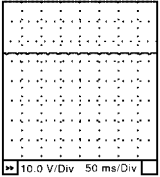
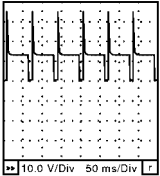
BBWA0785E

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
45	G/YL	EVAP canister purge volume control solenoid valve	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	BATTERY VOLTAGE (11 - 14V) <sup>★</sup> 
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine).</li> </ul>	BATTERY VOLTAGE (11 - 14V) <sup>★</sup> 
111	W/G	ECM relay (Self shut-off)	<b>[Engine is running]</b> <b>[Ignition switch "OFF"]</b> <ul style="list-style-type: none"> <li>● For 5 seconds after turning ignition switch "OFF"</li> </ul>	0 - 1.0V
			<b>[Ignition switch "OFF"]</b> <ul style="list-style-type: none"> <li>● 5 seconds passed after turning ignition switch "OFF"</li> </ul>	BATTERY VOLTAGE (11 - 14V)
119 120	R/G R/G	Power supply for ECM	<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

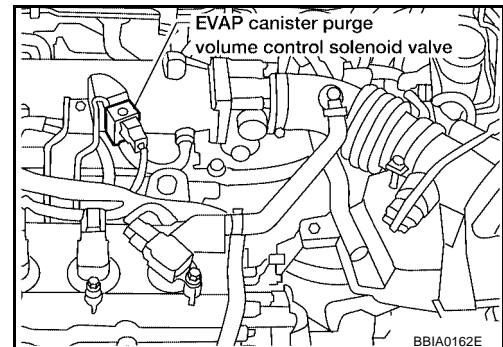
# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QG18DE (ULEV)]

UBS001NK

## Diagnostic Procedure

### 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Turn ignition switch "ON".

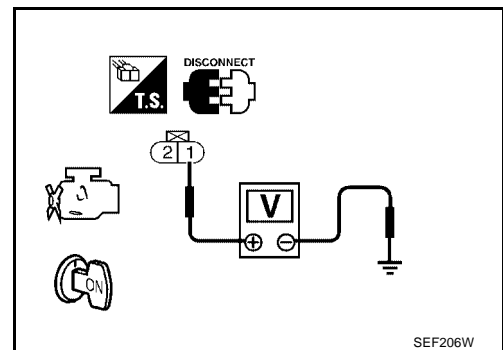


4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and engine ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E9, F47
- 10A fuse
- Harness for open or short between EVAP canister purge volume control solenoid valve and fuse
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

>> Repair harness or connectors.

### 3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 45 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QG18DE (ULEV)]

## 4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

**Water should not exist.**

OK or NG

- OK >> GO TO 5.  
NG >> Replace EVAP control system pressure sensor.

## 5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-337, "Component Inspection"](#) .

OK or NG

- OK (With CONSULT-II)>>GO TO 6.  
OK (Without CONSULT-II)>>GO TO 7.  
NG >> Replace EVAP control system pressure sensor.

## 6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

 **With CONSULT-II**

1. Turn ignition switch "OFF".
2. Reconnect harness connectors disconnected.
3. Start engine.
4. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 8.  
NG >> GO TO 7.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

## 7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-466, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.  
NG >> Replace EVAP canister purge volume control solenoid valve.

## 8. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 9.  
NG >> Clean the rubber tube using an air blower.

## 9. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-472, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.  
NG >> Replace EVAP canister vent control valve.

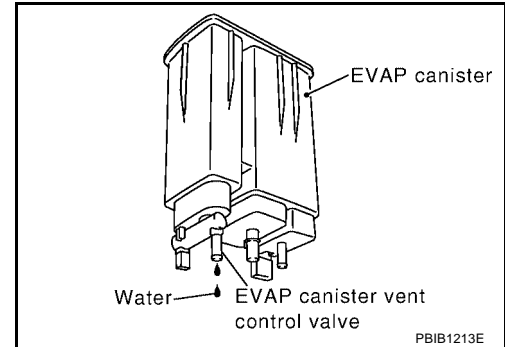
# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QG18DE (ULEV)]

## 10. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will drain from the EVAP canister.

OK or NG

- OK >> GO TO 11.  
 NG >> GO TO 14.



## 11. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.

**The weight should be less than 1.9 kg (4.2 lb).**

OK or NG

- OK >> GO TO 13.  
 NG >> GO TO 12.

## 12. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage

>> Repair hose or replace EVAP canister.

## 13. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

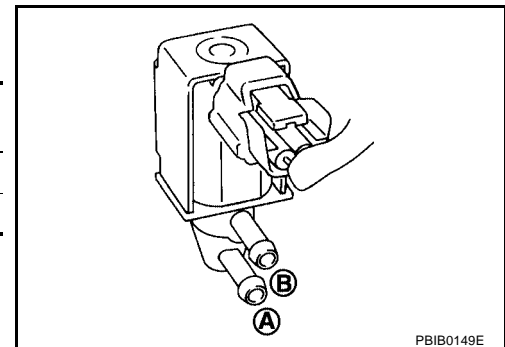
### Component Inspection EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

UBS001NL

Ⓟ With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100.0%	Yes
0.0%	No

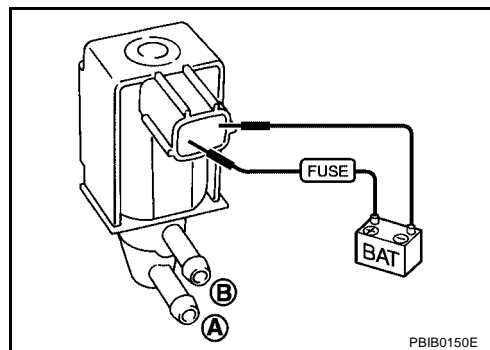


# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QG18DE (ULEV)]

**⊗ Without CONSULT-II**

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No



A  
EC  
C  
D  
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M

# DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (ULEV)]

## DTC P1446 EVAP CANISTER VENT CONTROL VALVE

PF14935

### Component Description

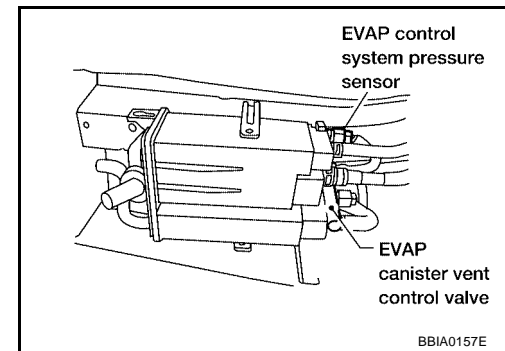
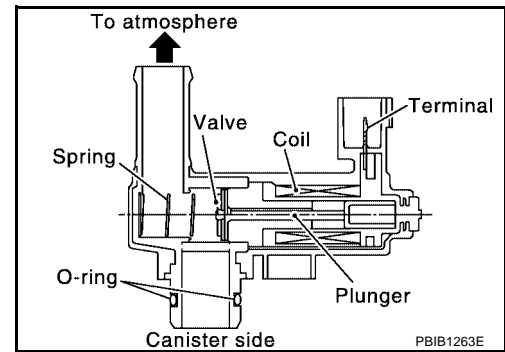
UBS001NM

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System" diagnosis.



### CONSULT-II Reference Value in Data Monitor Mode

UBS001NN

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

### On Board Diagnosis Logic

UBS006GU

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1446 1446	EVAP canister vent control valve close	EVAP canister vent control valve remains closed under specified driving conditions.	<ul style="list-style-type: none"> <li>● EVAP canister vent control valve</li> <li>● EVAP control system pressure sensor and the circuit</li> <li>● Blocked rubber tube to EVAP canister vent control valve</li> <li>● EVAP canister is saturated with water</li> </ul>

### DTC Confirmation Procedure

UBS001NQ

#### CAUTION:

Always drive vehicle at a safe speed.

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### Ⓟ WITH CONSULT-II

1. Turn ignition switch "ON" and wait at least 5 seconds.
2. Turn ignition switch "OFF" and wait at least 10 seconds.

# DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (ULEV)]

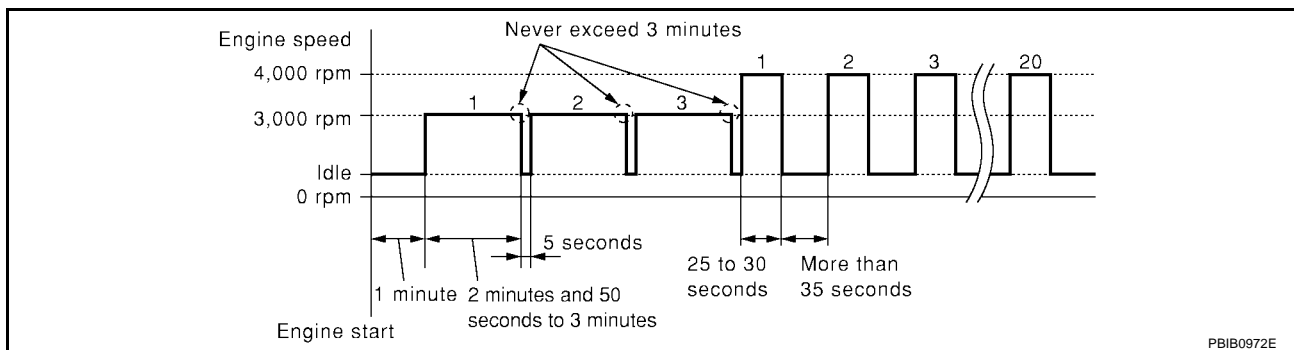
3. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
4. Start engine and let it idle for at least 1 minute.
5. Repeat next procedures 3 times.
  - a. Increase the engine speed up to 3,000 to 3,500 rpm and keep it for 2 minutes and 50 seconds to 3 minutes.  
**Never exceed 3 minutes.**
  - b. Fully released accelerator pedal and keep engine idle for about 5 seconds.
6. If 1st trip DTC is detected, go to [EC-471, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

If 1st trip DTC is not detected, go to the next step.

7. Repeat next procedure 20 times.
  - a. Quickly increase the engine speed up to 4,000 to 4,500 rpm or more and keep it for 25 to 30 seconds.
  - b. Fully released accelerator pedal and keep engine idle for at least 35 seconds.



8. If 1st trip DTC is detected, go to [EC-471, "Diagnostic Procedure"](#) .

## WITH GST

Follow the procedure "WITH CONSULT-II" above.

# DTC P1446 EVAP CANISTER VENT CONTROL VALVE

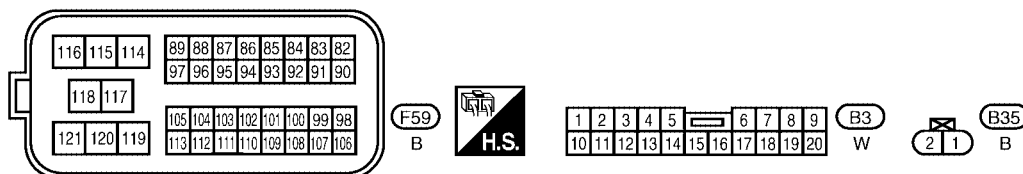
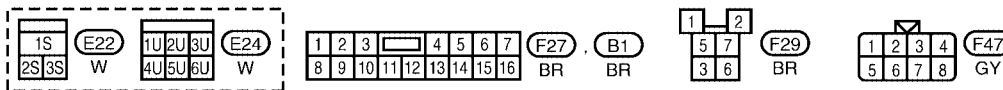
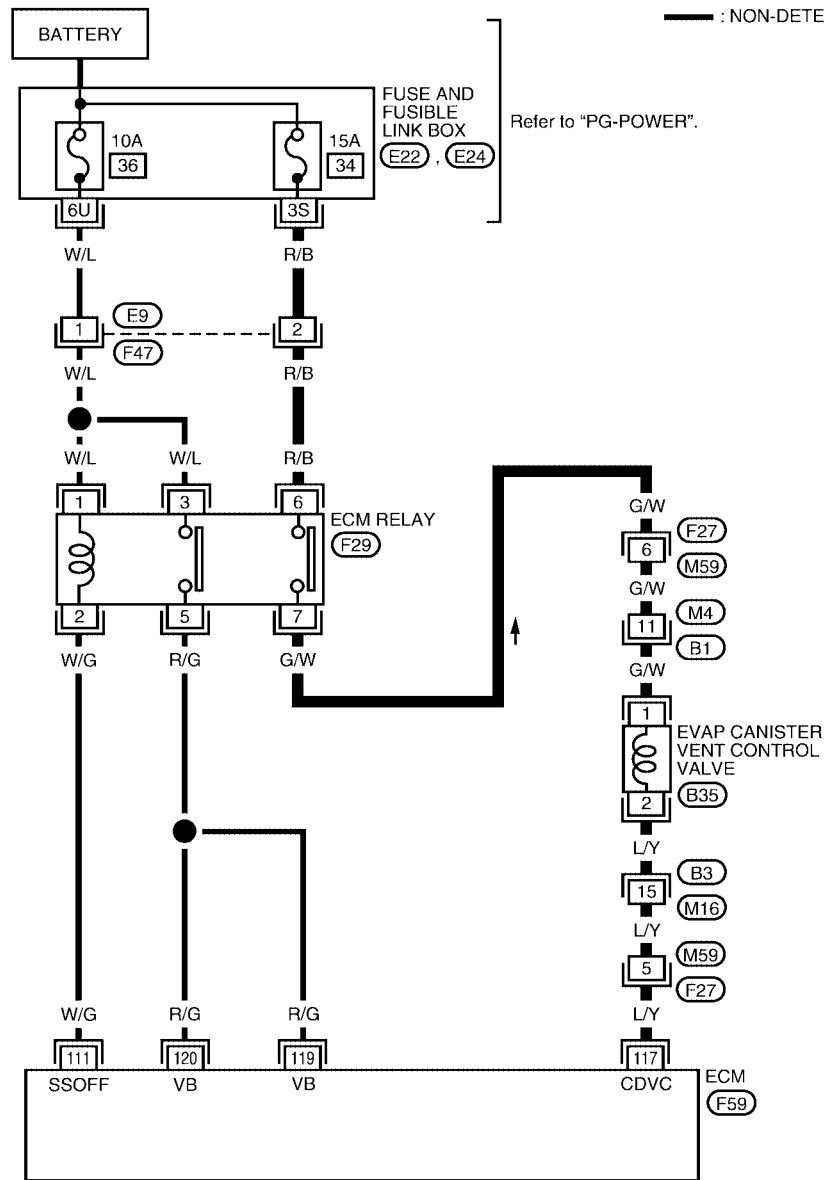
[QG18DE (ULEV)]

## Wiring Diagram

UBS001NR

### EC-VENT/V-01

**—** : DETECTABLE LINE FOR DTC  
**—** : NON-DETECTABLE LINE FOR DTC



BBWA0291E

# DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For 5 seconds after turning ignition switch "OFF"	0 - 1.0V
			[Ignition switch "OFF"] ● 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
117	L/Y	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
119 120	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

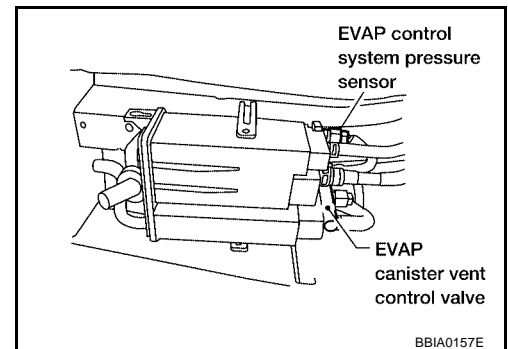
UBS001NS

### 1. CHECK RUBBER TUBE

1. Turn ignition switch "OFF".
2. Disconnect rubber tube connected to EVAP canister vent control valve.
3. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 2.  
NG >> Clean rubber tube using an air blower.



### 2. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-472, "Component Inspection"](#) .

OK or NG

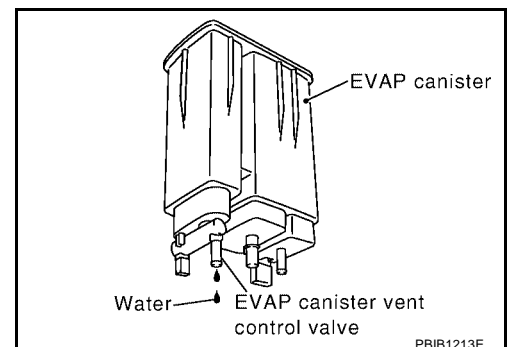
- OK >> GO TO 3.  
NG >> Replace EVAP canister vent control valve.

### 3. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will drain from the EVAP canister.

OK or NG

- OK >> GO TO 4.  
NG >> GO TO 6.



# DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (ULEV)]

## 4. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.

**The weight should be less than 1.9 kg (4.2 lb).**

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage

>> Repair hose or replace EVAP canister.

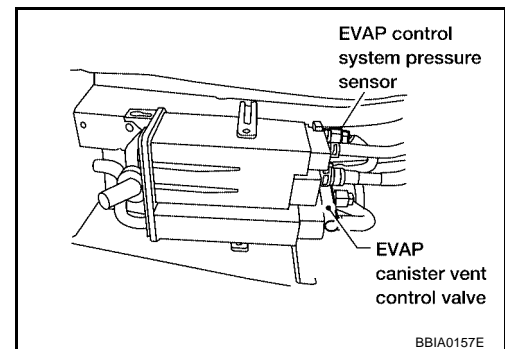
## 6. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

**Water should not exist.**

OK or NG

- OK >> GO TO 7.
- NG >> Replace EVAP control system pressure sensor.



## 7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-337, "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
- NG >> Replace EVAP control system pressure sensor.

## 8. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

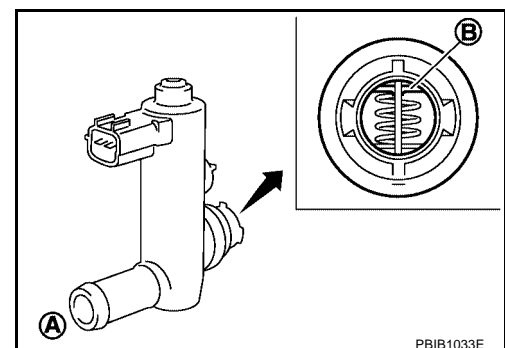
>> INSPECTION END

## Component Inspection EVAP CANISTER VENT CONTROL VALVE

UBS001NT

Ⓟ With CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.
3. Reconnect harness connectors disconnected.
4. Turn ignition switch "ON".





# DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (ULEV)]

- Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- Check air passage continuity and operation delay time.

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

**Operation takes less than 1 second.**

**Make sure new O-ring is installed properly.**

If NG, go to next step.

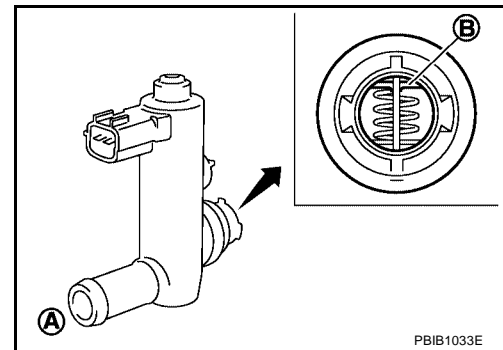
- Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
- Perform step 5 again.

⊗ **Without CONSULT-II**

- Remove EVAP canister vent control valve from EVAP canister.
- Check portion **B** of EVAP canister vent control valve for being rusted.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
H02S1 (B1)	XXX V

PBIB0834E



- Check air passage continuity and operation delay time under the following conditions.

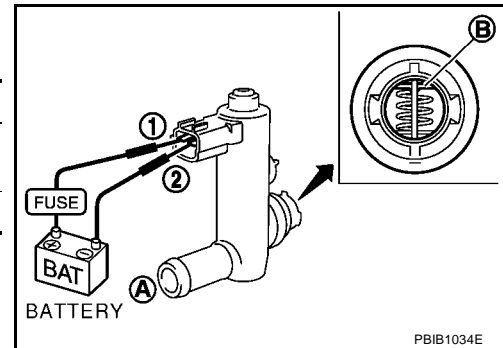
Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

**Operation takes less than 1 second.**

**Make sure new O-ring is installed properly.**

If NG, go to next step.

- Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
- Perform step 3 again.



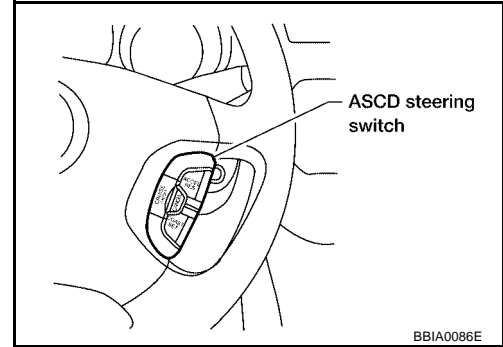
**DTC P1564 ASCD STEERING SWITCH**

**Component Description**

UBS0040M

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated.

Refer to [EC-598, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS0040N

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN SW	● Ignition switch: ON	CRUISE switch: Depressed	ON
		CRUISE switch: Released	OFF
CANCEL SW	● Ignition switch: ON	CANCEL switch: Depressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	● Ignition switch: ON	ACCEL/RES switch: Depressed	ON
		ACCEL/RES switch: Released	OFF
SET SW	● Ignition switch: ON	COAST/SET switch: Depressed	ON
		COAST/SET switch: Released	OFF

**On Board Diagnosis Logic**

UBS0040O

This self-diagnoses has the one trip detection logic. The MIL will not light up for this diagnosis.

**NOTE:**

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-372](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1564 1564	ASCD steering switch	<ul style="list-style-type: none"> <li>● An excessively high voltage signal from the ASCD steering switch is sent to ECM.</li> <li>● ECM detects that input signal from the ASCD steering switch is out of the specified range.</li> <li>● ECM detects that the ASCD steering switch is stuck ON.</li> </ul>	<ul style="list-style-type: none"> <li>● Harness or connectors (The switch circuit is open or shorted.)</li> <li>● ASCD steering switch</li> <li>● ECM</li> </ul>

**DTC Confirmation Procedure**

UBS0040P

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 10 seconds.
4. Press "CRUISE" switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press "ACCEL/RES" switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press "COAST/SET" switch for at least 10 seconds, then release it and wait at least 10 seconds.

# DTC P1564 ASCD STEERING SWITCH

[QG18DE (ULEV)]

7. Press "CANCEL" switch for at least 10 seconds, then release it and wait at least 10 seconds.
8. If DTC is detected, go to [EC-478, "Diagnostic Procedure"](#) .

 **WITH GST**

Follow the procedure "WITH CONSULT-II" above.

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# DTC P1564 ASCD STEERING SWITCH

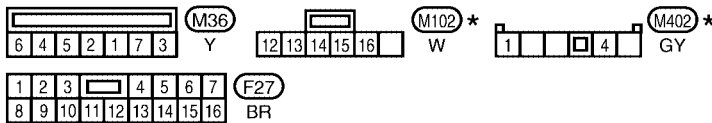
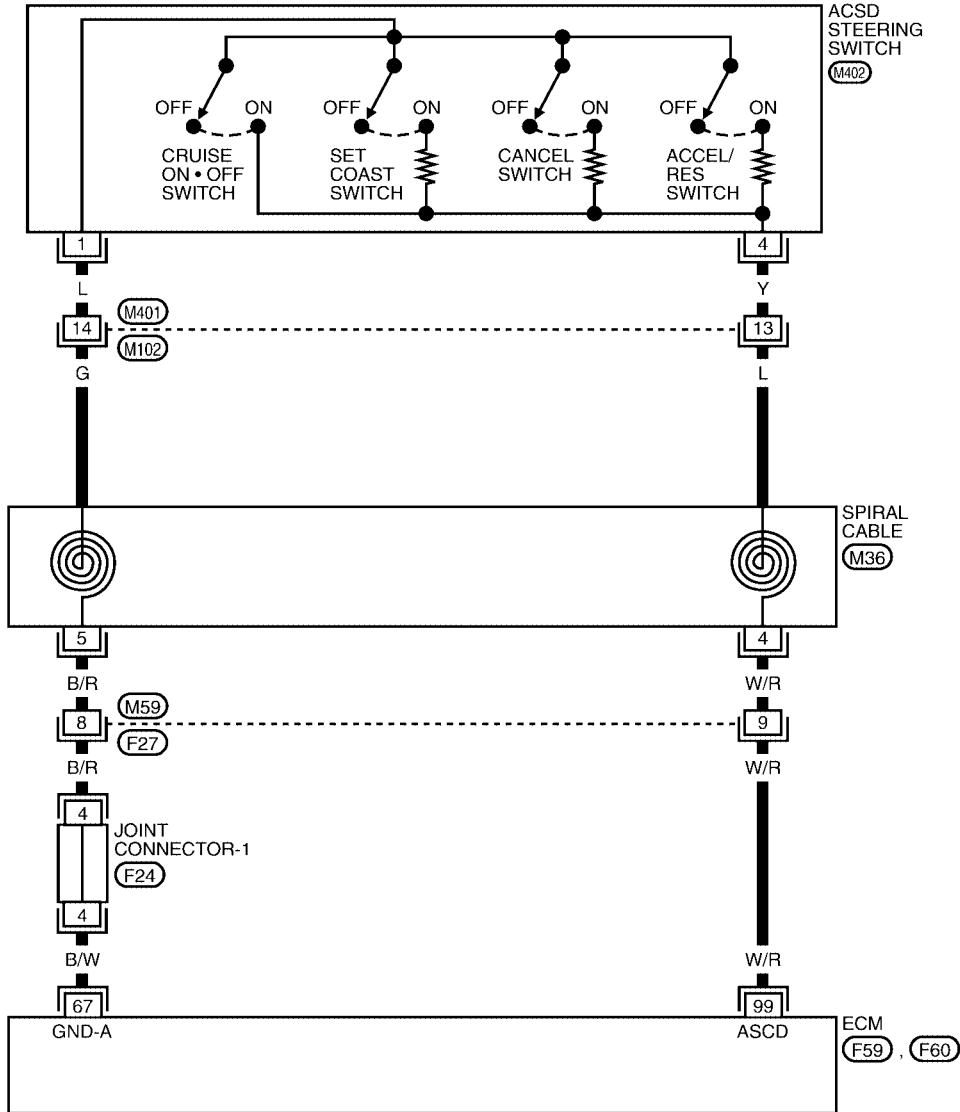
[QG18DE (ULEV)]

UBS0040Q

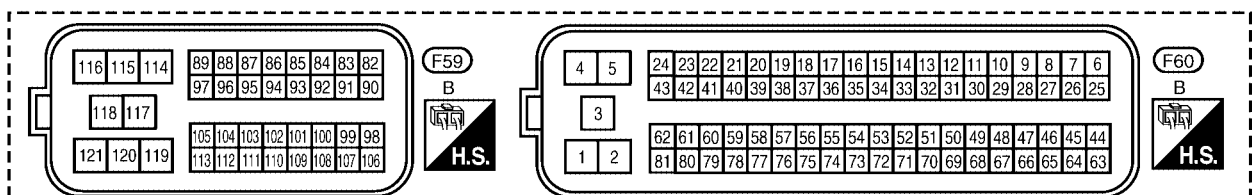
## Wiring Diagram

EC-ASC/SW-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.  
 (F24) - JOINT CONNECTOR



\*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

BBWA0793E

# DTC P1564 ASCD STEERING SWITCH

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
67	B/W	Sensors' ground	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 0V
99	W/R	ASCD steering switch	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● ASCD steering switch is "OFF".</li> </ul>	Approximately 4V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● CRUISE switch is "ON".</li> </ul>	Approximately 0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● CANCEL switch is "ON".</li> </ul>	Approximately 1V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● COAST/SET switch is "ON".</li> </ul>	Approximately 2V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● ACCEL/RESUME switch is "ON".</li> </ul>	Approximately 3V

A  
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## Diagnostic Procedure

### 1. CHECK ASCD STEERING SWITCH CIRCUIT

#### With CONSULT-II

1. Turn ignition switch "ON".
2. Select "MAIN SW", "RESUME/ACC SW", "SET SW" and "CANCEL SW" in "DATA MONITOR" mode with CONSULT-II.
3. Check each item indication under the following conditions.

Switch	Monitor item	Condition	Indication
CRUISE	MAIN SW	Pressed	ON
		Released	OFF
COAST/SET	SET SW	Pressed	ON
		Released	OFF
ACCEL/RES	RESUME/ACC SW	Pressed	ON
		Released	OFF
CANCEL	CANCEL SW	Pressed	ON
		Released	OFF

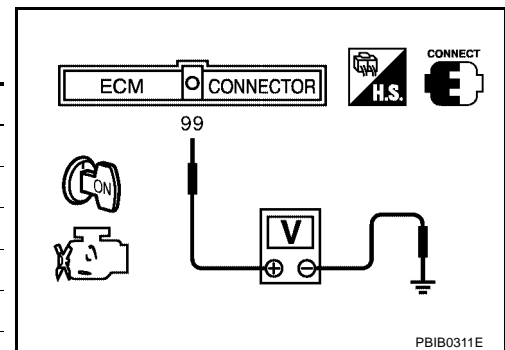
DATA MONITOR	
MONITOR	NO DTC
MAIN SW	OFF
CANCEL SW	OFF
RESUME/ACC SW	OFF
SET SW	OFF

SEC006D

#### Without CONSULT-II

1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 99 and ground with pressing each button.

Switch	Condition	Voltage [V]
CRUISE SW	Pressed	Approx. 0
	Released	Approx. 4
COAST/SET SW	Pressed	Approx. 2
	Released	Approx. 4
ACCEL/RES SW	Pressed	Approx. 3
	Released	Approx. 4
CANCEL SW	Pressed	Approx. 1
	Released	Approx. 4



#### OK or NG

- OK >> GO TO 7.  
 NG >> GO TO 2.

### 2. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

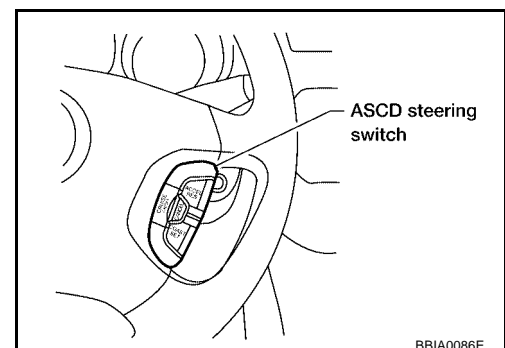
1. Turn ignition switch "OFF".
2. Disconnect ASCD steering switch harness connector.
3. Check harness continuity between ASCD steering switch terminal 1 and ground. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

#### OK or NG

- OK >> GO TO 4.  
 NG >> GO TO 3.



**3. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M59, F27
- Harness connectors M401, M102
- Joint connector-1
- Spiral cable
- Harness for open and short between ECM and ASCD steering switch

>> Repair open circuit or short to power in harness or connectors.

**4. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 99 and ASCD steering switch terminal 4. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

**5. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M59, F27
- Harness connectors M401, M102
- Spiral cable
- Harness for open and short between ECM and ASCD steering switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK ASCD STEERING SWITCH**

Refer to [EC-480, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace steering wheel.

**7. CHECK INTERMITTENT INCIDENT**

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

# DTC P1564 ASCD STEERING SWITCH

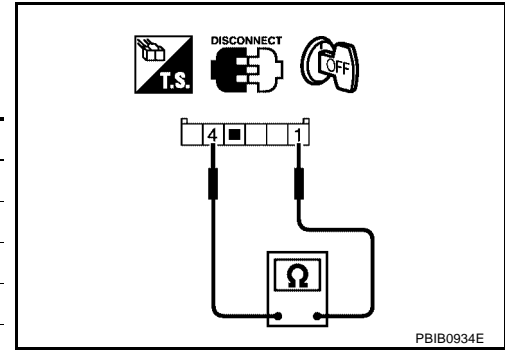
[QG18DE (ULEV)]

UBS0040S

## Component Inspection ASC D STEERING SWITCH

1. Disconnect ASCD steering switch.
2. Check continuity between ASCD steering switch terminals 1 and 4 with pushing each switch.

Switch	Condition	Resistance [kΩ]
CRUISE SW	Pressed	Approx. 0
	Released	Approx. 4.0
COAST/SET SW	Pressed	Approx. 0.7
	Released	Approx. 4.0
ACCEL/RES SW	Pressed	Approx. 1.5
	Released	Approx. 4.0
CANCEL SW	Pressed	Approx. 0.3
	Released	Approx. 4.0

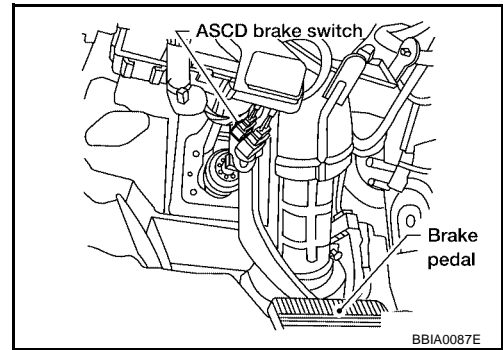




DTC P1572 ASCD BRAKE SWITCH

Component Description

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal). Refer to [EC-598, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW 1 (ASCD brake switch)	● Ignition switch: ON	● Brake pedal fully released	ON
		● Brake pedal depressed	OFF
BRAKE SW 2 (stop lamp switch)	● Ignition switch: ON	● Brake pedal fully released	OFF
		● Brake pedal depressed	ON

On Board Diagnosis Logic

This self-diagnosis has the one trip detection logic. The MIL will not light up for this diagnosis.

NOTE:

- If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-372](#)
- This self-diagnosis has the one trip detection logic. When malfunction A is detected, DTC is not stored in ECM memory. And in that case, 1st trip DTC and 1st trip freeze frame data are displayed. 1st trip DTC is erased when ignition switch OFF. And even when malfunction A is detected in two consecutive trips, DTC is not stored in ECM memory.

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1572 1572	ASCD brake switch	A) ● When the vehicle speed is above 30km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to ECM at the same time.	<ul style="list-style-type: none"> <li>● Harness or connectors (The stop lamp switch circuit is shorted.)</li> <li>● Harness or connectors (The ASCD brake switch circuit is shorted.)</li> </ul>
		B) ● ASCD brake switch signal is not sent to ECM for extremely long time while the vehicle is driving	<ul style="list-style-type: none"> <li>● Harness or connectors (The ASCD clutch switch circuit is shorted.) (M/T models)</li> <li>● Stop lamp switch</li> <li>● ASCD brake switch</li> <li>● ASCD clutch switch (M/T models)</li> <li>● Incorrect stop lamp switch installation</li> <li>● Incorrect ASCD brake switch installation</li> <li>● Incorrect ASCD clutch switch installation (M/T models)</li> <li>● ECM</li> </ul>

DTC Confirmation Procedure

**CAUTION:**  
Always drive vehicle at a safe speed.

# DTC P1572 ASCD BRAKE SWITCH

[QG18DE (ULEV)]

## NOTE:

- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.
- Procedure for malfunction B is not described here. It takes extremely long time to complete procedure for malfunction B. By performing procedure for malfunction A, the incident that causes malfunction B can be detected.

## TESTING CONDITION:

Steps 4 and 5 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

### WITH CONSULT-II

1. Start engine.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Press CRUISE switch and make sure that CRUISE indicator lights up.
4. Drive the vehicle for at least 5 consecutive seconds under the following condition.

VHCL SPEED SE	More than 30 km/h (19 MPH)
Selector lever	Suitable position

If 1st trip DTC is detected, go to [EC-484, "Diagnostic Procedure"](#)

If 1st trip DTC is not detected, go to the following step.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
VHCL SPEED SE	XXX km/h
CRUISE LAMP	ON
BRAKE SW 1	ON
BRAKE SW 2	OFF

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5. Drive the vehicle for at least 5 consecutive seconds under the following condition.

VHCL SPEED SE	More than 30 km/h (19 MPH)
Selector lever	Suitable position
Driving location	Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned vehicle speed.

6. If 1st trip DTC is detected, go to [EC-484, "Diagnostic Procedure"](#).

### WITH GST

Follow the procedure "WITH CONSULT-II" above.

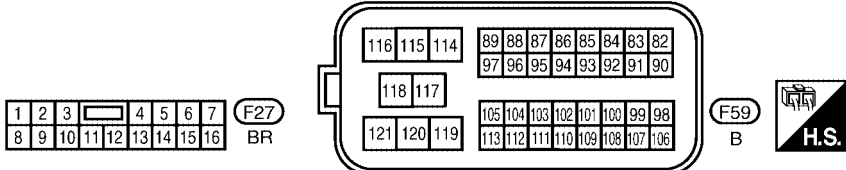
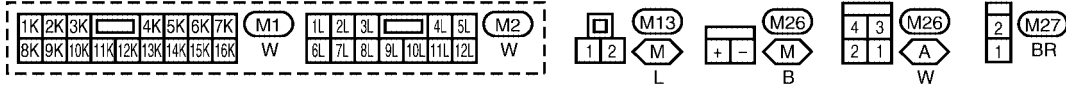
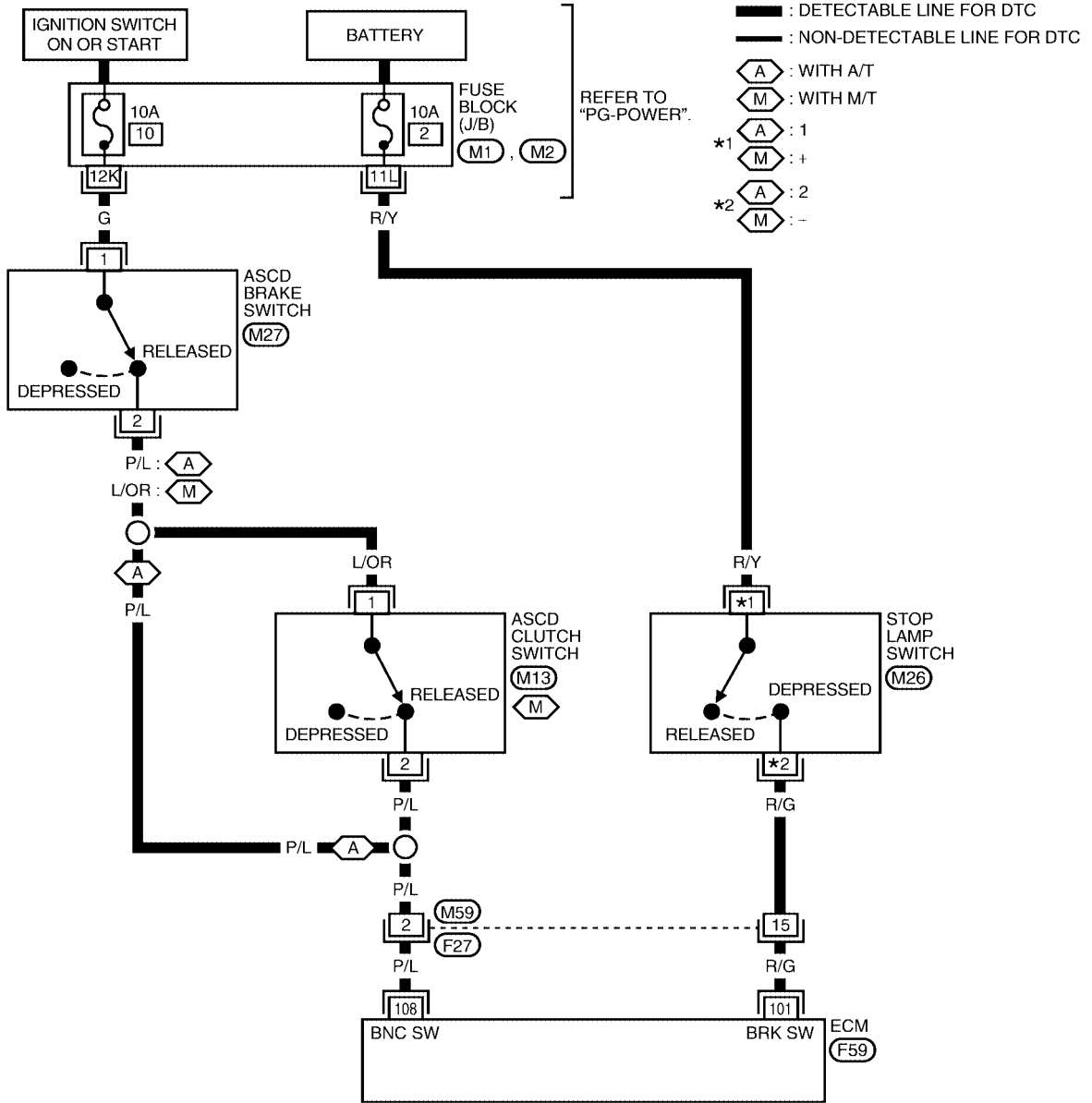
# DTC P1572 ASCD BRAKE SWITCH

[QG18DE (ULEV)]

UBS0040X

## Wiring Diagram

EC-ASC/BS-01



BBWA0303E

# DTC P1572 ASCD BRAKE SWITCH

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	R/G	Stop lamp switch	[Ignition switch "ON"] ● Brake pedal is fully released	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is depressed	BATTERY VOLTAGE (11 - 14V)
108	P/L	ASCD brake switch	[Ignition switch "ON"] ● Brake pedal is depressed	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is fully released	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS0040Y

### 1. CHECK OVERALL FUNCTION-I

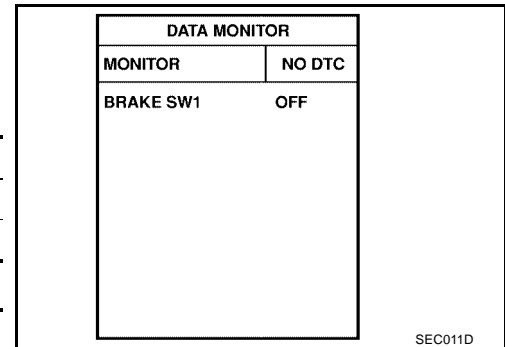
**With CONSULT-II**

- Turn ignition switch "ON".
- Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-II.
- Check "BRAKE SW1" indication under the following conditions.  
**M/T models**

CONDITION	INDICATION
When clutch pedal or brake pedal is depressed	OFF
When clutch pedal and brake pedal are fully released	ON

**A/T models**

CONDITION	INDICATION
When brake pedal is depressed	OFF
When brake pedal is fully released	ON



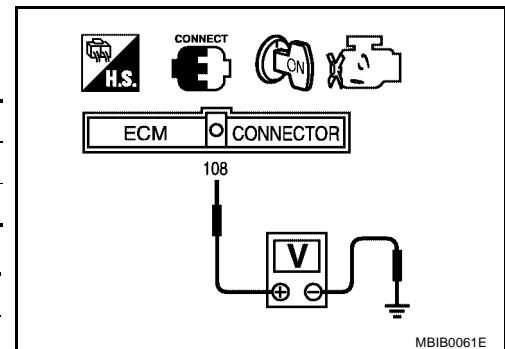
**Without CONSULT-II**

- Turn ignition switch "ON".
- Check voltage between ECM terminal 108 and ground under the following conditions.  
**M/T models**

CONDITION	VOLTAGE
When clutch pedal or brake pedal is depressed	Approximately 0V
When clutch pedal and brake pedal are fully released	Battery voltage

**A/T models**

CONDITION	VOLTAGE
When brake pedal is depressed	Approximately 0V
When brake pedal is fully released	Battery voltage



**OK or NG**

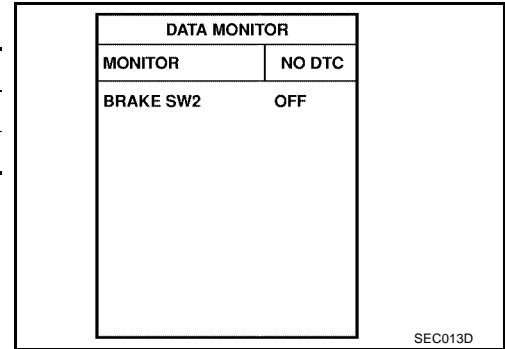
- OK >> GO TO 2.
- NG (M/T models) >>GO TO 3.
- NG (A/T models) >>GO TO 4.

## 2. CHECK OVERALL FUNCTION-II

**With CONSULT-II**

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

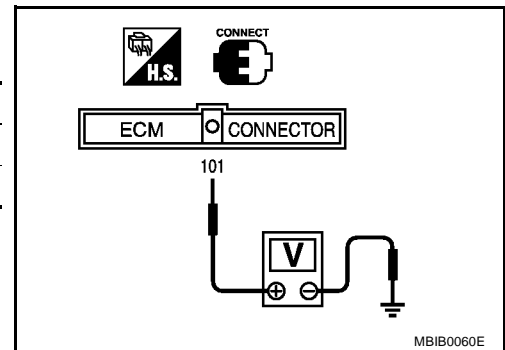
CONDITION	INDICATION
When brake pedal is released	OFF
When brake pedal is depressed	ON



**Without CONSULT-II**

Check voltage between ECM terminal 101 and ground under the following conditions.

CONDITION	VOLTAGE
When brake pedal is released	Approximately 0V
When brake pedal is depressed	Battery voltage

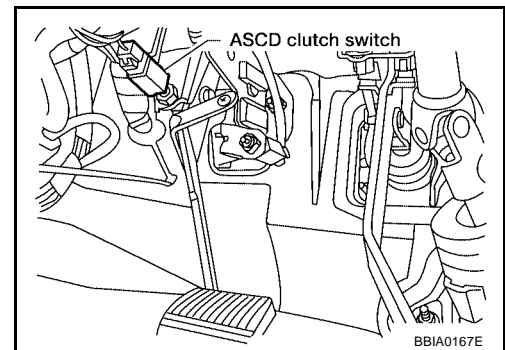


OK or NG

- OK >> GO TO 18.
- NG >> GO TO 13.

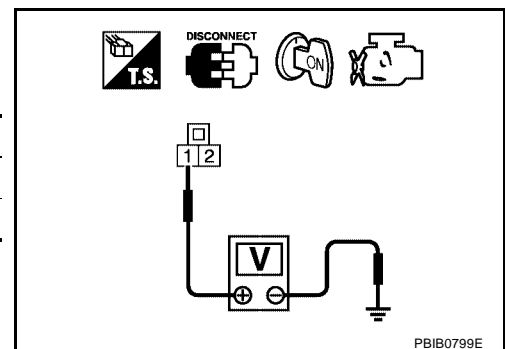
## 3. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch "ON".



4. Check voltage between ASCD clutch switch terminal 1 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
When brake pedal is released	Battery voltage
When brake pedal is depressed	Approx. 0V

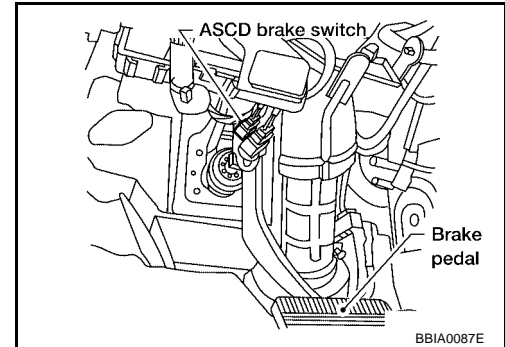


OK or NG

- OK >> GO TO 10.
- NG >> GO TO 4.

#### 4. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".

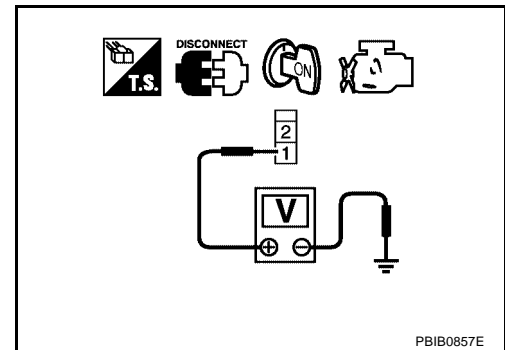


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK (M/T models) >> GO TO 6.
- OK (A/T models) >> GO TO 7.
- NG >> GO TO 5.



#### 5. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M1
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

#### 6. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between ASCD brake switch terminal 2 and ASCD clutch switch terminal 1. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**7. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 108 and ASCD brake switch terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 9.  
NG >> GO TO 8.

**8. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and ASCD brake switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

**9. CHECK ASCD BRAKE SWITCH**

Refer to [EC-489, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.  
NG >> Replace ASCD brake switch.

**10. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 108 and ASCD clutch switch terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 12.  
NG >> GO TO 11.

**11. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and ASCD clutch switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

**12. CHECK ASCD CLUTCH SWITCH**

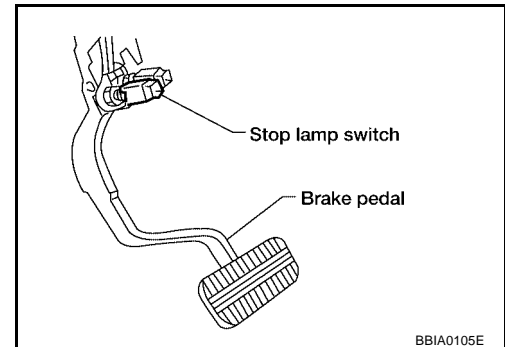
Refer to [EC-489, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.  
NG >> Replace ASCD clutch switch.

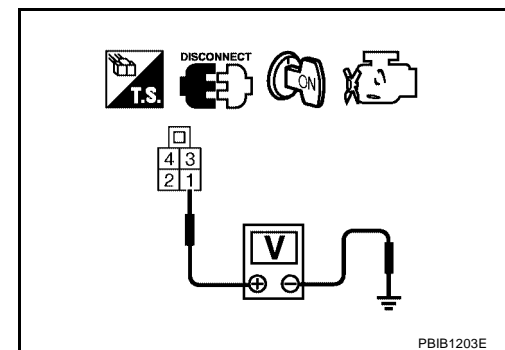
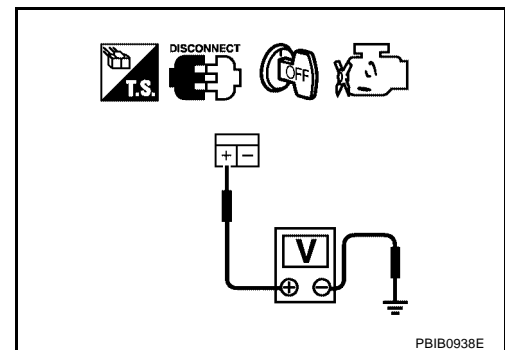
### 13. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect stop lamp switch harness connector.



3. Check voltage between stop lamp switch terminal + (M/T models) or 1 (A/T models) and ground with CONSULT-II or tester.

**Voltage: Battery voltage**



#### OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.

### 14. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M2
- 10A fuse
- Harness for open or short between stop lamp switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.



**15. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 101 and stop lamp switch terminal – (M/T models) or 2 (A/T models).  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 17.
- NG >> GO TO 16.

**16. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

**17. CHECK STOP LAMP SWITCH**

Refer to [EC-489, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 18.
- NG >> Replace stop lamp switch.

**18. CHECK INTERMITTENT INCIDENT**

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

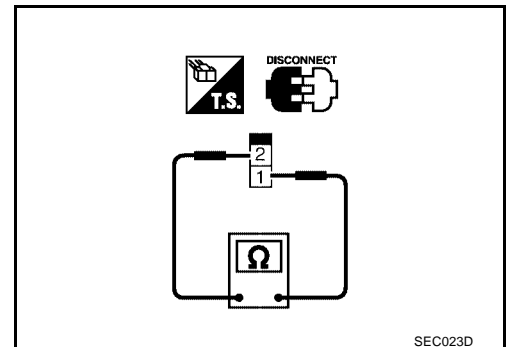
**Component Inspection  
ASC D BRAKE SWITCH**

UBS0040Z

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Check harness continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should exist.
When brake pedal is depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to [BR-11, "BRAKE PEDAL AND BRACKET"](#) , and perform step 3 again.



**ASC D CLUTCH SWITCH (FOR M/T MODELS)**

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.

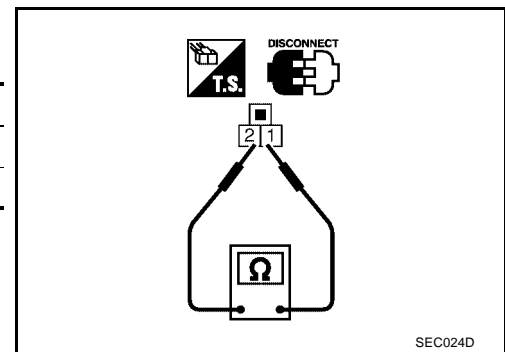
# DTC P1572 ASCD BRAKE SWITCH

[QG18DE (ULEV)]

- Check continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When clutch pedal is fully released.	Should exist.
When clutch pedal is depressed.	Should not exist.

If NG, adjust ASCD clutch switch installation, refer to [CL-6](#), "[CLUTCH SYSTEM](#)", and perform step 3 again.



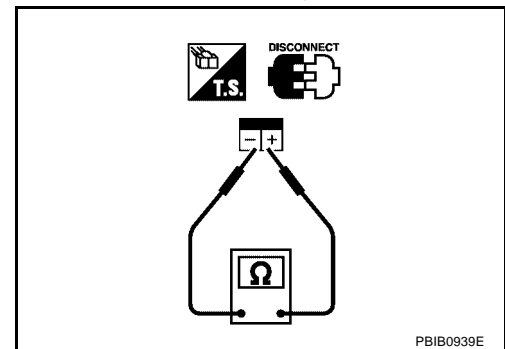
## STOP LAMP SWITCH

### M/T Models

- Turn ignition switch "OFF".
- Disconnect stop lamp switch harness connector.
- Check harness continuity between stop lamp switch terminals + and - under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should not exist.
When brake pedal is depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-11](#), "[BRAKE PEDAL AND BRACKET](#)", and perform step 3 again.

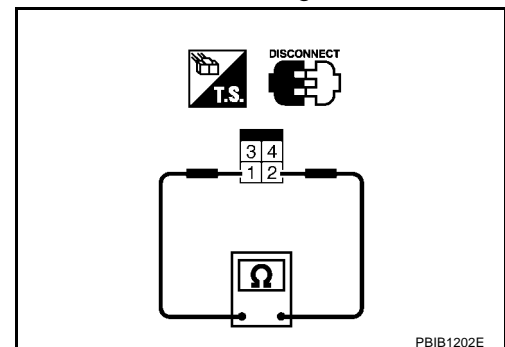


### A/T Models

- Turn ignition switch "OFF".
- Disconnect stop lamp switch harness connector.
- Check harness continuity between stop lamp switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should not exist.
When brake pedal is depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-11](#), "[BRAKE PEDAL AND BRACKET](#)", and perform step 3 again.



## DTC P1574 ASCD VEHICLE SPEED SENSOR

PFP:31036

### Component Description

UBS00410

The ECM receives two vehicle speed sensor signals via CAN communication line. One is sent from combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to [EC-598, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for ASCD functions.

### On Board Diagnosis Logic

UBS00411

This self-diagnosis has the one trip detection logic.  
The MIL will not light up for this diagnosis.

**NOTE:**

- If DTC P1574 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-145, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#) .
- If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to [EC-361, "DTC P0500 VSS"](#)
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-372, "DTC P0605 ECM"](#)

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1574 1574	ASCD vehicle speed sensor	ECM detects a difference between two vehicle speed signals is out of the specified range.	<ul style="list-style-type: none"> <li>● Harness or connectors (The CAN communication line is open or shorted.)</li> <li>● Combination meter</li> <li>● Wheel sensor</li> <li>● TCM</li> <li>● ECM</li> </ul>

### DTC Confirmation Procedure

UBS00412

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

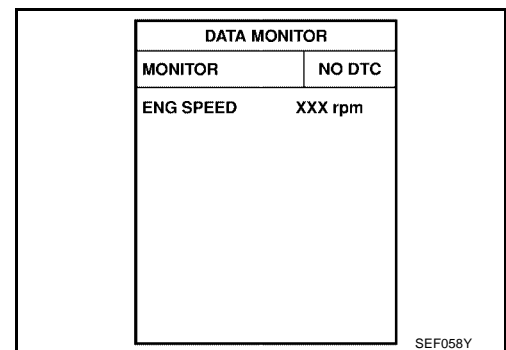
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

**Step 3 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.**

**WITH CONSULT-II**

1. Start engine.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Drive the vehicle at more than 40 km/h (25 MPH).
4. If DTC is detected, go to [EC-492, "Diagnostic Procedure"](#) .



**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

---

### Diagnostic Procedure

#### 1. CHECK DTC WITH TCM

---

Check DTC with TCM. Refer to [AT-38](#) .

OK or NG

OK >> GO TO 2.

NG >> Perform trouble shooting relevant to DTC indicated.

#### 2. CHECK COMBINATION METER

---

Check combination meter function.

Refer to [DI-8, "Combination Meter"](#) .

>> **INSPECTION END**

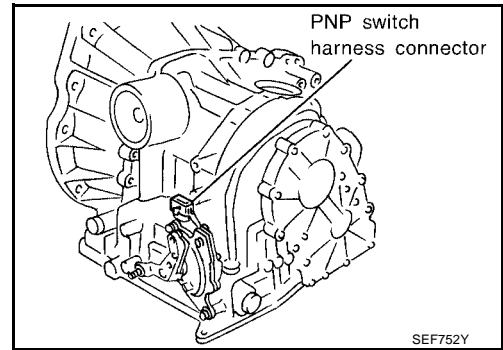
DTC P1706 PNP SWITCH

PFP:32006

Component Description

UBS0010U

When the gear position is “P” (A/T models only) or “N”, park/neutral position (PNP) switch is “ON”.  
ECM detects the park/neutral position when continuity with ground exists.



CONSULT-II Reference Value in Data Monitor Mode

UBS0010V

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
P/N POSI SW	● Ignition switch: ON	Shift lever: P or N (A/T model) Neutral (M/T model)	ON
		Shift lever: Except above	OFF

On Board Diagnosis Logic

UBS006HA

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1706 1706	Park/neutral position switch	The signal of the park/neutral position (PNP) switch is not changed in the process of engine starting and driving.	<ul style="list-style-type: none"> <li>● Harness or connectors [The park/neutral position (PNP) switch circuit is open or shorted.]</li> <li>● Park/neutral position (PNP) switch</li> </ul>

DTC Confirmation Procedure

UBS006IF

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

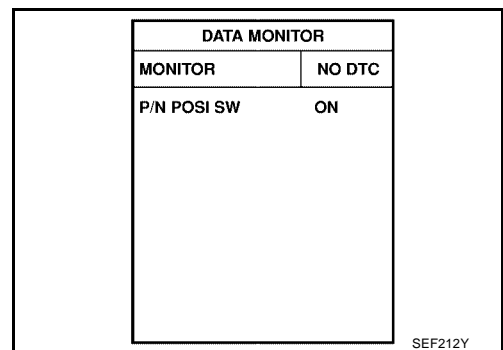
**WITH CONSULT-II**

1. Turn ignition switch “ON”.
2. Select “P/N POSI SW” in “DATA MONITOR” mode with CONSULT-II. Then check the “P/N POSI SW” signal under the following conditions.

Position (Selector lever)	Known-good signal
“N” and “P” position	ON
Except the above position	OFF

If NG, go to [EC-496, "Diagnostic Procedure"](#) .  
If OK, go to following step.

3. Select “DATA MONITOR” mode with CONSULT-II.
4. Start engine and warm it up to normal operating temperature.



# DTC P1706 PNP SWITCH

[QG18DE (ULEV)]

5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	More than 1,550 rpm (A/T models) More than 1,850 rpm (M/T models)
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	More than 3.0 msec (A/T models) More than 2.2 msec (M/T models)
VHCL SPEED SE	More than 64 km/h (40 MPH)
Selector lever	Suitable position

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
P/N POSI SW	OFF
B/FUEL SCHDL	XXX msec

SEF213Y

6. If 1st trip DTC is detected, go to [EC-496, "Diagnostic Procedure"](#)

## Overall Function Check

UBS0061G

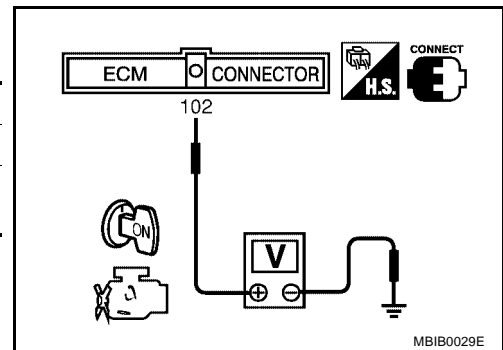
Use this procedure to check the overall function of the park/neutral position (PNP) switch circuit. During this check, a 1st trip DTC might not be confirmed.

### WITH GST

- Turn ignition switch "ON".
- Check voltage between ECM terminal 102 (PNP switch signal) and ground under the following conditions.

Condition (Gear position)	Voltage V (Known-good data)
"P" (A/T models only) and "N" position	Approx. 0
Except the above position	A/T models: Battery voltage M/T models: Approximately 5V

3. If NG, go to [EC-496, "Diagnostic Procedure"](#) .



# DTC P1706 PNP SWITCH

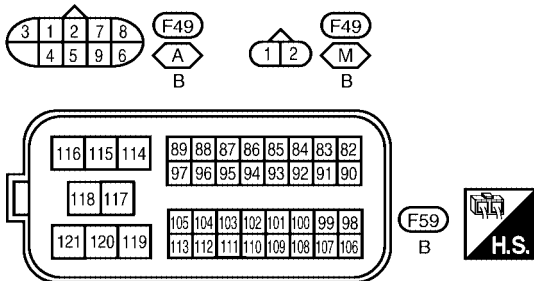
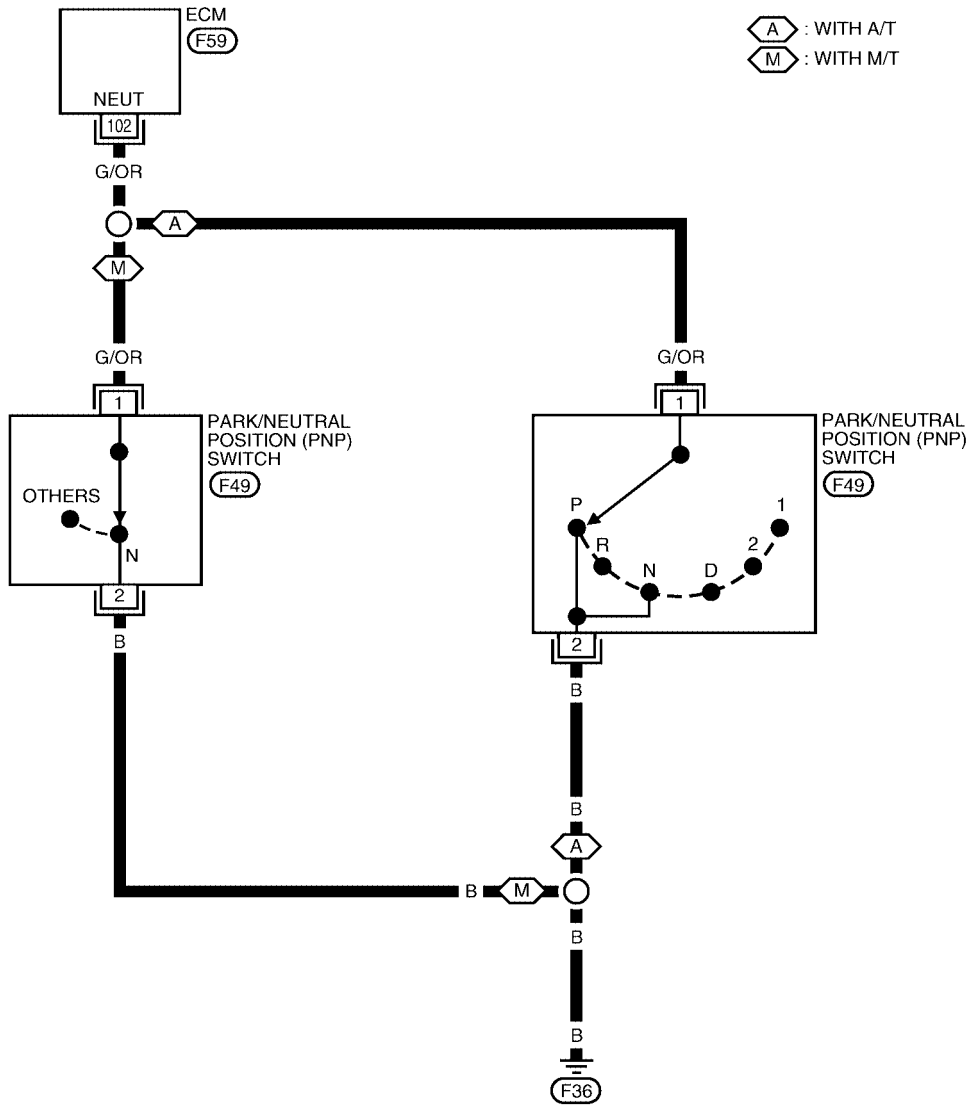
[QG18DE (ULEV)]

UBS0061H

## Wiring Diagram

EC-PNP/SW-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- A** : WITH A/T
- M** : WITH M/T



BBWA0304E

# DTC P1706 PNP SWITCH

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
102	G/OR	PNP switch	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"><li>Shift lever position is "P" or "N" (A/T models), "Neutral" (M/T models).</li></ul>	Approximately 0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"><li>Except the above gear position</li></ul>	<b>A/T models</b> BATTERY VOLTAGE (11 - 14V) <b>M/T models</b> Approximately 5V

## Diagnostic Procedure

UBS006II

### 1. CHECK GROUND CIRCUIT

- Turn ignition switch "OFF".
- Disconnect PNP switch harness connector.
- Check harness continuity between PNP switch terminal 2 and ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

- Also check harness for short to power.

OK or NG

OK >> GO TO 2.

NG >> Repair open circuit or short to power in harness or connectors.

### 2. CHECK INPUT SIGNAL CIRCUIT

- Disconnect ECM harness connector.
- Check harness continuity between ECM terminal 102 and PNP switch terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

- Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to power in harness or connectors.

### 3. CHECK PNP SWITCH

Refer to [AT-116, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#) (A/T models), [MT-13, "POSITION SWITCH"](#) (M/T models).

OK or NG

OK >> GO TO 4.

NG >> Replace PNP switch.

### 4. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**



**DTC P1805 BRAKE SWITCH**

PF:25320

**Description**

UBS00414

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driving.

**CONSULT-II Reference Value in Data Monitor Mode**

UBS00415

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

**On Board Diagnosis Logic**

UBS00416

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805 1805	Brake switch	A brake switch signal is not sent to ECM for an extremely long time while the vehicle is driving.	<ul style="list-style-type: none"> <li>● Harness or connectors (Stop lamp switch circuit is open or shorted.)</li> <li>● Stop lamp switch</li> </ul>

**FALI-SAFE MODE**

When the malfunction is detected, the ECM enters fail-safe mode.

Engine operating condition in fail-safe mode	
ECM controls the electric throttle control actuator by regulating the throttle opening to a small range. Therefore, acceleration will be poor.	
	Driving condition
When engine is idling	Normal
When accelerating	Poor acceleration

**DTC Confirmation Procedure**

UBS00417

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-II.
4. Select "DATA MONITOR" mode with CONSULT-II.
5. If 1st trip DTC is detected, go to [EC-499, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

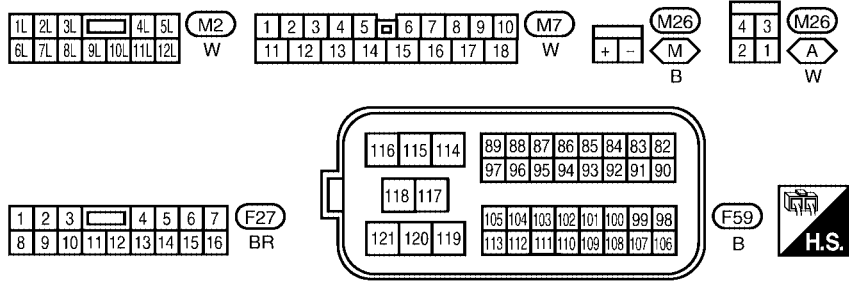
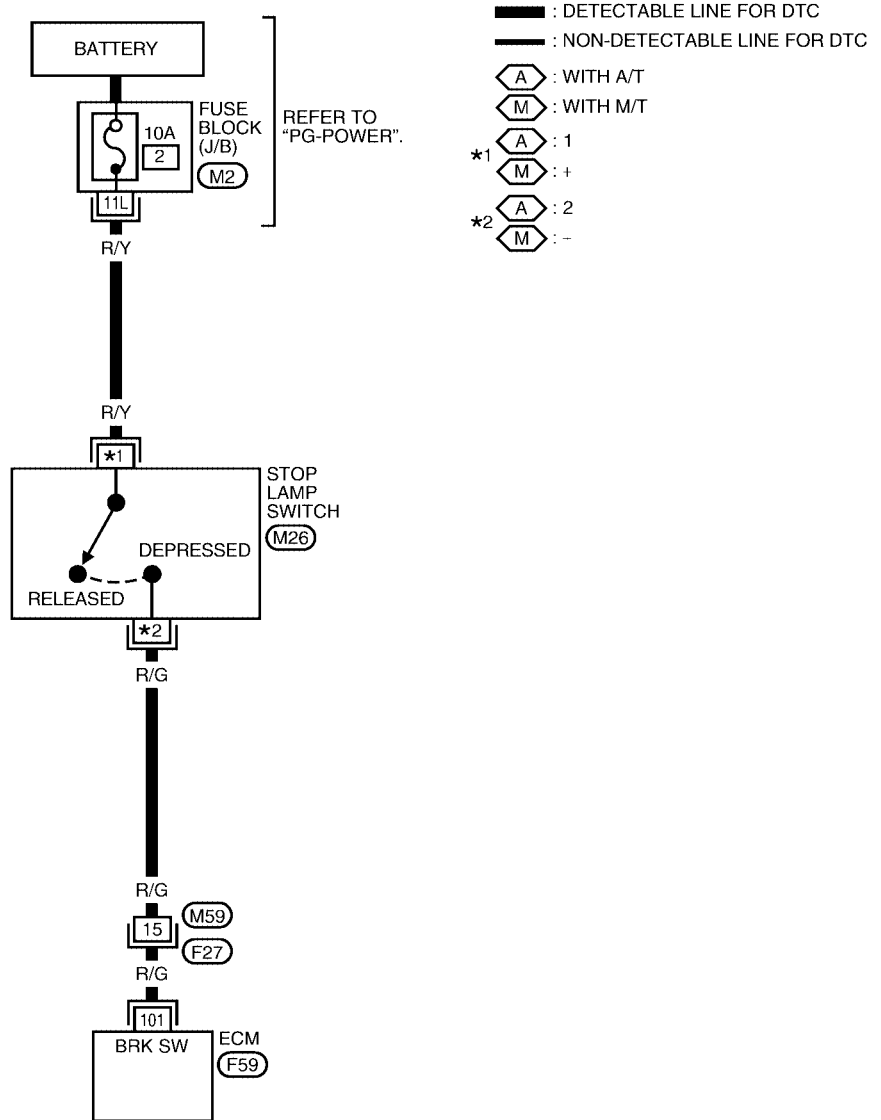
# DTC P1805 BRAKE SWITCH

[QG18DE (ULEV)]

UBS00418

## Wiring Diagram

### EC-BRK/SW-01



BBWA0305E

# DTC P1805 BRAKE SWITCH

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	R/G	Stop lamp switch	[Ignition switch "ON"] ● Brake pedal is fully released	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is depressed	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS00419

### 1. CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch "OFF".
2. Check the stop lamp when depressing and releasing the brake pedal.

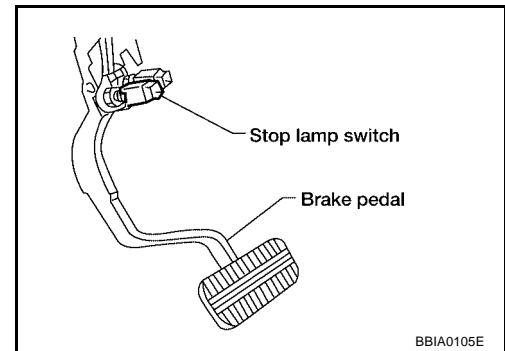
Brake pedal	Stop lamp
Fully released	Not illuminated
Depressed	Illuminated

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 2.

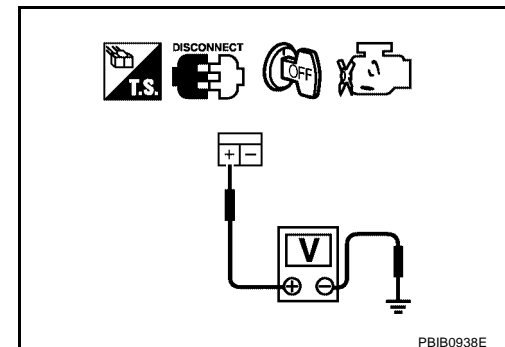
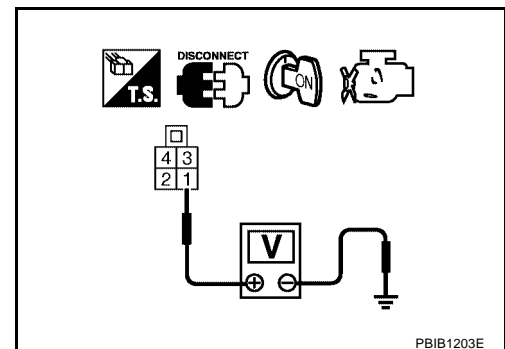
## 2. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch harness connector.



2. Check voltage between stop lamp switch terminal 1 (A/T models) or + (M/T models) and ground with CONSULT-II or tester.

**Voltage: Battery voltage**



OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.

## 3. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- Fuse block (J/B) connector M2
- Harness for open and short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

**4. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

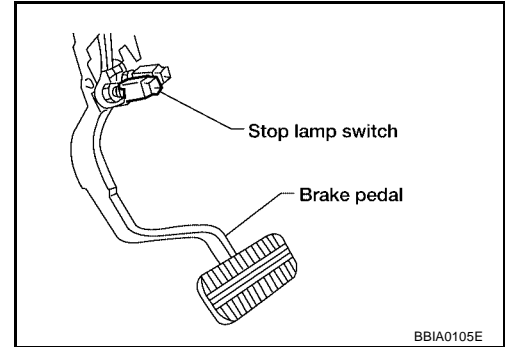
1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Disconnect stop lamp switch harness connector.
4. Check harness continuity between ECM terminal 101 and stop lamp switch terminal 2 (A/T models) or - (M/T models). Refer to Wiring Diagram.

**Continuity should exist.**

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.



**5. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK STOP LAMP SWITCH**

Refer to [EC-501, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace stop lamp switch.

**7. CHECK INTERMITTENT INCIDENT**

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

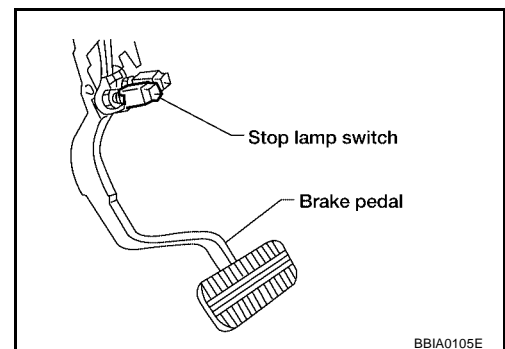
>> INSPECTION END

**Component Inspection  
STOP LAMP SWITCH**

UBS0041A

**A/T Models**

1. Disconnect stop lamp switch harness connector.



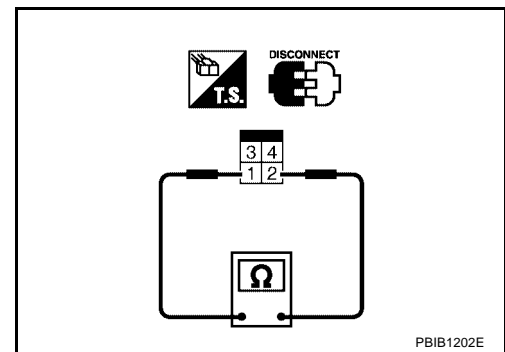
# DTC P1805 BRAKE SWITCH

[QG18DE (ULEV)]

2. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.

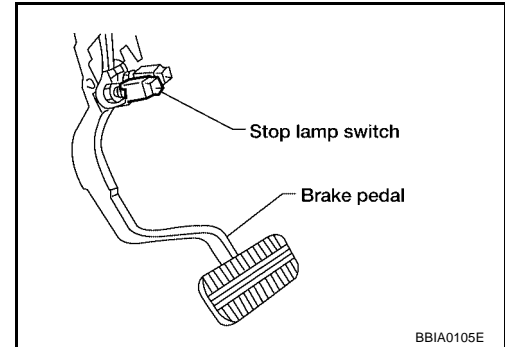
Conditions	Continuity
Brake pedal fully released	Should not exist.
Brake pedal depressed	Should exist.

3. If NG, adjust stop lamp switch installation, refer to [BR-11](#), "[BRAKE PEDAL AND BRACKET](#)", and perform step 2 again.



## M/T Models

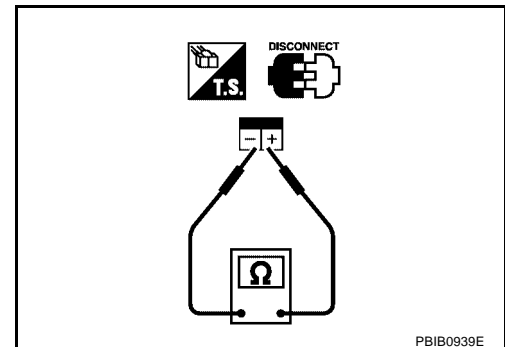
1. Disconnect stop lamp switch harness connector.



2. Check continuity between stop lamp switch terminals + and - under the following conditions.

Conditions	Continuity
Brake pedal fully released	Should not exist.
Brake pedal depressed	Should exist.

3. If NG, adjust stop lamp switch installation, refer to [BR-11](#), "[BRAKE PEDAL AND BRACKET](#)", and perform step 2 again.



DTC P2122, P2123 APP SENSOR

PF1:18002

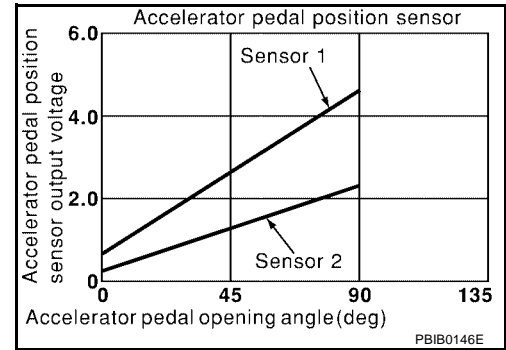
Component Description

UBS003ZC

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.

Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

UBS003ZD

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.65 - 0.87V
		Accelerator pedal: Fully depressed	More than 4.3V
ACCEL SEN2*	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.56 - 0.96V
		Accelerator pedal: Fully depressed	More than 4.0V
CLSD THL POS	● Ignition switch: ON	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

\*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal

On Board Diagnosis Logic

UBS003ZE

These self-diagnoses have the one trip detection logic.

NOTE:

If DTC P2122 or P2123 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-455, "DTC P1229 SENSOR POWER SUPPLY"](#) .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2122 2122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	● Harness or connectors (The APP sensor 1 circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 1)
P2123 2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

DTC Confirmation Procedure

UBS003ZF

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

## DTC P2122, P2123 APP SENSOR

[QG18DE (ULEV)]

---

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.



### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-507, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

### WITH GST

Follow the procedure "WITH CONSULT-II" above.

A

EC

C

D

E

F

G

H

I

J

K

L

M

# DTC P2122, P2123 APP SENSOR

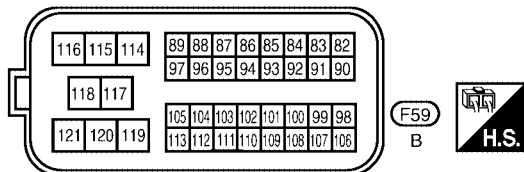
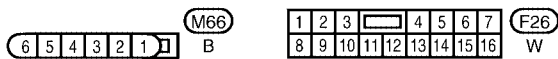
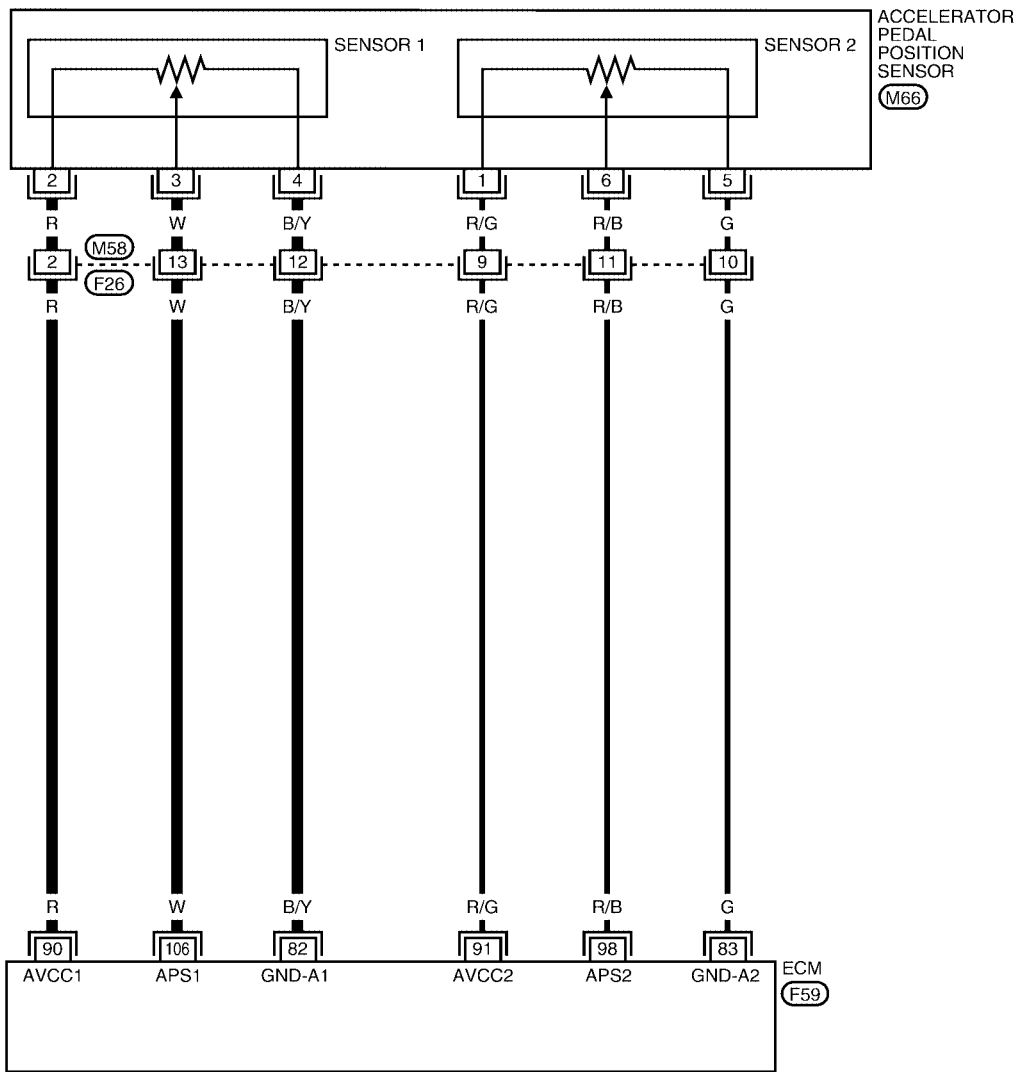
[QG18DE (ULEV)]

UBS003ZG

## Wiring Diagram

EC-APPS1-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



BBWA0306E

# DTC P2122, P2123 APP SENSOR

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B/Y	Sensor ground (Accelerator pedal position sensor 1)	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 0V
83	G	Sensor ground (Accelerator pedal position sensor 2)	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 0V
90	R	Sensor power supply (Accelerator pedal position sensor 1)	<b>[Ignition switch "ON"]</b>	Approximately 5V
91	R/G	Sensor power supply (Accelerator pedal position sensor 2)	<b>[Ignition switch "ON"]</b>	Approximately 5V
98	R/B	Accelerator pedal position sensor 2	<b>[Ignition switch "ON"]</b> ● Engine stopped ● Accelerator pedal fully released	0.28 - 0.48V
			<b>[Ignition switch "ON"]</b> ● Engine stopped ● Accelerator pedal fully depressed	More than 2.0V
106	W	Accelerator pedal position sensor 1	<b>[Ignition switch "ON"]</b> ● Engine stopped ● Accelerator pedal fully released	0.65 - 0.87V
			<b>[Ignition switch "ON"]</b> ● Engine stopped ● Accelerator pedal fully depressed	More than 4.3V

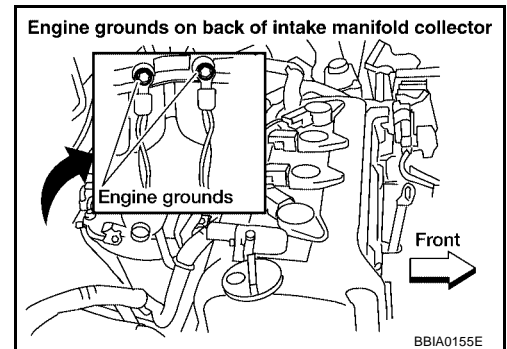
## Diagnostic Procedure

UBS003ZH

### 1. RETIGHTEN GROUND SCREWS

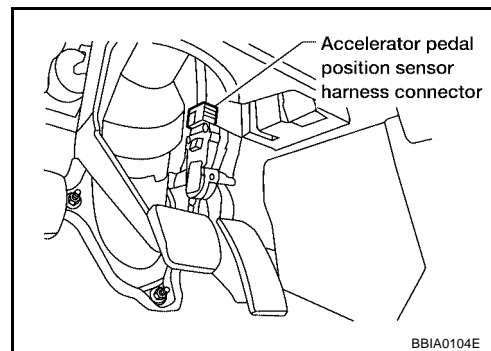
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

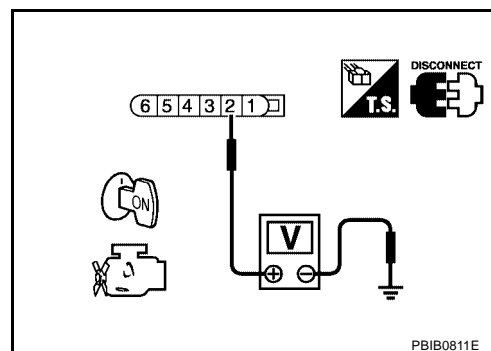


3. Check voltage between APP sensor terminal 2 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 4.  
NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between APP sensor terminal 4 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
NG >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

**6. CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 106 and APP sensor terminal 3.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.  
NG >> GO TO 7.

---

**7. DETECT MALFUNCTIONING PART**

---

Check the following.

- Harness connectors M58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

**8. CHECK APP SENSOR**

---

Refer to [EC-509, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.  
NG >> GO TO 9.

---

**9. REPLACE ACCELERATOR PEDAL ASSEMBLY**

---

1. Replace accelerator pedal assembly.
2. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

---

**10. CHECK INTERMITTENT INCIDENT**

---

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Component Inspection**  
**ACCELERATOR PEDAL POSITION SENSOR**

UBS003Z1

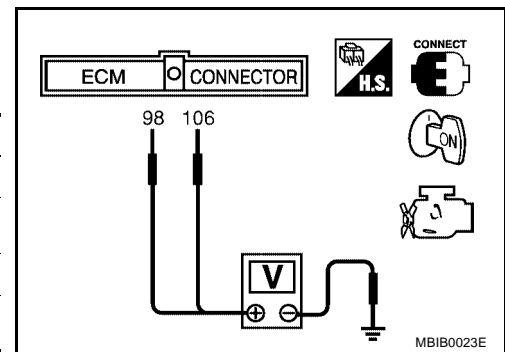
1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".

## DTC P2122, P2123 APP SENSOR

[QG18DE (ULEV)]

3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.65 - 0.87V
	Fully depressed	More than 4.3V
98 (Accelerator pedal position sensor 2)	Fully released	0.28 - 0.48V
	Fully depressed	More than 2.0V



4. If NG, replace accelerator pedal assembly.
5. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .
6. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
7. Perform [EC-53, "Idle Air Volume Learning"](#) .

### Removal and Installation ACCELERATOR PEDAL

UBS003ZJ

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

DTC P2127, P2128 APP SENSOR

PF1:18002

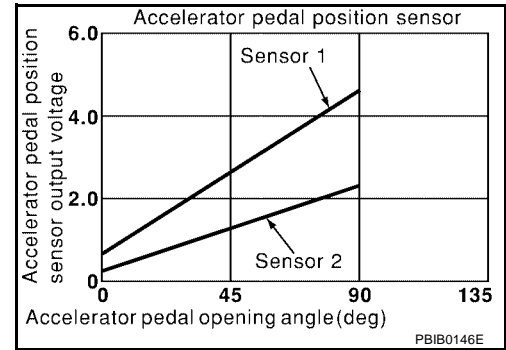
Component Description

UBS0040A

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.

Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

UBS0040B

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (engine stopped) Accelerator pedal: Fully released	0.65 - 0.87V
	Accelerator pedal: Fully depressed	More than 4.3V
ACCEL SEN2*	● Ignition switch: ON (engine stopped) Accelerator pedal: Fully released	0.56 - 0.96V
	Accelerator pedal: Fully depressed	More than 4.0V
CLSD THL POS	● Ignition switch: ON Accelerator pedal: Fully released	ON
	Accelerator pedal: Slightly depressed	OFF

\*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

UBS0040C

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1227 1227	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The APP sensor 2 circuit is open or shorted.) (TP sensor circuit is shorted.)</li> <li>● Accelerator pedal position sensor (Accelerator pedal position sensor 2)</li> <li>● Electric throttle control actuator (TP sensor 1 and 2)</li> </ul>
P1228 1228	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

DTC Confirmation Procedure

UBS0040D

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

## WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-514, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

## WITH GST

Follow the procedure "With CONSULT-II" above.



# DTC P2127, P2128 APP SENSOR

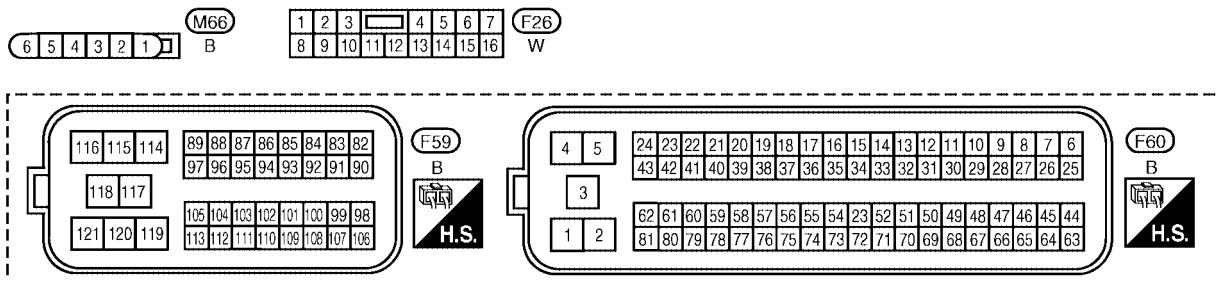
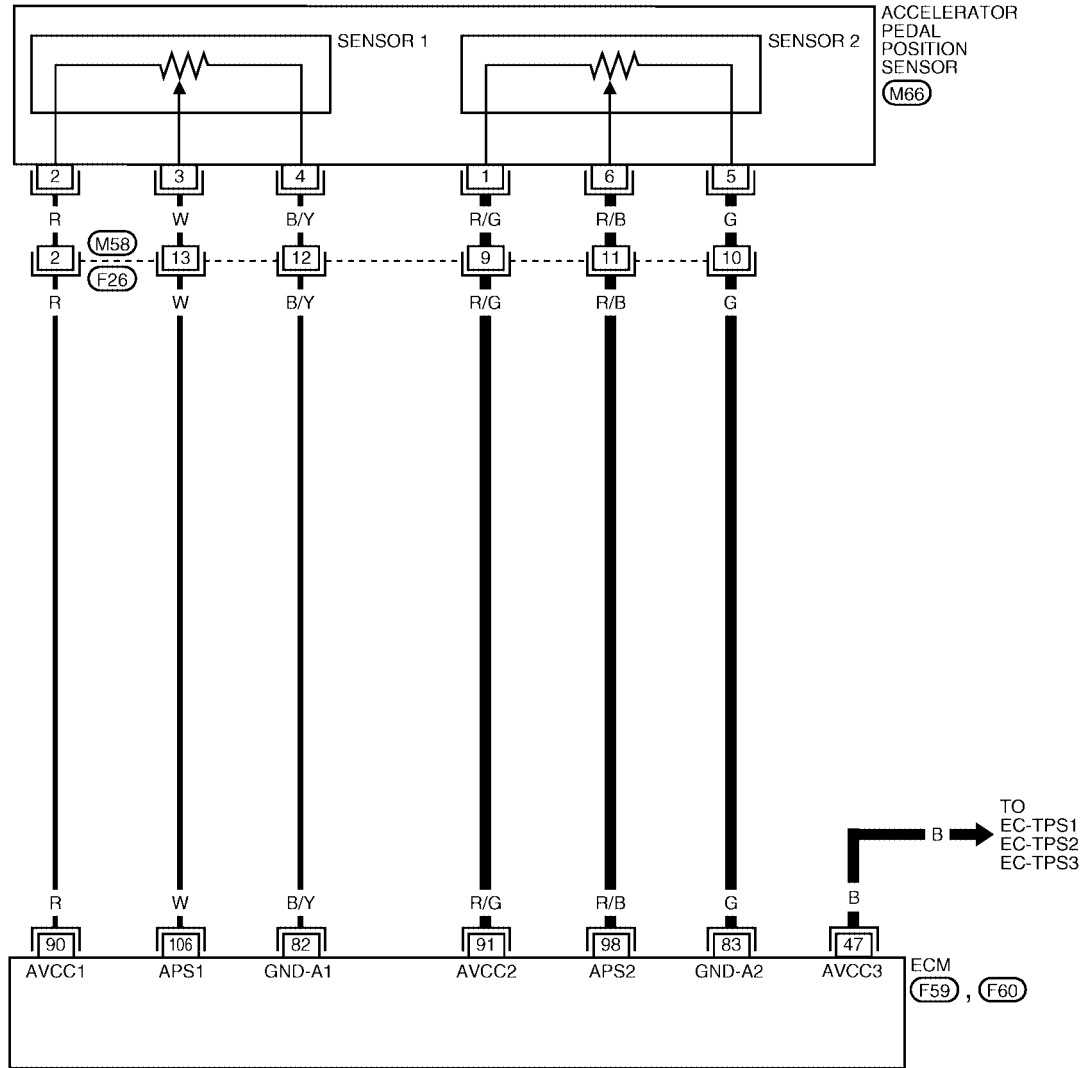
[QG18DE (ULEV)]

UBS0040E

## Wiring Diagram

EC-APPS2-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



BBWA1382E

# DTC P2127, P2128 APP SENSOR

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	B	Sensor power supply (Throttle position sensor)	<b>[Ignition switch "ON"]</b>	Approximately 5V
82	B/Y	Sensor ground (Accelerator pedal position sensor 1)	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 0V
83	G	Sensor ground (Accelerator pedal position sensor 2)	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 0V
90	R	Sensor power supply (Accelerator pedal position sensor 1)	<b>[Ignition switch "ON"]</b>	Approximately 5V
91	R/G	Sensor power supply (Accelerator pedal position sensor 2)	<b>[Ignition switch "ON"]</b>	Approximately 5V
98	R/B	Accelerator pedal position sensor 2	<b>[Ignition switch "ON"]</b> ● Engine stopped ● Accelerator pedal fully released	0.28 - 0.48V
			<b>[Ignition switch "ON"]</b> ● Engine stopped ● Accelerator pedal fully depressed	More than 2.0V
106	W	Accelerator pedal position sensor 1	<b>[Ignition switch "ON"]</b> ● Engine stopped ● Accelerator pedal fully released	0.65 - 0.87V
			<b>[Ignition switch "ON"]</b> ● Engine stopped ● Accelerator pedal fully depressed	More than 4.3V

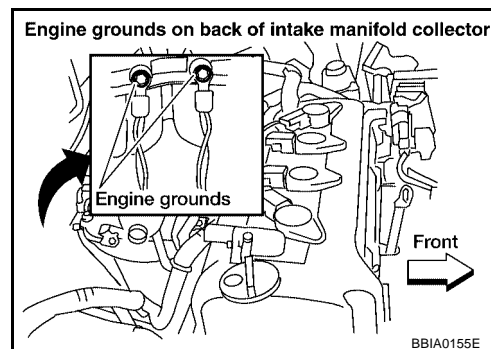
## Diagnostic Procedure

### 1. RETIGHTEN GROUND SCREWS

UBS0040F

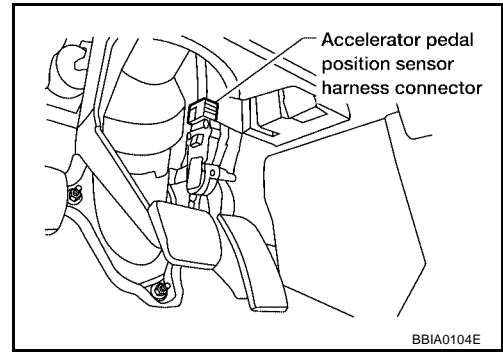
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



**2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I**

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

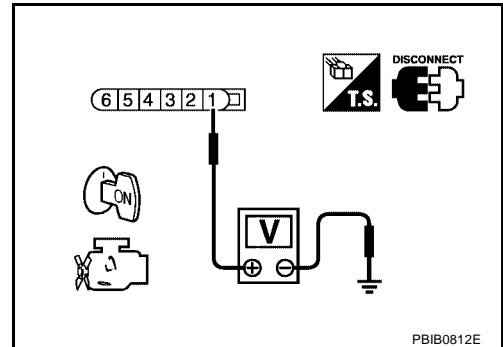


3. Check voltage between APP sensor terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 2.5V**

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 3.



**3. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II**

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 1 and ECM terminal 91. Refer to Wiring Diagram.

**Continuity should exist.**

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.

**4. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M58, F26
- Harness for open between ECM and accelerator pedal position sensor

>> Repair or replace open circuit.

**5. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III**

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
91	APP sensor terminal 1	<a href="#">EC-513</a>
47	Electric throttle control actuator terminal 1	<a href="#">EC-188</a>

OK or NG

- OK >> GO TO 6.
- NG >> Repair short to ground or short to power in harness or connectors.

---

## 6. CHECK THROTTLE POSITION SENSOR

---

Refer to [EC-192, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 14.  
NG >> GO TO 7.

---

## 7. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

---

1. Replace the electric throttle control actuator.
2. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

---

## 8. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Check harness continuity between ECM terminal 83 APP sensor terminal 5.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 10.  
NG >> GO TO 9.

---

## 9. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 10. CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 98 and APP sensor terminal 6.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 12.  
NG >> GO TO 11.

---

## 11. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 12. CHECK APP SENSOR

Refer to [EC-517, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 14.
- NG >> GO TO 13.

## 13. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

## 14. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

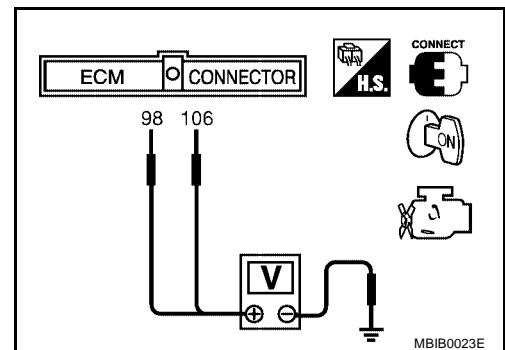
>> INSPECTION END

### Component Inspection ACCELERATOR PEDAL POSITION SENSOR

UBS0040G

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.65 - 0.87V
	Fully depressed	More than 4.3V
98 (Accelerator pedal position sensor 2)	Fully released	0.28 - 0.48V
	Fully depressed	More than 2.0V



4. If NG, replace accelerator pedal assembly.
5. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .
6. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
7. Perform [EC-53, "Idle Air Volume Learning"](#) .

### Removal and Installation ACCELERATOR PEDAL

UBS0040H

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

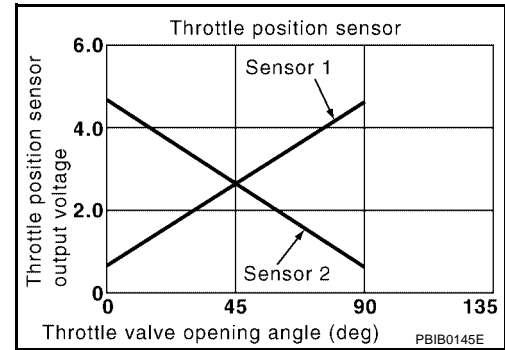
DTC P2135 TP SENSOR

Component Description

UBS003R3

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

UBS003R4

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	More than 0.36V
	● Shift lever: D (A/T model) 1st (M/T model)	Accelerator pedal: Fully depressed	Less than 4.75V

\*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

UBS003R5

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0221 0221	Throttle position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	<ul style="list-style-type: none"> <li>● Harness or connector (The TP sensor 1 and 2 circuit is open or shorted.) (APP sensor circuit is shorted.)</li> <li>● Electric throttle control actuator (TP sensor 1 and 2)</li> <li>● Accelerator pedal position sensor (APP sensor 2)</li> </ul>

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

DTC Confirmation Procedure

UBS003R6

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".

# DTC P2135 TP SENSOR

[QG18DE (ULEV)]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-521, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

A

EC

C

D

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I

J

K

L

M

## WITH GST

Follow the procedure "WITH CONSULT-II" above.

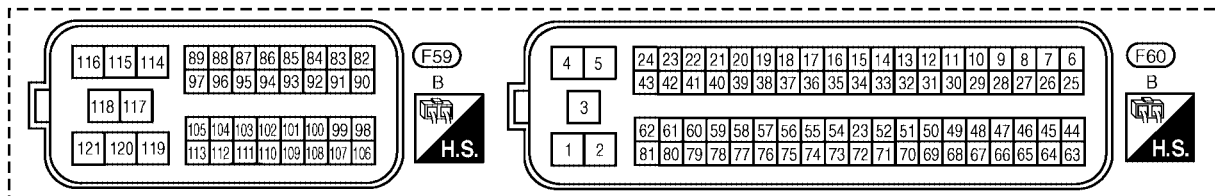
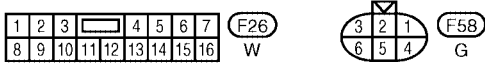
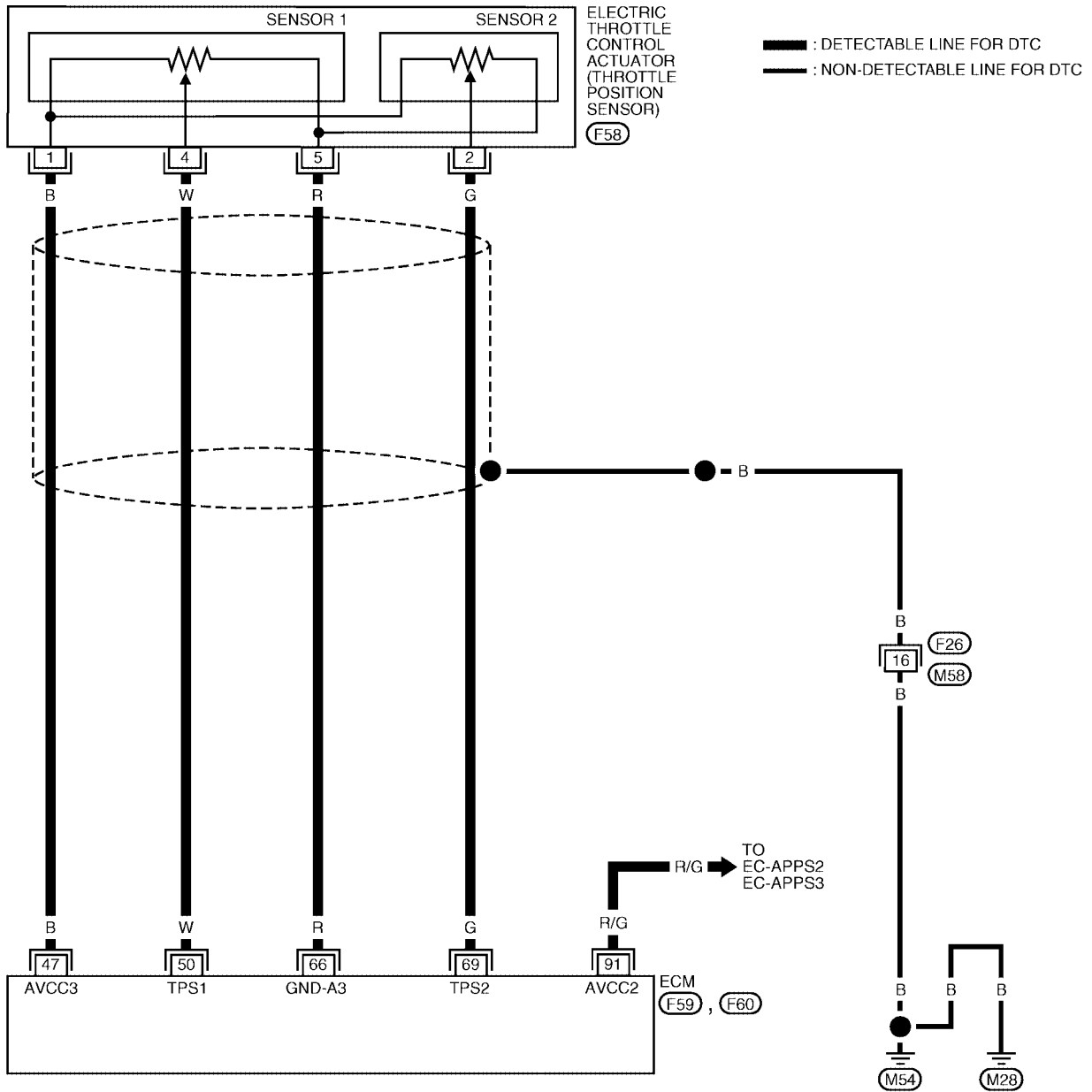
# DTC P2135 TP SENSOR

[QG18DE (ULEV)]

UBS003R7

## Wiring Diagram

EC-TPS3-01



BBWA1383E



# DTC P2135 TP SENSOR

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	B	Sensor power supply (Throttle position sensor)	[Ignition switch "ON"]	Approximately 5V
50	W	Throttle position sensor 1	[Ignition switch "ON"] ● Engine stopped ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released	More than 0.36V
			[Ignition switch "ON"] ● Engine stopped ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed	Less than 4.75V
66	R	Sensor ground (Throttle position sensor)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
69	G	Throttle position sensor 2	[Ignition switch "ON"] ● Engine stopped ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released	Less than 4.75V
			[Ignition switch "ON"] ● Engine stopped ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed	More than 0.36V
91	R/G	Sensor power supply (Accelerator pedal position sensor 2)	[Ignition switch "ON"]	Approximately 5V

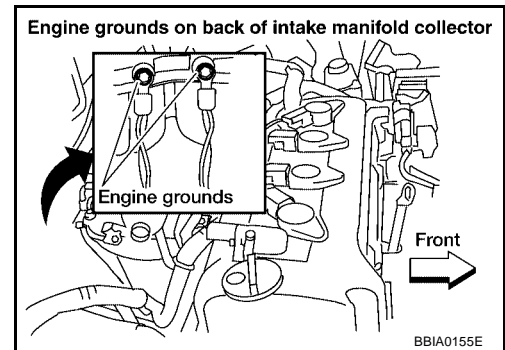
## Diagnostic Procedure

UBS003R8

### 1. RETIGHTEN GROUND SCREWS

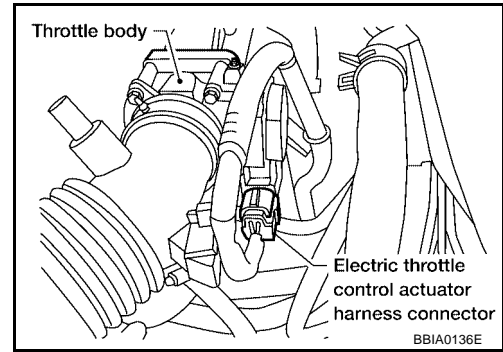
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

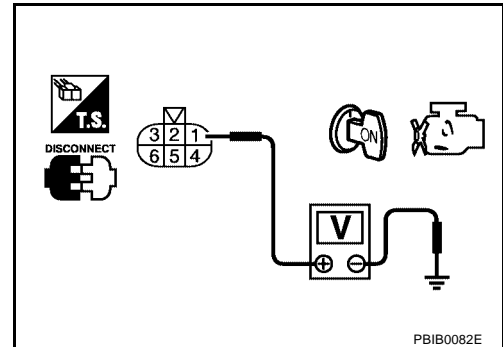


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 7.  
 NG >> GO TO 3.



## 3. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 1 and ECM terminal 47. Refer to Wiring Diagram.

**Continuity should exist.**

OK or NG

- OK >> GO TO 4.  
 NG >> Repair or replace open circuit.

## 4. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-III

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Electric throttle control actuator terminal 1	<a href="#">EC-520</a>
91	APP sensor terminal 1	<a href="#">EC-513</a>

OK or NG

- OK >> GO TO 5.  
 NG >> Repair short to ground or short to power in harness or connectors.

## 5. CHECK APP SENSOR

Refer to [EC-517](#) .

OK or NG

- OK >> GO TO 11.  
 NG >> GO TO 6.

**6. REPLACE ACCELERATOR PEDAL ASSEMBLY**

1. Replace accelerator pedal assembly.
2. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**7. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and electric throttle control actuator terminal 5.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Check harness continuity between ECM terminal 50 and electric throttle control actuator terminal 4, ECM terminal 69 and electric throttle control actuator terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**9. CHECK THROTTLE POSITION SENSOR**

Refer to [EC-524, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> GO TO 10.

**10. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**11. CHECK INTERMITTENT INCIDENT**

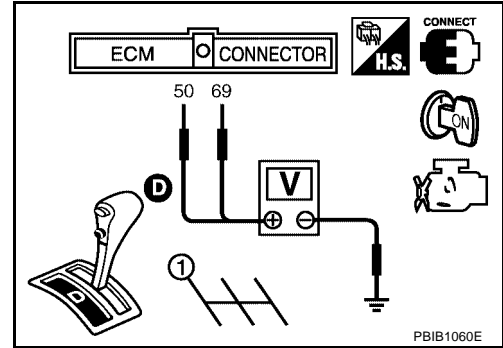
Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection**  
**THROTTLE POSITION SENSOR**

1. Reconnect all harness connectors disconnected.
2. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 50 (TP sensor 1 signal), 69 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
50 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
69 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-53, "Idle Air Volume Learning"](#) .

**Remove and Installation**  
**ELECTRIC THROTTLE CONTROL ACTUATOR**

Refer to [EM-12, "Removal and Installation"](#) .

DTC P2138 APP SENSOR

PFP:18002

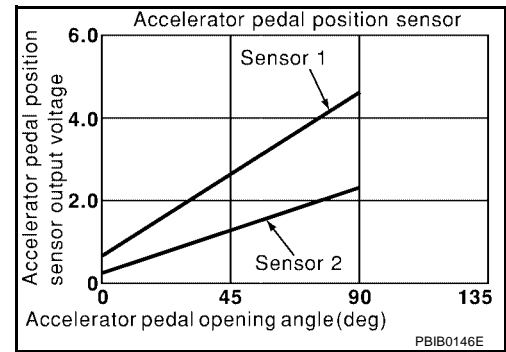
Component Description

UBS00324

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.

Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

UBS00325

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.65 - 0.87V
		Accelerator pedal: Fully depressed	More than 4.3V
ACCEL SEN2*	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.56 - 0.96V
		Accelerator pedal: Fully depressed	More than 4.0V
CLSD THL POS	● Ignition switch: ON	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

\*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

UBS00326

This self-diagnosis has the one trip detection logic.

NOTE:

If DTC P2138 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-455](#)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0226 0226	Accelerator pedal position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	<ul style="list-style-type: none"> <li>● Harness or connector (The APP sensor 1 and 2 circuit is open or shorted.) (TP sensor circuit is shorted)</li> <li>● Accelerator pedal position sensor 1 and 2</li> <li>● Electric throttle control actuator (TP sensor 1 and 2)</li> </ul>

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

---

### DTC Confirmation Procedure

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

**Before performing the following procedure, confirm that battery voltage is more than 10V at idle.**

### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-529, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

### WITH GST

Follow the procedure "WITH CONSULT-II" above.

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# DTC P2138 APP SENSOR

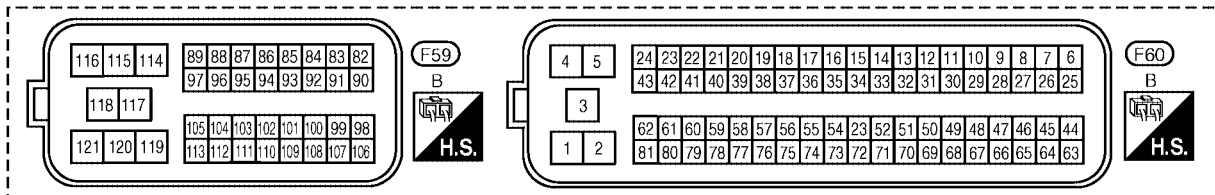
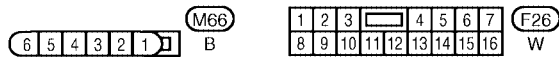
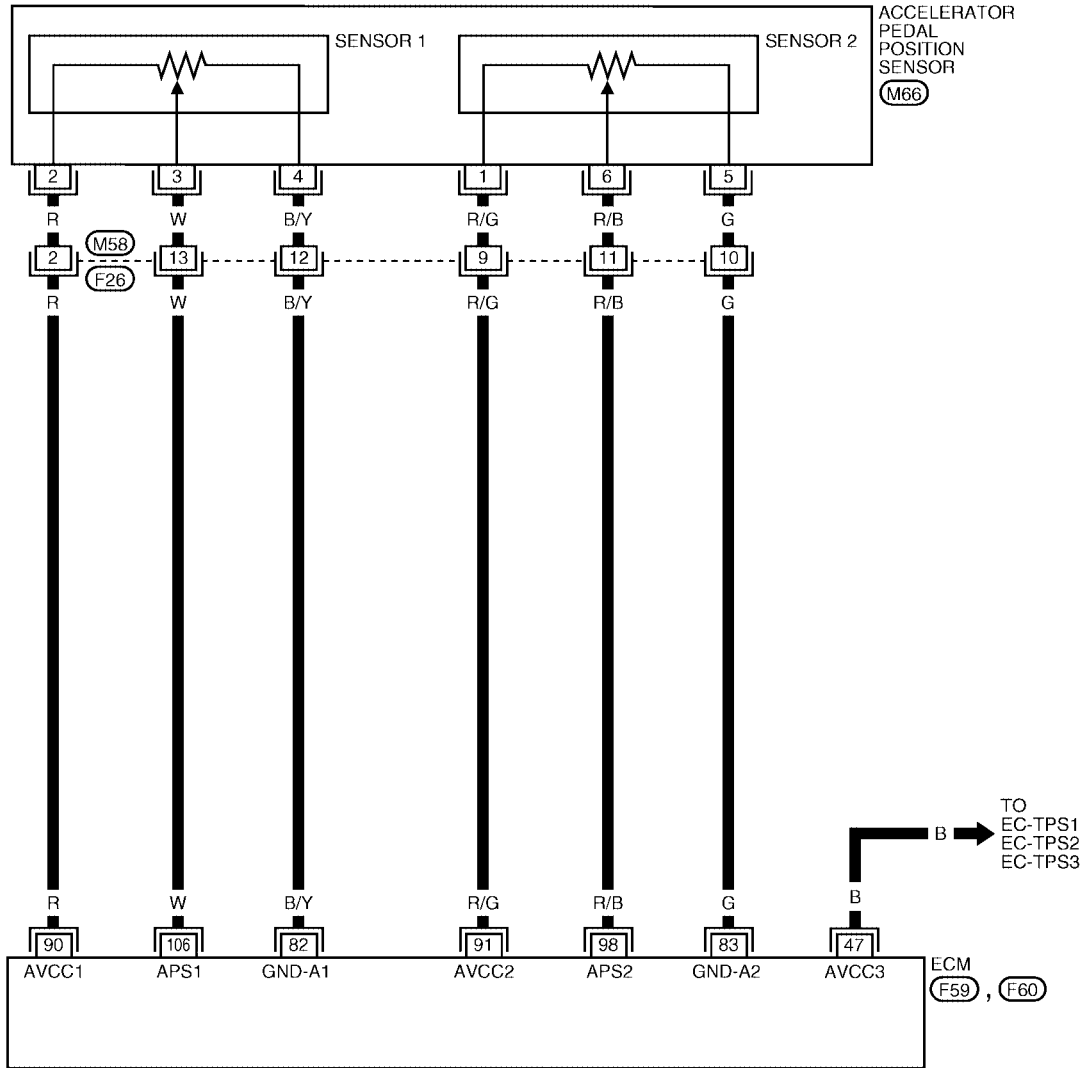
[QG18DE (ULEV)]

UBS003Z8

## Wiring Diagram

EC-APPS3-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



BBWA1384E



# DTC P2138 APP SENSOR

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	B	Sensor power supply (Throttle position sensor)	[Ignition switch "ON"]	Approximately 5V
82	B/Y	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
83	G	Sensor ground (Accelerator pedal position sensor 2)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
90	R	Sensor power supply (Accelerator pedal position sensor 1)	[Ignition switch "ON"]	Approximately 5V
91	R/G	Sensor power supply (Accelerator pedal position sensor 2)	[Ignition switch "ON"]	Approximately 5V
98	R/B	Accelerator pedal position sensor 2	[Ignition switch "ON"] ● Engine stopped ● Accelerator pedal fully released	0.28 - 0.48V
			[Ignition switch "ON"] ● Engine stopped ● Accelerator pedal fully depressed	More than 2.0V
106	W	Accelerator pedal position sensor 1	[Ignition switch "ON"] ● Engine stopped ● Accelerator pedal fully released	0.65 - 0.87V
			[Ignition switch "ON"] ● Engine stopped ● Accelerator pedal fully depressed	More than 4.3V

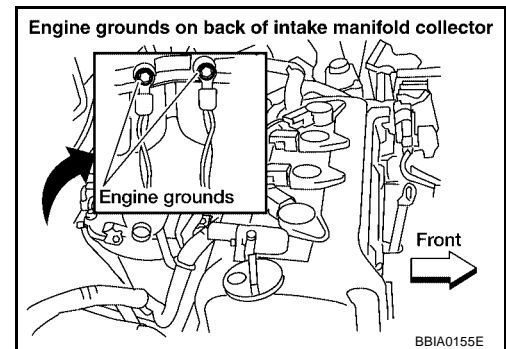
## Diagnostic Procedure

UBS00329

### 1. RETIGHTEN GROUND SCREWS

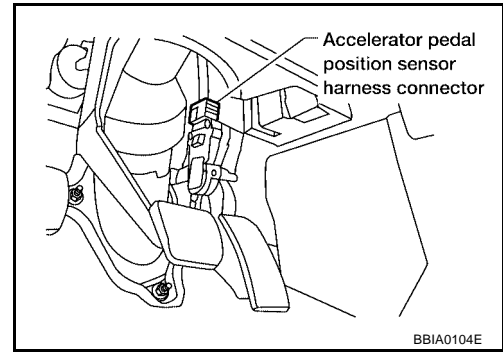
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

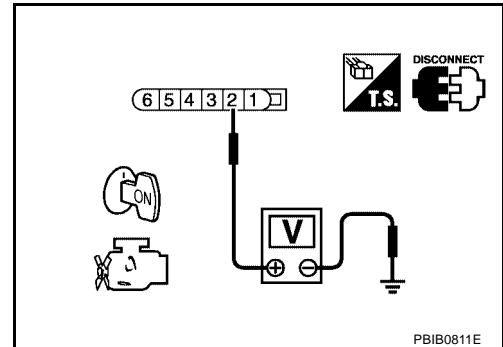


3. Check voltage between APP sensor terminal 2 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

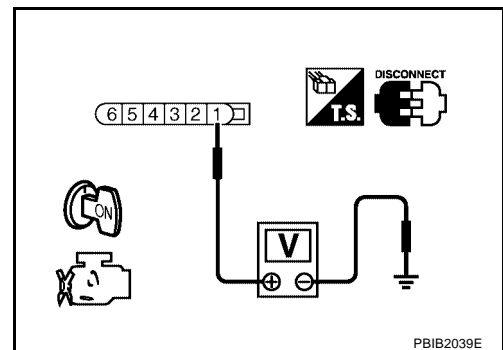
## 4. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

Check voltage between APP sensor terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 5.



**5. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 1 and ECM terminal 91.  
Refer to Wiring Diagram.

**Continuity should exist.**

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

**6. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M58, F26
- Harness for open between ECM and accelerator pedal position sensor

>> Repair or replace open circuit.

**7. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III**

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
91	APP sensor terminal 1	<a href="#">EC-513</a>
47	Electric throttle control actuator terminal 1	<a href="#">EC-188</a>

OK or NG

- OK >> GO TO 8.
- NG >> Repair short to ground or short to power in harness or connectors.

**8. CHECK THROTTLE POSITION SENSOR**

Refer to [EC-192, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 9.

**9. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

---

## 10. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Check harness continuity between ECM terminal 82 and APP sensor terminals 4, ECM terminal 83 and APP sensor terminal 5.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 12.  
NG >> GO TO 11.

---

## 11. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 12. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 106 and APP sensor terminal 3, ECM terminal 98 and APP sensor terminal 6.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 14.  
NG >> GO TO 13.

---

## 13. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors EM58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 14. CHECK APP SENSOR

---

Refer to [EC-534, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 16.  
NG >> GO TO 15.

---

**15. REPLACE ACCELERATOR PEDAL ASSEMBLY**

---

1. Replace accelerator pedal assembly.
2. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

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**16. CHECK INTERMITTENT INCIDENT**

---

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

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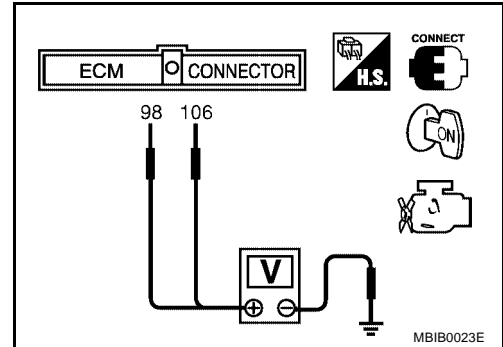
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**Component Inspection**

**ACCELERATOR PEDAL POSITION SENSOR**

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.65 - 0.87V
	Fully depressed	More than 4.3V
98 (Accelerator pedal position sensor 2)	Fully released	0.28 - 0.48V
	Fully depressed	More than 2.0V



4. If NG, replace accelerator pedal assembly and go to next step.
5. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .
6. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
7. Perform [EC-53, "Idle Air Volume Learning"](#) .

**Removal and Installation**

**ACCELERATOR PEDAL**

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

### IGNITION SIGNAL

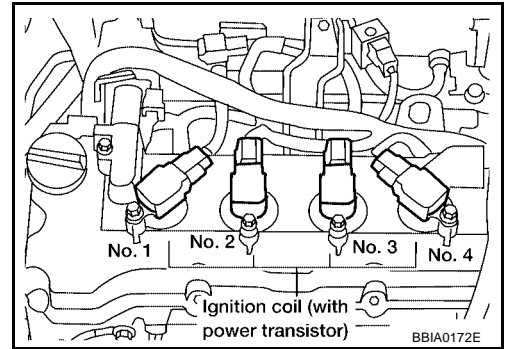
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UBS0057Y

#### Component Description

#### IGNITION COIL & POWER TRANSISTOR

The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns on and off the ignition coil primary circuit. This on-off operation induces the proper high voltage in the coil secondary circuit.



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# IGNITION SIGNAL

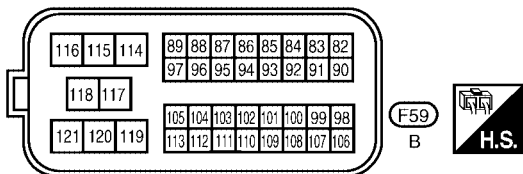
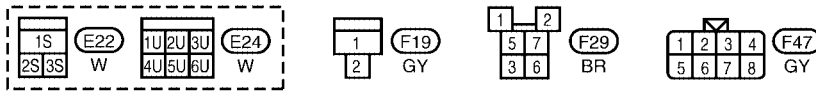
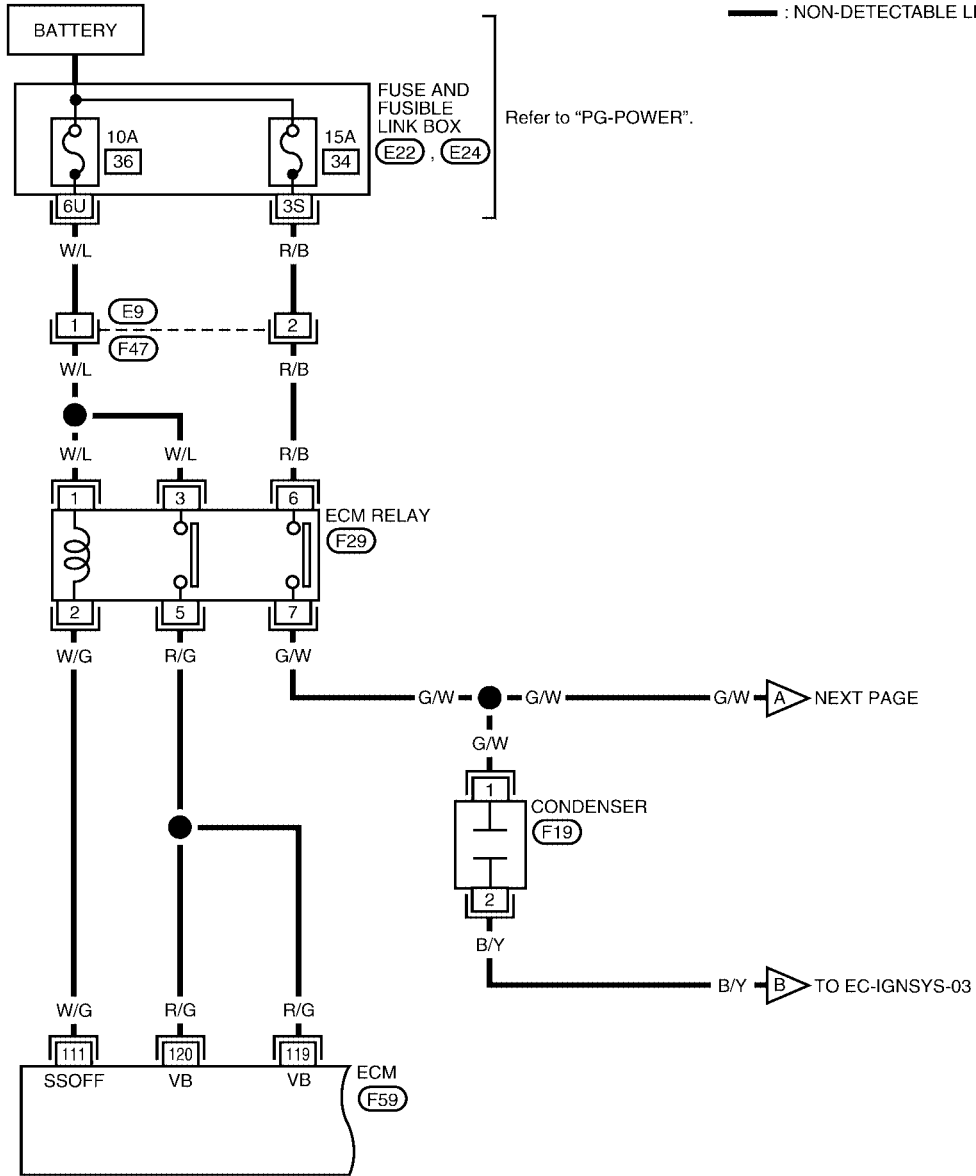
[QG18DE (ULEV)]

UBS0057Z

## Wiring Diagram

### EC-IGNSYS-01

— : DETECTABLE LINE FOR DTC  
 — : NON-DETECTABLE LINE FOR DTC



BBWA0310E



# IGNITION SIGNAL

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For 5 seconds after turning ignition switch "OFF"	0 - 1.0V
			[Ignition switch "OFF"] ● 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
119 120	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

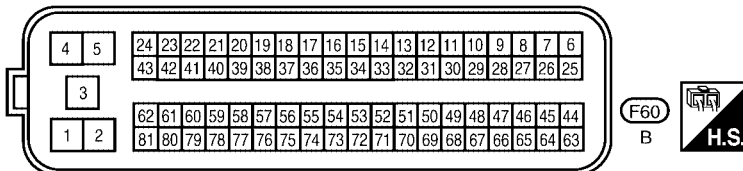
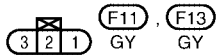
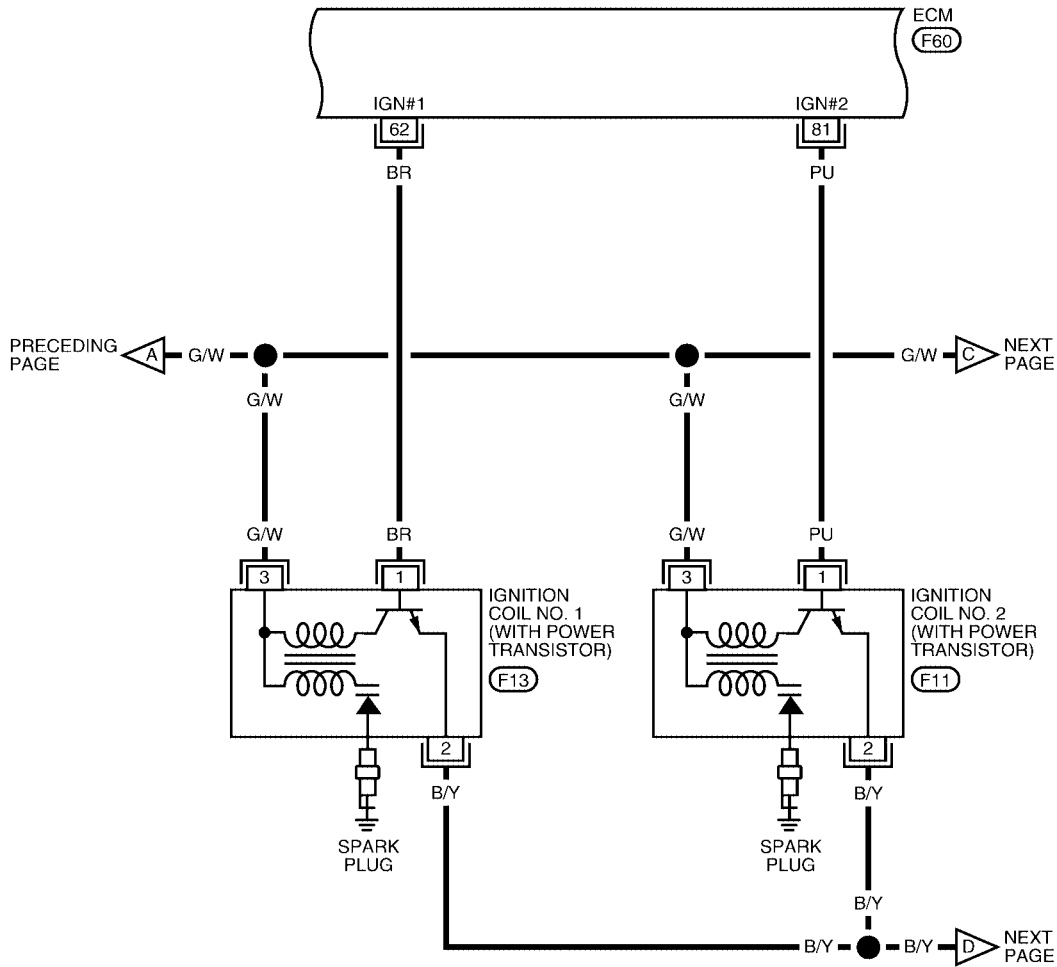
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# IGNITION SIGNAL

[QG18DE (ULEV)]

## EC-IGNSYS-02

— : DETECTABLE LINE FOR DTC  
 - - - : NON-DETECTABLE LINE FOR DTC



BBWA0795E


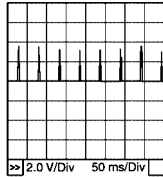
# IGNITION SIGNAL

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
62 81	BR PU	Ignition signal No. 1 Ignition signal No. 2	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>0 - 0.1V★</p>  <p>PBIB0521E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm</li> </ul>	<p>0 - 0.2V★</p>  <p>PBIB0522E</p>

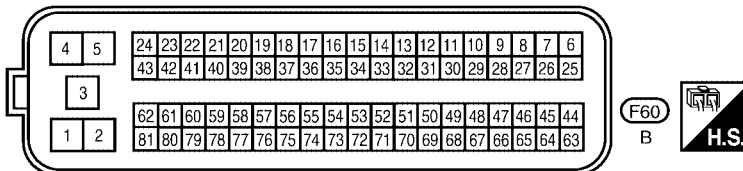
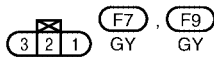
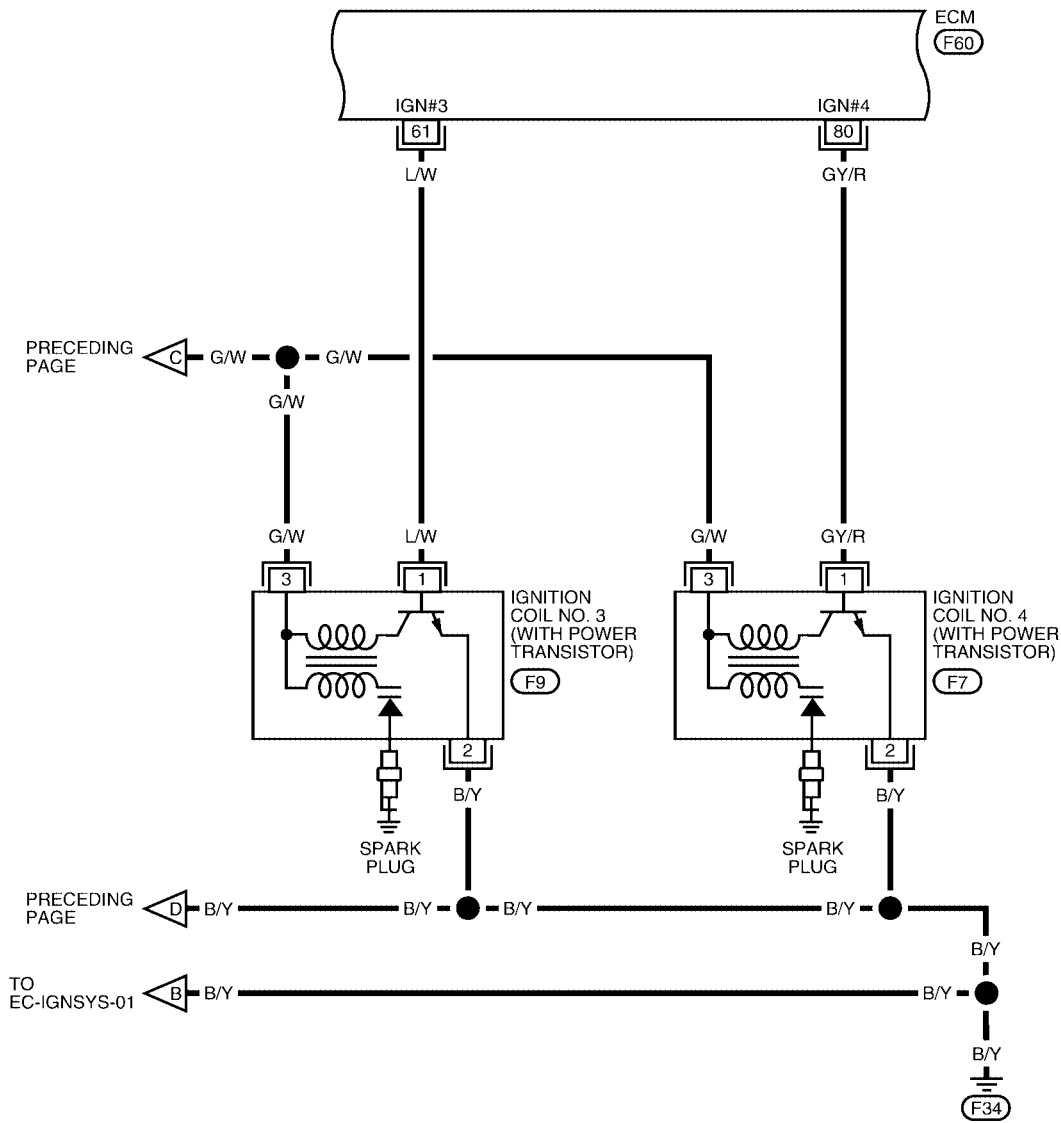
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

# IGNITION SIGNAL

[QG18DE (ULEV)]

## EC-IGNSYS-03

— : DETECTABLE LINE FOR DTC  
 - - - : NON-DETECTABLE LINE FOR DTC



BBWA0796E


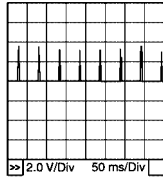
# IGNITION SIGNAL

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
61 80	L/W GY/R	Ignition signal No. 3 Ignition signal No. 4	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>0 - 0.1V★</p>  <p>PBIB0521E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm</li> </ul>	<p>0 - 0.2V★</p>  <p>PBIB0522E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

### 1. CHECK ENGINE START

Turn ignition switch "OFF", and restart engine.

**Is engine running?**

Yes or No

- Yes (With CONSULT-II)>>GO TO 2.
- Yes (Without CONSULT-II)>>GO TO 3.
- No >> GO TO 4.

### 2. CHECK OVERALL FUNCTION

④ With CONSULT-II

- Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
- Make sure that each circuit produces a momentary engine speed drop.

OK or NG

- OK >> INSPECTION END
- NG >> GO TO 10.

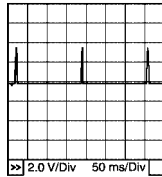
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

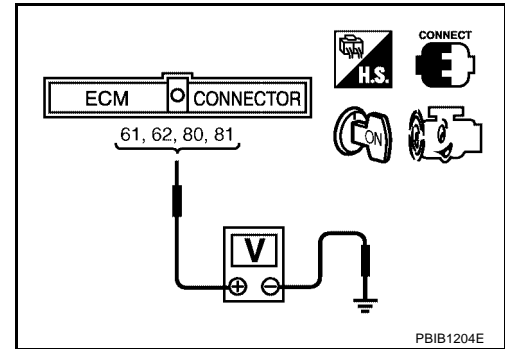
## 3. CHECK OVERALL FUNCTION

### ⊗ Without CONSULT-II

1. Let engine idle.
2. Read the voltage signal between ECM terminals 60, 61, 79, 80 and ground with an oscilloscope.
3. Verify that the oscilloscope screen shows the signal wave as shown below.



PBIB0521E



PBIB1204E

OK or NG

- OK >> **INSPECTION END**  
 NG >> GO TO 10.

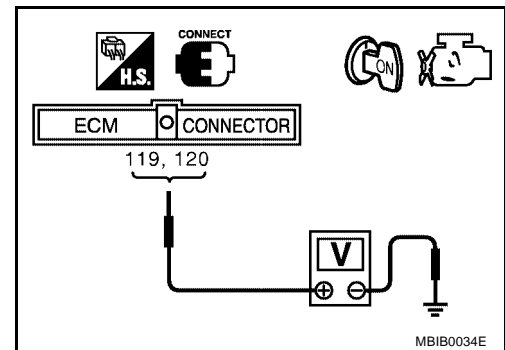
## 4. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch "ON".
2. Check voltage between ECM terminals 119, 120 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 5.  
 NG >> Go to [EC-138. "POWER SUPPLY CIRCUIT FOR ECM"](#)



MBIB0034E

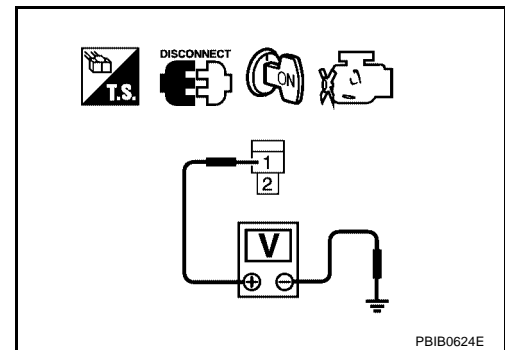
## 5. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch "OFF".
2. Disconnect condenser harness connector.
3. Turn ignition switch "ON".
4. Check voltage between condenser terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 10.  
 NG >> GO TO 6.



PBIB0624E

## 6. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch "OFF".
2. Disconnect ECM relay.
3. Check harness continuity between ECM relay terminal 7 and condenser terminal 1.  
Refer to Wiring Diagram.

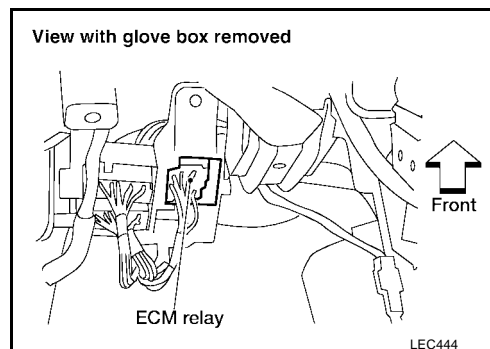
**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



## 7. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-IV

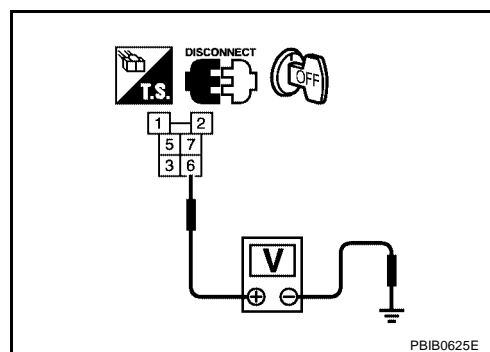
Check voltage between ECM relay terminal 6 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

OK >> GO TO 9.

NG >> GO TO 8.



## 8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E9, F47
- 15A fuse
- Harness for open or short between ECM relay and battery

>> Repair or replace harness or connectors.

## 9. CHECK ECM RELAY

Refer to [EC-545, "Component Inspection"](#).

OK or NG

OK >> GO TO 17.

NG >> Replace ECM relay.

## 10. CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect condenser harness connector.
3. Check harness continuity between condenser terminal 2 and ground.  
Refer to Wiring diagram.

**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

OK >> GO TO 11.

NG >> Repair open circuit or short to power in harness or connector.

## 11. CHECK CONDENSER

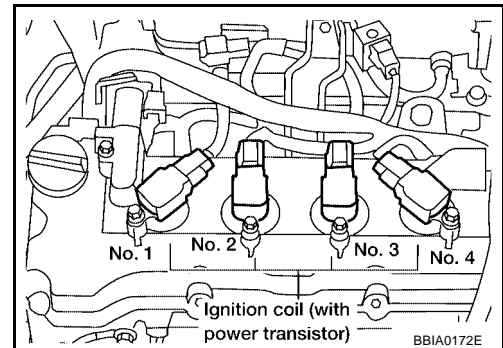
Refer to [EC-545, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 12.
- NG >> Replace condenser.

## 12. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

1. Turn ignition switch "OFF".
2. Reconnect all harness connectors disconnected.
3. Disconnect ignition coil harness connector.
4. Turn ignition switch "ON".

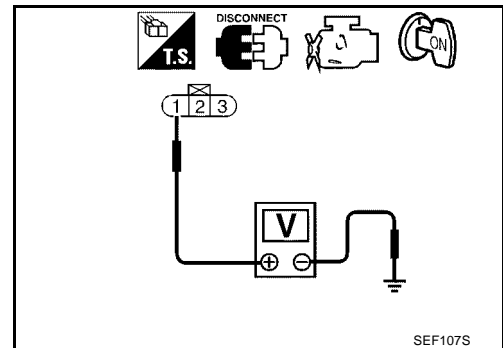


5. Check voltage between ignition coil terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 14.
- NG >> GO TO 13.



## 13. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between ignition coil and ECM relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 14. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between ignition coil terminal 2 and engine ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 15.
- NG >> Repair open circuit or short to power in harness or connectors.



## 15. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 61, 62, 80, 81 and ignition coil terminal 1. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 16.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 16. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to [EC-545, "Component Inspection"](#) .

OK or NG

OK >> GO TO 17.

NG >> Replace ignition coil with power transistor.

## 17. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

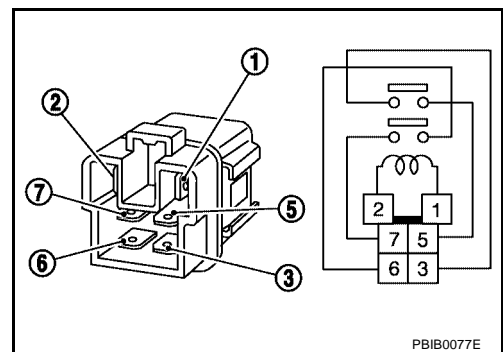
### Component Inspection ECM RELAY

UBS006GX

1. Apply 12V direct current between ECM relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5, 6 and 7.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No

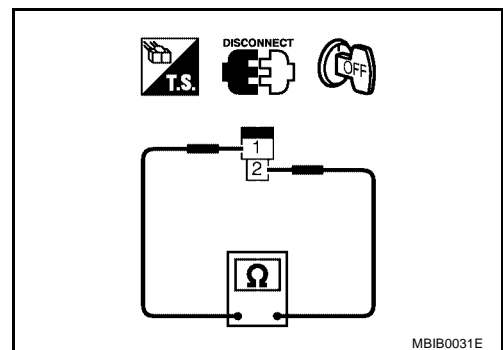
3. If NG, replace ECM relay.



### CONDENSER

1. Turn ignition switch "OFF".
2. Disconnect condenser harness connector.
3. Check resistance between condenser terminals 1 and 2.

**Resistance: Above 1 MΩ at 25°C (77°F)**



### IGNITION COIL WITH POWER TRANSISTOR

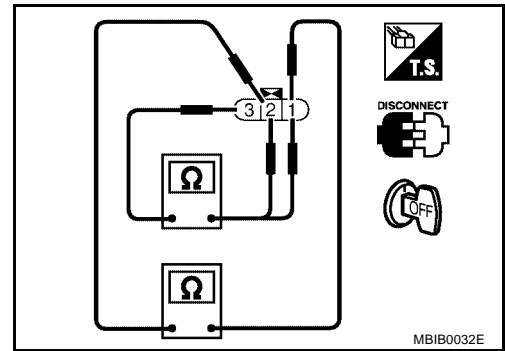
1. Turn ignition switch "OFF".
2. Disconnect ignition coil harness connector.

# IGNITION SIGNAL

[QG18DE (ULEV)]

3. Check resistance between ignition coil terminals as follows.

Terminal No.	Resistance $\Omega$ [at 25°C (77°F)]
3 and 1	Except 0 or $\infty$
3 and 2	Except 0
1 and 2	



UBS00582

## Removal and Installation IGNITION COIL WITH POWER TRANSISTOR

Refer to [EM-12, "Removal and Installation"](#) .

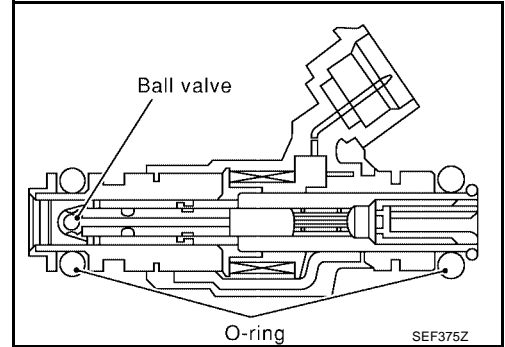
## INJECTOR

PFP:16600

UBS001P1

### Component Description

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the injector circuit, the coil in the injector is energized. The energized coil pulls the needle valve back and allows fuel to flow through the injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.



### CONSULT-II Reference Value in Data Monitor Mode

UBS001P2

MONITOR ITEM	CONDITION		SPECIFICATION
INJ PULSE-B1	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: N (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul>	Idle	2.4 - 3.2 msec
		2,000 rpm	1.9 - 3.2 msec
B/FUEL SCHDL	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: N (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul>	Idle	1.0 - 1.6 msec
		2,000 rpm	0.7 - 1.3 msec

A  
EC  
C  
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G  
H  
I  
J  
K  
L  
M

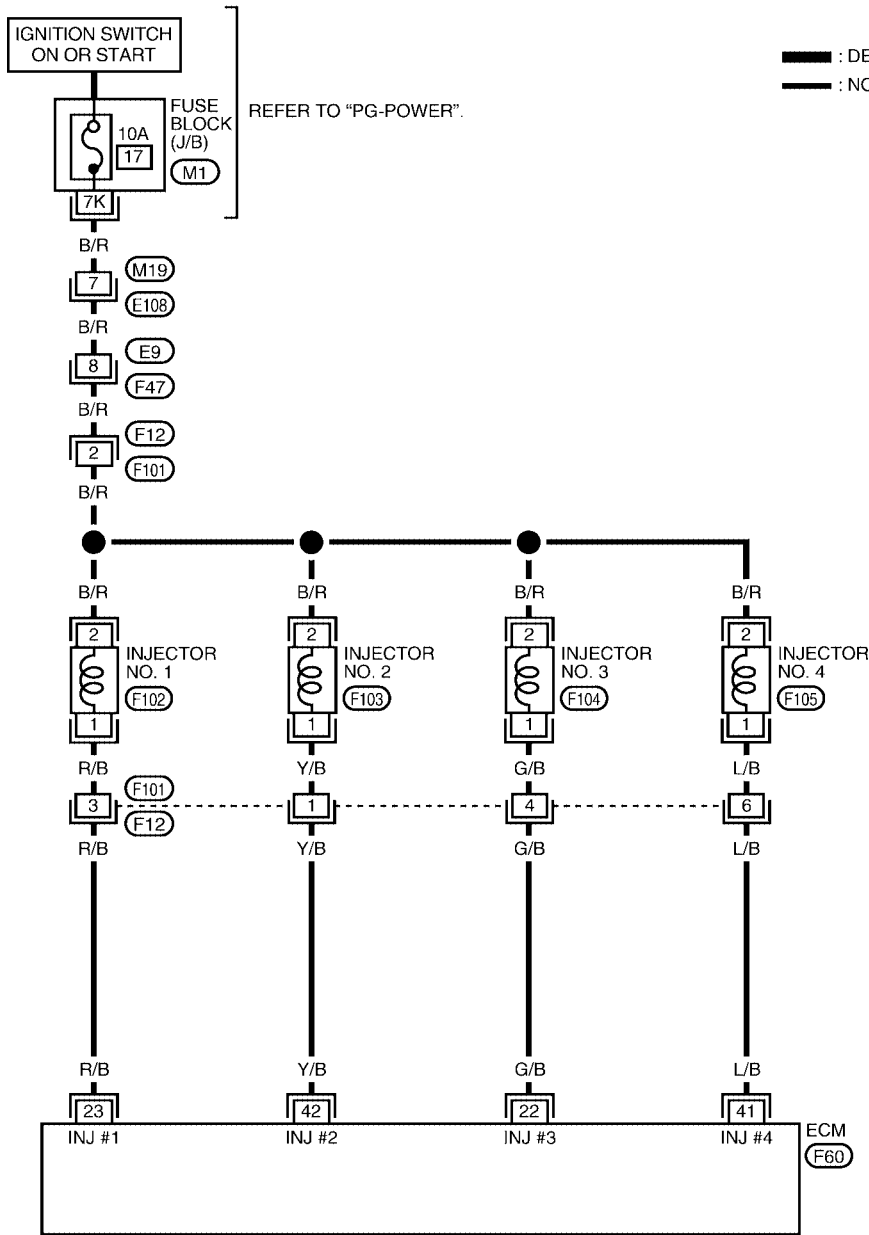
# INJECTOR

[QG18DE (ULEV)]

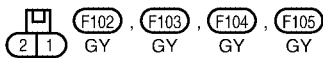
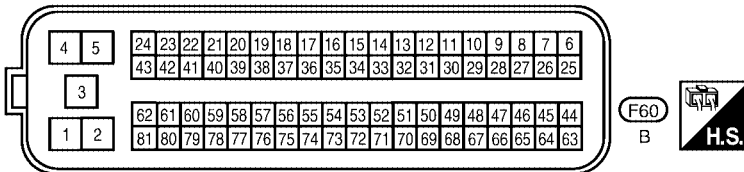
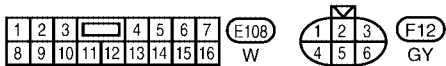
UBS001P3

## Wiring Diagram

### EC-INJECT-01



— : DETECTABLE LINE FOR DTC  
 — : NON-DETECTABLE LINE FOR DTC



Refer to the following.  
 M1 - FUSE BLOCK - JUNCTION BOX (J/B)

BBWA0797E

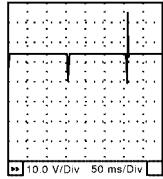
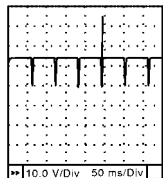
# INJECTOR

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
22 23 41 42	G/B R/B L/B Y/B	Injector No. 3 Injector No. 1 Injector No. 4 Injector No. 2	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right; font-size: small;">SEC984C</p>
			<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right; font-size: small;">SEC985C</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

A  
EC  
C  
D  
E  
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G  
H  
I  
J  
K  
L  
M

## Diagnostic Procedure

### 1. CHECK OVERALL FUNCTION

 **With CONSULT-II**

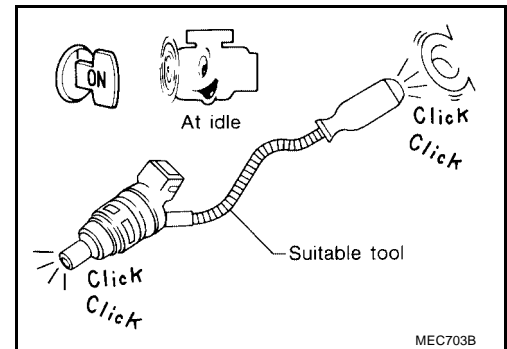
1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

 **Without CONSULT-II**

1. Start engine.
2. Listen to each injector operating sound.  
**Clicking noise should be heard.**

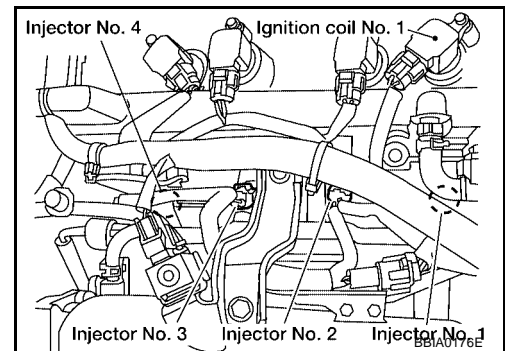


OK or NG

- OK    >> **INSPECTION END**  
 NG    >> **GO TO 2.**

### 2. CHECK POWER SUPPLY

1. Stop engine.
2. Disconnect injector harness connector.
3. Turn ignition switch "ON".

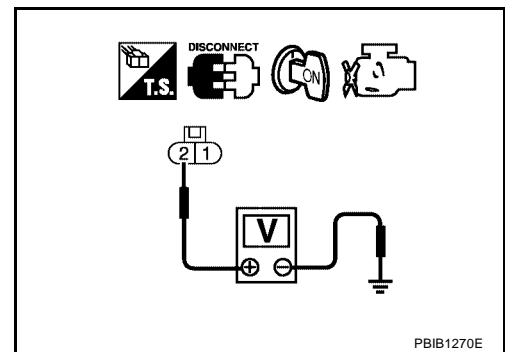


4. Check voltage between injector terminal 2 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



### 3. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M1
- 10A fuse
- Harness connectors M19, E108
- Harness connectors E9, F47
- Harness connectors F12, F101
- Harness for open or short between injector and fuse

>> Repair harness or connectors.

### 4. CHECK OUTPUT SIGNAL CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between injector harness connector terminal 1 and ECM terminals 22, 23, 41, 42.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F12, F101
- Harness for open or short between injector and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 6. CHECK INJECTOR

Refer to [EC-552, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace injector.

## 7. CHECK INTERMITTENT INCIDENT

Perform [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

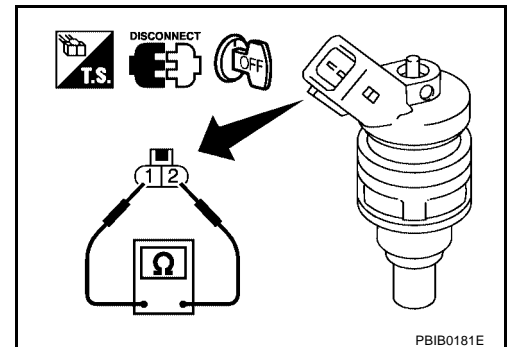
>> INSPECTION END

### Component Inspection INJECTOR

UBS001P5

1. Disconnect injector harness connector.
2. Check resistance between terminals as shown in the figure.

**Resistance: 13.5 - 17.5Ω [at 20°C (68°F)]**



UBS001P6

### Removal and Installation INJECTOR

Refer to [EM-12, "Removal and Installation"](#) .



# FUEL PUMP

[QG18DE (ULEV)]

## FUEL PUMP

PF1:17042

### Description SYSTEM DESCRIPTION

UBS006IU

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay
Battery	Battery voltage*		

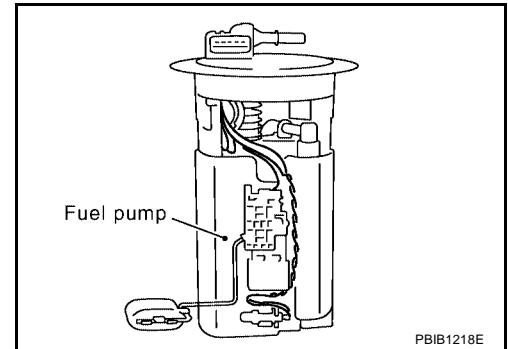
\*: ECM determines the start signal status by the signals of engine speed and battery voltage.

The ECM activates the fuel pump for several seconds after the ignition switch is turned on to improve engine startability. If the ECM receives a 180° signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to perform. If the 180° signal is not received when the ignition switch is on, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 5 seconds
Engine running and cranking	Operates
When engine is stopped	Stops in 1 second
Except as shown above	Stops

### COMPONENT DESCRIPTION

A turbine type design fuel pump is used in the fuel tank.



### CONSULT-II Reference Value in Data Monitor Mode

UBS001PC

MONITOR ITEM	CONDITION	SPECIFICATION
FUEL PUMP RLY	<ul style="list-style-type: none"> <li>● Ignition switch is turned to ON (Operates for 5 seconds)</li> <li>● Engine running and cranking</li> <li>● When engine is stopped (stops in 1.0 seconds)</li> </ul>	ON
	<ul style="list-style-type: none"> <li>● Except as shown above</li> </ul>	OFF

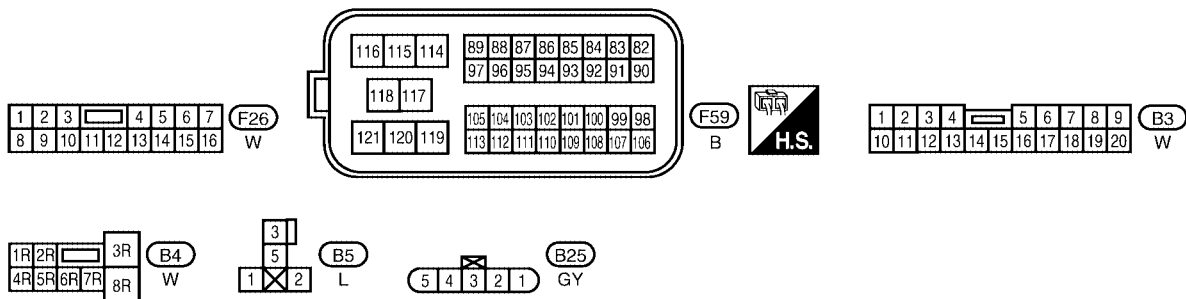
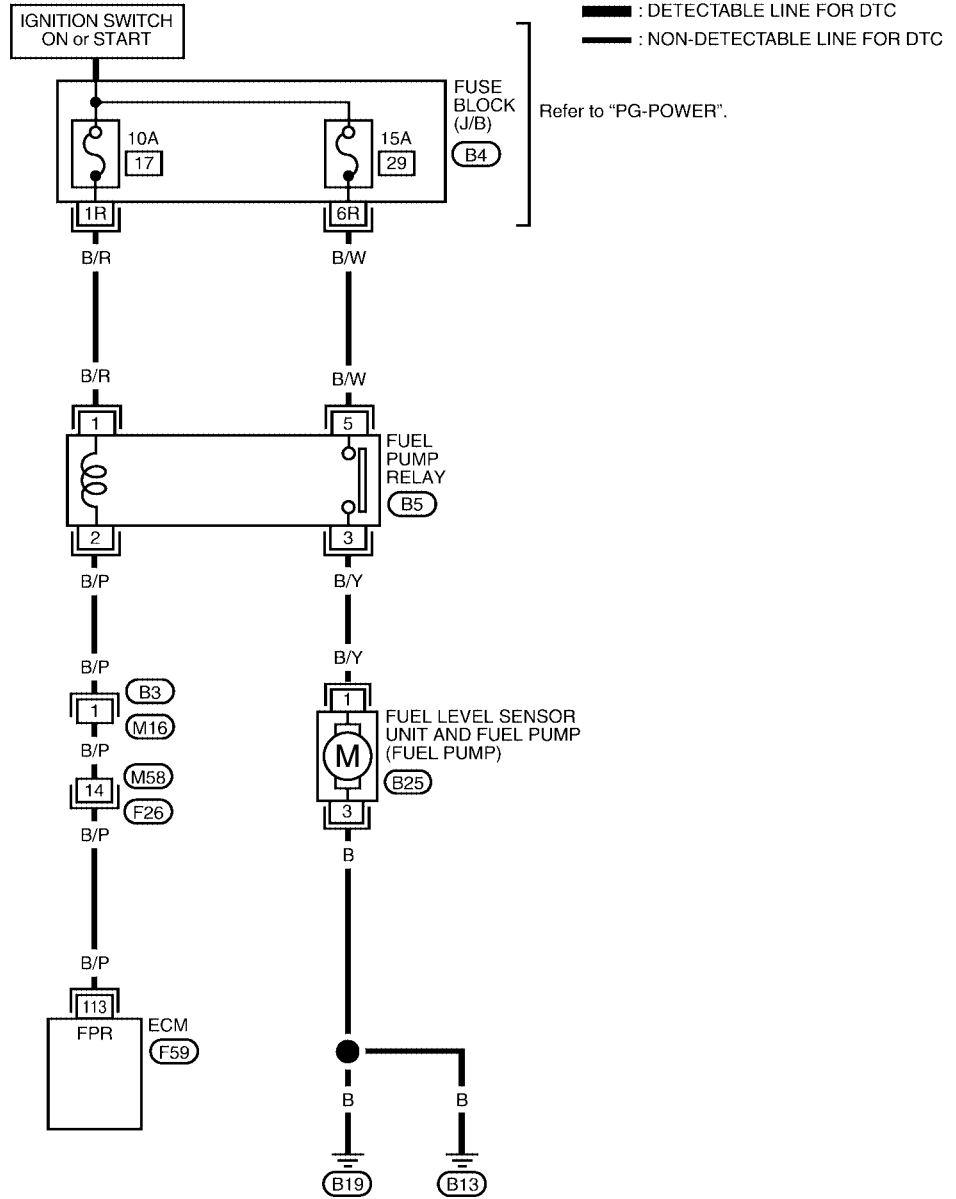
# FUEL PUMP

[QG18DE (ULEV)]

UBS001PD

## Wiring Diagram

### EC-F/PUMP-01



BBWA0314E

# FUEL PUMP

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
113	B/P	Fuel pump relay	[Ignition switch "ON"] ● For 1 second after turning ignition switch "ON"	0 - 1.0V
			[Engine is running] [Ignition switch "ON"] ● More than 1 second after turning ignition switch "ON".	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

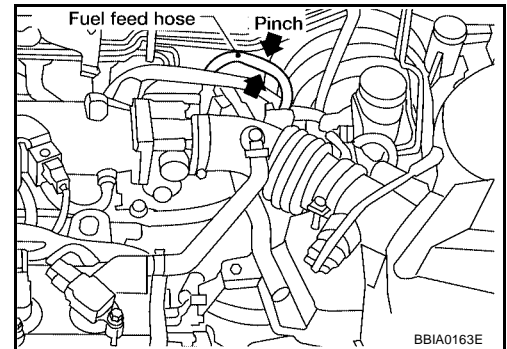
UBS001PE

### 1. CHECK OVERALL FUNCTION

- Turn ignition switch "ON".
- Pinch fuel feed hose with fingers.  
**Fuel pressure pulsation should be felt on the fuel feed hose for 5 seconds after ignition switch is turned "ON".**

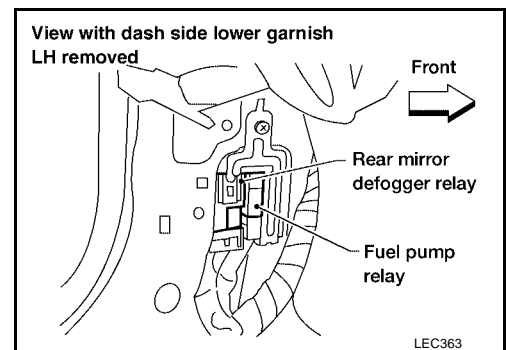
OK or NG

- OK >> **INSPECTION END**  
 NG >> GO TO 2.



### 2. CHECK POWER SUPPLY-I

- Turn ignition switch "OFF".
- Disconnect fuel pump relay.
- Turn ignition switch "ON".

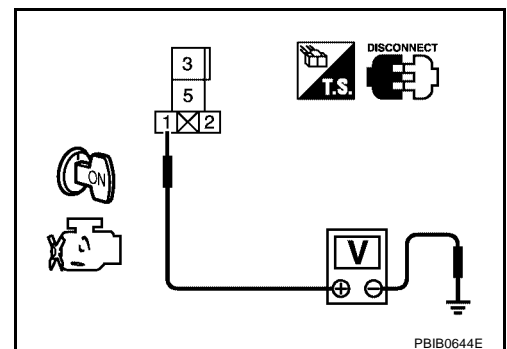


- Check voltage between fuel pump relay terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 4.  
 NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector B4
- 10A fuse
- Harness for open or short between fuse and fuel pump relay

>> Repair harness or connectors.

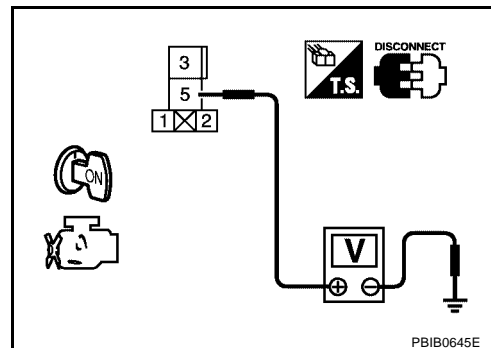
## 4. CHECK POWER SUPPLY-II

Check voltage between fuel pump relay terminal 5 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 6.  
 NG >> GO TO 5.



## 5. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector B4
- 15A fuse
- Harness for open or short between fuse and fuel pump relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 6. CHECK FUEL PUMP POWER SUPPLY AND GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect fuel pump harness connector.
3. Check harness continuity between fuel pump terminal 3 and body ground, fuel pump terminal 1 and fuel pump relay terminal 3.

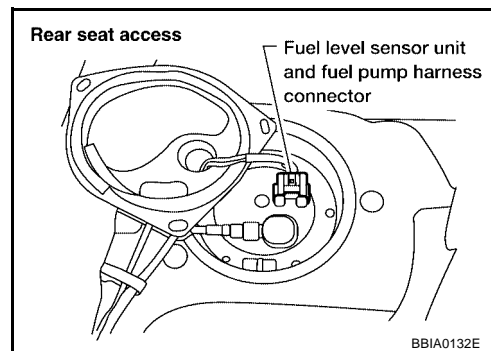
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.  
 NG >> GO TO 7.



## 7. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between fuel pump and body ground
- Harness for open or short between fuel pump and fuel pump relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK OUTPUT SIGNAL CIRCUIT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 113 and fuel pump relay connector terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 9.

**9. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors B3, M16
- Harness connector M58, F26
- Harness for open or short between ECM and fuel pump relay

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**10. CHECK FUEL PUMP RELAY**

Refer to [EC-557, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.
- NG >> Replace fuel pump relay.

**11. CHECK FUEL PUMP**

Refer to [EC-557, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 12.
- NG >> Replace fuel pump.

**12. CHECK INTERMITTENT INCIDENT**

Perform [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

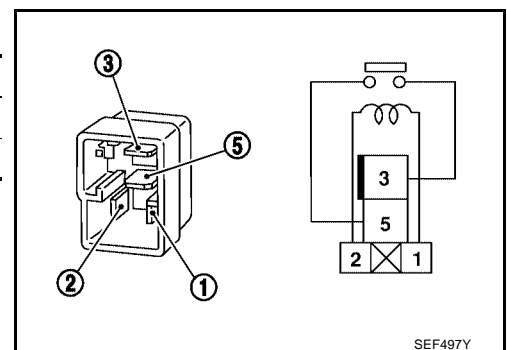
**Component Inspection  
FUEL PUMP RELAY**

UBS001PF

Check continuity between terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

If NG, replace relay.



SEF497Y

**FUEL PUMP**

1. Disconnect fuel pump harness connector.

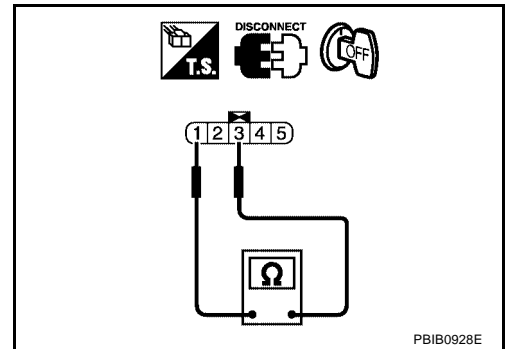
# FUEL PUMP

[QG18DE (ULEV)]

2. Check resistance between terminals 1 and 3.

**Resistance: 0.2 - 5.0Ω [at 25°C (77°F)]**

If NG, replace fuel pump.



## Removal and Installation FUEL PUMP

UBS001PG

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

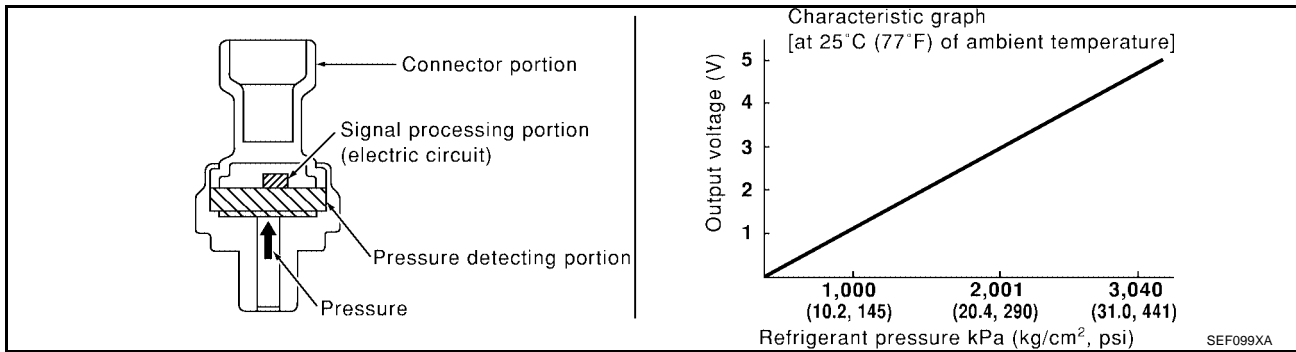
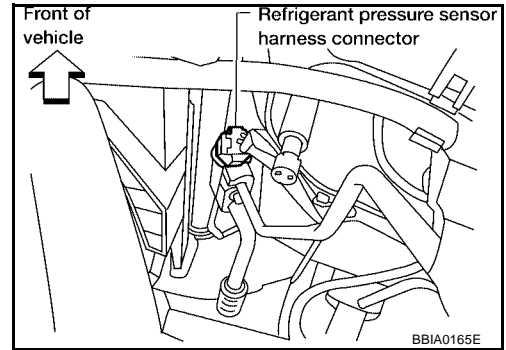
REFRIGERANT PRESSURE SENSOR

PFP:92136

UBS001PN

Description

The refrigerant pressure sensor is installed at the liquid tank of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.



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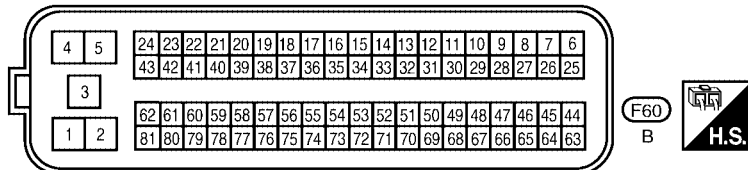
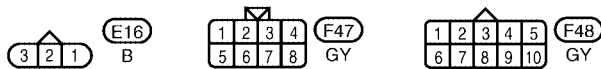
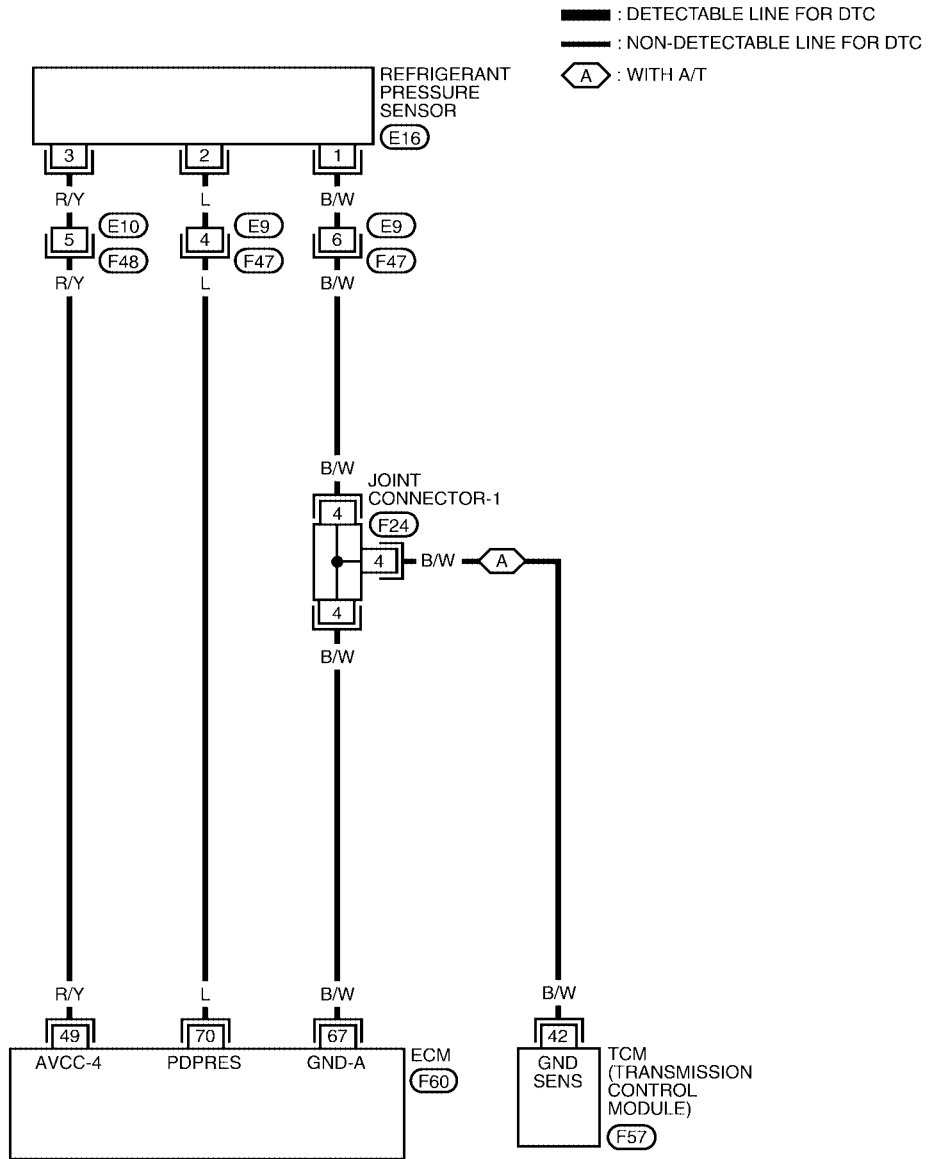
# REFRIGERANT PRESSURE SENSOR

[QG18DE (ULEV)]

## Wiring Diagram

UBS001PO

EC-RP/SEN-01



Refer to the following.

- (F24) - JOINT CONNECTOR
- (F57) - ELECTRICAL UNITS

BBWA0798E



# REFRIGERANT PRESSURE SENSOR

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
49	R/Y	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch "ON"]	Approximately 5V
67	B/W	Sensor ground (Refrigerant pressure sensor)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
70	L	Refrigerant pressure sensor	[Engine is running] ● Warm-up condition ● Both A/C switch and blower switch are "ON". (Compressor operates.)	1.0 - 4.0V

## Diagnostic Procedure

UBS001PP

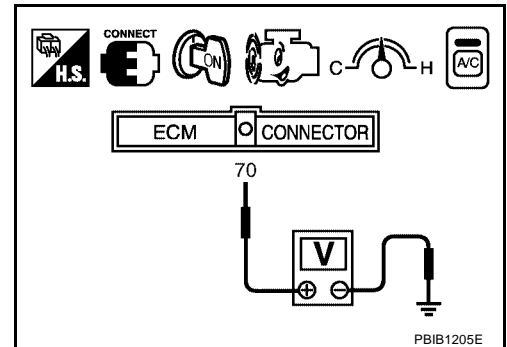
### 1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower switch "ON".
3. Check voltage between ECM terminal 70 and ground with CONSULT-II or tester.

**Voltage: 1.0 - 4.0V**

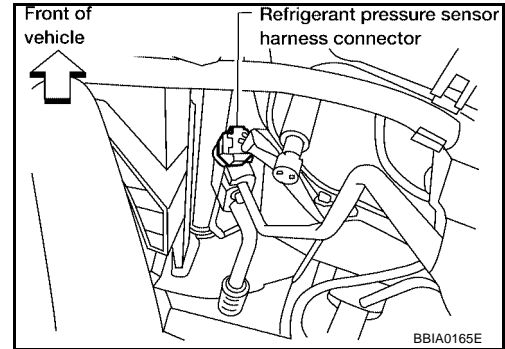
OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 2.



## 2. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn A/C switch and blower switch "OFF".
2. Stop engine.
3. Disconnect refrigerant pressure sensor harness connector.
4. Turn ignition switch "ON".

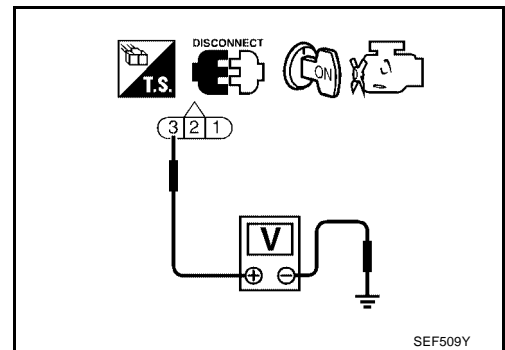


5. Check voltage between refrigerant pressure sensor terminal 3 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E10, F48
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair harness or connectors.

## 4. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between refrigerant pressure sensor terminal 1 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

**5. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors E9, F47
- Joint connector-1
- Harness for open or short between ECM and refrigerant pressure sensor
- Harness for open or short between TCM (Transmission control module) and refrigerant pressure sensor

>> Repair open circuit or short to power in harness or connectors.

**6. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 70 and refrigerant pressure sensor terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.  
NG >> GO TO 7.

**7. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors E9, F47
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK REFRIGERANT PRESSURE SENSOR**

Refer to [MTC-15, "Refrigerant Pressure Sensor"](#) .

OK or NG

- OK >> GO TO 9.  
NG >> Replace refrigerant pressure sensor.

**9. CHECK INTERMITTENT INCIDENT**

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

# ELECTRICAL LOAD SIGNAL

[QG18DE (ULEV)]

## ELECTRICAL LOAD SIGNAL

PF2:25350

### CONSULT-II Reference Value in Data Monitor Mode

UBS001PQ

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
LOAD SIGNAL	● Ignition switch: ON	Lighting switch "ON"	ON
		Lighting switch "OFF"	OFF

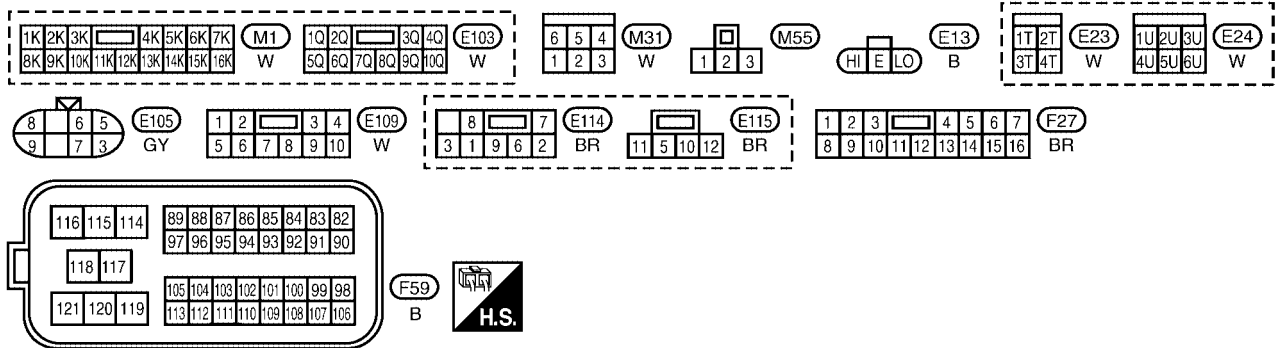
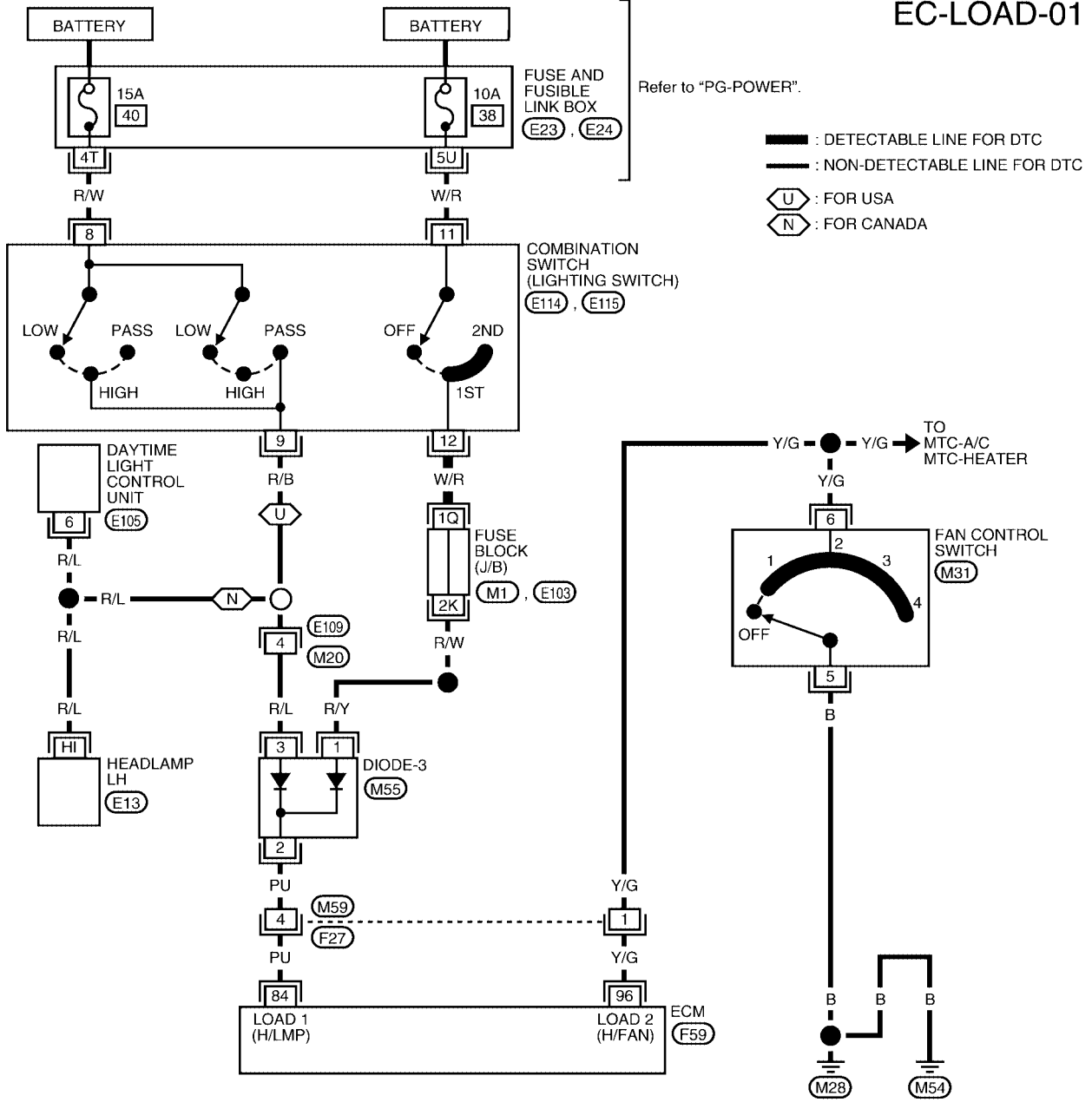
# ELECTRICAL LOAD SIGNAL

[QG18DE (ULEV)]

UBS001PR

## Wiring Diagram

### EC-LOAD-01



# ELECTRICAL LOAD SIGNAL

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
84	PU	Electrical load signal (Headlamp signal)	<b>[Ignition switch "ON"]</b> ● Lighting switch is "2ND" position	BATTERY VOLTAGE (11 - 14V)
			<b>[Ignition switch "ON"]</b> ● Lighting switch is "OFF"	Approximately 0V
96	Y/G	Electrical load signal (Heater fan signal)	<b>[Engine is running]</b> ● Heater fan switch "ON"	Approximately 0V
			<b>[Engine is running]</b> ● Heater fan switch "OFF"	Approximately 5V

## Diagnostic Procedure

UBS001PS

### 1. INSPECTION START

Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 4.

### 2. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II

 **With CONSULT-II**

1. Turn ignition switch "ON".
2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.

Condition	LOAD SIGNAL
Lighting switch "ON" at 1st or 2nd position	ON
Lighting switch "OFF"	OFF

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 6.

DATA MONITOR	
MONITORING	NO DTC
LOAD SIGNAL	ON

PBIB0103E

**3. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-III**

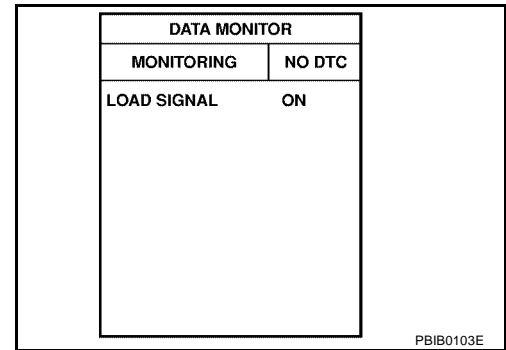
**With CONSULT-II**

1. Turn ignition switch "ON".
2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.

Condition	LOAD SIGNAL
Fan control switch "ON"	ON
Fan control switch "OFF"	OFF

**OK or NG**

- OK >> **INSPECTION END**  
 NG >> GO TO 7.



**4. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II**

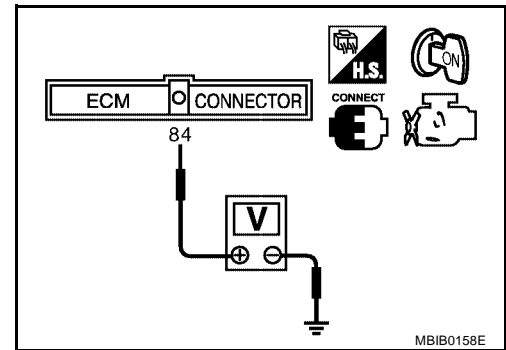
**Without CONSULT-II**

1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 84 and ground under the following conditions.

Condition	Voltage
Lighting switch "ON" at 2nd position	Battery voltage
Lighting switch "OFF"	0V

**OK or NG**

- OK >> GO TO 5.  
 NG >> GO TO 6.



**5. CHECK FAN CONTROL SWITCH CIRCUIT OVERALL FUNCTION-III**

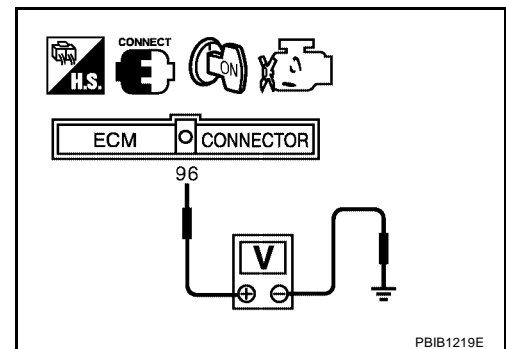
**Without CONSULT-II**

1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 96 and ground under the following conditions.

Condition	Voltage
Fan control switch "ON"	0V
Fan control switch "OFF"	5V

**OK or NG**

- OK >> **INSPECTION END**  
 NG >> GO TO 7.



## 6. CHECK HEADLAMP FUNCTION

1. Start engine.
2. Turn the lighting switch "ON" at 2nd position.
3. Check that headlamp are illuminated.

OK or NG

OK >> GO TO 8.

NG >> Refer to [LT-6, "HEADLAMP \(FOR USA\)"](#) or [LT-10, "HEADLAMP \(FOR CANADA\) — DAYTIME LIGHT SYSTEM —"](#).

## 7. CHECK FAN CONTROL FUNCTION

1. Start engine.
2. Turn "ON" the fan control switch.
3. Check the blower fan motor. Does the blower fan motor activate?

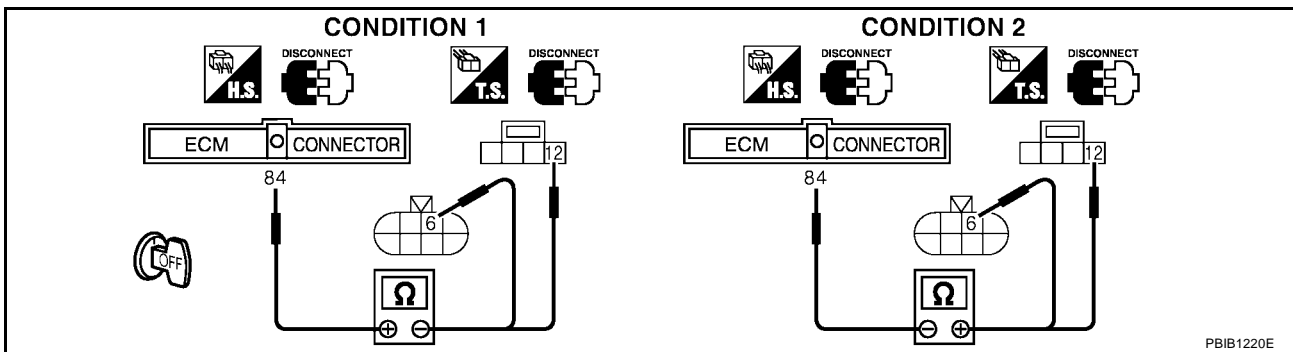
YES or NO

YES >> GO TO 10.

NO >> Refer to [MTC-46, "BLOWER MOTOR"](#).

## 8. CHECK HEADLAMP INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Stop engine.
2. Disconnect ECM harness connector.
3. Disconnect combination switch harness connectors (Models for USA), daytime light control unit harness connector (Models for Canada).
4. Check harness continuity between ECM terminal 84 and combination switch terminal 12 or daytime light control unit terminal 6 under the following conditions.



Condition	Continuity
1	Should not exist.
2	Should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 12.

NG >> GO TO 9.



**9. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M20, E109 (Models for Canada)
- Harness connectors M59, F27
- Harness connectors E108, M19 (Models for USA)
- Fuse block M1, E103
- Diode M52
- Diode M55
- Harness for open and short between ECM and combination switch or daytime light control unit

>> Repair open circuit or short to ground or short to power in harness or connectors.

**10. CHECK FAN CONTROL CIRCUIT FOR OPEN OR SHORT**

1. Stop engine.
2. Disconnect ECM harness connector.
3. Disconnect fan control switch harness connector.
4. Check harness continuity between ECM terminal 96 and fan control switch terminal 6.

**Continuity should exist.**

5. Check harness continuity between fan control switch terminal 5 and body ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

6. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 12.

NG >> GO TO 11.

**11. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M59, F27
- Harness for open and short between ECM and fan control switch
- Harness for open or short between fan control switch and body ground

>> Repair open circuit or short to ground or short to power in harness or connectors.

**12. CHECK INTERMITTENT INCIDENT**

Perform [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

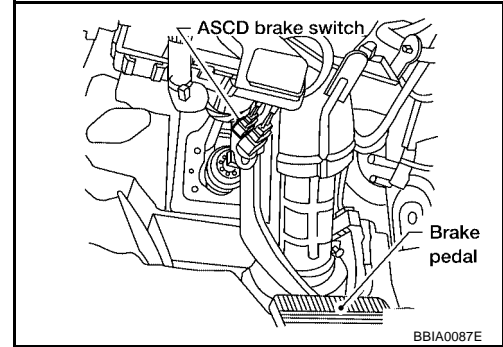
## ASC D BRAKE SWITCH

### Component Description

UBS0041B

When depress on the brake pedal, ASC D brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal)

Refer to [EC-598, "AUTOMATIC SPEED CONTROL DEVICE \(ASC D\)"](#) for the ASC D function.



### CONSULT-II Reference Value in Data Monitor Mode

UBS0041C

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW 1 (ASC D brake switch)	● Ignition switch: ON	● Brake pedal fully released	ON
		● Brake pedal depressed	OFF
BRAKE SW 2 (stop lamp switch)	● Ignition switch: ON	● Brake pedal fully released	OFF
		● Brake pedal depressed	ON

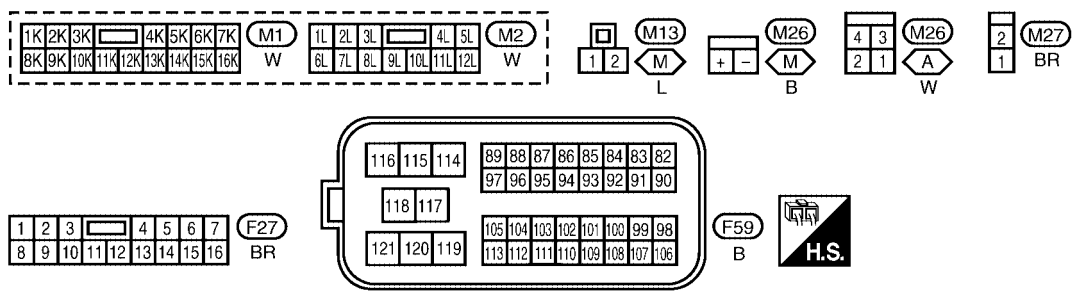
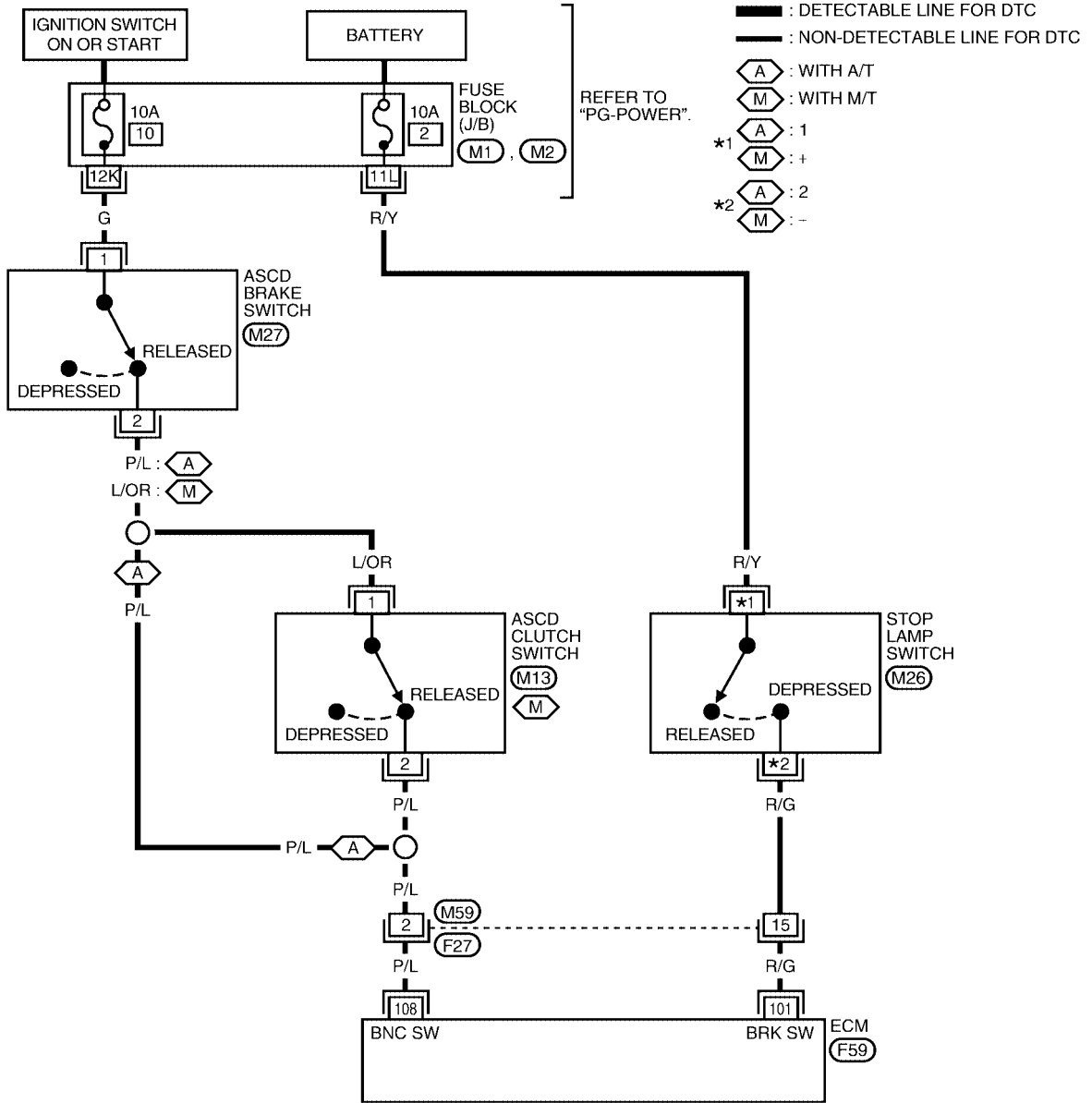
# ASCD BRAKE SWITCH

[QG18DE (ULEV)]

UBS0041D

## Wiring Diagram

EC-ASCBOF-01



BBWA0316E

# ASCD BRAKE SWITCH

[QG18DE (ULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	R/G	Stop lamp switch	[Ignition switch "ON"] ● Brake pedal is fully released	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is depressed	BATTERY VOLTAGE (11 - 14V)
108	P/L	ASCD brake switch	[Ignition switch "ON"] ● Brake pedal is depressed	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is fully released	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS006GY

### 1. CHECK OVERALL FUNCTION-I

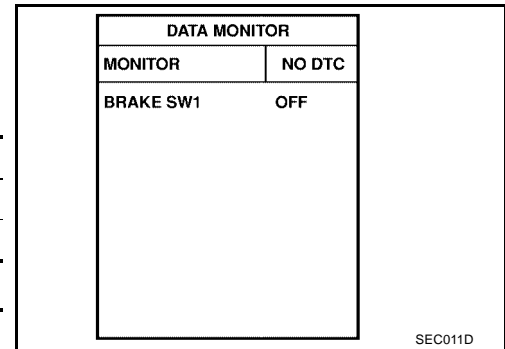
**With CONSULT-II**

- Turn ignition switch "ON".
- Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-II.
- Check "BRAKE SW1" indication under the following conditions.  
**M/T models**

CONDITION	INDICATION
When clutch pedal or brake pedal is depressed	OFF
When clutch pedal and brake pedal are fully released	ON

**A/T models**

CONDITION	INDICATION
When brake pedal is depressed	OFF
When brake pedal is fully released	ON



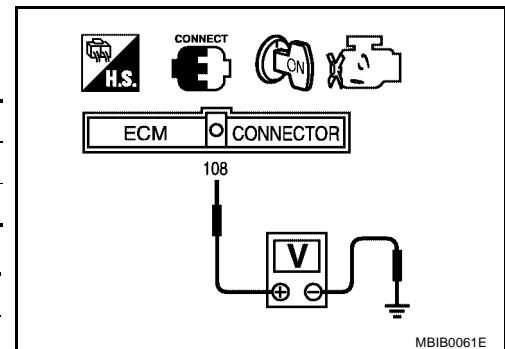
**Without CONSULT-II**

- Turn ignition switch "ON".
- Check voltage between ECM terminal 108 and ground under the following conditions.  
**M/T models**

CONDITION	VOLTAGE
When clutch pedal or brake pedal is depressed	Approximately 0V
When clutch pedal and brake pedal are fully released	Battery voltage

**A/T models**

CONDITION	VOLTAGE
When brake pedal is depressed	Approximately 0V
When brake pedal is fully released	Battery voltage



**OK or NG**

- OK >> GO TO 2.
- NG (M/T models) >>GO TO 3.
- NG (A/T models) >>GO TO 4.

# ASCD BRAKE SWITCH

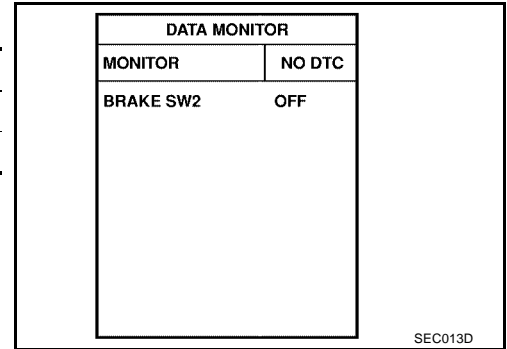
[QG18DE (ULEV)]

## 2. CHECK OVERALL FUNCTION-II

### With CONSULT-II

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

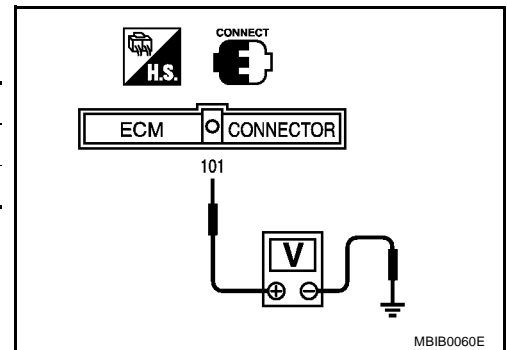
CONDITION	INDICATION
When brake pedal is released	OFF
When brake pedal is depressed	ON



### Without CONSULT-II

Check voltage between ECM terminal 101 and ground under the following conditions.

CONDITION	VOLTAGE
When brake pedal is released	Approximately 0V
When brake pedal is depressed	Battery voltage

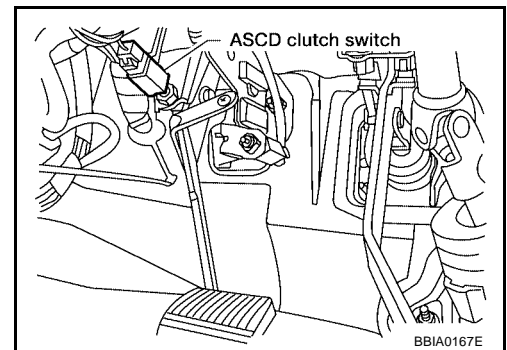


OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 13.

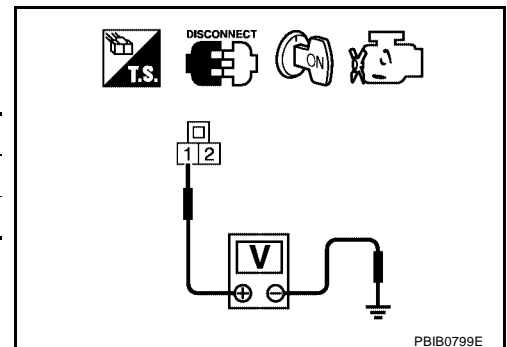
## 3. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch "ON".



4. Check voltage between ASCD clutch switch terminal 1 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
When brake pedal is released	Battery voltage
When brake pedal is depressed	Approx. 0V

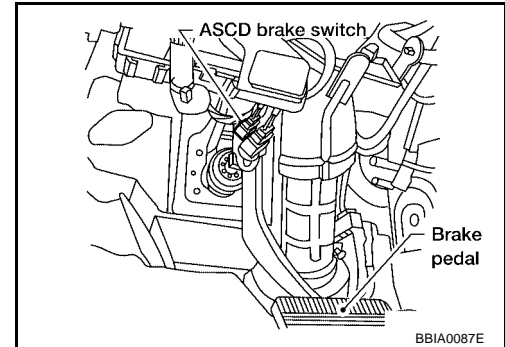


OK or NG

- OK >> GO TO 10.
- NG >> GO TO 4.

## 4. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".

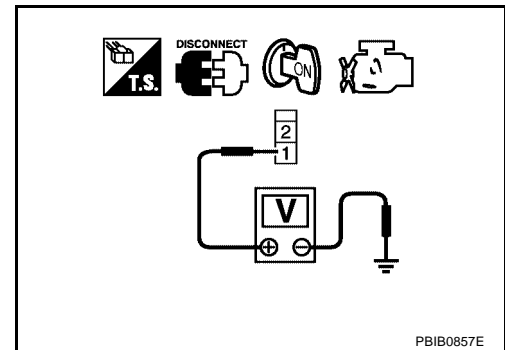


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK (M/T models) >> GO TO 6.
- OK (A/T models) >> GO TO 7.
- NG >> GO TO 5.



## 5. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M1
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 6. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between ASCD brake switch terminal 2 and ASCD clutch switch terminal 1. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 108 and ASCD brake switch terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 8.

## 8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and ASCD brake switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 9. CHECK ASCD BRAKE SWITCH

Refer to [EC-577, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.
- NG >> Replace ASCD brake switch.

## 10. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 108 and ASCD clutch switch terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 12.
- NG >> GO TO 11.

## 11. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and ASCD clutch switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 12. CHECK ASCD CLUTCH SWITCH

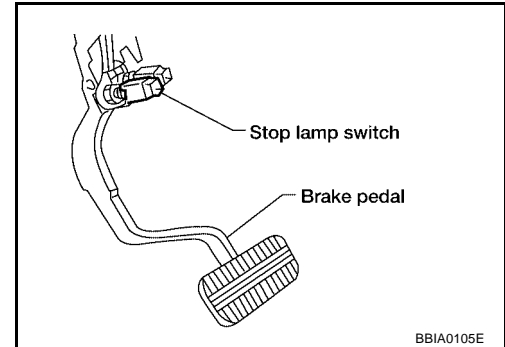
Refer to [EC-577, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.
- NG >> Replace ASCD clutch switch.

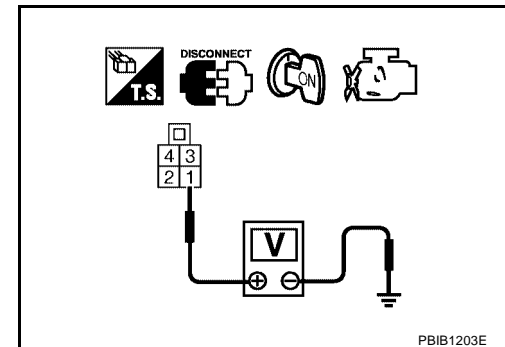
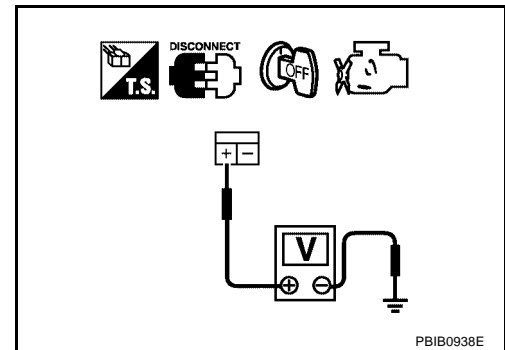
## 13. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect stop lamp switch harness connector.



3. Check voltage between stop lamp switch terminal + (M/T models) or 1 (A/T models) and ground with CONSULT -II or tester.

**Voltage: Battery voltage**



### OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.

## 14. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M2
- 10A fuse
- Harness for open or short between stop lamp switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.



**15. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 101 and stop lamp switch terminal – (M/T models) or 2 (A/T models).  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 17.
- NG >> GO TO 16.

**16. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

**17. CHECK STOP LAMP SWITCH**

Refer to [EC-577, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 18.
- NG >> Replace stop lamp switch.

**18. CHECK INTERMITTENT INCIDENT**

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

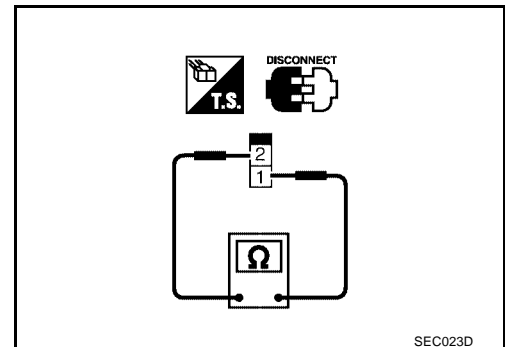
**Component Inspection  
ASCD BRAKE SWITCH**

UBS0061P

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Check harness continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should exist.
When brake pedal is depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to [BR-11, "BRAKE PEDAL AND BRACKET"](#) , and perform step 3 again.



**ASCD CLUTCH SWITCH (FOR M/T MODELS)**

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.

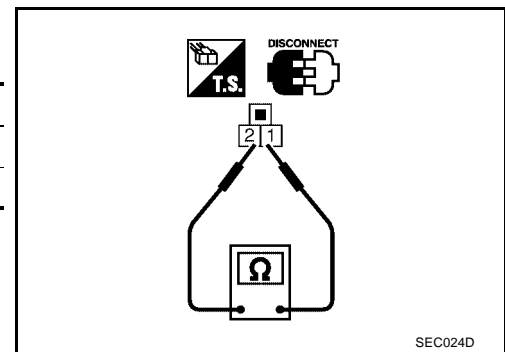
# ASCD BRAKE SWITCH

[QG18DE (ULEV)]

3. Check continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When clutch pedal is fully released.	Should exist.
When clutch pedal is depressed.	Should not exist.

If NG, adjust ASCD clutch switch installation, refer to [CL-6](#), "[CLUTCH SYSTEM](#)", and perform step 3 again.



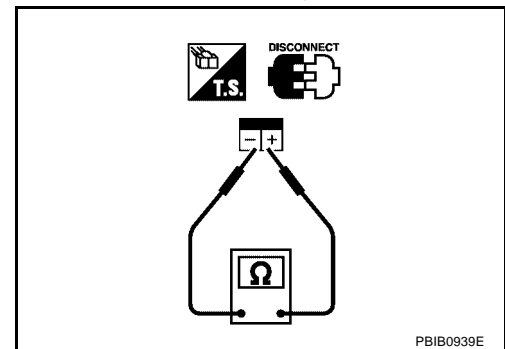
## STOP LAMP SWITCH

### M/T Models

1. Turn ignition switch "OFF".
2. Disconnect stop lamp switch harness connector.
3. Check harness continuity between stop lamp switch terminals + and - under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should not exist.
When brake pedal is depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-11](#), "[BRAKE PEDAL AND BRACKET](#)", and perform step 3 again.

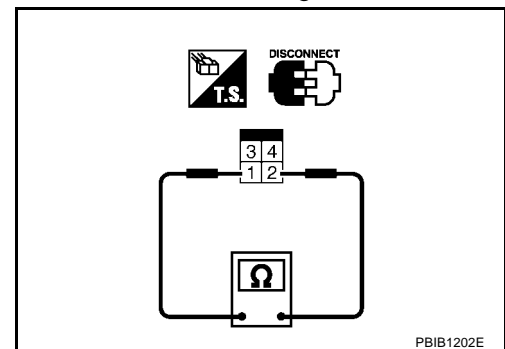


### A/T Models

1. Turn ignition switch "OFF".
2. Disconnect stop lamp switch harness connector.
3. Check harness continuity between stop lamp switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should not exist.
When brake pedal is depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-11](#), "[BRAKE PEDAL AND BRACKET](#)", and perform step 3 again.



## ASCD INDICATOR

PFP:24814

### Component Description

UBS0041F

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.

CRUISE indicator illuminates when CRUISE switch on ASCD steering switch is turned ON to indicated that ASCD system is ready for operation.

SET indicator illuminates when following conditions are met.

- CRUISE indicator is illuminated.
- SET switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET indicator remains lit during ASCD control.

Refer to [EC-598, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.

### CONSULT-II Reference Value in Data Monitor Mode

UBS0041G

Specification data are reference value.

MONITOR ITEM	CONDITION		SPECIFICATION
CRUISE LAMP	● Ignition switch: ON	● CRUISE switch pressed	ON
		● CRUISE switch released	OFF
SET LAMP	● CRUISE switch: ON ● When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH)	● COAST/SET switch pressed	ON
		● COAST/SET switch released	OFF

# ASC D INDICATOR

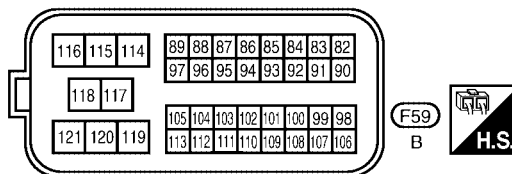
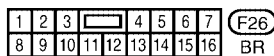
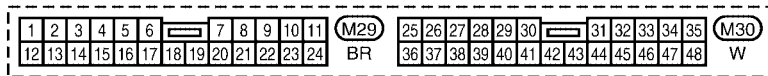
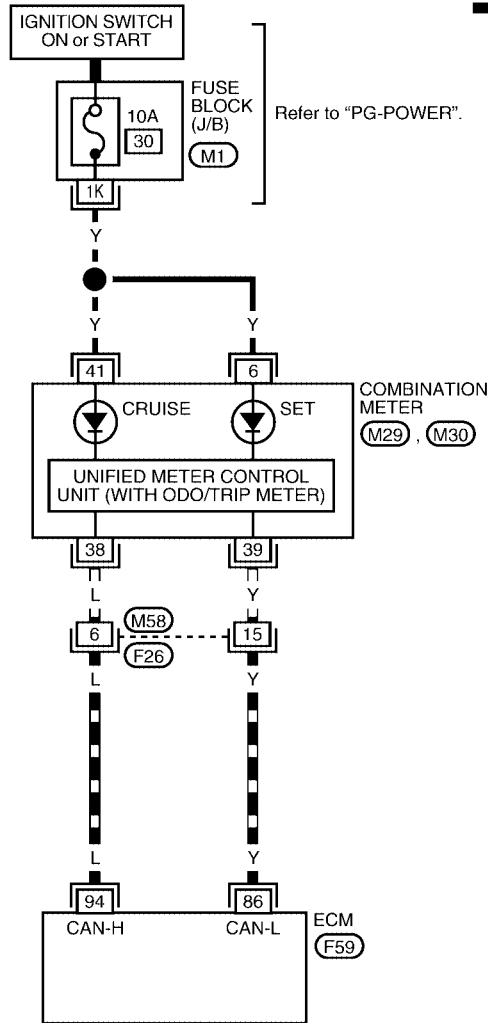
[QG18DE (ULEV)]

UBS0041H

## Wiring Diagram

### EC-ASCIND-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- ▬** : DATA LINE



BBWA0433E

## Diagnostic Procedure

### 1. CHECK OVERALL FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	CONDITION		SPECIFICATION
CRUISE LAMP	● Ignition switch: ON	● CRUISE switch pressed	ON
		● CRUISE switch released	OFF
SET LAMP	● CRUISE switch: ON ● When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH)	● COAST/SET switch pressed	ON
		● COAST/SET switch released	OFF

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 2.

### 2. CHECK DTC

Check that DTC U1000 or U1001 is not displayed.

OK or NG

OK >> Perform trouble diagnoses for DTC U1000, U1001, refer to [EC-145, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#) .

NG >> GO TO 3.

### 3. CHECK COMBINATION METER OPERATION

Does combination meter operate normally?

Yes or No

Yes >> GO TO 4.

No >> Check combination meter circuit. Refer to [DI-8, "Combination Meter"](#) .

### 4. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

# DATA LINK CONNECTOR

[QG18DE (ULEV)]

## DATA LINK CONNECTOR

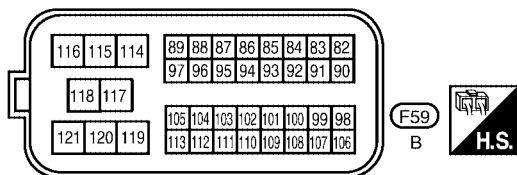
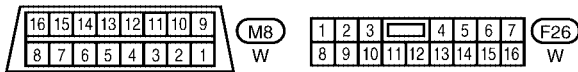
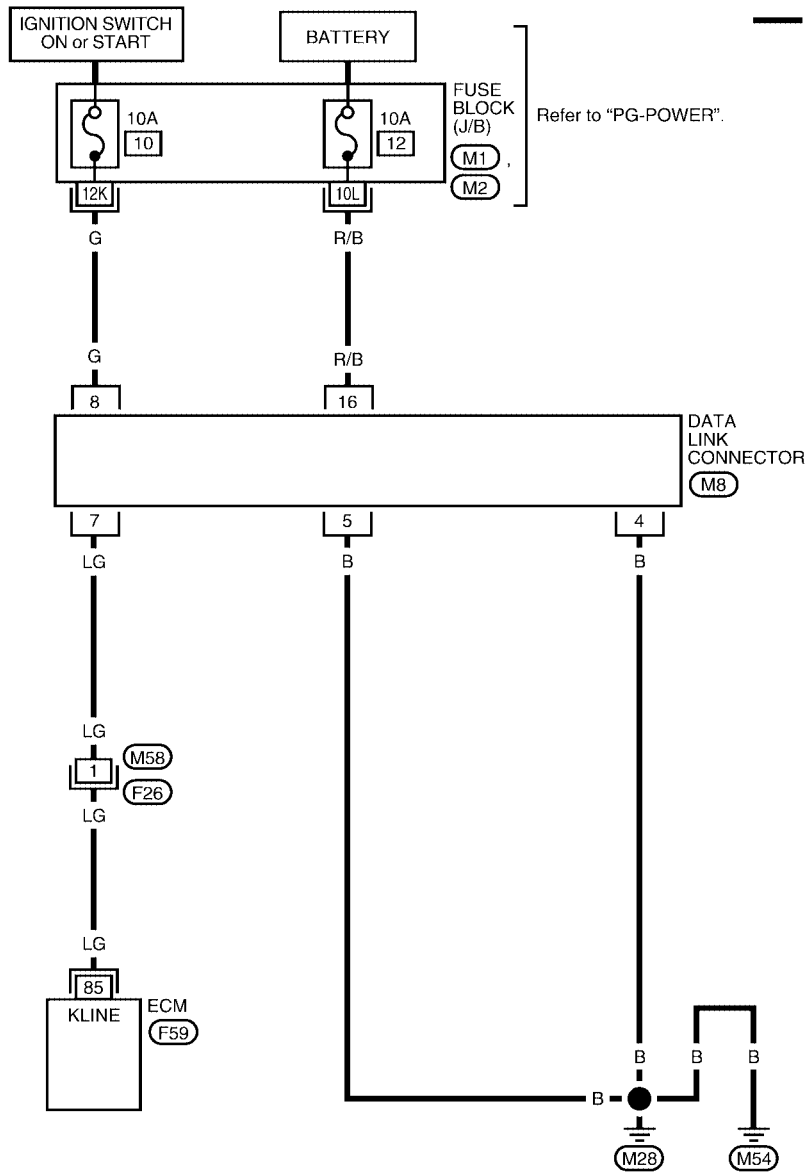
PF24814

### Wiring Diagram

UBS002N3

## EC-DLC-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.  
 (M1), (M2) - FUSE  
 BLOCK-JUNCTION BOX (J/B)

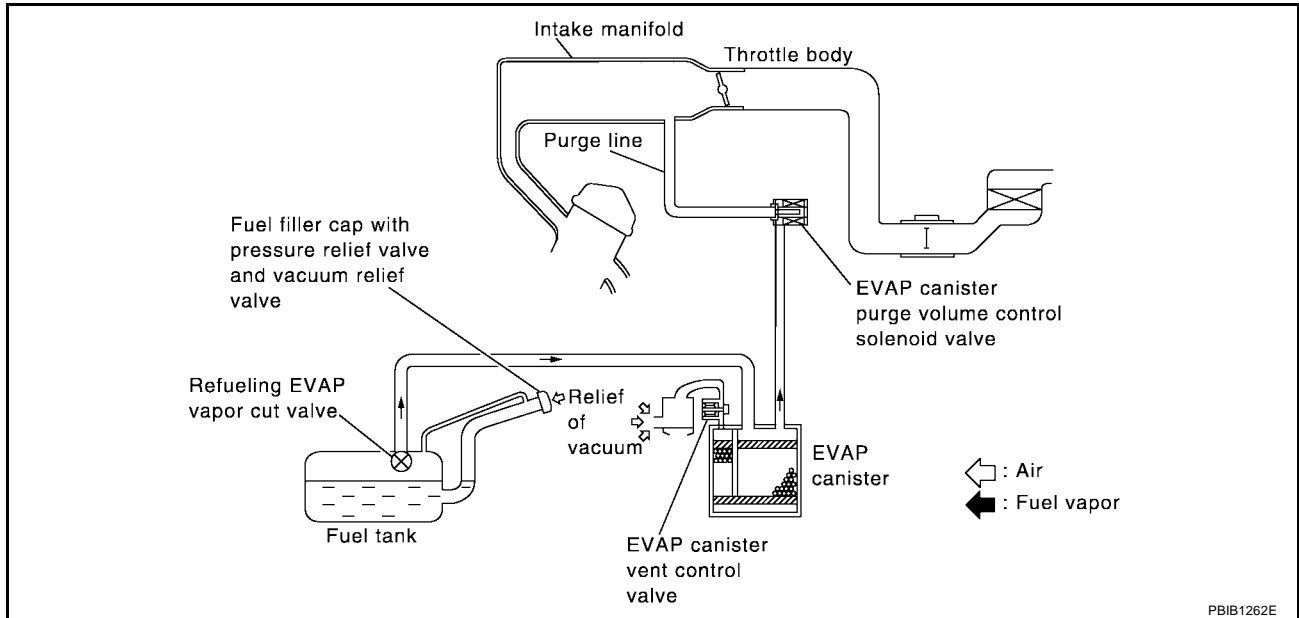
BBWA0318E

EVAPORATIVE EMISSION SYSTEM

PF14950

Description  
SYSTEM DESCRIPTION

UBS001PU



The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister.

The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank.

The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating.

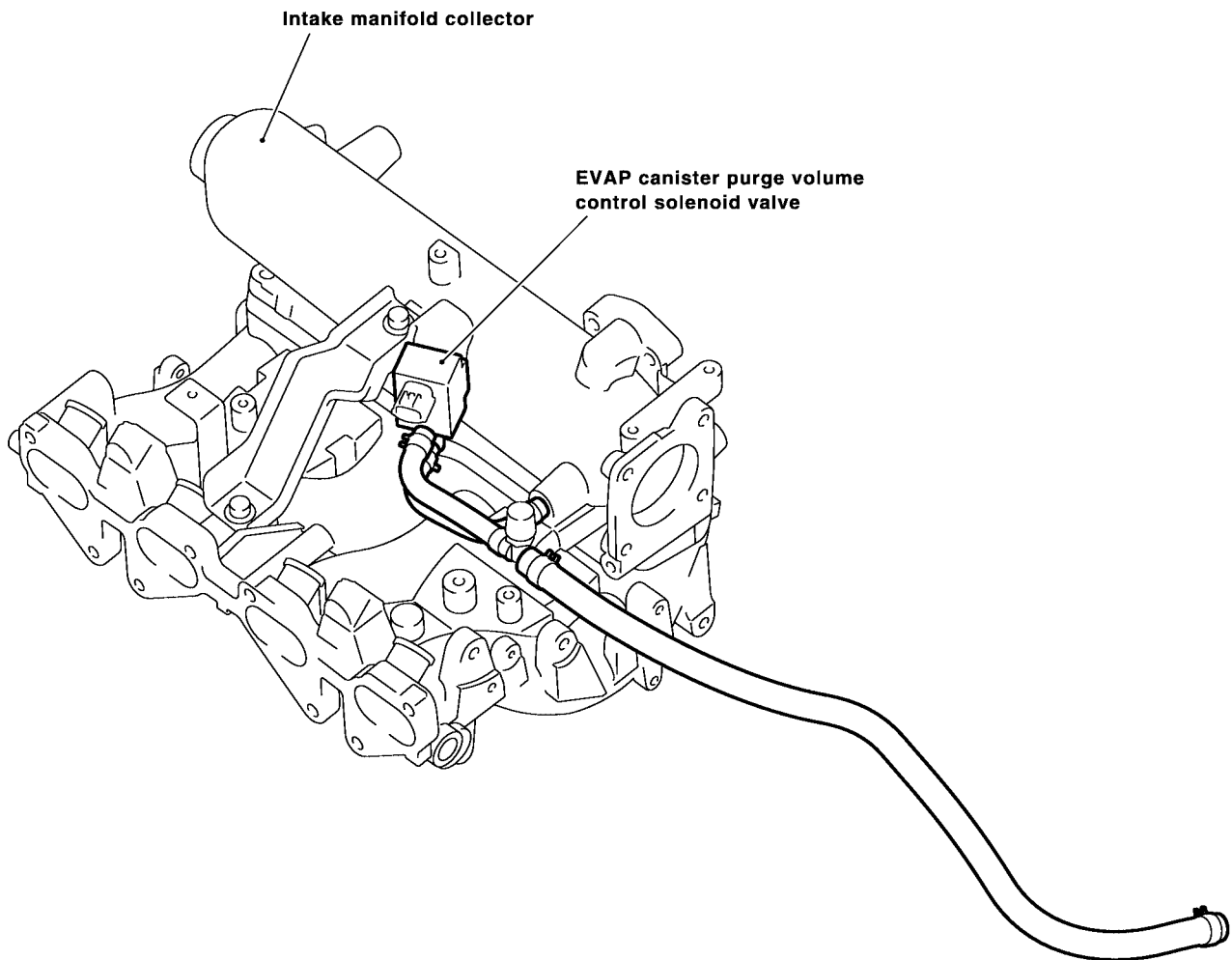
EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.

EVAP canister purge control solenoid valve also shuts off the vapor purge line during decelerating and idling.

# EVAPORATIVE EMISSION SYSTEM

[QG18DE (ULEV)]

## EVAPORATIVE EMISSION LINE DRAWING



**NOTE :** Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

PBIB1056E

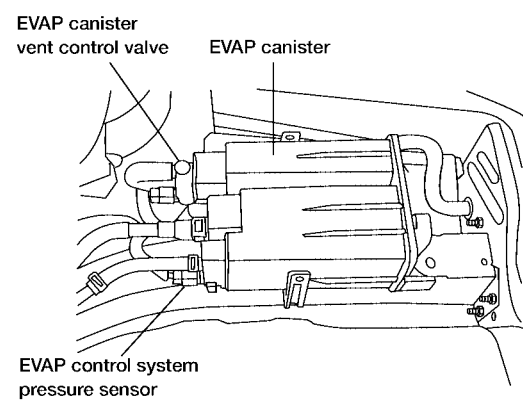
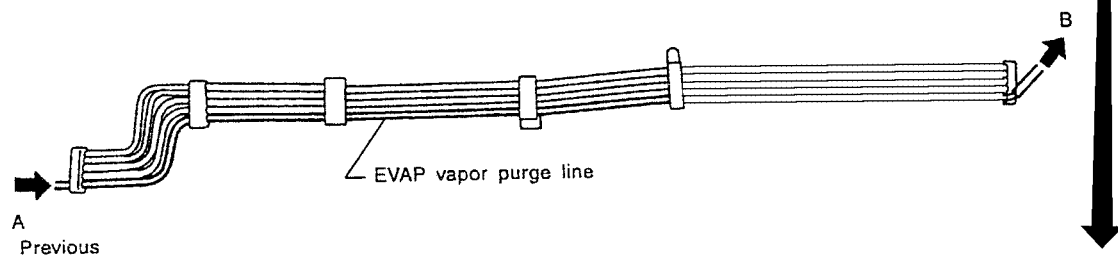
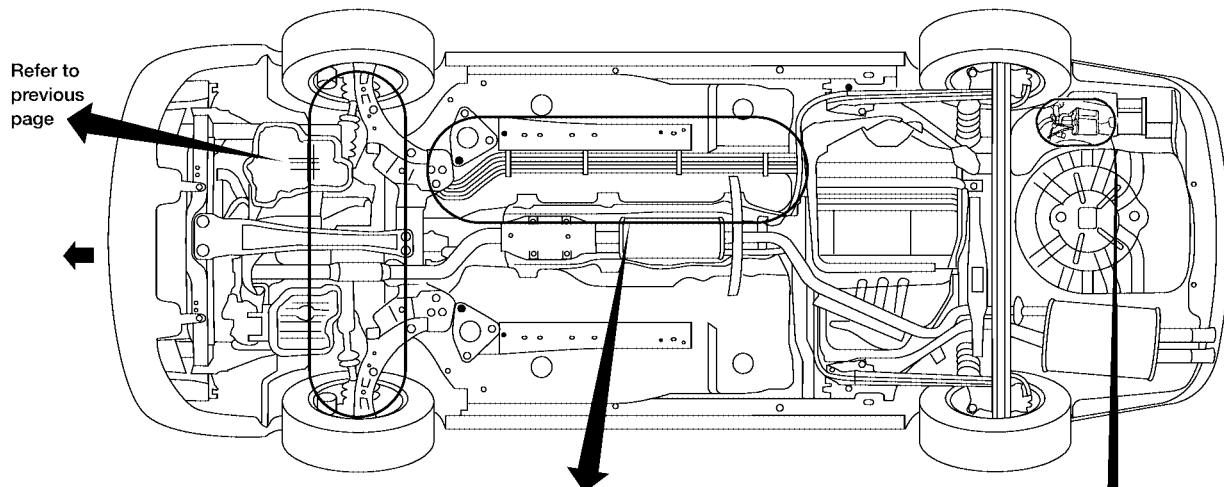


# EVAPORATIVE EMISSION SYSTEM

[QG18DE (ULEV)]

**NOTE:**

Do not use soapy water or any type of solvent while installing vacuum hoses or purge hoses.

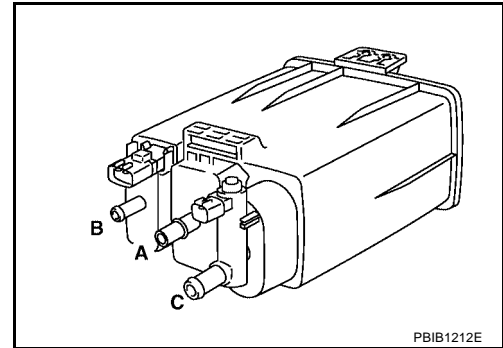


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### Component Inspection EVAP CANISTER

Check EVAP canister as follows:

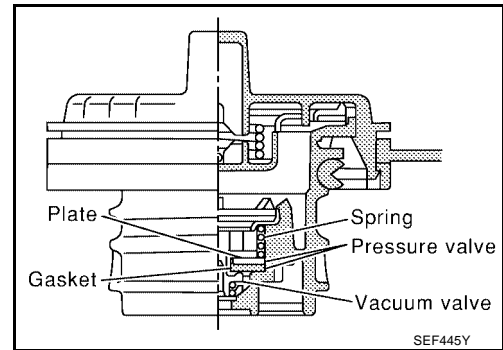
1. Block port **B** .
2. Blow air into port **A** and check that it flows freely out of port **C** .
3. Release blocked port **B** .
4. Apply vacuum pressure to port **B** and check that vacuum pressure exists at the ports **A** and **C** .
5. Block port **A** and **B** .
6. Apply pressure to port **C** and check that there is no leakage.



PBIB1212E

### FUEL TANK VACUUM RELIEF VALVE (BUILT INTO FUEL FILLER CAP)

1. Wipe clean valve housing.



SEF445Y

2. Check valve opening pressure and vacuum.

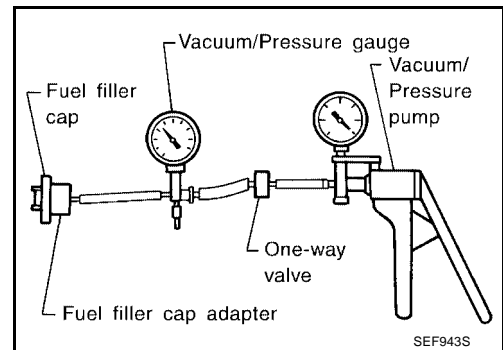
**Pressure:** 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm<sup>2</sup> , 2.22 - 2.90 psi)

**Vacuum:** -6.0 to -3.4 kPa (-0.061 to -0.035 kg/cm<sup>2</sup> , -0.87 to -0.48 psi)

3. If out of specification, replace fuel filler cap as an assembly.

**CAUTION:**

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.



SEF943S

### EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-316](#) .

### FUEL TANK TEMPERATURE SENSOR

Refer to [EC-255](#) .

### EVAP CANISTER VENT CONTROL VALVE

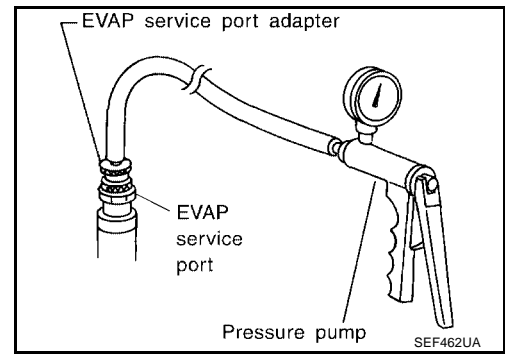
Refer to [EC-322](#) .

### EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-329](#) .

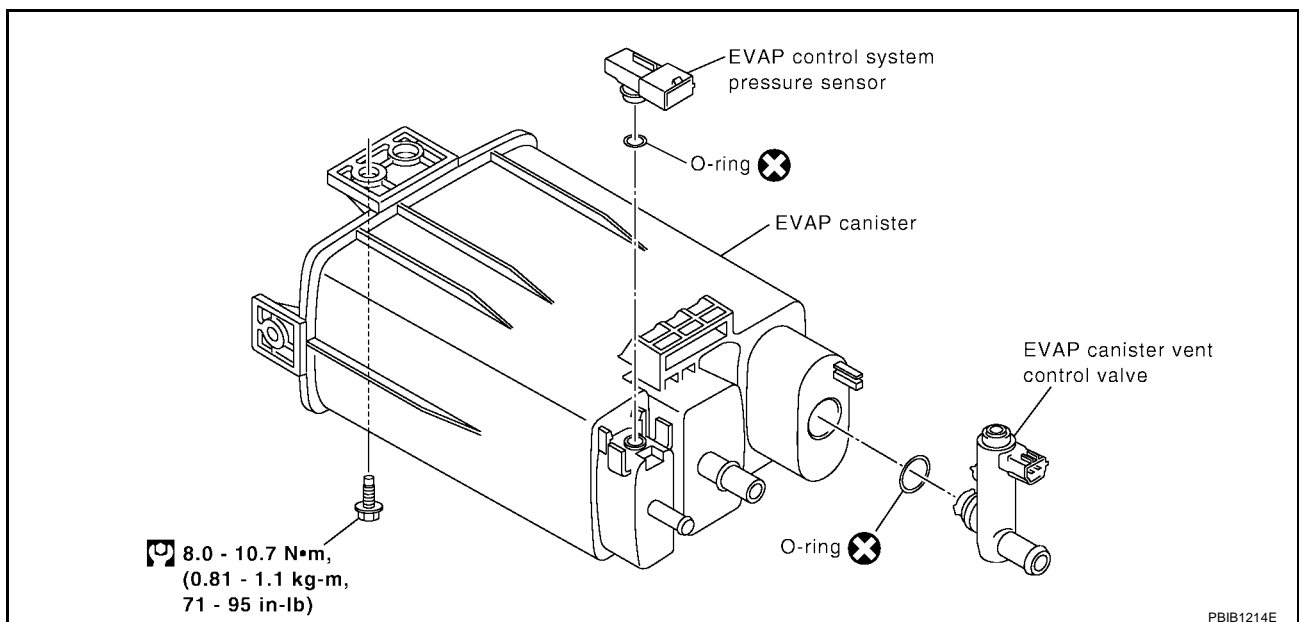
### EVAP SERVICE PORT

Positive pressure is delivered to the EVAP system through the EVAP service port. If fuel vapor leakage in the EVAP system occurs, use a leak detector to locate the leak.



### Removal and Installation EVAP CANISTER

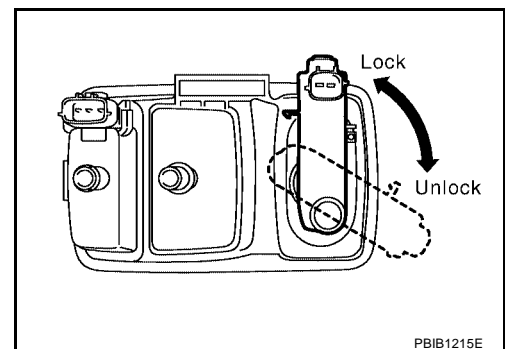
Tighten EVAP canister as shown in the figure.



### EVAP CANISTER VENT CONTROL VALVE

1. Turn EVAP canister vent control valve counterclockwise.
2. Remove the EVAP canister vent control valve.

**Do not reuse the O-ring, replace it with a new one.**



### How to Detect Fuel Vapor Leakage

#### CAUTION:

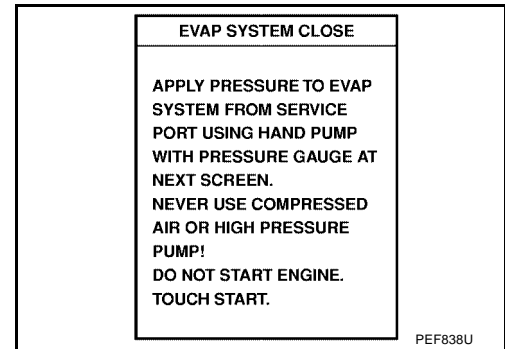
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in EVAP system.

#### NOTE:

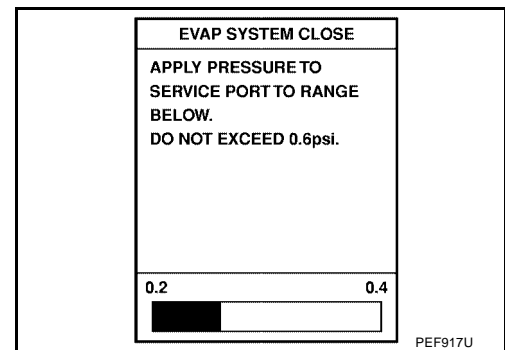
- Do not start engine.
- Improper installation of EVAP service port adapter to the EVAP service port may cause a leak.

### Ⓟ WITH CONSULT-II

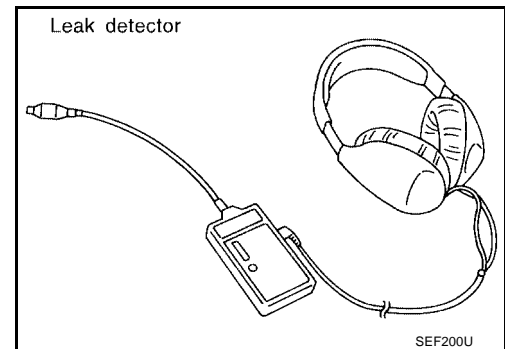
1. Attach the EVAP service port adapter securely to the EVAP service port.
2. Also attach the pressure pump and hose to the EVAP service port adapter.
3. Turn ignition switch "ON".
4. Select the "EVAP SYSTEM CLOSE" of "WORK SUPPORT MODE" with CONSULT-II.
5. Touch "START". A bar graph (Pressure indicating display) will appear on the screen.



6. Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
7. Remove EVAP service port adapter and hose with pressure pump.

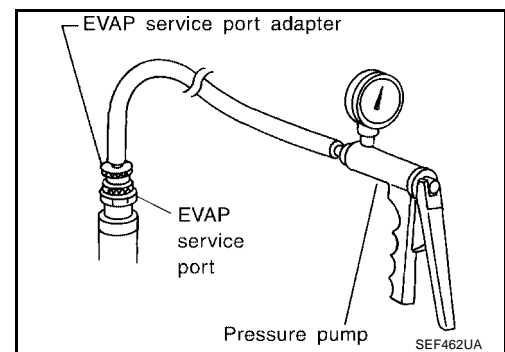


8. Locate the leak using a leak detector. Refer to [EC-584, "EVAPORATIVE EMISSION LINE DRAWING"](#).



### ⓧ WITHOUT CONSULT-II

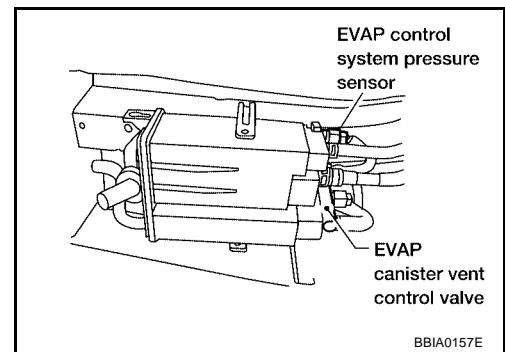
1. Attach the EVAP service port adapter securely to the EVAP service port.
2. Also attach the pressure pump with pressure gauge to the EVAP service port adapter.



## EVAPORATIVE EMISSION SYSTEM

[QG18DE (ULEV)]

3. Apply battery voltage to between the terminals of EVAP canister vent control valve to make a closed EVAP system.
4. To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm<sup>2</sup> , 0.2 to 0.4 psi).
5. Remove EVAP service port adapter and hose with pressure pump.
6. Locate the leak using a leak detector. Refer to [EC-584, "EVAPORATIVE EMISSION LINE DRAWING"](#) .



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# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

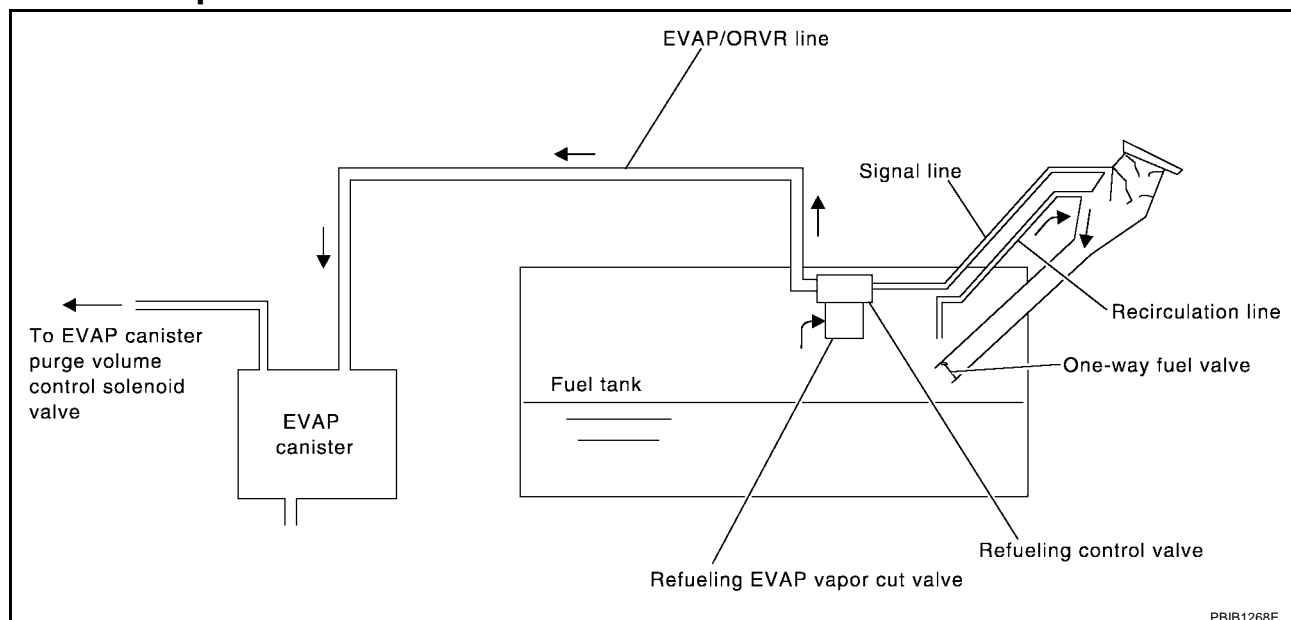
[QG18DE (ULEV)]

## ON BOARD REFUELING VAPOR RECOVERY (ORVR)

PFP:00032

### System Description

UBS00377



PBIB1268E

From the beginning of refueling, the fuel tank pressure goes up. When the pressure reaches the setting value of the refueling control valve (RCV) opening pressure, the RCV is opened. After RCV opens, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve, RCV and EVAP/ORVR line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is released to the atmosphere.

When the refueling has reached the full level of the fuel tank, the refueling EVAP vapor cut valve is closed and refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.

The RCV is always closed during driving and the evaporative emission control system is operated the same as conventional system.

#### **WARNING:**

When conducting inspections below, be sure to observe the following:

- Put a “CAUTION: INFLAMMABLE” sign in workshop.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Be sure to furnish the workshop with a CO<sub>2</sub> fire extinguisher.

#### **CAUTION:**

- Before removing fuel line parts, carry out the following procedures:
  - Put drained fuel in an explosion-proof container and put lid on securely.
  - Release fuel pressure from fuel line. Refer to “Fuel Pressure Release”, [EC-56](#).
  - Disconnect battery ground cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Do not kink or twist hose and tube when they are installed.
- Do not tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leaks at connection.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QG18DE (ULEV)]

UBS00378

## Diagnostic Procedure

**SYMPTOM: FUEL ODOR FROM EVAP CANISTER IS STRONG.**

### 1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Weigh the EVAP canister with EVAP canister vent control valve attached.  
The weight should be less than 1.9 kg (4.2 lb).

OK or NG

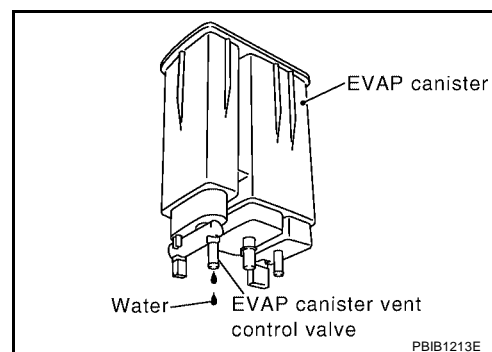
- OK >> GO TO 2.  
NG >> GO TO 3.

### 2. CHECK IF EVAP CANISTER SATURATED WITH WATER

Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 3.  
No >> GO TO 6.



### 3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> Repair or replace EVAP hose.

### 4. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-593, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.  
NG >> Replace refueling EVAP vapor cut valve with fuel tank.

### 5. CHECK REFUELING CONTROL VALVE

Refer to [EC-593, "Component Inspection"](#) .

OK or NG

- OK >> **INSPECTION END**  
NG >> Replace refueling control valve with fuel tank.

**SYMPTOM: CANNOT REFUEL/FUEL ODOR FROM THE FUEL FILLER OPENING IS STRONG WHILE REFUELING.**

### 1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Weigh the EVAP canister with EVAP canister vent control valve attached.  
The weight should be less than 1.9 kg (4.2 lb).

OK or NG

- OK >> GO TO 2.  
NG >> GO TO 3.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

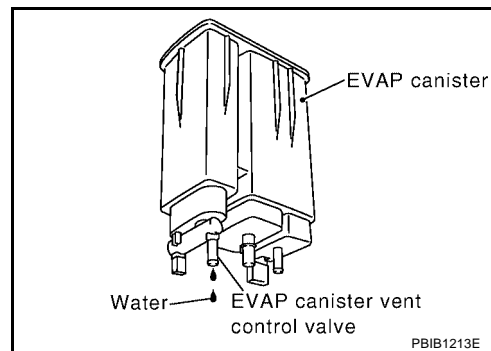
[QG18DE (ULEV)]

## 2. CHECK IF EVAP CANISTER SATURATED WITH WATER

Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 3.
- No >> GO TO 6.



## 3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 4.

## 4. CHECK VENT HOSES AND VENT TUBES

Check hoses and tubes between EVAP canister and refueling control valve for clogging, kink, looseness and improper connection.

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace hoses and tubes.

## 5. CHECK FILLER NECK TUBE

Check recirculation line for clogging, dents and cracks.

OK or NG

- OK >> GO TO 6.
- NG >> Replace filler neck tube.

## 6. CHECK REFUELING CONTROL VALVE

Refer to [EC-593, "Component Inspection"](#).

OK or NG

- OK >> GO TO 7.
- NG >> Replace refueling control valve with fuel tank.

## 7. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-593, "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.
- NG >> Replace refueling EVAP vapor cut valve with fuel tank.

## 8. CHECK FUEL FILLER TUBE

Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.

OK or NG

- OK >> GO TO 9.
- NG >> Replace fuel filler tube.



**9. CHECK ONE-WAY FUEL VALVE-I**

Check one-way valve for clogging.

OK or NG

OK >> GO TO 10.

NG >> Repair or replace one-way fuel valve with fuel tank.

**10. CHECK ONE-WAY FUEL VALVE-II**

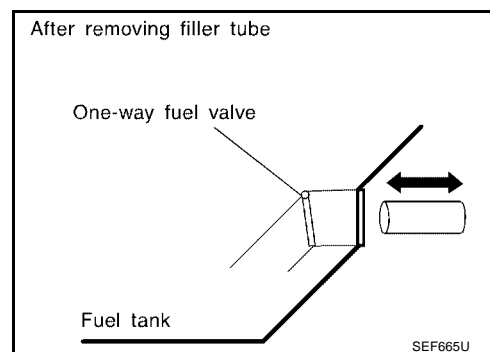
1. Make sure that fuel is drained from the tank.
2. Remove fuel filler tube and hose.
3. Check one-way fuel valve for operation as follows.  
When a stick is inserted, the valve should open, when removing stick it should close.

**Do not drop any material into the tank.**

OK or NG

OK >> **INSPECTION END**

NG >> Replace fuel filler tube or replace one-way fuel valve with fuel tank.



### Component Inspection

#### REFUELING EVAP VAPOR CUT VALVE

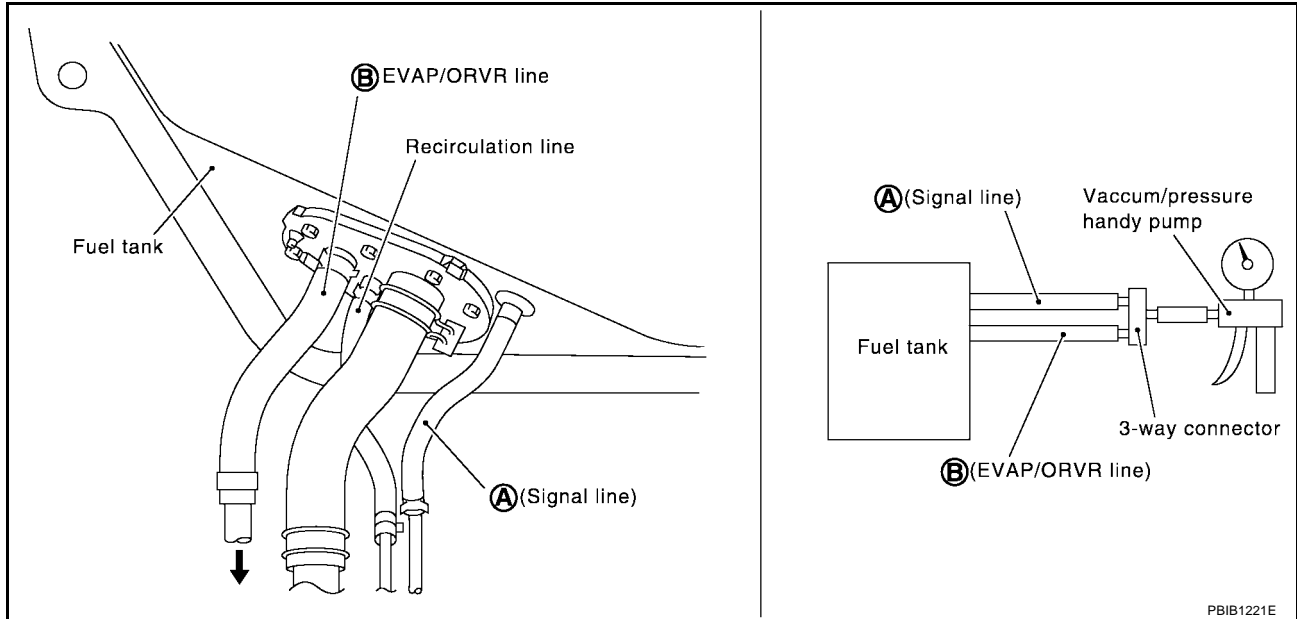
Ⓟ **With CONSULT-II**

1. Remove fuel tank. Refer to [FL-7, "FUEL TANK"](#).
2. Drain fuel from the tank as follows:
  - a. Remove fuel feed hose located on the fuel gauge retainer.
  - b. Connect a spare fuel hose, one side to fuel gauge retainer where the hose was removed and the other side to a fuel container.
  - c. Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-II.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.  
Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.
  - a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
  - b. Remove fuel gauge retainer with fuel gauge unit.  
**Always replace O-ring with new one.**
  - c. Put fuel tank upside down.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QG18DE (ULEV)]

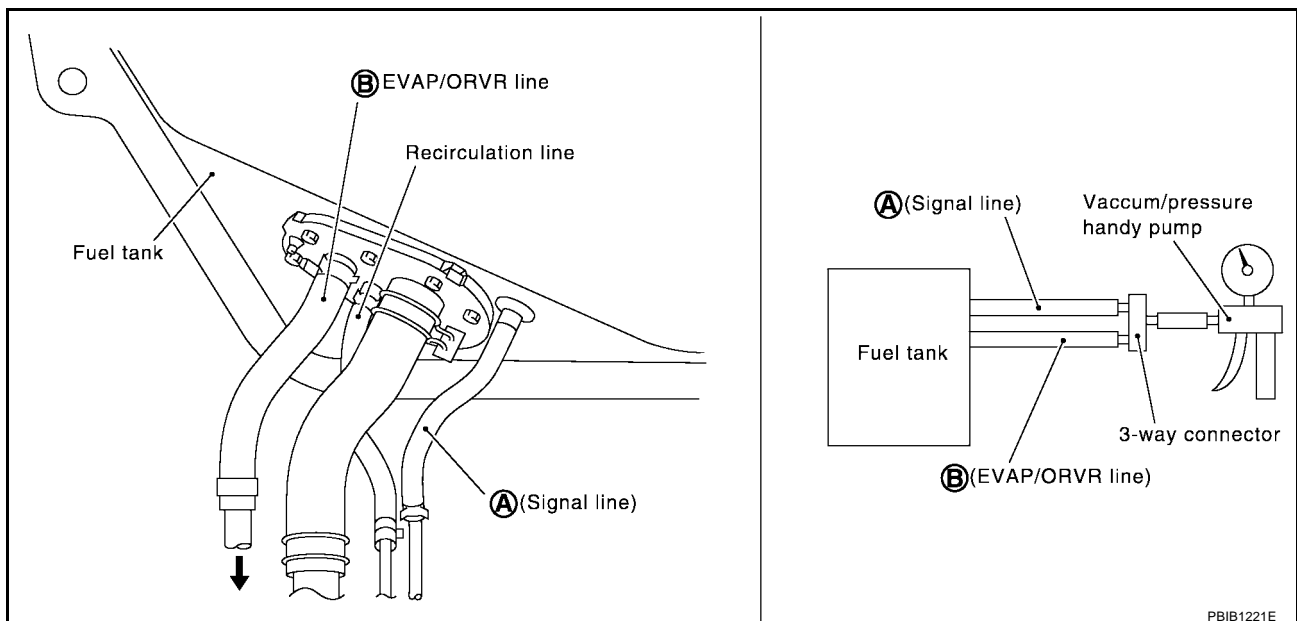
- d. Apply vacuum pressure to hose end [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



PBIB1221E

## ⊗ Without CONSULT-II

1. Remove fuel tank. Refer to [FL-7, "FUEL TANK"](#).
2. Drain fuel from the tank as follows:
  - a. Remove fuel gauge retainer.
  - b. Drain fuel from the tank using a handy pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.  
Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.
  - a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
  - b. Remove fuel gauge retainer with fuel gauge unit.  
**Always replace O-ring with new one.**
  - c. Put fuel tank upside down.
  - d. Apply vacuum pressure to hose end [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



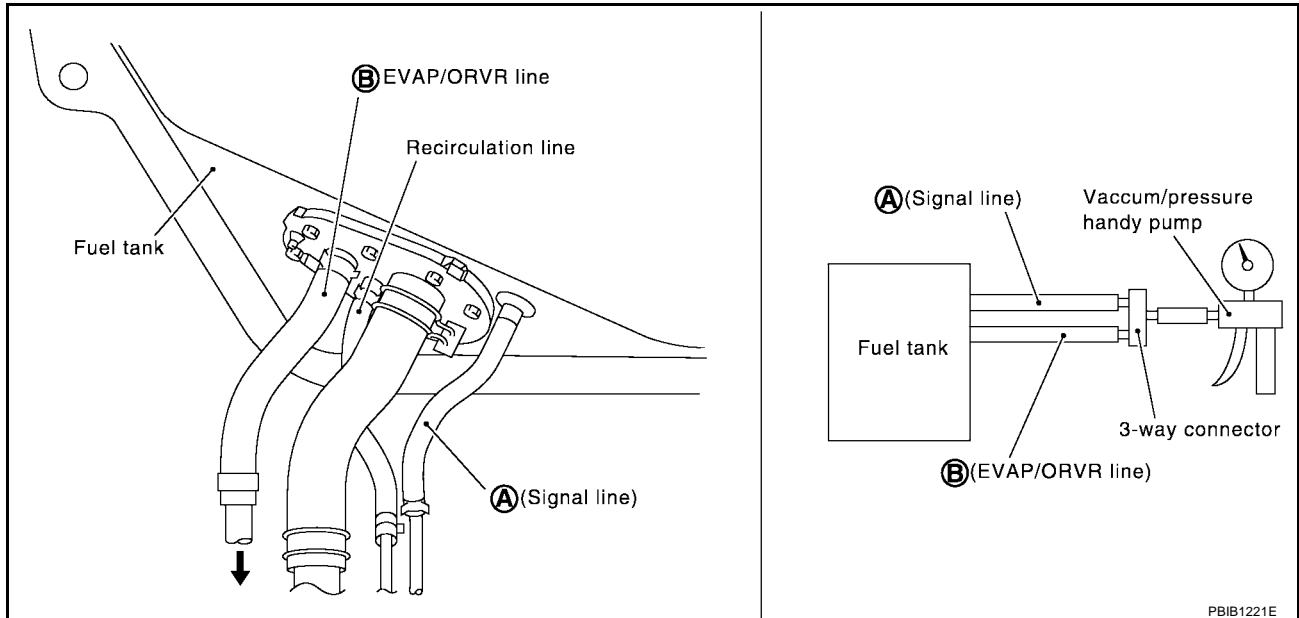
PBIB1221E

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QG18DE (ULEV)]

## REFUELING CONTROL VALVE

1. Remove fuel filler cap.
2. Check air into continuity between hose ends A and B.  
Blow air into the hose end B. Air should flow freely into the fuel tank.
3. Blow air into hose end A and check there is no leakage.
4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5,91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.

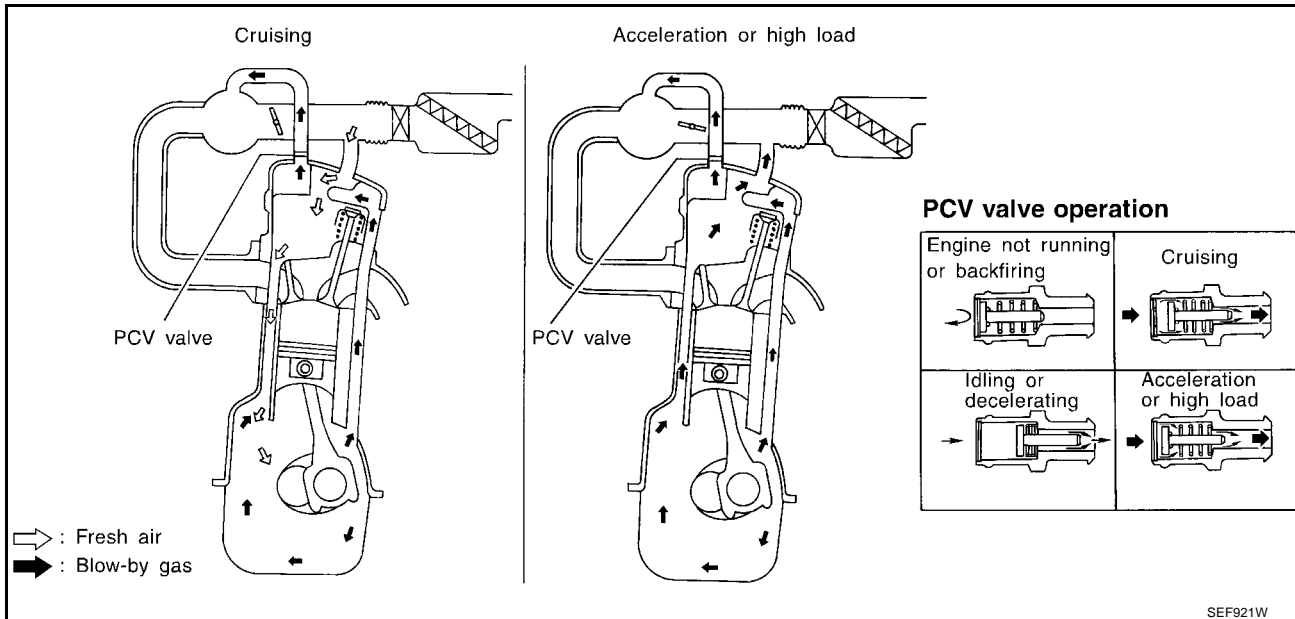


POSITIVE CRANKCASE VENTILATION

PF1:11810

Description

UBS001Q0



SEF921W

This system returns blow-by gas to the intake collector.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.

The ventilating air is then drawn from the air duct into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.

Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve.

The flow goes through the hose connection in the reverse direction.

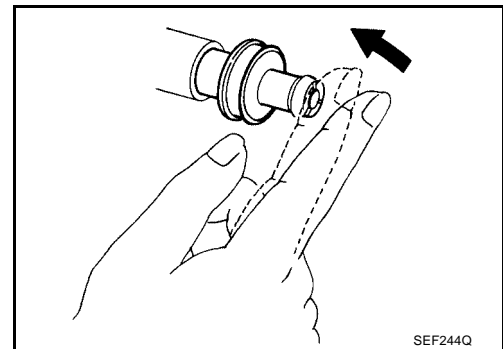
On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the intake collector under all conditions.

Inspection

PCV (POSITIVE CRANKCASE VENTILATION) VALVE

UBS001Q1

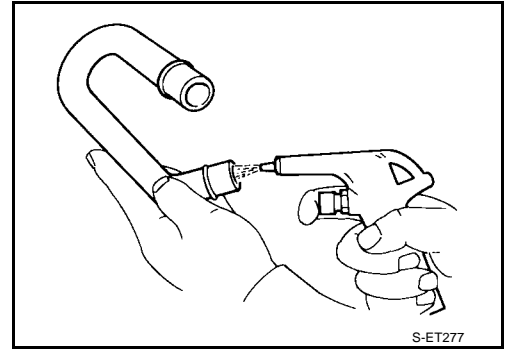
With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over the valve inlet.



SEF244Q

### VENTILATION HOSE

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace.



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# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[QG18DE (ULEV)]

## AUTOMATIC SPEED CONTROL DEVICE (ASCD)

PF1:18930

### System Description INPUT/OUTPUT SIGNAL CHART

UBS0041J

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation	ASCD vehicle speed control	Electric throttle control actuator
Stop lamp switch	Brake pedal operation		
ASCD steering switch	ASCD steering switch operation		
Park/Neutral position (PNP) switch	Gear position		
Combination meter	Vehicle speed		
TCM	Powertrain revolution		

### BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.

Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH).

ECM controls throttle angle of electric throttle control actuator to regulate engine speed.

Operation status of ASCD is indicated by CRUISE indicator and SET indicator in combination meter. If any malfunction occurs in ASCD system, it automatically deactivates control.

### SET OPERATION

Press ASCD CRUISE switch (Main switch). (The CRUISE indicator in combination meter illuminates.)

When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH), press SET switch. (Then SET indicator in combination meter illuminates.)

### ACCEL OPERATION

If the RESUME/ACCEL switch is depressed during cruise control driving, increase the vehicle speed until the switch is released or vehicle speed reaches maximum speed controlled by the system.

And then ASCD will keep the new set speed.

### CANCEL OPERATION

When any of following conditions exist, cruise operation will be canceled.

- CANCEL switch is depressed
- More than 2 switches at ASCD steering switch are depressed at the same time (Set speed will be cleared.).
- Brake pedal is depressed
- Clutch pedal is depressed or gear position is changed to the neutral position (M/T models)
- Selector lever is changed to "N", "P", "R" position (A/T models).
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed

When the ECM detects any of the following conditions, the ECM will cancel the cruise operation and inform the driver by blinking indicator lamp.

- Engine coolant temperature is slightly higher than the normal operating temperature: CRUISE lamp may blink slowly.  
When the engine coolant temperature decreases to the normal operating temperature, CRUISE lamp will stop blinking and the cruise operation will be able to work by depressing SET switch or RESUME switch.
- Malfunction for some self-diagnoses regarding ASCD control: SET lamp will blink quickly.

If MAIN switch is turned to OFF during ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

### COAST OPERATION

When the SET/COAST switch is depressed during cruise control driving, decrease vehicle set speed until the switch is released. And then ASCD will keep the new set speed.

# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[QG18DE (ULEV)]

## RESUME OPERATION

When the RESUME/ACCEL switch is depressed after cancel operation other than depressing MAIN switch is performed, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must meet following conditions.

- Brake pedal is released.
- A/T selector lever is in other than P and N positions (A/T models)
- Clutch pedal is released (M/T models)
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 144 km/h (89 MPH)

## Component Description

### ASCD STEERING SWITCH

Refer to [EC-474](#) .

### ASCD BRAKE SWITCH

Refer to [EC-481](#) , and [EC-570](#) .

### ASCD CLUTCH SWITCH

Refer to [EC-481](#) , and [EC-570](#) .

### STOP LAMP SWITCH

Refer to [EC-481](#) , [EC-497](#) and [EC-570](#) .

### ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EC-390](#) , [EC-392](#) , [EC-399](#) and [EC-404](#) .

### ASCD INDICATOR

Refer to [EC-579](#) .

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# SERVICE DATA AND SPECIFICATIONS (SDS)

[QG18DE (ULEV)]

## SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

### Fuel Pressure

UBS006GZ

Fuel pressure at idle	Approximately 350 kPa (3.57kg/cm <sup>2</sup> , 51psi)
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### Idle Speed and Ignition Timing

UBS001Q3

Target idle speed*1 rpm	A/T	No-load*1 (in "P" or "N" position)	800±50 rpm
	M/T	No-load*1 (in "Neutral" position)	650±50 rpm
Air conditioner: ON rpm	A/T	In "P" or "N" position	850 or more
	M/T	In "Neutral" position	
Ignition timing	A/T	In "P" or "N" position	18°±5° BTDC
	M/T	In "Neutral" position	7°±5° BTDC

\*1: Under the following conditions:

- Air conditioner switch: OFF
- Electrical load: OFF (Lights & rear window defogger)
- Steering wheel: Kept in straight-ahead position

### Mass Air Flow Sensor

UBS001Q4

Supply voltage V	Battery voltage (11 - 14)
Output voltage V	1.0 - 1.7*
Mass air flow (Using CONSULT-II or GST) g-m/sec	1.4 - 4.0 at idle* 5.0 - 10.0 at 2,500 rpm*

\*: Engine is warmed up to normal operating temperature and idling under no-load.

### Engine Coolant Temperature Sensor

UBS001Q5

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

### Fuel Pump

UBS001Q7

Resistance [at 25°C (77°F)] Ω	0.2 - 5.0
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### Injector

UBS001Q9

Resistance [at 20°C (68°F)] Ω	13.5 - 17.5
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### Resistor

UBS001QA

Resistance [at 25°C (77°F)] Ω	4 - 8
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### Throttle Control Motor

UBS006H0

Resistance [at 25°C (77°F)]	Approximately 1 - 15Ω
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### Heated Oxygen Sensor 1 Heater

UBS001QC

Resistance [at 25°C (77°F)] Ω	2.3 - 4.3
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### Calculated Load Value

UBS001QD

	Calculated load value % (Using CONSULT-II or GST)
At idle	20.0 - 35.5
At 2,500 rpm	12.0 - 27.0



# SERVICE DATA AND SPECIFICATIONS (SDS)

[QG18DE (ULEV)]

## Intake Air Temperature Sensor

UBS001QE

Temperature °C (°F)	Resistance kΩ
20 (68)	1.9 - 2.1
80 (176)	0.31 - 0.37

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## EVAP Canister Purge Volume Control Valve

UBS001QF

Resistance [at 20°C (68°F)] Ω	22 - 26
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C

## Heated Oxygen Sensor 2 Heater

UBS001QG

Resistance [at 25°C (77°F)] Ω	2.3 - 4.3
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D

## Crankshaft Position Sensor (POS)

UBS001QH

Resistance [at 20°C (68°F)] Ω	166 - 204
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E

## Fuel Tank Temperature Sensor

UBS001QI

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

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# INDEX FOR DTC

[QG18DE (SULEV)]

## INDEX FOR DTC

PFP:00024

### Alphabetical Index

UBS001QJ

**NOTE:**

If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-728](#).

×: Applicable —: Not applicable

Items (CONSULT-II screen terms)	DTC* <sup>1</sup>		Trip	MIL light- ing up	Reference page
	CONSULT-II GST* <sup>2</sup>	ECM* <sup>3</sup>			
A/F SENSOR1 (B1)	P1271	1271	2	×	<a href="#">EC-1033</a>
A/F SENSOR1 (B1)	P1272	1272	2	×	<a href="#">EC-1039</a>
A/F SENSOR1 (B1)	P1273	1273	2	×	<a href="#">EC-1045</a>
A/F SENSOR1 (B1)	P1274	1274	2	×	<a href="#">EC-1052</a>
A/F SENSOR1 (B1)	P1276	1276	2	×	<a href="#">EC-1059</a>
A/F SENSOR1 (B1)	P1278	1278	2	×	<a href="#">EC-1065</a>
A/F SENSOR1 (B1)	P1279	1279	2	×	<a href="#">EC-1073</a>
A/F SEN1 HTR (B1)	P1031	1031	2	×	<a href="#">EC-930</a>
A/F SEN1 HTR (B1)	P1032	1032	2	×	<a href="#">EC-930</a>
APP SEN 1/CIRC	P2122	2122	1	×	<a href="#">EC-1125</a>
APP SEN 1/CIRC	P2123	2123	1	×	<a href="#">EC-1125</a>
APP SEN 2/CIRC	P2127	2127	1	×	<a href="#">EC-1132</a>
APP SEN 2/CIRC	P2128	2128	1	×	<a href="#">EC-1132</a>
APP SENSOR	P2138	2138	1	×	<a href="#">EC-1147</a>
ASCD BRAKE SW	P1572	1572	1	—	<a href="#">EC-1102</a>
ASCD SW	P1564	1564	1	—	<a href="#">EC-1095</a>
ASCD VHL SPD SEN	P1574	1574	1	—	<a href="#">EC-1113</a>
A/T 1ST GR FNCTN	P0731	0731	2	×	<a href="#">AT-136</a>
A/T 2ND GR FNCTN	P0732	0732	2	×	<a href="#">AT-141</a>
A/T 3RD GR FNCTN	P0733	0733	2	×	<a href="#">AT-146</a>
A/T 4TH GR FNCTN	P0734	0734	2	×	<a href="#">AT-151</a>
A/T TCC S/V FNCTN	P0744	0744	2	×	<a href="#">AT-164</a>
ATF TEMP SEN/CIRC	P0710	0710	2	×	<a href="#">AT-121</a>
BRAKE SW/CIRCUIT	P1805	1805	2	—	<a href="#">EC-1119</a>
CMP SEN/CIRCUIT	P0340	0340	2	×	<a href="#">EC-842</a>
CLOSED LOOP-B1	P1148	1148	1	×	<a href="#">EC-1008</a>
CKP SEN/CIRCUIT	P0335	0335	2	×	<a href="#">EC-836</a>
CAN COMM CIRCUIT	U1000	1000* <sup>5</sup>	1	×	<a href="#">EC-728</a>
CAN COMM CIRCUIT	U1001	1001* <sup>5</sup>	2	—	<a href="#">EC-728</a>
CTP LEARING	P1225	1225	2	—	<a href="#">EC-1024</a>
CTP LEARING	P1226	1226	2	—	<a href="#">EC-1026</a>
CYL 1 MISFIRE	P0301	0301	2	×	<a href="#">EC-825</a>
CYL 2 MISFIRE	P0302	0302	2	×	<a href="#">EC-825</a>
CYL 3 MISFIRE	P0303	0303	2	×	<a href="#">EC-825</a>
CYL 4 MISFIRE	P0304	0304	2	×	<a href="#">EC-825</a>
ECM	P0605	0605	1 or 2	× or —	<a href="#">EC-927</a>
ECM BACK UP/CIRC	P1065	1065	2	×	<a href="#">EC-936</a>

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[QG18DE (SULEV)]

Items (CONSULT-II screen terms)	DTC*1		Trip	MIL lighting up	Reference page
	CONSULT-II GST*2	ECM*3			
ECT SEN/CIRC	P0117	0117	1	×	<a href="#">EC-760</a>
ECT SEN/CIRC	P0118	0118	1	×	<a href="#">EC-760</a>
ECT SENSOR	P0125	0125	1	×	<a href="#">EC-772</a>
ENGINE SPEED SIG	P0725	0725	2	×	<a href="#">AT-132</a>
ENG OVER TEMP	P1217	1217	1	×	<a href="#">EC-1009</a>
ETC ACTR	P1121	1121	1	×	<a href="#">EC-952</a>
ETC FUNCTION/CIRC	P1122	1122	1	×	<a href="#">EC-954</a>
ETC MOT	P1128	1128	1	×	<a href="#">EC-966</a>
ETC MOT PWR	P1124	1124	1	×	<a href="#">EC-961</a>
ETC MOT PWR	P1126	1126	1	×	<a href="#">EC-961</a>
EVAP GROSS LEAK	P0455	0455	2	×	<a href="#">EC-893</a>
EVAP PURG FLOW/MON	P0441	0441	2	×	<a href="#">EC-852</a>
EVAP SYS PRES SEN	P0452	0452	2	×	<a href="#">EC-880</a>
EVAP SYS PRES SEN	P0453	0453	2	×	<a href="#">EC-886</a>
EVAP SMALL LEAK	P0442	0442	2	×	<a href="#">EC-858</a>
EVAP VERY SML LEAK	P0456	0456	2	×	<a href="#">EC-901</a>
FUEL LEVL SEN/CIRC	P0462	0462	2	×	<a href="#">EC-914</a>
FUEL LEVL SEN/CIRC	P0463	0463	2	×	<a href="#">EC-914</a>
FUEL LEVEL SENSOR	P0461	0461	2	×	<a href="#">EC-912</a>
FUEL LEV SEN SLOSH	P0460	0460	2	×	<a href="#">EC-910</a>
FUEL SYS-LEAN-B1	P0171	0171	2	×	<a href="#">EC-795</a>
FUEL SYS-RICH-B1	P0172	0172	2	×	<a href="#">EC-802</a>
FTT SENSOR	P0181	0181	2	×	<a href="#">EC-809</a>
FTT SEN/CIRCUIT	P0182	0182	2	×	<a href="#">EC-814</a>
FTT SEN/CIRCUIT	P0183	0183	2	×	<a href="#">EC-814</a>
HO2S2 (B1)	P1146	1146	2	×	<a href="#">EC-992</a>
HO2S2 (B1)	P1147	1147	2	×	<a href="#">EC-1000</a>
HO2S2 (B1)	P0138	0138	2	×	<a href="#">EC-780</a>
HO2S2 (B1)	P0139	0139	2	×	<a href="#">EC-787</a>
HO2S2 HTR (B1)	P0037	0037	2	×	<a href="#">EC-734</a>
HO2S2 HTR (B1)	P0038	0038	2	×	<a href="#">EC-734</a>
IAT SEN CIRCUIT	P0112	0112	2	×	<a href="#">EC-755</a>
IAT SEN CIRCUIT	P0113	0113	2	×	<a href="#">EC-755</a>
IAT SEN CIRCUIT	P0127	0127	2	×	<a href="#">EC-775</a>
INT/V TIM CONT-B1	P0011	0011	2	×	<a href="#">EC-731</a>
INT/V TIM V/CIR-B1	P1111	1111	2	×	<a href="#">EC-947</a>
ISC SYSTEM	P0506	0506	2	×	<a href="#">EC-918</a>
ISC SYSTEM	P0507	0507	2	×	<a href="#">EC-920</a>
KNOCK SEN/CIRC-B1	P0327	0327	2	—	<a href="#">EC-832</a>
KNOCK SEN/CIRC-B1	P0328	0328	2	—	<a href="#">EC-832</a>
L/PRES SOL/CIRC	P0745	0745	2	×	<a href="#">AT-174</a>
MAF SEN/CIRCUIT	P0101	0101	1	×	<a href="#">EC-740</a>

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[QG18DE (SULEV)]

Items (CONSULT-II screen terms)	DTC*1		Trip	MIL lighting up	Reference page
	CONSULT-II GST*2	ECM*3			
MAF SEN/CIRCUIT	P0102	0102	1	×	<a href="#">EC-748</a>
MAF SEN/CIRCUIT	P0103	0103	1	×	<a href="#">EC-748</a>
MAF SEN/CIRCUIT	P1102	1102	1	×	<a href="#">EC-940</a>
MULTI CYL MISFIRE	P0300	0300	2	×	<a href="#">EC-825</a>
<b>NO DTC IS DETECTED. FURTHER TESTING MY BE REQUIRED.</b>	No DTC	Flashing*4	—	Flashing*4	<a href="#">EC-654</a>
<b>NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.</b>	<b>P0000</b>	0000	—	—	—
O/R CLTCH SOL/CIRC	P1760	1760	2	×	<a href="#">AT-194</a>
P-N POS SW/CIRCUIT	P1706	1706	2	×	<a href="#">EC-1115</a>
PW ST P SEN/CIRC	P0550	0550	2	—	<a href="#">EC-922</a>
PNP SW/CIRC	P0705	0705	2	×	<a href="#">AT-116</a>
PURG VOLUME CONT/V	P0444	0444	2	×	<a href="#">EC-867</a>
PURG VOLUME CONT/V	P0445	0445	2	×	<a href="#">EC-867</a>
PURG VOLUME CONT/V	P1444	1444	2	×	<a href="#">EC-1081</a>
SFT SOL A/CIRC	P0750	0750	1	×	<a href="#">AT-180</a>
SFT SOL B/CIRC	P0755	0755	1	×	<a href="#">AT-180</a>
SENSOR POWER/CIRC	P1229	1229	1	×	<a href="#">EC-1028</a>
SWIRL CONT VALVE	P1138	1138	2	×	<a href="#">EC-984</a>
SWL CON/V POSI SEN	P1137	1137	2	×	<a href="#">EC-976</a>
TCC SOLENOID/CIRC	P0740	0740	2	×	<a href="#">AT-160</a>
THERMSTAT FNCTN	P0128	0128	2	×	<a href="#">EC-814</a>
TP SEN/CIRC A/T	P1705	1705	1	×	<a href="#">AT-188</a>
TP SEN 1/CIRC	P0222	0222	1	×	<a href="#">EC-818</a>
TP SEN 1/CIRC	P0223	0223	1	×	<a href="#">EC-818</a>
TP SEN 2/CIRC	P0122	0122	1	×	<a href="#">EC-765</a>
TP SEN 2/CIRC	P0123	0123	1	×	<a href="#">EC-765</a>
TP SENSOR	P2135	2135	1	×	<a href="#">EC-1140</a>
TW CATALYST SYS-B1	P0420	0420	2	×	<a href="#">EC-848</a>
VARI SWL CON/SV-B1	P1132	1132	2	×	<a href="#">EC-971</a>
VEH SPEED SEN/CIRC*6	P0500	0500	2	×	<a href="#">EC-916</a>
VEH SPD SEN/CIR A/T*6	P0720	0720	2	×	<a href="#">AT-127</a>
VENT CONTROL VALVE	P0447	0447	2	×	<a href="#">EC-873</a>
VENT CONTROL VALVE	P1446	1446	2	×	<a href="#">EC-1089</a>

\*1: 1st trip DTC No. is the same as DTC No.

\*2: These numbers are prescribed by SAE J2012.

\*3: In Diagnostic Test Mode II (Self-diagnostic results), these numbers are controlled by NISSAN.

\*4: When engine is running.

\*5: The troubleshooting for this DTC needs CONSULT-II.

\*6: When the fail-safe operations for both self-diagnoses occur, the MIL illuminates.

## DTC No. Index

UBS001QK

### NOTE:

If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-728](#).

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×: Applicable —: Not Applicable

DTC*1		Items (CONSULT-II screen terms)	Trip	MIL lighting up	Reference page
CONSULT-II GST*2	ECM*3				
No DTC	Flashing*4	<b>NO DTC IS DETECTED. FURTHER TESTING MY BE REQUIRED.</b>	—	Flashing*4	<a href="#">EC-654</a>
U1000	1000*5	CAN COMM CIRCUIT	1	×	<a href="#">EC-728</a>
U1001	1001*5	CAN COMM CIRCUIT	2	—	<a href="#">EC-728</a>
<b>P0000</b>	0000	<b>NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.</b>	—	—	—
P0011	0011	INT/V TIM CONT-B1	2	×	<a href="#">EC-731</a>
P0037	0037	HO2S2 HTR (B1)	2	×	<a href="#">EC-734</a>
P0038	0038	HO2S2 HTR (B1)	2	×	<a href="#">EC-734</a>
P0101	0101	MAF SEN/CIRCUIT	1	×	<a href="#">EC-740</a>
P0102	0102	MAF SEN/CIRCUIT	1	×	<a href="#">EC-748</a>
P0103	0103	MAF SEN/CIRCUIT	1	×	<a href="#">EC-748</a>
P0112	0112	IAT SEN/CIRCUIT	2	×	<a href="#">EC-755</a>
P0113	0113	IAT SEN/CIRCUIT	2	×	<a href="#">EC-755</a>
P0117	0117	ECT SEN/CIRC	1	×	<a href="#">EC-760</a>
P0118	0118	ECT SEN/CIRC	1	×	<a href="#">EC-760</a>
P0122	0122	TP SEN 2/CIRC	1	×	<a href="#">EC-765</a>
P0123	0123	TP SEN 2/CIRC	1	×	<a href="#">EC-765</a>
P0125	0125	ECT SENSOR	1	×	<a href="#">EC-772</a>
P0127	0127	IAT SEN/CIRCUIT	2	×	<a href="#">EC-775</a>
P0128	0128	THERMSTAT FNCTN	2	×	<a href="#">EC-778</a>
P0138	0138	HO2S2 (B1)	2	×	<a href="#">EC-780</a>
P0139	0139	HO2S2 (B1)	2	×	<a href="#">EC-787</a>
P0171	0171	FUEL SYS-LEAN-B1	2	×	<a href="#">EC-795</a>
P0172	0172	FUEL SYS-RICH-B1	2	×	<a href="#">EC-802</a>
P0181	0181	FTT SENSOR	2	×	<a href="#">EC-809</a>
P0182	0182	FTT SEN/CIRCUIT	2	×	<a href="#">EC-814</a>
P0183	0183	FTT SEN/CIRCUIT	2	×	<a href="#">EC-814</a>
P0222	0222	TP SEN 1/CIRC	1	×	<a href="#">EC-818</a>
P0223	0223	TP SEN 1/CIRC	1	×	<a href="#">EC-818</a>
P0300	0300	MULTI CYL MISFIRE	2	×	<a href="#">EC-825</a>
P0301	0301	CYL 1 MISFIRE	2	×	<a href="#">EC-825</a>
P0302	0302	CYL 2 MISFIRE	2	×	<a href="#">EC-825</a>
P0303	0303	CYL 3 MISFIRE	2	×	<a href="#">EC-825</a>
P0304	0304	CYL 4 MISFIRE	2	×	<a href="#">EC-825</a>
P0327	0327	KNOCK SEN/CIRC-B1	2	—	<a href="#">EC-832</a>
P0328	0328	KNOCK SEN/CIRC-B1	2	—	<a href="#">EC-832</a>
P0335	0335	CKP SEN/CIRCUIT	2	×	<a href="#">EC-836</a>
P0340	0340	CMP SEN/CIRCUIT	2	×	<a href="#">EC-842</a>
P0420	0420	TW CATALYST SYS-B1	2	×	<a href="#">EC-848</a>
P0441	0441	EVAP PURG FLOW/MON	2	×	<a href="#">EC-852</a>
P0442	0442	EVAP SMALL LEAK	2	×	<a href="#">EC-858</a>

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DTC*1		Items (CONSULT-II screen terms)	Trip	MIL lighting up	Reference page
CONSULT-II GST*2	ECM*3				
P0444	0444	PURG VOLUME CONT/V	2	×	<a href="#">EC-867</a>
P0445	0445	PURG VOLUME CONT/V	2	×	<a href="#">EC-867</a>
P0447	0447	VENT CONTROL VALVE	2	×	<a href="#">EC-873</a>
P0452	0452	EVAP SYS PRES SEN	2	×	<a href="#">EC-880</a>
P0453	0453	EVAP SYS PRES SEN	2	×	<a href="#">EC-886</a>
P0455	0455	EVAP GROSS LEAK	2	×	<a href="#">EC-893</a>
P0456	0456	EVAP VERY SML LEAK	2	×	<a href="#">EC-901</a>
P0460	0460	FUEL LEV SEN SLOSH	2	×	<a href="#">EC-910</a>
P0461	0461	FUEL LEVEL SENSOR	2	×	<a href="#">EC-912</a>
P0462	0462	FUEL LEVL SEN/CIRC	2	×	<a href="#">EC-914</a>
P0463	0463	FUEL LEVL SEN/CIRC	2	×	<a href="#">EC-914</a>
P0500	0500	VEH SPEED SEN/CIRC*6	2	×	<a href="#">EC-916</a>
P0506	0506	ISC SYSTEM/CIRC	2	×	<a href="#">EC-918</a>
P0507	0507	ISC SYSTEM/CIRC	2	×	<a href="#">EC-920</a>
P0550	0550	PW ST P SEN/CIRC	2	—	<a href="#">EC-922</a>
P0605	0605	ECM	1 or 2	× or —	<a href="#">EC-927</a>
P0705	0705	PNP SW/CIRC	2	×	<a href="#">AT-116</a>
P0710	0710	ATF TEMP SEN/CIRC	2	×	<a href="#">AT-121</a>
P0720	0720	VEH SPD SEN/CIR A/T*6	2	×	<a href="#">AT-127</a>
P0725	0725	ENGINE SPEED SIG	2	×	<a href="#">AT-132</a>
P0731	0731	A/T 1ST GR FNCTN	2	×	<a href="#">AT-136</a>
P0732	0732	A/T 2ND GR FNCTN	2	×	<a href="#">AT-141</a>
P0733	0733	A/T 3RD GR FNCTN	2	×	<a href="#">AT-146</a>
P0734	0734	A/T 4TH GR FNCTN	2	×	<a href="#">AT-151</a>
P0740	0740	TCC SOLENOID/CIRC	2	×	<a href="#">AT-160</a>
P0744	0744	A/T TCC S/V FNCTN	2	×	<a href="#">AT-164</a>
P0745	0745	L/PRESS SOL/CIRC	2	×	<a href="#">AT-174</a>
P0750	0750	SFT SOL A/CIRC	1	×	<a href="#">AT-180</a>
P0755	0755	SFT SOL B/CIRC	1	×	<a href="#">AT-184</a>
P1031	1031	A/F SEN1 HTR (B1)	2	×	<a href="#">EC-930</a>
P1032	1032	A/F SEN1 HTR (B1)	2	×	<a href="#">EC-930</a>
P1065	1065	ECM BACK UP/CIRC	2	×	<a href="#">EC-936</a>
P1102	1102	MAF SENSOR	1	×	<a href="#">EC-940</a>
P1111	1111	INT/V TIM V/CIR-B1	2	×	<a href="#">EC-947</a>
P1121	1121	ETC ACTR	1	×	<a href="#">EC-952</a>
P1122	1122	ETC FUNCTION/CIRC	1	×	<a href="#">EC-954</a>
P1124	1124	ETC MOT PWR	1	×	<a href="#">EC-961</a>
P1126	1126	ETC MOT PWR	1	×	<a href="#">EC-961</a>
P1128	1128	ETC MOT	1	×	<a href="#">EC-966</a>
P1132	1132	VARI SWL CON/SV-B1	2	×	<a href="#">EC-971</a>
P1137	1137	SWL CON/V POSI SEN	2	—	<a href="#">EC-976</a>
P1138	1138	SWIRL CONT VALVE	2	×	<a href="#">EC-984</a>

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DTC*1		Items (CONSULT-II screen terms)	Trip	MIL lighting up	Reference page
CONSULT-II GST*2	ECM*3				
P1146	1146	HO2S2 (B1)	2	×	<a href="#">EC-992</a>
P1147	1147	HO2S2 (B1)	2	×	<a href="#">EC-1000</a>
P1148	1148	CLOSED LOOP-B1	1	×	<a href="#">EC-1008</a>
P1217	1217	ENG OVER TEMP	1	×	<a href="#">EC-1009</a>
P1225	1225	CTP LEARNING	2	—	<a href="#">EC-1024</a>
P1226	1226	CTP LEARNING	2	—	<a href="#">EC-1026</a>
P1229	1229	SENSOR POWER/CIRC	1	×	<a href="#">EC-1028</a>
P1271	1271	A/F SENSOR1 (B1)	2	×	<a href="#">EC-1033</a>
P1272	1272	A/F SENSOR1 (B1)	2	×	<a href="#">EC-1039</a>
P1273	1273	A/F SENSOR1 (B1)	2	×	<a href="#">EC-1045</a>
P1274	1274	A/F SENSOR1 (B1)	2	×	<a href="#">EC-1052</a>
P1276	1276	A/F SENSOR1 (B1)	2	×	<a href="#">EC-1059</a>
P1278	1278	A/F SENSOR1 (B1)	2	×	<a href="#">EC-1065</a>
P1279	1279	A/F SENSOR1 (B1)	2	×	<a href="#">EC-1073</a>
P1444	1444	PURG VOLUME CONT/V	2	×	<a href="#">EC-1081</a>
P1446	1446	VENT CONTROL VALVE	2	×	<a href="#">EC-1089</a>
P1564	1564	ASCD SW	1	—	<a href="#">EC-1095</a>
P1572	1572	ASCD BRAKE SW	1	—	<a href="#">EC-1102</a>
P1574	1574	ASCD VHL SPD SEN	1	—	<a href="#">EC-1113</a>
P1705	1705	TP SEN/CIRC A/T	1	×	<a href="#">AT-188</a>
P1706	1706	P-N POS SW/CIRCUIT	2	×	<a href="#">EC-1115</a>
P1760	1760	O/R CLTCH SOL/CIRC	2	×	<a href="#">AT-194</a>
P1805	1805	BRAKE SW/CIRCUIT	2	—	<a href="#">EC-1119</a>
P2122	2122	APP SEN 1/CIRC	1	×	<a href="#">EC-1125</a>
P2123	2123	APP SEN 1/CIRC	1	×	<a href="#">EC-1125</a>
P2127	2127	APP SEN 2/CIRC	1	×	<a href="#">EC-1132</a>
P2128	2128	APP SEN 2/CIRC	1	×	<a href="#">EC-1132</a>
P2135	2135	TP SENSOR	1	×	<a href="#">EC-1140</a>
P2138	2138	APP SENSOR	1	×	<a href="#">EC-1147</a>

\*1: 1st trip DTC No. is the same as DTC No.

\*2: These numbers are prescribed by SEA J2012.

\*3: In Diagnostic Test Mode II (Self-diagnostic results), these numbers are controlled by NISSAN.

\*4: When engine is running.

\*5: The troubleshooting for this DTC needs CONSULT-II.

\*6: When the fail-safe operations for both self-diagnoses occur, the MIL illuminates.

**PRECAUTIONS**

PF0:00001

**Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”**

UBS001QL

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

**WARNING:**

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

**On Board Diagnostic (OBD) System of Engine and A/T**

UBS001QM

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

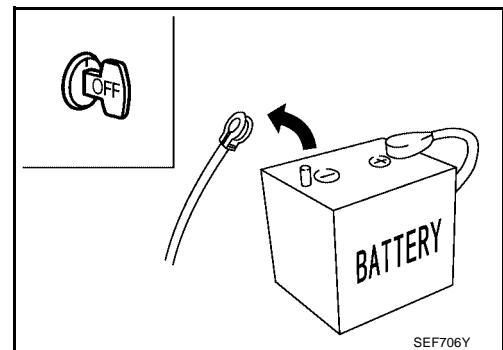
**CAUTION:**

- Be sure to turn the ignition switch “OFF” and disconnect the negative battery cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to EL section, “Description”, “HARNESS CONNECTOR”.
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the EVAP system or fuel injection system, etc.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission Control Module) before returning the vehicle to the customer.

**Precautions**

UBS001QN

- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the engine control system harness connector, turn ignition switch OFF and disconnect negative battery terminal. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned off.
- Before removing parts, turn off ignition switch and then disconnect battery ground cable.

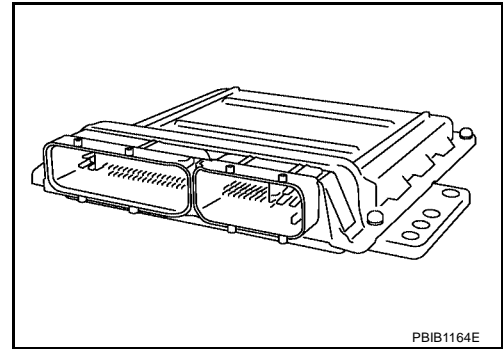




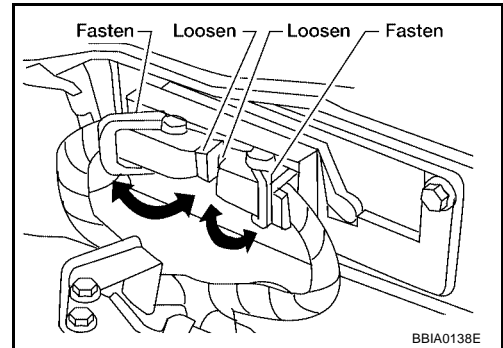
# PRECAUTIONS

[QG18DE (SULEV)]

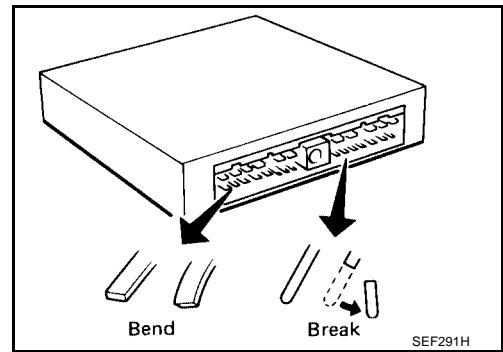
- Do not disassemble ECM.
- If a battery terminal is disconnected, the memory will return to the ECM value.  
The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a malfunction. Do not replace parts because of a slight variation.



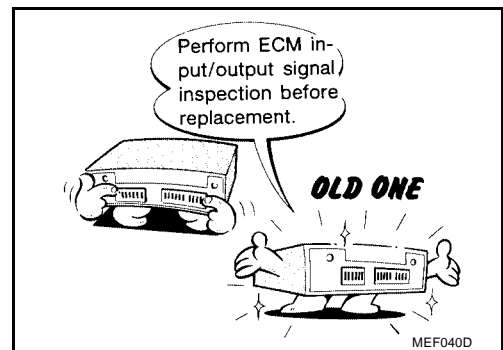
- When connecting engine control system harness connector, fasten it securely with a lever as far as it will go as shown at right.



- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).  
Make sure that there are not any bends or breaks on ECM pin terminals when connecting pin connectors.



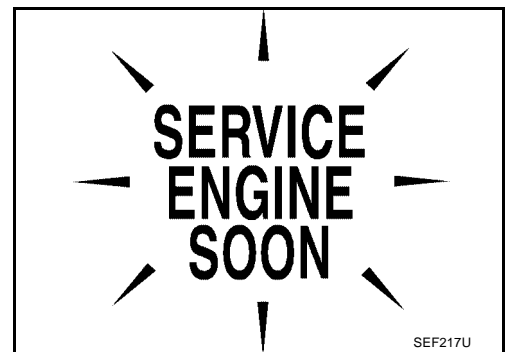
- Securely connect engine control system harness connectors.  
A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep engine control system parts and harness dry.
- Before replacing ECM, perform Terminals and Reference Value inspection and make sure ECM functions properly. Refer to [EC-686](#).



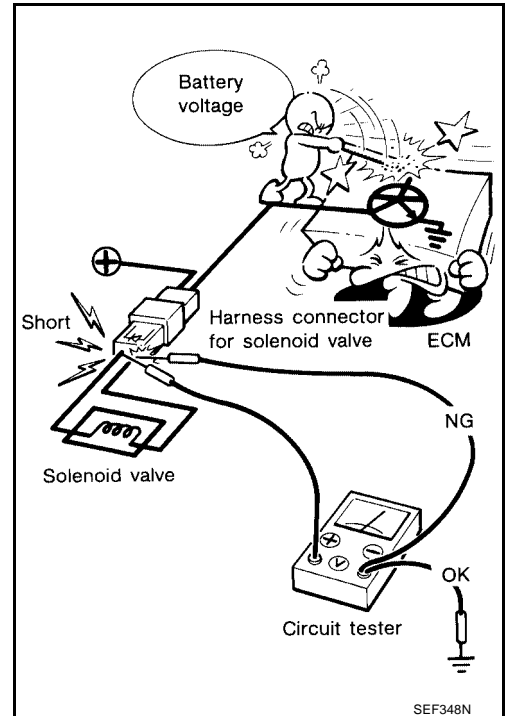
## PRECAUTIONS

[QG18DE (SULEV)]

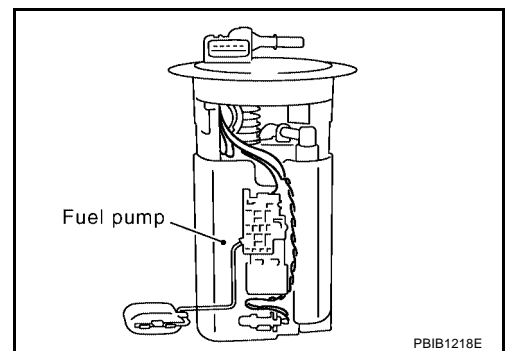
- After performing each TROUBLE DIAGNOSIS, perform “Overall Function Check” or “DTC Confirmation Procedure”.  
The DTC should not be displayed in the “DTC Confirmation Procedure” if the repair is completed. The “Overall Function Check” should be a good result if the repair is completed.



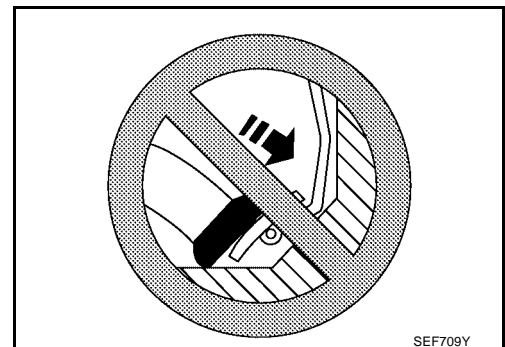
- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the body ground.
- Handle mass air flow sensor carefully to avoid damage.
- Do not disassemble mass air flow sensor.
- Do not clean mass air flow sensor with any type of detergent.
- Even a slight leak in the air intake system can cause serious problems.
- Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).



- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.



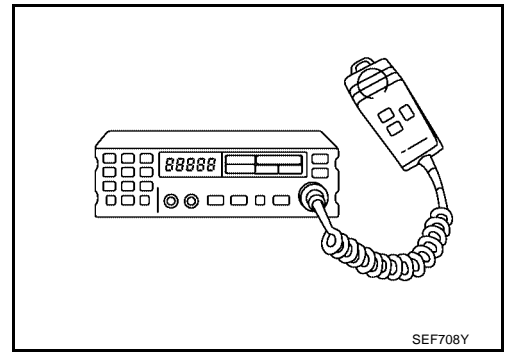
- Do not depress accelerator pedal when starting.
- Immediately after starting, do not rev up engine unnecessarily.
- Do not rev up engine just prior to shutdown.



## PRECAUTIONS

[QG18DE (SULEV)]

- When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.
- Keep the antenna as far as possible from the electronic control units.
- Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls. Do not let them run parallel for a long distance.
- Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
- Be sure to ground the radio to vehicle body.



### Wiring Diagrams and Trouble Diagnosis

When you read Wiring diagrams, refer to the following:

- [GI-13, "How to Read Wiring Diagrams"](#).
- [PG-2, "POWER SUPPLY ROUTING"](#). for power distribution circuit

When you perform trouble diagnosis, refer to the following:

- [GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"](#).
- [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#).

UBS001QO

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# PREPARATION

[QG18DE (SULEV)]

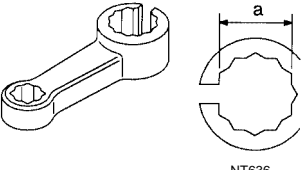
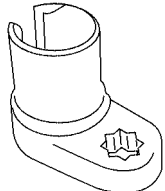
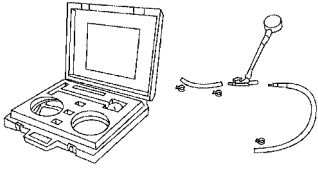

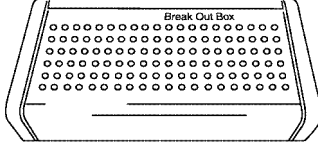
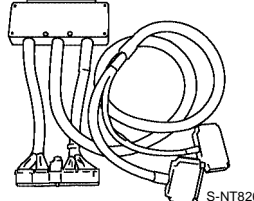
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UBS001QP

## PREPARATION

### Special Service Tools

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

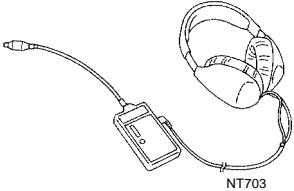
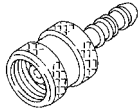
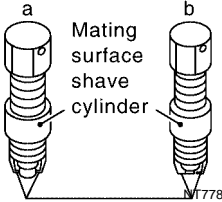
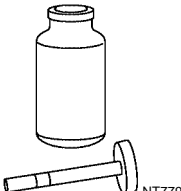

Tool number (Kent-Moore No.) Tool name	Description	
KV10114400 (J-38365) Heated oxygen sensor wrench	 <p>NT636</p>	Loosening or tightening heated oxygen sensor <b>a: 22 mm (0.87 in)</b>
(J-44626) Air fuel ratio (A/F) sensor wrench	 <p>LEM054</p>	Loosening or tightening air fuel ratio (A/F) sensor 1
(J-44321) Fuel pressure gauge kit	 <p>LEC642</p>	Checking fuel pressure
(J-45356) Fuel filler cap adapter	 <p>NT815</p>	Checking fuel tank vacuum relief valve opening pressure
KV109E0010 (J-46209) Break-out box	 <p>S-NT825</p>	Measuring the ECM signals with a circuit tester
KV109E0080 (J-45819) Y-cable adapter	 <p>S-NT826</p>	Measuring the ECM signals with a circuit tester

# PREPARATION

[QG18DE (SULEV)]

## Commercial Service Tools

UBS001QQ

Tool name	Description
Leak detector i.e.: (J41416)	 Locating the EVAP leak NT703
EVAP service port adapter i.e.: (J41413-OBD)	 Applying positive pressure through EVAP service port NT704
Oxygen sensor thread cleaner i.e.: (J-43897-18) (J-43897-12)	 Reconditioning the exhaust system threads before installing a new oxygen sensor or A/F sensor. Use with anti-seize lubricant shown below. <b>a: J-43897-18 18 mm with 1.5 mm pitch dia., for Zirconia Oxygen Sensor or A/F sensor</b> <b>b: J-43897-12 12 mm with 1.25 mm pitch dia., for Titania Oxygen Sensor</b> NT778
Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)	 Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads. NT779
Fuel tube removal tool	 For disconnecting fuel tube quick connectors <b>a: 7.9 mm (5/16 in)</b> LEC643

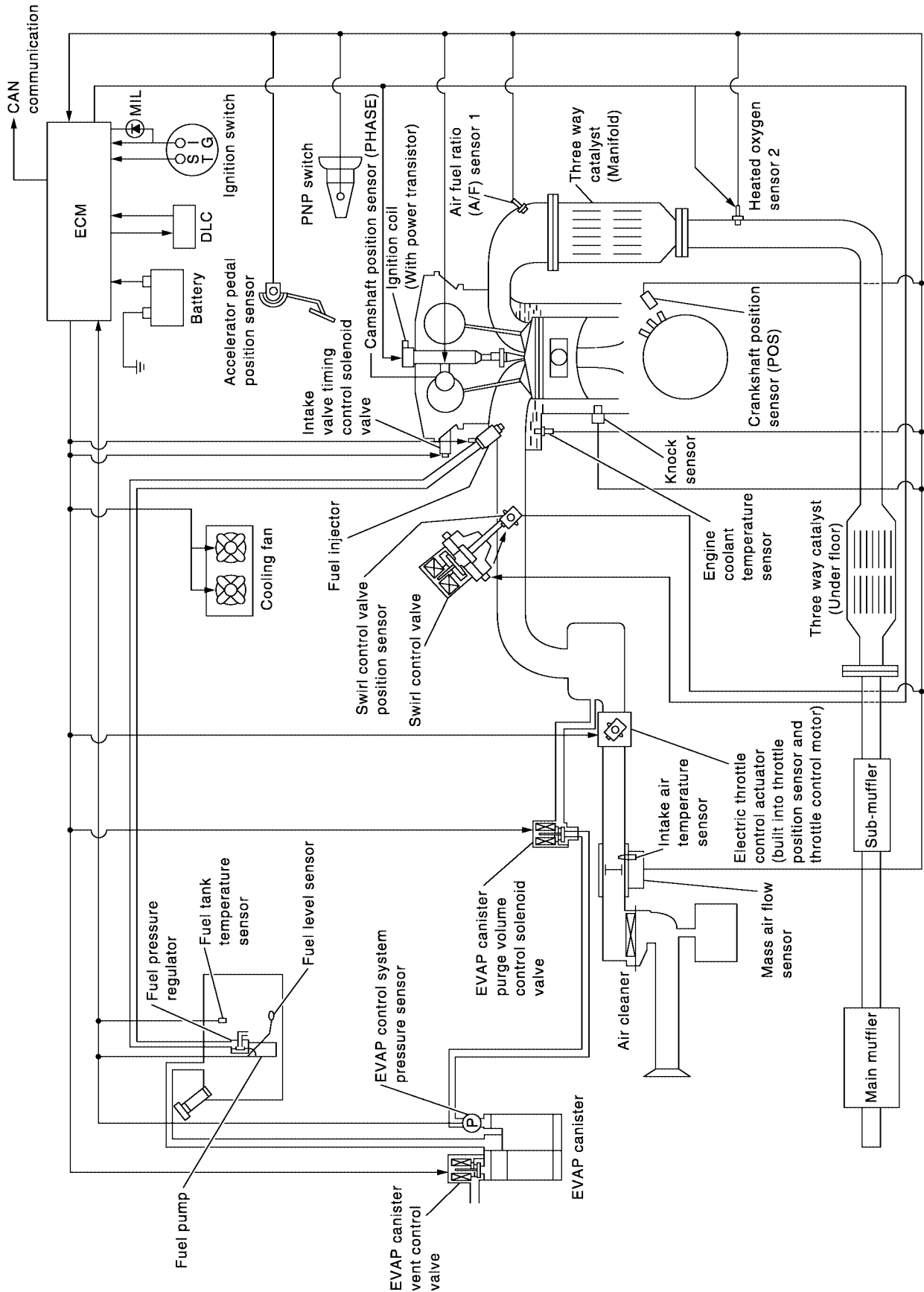
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ENGINE CONTROL SYSTEM

PFP:23710

System Diagram

UBS001QR



PBIB1264E

Vacuum Hose Drawing

UBS006F2

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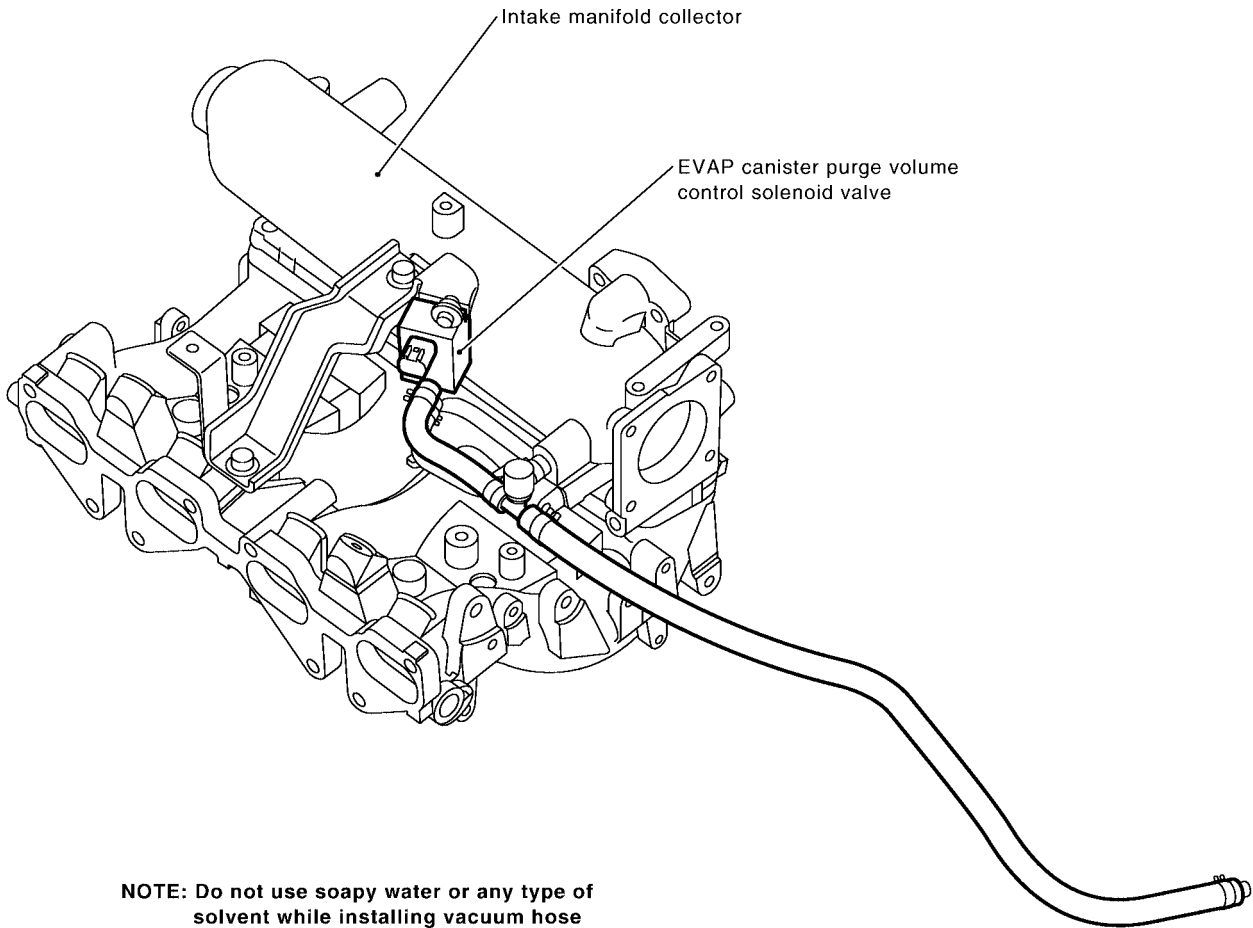
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**NOTE:** Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

PBIB1180E

# ENGINE CONTROL SYSTEM

[QG18DE (SULEV)]

UBS001QS

## System Chart

Input (Sensor)	ECM Function	Output (Actuator)	
<ul style="list-style-type: none"> <li>● Camshaft position sensor (PHASE)</li> <li>● Crankshaft position sensor (POS)</li> <li>● Mass air flow sensor</li> <li>● Engine coolant temperature sensor</li> <li>● Air fuel ratio (A/F) sensor 1</li> <li>● Ignition switch</li> <li>● Throttle position sensor</li> <li>● PNP switch</li> <li>● Air conditioner switch</li> <li>● Knock sensor</li> <li>● EVAP control system pressure sensor</li> <li>● Fuel tank temperature sensor*<sup>1</sup></li> <li>● Battery voltage</li> <li>● Power steering oil pressure switch</li> <li>● Vehicle speed signal*<sup>3</sup></li> <li>● Intake air temperature sensor</li> <li>● Heated oxygen sensor 2*<sup>2</sup></li> <li>● TCM (Transmission control module)*<sup>3</sup></li> <li>● Accelerator pedal position sensor</li> <li>● Electrical load</li> <li>● Swirl control valve position sensor*<sup>1</sup></li> <li>● Fuel level sensor*<sup>3</sup></li> <li>● Refrigerant pressure sensor</li> <li>● Stop lamp switch</li> <li>● ASCD steering switch</li> <li>● ASCD clutch switch</li> <li>● ASCD brake switch</li> </ul>	Fuel injection & mixture ratio control	Injectors	
	Distributor ignition system	Power transistor	
	Intake valve timing control	Intake valve timing control solenoid valve	
	Fuel pump control	Fuel pump relay	
	On board diagnostic system	Malfunction indicator lamp (On the instrument panel)	
	Swirl control valve control	Swirl control valve	
	A/F sensor 1 heater and heated oxygen sensor 2 heater control	A/F sensor 1 heater and heated oxygen sensor 2 heater	
	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve	
	Cooling fan control	Cooling fan relays	
	Air conditioning cut control	Air conditioner relay	
	ASCD vehicle speed control	Electric throttle control actuator	
		ON BOARD DIAGNOSIS for EVAP system	<ul style="list-style-type: none"> <li>● EVAP canister vent control valve</li> </ul>

\*1: These sensors are not used to control the engine system. They are used only for the on board diagnosis.

\*2: This sensor is not used to control the engine system under normal conditions.

\*3: These input signals are sent to the ECM through CAN communication line.



## Multiport Fuel Injection (MFI) System INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed* <sup>3</sup> and piston number	Fuel injection & mixture ratio control	Injector
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
PNP switch	Gear position		
Vehicle speed signal* <sup>2</sup>	Vehicle speed		
Ignition switch	Start signal		
Air conditioner switch	Air conditioner operation		
Knock sensor	Engine knocking condition		
Electrical load	Electrical load signal		
Battery	Battery voltage* <sup>3</sup>		
Power steering pressure sensor	Power steering operation		
Heated oxygen sensor 2* <sup>1</sup>	Density of oxygen in exhaust gas		

\*1: Under normal conditions, this sensor is not for engine control operation.

\*2: This signal is sent to the ECM through CAN communication line.

\*3: ECM determines the start signal status by the signals of engine speed and battery voltage.

### SYSTEM DESCRIPTION

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined by input signals (for engine speed and intake air) from both the camshaft position sensor and the mass air flow sensor.

### VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

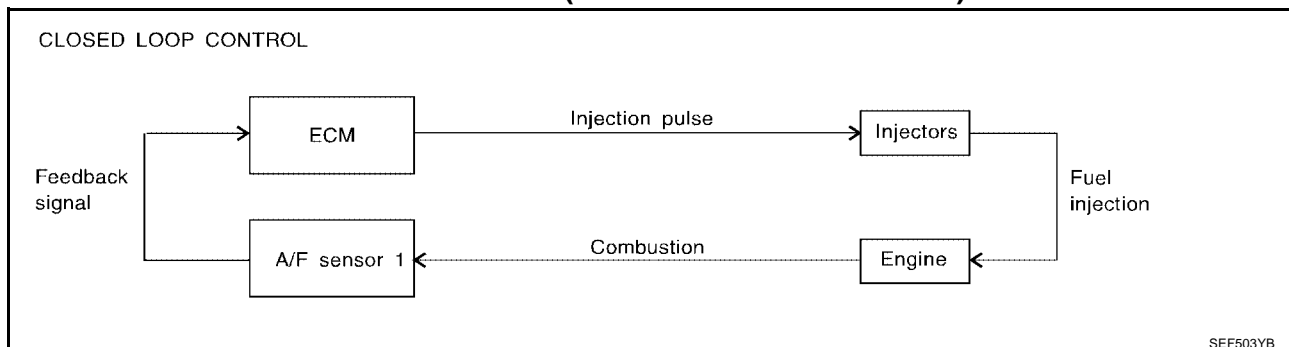
In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from "N" to "D" (A/T models only)
- High-load, high-speed operation

<Fuel decrease>

- During deceleration
- During high engine speed operation
- During high vehicle speed operation
- Extremely high engine coolant temperature

**MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)**

The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The three way catalyst can then better reduce CO, HC and NO<sub>x</sub> emissions. This system uses an air fuel ratio (A/F) sensor 1 in the exhaust manifold to monitor if the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about the air fuel ratio (A/F) sensor 1, refer to [EC-1033](#). This maintains the mixture ratio within the stoichiometric range (ideal air-fuel mixture).

This stage is referred to as the closed loop control condition.

Heated oxygen sensor 2 is located downstream of the three way catalyst. Even if the switching characteristics of the A/F sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from heated oxygen sensor 2.

**Open Loop Control**

The open loop system condition refers to when the ECM detects any of the following conditions. Feedback control stops in order to maintain stabilized fuel combustion.

- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of A/F sensor 1 or its circuit
- Insufficient activation of A/F sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- After shifting from “N” to “D” (A/T models)
- When starting the engine

**MIXTURE RATIO SELF-LEARNING CONTROL**

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from A/F sensor 1. This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. Both manufacturing differences (i.e., mass air flow sensor hot film) and characteristic changes during operation (i.e., injector clogging) directly affect mixture ratio.

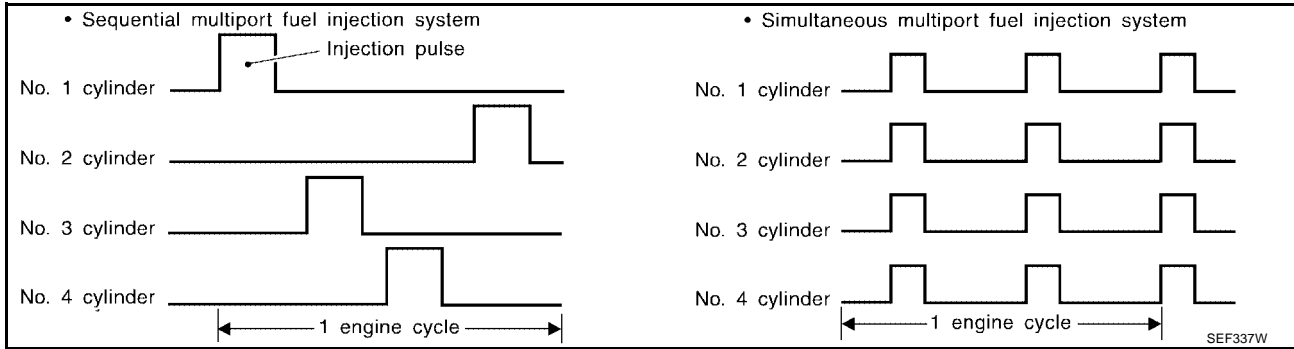
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of “injection pulse duration” to automatically compensate for the difference between the two ratios.

“Fuel trim” refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes short term fuel trim and long term fuel trim.

“Short term fuel trim” is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from A/F sensor 1 indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.

“Long term fuel trim” is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

## FUEL INJECTION TIMING



Two types of systems are used.

### Sequential Multiport Fuel Injection System

Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.

### Simultaneous Multiport Fuel Injection System

Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.

The four injectors will then receive the signals two times for each engine cycle.

This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

### FUEL SHUT-OFF

Fuel to each cylinder is cut off during deceleration or operation of the engine at excessively high speeds.

## Electronic Ignition (EI) System INPUT/OUTPUT SIGNAL CHART

UBS001QU

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed*2 and piston number	Ignition timing control	Power transistor
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Vehicle speed signal*1	Vehicle speed		
Knock sensor	Engine knocking		
PNP switch	Gear position		
Battery	Battery voltage*2		

\*1: This signal sent to the ECM through CAN communication line.

\*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

### SYSTEM DESCRIPTION

The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM. This data forms the map shown above.

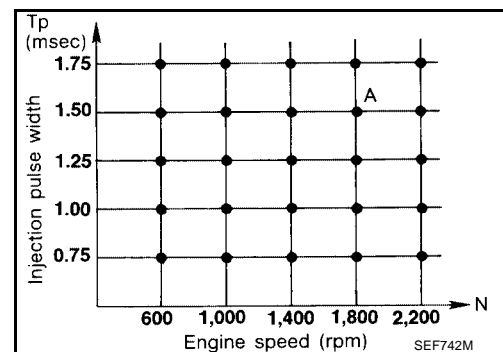
The ECM receives information such as the injection pulse width and camshaft position sensor signal. Computing this information, ignition signals are transmitted to the power transistor.

e.g., N: 1,800 rpm, Tp: 1.50 msec

A°BTDC

During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.

- At starting



- During warm-up
- At idle
- At low battery voltage
- During acceleration

The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not operate under normal driving conditions.

If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

## Air Conditioning Cut Control INPUT/OUTPUT SIGNAL CHART

*UBS001QV*

Sensor	Input Signal to ECM	ECM function	Actuator
Air conditioner switch	Air conditioner "ON" signal	Air conditioner cut control	Air conditioner relay
PNP switch	Neutral position		
Throttle position sensor	Throttle valve opening angle		
Accelerator pedal position sensor	Accelerator pedal position		
Camshaft position sensor (PHASE)	Engine speed* <sup>1</sup>		
Crankshaft position sensor (POS)			
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage* <sup>1</sup>		
Refrigerant pressure sensor	Refrigerant pressure		
Power steering pressure sensor	Power steering operation		

\*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

## SYSTEM DESCRIPTION

This system improves engine operation when the air conditioner is used. Under the following conditions, the air conditioner is turned off.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- When operating power steering during low engine speed or low vehicle speed.
- When engine speed is excessively low.
- When the refrigerant pressure is excessively high or low.

## Fuel Cut Control (at No Load & High Engine Speed) INPUT/OUTPUT SIGNAL CHART

*UBS001QW*

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed signal* <sup>1</sup>	Vehicle speed	Fuel cut control	Injectors
PNP switch	Neutral position		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS)	Engine speed		
Camshaft position sensor (PHASE)			

\*1: This signal is sent to the ECM through CAN communication line.

## SYSTEM DESCRIPTION

If the engine speed is above 2,500 rpm with no load, (for example, in Neutral and engine speed over 2,500 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed. Fuel cut will operate until the engine speed reaches 2,000 rpm, then fuel cut is cancelled.

**NOTE:**

This function is different from deceleration control listed under [EC-617, "Multiport Fuel Injection \(MFI\) System"](#).

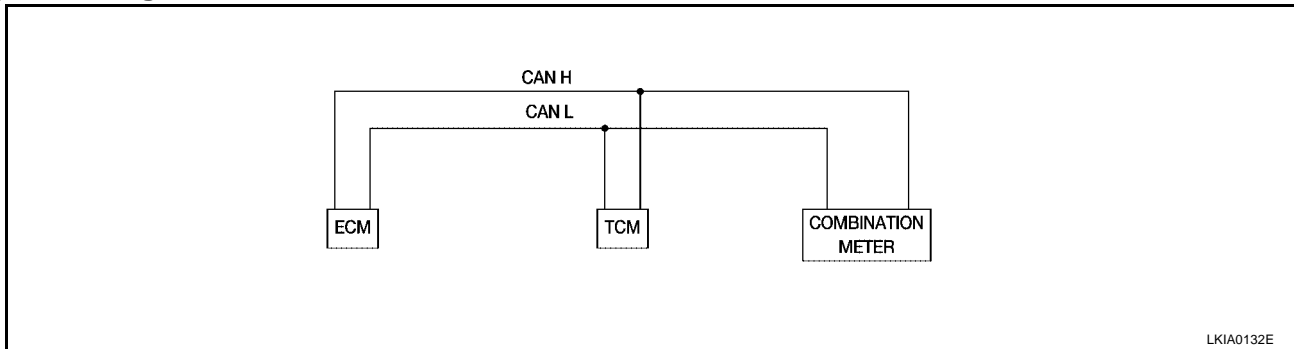
## CAN communication SYSTEM DESCRIPTION

UBS003W9

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

## MODELS WITH A/T

### System Diagram



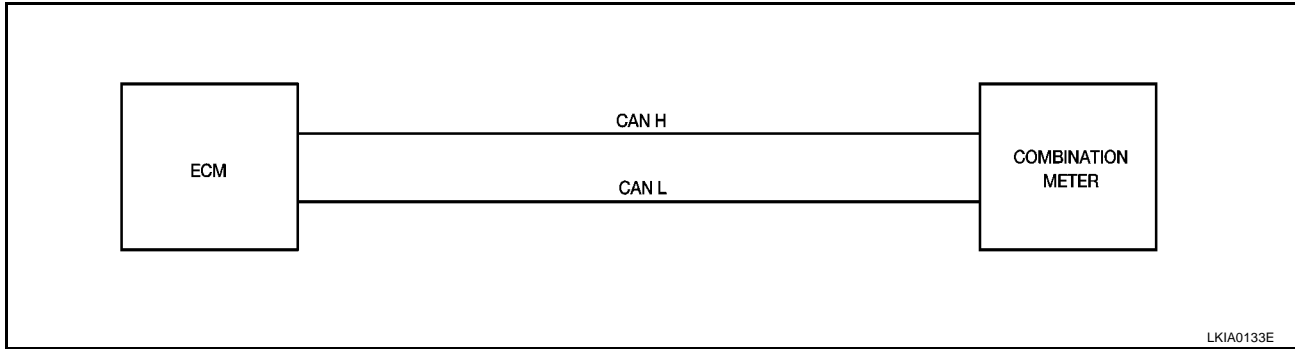
### Input/Output Signal Chart

T: Transmit R: Receive

Signals	ECM	TCM	Combination meter
Accelerator pedal position signal	T	R	
Output shaft revolution signal	R	T	
A/T self-diagnosis signal	R	T	
Closed throttle position signal	T	R	
Wide open throttle position signal	T	R	
Stop lamp switch signal		R	T
Overdrive control switch signal		R	T
O/D OFF indicator signal		T	R
Engine speed signal	T		R
Engine coolant temperature signal	T		R
Vehicle speed signal	R		T
Fuel level sensor signal	R		T
Malfunction indicator lamp signal	T		R
ASCD SET lamp signal	T		R
ASCD CRUISE lamp signal	T		R

**MODELS WITH M/T**

**System Diagram**



**Input/Output Signal Chart**

T: Transmit R: Receive

Signals	ECM	Combination meter
Engine speed signal	T	R
Engine coolant temperature signal	T	R
Vehicle speed signal	R	T
Fuel level sensor signal	R	T
Malfunction indicator lamp signal	T	R
ASCD SET lamp signal	T	R
ASCD CRUISE lamp signal	T	R

### BASIC SERVICE PROCEDURE

#### Idle Speed and Ignition Timing Check IDLE SPEED

##### Using CONSULT-II

##### With CONSULT-II

Check idle speed in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

##### With GST

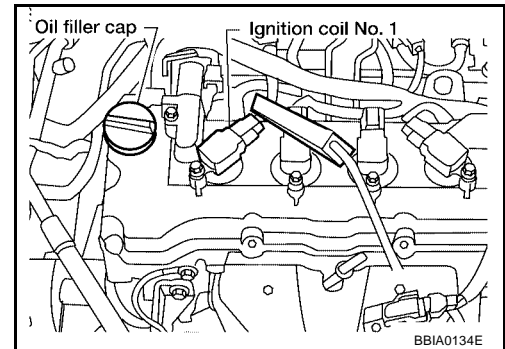
Check idle speed in "MODE 1" with GST.

#### IGNITION TIMING

Any of following two methods may be used.

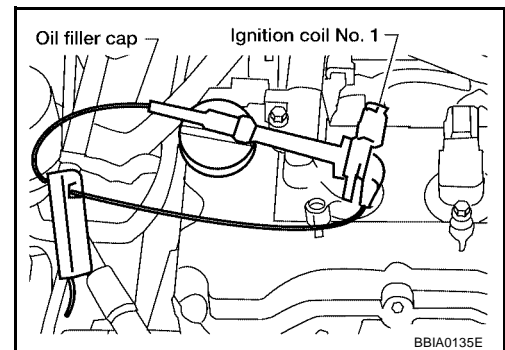
##### Method A

1. Slide the harness protector off ignition coil No. 1 to clear the wires.
2. Attach timing light to the wires as shown in the figure.
3. Check ignition timing.



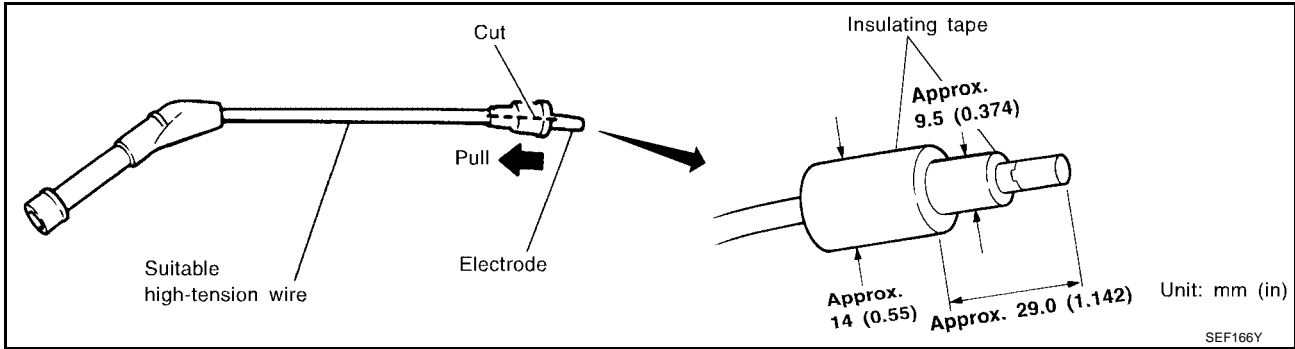
##### Method B

1. Remove No. 1 ignition coil.

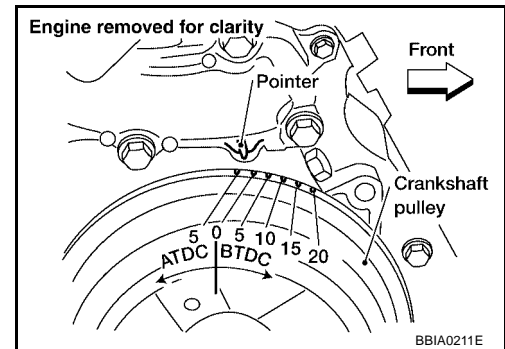


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- Connect No. 1 ignition coil and No. 1 spark plug with suitable high-tension wire as shown, and attach timing light clamp to this wire.



- Check ignition timing.



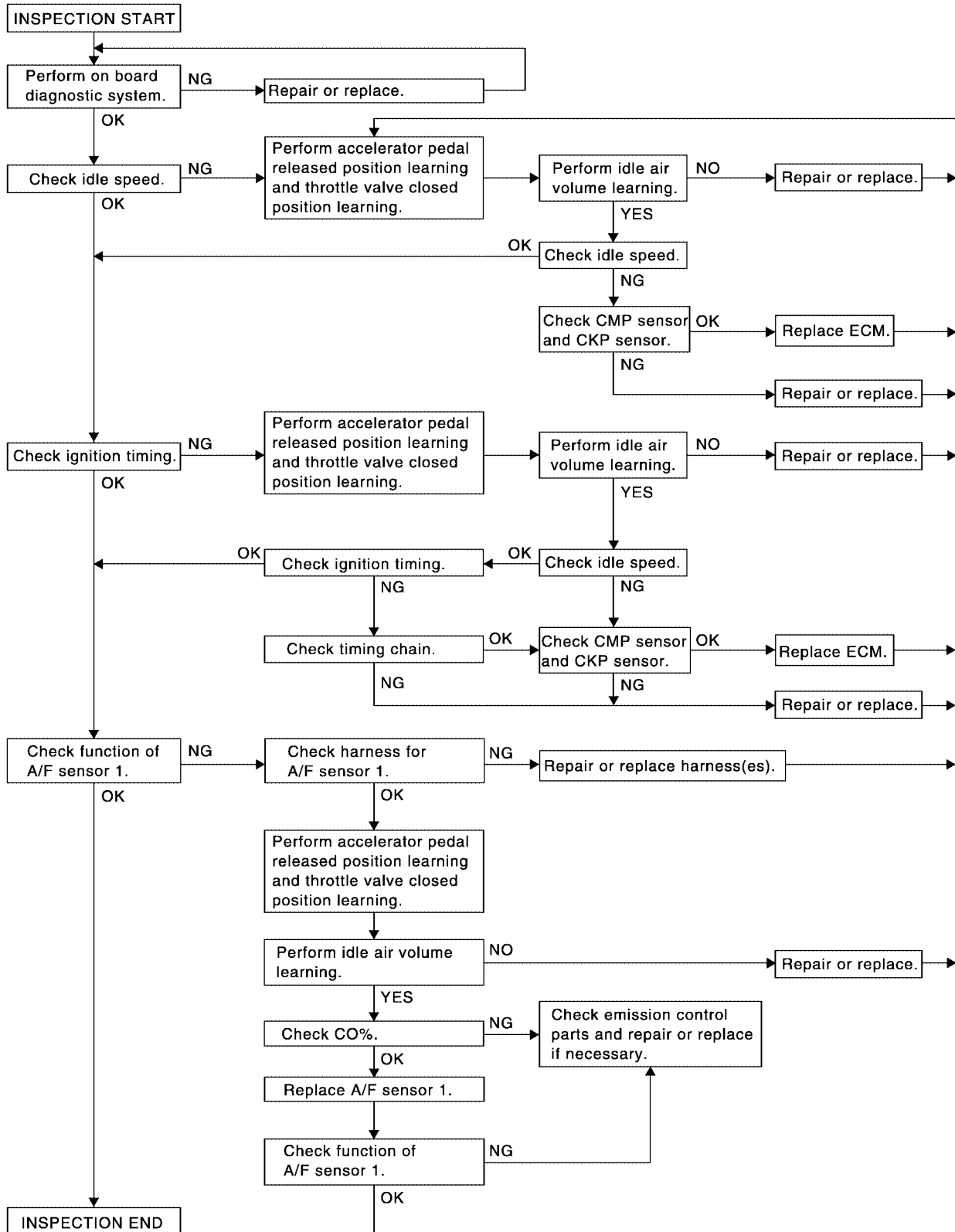
### Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment

UBS001QY

- PREPARATION**
- Make sure that the following parts are in good order.
    - Battery
    - Ignition system
    - Engine oil and coolant levels
    - Fuses
    - ECM harness connector
    - Vacuum hoses
    - Air intake system (Oil filler cap, oil level gauge, etc.)
    - Fuel pressure
    - Engine compression
    - Throttle valve
    - EVAP system
  - On models equipped with air conditioner, checks should be carried out while the air conditioner is "OFF".
  - On models equipped with automatic transaxle, when checking idle speed, ignition timing and mixture ratio, checks should be carried out while shift lever is in "P" or "N" position.
  - When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.
  - Turn off headlamps, heater blower, rear window defogger.
  - Keep front wheels pointed straight ahead.
  - Make the check after the cooling fan has stopped.



## OVERALL INSPECTION SEQUENCE



**NOTE:**

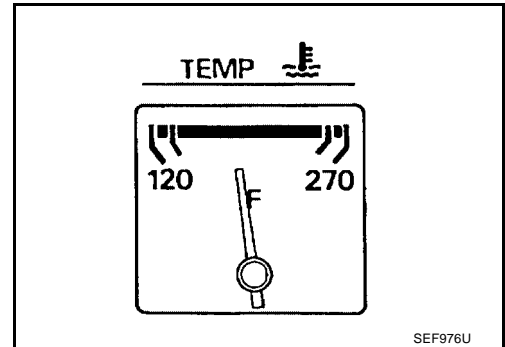
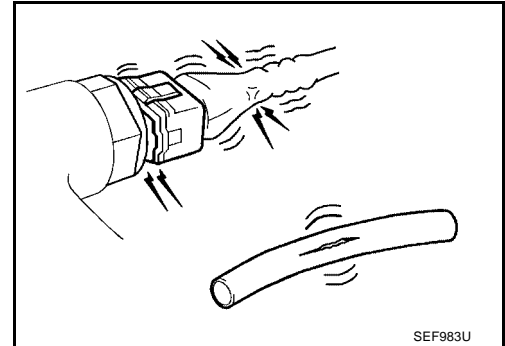
If a vehicle contains a part which is operating outside of design specifications with no MIL illumination, the part shall not be replaced prior to emission testing unless it is determined that the part has been tampered with or abused in such a way that the diagnostic system cannot reasonably be expected to detect the resulting malfunction.

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## INSPECTION PROCEDURE

### 1. INSPECTION START

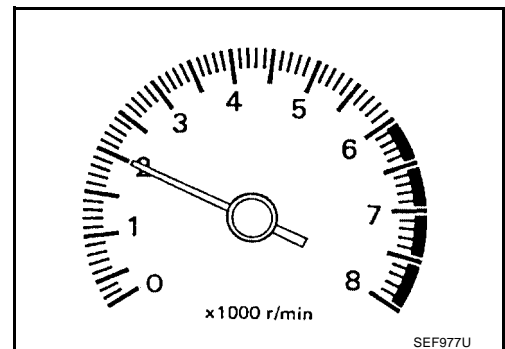
1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
  - Harness connectors for improper connections
  - Wiring harness for improper connections, pinches and cut
  - Vacuum hoses for splits, kinks and improper connections
  - Hoses and ducts for leaks
  - Air cleaner clogging
  - Gasket
  - Throttle valve and throttle position sensor operation
3. Confirm that electrical or mechanical loads are not applied.
  - Headlamp switch is OFF.
  - Air conditioner switch is OFF.
  - Rear window defogger switch is OFF.
  - Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge. Ensure engine stays below 1,000 rpm.



5. Run engine at about 2,000 rpm for about 2 minutes under no-load.
6. Make sure that no DTC is displayed with CONSULT-II or GST.

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. REPAIR OR REPLACE

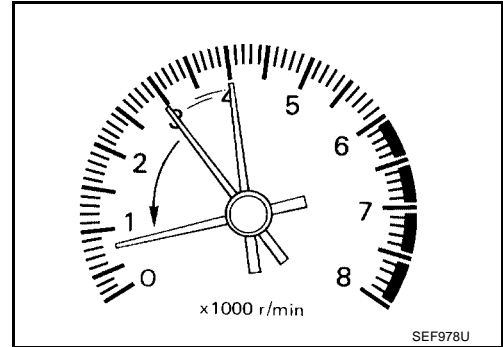
Repair or replace components as necessary according to corresponding "Diagnostic Procedure".

>> GO TO 3.

**3. CHECK TARGET IDLE SPEED**

**With CONSULT-II**

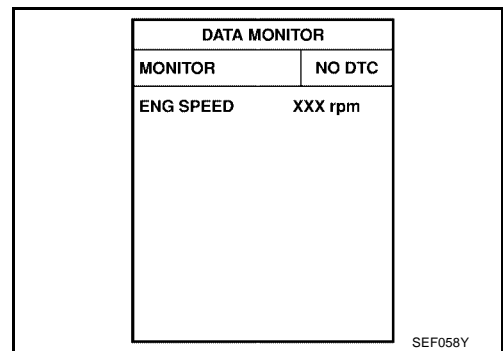
1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.



3. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**



**Without CONSULT-II**

1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.
3. Check idle speed.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

**OK or NG**

- OK >> GO TO 10.
- NG >> GO TO 4.

**4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING**

1. Stop engine.
2. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#).

>> GO TO 5.

**5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING**

Perform [EC-634, "Throttle Valve Closed Position Learning"](#).

>> GO TO 6.

## 6. PERFORM IDLE AIR VOLUME LEARNING

---

Perform [EC-635, "Idle Air Volume Learning"](#) .

Is Idle Air Volume Learning carried out successfully?

Yes or No

Yes >> GO TO 7.

No >> 1. Follow the construction of "Idle Air Volume Learning".  
2. GO TO 4.

## 7. CHECK TARGET IDLE SPEED AGAIN

---

### Ⓟ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

### ⓧ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

OK or NG

OK >> GO TO 10.

NG >> GO TO 8.

## 8. DETECT MALFUNCTIONING PART

---

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-842](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-836](#) .

OK or NG

OK >> GO TO 9.

NG >> 1. Repair or replace.  
2. GO TO 4.

## 9. CHECK ECM FUNCTION

---

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a incident, but this is the rarely the case.)

>> GO TO 4.

## 10. CHECK IGNITION TIMING

---

1. Run engine at idle.
2. Check ignition timing with a timing light.

**M/T: 7 ± 5° BTDC**

**A/T: 18 ± 5° BTDC (in "P" or "N" position)**

OK or NG

OK (With CONSULT-II)>>GO TO 19.

OK (Without CONSULT-II)>>GO TO 20.

NG >> GO TO 11.

**11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING**

1. Stop engine.
2. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 12.

**12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING**

Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 13.

**13. PERFORM IDLE AIR VOLUME LEARNING**

Perform [EC-635, "Idle Air Volume Learning"](#) .

**Is Idle Air Volume Learning carried out successfully?**

Yes or No

- Yes >> GO TO 14.  
 No >> 1. Follow the construction of "Idle Air Volume Learning".  
 2. GO TO 4.

**14. CHECK TARGET IDLE SPEED AGAIN**

 **With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

 **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

OK or NG

- OK >> GO TO 15.  
 NG >> GO TO 17.

**15. CHECK IGNITION TIMING AGAIN**

1. Run engine at idle.
2. Check ignition timing with a timing light.

**M/T: 7 ± 5° BTDC**

**A/T: 18 ± 5° BTDC (in "P" or "N" position)**

OK or NG

- OK (With CONSULT-II)>>GO TO 19.  
 NG >> GO TO 16.

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## 16. CHECK TIMING CHAIN INSTALLATION

---

Check timing chain installation. Refer to [EM-45](#) .

OK or NG

- OK >> GO TO 17.  
NG >> 1. Repair the timing chain installation.  
2. GO TO 4.

---

## 17. DETECT MALFUNCTIONING PART

---

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-842](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-836](#) .

OK or NG

- OK >> GO TO 18.  
NG >> 1. Repair or replace.  
2. GO TO 4.

---

## 18. CHECK ECM FUNCTION

---

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a incident, but this is the rarely the case.)

>> GO TO 4.

---

## 19. CHECK AIR FUEL RATIO (A/F) SENSOR 1 FUNCTION

---

 **With CONSULT-II**

1. Turn off the ignition key and keep the key off more than 10 seconds.
2. Start engine and warm it up to normal operating temperature.
3. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in “D” position with “OD” OFF (A/T) or 4th position (M/T).

**NOTE:**

Keep the accelerator pedal as steady as possible during the cruising.

4. Set “OD” ON, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

**NOTE:**

Never apply brake during releasing the accelerator pedal.

5. Repeat steps 2 to 3 five times.
6. Stop the vehicle and connect CONSULT-II to the vehicle.
7. Make sure that no 1st trip DTC is displayed in “SELF-DIAG RESULTS” mode.

OK or NG

- OK >> **INSPECTION END**  
NG >> GO TO 21.

**20. CHECK AIR FUEL RATIO (A/F) SENSOR 1 FUNCTION**

⊗ **Without CONSULT-II**

1. Turn off the ignition key and keep the key off more than 10 seconds.
2. Start engine and warm it up to normal operating temperature.
3. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in "D" position with "OD" OFF (A/T) or 4th position (M/T).

**NOTE:**

Keep the accelerator pedal as steady as possible during the cruising.

4. Set "OD" ON, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

**NOTE:**

Never apply brake during releasing the accelerator pedal.

5. Repeat steps 2 to 3 five times.
6. Stop the vehicle and turn ignition switch "OFF".
7. Stop vehicle and connect GST to the vehicle.
8. Make sure that no DTC is displayed.

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 21.

**21. CHECK AIR FUEL RATIO (A/F) SENSOR 1 (BANK 1) HARNESS**

1. Turn ignition switch "OFF" and disconnect battery ground cable.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

ECM Terminal	A/F sensor 1 terminal
16	1
35	5
56	6
75	2

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 22.
- NG >> 1. Repair or replace harness between ECM and A/F sensor 1.  
2. GO TO 4.

**22. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING**

1. Reconnect ECM harness connector.
2. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 23.

**23. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING**

Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 24.

## 24. PERFORM IDLE AIR VOLUME LEARNING

Refer to [EC-635, "Idle Air Volume Learning"](#) .

Is Idle Air Volume Learning carried out successfully?

Yes or No

Yes (With CONSULT-II)>>GO TO 25.

Yes (Without CONSULT-II)>>GO TO 26.

No >> 1. Follow the construction of "Idle Air Volume Learning".  
2. GO TO 4.

## 25. CHECK "CO"%

### Ⓜ With CONSULT-II

1. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
2. Turn ignition switch "OFF", wait at least 10 seconds and then turn "ON".
3. Select "ENG COOLANT TEMP" in "ACTIVE TEST" mode.
4. Set "ENG COOLANT TEMP" to 5°C (41°F) by touching "DWN" and "Qd".
5. Start engine and rev it (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.
6. Check "CO"%.

**Idle CO: 3 – 11% and engine runs smoothly.**

OK or NG

OK >> GO TO 28.

NG >> GO TO 27.

ACTIVE TEST	
ENG COOLANT TEMP	XXX °C
MONITOR	
ENG SPEED	XXX rpm
INJ PULSE-B1	XXX msec
IGN TIMING	XXX BTDC

SEF172Y

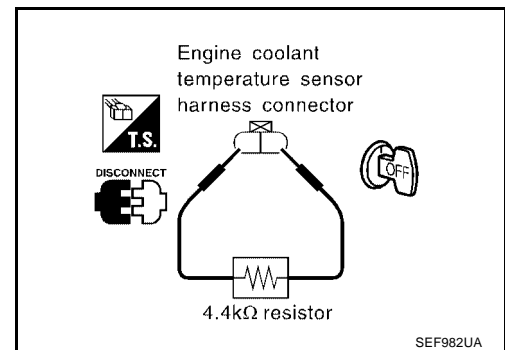
## 26. CHECK "CO"%

### ⊗ Without CONSULT-II

1. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge.
2. Turn ignition switch "OFF".
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect a resistor (4.4 kΩ) between terminals of engine coolant temperature sensor harness connector.
5. Start engine and rev it (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.
6. Check "CO"%.

**Idle CO: 3 – 11% and engine runs smoothly.**

7. After checking "CO"% , turn ignition switch "OFF", disconnect the resistor from the terminals of engine coolant temperature sensor harness connector, and then connect engine coolant temperature sensor harness connector to engine coolant temperature sensor.



OK or NG

OK >> GO TO 28.

NG >> GO TO 27.

## 27. RECONNECT AIR FUEL RATIO (A/F) SENSOR 1 HARNESS CONNECTOR

1. Turn ignition switch "OFF".
2. Reconnect A/F sensor 1 harness connector.

>> GO TO 31.



**28. REPLACE HEATED OXYGEN SENSOR 1**

1. Stop engine.
2. Replace A/F sensor 1.

With CONSULT-II>>GO TO 29.  
Without CONSULT-II>>GO TO 30.

**29. CHECK AIR FUEL RATIO (A/F) SENSOR 1 FUNCTION**

**Ⓜ With CONSULT-II**

1. Turn off the ignition key and keep the key off more than 10 seconds.
2. Start engine and warm it up to normal operating temperature.
3. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in “D” position with “OD” OFF (A/T) or 4th position (M/T).

**NOTE:**

Keep the accelerator pedal as steady as possible during the cruising.

4. Set “OD” ON, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

**NOTE:**

Never apply brake during releasing the accelerator pedal.

5. Repeat steps 2 to 3 five times.
6. Stop the vehicle and connect CONSULT-II to the vehicle.
7. Make sure that no 1st trip DTC is displayed in “SELF-DIAG RESULTS” mode.

OK or NG

- OK >> GO TO 4.  
NG >> GO TO 31.

**30. CHECK AIR FUEL RATIO (A/F) SENSOR 1 FUNCTION**

**ⓧ Without CONSULT-II**

1. Turn off the ignition key and keep the key off more than 10 seconds.
2. Start engine and warm it up to normal operating temperature.
3. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in “D” position with “OD” OFF (A/T) or 4th position (M/T).

**NOTE:**

Keep the accelerator pedal as steady as possible during the cruising.

4. Set “OD” ON, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

**NOTE:**

Never apply brake during releasing the accelerator pedal.

5. Repeat steps 2 to 3 five times.
6. Stop the vehicle and turn ignition switch “OFF”.
7. Stop vehicle and connect GST to the vehicle.
8. Make sure that no DTC is displayed.

OK or NG

- OK >> GO TO 4.  
NG >> GO TO 31.

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## 31. DETECT MALFUNCTIONING PART

Check the following.

- Check fuel pressure regulator and repair or replace if necessary. Refer to [EC-637, "Fuel Pressure Check"](#).
- Check mass air flow sensor and its circuit, and repair or replace if necessary. Refer to [EC-740](#) , [EC-748](#) and [EC-940](#) .
- Check injector and its circuit, and repair or replace if necessary. Refer to [EC-1168](#) .
- Check engine coolant temperature sensor and its circuit, and repair or replace if necessary. Refer to [EC-760](#) and [EC-772](#) .

OK or NG

OK >> GO TO 33.

NG >> 1. Repair or replace.

2. GO TO 32.

## 32. ERASE UNNECESSARY DTC

After this inspection, unnecessary DTC might be displayed.

Erase the stored memory in ECM and TCM. Refer to [EC-651, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) and [AT-40](#) .

>> GO TO 4.

## 33. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a incident, but this is the rarely the case.)

>> GO TO 4.

### Accelerator Pedal Released Position Learning DESCRIPTION

UBS006IE

"Accelerator Pedal Released Position Learning" is an operation to learn the fully released position of the accelerator pedal by monitoring the accelerator pedal position sensor output signal. It must be performed each time harness connector of accelerator pedal position sensor or ECM is disconnected.

#### OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch "ON" and wait at least 2 seconds.
3. Turn ignition switch "OFF" wait at least 10 seconds.
4. Turn ignition switch "ON" and wait at least 2 seconds.
5. Turn ignition switch "OFF" wait at least 10 seconds.

### Throttle Valve Closed Position Learning DESCRIPTION

UBS001QZ

"Throttle Valve Closed Position Learning" is an operation to learn the fully closed position of the throttle valve by monitoring the throttle position sensor output signal. It must be performed each time harness connector of electric throttle control actuator of ECM is disconnected.

#### OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch "ON".
3. Turn ignition switch "OFF" wait at least 10 seconds.  
Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

### Idle Air Volume Learning DESCRIPTION

“Idle Air Volume Learning” is an operation to learn the idle air volume that keeps each engine within the specific range. It must be performed under any of the following conditions:

- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

### PREPARATION

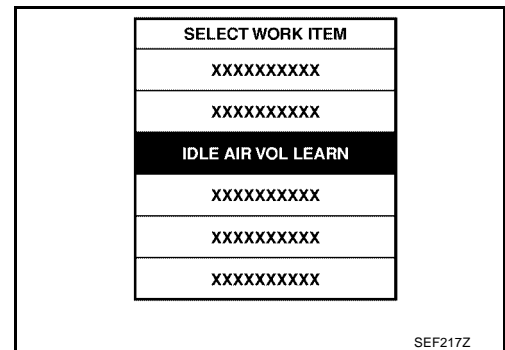
Before performing “Idle Air Volume Learning”, make sure that all of the following conditions are satisfied. Learning will be cancelled if any of the following conditions are missed for even a moment.

- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 95°C (158 - 203°F)
- PNP switch: ON
- Electric load switch: OFF  
(Air conditioner, headlamp, rear window defogger)  
**On vehicles equipped with daytime light systems, set lighting switch to the 1st position to light only small lamps.**
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up  
For models with CONSULT-II, drive vehicle until “FLUID TEMP SE” in “DATA MONITOR” mode of “A/T” system indicates less than 0.9V.  
For models without CONSULT-II, drive vehicle for 10 minutes.

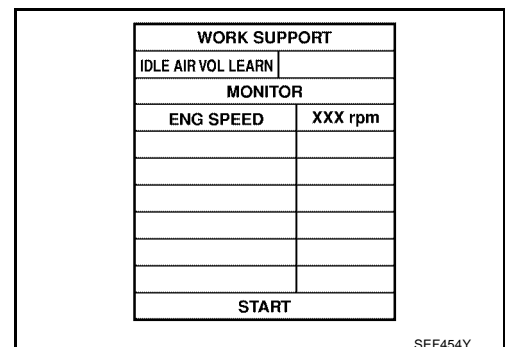
### OPERATION PROCEDURE

#### ④ With CONSULT-II

1. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .
2. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic PREPARATION” (previously mentioned) are in good order.
5. Select “IDLE AIR VOL LEARN” in “WORK SUPPORT” mode.



6. Touch “START” and wait 20 seconds.



# BASIC SERVICE PROCEDURE

[QG18DE (SULEV)]

7. Make sure that "CMPLT" is displayed on CONSULT-II screen. If "CMPLT" is not displayed, "Idle Air Volume Learning" will not be carried out successfully. In this case, find the cause of the incident by referring to the "Diagnostic Procedure" below.
8. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.

WORK SUPPORT	
IDLE AIR VOL LEARN	CMPLT
MONITOR	
ENG SPEED	XXX rpm
START	

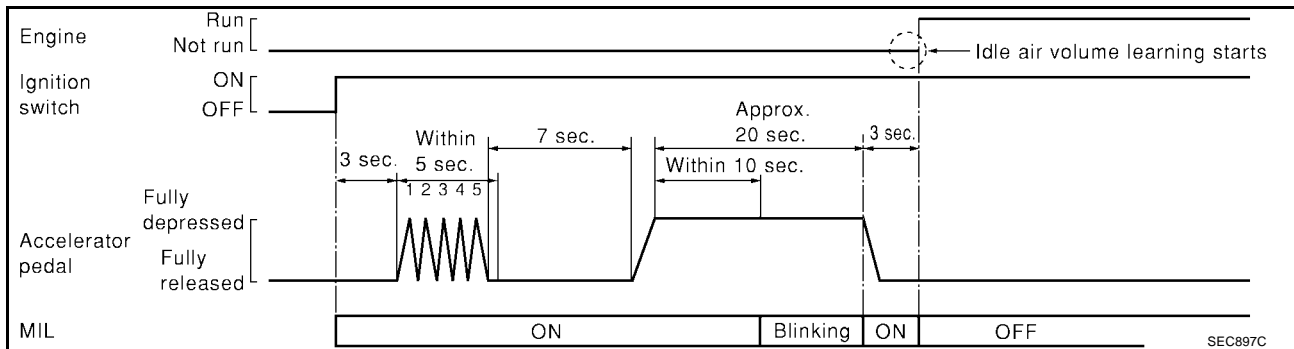
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ITEM	SPECIFICATION
Idle speed	M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)
Ignition timing	M/T: 7±5° BTDC A/T: 18±5° BTDC (in "P" or "N" position)

**⊗ Without CONSULT-II**

**NOTE:**

- It is better to count the time accurately with a clock.
  - It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.
1. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .
  2. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
  3. Start engine and warm it up to normal operating temperature.
  4. Check that all items listed under the topic "PREPARATION" (previously mentioned) are in good order.
  5. Turn ignition switch "OFF" and wait at least 10 seconds.
  6. Confirm that accelerator pedal is fully released, turn ignition switch "ON" and wait 3 seconds.
  7. Repeat the following procedure quickly five times within 5 seconds.
    - a. Fully depress the accelerator pedal.
    - b. Fully release the accelerator pedal.
  8. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MIL stops blinking and turned ON.
  9. Fully release the accelerator pedal within 3 seconds after the MIL goes off.
  10. Start engine and let it idle.
  11. Wait 20 seconds.



12. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.

ITEM	SPECIFICATION
Idle speed	M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)
Ignition timing	M/T: 7±5° BTDC A/T: 18±5° BTDC (in "P" or "N" position)

13. If idle speed and ignition timing are not within the specification, the result will be incomplete. In this case, find the cause of the incident by referring to the "Diagnostic Procedure" below.

## DIAGNOSTIC PROCEDURE

If idle air volume learning cannot be performed successfully, proceed as follows:

1. Check that throttle valve is fully closed.
2. Check PCV valve operation.
3. Check that downstream of throttle valve is free from air leakage.
4. When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.  
It is useful to perform [EC-716, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE"](#).
5. If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform "Idle air volume learning" all over again:
  - Engine stalls.
  - Erroneous idle.

## Fuel Pressure Check

### FUEL PRESSURE RELEASE

UBS001R0

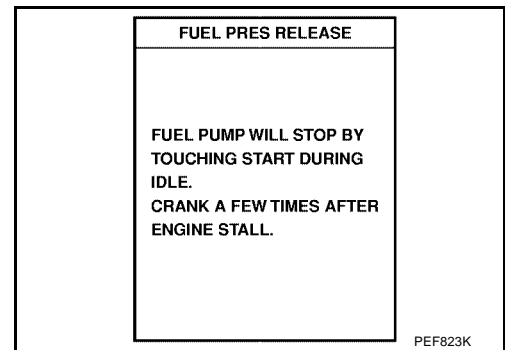
Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.

#### NOTE:

Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because B15 models do not have fuel return system.

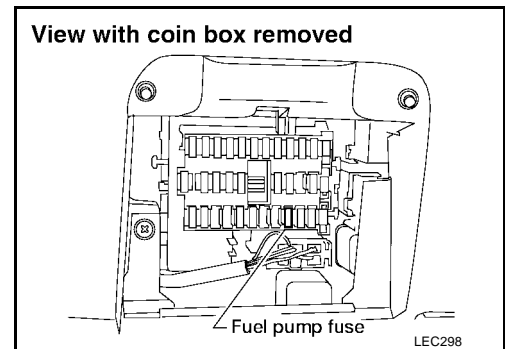
#### Ⓟ With CONSULT-II

1. Start engine.
2. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT-II.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch "OFF".



#### ⓧ Without CONSULT-II

1. Remove fuse for fuel pump.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch "OFF" and reconnect fuel pump fuse.



### FUEL PRESSURE CHECK

- When reconnecting fuel line, always use new clamps.
- Make sure that clamp screws do not contact adjacent parts.
- Use a torque driver to tighten clamps.
- Use Fuel Pressure Gauge Kit J-44321 to check fuel pressure.
- Do not perform fuel pressure check with electrical systems operating (i.e. lights, rear defogger, A/C switch, etc.). Fuel pressure gauge may indicate false readings due to varying engine loads and changes in manifold vacuum.

1. Release fuel pressure to zero.
2. Disconnect fuel hose from fuel feed tube (engine side) using fuel tube quick connect removal tool.
3. Release quick connector and disconnect fuel hose from fuel feed tube (underbody side). Remove fuel hose assembly.

**CAUTION:**

**Do not install hose clamps over flared portions of fuel feed tubes or damage to fuel feed tubes may result.**

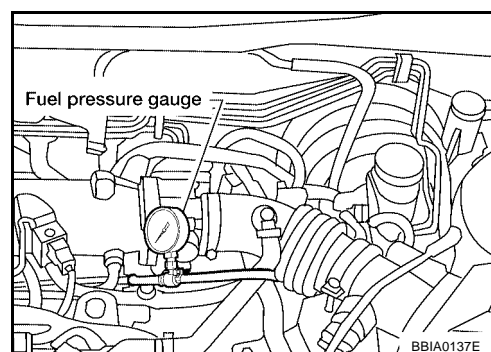
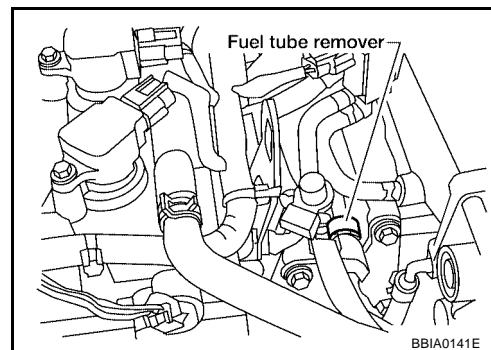
4. Install fuel pressure gauge from kit J-44321 between fuel tubes using hose and clamps from kit.
5. Turn ignition switch "ON" and check for fuel leakage.
6. Start engine and read the indication on fuel pressure gauge.

**At idle speed:**

**Approximately 350 kPa (3.57 kg/cm<sup>2</sup> , 51 psi)**

If results are unsatisfactory, check for fuel leakage in fuel line between fuel tank and injector, and check fuel filter for clogging.

If fuel line and fuel filter are OK, replace fuel pressure regulator. Refer to [EC-1168](#) .



## ON BOARD DIAGNOSTIC (OBD) SYSTEM

PFP:00028

### Introduction

UBS001R1

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information	SAE Mode
Diagnostic Trouble Code (DTC)	Mode 3 of SAE J1979
Freeze Frame data	Mode 2 of SAE J1979
System Readiness Test (SRT) code	Mode 1 of SAE J1979
1st Trip Diagnostic Trouble Code (1st Trip DTC)	Mode 7 of SAE J1979
1st Trip Freeze Frame data	
Test values and Test limits	Mode 6 of SAE J1979
Carbration ID	Mode 9 of SAE J1979

The above information can be checked using procedures listed in the table below.

X: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT code	Test value
CONSULT-II	×	×	×	×	×	—
GST	×	×*1	×	—	×	×
ECM	×	×*2	—	—	—	—

\*1: 1st trip DTCs for self-diagnoses concerning SRT items cannot be shown on the GST display.

\*2: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other.

The malfunction indicator lamp (MIL) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to [EC-668](#) )

### Two Trip Detection Logic

UBS001R2

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MIL will not light up at this stage. <1st trip>

If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MIL lights up. The MIL lights up at the same time as when the DTC is stored. <2nd trip> The “trip” in the “Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation. Specific on board diagnostic items will cause the ECM to light up or blink the MIL, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

X: Applicable —: Not applicable

Items	MIL				DTC		1st trip DTC	
	1st trip		2nd trip		1st trip displaying	2nd trip displaying	1st trip displaying	2nd trip displaying
	Blinking	Lighting up	Blinking	Lighting up				
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	×	—	—	—	—	—	×	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	—	—	×	—	—	×	—	—
One trip detection diagnoses (Refer to <a href="#">EC-1008</a> )	—	×	—	—	×	—	×	—
Except above	—	—	—	×	—	×	×	—

When there is an open circuit on MIL circuit, the ECM can not warn the driver by lighting MIL up when there is malfunction on engine control system.

Therefore, when electrical controlled throttle and part of ECM related diagnoses is continuously detected as NG for 5-trips, ECM warns the driver that engine control system has trouble and MIL circuit is open by means of operating fail-safe function.

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

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The fail-safe function also operate when above diagnoses except MIL circuit and demands the driver to repair the malfunction.

Engine operating condition in fail-safe mode

Engine speed will not rise more then 2,500 rpm due to the fuel cut.

## Emission-related Diagnostic Information EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

UBS001R3

X: Applicable —: Not applicable

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST*2	ECM*3				
CAN COMM CIRCUIT	U1000	1000*7	—	—	—	<a href="#">EC-728</a>
CAN COMM CIRCUIT	U1001	1001*7	—	—	×	<a href="#">EC-728</a>
<b>NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.</b>	<b>P0000</b>	0000	—	—	—	—
INT/V TIMING CONT	P0011	0011	—	—	×	<a href="#">EC-731</a>
HO2S2 HTR (B1)	P0037	0037	×	×	×*5	<a href="#">EC-734</a>
HO2S2 HTR (B1)	P0038	0038	×	×	×*5	<a href="#">EC-734</a>
MAF SEN/CIRCUIT	P0101	0101	—	—	—	<a href="#">EC-740</a>
MAF SEN/CIRCUIT	P0102	0102	—	—	—	<a href="#">EC-748</a>
MAF SEN/CIRCUIT	P0103	0103	—	—	—	<a href="#">EC-748</a>
IAT SEN/CIRCUIT	P0112	0112	—	—	×	<a href="#">EC-755</a>
IAT SEN/CIRCUIT	P0113	0113	—	—	×	<a href="#">EC-755</a>
ECT SEN/CIRC	P0117	0117	—	—	—	<a href="#">EC-760</a>
ECT SEN/CIRC	P0118	0118	—	—	—	<a href="#">EC-760</a>
TP SEN2/CIRC	P0122	0122	—	—	—	<a href="#">EC-765</a>
TP SEN2/CIRC	P0123	0123	—	—	—	<a href="#">EC-765</a>
ECT SEN/CIRC	P0125	0125	—	—	—	<a href="#">EC-772</a>
IAT SEN/CIRCUIT	P0127	0127	—	—	×	<a href="#">EC-775</a>
THERMSTAT FNCTN	P0128	0128	—	—	×	<a href="#">EC-778</a>
HO2S2 (B1)	P0138	0138	×	×	×*5	<a href="#">EC-780</a>
HO2S2 (B1)	P0139	0139	×	×	×*5	<a href="#">EC-787</a>
FUEL SYS-LEAN-B1	P0171	0171	—	—	×	<a href="#">EC-795</a>
FUEL SYS-RICH-B1	P0172	0172	—	—	×	<a href="#">EC-802</a>
FTT SENSOR	P0181	0181	—	—	×	<a href="#">EC-809</a>
FTT SEN/CIRCUIT	P0182	0182	—	—	×	<a href="#">EC-814</a>
FTT SEN/CIRCUIT	P0183	0183	—	—	×	<a href="#">EC-814</a>
TP SEN 1/CIRC	P0222	0222	—	—	—	<a href="#">EC-818</a>
TP SEN 1/CIRC	P0223	0223	—	—	—	<a href="#">EC-818</a>
MULTI CYL MISFIRE	P0300	0300	—	—	×	<a href="#">EC-825</a>
CYL 1 MISFIRE	P0301	0301	—	—	×	<a href="#">EC-825</a>
CYL 2 MISFIRE	P0302	0302	—	—	×	<a href="#">EC-825</a>
CYL 3 MISFIRE	P0303	0303	—	—	×	<a href="#">EC-825</a>
CYL 4 MISFIRE	P0304	0304	—	—	×	<a href="#">EC-825</a>
KNOCK SEN/CIRC-B1	P0327	0327	—	—	×	<a href="#">EC-832</a>
KNOCK SEN/CIRC-B1	P0328	0328	—	—	×	<a href="#">EC-832</a>
CKP SEN/CIRCUIT	P0335	0335	—	—	×	<a href="#">EC-836</a>



# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QG18DE (SULEV)]

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST*2	ECM*3				
CMP SEN/CIRCUIT	P0340	0340	—	—	×	<a href="#">EC-842</a>
TW CATALYST SYS-B1	P0420	0420	×	×	×*5	<a href="#">EC-848</a>
EVAP PURG FLOW/MON	P0441	0441	×	×	×*5	<a href="#">EC-852</a>
EVAP SMALL LEAK	P0442	0442	×	×	×*5	<a href="#">EC-858</a>
PURG VOLUME CONT/V	P0444	0444	—	—	×	<a href="#">EC-867</a>
PURG VOLUME CONT/V	P0445	0445	—	—	×	<a href="#">EC-867</a>
VENT CONTROL VALVE	P0447	0447	—	—	×	<a href="#">EC-873</a>
EVAPO SYS PRES SEN	P0452	0452	—	—	×	<a href="#">EC-880</a>
EVAPO SYS PRES SEN	P0453	0453	—	—	×	<a href="#">EC-886</a>
EVAP GROSS LEAK	P0455	0455	—	×	×*5	<a href="#">EC-893</a>
EVAP VERY SML LEAK	P0456	0456	×*4	—	×*5	<a href="#">EC-901</a>
FUEL LEV SEN SLOSH	P0460	0460	—	—	×	<a href="#">EC-910</a>
FUEL LEVEL SENSOR	P0461	0461	—	—	×	<a href="#">EC-912</a>
FUEL LEVEL SEN/CIRC	P0462	0462	—	—	×	<a href="#">EC-914</a>
FUEL LEVEL SEN/CIRC	P0463	0463	—	—	×	<a href="#">EC-914</a>
VEH SPEED SEN/CIRC*6	P0500	0500	—	—	×	<a href="#">EC-916</a>
ISC SYSTEM/CIRC	P0506	0506	—	—	×	<a href="#">EC-918</a>
ISC SYSTEM/CIRC	P0507	0507	—	—	×	<a href="#">EC-920</a>
PW ST P SEN/CIRC	P0550	0550	—	—	×	<a href="#">EC-922</a>
ECM	P0605	0605	—	—	×	<a href="#">EC-927</a>
PNP SW/CIRC	P0705	0705	—	—	×	<a href="#">AT-116</a>
ATF TEMP SEN/CIRC	P0710	0710	—	—	×	<a href="#">AT-121</a>
VEH SPD SEN/CIR AT*6	P0720	0720	—	—	×	<a href="#">AT-127</a>
ENGINE SPEED SIG	P0725	0725	—	—	×	<a href="#">AT-132</a>
A/T 1ST GR FNCTN	P0731	0731	—	—	×	<a href="#">AT-136</a>
A/T 2ND GR FNCTN	P0732	0732	—	—	×	<a href="#">AT-141</a>
A/T 3RD GR FNCTN	P0733	0733	—	—	×	<a href="#">AT-146</a>
A/T 4TH GR FNCTN	P0734	0734	—	—	×	<a href="#">AT-151</a>
TCC SOLENOID/CIRC	P0740	0740	—	—	×	<a href="#">AT-160</a>
A/T TCC S/V FNCTN	P0744	0744	—	—	×	<a href="#">AT-164</a>
L/PRESS SOL/CIRC	P0745	0745	—	—	×	<a href="#">AT-174</a>
SFT SOL A/CIRC	P0750	0750	—	—	—	<a href="#">AT-180</a>
SFT SOL B/CIRC	P0755	0755	—	—	—	<a href="#">AT-184</a>
A/F SEN1 HTR (B1)	P1031	1031	×	×	×*5	<a href="#">EC-930</a>
A/F SEN1 HTR (B1)	P1032	1032	×	×	×*5	<a href="#">EC-930</a>
ECM BACK UP/CIRC	P1065	1065	—	—	×	<a href="#">EC-936</a>
MAF SENSOR	P1102	1102	—	—	—	<a href="#">EC-940</a>
INT/V TIM V/CIR-B1	P1111	1111	—	—	×	<a href="#">EC-947</a>
ETC ACTR	P1121	1121	—	—	—	<a href="#">EC-952</a>
ETC FUNCTION/CIRC	P1122	1122	—	—	—	<a href="#">EC-954</a>
ETC MOT PWR	P1124	1124	—	—	—	<a href="#">EC-961</a>

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[QG18DE (SULEV)]

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST*2	ECM*3				
ETC MOT PWR	P1126	1126	—	—	—	<a href="#">EC-961</a>
ETC MOT PWR	P1128	1128	—	—	—	<a href="#">EC-966</a>
VARI SWL CON/SV-B1	P1132	1132	—	—	×	<a href="#">EC-971</a>
SWIRL CON/V POSI SEN	P1137	1137	—	—	×	<a href="#">EC-976</a>
SWIRL CONT VALVE	P1138	1138	—	—	×	<a href="#">EC-984</a>
HO2S2 (B1)	P1146	1146	×	×	×*5	<a href="#">EC-992</a>
HO2S2 (B1)	P1147	1147	×	×	×*5	<a href="#">EC-1000</a>
CLOSED LOOP-B1	P1148	1148	—	—	—	<a href="#">EC-1008</a>
ENG OVER TEMP	P1217	1217	—	—	—	<a href="#">EC-1009</a>
CTP LEARNING	P1225	1225	—	—	×	<a href="#">EC-1024</a>
CTP LEARNING	P1226	1226	—	—	×	<a href="#">EC-1026</a>
SENSOR POWER/CIRC	P1229	1229	—	—	—	<a href="#">EC-1028</a>
A/F SENSOR 1 (B1)	P1271	1271	×	×	×*5	<a href="#">EC-1033</a>
A/F SENSOR 1 (B1)	P1272	1272	×	×	×*5	<a href="#">EC-1039</a>
A/F SENSOR 1 (B1)	P1273	1273	×	×	×*5	<a href="#">EC-1045</a>
A/F SENSOR 1 (B1)	P1274	1274	×	×	×*5	<a href="#">EC-1052</a>
A/F SENSOR 1 (B1)	P1276	1276	×	×	×*5	<a href="#">EC-1059</a>
A/F SENSOR 1 (B1)	P1278	1278	×	×	×*5	<a href="#">EC-1065</a>
A/F SENSOR 1 (B1)	P1279	1279	×	×	×*5	<a href="#">EC-1073</a>
PURG VOLUME CONT/V	P1444	1444	—	—	×	<a href="#">EC-1081</a>
VENT CONTROL VALVE	P1446	1446	—	—	×	<a href="#">EC-1089</a>
ASCD SW	P1564	1564	—	—	—	<a href="#">EC-1095</a>
ASCD BRAKE SW	P1572	1572	—	—	—	<a href="#">EC-1102</a>
ASCD VHL SPD SEN	P1574	1574	—	—	—	<a href="#">EC-1113</a>
TP SEN/CIRC A/T	P1705	1705	—	—	—	<a href="#">AT-188</a>
P-N POS SW/CIRCUIT	P1706	1706	—	—	×	<a href="#">EC-1115</a>
O/R CLTCH SOL/CIRC	P1760	1760	—	—	×	<a href="#">AT-194</a>
BRAKE SW/CIRCUIT	P1805	1805	—	—	×	<a href="#">EC-1119</a>
APP SEN 1/CIRC	P2122	2122	—	—	—	<a href="#">EC-1125</a>
APP SEN 1/CIRC	P2123	2123	—	—	—	<a href="#">EC-1125</a>
APP SEN 2/CIRC	P2127	2127	—	—	—	<a href="#">EC-1132</a>
APP SEN 2/CIRC	P2128	2128	—	—	—	<a href="#">EC-1132</a>
TP SENSOR	P2135	2135	—	—	—	<a href="#">EC-1140</a>
APP SENSOR	P2138	2138	—	—	—	<a href="#">EC-1147</a>

\*1: 1st trip DTC No. is the same as DTC No.

\*2: These numbers are prescribed by SAE J2012.

\*3: In Diagnostic Test Mode II (Self-diagnostic results), these numbers are controlled by NISSAN.

\*4: SRT code will not be set if the self-diagnostic result is NG.

\*5: These are not displayed with GST.

\*6: When the fail-safe operations for both self-diagnoses occur at the same time, the MIL illuminates.

\*7: The trouble shooting for these DTCs needs CONSULT-II.

## DTC AND 1ST TRIP DTC

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not reoccur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MIL will not light up (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MIL lights up. In other words, the DTC is stored in the ECM memory and the MIL lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored. For malfunctions that blink or light up the MIL during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.

Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", [EC-651](#).

For malfunctions in which 1st trip DTCs are displayed, refer to [EC-643](#). These items are required by legal regulations to continuously monitor the system/component. In addition, the items monitored non-continuously are also displayed on CONSULT-II.

1st trip DTC is specified in Mode 7 of SAE J1979. 1st trip DTC detection occurs without lighting up the MIL and therefore does not warn the driver of a malfunction. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in "Work Flow" procedure Step II, refer to [EC-662](#). Then perform "DTC Confirmation Procedure" or "Overall Function Check" to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

### How to Read DTC and 1st Trip DTC

DTC and 1st trip DTC can be read by the following methods.

 **With CONSULT-II**

 **With GST**

CONSULT-II or GST (Generic Scan Tool) Examples: P0340, P0350, P0705, P0750, etc.

These DTCs are prescribed by SAE J2012.

(CONSULT-II also displays the malfunctioning component or system.)

- **1st trip DTC No. is the same as DTC No.**
- **Output of a DTC indicates a malfunction. However, GST does not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-II can identify malfunction status as shown below. Therefore, using CONSULT-II (if available) is recommended.**

A sample of CONSULT-II display for DTC and 1st trip DTC is shown below. DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode of CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

If the DTC is being detected currently, the time data will be "0".

If a 1st trip DTC is stored in the ECM, the time data will be "[1t]".

DTC display	SELF DIAG RESULTS		1st trip DTC display	SELF DIAG RESULTS	
	DTC RESULTS	TIME		DTC RESULTS	TIME
	CKP SEN/CIRCUIT [P0335]	0		CKP SEN/CIRCUIT [P0335]	1t

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### FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

The ECM records driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed and absolute pressure at the moment a malfunction is detected.

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

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GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For details, see [EC-700](#).

Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0304 Fuel Injection System Function — DTC: P0171, P0172
2		Except the above items (Includes A/T related items)
3	1st trip freeze frame data	

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored in the 2nd trip. After that when the misfire (Priority: 1) is detected in another trip, the freeze frame data will be updated from the EGR malfunction to the misfire. The 1st trip freeze frame data is updated each time a different malfunction is detected. There is no priority for 1st trip freeze frame data. However, once freeze frame data is stored in the ECM memory, 1st trip freeze data is no longer stored (because only one freeze frame data or 1st trip freeze frame data can be stored in the ECM). If freeze frame data is stored in the ECM memory and freeze frame data with the same priority occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”, [EC-651](#).

## SYSTEM READINESS TEST (SRT) CODE

System Readiness Test (SRT) code is specified in Mode 1 of SAE J1979.

As part of an enhanced emissions test for Inspection & Maintenance (I/M), certain states require the status of SRT be used to indicate whether the ECM has completed self-diagnosis of major emission systems and components. Completion must be verified in order for the emissions inspection to proceed.

If a vehicle is rejected for a State emissions inspection due to one or more SRT items indicating “INCMP”, use the information in this Service Manual to set the SRT to “CMPLT”.

In most cases the ECM will automatically complete its self-diagnosis cycle during normal usage, and the SRT status will indicate “CMPLT” for each application system. Once set as “CMPLT”, the SRT status remains “CMPLT” until the self-diagnosis memory is erased.

Occasionally, certain portions of the self-diagnostic test may not be completed as a result of the customer's normal driving pattern; the SRT will indicate “INCMP” for these items.

### NOTE:

The SRT will also indicate “INCMP” if the self-diagnosis memory is erased for any reason or if the ECM memory power supply is interrupted for several hours.

If, during the state emissions inspection, the SRT indicates “CMPLT” for all test items, the inspector will continue with the emissions test. However, if the SRT indicates “INCMP” for one or more of the SRT items the vehicle is returned to the customer untested.

### NOTE:

If MIL is “ON” during the state emissions inspection, the vehicle is also returned to the customer untested even though the SRT indicates “CMPLT” for all test items. Therefore, it is important to check SRT (“CMPLT”) and DTC (No DTCs) before the inspection.

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QG18DE (SULEV)]

## SRT Item

The table below shows required self-diagnostic items to set the SRT to "CMPLT".

SRT item (CONSULT-II indication)	Performance Priority*1	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	2	Three way catalyst function	P0420
EVAP SYSTEM	1	EVAP control system	P0442
	—	EVAP control system	P1442
	2	EVAP control system	P0441
HO2S	2	Air fuel ratio (A/F) sensor 1	P1271
		Air fuel ratio (A/F) sensor 1	P1272
		Air fuel ratio (A/F) sensor 1	P1273
		Air fuel ratio (A/F) sensor 1	P1274
		Air fuel ratio (A/F) sensor 1	P1276
		Air fuel ratio (A/F) sensor 1	P1278, P1279
		Heated oxygen sensor 2	P0138
		Heated oxygen sensor 2	P0139
		Heated oxygen sensor 2	P1146
HO2S HTR	2	Heated oxygen sensor 2	P1147
		Air fuel ratio (A/F) sensor heater	P1031, P1032
		Heated oxygen sensor 2 heater	P0037

\*1: If completion of several SRTs is required, perform driving patterns (DTC confirmation procedure), one by one based on the performance priority for models with CONSULT-II.

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QG18DE (SULEV)]

## SRT Set Timing

SRT is set as "CMPLT" after self-diagnosis has been performed one or more times. Completion of SRT is done regardless of whether the result is OK or NG. The set timing is different between OK and NG results and is shown in the table below.

Self-diagnosis result		Example							
		Diagnosis	Ignition cycle						
	← ON →		OFF	← ON →	OFF	← ON →	OFF	← ON →	
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)			
		P0402	OK (1)	— (1)	— (1)	OK (2)			
		P1402	OK (1)	OK (2)	— (2)	— (2)			
		SRT of EGR	"CMPLT"	"CMPLT"	"CMPLT"	"CMPLT"			
	Case 2	P0400	OK (1)	— (1)	— (1)	— (1)			
		P0402	— (0)	— (0)	OK (1)	— (1)			
		P1402	OK (1)	OK (2)	— (2)	— (2)			
		SRT of EGR	"INCMP"	"INCMP"	"CMPLT"	"CMPLT"			
NG exists	Case 3	P0400	OK	OK	—	—			
		P0402	—	—	—	—			
		P1402	NG	—	NG	NG	NG (Consecutive NG)		
		(1st trip) DTC	1st trip DTC	—	1st trip DTC	DTC (= MIL "ON")			
		SRT of EGR	"INCMP"	"INCMP"	"INCMP"	"CMPLT"			

OK: Self-diagnosis is carried out and the result is OK.

NG: Self-diagnosis is carried out and the result is NG.

—: Self-diagnosis is not carried out.

When all SRT related self-diagnoses show OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate "CMPLT". → Case 1 above

When all SRT related self-diagnoses show OK results through several different cycles, the SRT will indicate "CMPLT" at the time the respective self-diagnoses have at least one OK result. → Case 2 above

If one or more SRT related self-diagnoses show NG results in 2 consecutive cycles, the SRT will also indicate "CMPLT". → Case 3 above

The table above shows that the minimum number of cycles for setting SRT as "INCMP" is one (1) for each self-diagnosis (Case 1 & 2) or two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary for each self-diagnosis to be executed twice (Case 3) for the following reasons:

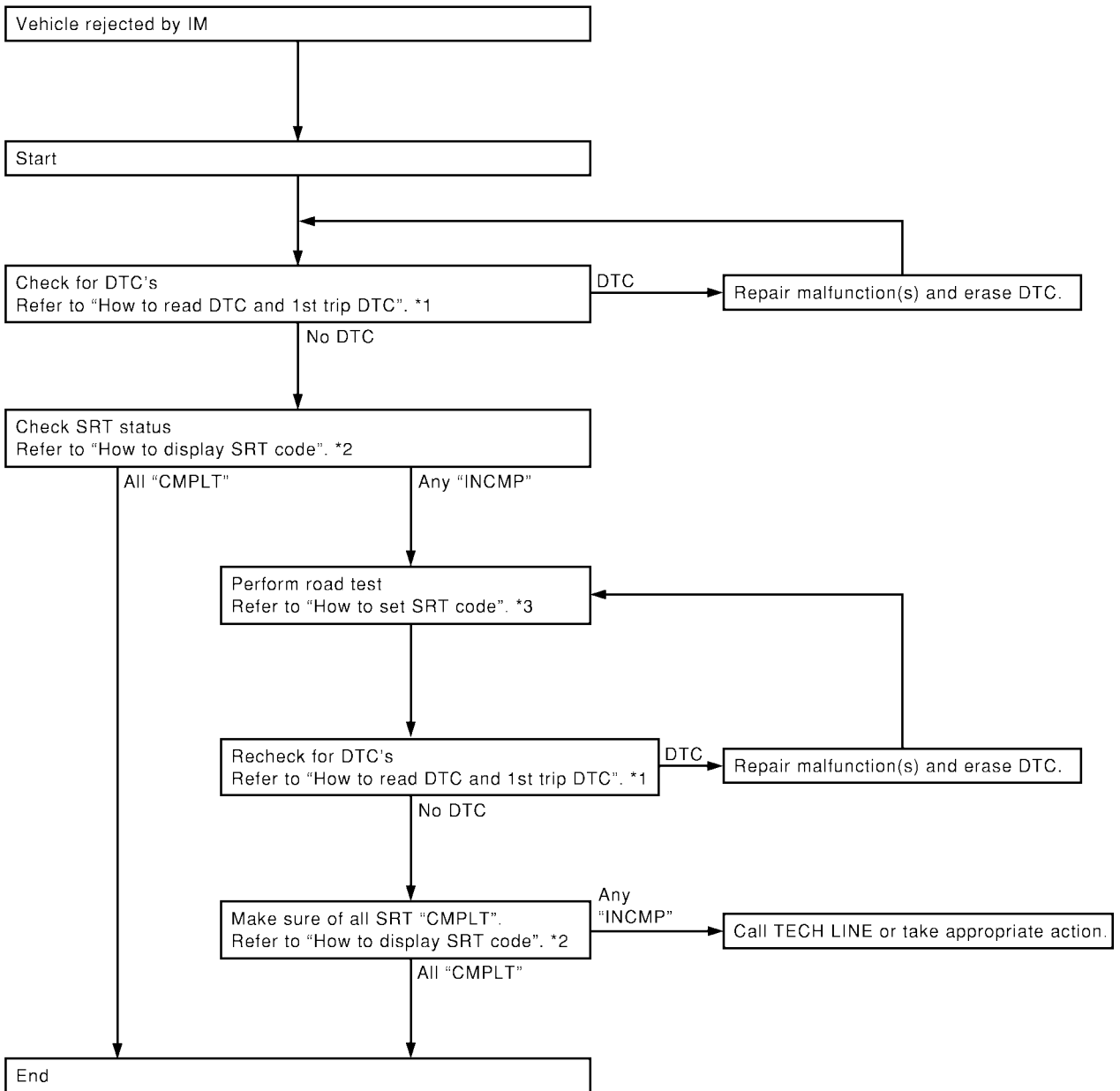
- The SRT will indicate "CMPLT" at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires "CMPLT" of the SRT only with OK self-diagnosis results.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to "CMPLT" of SRT, the self-diagnosis memory must be erased from ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate "INCMP".

**NOTE:**

SRT can be set as "CMPLT" together with the DTC(s). Therefore, DTC check must always be carried out prior to the state emission inspection even though the SRT indicates "CMPLT".

## SRT Service Procedure

If a vehicle has failed the state emissions inspection due to one or more SRT items indicating "INCMP", review the flowchart diagnostic sequence on the next page.



\*1 [EC-643](#)

\*2 [EC-647](#)

\*3 [EC-648](#)

SEP170Z

## How to Display SRT Code

### With CONSULT-II

Selecting "SRT STATUS" in "DTC CONFIRMATION" mode with CONSULT-II.

For items whose SRT codes are set, a "CMPLT" is displayed on the CONSULT-II screen; for items whose SRT codes are not set, "INCMP" is displayed.

### With GST

Selecting Mode 1 with GST (Generic Scan Tool)

A sample of CONSULT-II display for SRT code is shown below.

"INCMP" means the self-diagnosis is incomplete and SRT is not set. "CMPLT" means the self-diagnosis is complete and SRT is set.

SRT STATUS	
CATALYST	CMPLT
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	CMPLT

SEF935Z

### How to Set SRT Code

To set all SRT codes, self-diagnosis for the items indicated above must be performed one or more times. Each diagnosis may require a long period of actual driving under various conditions.

#### **With CONSULT-II**

Perform corresponding DTC Confirmation Procedure one by one based on “Performance Priority” in the table on [EC-645](#).

#### **Without CONSULT-II**

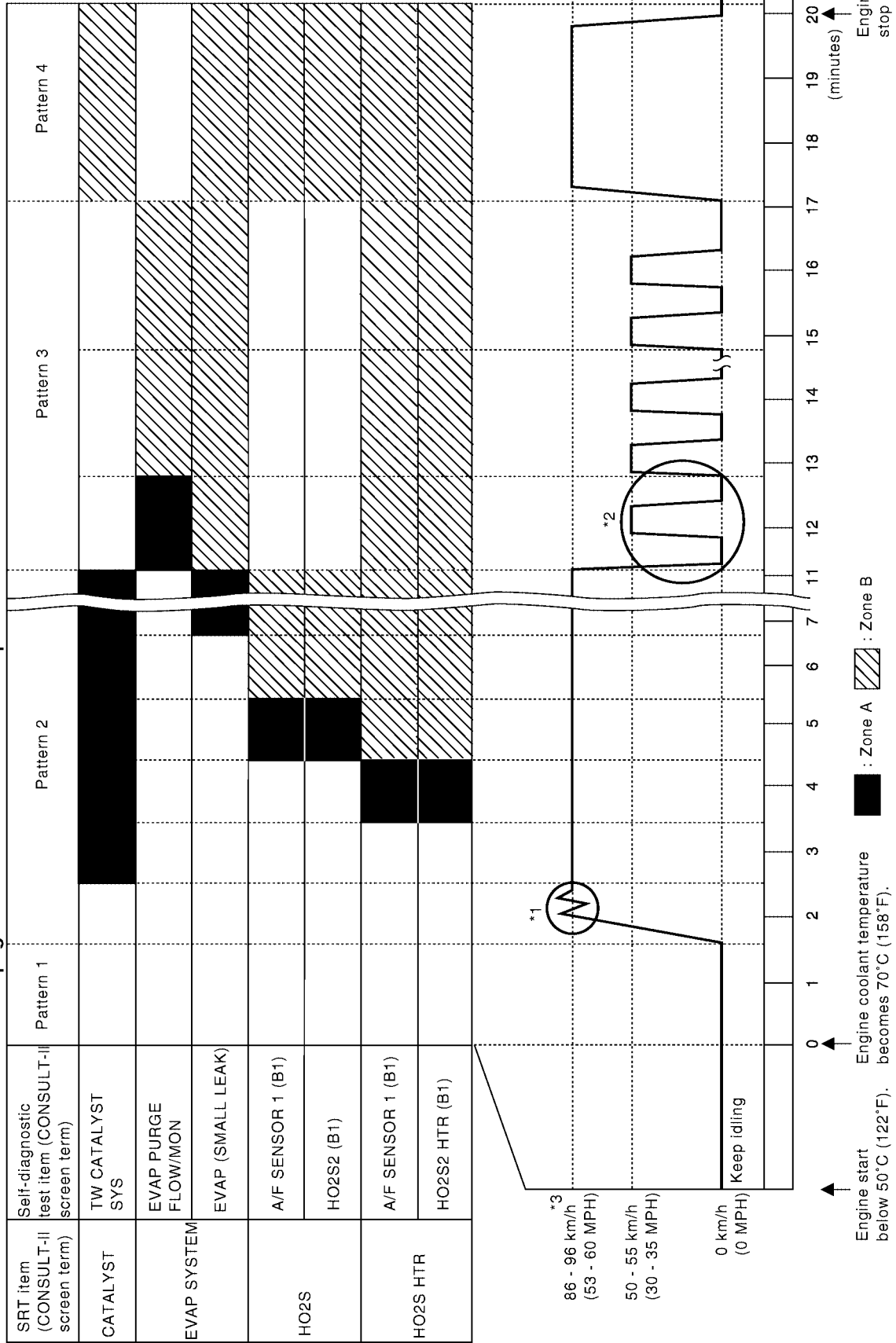
The most efficient driving pattern in which SRT codes can be properly set is explained on the next page. The driving pattern should be performed one or more times to set all SRT codes.



## Driving Pattern

**Note: Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws. Refer to next page for more information and explanation of chart.**

### Driving pattern



PBIB1182E

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QG18DE (SULEV)]

- The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.  
Zone A refers to the range where the time required for the diagnosis under normal conditions\* is the shortest.  
Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

\*: Normal conditions refer to the following:

- Sea level
- Flat road
- Ambient air temperature: 20 - 30°C (68 - 86°F)
- Diagnosis is performed as quickly as possible under normal conditions.  
Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

- The engine is started at the engine coolant temperature of -10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 73 and ground is 3.0 - 4.3V).**
- The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 73 and ground is lower than 1.4V).**
- The engine is started at the fuel tank temperature of warmer than 0°C (32°F) (where the voltage between the ECM terminal 107 and ground is less than 4.1V).**

Pattern 2:

- When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

Pattern 3:

- The driving pattern outlined in \*<sup>2</sup> must be repeated at least 3 times.

Pattern 4:

- Tests are performed after the engine has been operated for at least 17 minutes.
- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

\*1: Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH), then release the accelerator pedal and keep it released for more than 10 seconds. Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH) again.

\*2: Operate the vehicle in the following driving pattern.

- Decelerate vehicle to 0 km/h (0 MPH) and let engine idle.
- Repeat driving pattern shown below at least 10 times.  
- **During acceleration, hold the accelerator pedal as steady as possible.**

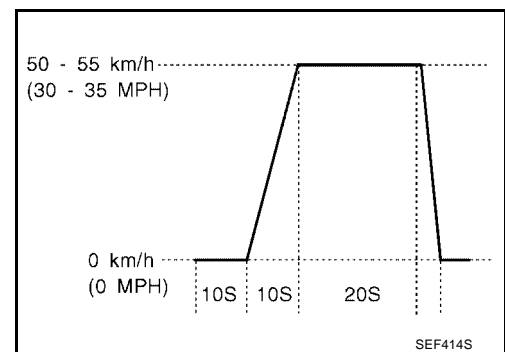
\*3: Checking the vehicle speed with GST is advised.

### Suggested Transmission Gear Position for A/T Models

Set the selector lever in the "D" position with the overdrive switch turned ON.

### Suggested Upshift Speeds for M/T Models

Shown below are suggested vehicle speeds for shifting into a higher gear. These suggestions relate to fuel economy and vehicle performance. Actual upshift speeds will vary according to road conditions, the weather and individual driving habits.



Gear change	For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft)]:	For quick acceleration in low altitude areas and high altitude areas [over 1,219 m (4,000 ft)]:
	ACCEL shift point km/h (MPH)	km/h (MPH)
1st to 2nd	24 (15)	24 (15)
2nd to 3rd	40 (25)	40 (25)
3rd to 4th	65 (40)	65 (40)
4th to 5th	75 (45)	75 (45)

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QG18DE (SULEV)]

## Suggested Maximum Speed in Each Gear

Downshift to a lower gear if the engine is not running smoothly, or if you need to accelerate.

Do not exceed the maximum suggested speed (shown below) in any gear. For level road driving, use the highest gear suggested for that speed. Always observe posted speed limits and drive according to the road conditions to ensure safe operation. Do not over-rev the engine when shifting to a lower gear as it may cause engine damage or loss of vehicle control.

Gear	km/h (MPH)
1st	48 (30)
2nd	84 (52)
3rd	128 (80)
4th	—
5th	—

## TEST VALUE AND TEST LIMIT (GST ONLY — NOT APPLICABLE TO CONSULT-II)

The following is the information specified in Mode 6 of SAE J1979.

The test value is a parameter used to determine whether a system/circuit diagnostic test is “OK” or “NG” while being monitored by the ECM during self-diagnosis. The test limit is a reference value which is specified as the maximum or minimum value and is compared with the test value being monitored.

Items for which these data (test value and test limit) are displayed are the same as SRT code items (15 test items).

These data (test value and test limit) are specified by Test ID (TID) and Component ID (CID) and can be displayed on the GST screen.

X: Applicable —: Not applicable

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
CATALYST	Three way catalyst function	01H	01H	Max.	×
		02H	81H	Min.	×
EVAP SYSTEM	EVAP control system (Small leak)	05H	03H	Max.	×
	EVAP control system purge flow monitoring	06H	83H	Min.	×
HO2S	A/F sensor 1	43H	0EH	Max.	×
		44H	8EH	Min.	×
		45H	8EH	Min.	×
	Heated oxygen sensor 2	19H	86H	Min.	×
		1AH	86H	Min.	×
		1BH	06H	Max.	×
		1CH	06H	Max.	×
HO2S HTR	A/F sensor 1 heater	57H	10H	Max.	×
		58H	90H	Min.	×
	Heated oxygen sensor 2 heater	2DH	0AH	Max.	×
		2EH	8AH	Min.	×

## HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

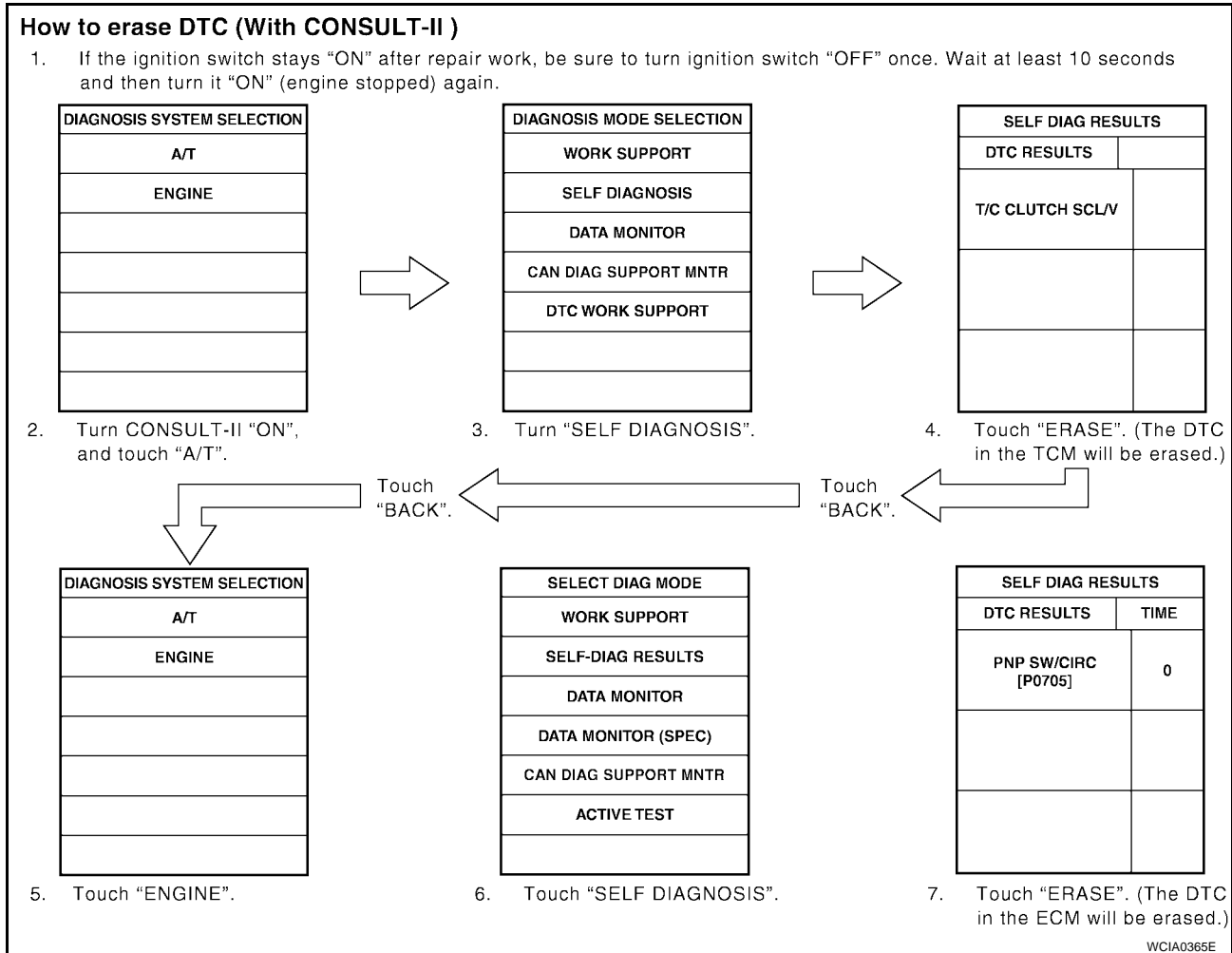
### Ⓟ How to Erase DTC (With CONSULT-II)

#### NOTE:

If the DTC is not for A/T related items (see [EC-602](#)), skip steps 2 through 4.

1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait at least 10 seconds and then turn it “ON” (engine stopped) again.
2. Turn CONSULT-II “ON” and touch “A/T”.
3. Touch “SELF-DIAG RESULTS”.
4. Touch “ERASE”. [The DTC in the TCM (Transmission control module) will be erased.] Then touch “BACK” twice.

5. Touch "ENGINE".
  6. Touch "SELF-DIAG RESULTS".
  7. Touch "ERASE". (The DTC in the ECM will be erased.)
- If DTCs are displayed for both ECM and TCM (Transmission control module), they need to be erased individually from the ECM and TCM (Transmission control module).



The emission related diagnostic information in the ECM can be erased by selecting "ERASE" in the "SELF-DIAG RESULTS" mode with CONSULT-II.

### **How to Erase DTC (With GST)**

The emission related diagnostic information in the ECM can be erased by selecting Mode 4 with GST.

**NOTE:**

**If the DTC is not for A/T related items (see [EC-602](#)), skip step 2.**

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
  2. Perform "SELF-DIAGNOSTIC PROCEDURE (Without CONSULT-II)" in AT section titled "TROUBLE DIAGNOSIS", "Self-diagnosis". (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
  3. Select Mode 4 with GST (Generic Scan Tool).
- **If the battery is disconnected, the emission-related diagnostic information will be lost after approx. 24 hours.**
  - **The following data are cleared when the ECM memory is erased.**
    1. Diagnostic trouble codes
    2. 1st trip diagnostic trouble codes
    3. Freeze frame data

4. 1st trip freeze frame data
5. System readiness test (SRT) codes
6. Test values
7. Others

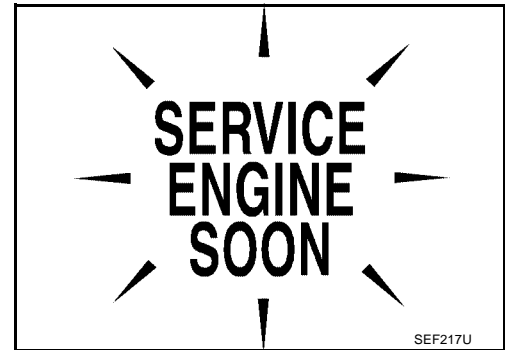
Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

## Malfunction Indicator Lamp (MIL) DESCRIPTION

UBS001R5






The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
  - If the MIL does not light up, refer to [DI-27, "WARNING LAMPS"](#).
2. When the engine is started, the MIL should go off. If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.



## ON BOARD DIAGNOSTIC SYSTEM FUNCTION

The on board diagnostic system has the following three functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in "ON" position  Engine stopped 	BULB CHECK	This function checks the MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL circuit.
	Engine running 	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MIL in the 1st trip. <ul style="list-style-type: none"> <li>● "Misfire (Possible three way catalyst damage)"</li> <li>● "One trip detection diagnoses"</li> </ul>
Mode II	Ignition switch in "ON" position  Engine stopped 	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.

When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting MIL up when there is malfunction on engine control system.

Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating fail-safe function.

The fail-safe function also operates when above diagnoses except MIL circuit and demands the driver to repair the trouble.

Engine operating condition in fail-safe mode

Engine speed will not rise more than 2,500 rpm due to the fuel cut

## MIL Flashing Without DTC

If the ECM is in Diagnostic Test Mode II, MIL may flash when engine is running. In this case, check ECM diagnostic test mode. [EC-654, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#) .

How to switch the diagnostic test (function) modes, and details of the above functions are described later. [EC-654, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#) .

The following emission-related diagnostic information is cleared when the ECM memory is erased.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values
- Others

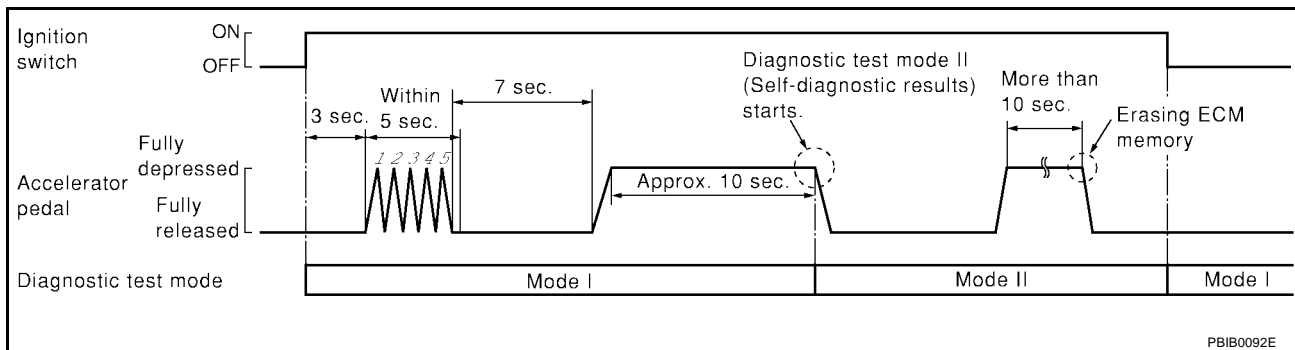
## HOW TO SWITCH DIAGNOSTIC TEST MODE

### NOTE:

- It is better to count the time accurately with a clock.
- It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.
- Always ECM returns to Diagnostic Test Mode I after ignition switch is turned "OFF".

### How to Set Diagnostic Test Mode II (Self-diagnostic Results)

1. Confirm that accelerator pedal is fully released, turn ignition switch "ON" and wait 3 seconds.
2. Repeat the following procedure quickly five times within 5 seconds.
  - a. Fully depress the accelerator pedal.
  - b. Fully release the accelerator pedal.
3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MIL starts blinking.
4. Fully release the accelerator pedal.  
ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).



### How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to [EC-655, "DIAGNOSTIC TEST MODE II — SELF-DIAGNOSTIC RESULTS"](#) .
2. Fully depress the accelerator pedal and keep it for more than 10 seconds.  
The emission-related diagnostic information has been erased from the backup memory in the ECM.
3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

## DIAGNOSTIC TEST MODE I — BULB CHECK

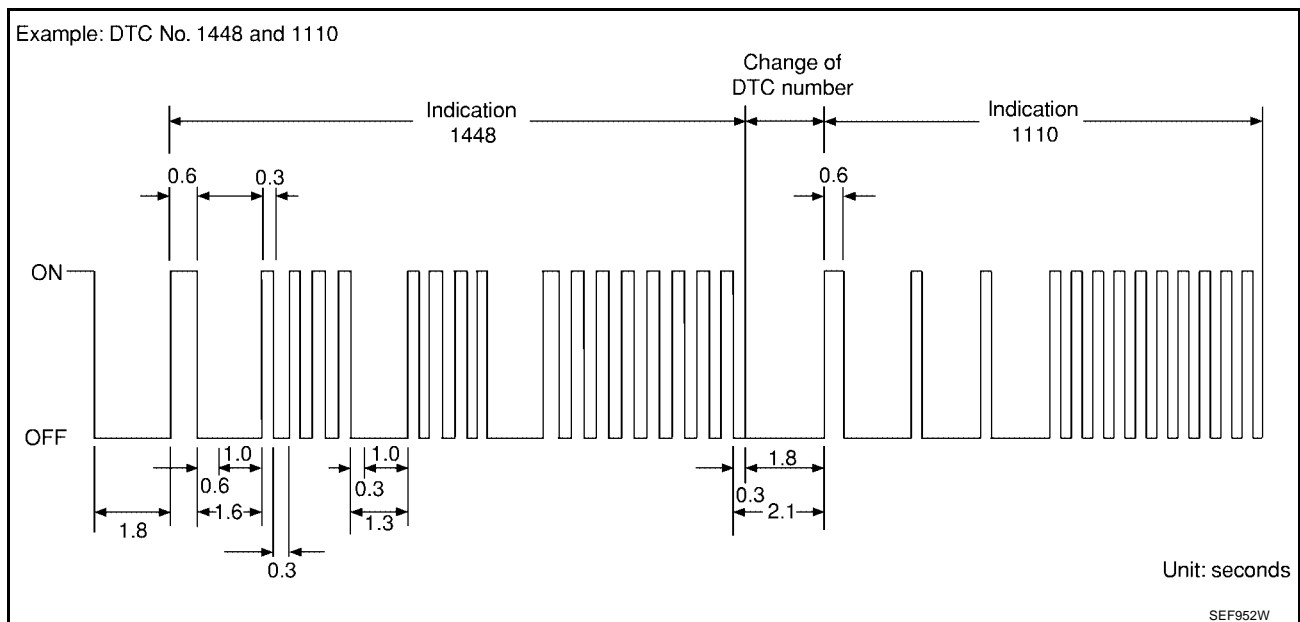
In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to [DI-27, "WARNING LAMPS"](#) .

## DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

MIL	Condition
ON	When the malfunction is detected or the ECM's CPU is malfunctioning.
OFF	No malfunction.

## DIAGNOSTIC TEST MODE II — SELF-DIAGNOSTIC RESULTS

In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MIL as shown below. The DTC and 1st trip DTC are displayed at the same time. If the MIL does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MIL illuminates in diagnostic test mode II (SELF-DIAGNOSTIC RESULTS), it is a DTC; if two or more codes are displayed, they may be either DTCs or 1st trip DTCs. DTC No. is same as that of 1st trip DTC. These unidentified codes can be identified by using the CONSULT-II or GST. A DTC will be used as an example for how to read a code.



A particular trouble code can be identified by the number of four-digit numeral flashes. The "zero" is indicated by the number of ten flashes. The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-second) - OFF (0.6-second) cycle.

The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second OFF cycle.

A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared.

A change from one trouble code to another occurs at an interval of 1.8-second OFF.

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC "0000" refers to no malfunction. (See [EC-602, "INDEX FOR DTC"](#) )

### How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to [EC-651, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) .

- If the battery is disconnected, the DTC will be lost from the backup memory after approx 24 hours.
- Be careful not to erase the stored memory before starting trouble diagnoses.

## OBD System Operation Chart

### RELATIONSHIP BETWEEN MIL, 1ST TRIP DTC, DTC, AND DETECTABLE ITEMS

- When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data are stored in the ECM memory.
- When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data are stored in the ECM memory, and the MIL will come on. For details, refer to “Two Trip Detection Logic” on [EC-639](#).
- The MIL will go off after the vehicle is driven 3 times with no malfunction. The drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset.
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (driving pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (driving pattern C) without the same malfunction recurring. The “TIME” in “SELF-DIAGNOSTIC RESULTS” mode of CONSULT-II will count the number of times the vehicle is driven.
- The 1st trip DTC is not displayed when the self-diagnosis results in “OK” for the 2nd trip.

### SUMMARY CHART

Items	Fuel Injection System	Misfire	Other
MIL (goes off)	3 (pattern B)	3 (pattern B)	3 (pattern B)
DTC, Freeze Frame Data (no display)	80 (pattern C)	80 (pattern C)	40 (pattern A)
1st Trip DTC (clear)	1 (pattern C), *1	1 (pattern C), *1	1 (pattern B)
1st Trip Freeze Frame Data (clear)	*1, *2	*1, *2	1 (pattern B)

For details about patterns “B” and “C” under “Fuel Injection System” and “Misfire”, see [EC-649](#).

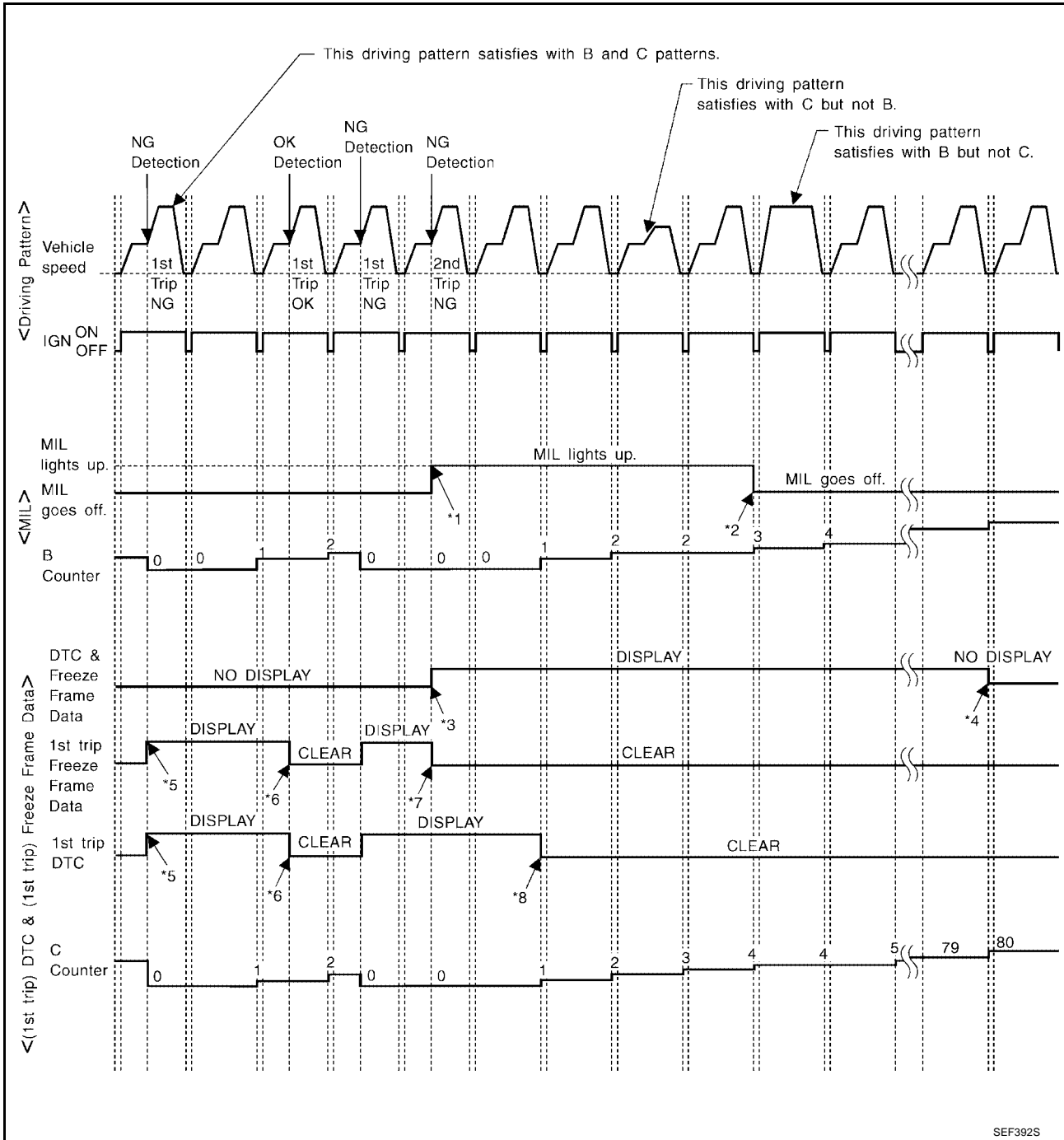
For details about patterns “A” and “B” under “Other”, see [EC-649](#).

\*1: Clear timing is at the moment OK is detected.

\*2: Clear timing is when the same malfunction is detected in the 2nd trip.



## RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS FOR "MIS-FIRE" <EXHAUST QUALITY DETERIORATION>, "FUEL INJECTION SYSTEM"



\*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

\*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

\*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

\*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

\*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

\*6: The 1st trip DTC and the 1st trip freeze frame data will be cleared at the moment OK is detected.

\*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

\*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

## EXPLANATION FOR DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”

### Driving Pattern B

Driving pattern B means the vehicle operation as follows:

All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunction.
- The MIL will go off when the B counter reaches 3. (\*2 in “OBD SYSTEM OPERATION CHART”)

### Driving Pattern C

Driving pattern C means the vehicle operation as follows:

1. The following conditions should be satisfied at the same time:

Engine speed: (Engine speed in the freeze frame data)  $\pm 375$  rpm

Calculated load value: (Calculated load value in the freeze frame data)  $\times (1 \pm 0.1)$  [%]

Engine coolant temperature (T) condition:

- When the freeze frame data shows lower than 70°C (158°F), “T” should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), “T” should be higher than or equal to 70°C (158°F).

Example:

If the stored freeze frame data is as follows:

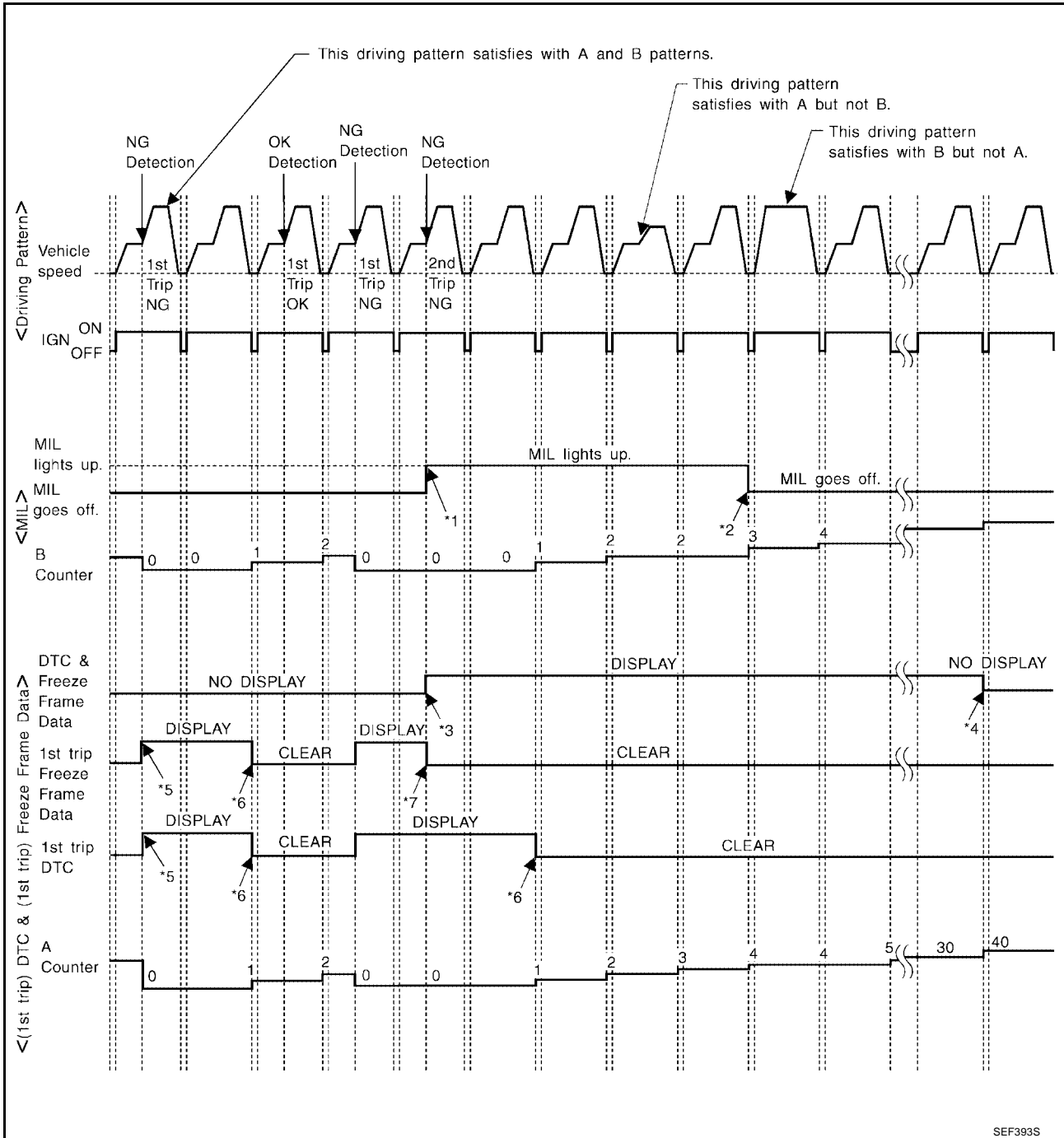
Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F)

To be satisfied with driving pattern C, the vehicle should run under the following conditions:

Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

- The C counter will be cleared when the malfunction is detected regardless of vehicle conditions above.
- The C counter will be counted up when vehicle conditions above is satisfied without the same malfunction.
- The DTC will not be displayed after C counter reaches 80.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

## RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"



\*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

\*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

\*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

\*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

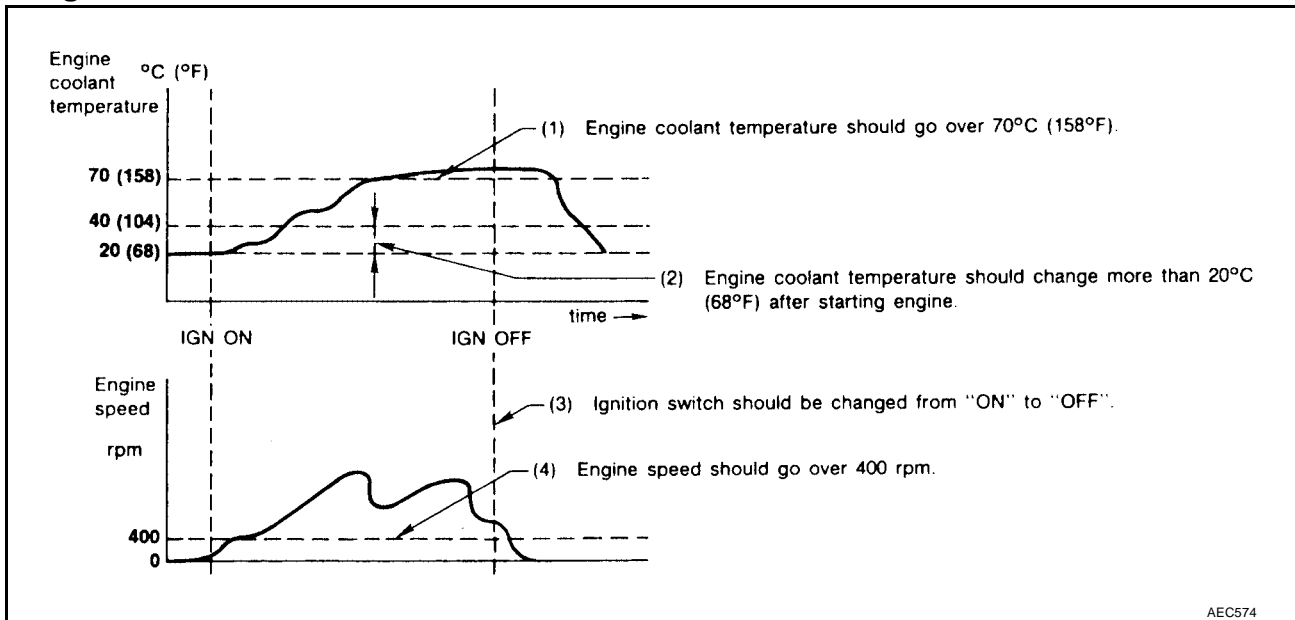
\*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

\*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.

\*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

## EXPLANATION FOR DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

### Driving Pattern A



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

### Driving Pattern B

Driving pattern B means the vehicle operation as follows:

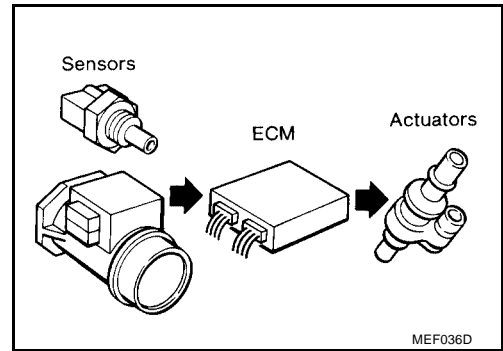
All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunctions.
- The MIL will go off when the B counter reaches 3 (\*<sup>2</sup> in "OBD SYSTEM OPERATION CHART").

**TROUBLE DIAGNOSIS**

**Trouble Diagnosis Introduction**  
**INTRODUCTION**

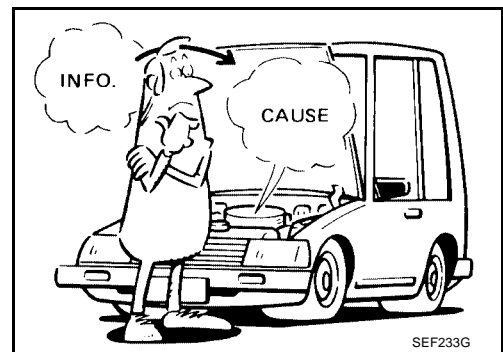
The engine has an ECM to control major systems such as fuel control, ignition control, idle air control system, etc. The ECM accepts input signals from sensors and instantly drives actuators. It is essential that both input and output signals are proper and stable. At the same time, it is important that there are no malfunctions such as vacuum leaks, fouled spark plugs, or other malfunctions with the engine.



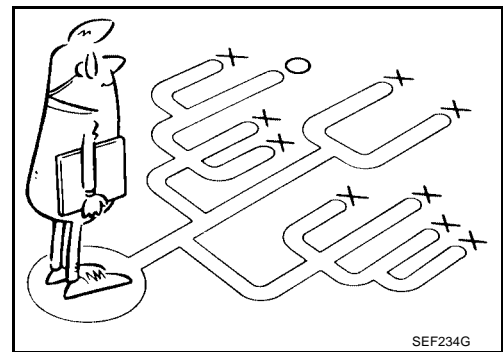
It is much more difficult to diagnose a incident that occurs intermittently rather than continuously. Most intermittent incidents are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

A visual check only may not find the cause of the incidents. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the [EC-662](#).

Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such incidents, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "Diagnostic Worksheet" like the example on next page should be used.



Start your diagnosis by looking for "conventional" malfunctions first. This will help troubleshoot driveability malfunctions on an electronically controlled engine vehicle.

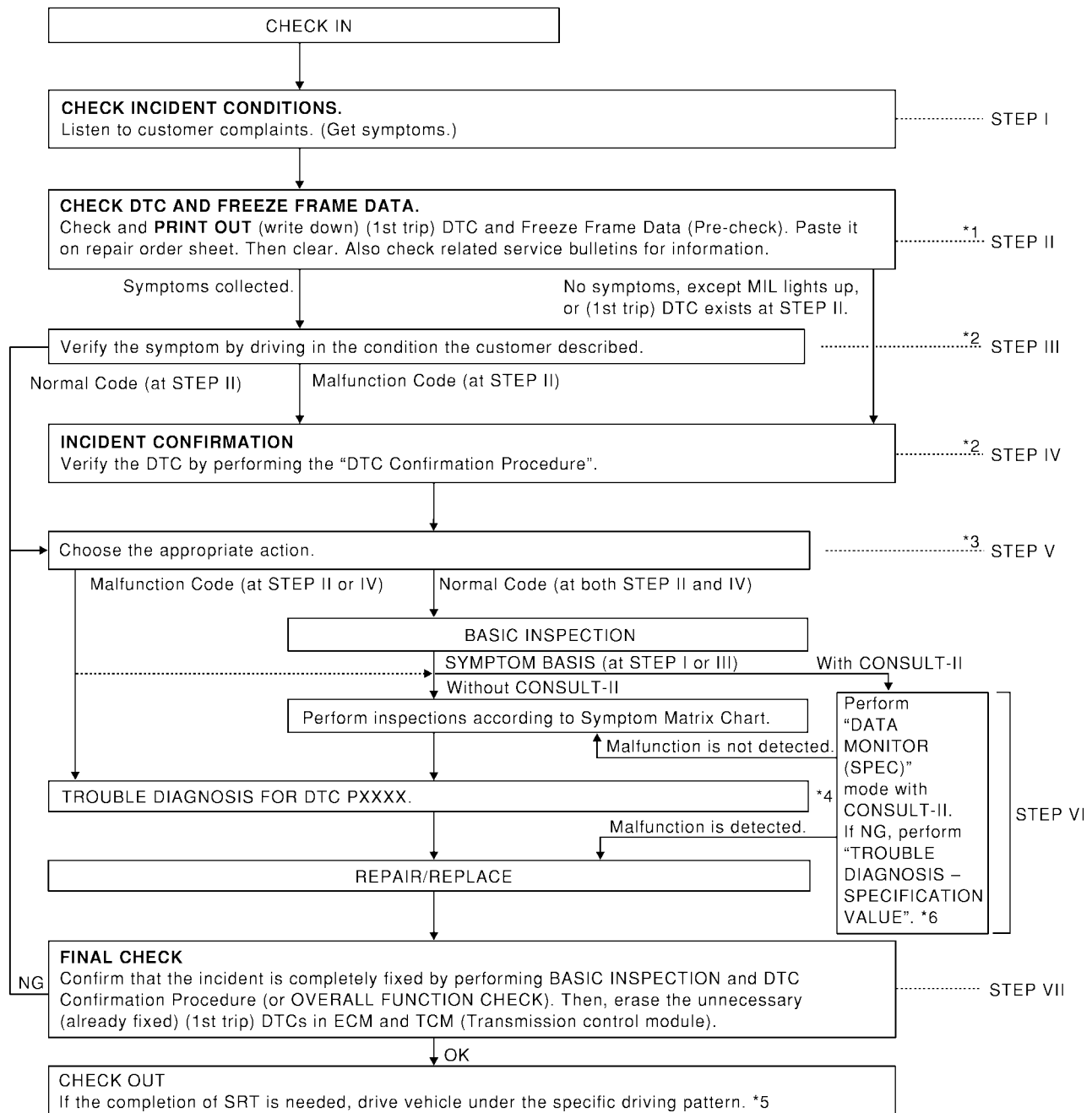


A  
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# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

## WORK FLOW



PBIB1043E

\*1: If time data of "SELF-DIAG RESULTS" is other than "0" or "1t", refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

\*2: If the incident cannot be duplicated, refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

\*3: If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to [EC-721, "POWER SUPPLY CIRCUIT FOR ECM"](#).

\*4: If the malfunctioning part cannot be found, refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

\*5: [EC-649](#)

\*6: [EC-716](#)

# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

## DESCRIPTION FOR WORK FLOW

STEP	DESCRIPTION FOR WORK FLOW	A
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the <a href="#">EC-664. "DIAGNOSTIC WORKSHEET"</a> .	EC
STEP II	Before confirming the concern, check and write down (print out using CONSULT-II or Generic Scan Tool) the (1st trip) Diagnostic Trouble Code (DTC) and the (1st trip) freeze frame data, then erase the code and the data. (Refer to <a href="#">EC-639</a> .) The (1st trip) DTC and the (1st trip) freeze frame data can be used when duplicating the incident at STEP III & IV. Study the relationship between the cause, specified by (1st trip) DTC, and the symptom described by the customer. (The "Symptom Matrix Chart" will be useful. See <a href="#">EC-674</a> .) Also check related service bulletins for information.	C
STEP III	Try to confirm the symptom and under what conditions the incident occurs. The "DIAGNOSTIC WORK SHEET" and the freeze frame data are useful to verify the incident. Connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot be verified, perform INCIDENT SIMULATION TESTS. (Refer to <a href="#">GI-26. "How to Perform Efficient Diagnosis for an Electrical Incident"</a> .) If the malfunction code is detected, skip STEP IV and perform STEP V.	D E
STEP IV	Try to detect the (1st trip) Diagnostic Trouble Code by driving in (or performing) The "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE". Check and read the (1st trip) DTC and (1st trip) freeze frame data by using CONSULT-II or Generic Scan Tool. During the (1st trip) DTC verification, be sure to connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot be verified, perform INCIDENT SIMULATION TESTS. (Refer to <a href="#">GI-26. "How to Perform Efficient Diagnosis for an Electrical Incident"</a> .) In case the "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" is not available, perform the "OVERALL FUNCTION CHECK" instead. The (1st trip) DTC cannot be displayed by this check, however, this simplified "check" is an effective alternative. The "NG" result of the "OVERALL FUNCTION CHECK" is the same as the (1st trip) DTC detection.	F G H
STEP V	Take the appropriate action based on the results of STEP I through IV. If the malfunction code is indicated, proceed to TROUBLE DIAGNOSIS FOR DTC PXXXX. If the normal code is indicated, proceed to the BASIC INSPECTION. (Refer to <a href="#">EC-669</a> .) If CONSULT-II is available, perform "DATA MONITOR (SPEC)" mode with CONSULT-II and proceed to the <a href="#">EC-716. "TROUBLE DIAGNOSIS - SPECIFICATION VALUE"</a> . If malfunction is detected, proceed to "REPAIR/REPLACE". Then perform inspections according to the Symptom Matrix Chart. (Refer to <a href="#">EC-674</a> .)	I J
STEP VI	Identify where to begin diagnosis based on the relationship study between symptom and possible causes. Inspect the system for mechanical binding, loose connectors or wiring damage using (tracing) "Harness Layouts". Gently shake the related connectors, components or wiring harness with CONSULT-II set in "DATA MONITOR (AUTO TRIG)" mode. Check the voltage of the related ECM terminals or monitor the output data from the related sensors with CONSULT-II. Refer to <a href="#">EC-686</a> . The "DIAGNOSTIC PROCEDURE" in EC section contains a description based on open circuit inspection. A short circuit inspection is also required for the circuit check in the DIAGNOSTIC PROCEDURE. For details, refer to GI section ("HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT", "Circuit Inspection"). Repair or replace the malfunction parts. If malfunctioning part cannot be detected, perform <a href="#">EC-720. "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"</a> .	K L M
STEP VII	Once you have repaired the circuit or replaced a component, you need to run the engine in the same conditions and circumstances which resulted in the customer's initial complaint. Perform the "DTC CONFIRMATION PROCEDURE" and confirm the normal code [DTC No. P0000 or 0505] is detected. If the incident is still detected in the final check, perform STEP VI by using a different method from the previous one. Before returning the vehicle to the customer, be sure to erase the unnecessary (already fixed) (1st trip) DTC in ECM and TCM (Transmission control module). (Refer to <a href="#">EC-640</a> .)	

**DIAGNOSTIC WORKSHEET****Description**

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make trouble-shooting faster and more accurate.

In general, each customer feels differently about a incident. It is important to fully understand the symptoms or conditions for a customer complaint.

Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.

Some conditions may cause the malfunction indicator lamp to come on steady or blink and DTC to be detected. Example:

- Vehicle ran out of fuel, which caused the engine to misfire.
- Fuel filler cap was left off or incorrectly screwed on, allowing fuel to evaporate into the atmosphere.

**KEY POINTS**

**WHAT** ..... Vehicle & engine model  
**WHEN** ..... Date, Frequencies  
**WHERE**..... Road conditions  
**HOW** ..... Operating conditions,  
Weather conditions,  
Symptoms

SEF907L





**DTC Inspection Priority Chart**

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

**NOTE:**

If DTC U1000 and/or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-728](#).

Priority	Detected items (DTC)
1	<ul style="list-style-type: none"> <li>● U1000, U1001 CAN communication line</li> <li>● P0101, P0102, P0103, P1102 MAF sensor</li> <li>● P0112, P0113, P0127 IAT sensor</li> <li>● P0117, P0118, P0125 ECT sensor</li> <li>● P0122, P0123 TP sensor</li> <li>● P0128 Thermostat function</li> <li>● P0181, P0182, P0183 FTT sensor</li> <li>● P0327, P0328 Knock sensor</li> <li>● P0335 Crankshaft position sensor (POS)</li> <li>● P0340 Camshaft position sensor (PHASE)</li> <li>● P0460, P0461, P0462, P1463 Fuel level sensor</li> <li>● P0500 Vehicle speed sensor</li> <li>● P0605 ECM</li> <li>● P0705 Park/Neutral position (PNP) switch</li> <li>● P1229 Sensor power supply</li> <li>● P1706 Park/Neutral position (PNP) switch</li> <li>● P2122, P2123, P2127, P2128, P2138 Accelerator pedal position sensor</li> </ul>

# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

Priority	Detected items (DTC)	
2	<ul style="list-style-type: none"> <li>● P0037, P0038 HO2S2</li> <li>● P0138, P0139, P1146, P1148 HO2S2</li> <li>● P0441 EVAP control system</li> <li>● P0444, P0445, P1444 EVAP canister purge volume control solenoid valve</li> <li>● P0447, P1446, P1448 EVAP canister vent control valve</li> <li>● P0452, P0453 EVAP control system pressure sensor</li> <li>● P0550 Power steering pressure sensor</li> <li>● P0705, P0710, P0720, P0725, P0740, P0745, P0750, P0755, P1705, P1706, P1760 A/T related sensors, solenoid valves and switches</li> <li>● P1031, P1032 A/F sensor 1 heater</li> <li>● P1065 ECM power supply</li> <li>● P1122 Electric throttle control function</li> <li>● P1124, P1126, P1128 Electric throttle control actuator</li> <li>● P1137 Swirl control valve control position sensor</li> <li>● P1138 Swirl control valve</li> <li>● P1217 Engine over temperature (OVER HEAT)</li> <li>● P1271, P1272, P1273, P1274, P1276, P1278, P1279 A/F sensor 1</li> <li>● P1805 Brake switch</li> </ul>	<p>A</p> <p><b>EC</b></p> <p>C</p> <p>D</p> <p>E</p> <p>F</p> <p>G</p>
3	<ul style="list-style-type: none"> <li>● P0011 IVT control</li> <li>● P0171, P0172 Fuel injection system function</li> <li>● P0300-P0304 Cylinder misfire</li> <li>● P0420 Three way catalyst function</li> <li>● P0442, P1442 P0456 EVAP control system</li> <li>● P0455 EVAP control system</li> <li>● P0506, P0507 Idle speed control system</li> <li>● P0731-P0734, P0744 A/T function</li> <li>● P1111 IVT control solenoid valve</li> <li>● P1121 Electric throttle control actuator</li> <li>● P1132 Swirl control valve</li> <li>● P1148 Closed loop control</li> <li>● P1564 ASCD steering switch</li> <li>● P1572 ASCD brake switch</li> <li>● P1574 ASCD vehicle speed sensor</li> </ul>	<p>H</p> <p>I</p> <p>J</p> <p>K</p> <p>L</p>

M

# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

UBS001R9

## Fail-safe Chart

- When the DTC listed below is detected, the ECM enters fail-safe mode and the MIL lights up.

DTC No.	Detected items	Engine operating condition in fail-safe mode								
P0102 P0103 P1102	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.								
P0117 P0118	Engine coolant temperature sensor circuit	<p>Engine coolant temperature will be determined by ECM based on the time after turning ignition switch "ON" or "START". CONSULT-II displays the engine coolant temperature decided by ECM.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Condition</th> <th style="width: 50%;">Engine coolant temperature decided (CONSULT-II display)</th> </tr> </thead> <tbody> <tr> <td>Just as ignition switch is turned ON or Start</td> <td style="text-align: center;">40°C (104°F)</td> </tr> <tr> <td>More than approx. 4 minutes after ignition ON or Start</td> <td style="text-align: center;">80°C (176°F)</td> </tr> <tr> <td>Except as shown above</td> <td style="text-align: center;">40 - 80°C (104 - 176°F) (Depends on the time)</td> </tr> </tbody> </table> <p>When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.</p>	Condition	Engine coolant temperature decided (CONSULT-II display)	Just as ignition switch is turned ON or Start	40°C (104°F)	More than approx. 4 minutes after ignition ON or Start	80°C (176°F)	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
Condition	Engine coolant temperature decided (CONSULT-II display)									
Just as ignition switch is turned ON or Start	40°C (104°F)									
More than approx. 4 minutes after ignition ON or Start	80°C (176°F)									
Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)									
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	<p>The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.</p>								
P1121	Electric throttle control actuator (ECM detect the throttle valve is stuck open.)	<p>While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in "N" or "P" position, and engine speed will not exceed 1,000 rpm or more.</p>								
P1122	Electric throttle control function	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
P1124 P1126	Throttle control motor relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
P1128	Throttle control motor	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
P1129	Sensor power supply	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
P2122 P2123 P2127 P2128 P2138	Accelerator pedal position sensor	<p>The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.</p>								

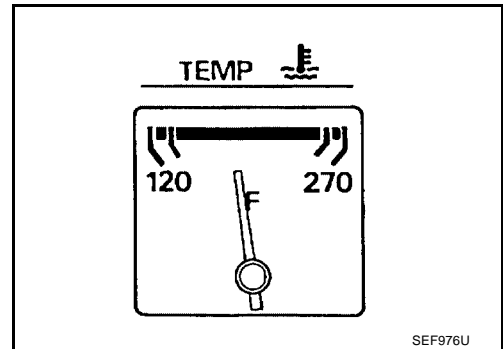
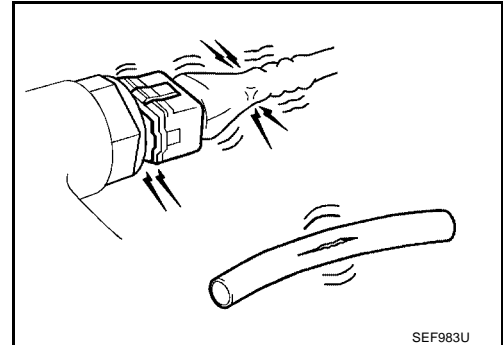
- When there is an open circuit on MIL circuit, the ECM can not warn the driver by lighting MIL up when there is malfunction on engine control system.  
Therefore, when Electrical controlled throttle and part of ECM related diagnoses is continuously detected as NG for 5-trips, ECM warns the driver that engine control system has malfunction and MIL circuit is open by means of operating fail-safe function.  
The fail-safe function also operates when above diagnoses except MIL circuit and demands the driver to repair the malfunction.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut.
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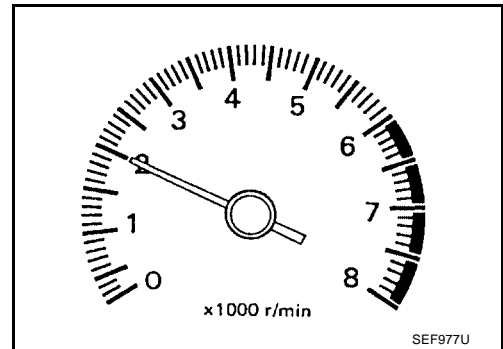
## Basic Inspection

### 1. INSPECTION START

1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
  - Harness connectors for improper connections
  - Wiring harness for improper connections, pinches and cut
  - Vacuum hoses for splits, kinks and improper connections
  - Hoses and ducts for leaks
  - Air cleaner clogging
  - Gasket
3. Confirm that electrical or mechanical loads are not applied.
  - Headlamp switch is OFF.
  - Air conditioner switch is OFF.
  - Rear window defogger switch is OFF.
  - Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge. Ensure engine stays below 1,000 rpm.



5. Run engine at about 2,000 rpm for about 2 minutes under no-load.
  6. Make sure that no DTC is displayed with CONSULT-II or GST.
- OK or NG**
- OK    >> GO TO 3.  
 NG    >> GO TO 2.



### 2. REPAIR OR REPLACE

Repair or replace components as necessary according to corresponding "Diagnostic Procedure".

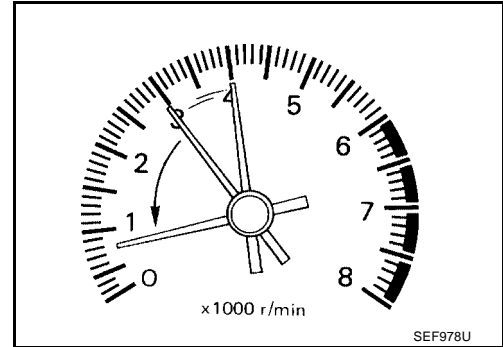
>> GO TO 3.

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### 3. CHECK TARGET IDLE SPEED

#### With CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.



3. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### Without CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.
3. Check idle speed.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

OK or NG

- OK >> GO TO 9.  
NG >> GO TO 4.

### 4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#).

>> GO TO 5.

### 5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-634, "Throttle Valve Closed Position Learning"](#).

>> GO TO 6.

**6. PERFORM IDLE AIR VOLUME LEARNING**

Refer to [EC-635, "Idle Air Volume Learning"](#) .

Is "Idle Air Volume Learning" carried out successfully?

Yes or No

Yes >> GO TO 7.

No >> 1. Follow the construction of "Idle Air Volume Learning".  
2. GO TO 4.

**7. CHECK TARGET IDLE SPEED AGAIN****Ⓜ With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

**ⓧ Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

OK or NG

OK >> GO TO 10.

NG >> GO TO 8.

**8. DETECT MALFUNCTIONING PART**

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-842](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-836](#) .

OK or NG

OK >> GO TO 9.

NG >> 1. Repair or replace.  
2. GO TO 4.

**9. CHECK ECM FUNCTION**

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a incident, but this is the rarely the case.)

>> GO TO 4.

**10. CHECK IGNITION TIMING**

1. Run engine at idle.
2. Check ignition timing with a timing light.

**M/T: 7 ± 5° BTDC**

**A/T: 18 ± 5° BTDC (in "P" or "N" position)**

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 11.

**11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING**

---

1. Stop engine.
2. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 12.

**12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING**

---

Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 13.

**13. PERFORM IDLE AIR VOLUME LEARNING**

---

Refer to [EC-635, "Idle Air Volume Learning"](#) .

**Is "Idle Air Volume Learning" carried out successfully?**

Yes or No

Yes >> GO TO 14.

No >> 1. Follow the construction of "Idle Air Volume Learning".  
2. GO TO 4.

**14. CHECK TARGET IDLE SPEED AGAIN**

---

 **With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

 **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

**M/T: 650 ± 50 rpm**

**A/T: 800 ± 50 rpm (in "P" or "N" position)**

OK or NG

OK >> GO TO 15.

NG >> GO TO 17.

**15. CHECK IGNITION TIMING AGAIN**

---

1. Run engine at idle.
2. Check ignition timing with a timing light.

**M/T: 7 ± 5° BTDC**

**A/T: 18 ± 5° BTDC (in "P" or "N" position)**

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 16.



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**16. CHECK TIMING CHAIN INSTALLATION**

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Check timing chain installation. Refer to [EM-45, "INSTALLATION"](#) .

**OK or NG**

- OK >> GO TO 17.  
NG >> 1. Repair the timing chain installation.  
2. GO TO 4.

---

**17. DETECT MALFUNCTIONING PART**

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Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-842](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-836](#) .

**OK or NG**

- OK >> GO TO 18.  
NG >> 1. Repair or replace.  
2. GO TO 4.

---

**18. CHECK ECM FUNCTION**

---

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a incident, but this is the rarely the case.)

>> GO TO 4.

A

EC

C

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M

# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

UBS001RB

## Symptom Matrix Chart SYSTEM — ENGINE CONTROL SYSTEM

		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	<a href="#">EC-1174</a>
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			<a href="#">EC-637</a>
	Injector circuit	1	1	2	3	2		2	2			2			<a href="#">EC-1168</a>
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			<a href="#">EC-1205</a>
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		<a href="#">EC-1218</a>
	Incorrect idle speed adjustment	3	3				1	1	1	1		1			<a href="#">EC-624</a>
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	<a href="#">EC-952</a> , <a href="#">EC-954</a>
Igni-tion	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			<a href="#">EC-669</a>
	Ignition circuit	1	1	2	2	2		2	2			2			<a href="#">EC-1156</a>
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3		2	<a href="#">EC-721</a>
Air conditioner circuit		2	2	3	3	3	3	3	3	3		3		2	<a href="#">MTC-19</a>

1 - 6: The numbers refer to the order of inspection.

(continued on next page)

# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

	SYMPTOM													Reference page
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATSWATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Camshaft position sensor (PHASE) circuit	2	2	3	3	3		3	3			3			<a href="#">EC-825</a>
Mass air flow sensor circuit	1	1	2	2	2		2	2			2			<a href="#">EC-740,</a> <a href="#">EC-748</a>
A/F sensor 1		1	2	3	2		2	2			2			<a href="#">EC-1033</a>
Engine coolant temperature sensor circuit	1	1	2	3	2	3	2	2	3		2			<a href="#">EC-760,</a> <a href="#">EC-772</a>
Throttle position sensor circuit		1	2		2	2	2	2	2		2			<a href="#">EC-765,</a> <a href="#">EC-818,</a> <a href="#">EC-1024,</a> <a href="#">EC-1026,</a> <a href="#">EC-1140</a>
Accelerator pedal position sensor circuit			3	2	1	2			2					<a href="#">EC-1028,</a> <a href="#">EC-1125,</a> <a href="#">EC-1132,</a> <a href="#">EC-1147</a>
Incorrect throttle position sensor adjustment		3	1		1	1	1	1	1		1			<a href="#">EC-669</a>
Swirl control valve circuit	3	3						2						<a href="#">EC-984</a>
Intake valve timing control system		3	3		3		3				3			<a href="#">EC-947</a>
Vehicle speed sensor circuit		2	3		3						3			<a href="#">EC-916</a>
Knock sensor circuit			2								3			<a href="#">EC-832</a>
ECM	2	2	3	3	3	3	3	3	3	3	3			<a href="#">EC-927,</a> <a href="#">EC-668</a>
Start signal circuit	2													<a href="#">SC-10</a>
PNP switch circuit			3		3		3	3			3			<a href="#">EC-1115</a>
Power steering pressure sensor circuit		2					3	3						<a href="#">EC-922</a>
Electrical load signal circuit							3	3						<a href="#">EC-1185</a>

1 - 6: The numbers refer to the order of inspection.  
(continued on next page)

# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

## SYSTEM — ENGINE MECHANICAL & OTHER

		SYMPTOM											Reference page			
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION		EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		
Fuel	Fuel tank	5	5												<a href="#">FL-7</a>	
	Fuel piping			5	5	5		5	5			5				
	Vapor lock															
	Valve deposit															
	Poor fuel (Heavy weight gasoline, Low octane)	5		5	5	5		5	5			5				
Air	Air duct		5													
	Air cleaner															
	Air leakage from air duct (Mass air flow sensor — electric throttle control actuator)			5	5		5		5	5			5			
	Electric throttle control actuator, Throttle wire	5				5		5			5					<a href="#">EM-12</a>
	Air leakage from intake manifold/Collector/Gasket															
Cranking	Battery	1	1	1		1		1	1					1	<a href="#">SC-4</a>	
	Generator circuit															
	Starter circuit	3										1			<a href="#">EM-67</a>	
	Flywheel/Drive plate/Signal plate	6													<a href="#">EC-1115</a>	
	PNP switch	4														

1 - 6: The numbers refer to the order of inspection.  
(continued on next page)

# TROUBLE DIAGNOSIS

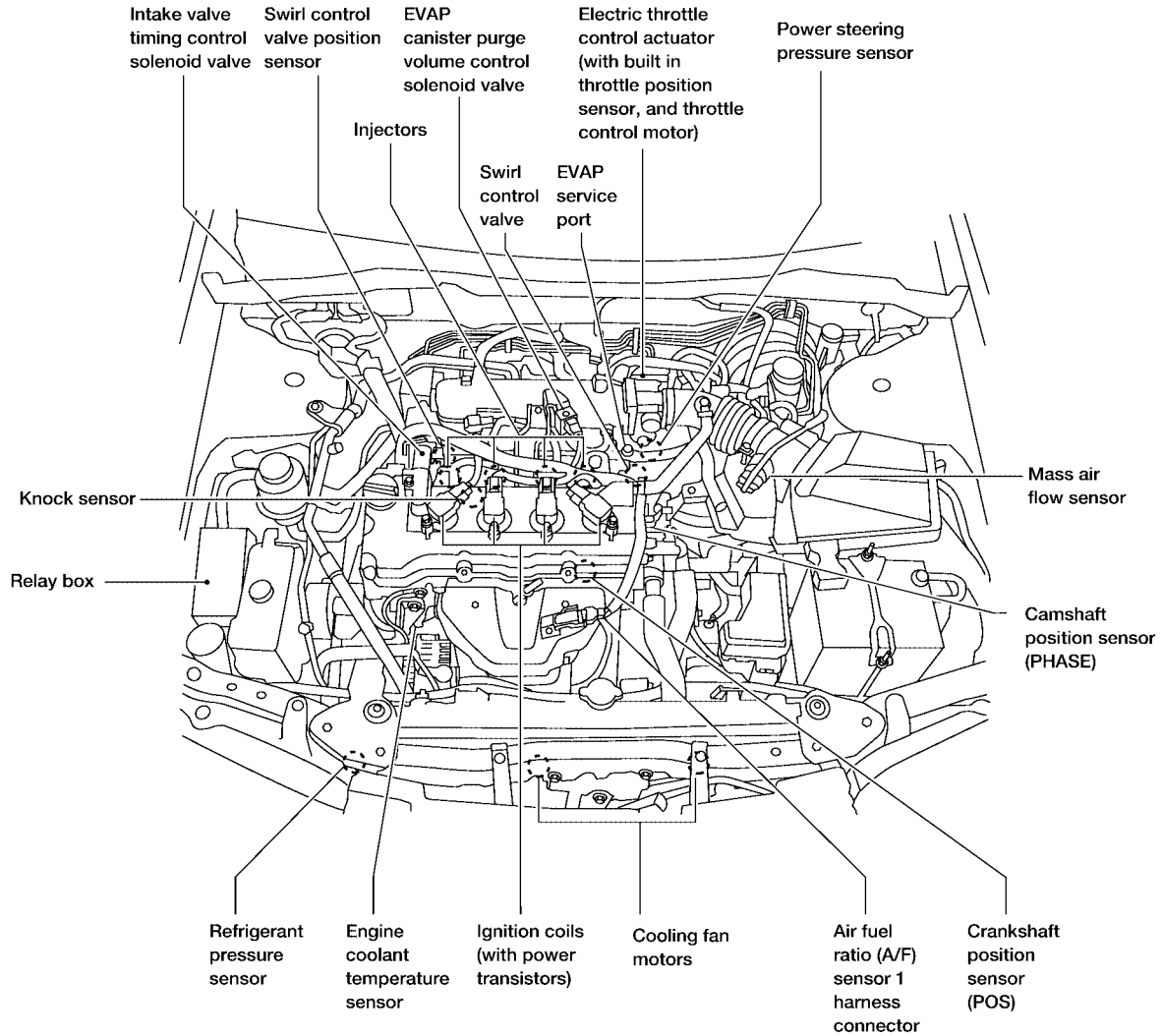
[QG18DE (SULEV)]

		SYMPTOM												Reference page		
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATSWATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM-52, EM-67	
	Cylinder head gasket										4	3				
	Cylinder block												4			
	Piston															
	Piston ring	6	6	6	6	6		6	6			6				
	Connecting rod															
	Bearing															
	Crankshaft															
Valve mechanism	Timing chain														EM-52	
	Camshaft															
	Intake valve timing control	5	5	5	5	5		5	5			5				
	Intake valve												3			
	Exhaust valve															
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5		5	5			5			EM-52	
	Three way catalyst															
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5		5	5			5			EM-16, LU-8, LU-7	
	Oil level (Low)/Filthy oil															
Cooling	Radiator/Hose/Radiator filler cap														CO-6, CO-7	
	Thermostat									5						
	Water pump	5	5	5	5	5		5	5		4	5				
	Water gallery															
	Cooling fan									5						EC-1009
	Coolant level (low)/Contaminated coolant															CO-7

1 - 6: The numbers refer to the order of inspection.

### Engine Control Component Parts Location

UBS001RC



BBIA0168E

A

EC

C

D

E

F

G

H

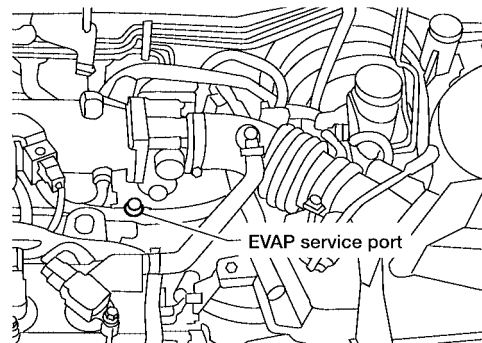
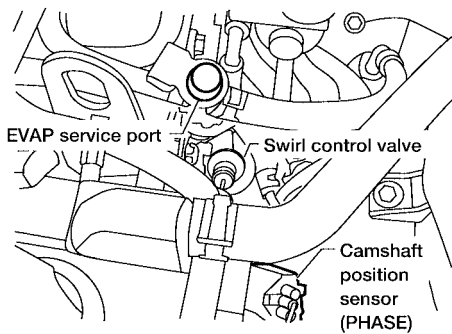
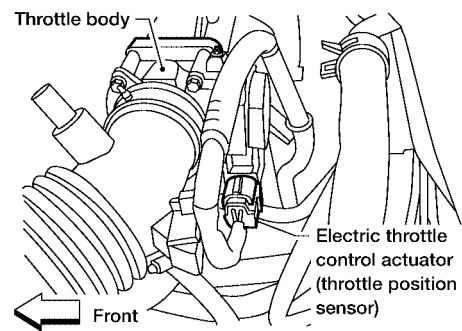
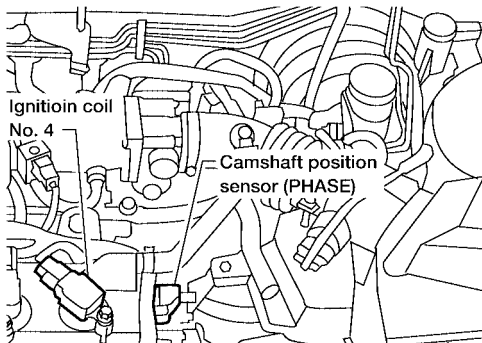
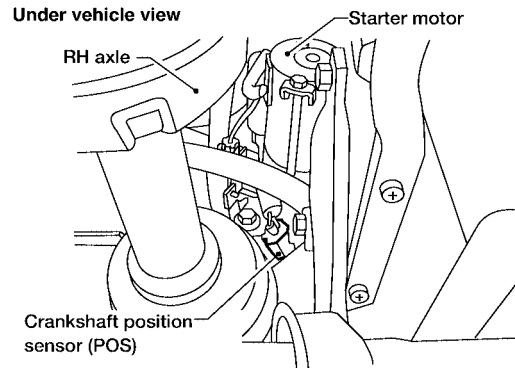
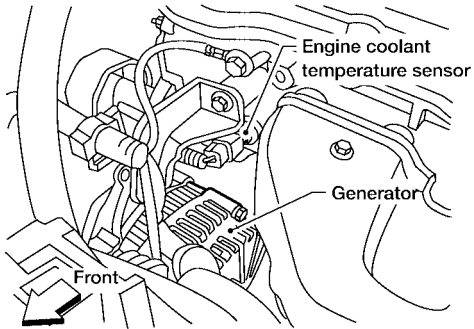
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J

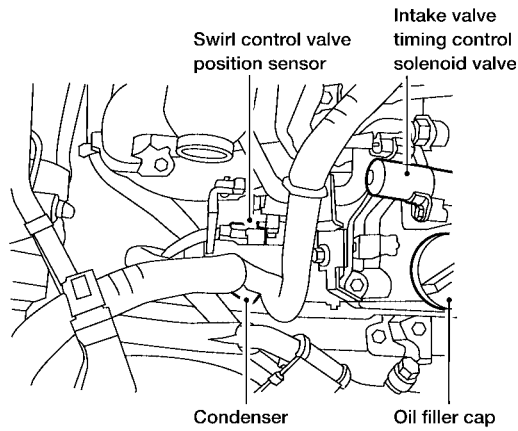
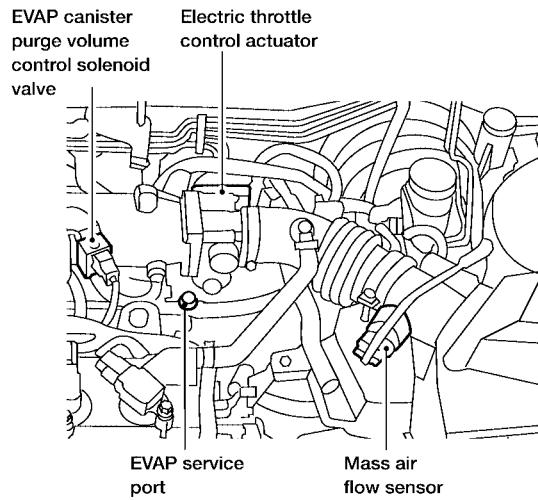
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L

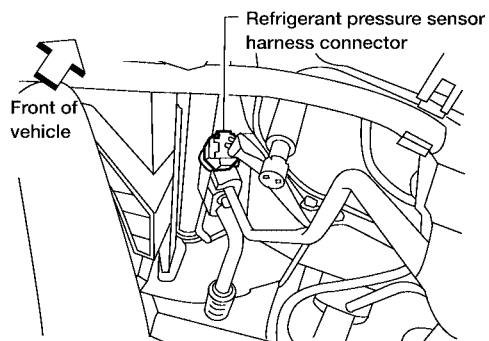
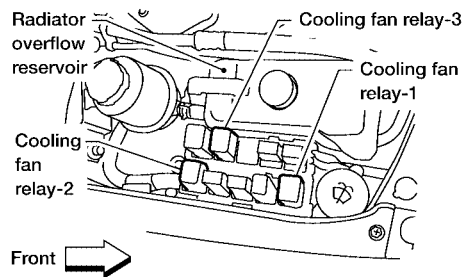
M



BBIA0169E



View with relay box cover removed



BBIA0170E



A

EC

C

D

E

F

G

H

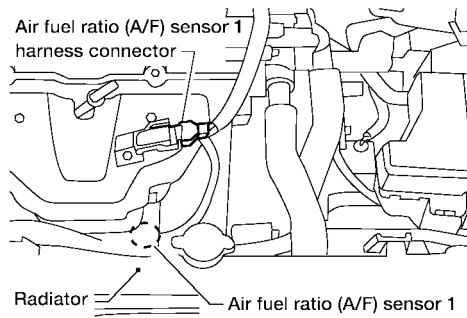
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J

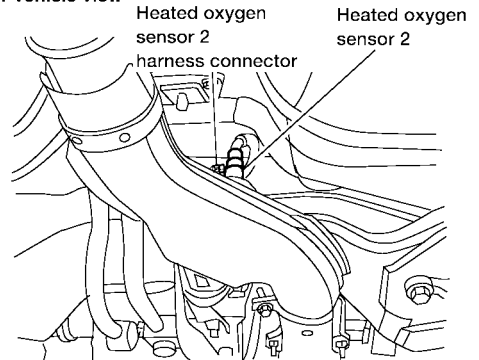
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L

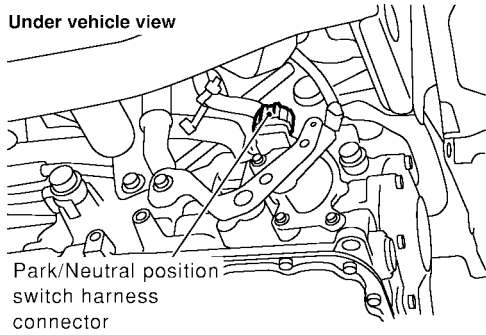
M



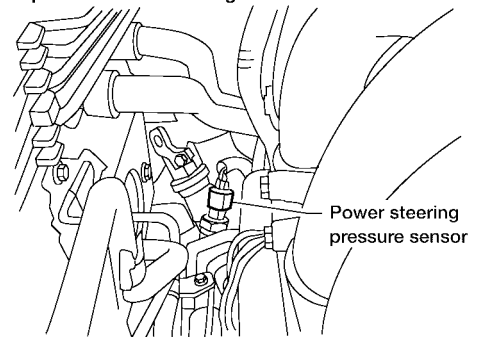
Under vehicle view



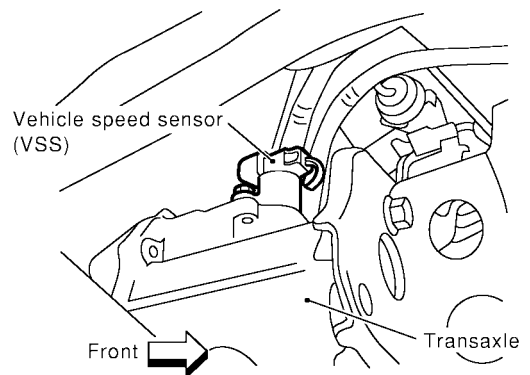
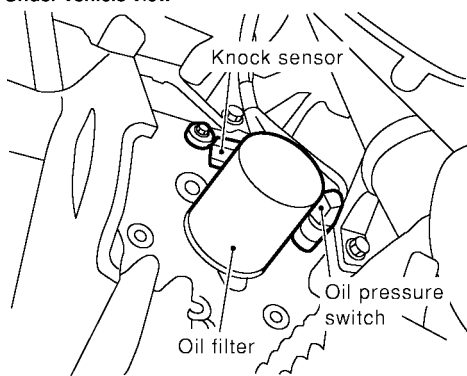
Under vehicle view



Top view from rear of engine

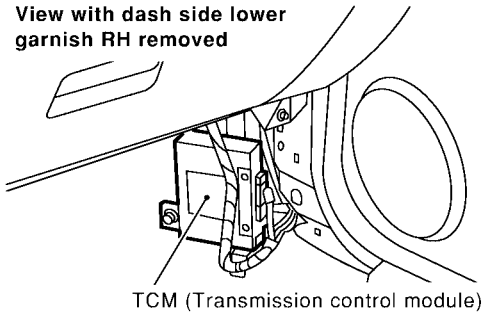


Under vehicle view

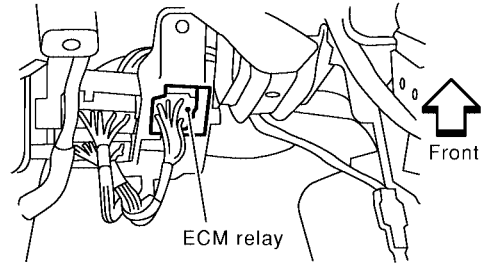


BBIA0139E

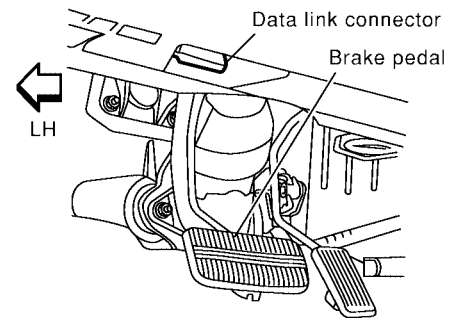
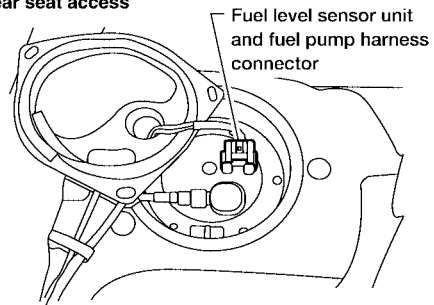
View with dash side lower  
garnish RH removed



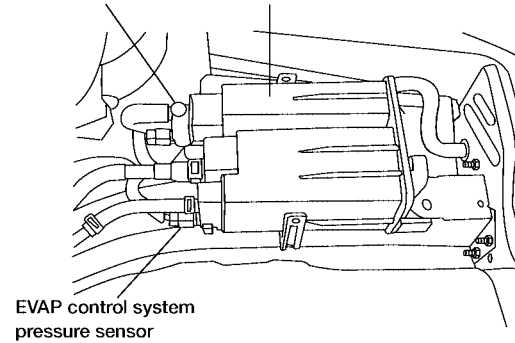
Passenger side view with  
instrument panel removed for clarity



Rear seat access



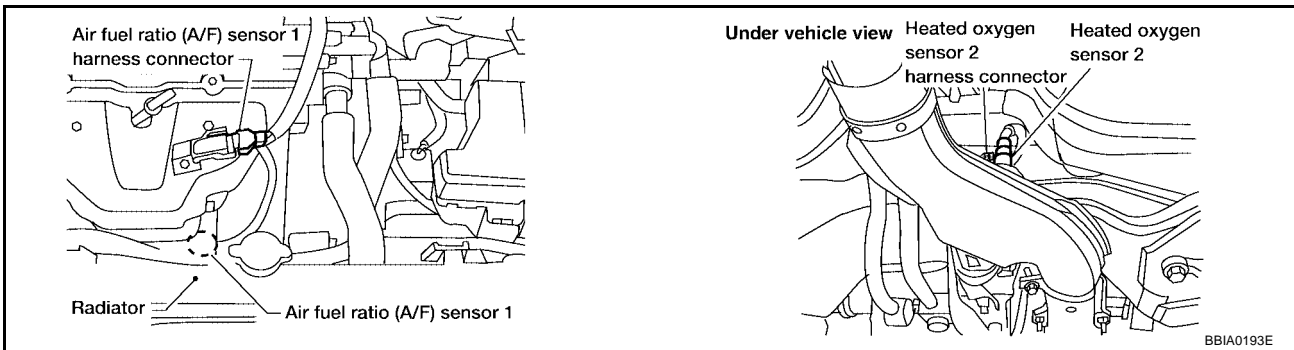
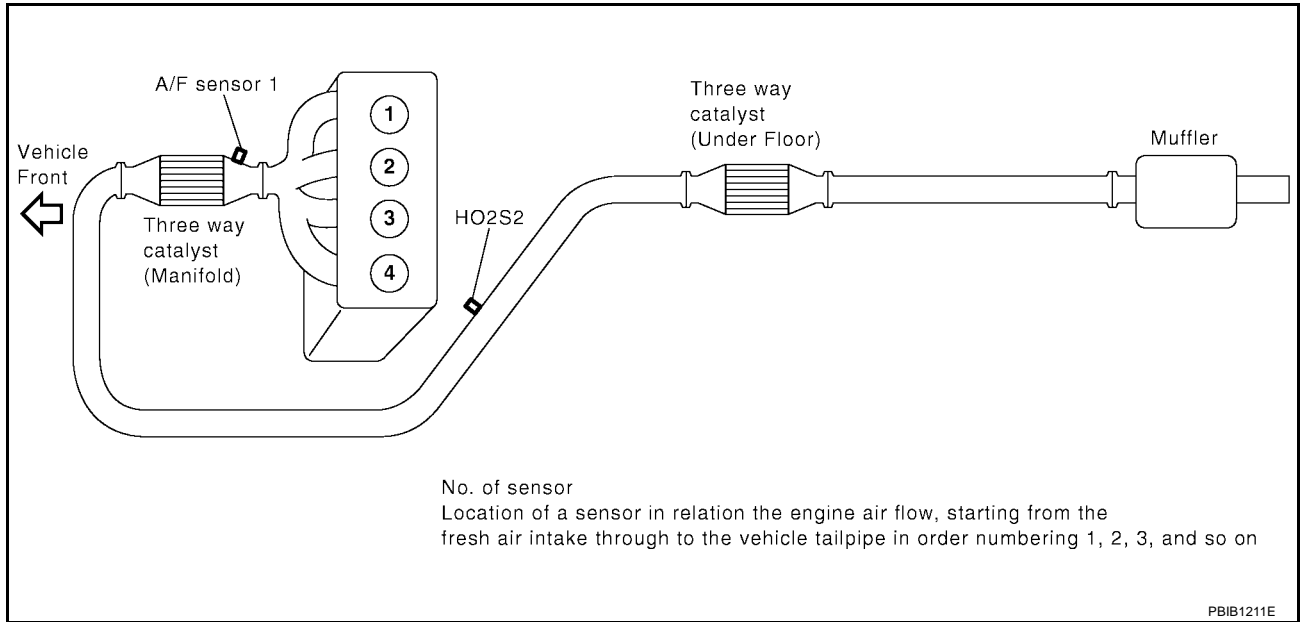
EVAP canister  
vent control valve



BBIA0171E

# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]



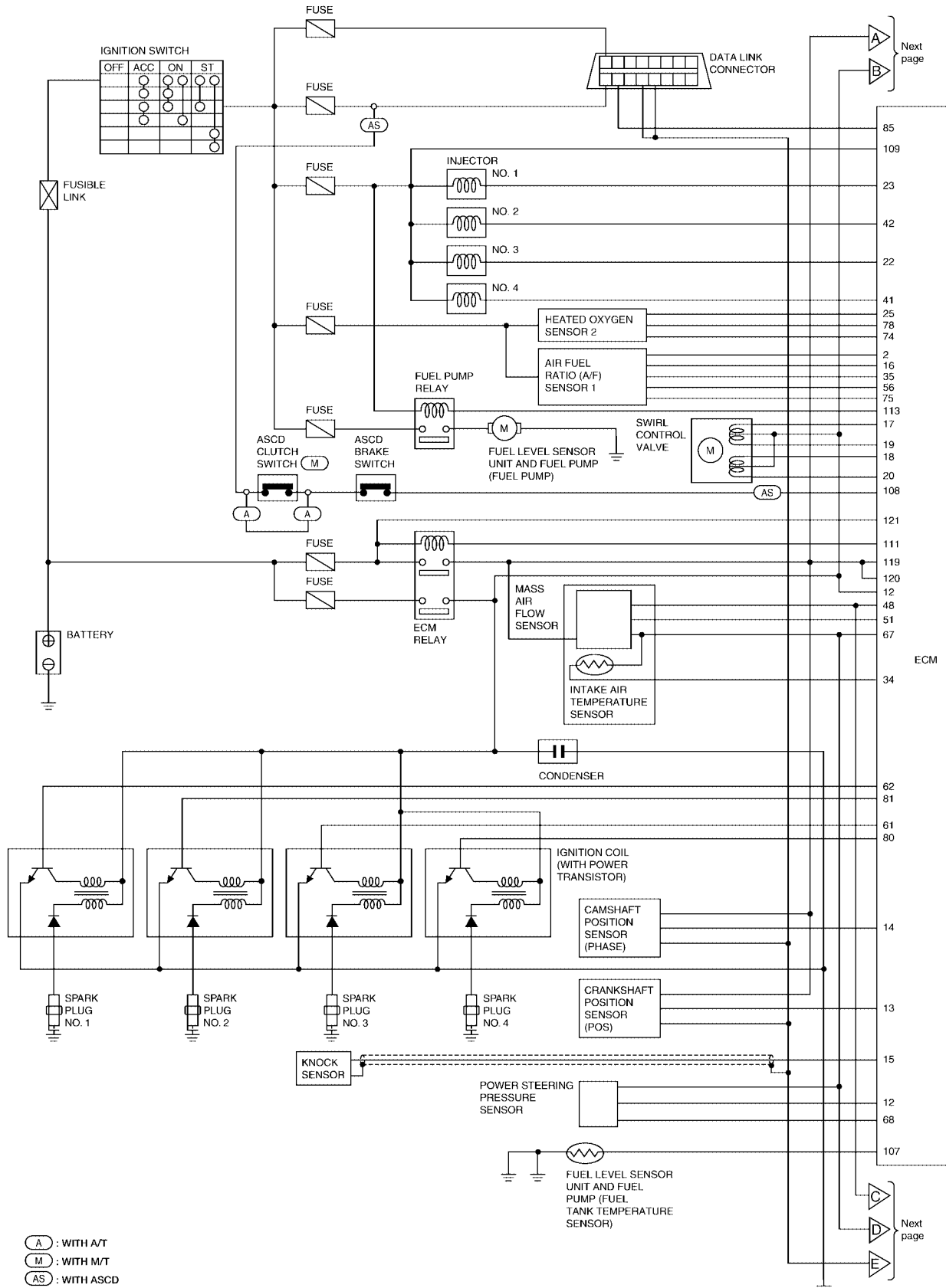
A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

## Circuit Diagram

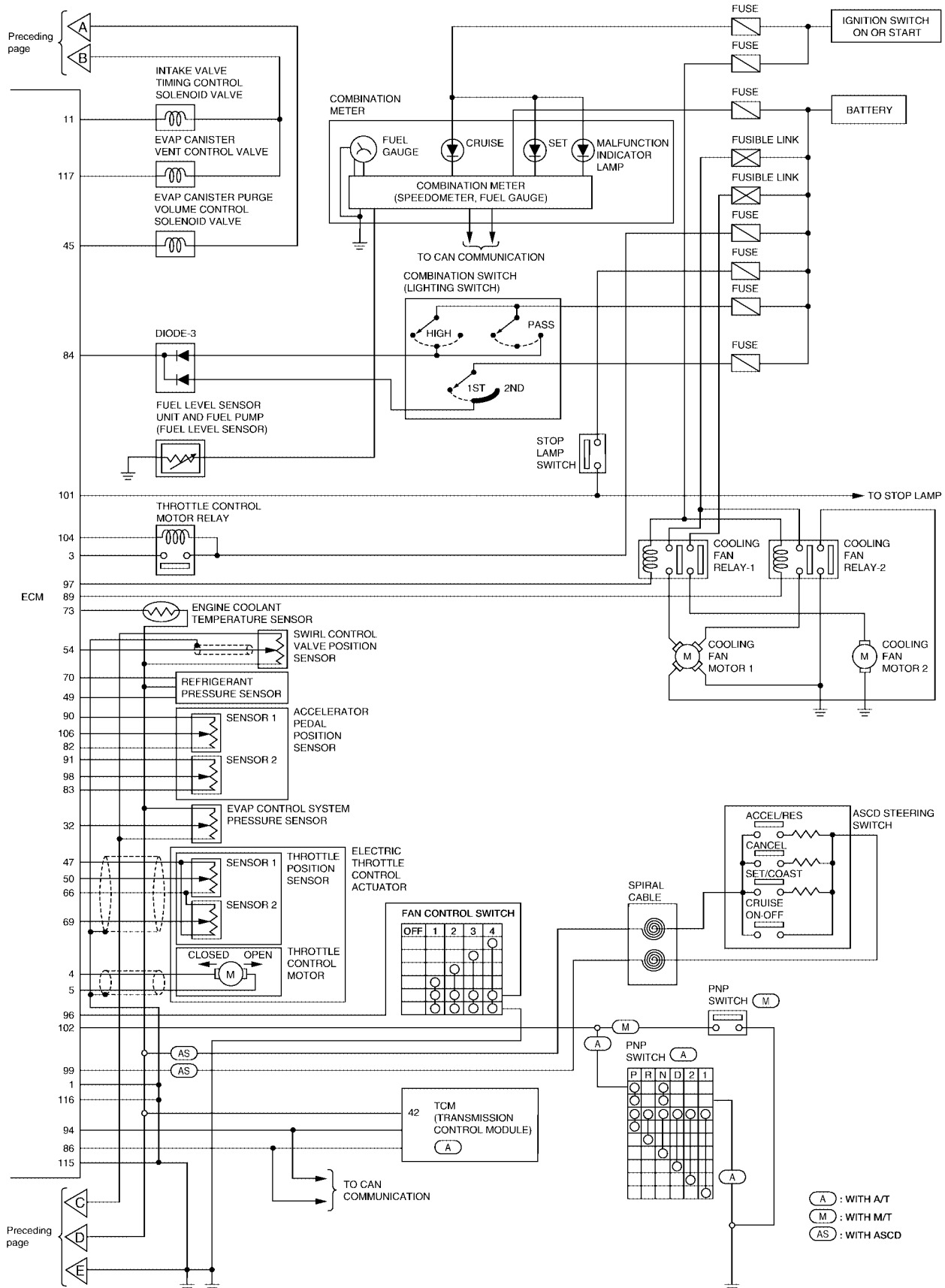
UBS001RD



BBWA0405E

# TROUBLE DIAGNOSIS

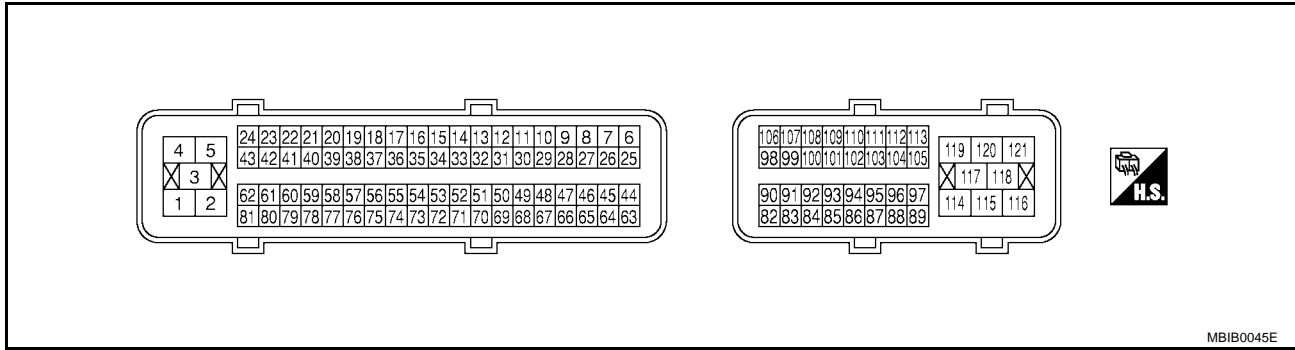
[QG18DE (SULEV)]



BBWA0406E

## ECM Harness Connector Terminal Layout

UBS001RE

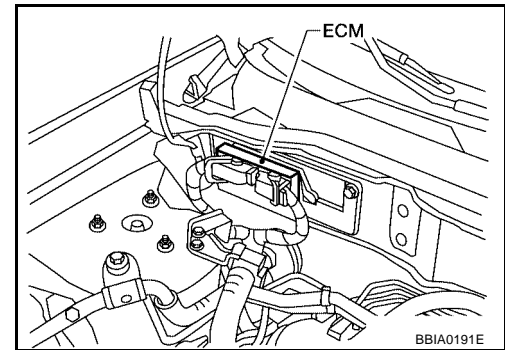


MBIB0045E

## ECM Terminals and Reference Value PREPARATION

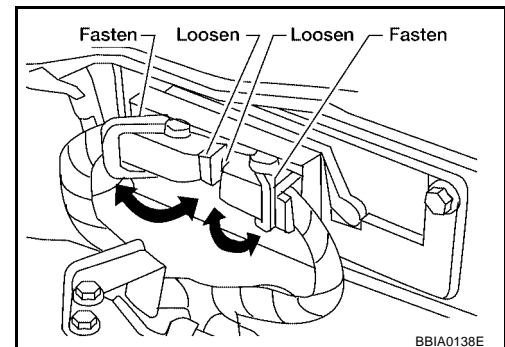
UBS0067T

1. ECM is located in the right side of the cowl top (behind the strut tower).  
For this inspection:
2. Remove ECM harness protector.



BBIA0191E

3. When disconnecting ECM harness connector, loosen it with levers as far as they will go as show at right.
4. Connect a bread-out box (SST) and Y-cable adapter (SST) between the ECM and ECM harness connector.
  - Use extreme care not to touch 2 pins at one time.
  - Data is for comparison and may not be exact.



BBIA0138E

## ECM INSPECTION TABLE

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-II.

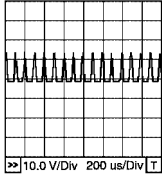
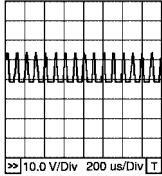
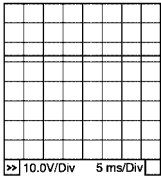
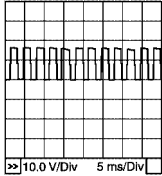
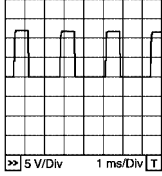
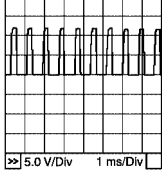
### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	B	ECM ground	<b>[Engine is running]</b> ● Idle speed	Engine ground
2	R	A/F sensor 1 heater	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 5V
3	R/W	Throttle control motor power supply	<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)

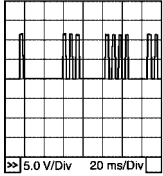
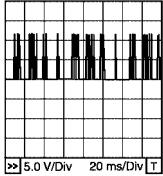
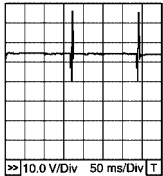
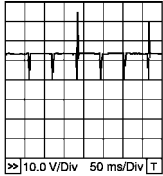
# TROUBLE DIAGNOSIS

**[QG18DE (SULEV)]**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
4	P	Throttle control motor (Close)	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Gear position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal is releasing</li> </ul>	0 - 14V★  <small>10.0 V/Div 200 us/Div</small>	EC
			PBIB0534E		
5	L	Throttle control motor (Open)	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Gear position is "D" (A/T models)</li> <li>● Shift lever position is "1st" (M/T models)</li> <li>● Accelerator pedal is depressing</li> </ul>	0 - 14V★  <small>10.0 V/Div 200 us/Div</small>	EC
			PBIB0533E		
11	G/Y	Intake valve timing control solenoid valve	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	BATTERY VOLTAGE (11 - 14V)★  <small>10.0V/Div 5 ms/Div</small>	EC
			MBIB0052E		
11	G/Y	Intake valve timing control solenoid valve	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed 2,500 rpm</li> </ul>	7 - 10V★  <small>10.0 V/Div 5 ms/Div</small>	EC
			PBIB0532E		
12	P	Power steering pressure sensor	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Steering wheel is being turned</li> </ul>	0.5 - 4.0V	EC
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Steering wheel is not being turned</li> </ul>	0.4 - 0.8V	
13	Y	Crankshaft position sensor (POS)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 3.0V★  <small>5 V/Div 1 ms/Div</small>	EC
			PBIB0527E		
13	Y	Crankshaft position sensor (POS)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is 2,000 rpm</li> </ul>	Approximately 3.0V★  <small>5.0 V/Div 1 ms/Div</small>	EC
			PBIB0528E		

# TROUBLE DIAGNOSIS

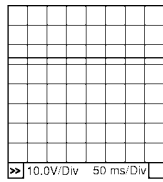
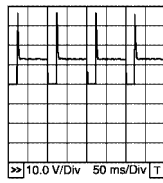
**[QG18DE (SULEV)]**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	W/R	Camshaft position sensor (PHASE)	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>1.0 - 4.0V★</p>  <p style="text-align: right; font-size: small;">PBIB0525E</p>
			<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Engine speed is 2,000 rpm.</li> </ul>	<p>1.0 - 4.0V★</p>  <p style="text-align: right; font-size: small;">PBIB0526E</p>
15	W	Knock sensor	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	Approximately 2.5V
16	OR/L	A/F sensor 1	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 3.1V
35	B/Y			Approximately 2.6V
56	OR			2 - 3V
75	W/L			2 - 3V
17 18 19 20	LG R/W PU/W L/Y	Swirl control valve	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	0.1 - 14V
22 23 41 42	G/B R/B L/B Y/B	Injector No. 3 Injector No. 1 Injector No. 4 Injector No. 2	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right; font-size: small;">PBIB0529E</p>
			<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right; font-size: small;">PBIB0530E</p>




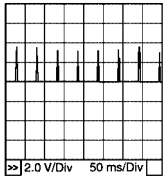
# TROUBLE DIAGNOSIS

**[QG18DE (SULEV)]**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
25	W/B	Heated oxygen sensor 2 heater	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Engine speed: Below 3,600 rpm after the following conditions are met.</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under on load</li> </ul>	0 - 1.0V	A
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped.</li> </ul> <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is above 3,600 rpm.</li> </ul>	BATTERY VOLTAGE (11 - 14V)	EC
32	L	EVAP control system pressure sensor	<b>[Ignition switch "ON"]</b>	Approximately 1.8 - 4.8V	C
34	Y/G	Intake air temperature sensor	<b>[Engine is running]</b>	Approximately 0 - 4.8V Output voltage varies with intake air temperature.	D
45	GY/L	EVAP canister purge volume control solenoid valve	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	BATTERY VOLTAGE (11 - 14V)★ 	E
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine)</li> </ul>	Approximately 10V★ 	F
47	B	Sensor power supply (Throttle position sensor)	<b>[Ignition switch "ON"]</b>	Approximately 5V	G
48	R/W	Sensor's power supply	<b>[Ignition switch "ON"]</b>	Approximately 5V	H
49	R/Y	Sensor power supply (Refrigerant pressure sensor)	<b>[Ignition switch "ON"]</b>	Approximately 5V	I
50	W	Throttle position sensor 1	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Gear position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully released</li> </ul>	More than 0.36V	J
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Gear position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully depressed</li> </ul>	Less than 4.75V	K

# TROUBLE DIAGNOSIS

**[QG18DE (SULEV)]**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
51	L/R	Mass air flow sensor	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	1.0 - 1.7V
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,500 rpm.</li> </ul>	1.5 - 2.1V
54	Y	Swirl control valve position sensor	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Idle speed</li> <li>● Engine coolant temperature is below 44°C (111°F).</li> </ul>	Approximately 5V
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> <li>● Engine coolant temperature is above 45°C (113°F).</li> </ul>	0 - 1.0V
61 62 80 81	L/W BR GY/R PU	Ignition signal No. 3 Ignition signal No. 1 Ignition signal No. 4 Ignition signal No. 2	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	0 - 0.1V★  <small>PBIB0521E</small>
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm.</li> </ul>	0 - 0.2V★  <small>PBIB0522E</small>
66	R	Sensor ground (Throttle position sensor)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 0V
67	B/W	Sensor ground (Mass air flow sensor)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 0V
68	G/R	Sensor power supply (Power steering pressure sensor)	<b>[Ignition switch "ON"]</b>	Approximately 5V
69	G	Throttle position sensor 2	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Gear position is "D" (A/T models)</li> <li>● Shift lever position is "1st" (M/T models)</li> <li>● Accelerator pedal fully released</li> </ul>	Less than 4.75V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Gear position is "D" (A/T models)</li> <li>● Shift lever position is "1st" (M/T models)</li> <li>● Accelerator pedal fully depressed</li> </ul>	More than 0.36V

# TROUBLE DIAGNOSIS

**[QG18DE (SULEV)]**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	A
70	L	Refrigerant pressure sensor	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Both A/C switch and blower switch are "ON" (Compressor operates.)</li> </ul>	1.0 - 4.0V	EC
73	BR/W	Engine coolant temperature sensor	<b>[Engine is running]</b>	Approximately 0 - 4.8V Output voltage varies with engine coolant temperature.	C
74	R/L	Heated oxygen sensor 2	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Revving engine from idle up to 3,000 rpm quickly after the following conditions are met.</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	0 - Approximately 1.0V	D E F
78	B	Sensor ground (Heated oxygen sensor)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Idle speed</li> </ul>	Approximately 0V	G
82	B/Y	Sensor ground (Accelerator pedal position sensor 1)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Idle speed</li> </ul>	Approximately 0V	H
83	G	Sensor ground (Accelerator pedal position sensor 2)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Idle speed</li> </ul>	Approximately 0V	I
84	PU	Electrical load signal (Headlamp signal)	<b>[Lighting switch "ON"]</b> <ul style="list-style-type: none"> <li>● Lighting switch is "2nd" position</li> </ul>	BATTERY VOLTAGE (11 - 14V)	J
			<b>[Lighting switch "ON"]</b> <ul style="list-style-type: none"> <li>● Lighting switch is "OFF"</li> </ul>	Approximately 0V	K
85	LG	DATA link connector	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● CONSULT-II or GST is disconnected.</li> </ul>	BATTERY VOLTAGE (11 - 14V)	L
86	Y	CAN communication line	<b>[Ignition switch "ON"]</b>	Approximately 2.3V	L
89	LG/B	Cooling fan relay (High)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Cooling fan is not operating</li> </ul>	BATTERY VOLTAGE (11 - 14V)	M
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Cooling fan is high speed operating</li> </ul>	0 - 1.0V	M
90	R	Sensor power supply (Accelerator pedal position sensor 1)	<b>[Ignition switch "ON"]</b>	Approximately 5V	
91	R/G	Sensor power supply (Accelerator pedal position sensor 2)	<b>[Ignition switch "ON"]</b>	Approximately 5V	
94	L	CAN communication line	<b>[Ignition switch "ON"]</b>	Approximately 2.8V	
96	Y/G	Heater fan switch	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Heater fan switch "ON"</li> </ul>	Approximately 0V	
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Heater fan switch "OFF"</li> </ul>	Approximately 0V	

# TROUBLE DIAGNOSIS

**[QG18DE (SULEV)]**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
97	LG/R	Cooling fan relay (Low)	<b>[Ignition switch "ON"]</b> ● Cooling fan is not operating	BATTERY VOLTAGE (11 - 14V)
			<b>[Ignition switch "ON"]</b> ● Cooling fan is operating	0 - 1.0V
98	R/B	Accelerator pedal position sensor 2	<b>[Ignition switch "ON"]</b> ● Engine stopped ● Accelerator pedal fully released	0.28 - 0.48V
			<b>[Ignition switch "ON"]</b> ● Engine stopped ● Accelerator pedal fully depressed	More than 2.0V
99	W/R	ASCD steering switch	<b>[Ignition switch "ON"]</b> ● ASCD steering switch is "OFF".	Approximately 4V
			<b>[Ignition switch "ON"]</b> ● CRUISE switch is "ON".	Approximately 0V
			<b>[Ignition switch "ON"]</b> ● CANCEL switch is "ON".	Approximately 1V
			<b>[Ignition switch "ON"]</b> ● COAST/SET switch is "ON".	Approximately 2V
			<b>[Ignition switch "ON"]</b> ● ACCEL/RESUME switch is "ON".	Approximately 3V
101	R/G	Stop lamp switch	<b>[Ignition switch "ON"]</b> ● Brake pedal fully released	Approximately 0V
			<b>[Ignition switch "ON"]</b> ● Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)
102	G/OR	PNP switch	<b>[Ignition switch "ON"]</b> ● Gear position is "P" or "N"	Approximately 0V
			<b>[Ignition switch "ON"]</b> ● Except the above gear position	<b>A/T models</b> BATTERY VOLTAGE (11 - 14V) <b>M/T models</b> Approximately 5V
104	P	Throttle control motor relay	<b>[Ignition switch "OFF"]</b>	BATTERY VOLTAGE (11 - 14V)
			<b>[Ignition switch "ON"]</b>	0 - 1.0V
106	W	Accelerator pedal position sensor 1	<b>[Ignition switch "ON"]</b> ● Engine stopped ● Accelerator pedal fully released	0.65 - 0.87V
			<b>[Ignition switch "ON"]</b> ● Engine stopped ● Accelerator pedal fully depressed	More than 4.3V
107	OR	Fuel tank temperature sen- sor	<b>[Engine is running]</b>	Approximately 0 - 4.8V Output voltage varies with fuel tank temperature.

# TROUBLE DIAGNOSIS

**[QG18DE (SULEV)]**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
108	P/L	ASCD brake switch	<b>[Ignition switch "ON"]</b> ● Brake pedal is depressed ● Clutch pedal is depressed (M/T models)	Approximately 0V	EC
			<b>[Ignition switch "ON"]</b> ● Brake pedal is depressed ● Clutch pedal is depressed (M/T models)	BATTERY VOLTAGE (11 - 14V)	C
109	B/R	Ignition switch	<b>[Ignition switch "OFF"]</b>	0V	D
			<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)	E
111	W/G	ECM relay (Self shut-off)	<b>[Engine is running]</b> <b>[Ignition switch "OFF"]</b> ● For 5 seconds after turning ignition switch "OFF"	0 - 1.0V	F
			<b>[Ignition switch "OFF"]</b> ● 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)	G
113	B/P	Fuel pump relay	<b>[Ignition switch "ON"]</b> ● For 1 second after turning ignition switch "ON"	0 - 1.0V	H
			<b>[Engine is running]</b> <b>[Ignition switch "ON"]</b> ● More than 1 second after turning ignition switch "ON".	BATTERY VOLTAGE (11 - 14V)	I
115 116	B B	ECM ground	<b>[Engine is running]</b> ● Idle speed	Engine ground	J
117	L/Y	EVAP canister vent control valve	<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)	K
119 120	R/G R/G	Power supply for ECM	<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)	L
121	W/L	Power supply for ECM (Buck-up)	<b>[Ignition switch "OFF"]</b>	BATTERY VOLTAGE (11 - 14V)	M

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

UBS001RG

## CONSULT-II Function FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-II unit.
Self-diagnostic results	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*1
Data monitor	Input/Output data in the ECM can be read.
Data monitor (SPEC)	Input/Output specification of the Basic fuel schedule, AFM, A/F feedback control value and the other data monitor items can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.
Active test	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
DTC & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
Function test	Conducted by CONSULT-II instead of a technician to determine each system is "OK" or "NG".
ECM part number	ECM part number can be read.

\*1 The following emission-related diagnostic information is cleared when the ECM memory is erased.

1. Diagnostic trouble codes
2. 1st trip diagnostic trouble codes
3. Freeze frame data
4. 1st trip freeze frame data
5. System readiness test (SRT) codes
6. Test values
7. Others

# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

## ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

Item		DIAGNOSTIC TEST MODE								
		WORK SUP-PORT	SELF-DIAGNOS-TIC RESULTS		DATA MONI-TOR	DATA MONI-TOR (SPEC)	ACTIVE TEST	DTC & SRT CON-FIRMATION		
			DTC*1	FREEZE FRAME DATA*2				SRT STATUS	DTC WORK SUP-PORT	
ENGINE CONTROL COMPONENT PARTS INPUT	Camshaft position sensor (PHASE)		×	×						A
	Crankshaft position sensor (POS)		×			×				B
	Mass air flow sensor		×		×	×				C
	Engine coolant temperature sensor		×	×	×	×	×			D
	A/F sensor 1		×		×			×	×	E
	Heated oxygen sensor 2		×		×	×		×	×	F
	Vehicle speed sensor		×	×	×	×				G
	Accelerator pedal position sensor		×		×	×				H
	Throttle position sensor		×		×	×				I
	Fuel tank temperature sensor		×		×	×	×			J
	EVAP control system pressure sensor		×		×	×				K
	Intake air temperature sensor		×	×	×	×				L
	Knock sensor		×							M
	Closed throttle position switch (Accelerator pedal position sensor signal)				×	×				N
	Air conditioner switch				×	×				O
	Park/neutral position (PNP) switch		×		×	×				P
	Stop lamp switch		×		×	×				Q
	Power steering oil pressure switch				×	×				R
	Battery voltage				×	×				S
	Load signal				×	×				T
Swirl control valve position sensor		×		×	×				U	
Fuel level sensor		×		×	×				V	
ASCD steering switch		×		×	×				W	
ASCD brake switch		×		×	×				X	

# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

Item		DIAGNOSTIC TEST MODE							
		WORK SUP-PORT	SELF-DIAGNOS-TIC RESULTS		DATA MONI-TOR	DATA MONI-TOR (SPEC)	ACTIVE TEST	DTC & SRT CON-FIRMATION	
			DTC*1	FREEZE FRAME DATA*2				SRT STATUS	DTC WORK SUP-PORT
ENGINE CONTROL COMPONENT PARTS OUTPUT	Injectors				×	×	×		
	Power transistor (Ignition timing)	×			×	×	×		
	Throttle control motor relay		×		×	×			
	Throttle control motor		×						
	EVAP canister purge volume control solenoid valve		×		×	×	×		×
	Air conditioner relay				×	×			
	Fuel pump relay	×			×	×	×		
	Cooling fan		×		×	×	×		
	A/F sensor 1 heater		×		×	×		×	
	Heated oxygen sensor 2 heater		×		×	×		×	
	EVAP canister vent control valve		×		×	×	×		
	Swirl control valve		×		×	×	×		
	Intake valve timing control solenoid valve		×		×	×	×		
	Calculated load value			×	×	×			

X: Applicable

\*1: This item includes 1st trip DTCs.

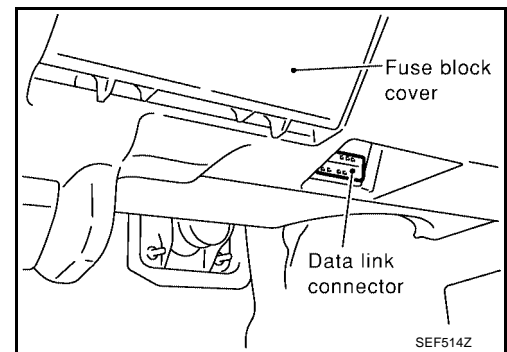
\*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-II screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to [EC-640](#).

## CONSULT-II INSPECTION PROCEDURE

### CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

1. Turn ignition switch OFF.
2. Connect CONSULT-II and "CONSULT-II CONVERTER" to data link connector, which is located under LH dash panel near the fuse box cover.

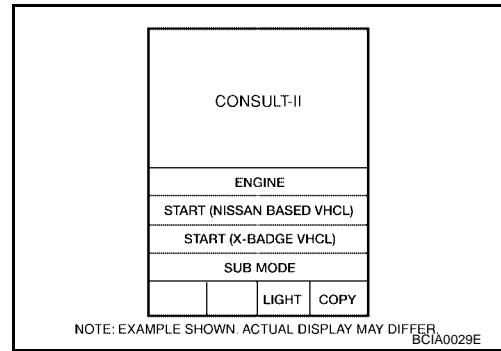




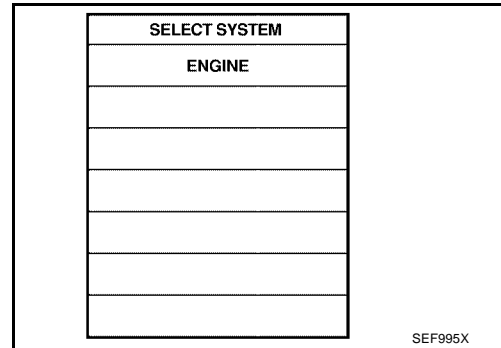
# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

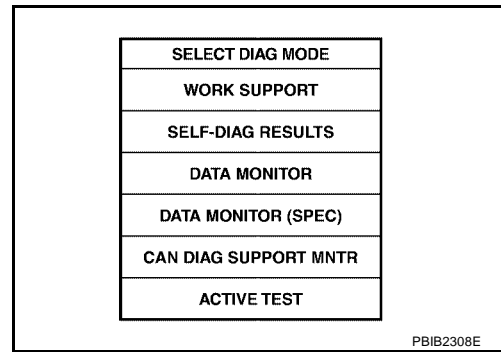
3. Turn ignition switch ON.
4. Touch "START".



5. Touch "ENGINE".



6. Perform each diagnostic test mode according to each service procedure.
- For further information, see the CONSULT-II Operation Manual.**



## WORK SUPPORT MODE

### Work Item

WORK ITEM	CONDITION	USAGE
FUEL PRESSURE RELEASE	<ul style="list-style-type: none"> <li>● FUEL PUMP WILL STOP BY TOUCHING "START" DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS.</li> </ul>	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	<ul style="list-style-type: none"> <li>● THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM.</li> </ul>	When learning the idle air volume
SELF-LEARNING CONT	<ul style="list-style-type: none"> <li>● THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT.</li> </ul>	When clearing the coefficient of self-learning control value

# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

WORK ITEM	CONDITION	USAGE
EVAP SYSTEM CLOSE	<p>CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS.</p> <ul style="list-style-type: none"> <li>● IGN SW "ON"</li> <li>● ENGINE NOT RUNNING</li> <li>● AMBIENT TEMPERATURE IS ABOVE 0°C (32°F).</li> <li>● NO VACUUM AND NO HIGH PRESSURE IN EVAP SYSTEM</li> <li>● TANK FUEL TEMP. IS MORE THAN 0°C (32°F).</li> <li>● WITHIN 10 MINUTES AFTER STARTING "EVAP SYSTEM CLOSE"</li> <li>● WHEN TRYING TO EXECUTE "EVAP SYSTEM CLOSE" UNDER ANY CONDITION OTHER THAN THE ABOVE, CONSULT-II WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTIONS.</li> </ul> <p><b>NOTE:</b>  <b>WHEN STARTING ENGINE, CONSULT-II MAY DISPLAY "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", EVEN IN USING CHARGED BATTERY.</b></p>	When detecting EVAP vapor leak point of EVAP system
TARGET IDLE RPM ADJ*	<ul style="list-style-type: none"> <li>● IDLE CONDITION</li> </ul>	When setting target idle speed
TARGET IGNITION TIMING ADJ*	<ul style="list-style-type: none"> <li>● IDLE CONDITION</li> </ul>	<ul style="list-style-type: none"> <li>● When adjusting target ignition timing After adjustment, confirm target ignition timing with a timing light.</li> <li>● If the "TARGET IDLE RPM ADJ" has been done, the Idle Air Volume Learning procedure will not be completed.</li> </ul>

\*: This function is not necessary in the usual service procedure.

## SELF-DIAG RESULTS MODE

### Self Diagnostic Item

Regarding items of "DTC and 1st trip DTC", refer to "TROUBLE DIAGNOSIS — INDEX" (See [EC-602](#).)

### Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*1	Description
DIAG TROUBLE CODE [PXXXX]	<ul style="list-style-type: none"> <li>● The engine control component part/control system has a trouble code, it is displayed as "PXXXX". (Refer to "TROUBLE DIAGNOSIS — INDEX", <a href="#">EC-602</a>.)</li> </ul>
FUEL SYS-B1	<ul style="list-style-type: none"> <li>● "Fuel injection system status" at the moment a malfunction is detected is displayed.</li> <li>● One mode in the following is displayed.  "MODE 2": Open loop due to detected system malfunction  "MODE 3": Open loop due to driving conditions (power enrichment, deceleration enrichment)  "MODE 4": Closed loop - using oxygen sensor(s) as feedback for fuel control  "MODE 5": Open loop - has not yet satisfied condition to go to closed loop</li> </ul>
CAL/LD VALUE [%]	<ul style="list-style-type: none"> <li>● The calculated load value at the moment a malfunction is detected is displayed.</li> </ul>
COOLANT TEMP [°C] or [°F]	<ul style="list-style-type: none"> <li>● The engine coolant temperature at the moment a malfunction is detected is displayed.</li> </ul>
S-FUEL TRIM-B1 [%]	<ul style="list-style-type: none"> <li>● "Short-term fuel trim" at the moment a malfunction is detected is displayed.</li> <li>● The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.</li> </ul>
L-FUEL TRIM-B1 [%]	<ul style="list-style-type: none"> <li>● "Long-term fuel trim" at the moment a malfunction is detected is displayed.</li> <li>● The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.</li> </ul>

# TROUBLE DIAGNOSIS

**[QG18DE (SULEV)]**

Freeze frame data item*1	Description	
ENGINE SPEED [rpm]	<ul style="list-style-type: none"> <li>● The engine speed at the moment a malfunction is detected is displayed.</li> </ul>	A
VEHICLE SPEED [km/h] or [mph]	<ul style="list-style-type: none"> <li>● The vehicle speed at the moment a malfunction is detected is displayed.</li> </ul>	EC
B/FUEL SCHDL [msec]	<ul style="list-style-type: none"> <li>● The base fuel schedule at the moment a malfunction is detected is displayed.</li> </ul>	C
INT/A TEMP SE [°C] or [°F]	<ul style="list-style-type: none"> <li>● The intake air temperature at the moment a malfunction is detected is displayed.</li> </ul>	D

\*1: The items are the same as those of 1st trip freeze frame data.

A  
EC  
C  
D  
E  
F  
G  
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# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

## DATA MONITOR MODE

### Monitored Item

x: Applicable

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	Description	Remarks
ENG SPEED [rpm]	x	x	<ul style="list-style-type: none"> <li>Indicates the engine speed computed from the signals of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).</li> </ul>	
MAS A/F SE-B1 [V]	x	x	<ul style="list-style-type: none"> <li>The signal voltage of the mass air flow sensor is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> </ul>
B/FUEL SCHDL [msec]		x	<ul style="list-style-type: none"> <li>"Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.</li> </ul>	
A/F ALPHA-B1 [%]		x	<ul style="list-style-type: none"> <li>The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> <li>This data also includes the data for the air-fuel ratio learning control.</li> </ul>
COOLAN TEMP/S [°C] or [°F]	x	x	<ul style="list-style-type: none"> <li>The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.</li> </ul>
A/F SEN1 (B1) [V]	x	x	<ul style="list-style-type: none"> <li>The A/F signal computed from the input signal of the A/F sensor 1 is displayed.</li> </ul>	
HO2S2 (B1) [V]	x	x	<ul style="list-style-type: none"> <li>The signal voltage of the heated oxygen sensor 2 is displayed.</li> </ul>	
HO2S2 MNTR (B1) [RICH/LEAN]	x		<ul style="list-style-type: none"> <li>Display of heated oxygen sensor 2 signal: RICH... means the amount of oxygen after three way catalyst is relatively small. LEAN... means the amount of oxygen after three way catalyst is relatively large.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> </ul>
VHCL SPEED SE [km/h] or [mph]	x	x	<ul style="list-style-type: none"> <li>The vehicle speed computed from the vehicle speed sensor signal is displayed.</li> </ul>	
BATTERY VOLT [V]	x	x	<ul style="list-style-type: none"> <li>The power supply voltage of ECM is displayed.</li> </ul>	
ACCEL SEN 1 [V]	x	x	<ul style="list-style-type: none"> <li>The accelerator pedal position sensor signal voltage is displayed.</li> </ul>	
ACCEL SEN 2 [V]	x			
THRTL SEN 1 [V]	x	x	<ul style="list-style-type: none"> <li>The throttle position sensor signal voltage is displayed.</li> </ul>	
THRTL SEN 2 [V]	x			
FUEL T/TMP SE [°C] or [°F]	x		<ul style="list-style-type: none"> <li>The fuel temperature judged from the fuel tank temperature sensor signal voltage is displayed.</li> </ul>	
INT/A TEMP SE [°C] or [°F]	x	x	<ul style="list-style-type: none"> <li>The intake air temperature determined by the signal voltage of the intake air temperature sensor is indicated.</li> </ul>	

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[QG18DE (SULEV)]

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	Description	Remarks
EVAP SYS PRES [V]	×		<ul style="list-style-type: none"> <li>The signal voltage of EVAP control system pressure sensor is displayed.</li> </ul>	
FUEL LEVEL SE [V]	×		<ul style="list-style-type: none"> <li>The signal voltage of the fuel level sensor is displayed.</li> </ul>	
START SIGNAL [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage.</li> </ul>	<ul style="list-style-type: none"> <li>After starting the engine, [OFF] is displayed regardless of the starter signal.</li> </ul>
CLSD THL POS [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal.</li> </ul>	
AIR COND SIG [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal.</li> </ul>	
P/N POSI SW [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal.</li> </ul>	
PW/ST SIGNAL [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>[ON/OFF] condition of the power steering system determined by the power steering pressure sensor signal is indicated.</li> </ul>	
LOAD SIGNAL [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the electrical load signal.</li> <li>ON... rear defogger is operating and/or lighting switch is on.</li> <li>OFF... rear defogger is not operating and lighting switch is not on.</li> </ul>	
IGNITION SW [ON/OFF]	×		<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from ignition switch.</li> </ul>	
HEATER FAN SW [ON/OFF]	×		<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the heater fan switch signal.</li> </ul>	
BRAKE SW [ON/OFF]		×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the stop lamp switch signal.</li> </ul>	
INJ PULSE-B1 [msec]		×	<ul style="list-style-type: none"> <li>Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain computed value is indicated.</li> </ul>
IGN TIMING [BTDC]		×	<ul style="list-style-type: none"> <li>Indicates the ignition timing computed by ECM according to the input signals.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> </ul>
CAL/LD VALUE [%]			<ul style="list-style-type: none"> <li>"Calculated load value" indicates the value of the current airflow divided by peak airflow.</li> </ul>	
MASS AIRFLOW [g·m/s]			<ul style="list-style-type: none"> <li>Indicates the mass airflow computed by ECM according to the signal voltage of the mass airflow sensor.</li> </ul>	
PURG VOL C/V [%]			<ul style="list-style-type: none"> <li>Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals.</li> <li>The opening becomes larger as the value increases.</li> </ul>	

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# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	Description	Remarks
SWRL C/V (B1)[step]			<ul style="list-style-type: none"> <li>● Indicates the swirl control valve control value computed by the ECM according to the input signals.</li> <li>● The opening becomes larger as the value increases.</li> </ul>	
INT/V TIM (B1) [°CA]			<ul style="list-style-type: none"> <li>● Indicates [°CA] of intake camshaft advanced angle.</li> </ul>	
INT/V SOL-B1 [ON/OFF]			<ul style="list-style-type: none"> <li>● The control condition of the intake valve timing control solenoid valve is indicated. ON... Intake valve timing control solenoid is operating. OFF... Intake valve timing control solenoid is not operating.</li> </ul>	
AIR COND RLY [ON/OFF]		×	<ul style="list-style-type: none"> <li>● The air conditioner relay control condition (determined by ECM according to the input signal) is indicated.</li> </ul>	
FUEL PUMP RLY [ON/OFF]		×	<ul style="list-style-type: none"> <li>● Indicates the fuel pump relay control condition determined by ECM according to the input signals.</li> </ul>	
VENT CONT/V [ON/OFF]			<ul style="list-style-type: none"> <li>● The control condition of the EVAP canister vent control valve (determined by ECM according to the input signal) is indicated.</li> <li>● ON... Closed OFF... Open</li> </ul>	
THRTL RELAY [ON/OFF]		×	<ul style="list-style-type: none"> <li>● Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.</li> </ul>	
COOLING FAN [ON/OFF]			<ul style="list-style-type: none"> <li>● Indicates the control condition of the cooling fan (determined by ECM according to the input signal). HIGH... High speed operation LOW... Low speed operation OFF... Stop</li> </ul>	
HO2S2 HTR (B1) [ON/OFF]			<ul style="list-style-type: none"> <li>● Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals.</li> </ul>	
IDL A/V LEARN [ON/OFF]			<ul style="list-style-type: none"> <li>● Display the condition of idle air volume learning YET... Idle air volume learning has not been performed yet. CMLPT... Idle air volume learning has already been performed successfully.</li> </ul>	
TRVL AFTER MIL [km] or [Mile]			<ul style="list-style-type: none"> <li>● Distance traveled while MIL is activated</li> </ul>	
AC PRESS SEN [V]			<ul style="list-style-type: none"> <li>● The signal voltage from the refrigerant pressure sensor is displayed.</li> </ul>	
VHCL SPEED SE [km/h] or [mph]			<ul style="list-style-type: none"> <li>● The vehicle speed computed from the vehicle speed signal sent from TCM is displayed.</li> </ul>	

# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	Description	Remarks
SET VHCL SPD [km/h] or [mph]			<ul style="list-style-type: none"> <li>The preset vehicle speed is displayed.</li> </ul>	
MAIN SW [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from CRUISE switch signal.</li> </ul>	
CANSEL SW [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from CANCEL switch signal.</li> </ul>	
RESUME/ACC SW [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from ACCEL/RES switch signal.</li> </ul>	
SET SW [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from COAST/SET switch signal.</li> </ul>	
BRAKE SW1 SW [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from ASCD brake switch signal, and ASCD clutch switch signal (M/T models).</li> </ul>	
BRAKE SW2 SW [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of stop lamp switch signal.</li> </ul>	
VHCL SPD CUT [NON/CUT]			<ul style="list-style-type: none"> <li>Indicates the vehicle cruise condition. NON... Vehicle speed is maintained at the ASCD set speed. CUT... Vehicle speed increased to excessively high compared with the ASCD set speed, and ASCD operation is cut off.</li> </ul>	
LO SPEED CUT [NON/CUT]			<ul style="list-style-type: none"> <li>Indicates the vehicle cruise condition. NON... Vehicle speed is maintained at the ASCD set speed. CUT... Vehicle speed increased to excessively low compared with the ASCD set speed, and ASCD operation is cut off.</li> </ul>	
AT OD MONITOR [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of A/T O/D according to the input signal from the TCM.</li> </ul>	
AT OD CANCEL [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of A/T O/D cancel signal sent from the TCM.</li> </ul>	
CRUISE LAMP [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals.</li> </ul>	
A/F S1 HTR (B1) [%]			<ul style="list-style-type: none"> <li>Indicates A/F sensor 1 heater control value computed by ECM according to the input signal.</li> <li>The current flow to the heater becomes larger as the value increases.</li> </ul>	
SWL/C POSI SE [degree]	×		<ul style="list-style-type: none"> <li>Indicates the swirl control value opening angle computed by ECM according to signal voltage of the swirl control valve position sensor.</li> </ul>	
SET LAMP [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals.</li> </ul>	

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# TROUBLE DIAGNOSIS

**[QG18DE (SULEV)]**

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	Description	Remarks
Voltage [V]			<ul style="list-style-type: none"> <li>● Voltage, frequency, duty cycle or pulse width measured by the probe.</li> </ul>	<ul style="list-style-type: none"> <li>● Only “#” is displayed if item is unable to be measured.</li> <li>● Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.</li> </ul>
Frequency [msec], [Hz] or [%]				
DUTY-HI				
SUTY-LOW				
PLS WIDTH-HI				
PLS WIDTH-LOW				

**NOTE:**

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.



# TROUBLE DIAGNOSIS

[QG18DE (SULEV)]

## DATA MONITOR (SPEC) MODE

### Monitored Item

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
ENG SPEED [rpm]	×	×	<ul style="list-style-type: none"> <li>Indicates the engine speed computed from the POS signal of the crankshaft position sensor.</li> </ul>	
MAS A/F SE-B1 [V]	×	×	<ul style="list-style-type: none"> <li>The signal voltage of the mass air flow sensor specification is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>When engine is running, specification range is indicated.</li> </ul>
B/FUEL SCHDL [msec]		×	<ul style="list-style-type: none"> <li>"Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.</li> </ul>	<ul style="list-style-type: none"> <li>When engine is running, specification range is indicated.</li> </ul>
A/F ALPHA-B1 [%]		×	<ul style="list-style-type: none"> <li>The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.</li> </ul>	<ul style="list-style-type: none"> <li>When engine is running, specification range is indicated.</li> <li>This data also includes the data for the air-fuel ratio learning control.</li> </ul>

**NOTE:**

Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

## ACTIVE TEST MODE

### Test Item

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	<ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Change the amount of fuel injection using CONSULT-II.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>Harness and connector</li> <li>Fuel injectors</li> <li>A/F sensor 1</li> </ul>
IGNITION TIMING	<ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Timing light: Set</li> <li>Retard the ignition timing using CONSULT-II.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>"Idle Air Volume Learning" (Refer to <a href="#">EC-634</a>.)</li> <li>Crankshaft position sensor (POS)</li> <li>Crankshaft position sensor (PHASE)</li> <li>Engine component parts and installing conditions</li> </ul>
POWER BALANCE	<ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine.</li> <li>A/C switch "OFF"</li> <li>Shift lever "N"</li> <li>Cut off each injector signal one at a time using CONSULT-II.</li> </ul>	Engine runs rough or dies.	<ul style="list-style-type: none"> <li>Harness and connector</li> <li>Compression</li> <li>Injectors</li> <li>Power transistor</li> <li>Spark plugs</li> <li>Ignition coils</li> </ul>
COOLING FAN	<ul style="list-style-type: none"> <li>Ignition switch: ON</li> <li>Turn the cooling fan "ON" and "OFF" using CONSULT-II.</li> </ul>	Cooling fan moves and stops.	<ul style="list-style-type: none"> <li>Harness and connector</li> <li>Cooling fan motor</li> <li>Cooling fan relay</li> </ul>
ENG COOLANT TEMP	<ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Change the engine coolant temperature using CONSULT-II.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>Harness and connector</li> <li>Engine coolant temperature sensor</li> <li>Fuel injectors</li> </ul>
FUEL PUMP RELAY	<ul style="list-style-type: none"> <li>Ignition switch: ON (Engine stopped)</li> <li>Turn the fuel pump relay "ON" and "OFF" using CONSULT-II and listen to operating sound.</li> </ul>	Fuel pump relay makes the operating sound.	<ul style="list-style-type: none"> <li>Harness and connector</li> <li>Fuel pump relay</li> </ul>

# TROUBLE DIAGNOSIS

**[QG18DE (SULEV)]**

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
VALVE TIMING SOL	<ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> <li>● Turn solenoid valve "ON" and "OFF" with CONSULT-II and listen for operating sound</li> </ul>	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> <li>● Harness and connector</li> <li>● Solenoid valve</li> </ul>
PURG VOL CONT/V	<ul style="list-style-type: none"> <li>● Engine: After warming up, run engine at 1,500 rpm.</li> <li>● Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-II.</li> </ul>	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> <li>● Harness and connector</li> <li>● Solenoid valve</li> </ul>
FUEL/T TEMP SEN	<ul style="list-style-type: none"> <li>● Change the fuel tank temperature using CONSULT-II.</li> </ul>		
VENT CONTROL/V	<ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> <li>● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound.</li> </ul>	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> <li>● Harness and connector</li> <li>● Solenoid valve</li> </ul>
SWIRL CONTROL VALVE	<ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> <li>● Change swirl control valve opening step using CONSULT-II.</li> </ul>	Swirl control valve makes an operating sound.	<ul style="list-style-type: none"> <li>● Harness and connector</li> <li>● Swirl control valve</li> </ul>

## DTC & SRT CONFIRMATION MODE

### SRT STATUS Mode

For details, refer to [EC-644, "SYSTEM READINESS TEST \(SRT\) CODE"](#) .

### SRT Work Support Mode

This mode enables a technician to drive a vehicle to set the SRT while monitoring the SRT status.

### DTC Work Support Mode

Test mode	Test item	Condition	Reference page
EVAPORATIVE SYSTEM	EVAP SML LEAK P0442/P1442*	Refer to corresponding trouble diagnosis for DTC.	<a href="#">EC-858</a>
	EVAP V/S LEAK P0456/P1456*		<a href="#">EC-1081</a>
	PURG VOL CN/V P1444		<a href="#">EC-1081</a>
	PURGE FLOW P0441		<a href="#">EC-852</a>
A/F SEN1	A/F SEN1 (B1) P1273		<a href="#">EC-1045</a>
	A/F SEN1 (B1) P1274		<a href="#">EC-1052</a>
	A/F SEN1 (B1) P1278		<a href="#">EC-1065</a>
	A/F SEN1 (B1) P1279		<a href="#">EC-1073</a>
	A/F SEN1 (B1) P1276		<a href="#">EC-1059</a>
HO2S2	HO2S2 (B1) P1146		<a href="#">EC-992</a>
	HO2S2 (B1) P1147	<a href="#">EC-1000</a>	
	HO2S2 (B1) P0139	<a href="#">EC-787</a>	

\*: DTC P1442 and P1456 does not apply to B15 models but appears in DTC Work Support Mode screen.

## REAL TIME DIAGNOSIS IN DATA MONITOR MODE (RECORDING VEHICLE DATA)

### Description

CONSULT-II has two kinds of triggers and they can be selected by touching "SETTING" in "DATA MONITOR" mode.

1. "AUTO TRIG" (Automatic trigger):

- The malfunction will be identified on the CONSULT-II screen in real time.

In other words, DTC/1st trip DTC and malfunction item will be displayed if the malfunction is detected by ECM.

At the moment a malfunction is detected by ECM, "MONITOR" in "DATA MONITOR" screen is changed to "Recording Data... xx%" as shown at left, and the data after the malfunction detection is recorded. Then when the percentage reached 100%, "REAL-TIME DIAG" screen is displayed. If "STOP" is touched on the screen during "Recording Data... xx%", "REAL-TIME DIAG" screen is also displayed.

The recording time after the malfunction detection and the recording speed can be changed by "TRIGGER POINT" and "Recording Speed". Refer to CONSULT-II OPERATION MANUAL.

2. "MANU TRIG" (Manual trigger):

- DTC/1st trip DTC and malfunction item will not be displayed automatically on CONSULT-II screen even though a malfunction is detected by ECM.

DATA MONITOR can be performed continuously even though a malfunction is detected.

Use these triggers as follows:

DATA MONITOR	
Recording Data...11%	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
VHCL SPEED SE	XXX km/h

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SET RECORDING CONDITION				
AUTO TRIG				
MANU TRIG				
TRIGGER POINT				
RECORDING SPEED				
<table style="width: 100%; border: none;"> <tr> <td style="border: none;">MIN</td> <td style="border: none;">MAX</td> </tr> <tr> <td style="border: none;">/64 /32 /16 /8 /4 /2 FULL</td> <td style="border: none;"></td> </tr> </table>	MIN	MAX	/64 /32 /16 /8 /4 /2 FULL	
MIN	MAX			
/64 /32 /16 /8 /4 /2 FULL				

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### Operation

1. "AUTO TRIG"

- While trying to detect the DTC/1st trip DTC by performing the "DTC Confirmation Procedure", be sure to select to "DATA MONITOR (AUTO TRIG)" mode. You can confirm the malfunction at the moment it is detected.
- While narrowing down the possible causes, CONSULT-II should be set in "DATA MONITOR (AUTO TRIG)" mode, especially in case the incident is intermittent.  
When you are inspecting the circuit by gently shaking (or twisting) the suspicious connectors, components and harness in the "DTC Confirmation Procedure", the moment a malfunction is found the DTC/1st trip DTC will be displayed. (Refer to [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#), "Incident Simulation Tests".)

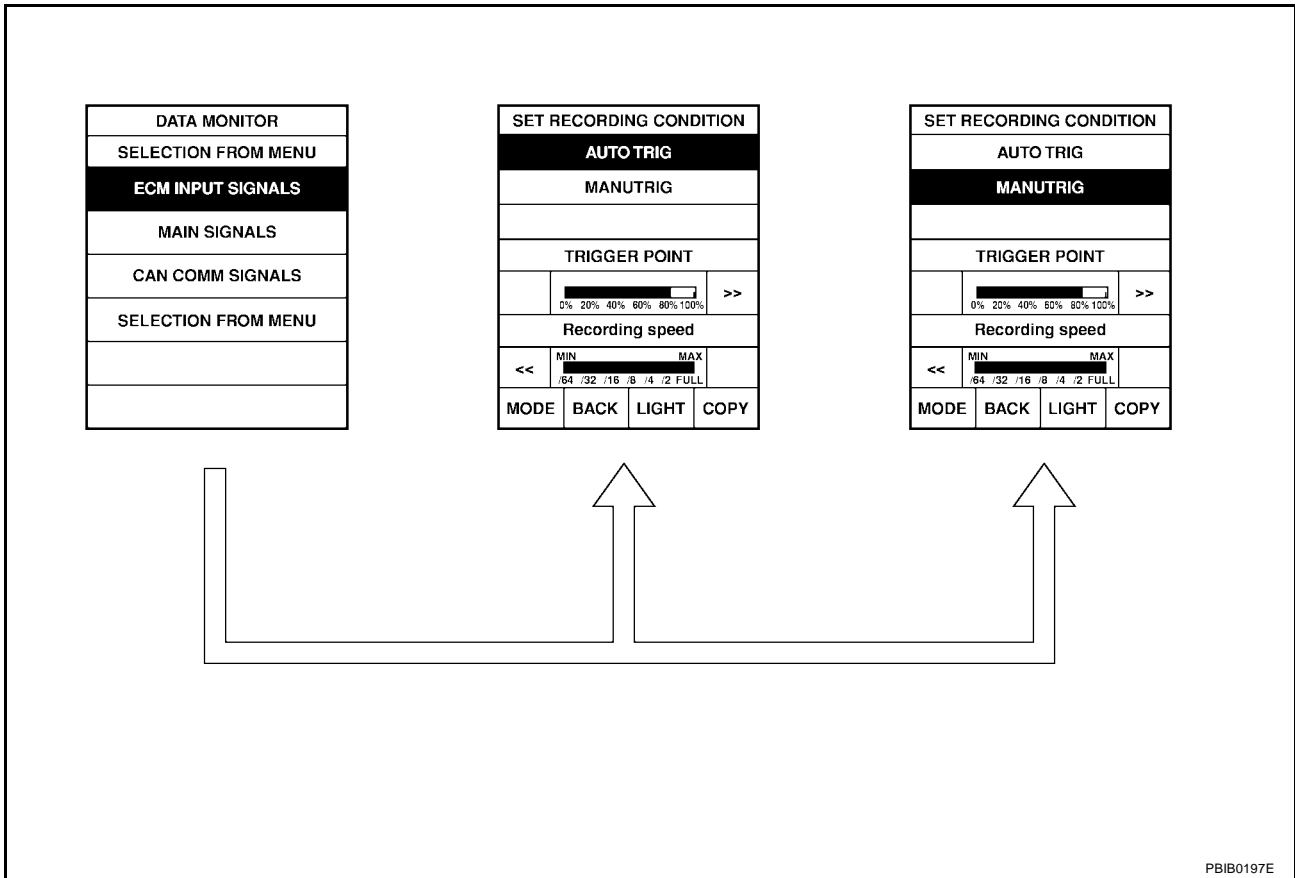
2. "MANU TRIG"

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- If the malfunction is displayed as soon as “DATA MONITOR” is selected, reset CONSULT-II to “MANU TRIG”. By selecting “MANU TRIG” you can monitor and store the data. The data can be utilized for further diagnosis, such as a comparison with the value for the normal operating condition.



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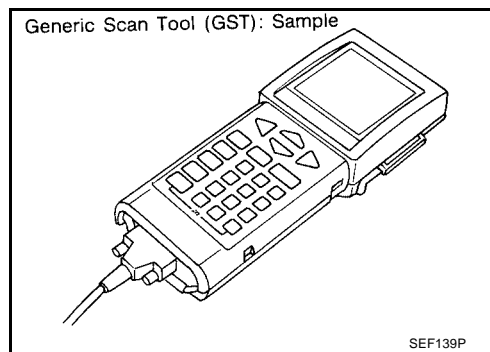
### Generic Scan Tool (GST)

#### DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 8 different functions explained on the next page.

ISO9141 is used as the protocol.

The name "GST" or "Generic Scan Tool" is used in this service manual.

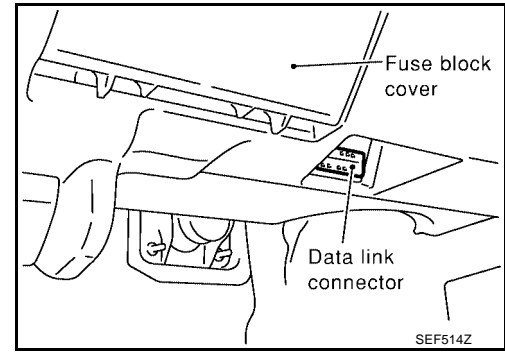


#### FUNCTION

Diagnostic test mode		Function
MODE 1	READINESS TESTS	This mode gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
MODE 2	(FREEZE DATA)	This mode gains access to emission-related data value which were stored by ECM during the freeze frame. [For details, refer to "Freeze Frame Data" <a href="#">EC-643</a> .]
MODE 3	DTCs	This mode gains access to emission-related power train trouble codes which were stored by ECM.
MODE 4	CLEAR DIAG INFO	This mode can clear all emission-related diagnostic information. This includes: <ul style="list-style-type: none"> <li>● Clear number of diagnostic trouble codes (MODE 1)</li> <li>● Clear diagnostic trouble codes (MODE 3)</li> <li>● Clear trouble code for freeze frame data (MODE 1)</li> <li>● Clear freeze frame data (MODE 2)</li> <li>● Reset status of system monitoring test (MODE 1)</li> <li>● Clear on board monitoring test results (MODE 6 and 7)</li> </ul>
MODE 6	(ON BOARD TESTS)	This mode accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
MODE 7	(ON BOARD TESTS)	This mode enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
MODE 8	—	This mode can close EVAP system in ignition switch "ON" position (Engine stopped). When this mode is performed, following parts can be opened or closed. <ul style="list-style-type: none"> <li>● EVAP canister vent control valve open</li> <li>● Vacuum cut valve bypass valve closed</li> </ul> In the following conditions, this mode cannot function. <ul style="list-style-type: none"> <li>● Low ambient temperature</li> <li>● Low battery voltage</li> <li>● Engine running</li> <li>● Ignition switch "OFF"</li> <li>● Low fuel temperature</li> <li>● Too much pressure is applied to EVAP system</li> </ul>
MODE 9	(CALIBRATION ID)	This mode enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.

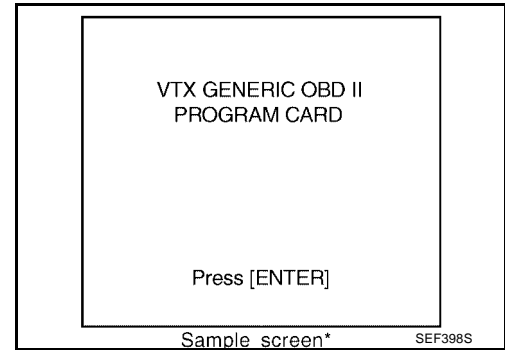
## GST INSPECTION PROCEDURE

1. Turn ignition switch OFF.
2. Connect GST to data link connector for GST which is located under LH dash panel near the fuse box cover.



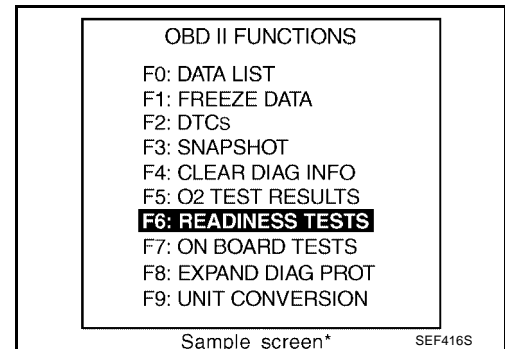
3. Turn ignition switch ON.
4. Enter the program according to instruction on the screen or in the operation manual.

(\*: Regarding GST screens in this section, sample screens are shown.)



5. Perform each diagnostic mode according to each service procedure.

**For further information, see the GST Operation Manual of the tool maker.**



## CONSULT-II Reference Value in Data Monitor Mode

UBS001R1

Remarks:

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.

\* Specification data may not be directly related to their components signals/values/operations.

(i.e., Adjust ignition timing with a timing light before monitoring IGN TIMING. Specification data might be displayed even when ignition timing is not adjusted to specification. This IGN TIMING monitors the data calculated by the ECM according to the input signals from the camshaft position sensor and other ignition timing related sensors.)

MONITOR ITEM	CONDITION	SPECIFICATION
ENG SPEED	<ul style="list-style-type: none"> <li>● Tachometer: Connect</li> <li>● Run engine and compare tachometer indication with the CONSULT-II value.</li> </ul>	Almost the same speed as the CONSULT-II value.
MAS A/F SE-B1	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: "N" (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul>	Idle 1.0 - 1.7V
	2,500 rpm	1.5 - 2.4V
B/FUEL SCHDL	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: "N" (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul>	Idle 1.0 - 1.6 msec
	2,000 rpm	0.7 - 1.3 msec

# TROUBLE DIAGNOSIS

**[QG18DE (SULEV)]**

MONITOR ITEM	CONDITION	SPECIFICATION
A/F ALPHA-B1	● Engine: After warming up	Maintaining engine speed at 2,000 rpm 53 - 155%
COOLAN TEMP/S	● Engine: After warming up	More than 70°C (158°F)
A/F SEN1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm Fluctuates around 1.5V
HO2S2 (B1)	● Engine: After warming up ● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load	Revving engine from idle to 3,000 rpm quickly 0 - 0.3V ↔ 0.6 - 1.0V
HO2S2 MNTR (B1)	● Engine: After warming up ● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load	Revving engine from idle to 3,000 rpm quickly LEAN ↔ RICH
VHCL SPEED SE	● Turn drive wheels and compare speedometer indication with the CONSULT-II value	Almost the same speed as the CONSULT-II value
BATTERY VOLT	● Ignition switch: ON (Engine stopped)	11 - 14V
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released 0.65 - 0.87V
		Accelerator pedal: Fully depressed More than 4.3V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released 0.56 - 0.96V
		Accelerator pedal: Fully depressed More than 4.0V
THRTL SEN1 THRTL SEN2*	● Ignition switch: ON (Engine stopped) ● Shift lever D: (A/T model) 1st: (M/T model)	Accelerator pedal: Fully released More than 0.36V
		Accelerator pedal: Fully depressed Less than 4.75V
EVAP SYS PRES	● Ignition switch: ON	1.8 - 4.8V
START SIGNAL	● Ignition switch: ON → START → ON	OFF → ON → OFF
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Throttle valve: Idle position ON
		Throttle valve: Slightly open OFF
AIR COND SIG	● Engine: After warming up, idle the engine	A/C switch "OFF" OFF
		A/C switch "ON" (Compressor operates) ON
P/N POSI SW	● Ignition switch: ON	Shift lever "P" or "N" (A/T), Neutral (M/T) ON
		Except above OFF
PW/ST SIGNAL	● Engine: After warming up, idle the engine	Steering wheel in neutral position (Forward direction) OFF
		The steering wheel is turned ON
LOAD SIGNAL	● Ignition switch: ON	Rear window defogger switch and/or lighting switch is in 2nd ON
		Rear window defogger switch is OFF and lighting switch is OFF OFF
IGNITION SW	● Ignition switch: ON → OFF → ON	ON → OFF

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# TROUBLE DIAGNOSIS

**[QG18DE (SULEV)]**

MONITOR ITEM	CONDITION	SPECIFICATION
HEATER FAN SW	<ul style="list-style-type: none"> <li>● Engine: After warming up, idle the engine</li> </ul>	Heater fan is operating ON
		Heater fan is not operating OFF
BRAKE SW	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	Brake pedal: Fully released OFF
		Brake pedal: Slightly depressed ON
INJ PULSE-B1	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: "N" (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul>	Idle 2.4 - 3.2 msec
		2,000 rpm 1.9 - 3.2 msec
IGN TIMING	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: "N" (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul>	Idle A/T 18°±5° BTDC M/T 7°±5° BTDC
		2,000 rpm More than 25° BTDC
CAL/LD VALUE	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: "N" (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul>	Idle 20.0 - 35.5%
		2,500 rpm 12.0 - 27.0%
MASS AIRFLOW	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: "N" (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul>	Idle 1.4 - 4.0 g·m/s
		2,500 rpm 5.0 - 10.0 g·m/s
PURG VOL C/V	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: "OFF"</li> <li>● Shift lever: "N" (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul>	Idle 0%
		2,000 rpm —
SWL C/V (B1)	<ul style="list-style-type: none"> <li>● Engine: Idle the engine</li> </ul>	Engine coolant temperature is below 44°C (111°F) 0 - 5 step
		Engine coolant temperature is above 45°C (113°F) 115 - 120 step
INT/V SOL (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N (A/T), Neutral (M/T)</li> <li>● Air conditioner switch: OFF</li> <li>● No - load</li> </ul>	Idle 0% - 2%
		When revving engine up to 2,000 rpm quickly Approx. 0% - 80%
AIR COND RLY	<ul style="list-style-type: none"> <li>● Air conditioner switch: OFF → ON</li> </ul>	OFF → ON
FUEL PUMP RLY	<ul style="list-style-type: none"> <li>● Ignition switch is turned to ON (Operates for 5 seconds)</li> <li>● Engine running and cranking</li> <li>● When engine is stopped (Stops in 1 seconds)</li> </ul>	ON
	<ul style="list-style-type: none"> <li>● Except as shown above</li> </ul>	OFF
VENT CONT/V	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	OFF
THRTL RELAY	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	ON
INT/V TIM (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N (A/T), Neutral (M/T)</li> <li>● Air conditioner switch: OFF</li> <li>● No - load</li> </ul>	Idle -5° - 5°CA
		When revving engine up to 2,000 rpm quickly Approx. 0° - 30°CA



# TROUBLE DIAGNOSIS

**[QG18DE (SULEV)]**

MONITOR ITEM	CONDITION	SPECIFICATION	
COOLING FAN	Engine coolant temperature is 94°C (201°F) or less	OFF	
	<ul style="list-style-type: none"> <li>● After warming up engine, idle the engine.</li> <li>● Air conditioner switch: OFF</li> </ul> Engine coolant temperature is between 95°C (203°F) and 104°C (219°F)	LOW	
	Engine coolant temperature is 105°C (221°F) or more	HIGH	
HO2S2 HTR (B1)	<ul style="list-style-type: none"> <li>● Engine speed: Above 3,600 rpm</li> </ul>	OFF	
	<ul style="list-style-type: none"> <li>● Engine speed is below 3,600 rpm after the following conditions are met.               <ul style="list-style-type: none"> <li>– Engine: After warming up</li> <li>– Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul> </li> </ul>	ON	
TRVL AFTER MIL	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul> Vehicle has traveled after MIL has turned ON	0 - 65,535 km (0 - 40,723 mile)	
A/F S1 HTR (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up, idle the engine</li> </ul>	0 - 100%	
SWL/C POSI SE	<ul style="list-style-type: none"> <li>● Engine: Idle the engine</li> </ul>	Engine coolant temperature is below 44°C (111°F)	Approx. 0 deg.
		Engine coolant temperature is above 45°C (113°F)	Approx. 80 deg.
AC PRESS SEN	<ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> </ul>	Approx. 0V	
	<ul style="list-style-type: none"> <li>● Engine: Idle</li> <li>● Air conditioner switch: OFF</li> </ul>	1.0 - 4.0V	
VEH SPEED SE	<ul style="list-style-type: none"> <li>● Turn drive wheels and compare speedometer indication with the CONSULT-II value.</li> </ul>	Almost the same speed as the CONSULT-II valve	
SET VHCL SPD	<ul style="list-style-type: none"> <li>● Engine: Running</li> </ul>	ASCD: Operating	The preset vehicle speed is displayed.
MAIN SW	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	CRUISE switch: Depressed	ON
		CRUISE switch: Released	OFF
CANCEL SW	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	CRUISE switch: Depressed	ON
		CRUISE switch: Released	OFF
RESUME/ACC SW	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	ACCEL/RES switch: Depressed	ON
		ACCEL/RES switch: Released	OFF
SET SW	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	COAST/SET switch: Depressed	ON
		COAST/SET switch: Released	OFF
BRAKE SW1	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	Clutch pedal (M/T) and brake pedal: Fully released	ON
		Clutch pedal (M/T) and brake pedal: Fully released	OFF
BRAKE SW2	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
CRUISE LAMP	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	CRUISE Lamp: Illuminated	ON
		CRUISE Lamp: Not illuminated	OFF
SET LAMP	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	SET Lamp: Illuminated	ON
		SET Lamp: Not illuminated	OFF

\*: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

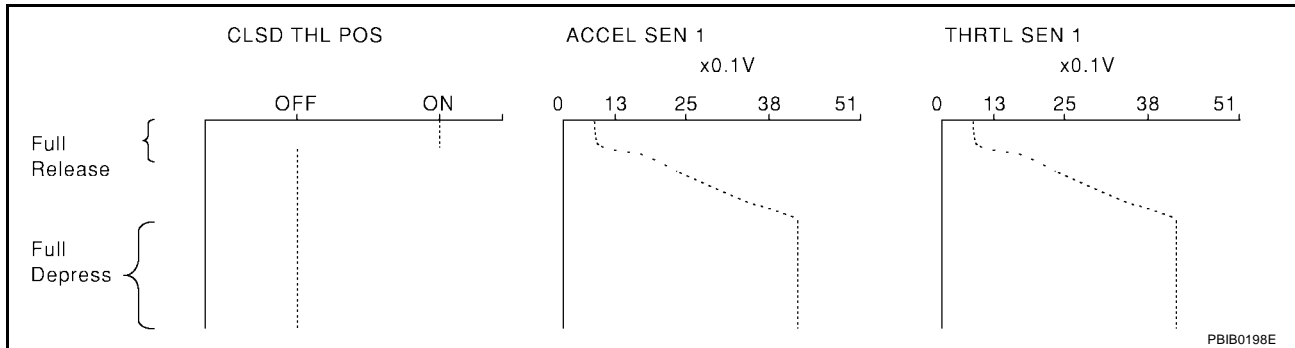
## Major Sensor Reference Graph in Data Monitor Mode

The following are the major sensor reference graphs in "DATA MONITOR" mode.

### CLSD THL POS, ACCEL SEN 1, THRTL SEN 1

Below is the data for "CLSD THL POS", "ACCEL SEN 1" and "THRTL SEN 1" when depressing the accelerator pedal with the ignition switch "ON" and with selector lever in "D" position.

The signal of "ACCEL SEN 1" and "THRTL SEN 1" should rise gradually without any intermittent drop or rise after "CLSD THL POS" is changed from "ON" to "OFF".

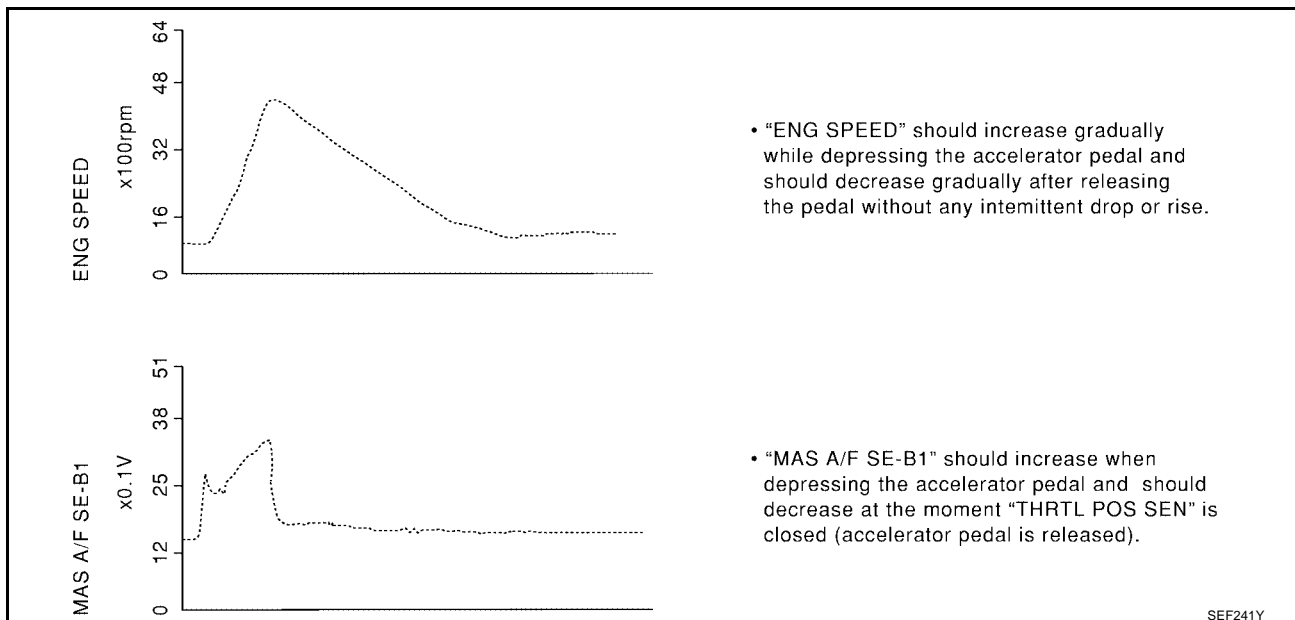


PBIB0198E

### ENG SPEED, MAS A/F SE-B1, THRTL POS SEN, HO2S2 (B1), INJ PULSE-B1

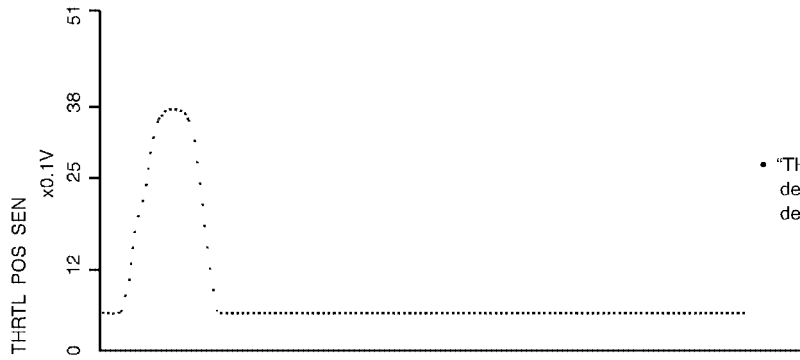
Below is the data for "ENG SPEED", "MAS A/F SE-B1", "THRTL POS SEN", "HO2S2 (B1/B2)" and "INJ PULSE" when revving engine quickly up to 4,800 rpm under no load after warming up engine to normal operating temperature.

Each value is for reference, the exact value may vary.

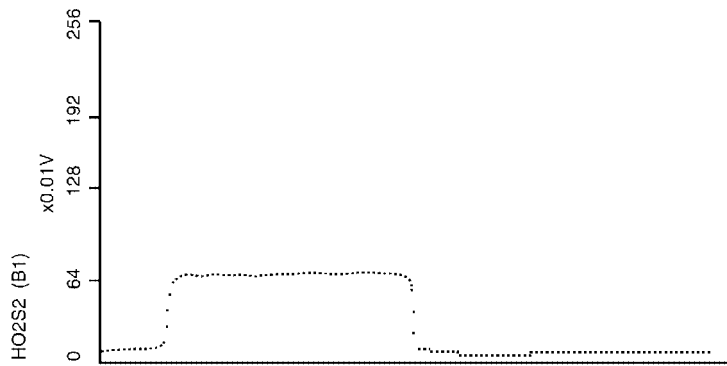


SEF241Y

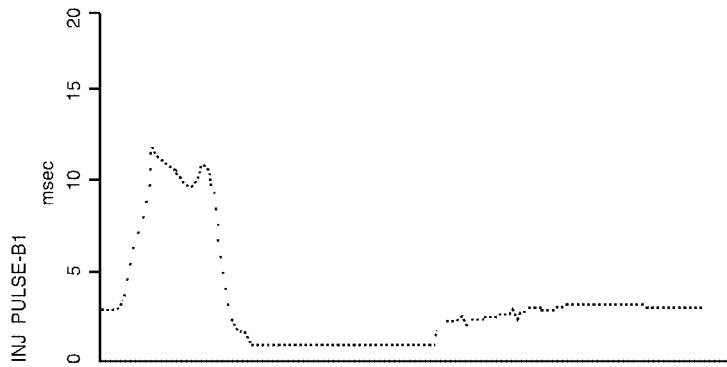
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- "THRTL POS SEN" should increase while depressing the accelerator pedal and should decrease while releasing it.



- "HO2S2 (B1)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



- "INJ PULSE-B1" should increase when depressing the accelerator pedal and should decrease when the pedal is released.

## TROUBLE DIAGNOSIS - SPECIFICATION VALUE

PFP:00031

### Description

UBS001RK

The specification (SP) value indicates the tolerance of the value that is displayed in "DATA MONITOR (SPEC)" mode of CONSULT-II during normal operation of the Engine Control System. When the value in "DATA MONITOR (SPEC)" mode is within the SP value, the Engine Control System is confirmed OK. When the value in "DATA MONITOR (SPEC)" mode is NOT within the SP value, the Engine Control System may have one or more malfunctions.

The SP value is used to detect malfunctions that may affect the Engine Control System, but will not light the MIL.

The SP value will be displayed for the following three items:

- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction)
- A/F ALPHA-B1 (The mean value of air-fuel ratio feedback correction factor per cycle)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor)

### Testing Condition

UBS001RL

- Vehicle driven distance: More than 5,000 km (3,017 miles)
- Barometric pressure: 98.3 - 104.3 kPa (1.003 - 1.064 kg/cm<sup>2</sup> , 14.25 - 15.12 psi)
- Atmospheric temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up\*1
- Electrical load: Not applied\*2
- Engine speed: Idle

\*1: For A/T or CVT models, after the engine is warmed up to normal operating temperature, drive vehicle until "FLUID TEMP SE" (A/T or CVT fluid temperature sensor signal) indicates more than 60°C (140°F). For MT models, drive vehicle for 5 minutes after the engine is warmed up to normal operating temperature.

\*2: Rear window defogger switch, air conditioner switch, lighting switch are "OFF". Cooling fans are not operating. Steering wheel is straight ahead.

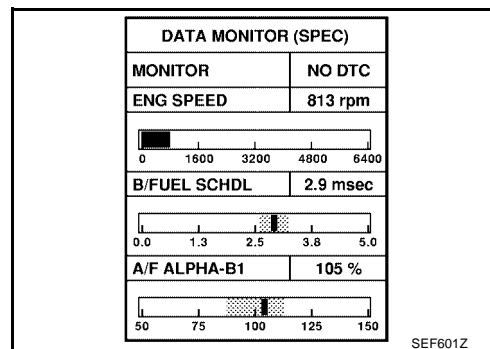
### Inspection Procedure

UBS001RM

#### NOTE:

Perform "DATA MONITOR (SPEC)" mode in maximum scale display.

1. Perform [EC-669, "Basic Inspection"](#) .
2. Confirm that the testing conditions indicated above are met.
3. Select "B/FUEL SCHDL", "A/F ALPHA-B1" and "MAS A/F SE-B1" in "DATA MONITOR (SPEC)" mode with CONSULT-II.
4. Make sure that monitor items are within the SP value.
5. If NG, go to [EC-717, "Diagnostic Procedure"](#) .

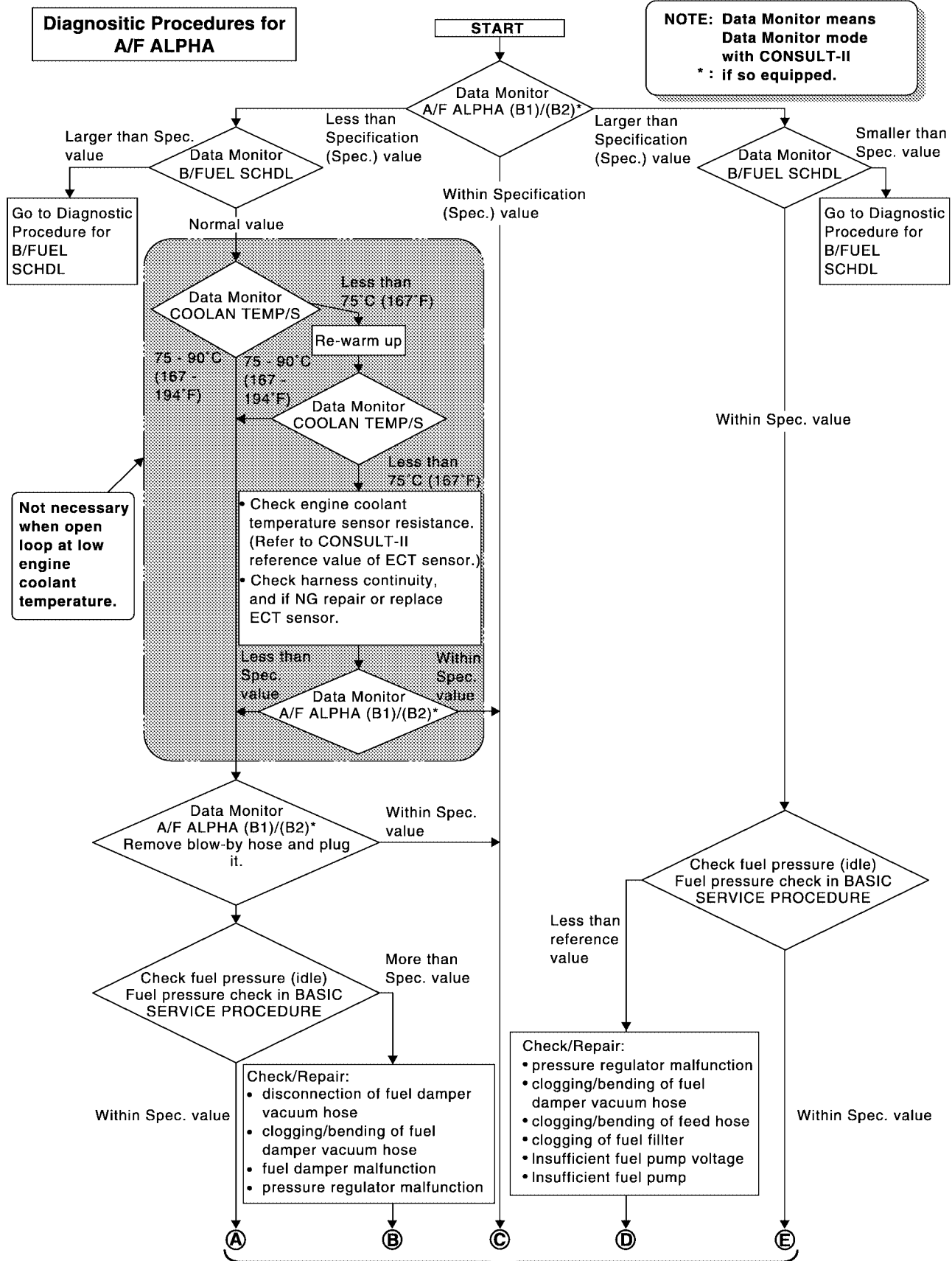


# TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[QG18DE (SULEV)]

UBS001RN

## Diagnostic Procedure

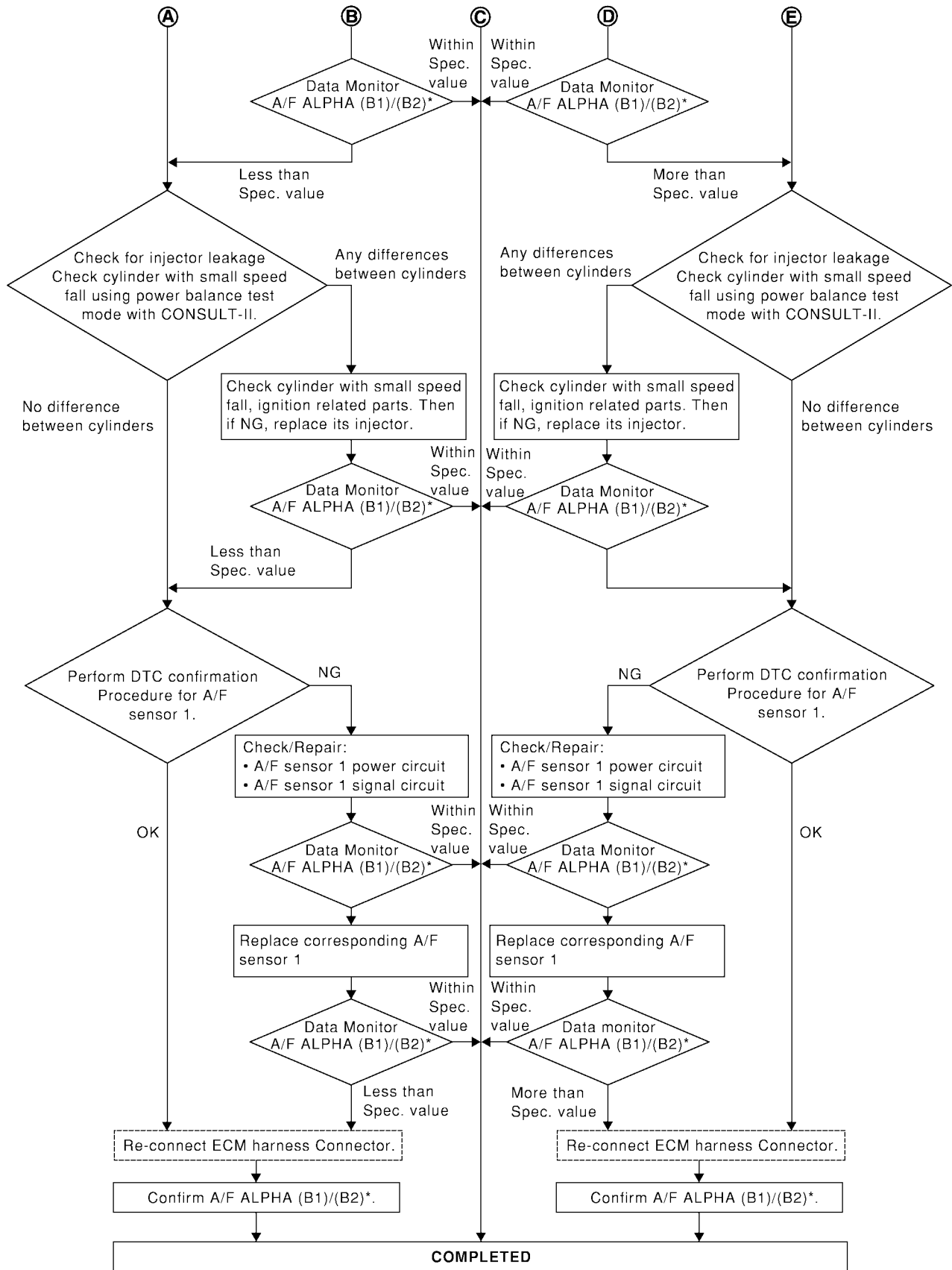


(Go to next page.)

SEF6132D

# TROUBLE DIAGNOSIS - SPECIFICATION VALUE

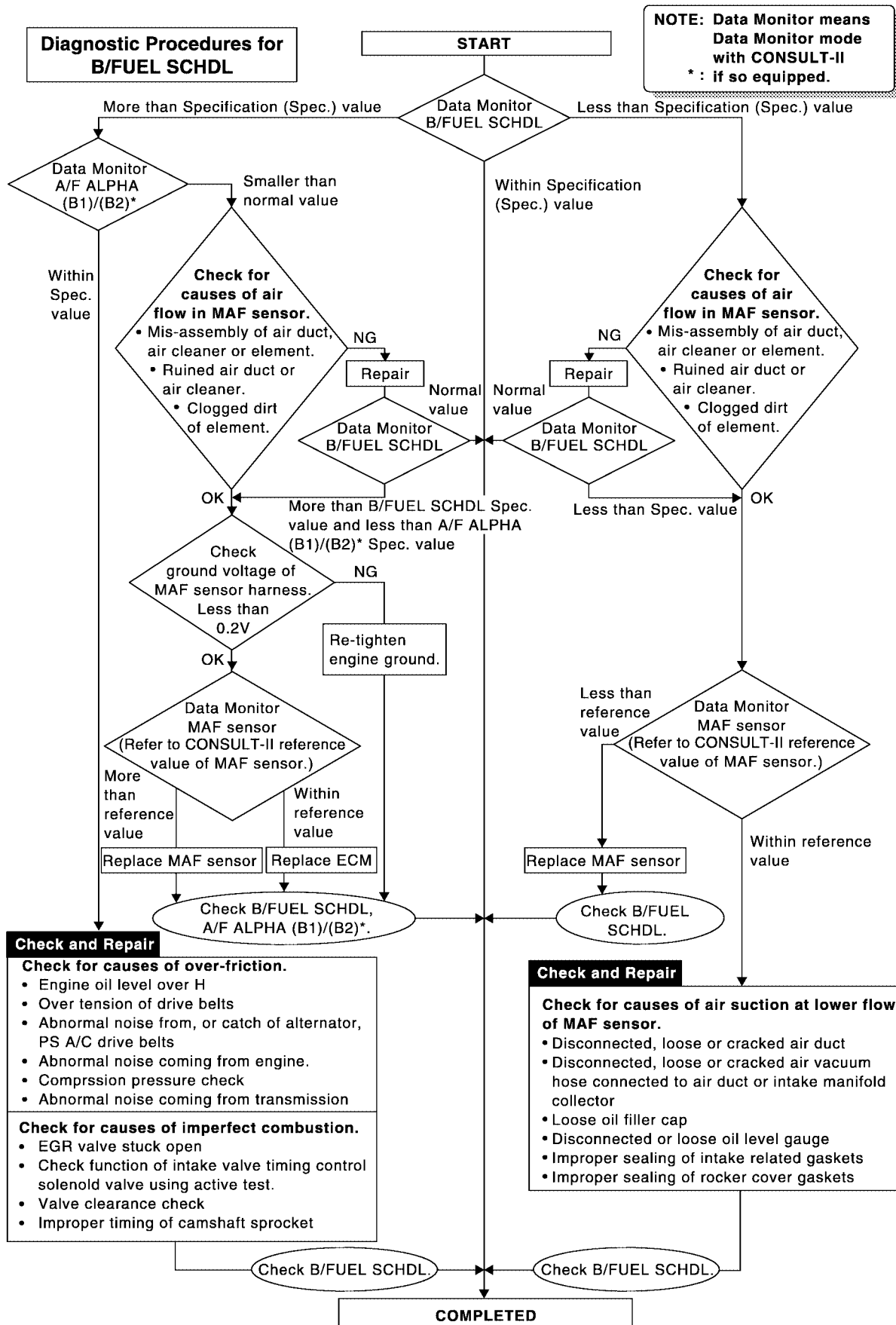
[QG18DE (SULEV)]



SEF614Z

# TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[QG18DE (SULEV)]



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# TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

[QG18DE (SULEV)]

## TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

PFP:00006

### Description

UBS001RO

Intermittent incidents (I/I) may occur. In many cases, the malfunction resolves itself (the part or circuit function returns to normal without intervention). It is important to realize that the symptoms described in the customer's complaint often do not recur on DTC (1st trip) visits. Realize also that the most frequent cause of I/I occurrences is poor electrical connections. Because of this, the conditions under which the incident occurred may not be clear. Therefore, circuit checks made as part of the standard diagnostic procedure may not indicate the specific malfunctioning area.

### Common I/I Report Situations

STEP in Work Flow	Situation
II	The CONSULT-II is used. The SELF-DIAG RESULTS screen shows time data other than "0" or "1t".
III	The symptom described by the customer does not recur.
IV	(1st trip) DTC data does not appear during the DTC CONFIRMATION PROCEDURE.
VI	The TROUBLE DIAGNOSIS for PXXXX does not indicate the malfunctioning area.

### Diagnostic Procedure

UBS001RP

#### 1. INSPECTION START

Erase (1st trip) DTCs. Refer to [EC-651, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).

>> GO TO 2.

#### 2. CHECK GROUND TERMINALS

Check ground terminals for corroding or loose connection. Refer to [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#), "GROUND INSPECTION".

OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

#### 3. SEARCH FOR ELECTRICAL INCIDENT

Refer to [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#), "Incident Simulation Tests".

OK or NG

OK >> GO TO 4.

NG >> Repair or replace.

#### 4. CHECK CONNECTOR TERMINALS

Refer to [GI-23, "How to Check Terminal"](#), "How to Check Enlarged Contact Spring of Terminal".

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace connector.



# POWER SUPPLY CIRCUIT FOR ECM

[QG18DE (SULEV)]

## POWER SUPPLY CIRCUIT FOR ECM

PF24110

### Wiring Diagram

UBS001RQ

EC-MAIN-01

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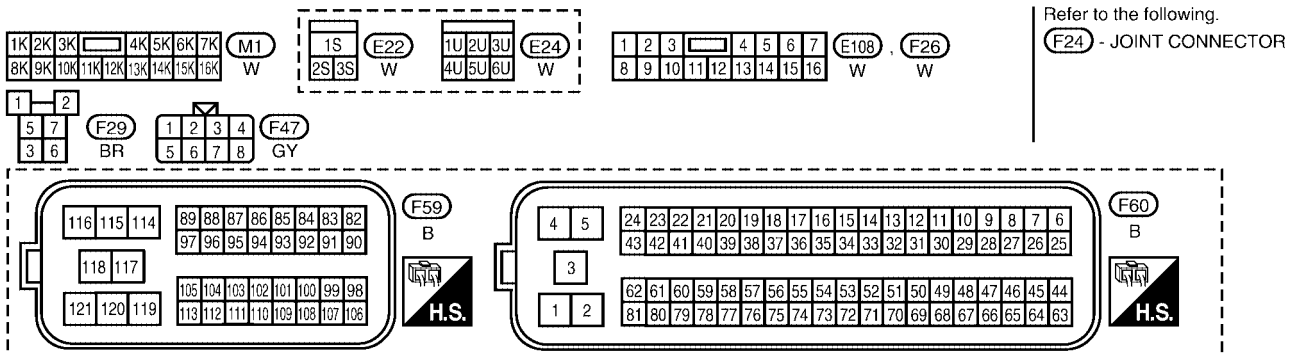
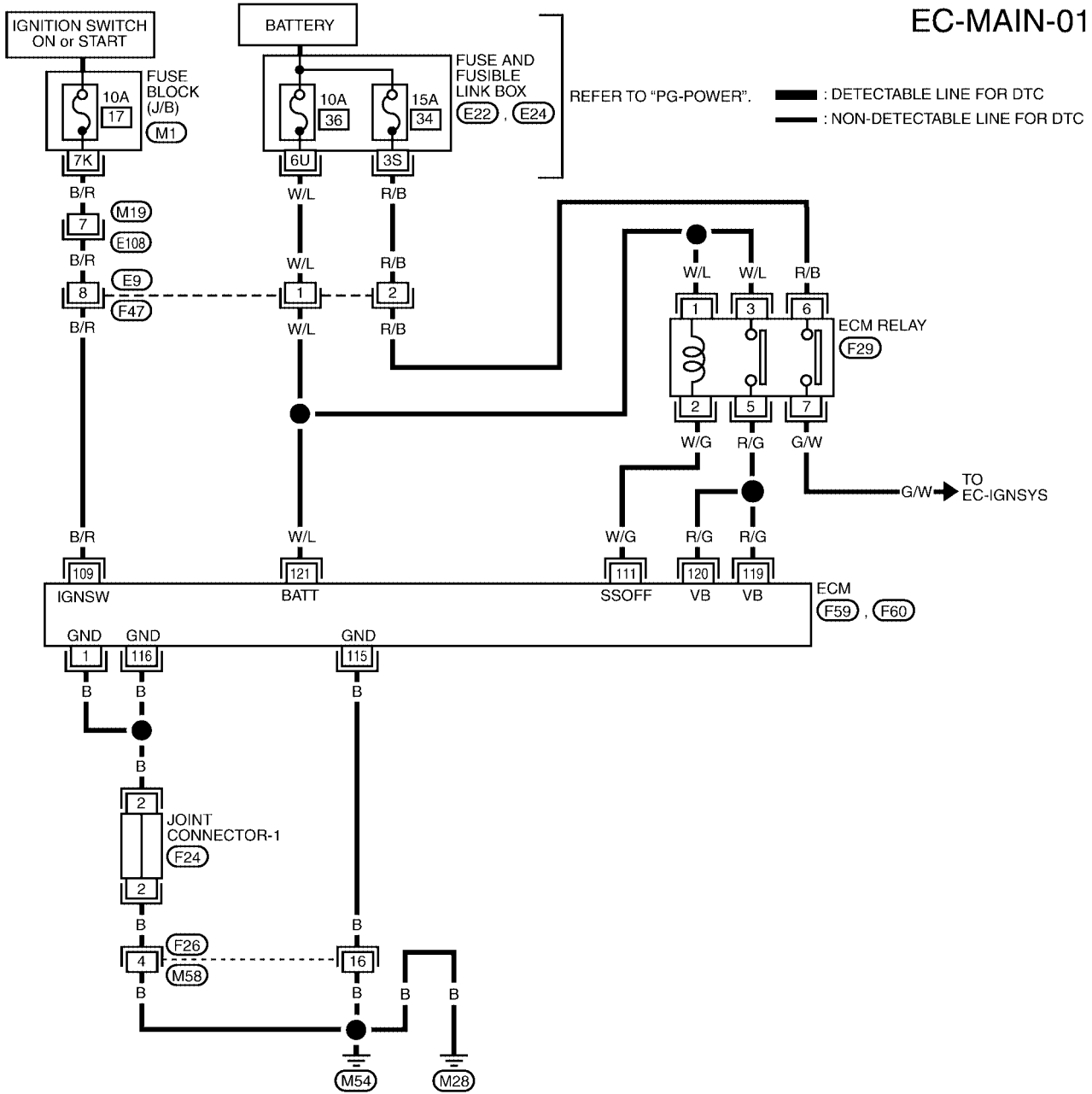
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# POWER SUPPLY CIRCUIT FOR ECM

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	B	ECM ground	<b>[Engine is running]</b> ● Idle speed	Engine ground
109	B/R	Ignition switch	<b>[Ignition switch "OFF"]</b>	0V
			<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)
111	W/G	ECM relay (Self shut-off)	<b>[Engine is running]</b> <b>[Ignition switch "OFF"]</b> ● For 5 seconds after turning ignition switch "OFF"	0 - 1.0V
			<b>[Ignition switch "OFF"]</b> ● 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
115 116	B B	ECM ground	<b>[Engine is running]</b> ● Idle speed	Engine ground
119 120	R/G R/G	Power supply for ECM	<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS001RR

### 1. INSPECTION START

Start engine.

**Is engine running?**

Yes or No

- Yes >> GO TO 9.
- No >> GO TO 2.

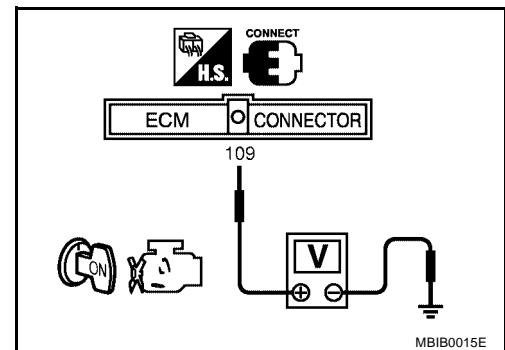
### 2. CHECK ECM POWER SUPPLY-I

1. Turn ignition switch "OFF" and then "ON".
2. Check voltage between ECM terminal 109 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



---

### 3. DETECT MALFUNCTIONING PART

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Check the following.

- Harness connectors E9, F47
- Harness connectors M19, E108
- Fuse block (J/B) connector M1
- 10A fuse
- Harness for open or short between ECM and 10A fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

### 4. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 1, 115, 116, and engine ground.  
Refer to WIRING DIAGRAM.

**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

OK >> GO TO 6.

NG >> GO TO 5.

---

### 5. DETECT MALFUNCTIONING PART

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Check the following.

- Harness connectors F26, M58
- Joint connector-1
- Harness for open or short between ECM and ground

>> Repair open circuit or short to power in harness or connectors.

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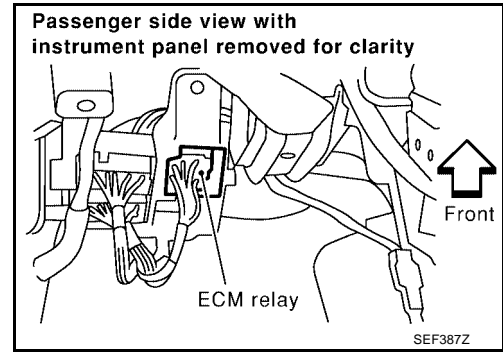
K

L

M

**6. CHECK ECM POWER SUPPLY-II**

1. Disconnect ECM relay.

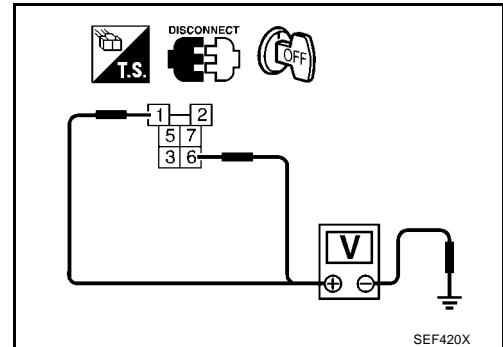


2. Check voltage between ECM relay terminals 1, 6 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.



**7. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors E9, F47
- Fuse and fusible link box connectors E22, E24
- 10A fuse
- 15A fuse
- Harness for open or short between ECM relay and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK ECM OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Check harness continuity between ECM terminal 111 and ECM relay terminal 2.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> Go to [EC-1156, "IGNITION SIGNAL"](#).
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

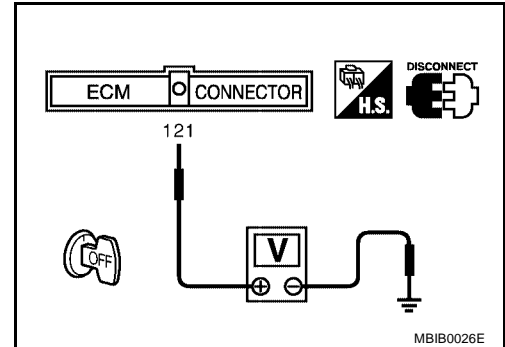
9. CHECK ECM POWER SUPPLY-III

1. Stop engine.
2. Check voltage between ECM terminal 121 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 11.
- NG >> GO TO 10.



10. DETECT MALFUNCTIONING PART

Check the harness for open or short between ECM and harness connector F47.

>> Repair harness or connectors.

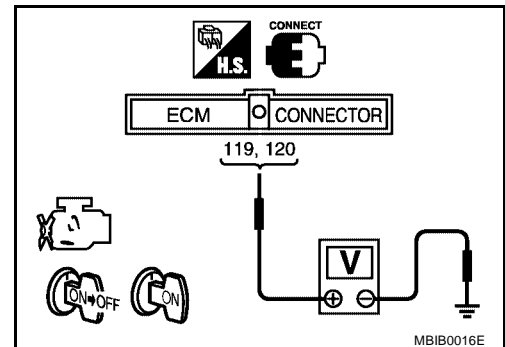
11. CHECK POWER SUPPLY-III

1. Turn ignition switch "ON" and then "OFF".
2. Check voltage between ECM terminals 119, 120 and ground with CONSULT-II or tester.

**Voltage: After turning ignition switch "OFF", battery voltage will exist for a few seconds, then drop to approximately 0V.**

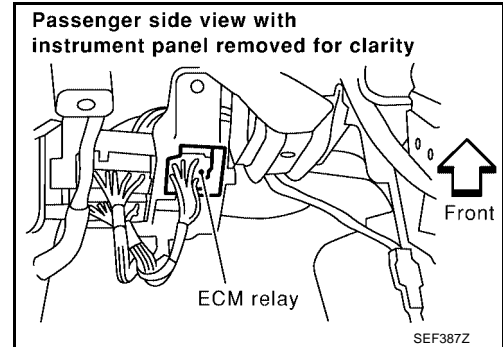
OK or NG

- OK >> GO TO 17.
- NG (Battery voltage does not exist.)>>GO TO 12.
- NG (Battery voltage exists for more than a few seconds.)>>GO TO 14.



## 12. CHECK VOLTAGE BETWEEN ECM RELAY AND GROUND

1. Disconnect ECM harness connector.
2. Disconnect ECM relay.

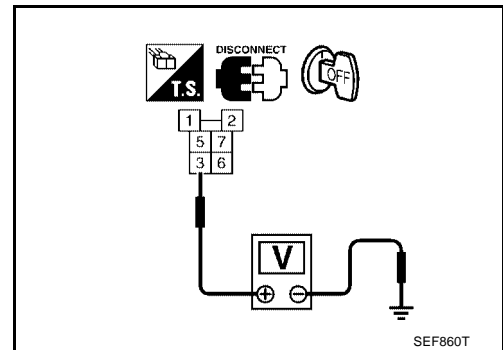


3. Check voltage between ECM relay terminal 3 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 14.  
 NG >> GO TO 13.



## 13. DETECT MALFUNCTIONING PART

Check the harness for open or short between ECM relay and harness connector F47.

>> Repair harness or connectors.

## 14. CHECK HARNESS CONTINUITY BETWEEN ECM RELAY AND ECM

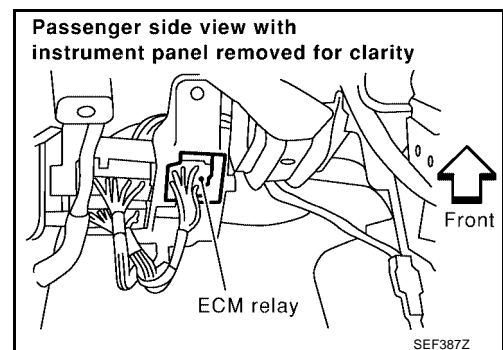
1. Check harness continuity between ECM terminals 119, 120 and ECM relay terminal 5.  
 Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 15.  
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.



## 15. CHECK OUTPUT SIGNAL CIRCUIT

1. Check harness continuity between ECM terminal 111 and ECM relay terminal 2.  
 Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 16.  
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.

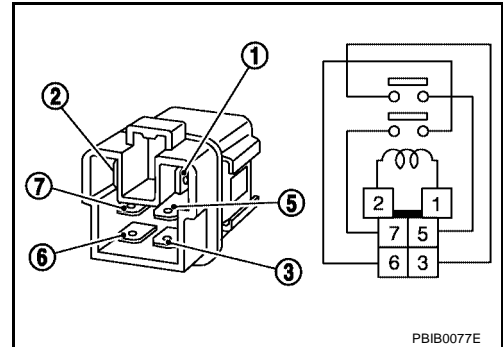
**16. CHECK ECM RELAY**

1. Apply 12V direct current between ECM relay terminals 1 and 2.
2. Check continuity between ECM relay terminals 3 and 5, 6 and 7.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No

OK or NG

- OK >> GO TO 17.
- NG >> Replace ECM relay.



**17. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 1, 115, 116, and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 19.
- NG >> GO TO 18

**18. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors F26, M58
- Joint connector-1
- Harness for open or short between ECM and ground

>> Repair open circuit or short to power in harness or connectors.

**19. CHECK INTERMITTENT INCIDENT**

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

# DTC U1000, U1001 CAN COMMUNICATION LINE

[QG18DE (SULEV)]

## DTC U1000, U1001 CAN COMMUNICATION LINE

PF:23710

### Description

UBS003WA

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

### On Board Diagnosis Logic

UBS003WB

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1000*2 1000*2	CAN communication line	<ul style="list-style-type: none"><li>● ECM cannot communicate to other control units.</li><li>● ECM cannot communicate for more than the specified time.</li></ul>	<ul style="list-style-type: none"><li>● Harness or connectors (CAN communication line is open or shorted)</li></ul>
U1001*1 1001*1			

\*1: The MIL will not light up for this diagnosis.

\*2: This self-diagnosis has the one trip detection logic.

### DTC Confirmation Procedure

UBS003WC

1. Turn ignition switch "ON" and wait at least 3 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If 1st trip DTC is detected, go to [EC-730, "Diagnostic Procedure"](#).



# DTC U1000, U1001 CAN COMMUNICATION LINE




[QG18DE (SULEV)]

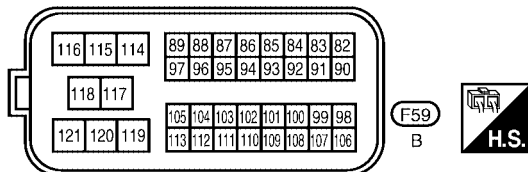
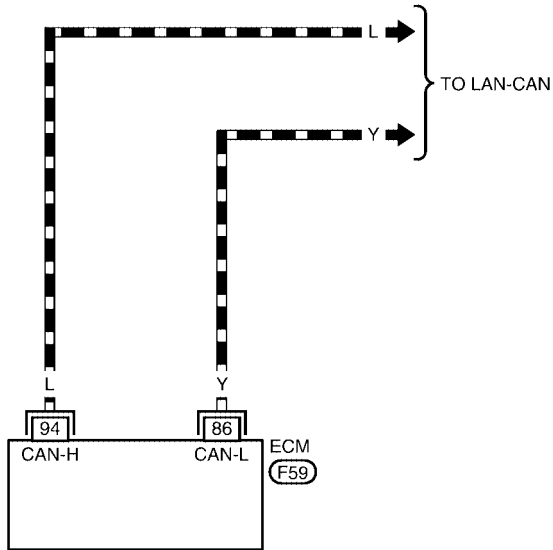
## Wiring Diagram

UBS003WD

EC-CAN-01

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : DATA LINE



BBWA0274E

# DTC U1000, U1001 CAN COMMUNICATION LINE

[QG18DE (SULEV)]

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## Diagnostic Procedure

UBS003WE

Go to [LAN-3, "CAN COMMUNICATION"](#).

DTC P0011 IVT CONTROL

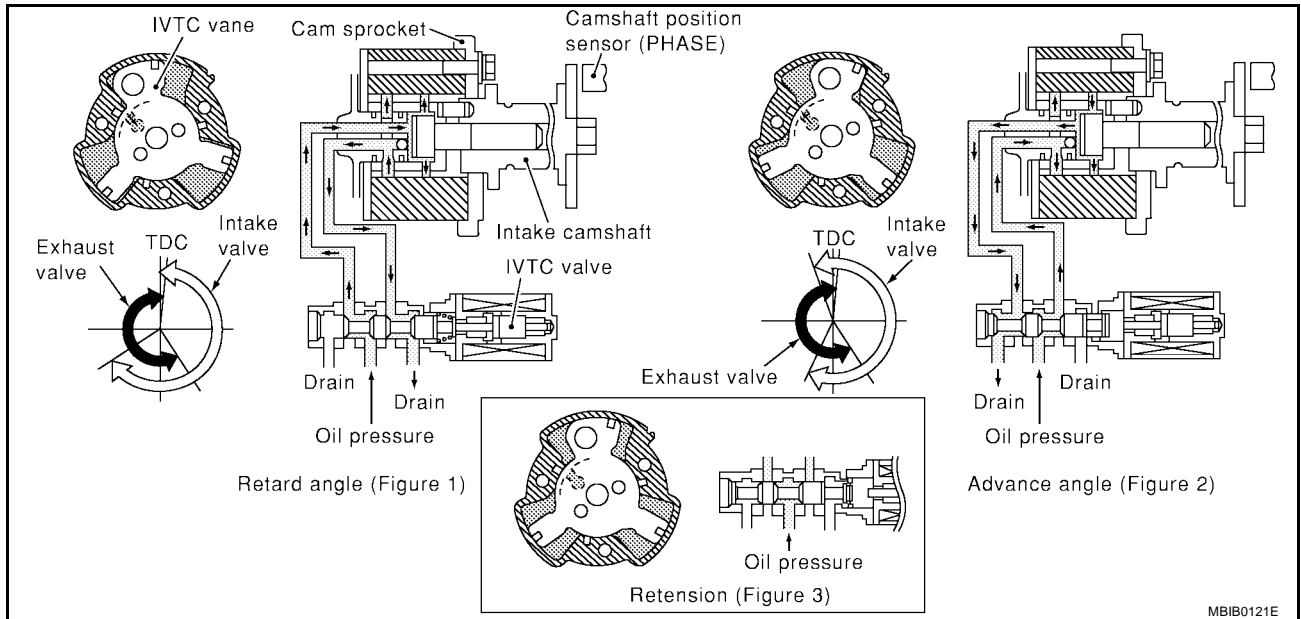
PFP:23796

Description  
SYSTEM DESCRIPTION

UBS0067U

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS)	Engine speed	Intake valve timing control	Intake valve timing control solenoid valve
Camshaft position sensor (PHASE)			
Engine coolant temperature sensor	Engine coolant temperature		
Vehicle speed signal*	Vehicle speed		

\*: This signal is sent to the ECM through CAN communication line.



MBIB0121E

This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

CONSULT-II Reference Value in Data Monitor Mode

UBS0067V

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
INT/V TIM (B1)	● Engine: After warming up ● Shift lever: N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No-load	Idle -5° - 5°C
		When revving engine up to 2,000 rpm quickly Approx. 0° - 30°C
INT/V SOL (B1)	● Engine: After warming up ● Shift lever: N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No-load	Idle 0% - 2%
		When revving engine up to 2,000 rpm quickly Approx. 0% - 80%

## On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	Detecting condition	Possible cause
P0011 0011	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	<ul style="list-style-type: none"> <li>● Crankshaft position sensor (POS)</li> <li>● Camshaft position sensor (PHASE)</li> <li>● Accumulation of debris to the signal pick-up portion of the camshaft</li> </ul>

### FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode.

Detected items	Engine operating condition in fail-safe mode
Intake valve timing control	The signal is not energized to the solenoid valve and the valve control does not function

### DTC Confirmation Procedure

#### CAUTION:

Always drive at a safe speed.

#### NOTE:

- If DTC P0011 is displayed with DTC P1111, first perform trouble diagnosis for “DTC P1111”. See [EC-947, "DTC P1111 IVT CONTROL SOLENOID VALVE"](#) .
- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 10V and 16V at idle.

#### WITH CONSULT-II

1. Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Maintain the following conditions for at least 6 consecutive seconds.  
Hold the accelerator pedal as steady as possible.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

PBIB0164E

VHCL SPEED SE	100 - 120 km/h (63 - 75 MPH)
ENG SPEED	2,000 - 4,000 rpm
COOLAN TEMP/S	60 - 120°C (140 - 248°F)
B/FUEL SCHDL	More than 3.38 msec
Selector lever	A/T models: “D” position M/T models: 5th position

4. Stop vehicle with engine running and let engine idle for 10 seconds.
5. If 1st trip DTC is detected, go to [EC-150, "Diagnostic Procedure"](#) .  
If 1st trip DTC is not detected, go to next step.
6. Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	1,700 - 3,175 rpm (A constant rotation is maintained.)
COOLANT TEMPS	70 - 105°C (176 - 194°F)
Selector lever	1st or 2nd position
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions required for this test.)

7. If 1st trip DTC is detected, go to [EC-950, "Diagnostic Procedure"](#) .

#### WITH GST

Follow the procedure “WITH CONSULT-II” above.

**Diagnostic Procedure****1. CHECK CRANKSHAFT POSITION SENSOR (POS)**

Refer to [EC-841, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 2.
- NG >> Replace crankshaft position sensor (POS).

**2. CHECK CAMSHAFT POSITION SENSOR (PHASE)**

Refer to [EC-847, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 3.
- NG >> Replace camshaft position sensor (PHASE).

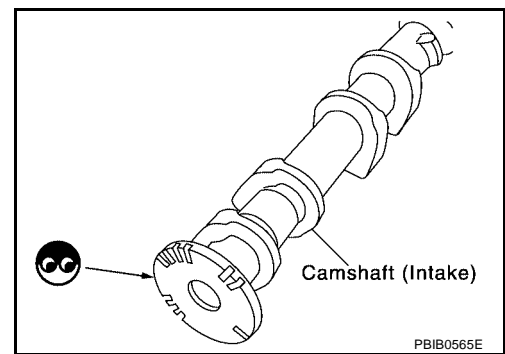
**3. CHECK CAMSHAFT (INTAKE)**

Check the following.

- Accumulation of debris to the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end

OK or NG

- OK >> GO TO 4.
- NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.

**4. CHECK INTERMITTENT INCIDENT**

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

For wiring diagram refer to [EC-838, "Wiring Diagram"](#) for CKP sensor (POS) and [EC-843, "Wiring Diagram"](#) for CMP sensor (PHASE).

>> INSPECTION END

**DTC P0037, P0038 HO2S2 HEATER**

PF226A0

**Description  
SYSTEM DESCRIPTION**

UBS0067Z

Sensor	Input Signal to ECM	ECM Function	Actuator
Camshaft position sensor (PHASE)	Engine speed	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
Crankshaft position sensor (POS)			
Engine coolant temperature sensor	Engine coolant temperature		
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater corresponding to the engine speed, amount of intake air and engine coolant temperature.

**OPERATION**

Engine speed rpm	Heated oxygen sensor 2 heater
Above 3,600	OFF
<ul style="list-style-type: none"> <li>Below 3,600 rpm after the following conditions are met.</li> <li>Engine: After warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	ON

**CONSULT-II Reference Value in Data Monitor Mode**

UBS00680

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 MNTR (B1)	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul> Revving engine from idle to 3,000 rpm quickly	LEAN ←→ RICH

**On Board Diagnosis Logic**

UBS00681

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0037 0037	Heated oxygen sensor 2 heater control circuit low	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	<ul style="list-style-type: none"> <li>Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.)</li> <li>Heater oxygen sensor 2 heater</li> </ul>
P0038 0038	Heated oxygen sensor 2 heater control circuit high	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	<ul style="list-style-type: none"> <li>Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.)</li> <li>Heater oxygen sensor 2 heater</li> </ul>

**DTC Confirmation Procedure**

UBS00682

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

**Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V at idle.**

**WITH CONSULT-II**

1. Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch “OFF” and wait at least 10 seconds.

## DTC P0037, P0038 HO2S2 HEATER

[QG18DE (SULEV)]

4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
5. Let engine idle for one minute.
6. If 1st trip DTC is detected, go to [EC-737, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

### WITH GST

1. Start engine and warm it up to the normal operating temperature.
  2. Turn ignition switch "OFF" and wait at least 10 seconds.
  3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
  4. Let engine idle for one minute.
  5. Turn ignition switch "OFF" and wait at least 10 seconds.
  6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
  7. Let engine idle for one minute.
  8. Select "MODE 3" with GST.
  9. If DTC is detected, go to [EC-737, "Diagnostic Procedure"](#).
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

# DTC P0037, P0038 HO2S2 HEATER

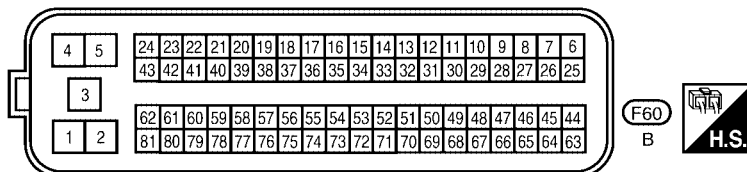
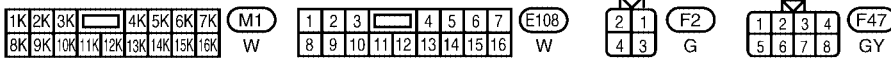
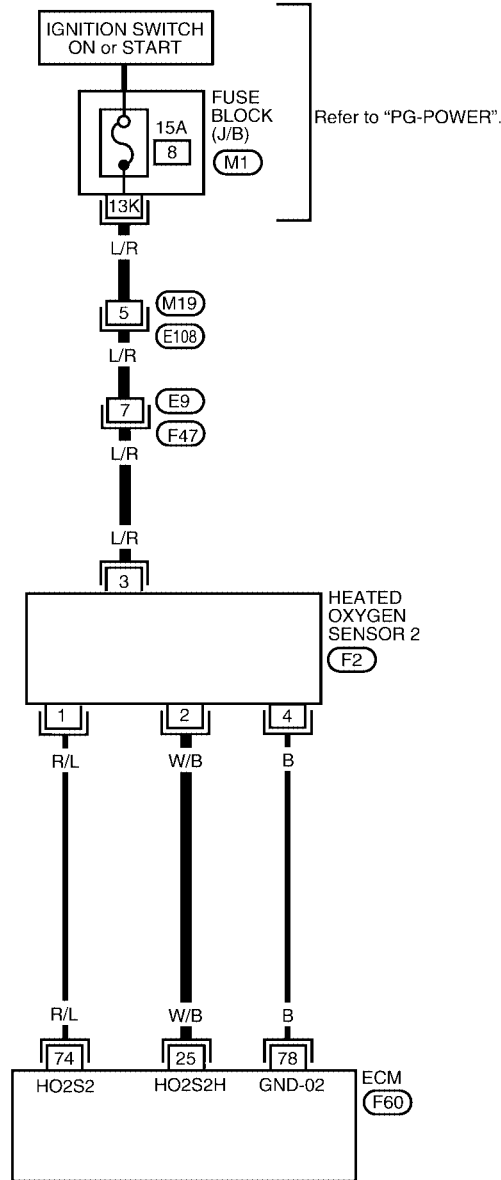
[QG18DE (SULEV)]

UBS00683

## Wiring Diagram

EC-HO2S2H-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



BBWA0773E



# DTC P0037, P0038 HO2S2 HEATER

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

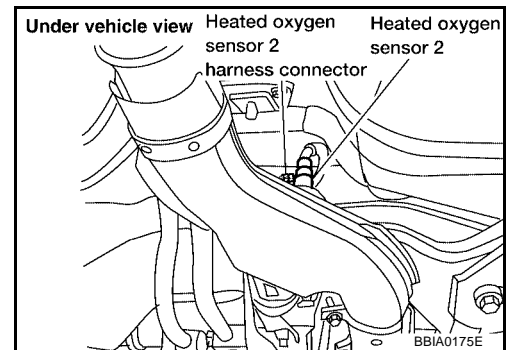
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
25	W/B	Heated oxygen sensor 2 heater	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Engine speed: Below 3,600 rpm after the following conditions are met.</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under on load</li> </ul>	0 - 1.0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped.</li> </ul> <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is above 3,600 rpm.</li> </ul>	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS00684

### 1. CHECK HO2S2 POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Turn ignition switch "ON".

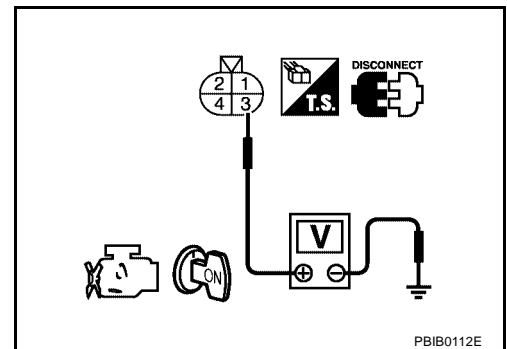


4. Check voltage between HO2S2 terminal 3 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.  
 NG >> GO TO 2.



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## 2. DETECT MALFUNCTIONING PART

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Check the following.

- Harness connectors E9, F47
- Harness connectors E108, M19
- Fuse block (J/B) connector M1
- 15A fuse
- Harness for open or short between heated oxygen sensor 2 and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 3. CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 25 and HO2S2 terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 4. CHECK HEATED OXYGEN SENSOR 2 HEATER

---

Refer to [EC-739, "Component Inspection"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace heated oxygen sensor 2.

---

## 5. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Component Inspection**  
**HEATED OXYGEN SENSOR 2 HEATER**

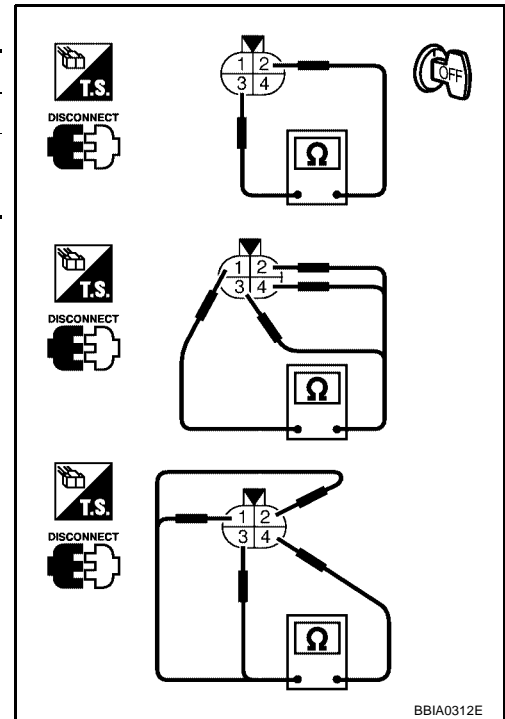
1. Check resistance between HO2S2 terminals as follows.

Terminal No.	Resistance
2 and 3	2.3 - 4.3 $\Omega$ at 25°C (77°F)
1 and 2, 3, 4	$\infty \Omega$
4 and 1, 2, 3	(Continuity should not exist)

2. If NG, replace heated oxygen sensor 2.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



BBIA0312E

**Removal and Installation**  
**HEATED OXYGEN SENSOR 2**

Refer to [EX-3, "EXHAUST SYSTEM"](#) .

A  
 EC  
 C  
 D  
 E  
 F  
 G  
 H  
 I  
 J  
 K  
 L  
 M

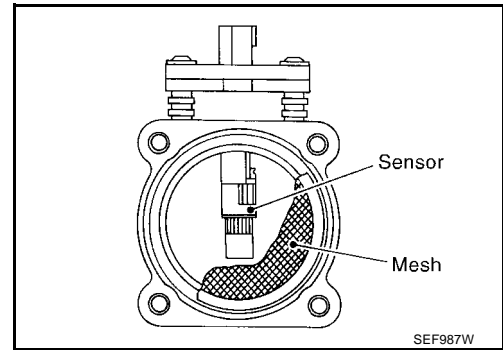
**DTC P0101 MAF SENSOR**

PF2:22680

**Component Description**

UBS003M1

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss. Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS003M2

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS A/F SE-B1	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: "OFF"</li> <li>● Shift lever: "N" (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul> Idle	1.0 - 1.7V
	2,500 rpm	1.5 - 2.4V
CAL/LD VALUE	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: "OFF"</li> <li>● Shift lever: "N" (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul> Idle	20.0 - 35.5%
	2,500 rpm	12.0 - 30.0%
MASS AIRFLOW	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: "OFF"</li> <li>● Shift lever: "N" (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul> Idle	1.4 - 4.0 g·m/s
	2,500 rpm	5.0 - 10.0 g·m/s

**On Board Diagnosis Logic**

UBS003M3

This self-diagnosis has the one trip detection logic.

**NOTE:**

If DTC P0101 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-455, "DTC P1229 SENSOR POWER SUPPLY"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0101 0101	Mass air flow sensor circuit range/performance problem	A) A high voltage from the sensor is sent to ECM under light load driving condition.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Mass air flow sensor</li> </ul>
		B) A low voltage from the sensor is sent to ECM under heavy load driving condition.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Intake air leaks</li> <li>● Mass air flow sensor</li> </ul>

**DTC Confirmation Procedure**

UBS003M4

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION "B".

### PROCEDURE FOR MALFUNCTION A

#### NOTE:

If engine will not start or stops soon, wait at least 10 seconds with engine stopped (Ignition switch "ON") instead of running engine at idle speed.

#### With CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and warm it up to normal operating temperature.
4. Run engine for at least 10 seconds at idle speed.
5. If DTC is detected, go to [EC-744, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANT TEMP/S	XXX °C

SEF174Y

#### With GST

Follow the procedure "With CONSULT-II" above.

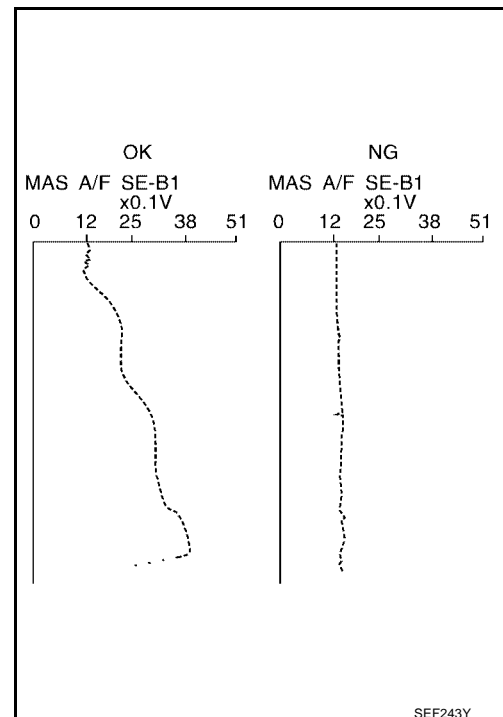
### PROCEDURE FOR MALFUNCTION B

#### CAUTION:

Always driver vehicle at a safe speed.

#### With CONSULT-II

1. Turn ignition switch "ON".
2. Start engine and warm it up to normal operating temperature.  
If engine cannot be started, go to [EC-744, "Diagnostic Procedure"](#).
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Check the voltage of "MAS A/F SE-B1" with "DATA MONITOR".
5. Increases engine speed to about 4,000 rpm.
6. Monitor the linear voltage rise in response to engine speed increases.  
If NG, go to [EC-744, "Diagnostic Procedure"](#).  
If OK, go to following step.



# DTC P0101 MAF SENSOR

[QG18DE (SULEV)]

7. Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	More than 2,000 rpm
THRTL POS SEN	More than 3.0V
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
THRTL POS SEN	XXX V

SEF719Y

8. If DTC is detected, go to [EC-744, "Diagnostic Procedure"](#) .

## Overall Function Check

UBS003M5

Use this procedure to check the overall function of the mass air flow sensor circuit. During this check, a DTC might not be confirmed.

### PROCEDURE FOR MALFUNCTION B

#### With GST

1. Turn ignition switch "ON".
2. Start engine and warm it up to normal operating temperature.
3. Select "MODE 1" with GST.
4. Check the mass air flow sensor signal with "MODE 1".
5. Check for linear mass air flow rise in response to increases to about 4,000 rpm in engine speed.
6. If NG, go to [EC-744, "Diagnostic Procedure"](#) .

CALC LOAD	20%
COOLANT TEMP	95°C
SHORT FT #1	2%
LONG FT #1	0%
SHORT FT #2	4%
LONG FT #2	0%
ENGINE SPD	2637RPM
VEHICLE SPD	0MPH
IGN ADVANCE	41.0°
INTAKE AIR	41°C
<b>MAF</b>	<b>14.1gm/sec</b>
THROTTLE POS	3%

SEF534P

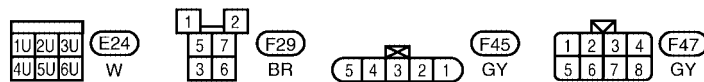
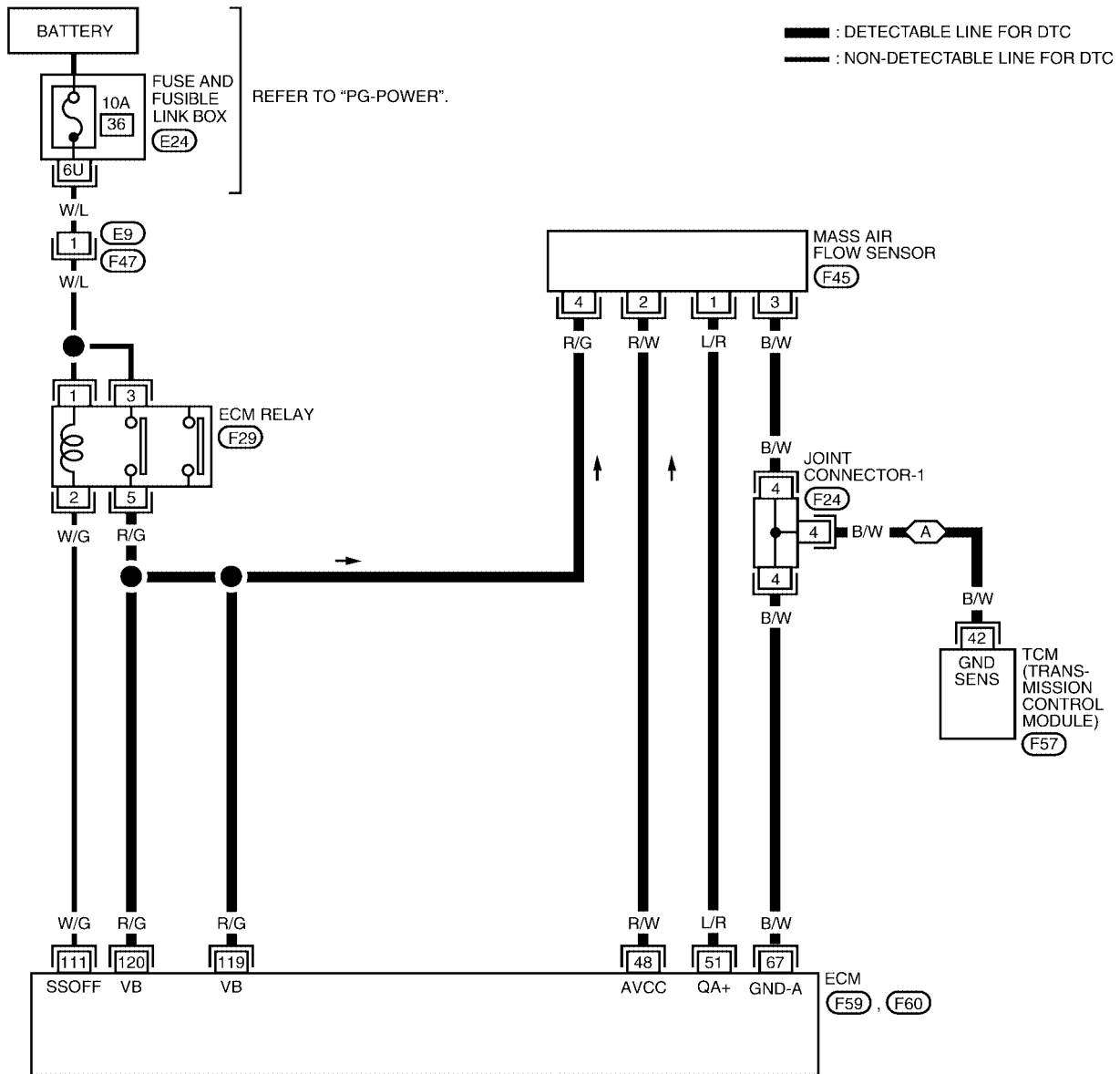
# DTC P0101 MAF SENSOR

[QG18DE (SULEV)]

UBS003M6

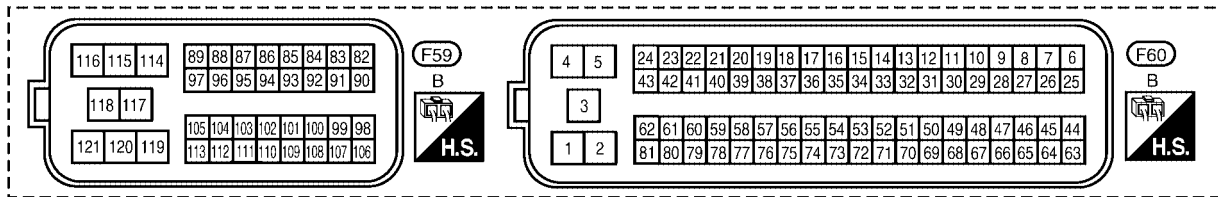
## Wiring Diagram

EC-MAFS-01



Refer to the following.

F24 - JOINT CONNECTOR  
F57 - ELECTRICAL UNITS



BBWA0774E

# DTC P0101 MAF SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
48	R/W	Sensors' power supply	[Ignition switch "ON"]	Approximately 5V
51	L/R	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.0 - 1.7V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.5 - 2.1V
67	B/W	Mass air flow sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
111	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For 5 seconds after turning ignition switch "OFF"	0 - 1.0V
			[Ignition switch "OFF"] ● 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
119 120	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS003M7

### 1. INSPECTION START

Which malfunction (A or B) is duplicated?

A or B

- A >> GO TO 3.
- B >> GO TO 2.

### 2. CHECK INTAKE SYSTEM

Check the following for connections.

- Air duct
- Vacuum hoses
- Intake air passage between air duct and collector

OK or NG

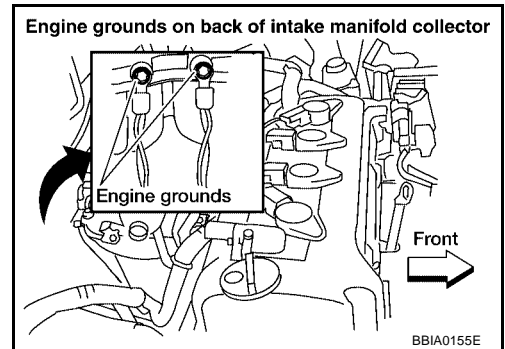
- OK >> GO TO 3.
- NG >> Reconnect the parts.



### 3. RETIGHTEN GROUND SCREWS

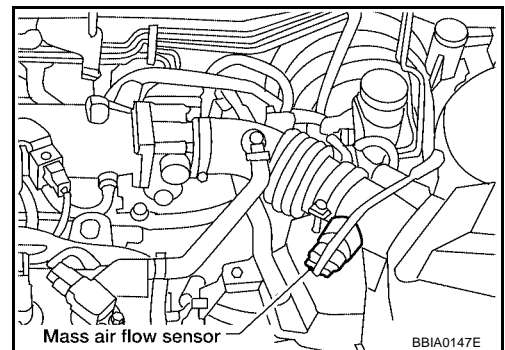
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 4.



### 4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow sensor harness connector.
2. Turn ignition switch "ON".

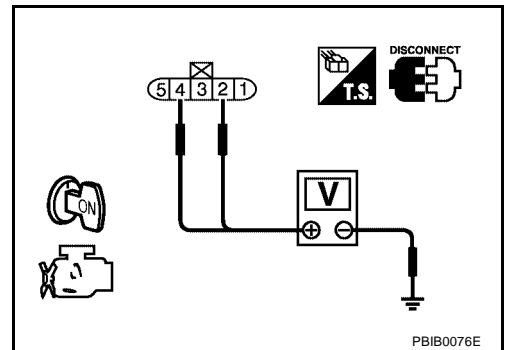


3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.

Terminal	Voltage
2	Approximately 5V
4	Battery voltage

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.



### 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between ECM relay and mass air flow sensor
- Harness for open or short between mass air flow sensor and ECM

>> Repair harness or connectors.

---

## 6. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and engine ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.  
NG >> GO TO 7.

---

## 7. DETECT MALFUNCTIONING PART

---

Check the following.

- Joint connector-1
- Harness for open or short between mass air flow sensor and ECM
- Harness for open or short between mass air flow sensor and TCM

>> Repair harness or connectors.

---

## 8. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Check harness continuity between MAF sensor terminal 1 and ECM terminal 51.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.  
NG >> Repair open circuit or short to ground or short or short to power in harness or connectors.

---

## 9. CHECK MASS AIR FLOW SENSOR

---

Refer to [EC-747, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.  
NG >> Replace mass air flow sensor.

---

## 10. CHECK INTERMITTENT INCIDENT

---

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

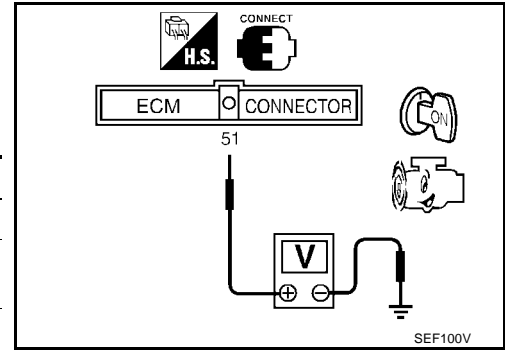
### Component Inspection MASS AIR FLOW SENSOR

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 51 (Mass air flow sensor signal) and ground.

Conditions	Voltage V
Ignition switch "ON" (Engine stopped.)	Less than 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.7
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 2.1
Idle to about 4,000 rpm*	1.0 - 1.7 to Approx. 4.0

\*: Check for linear voltage rise in response to increases to about 4,000 rpm in engine speed.

4. If the voltage is out of specification, proceed the following.
  - Turn ignition switch "OFF".
  - Disconnect mass air flow sensor harness connector and reconnect it again.
  - Perform step 2 and 3 again.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.
6. If NG, clean or replace mass air flow sensor.



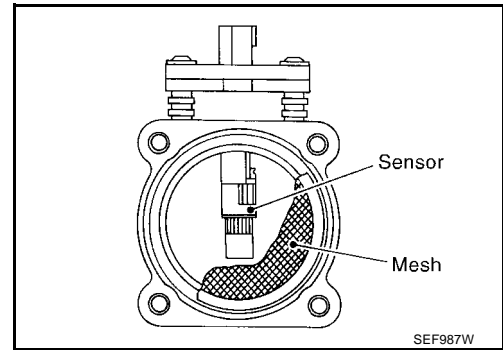
A  
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M

**DTC P0102, P0103 MAF SENSOR**

**Component Description**

UBS003MA

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss. Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS003MB

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS A/F SE-B1	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: "OFF"</li> <li>● Shift lever: "N" (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul>	Idle 1.0 - 1.7V
	2,500 rpm	1.5 - 2.1V
CAL/LD VALUE	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: "OFF"</li> <li>● Shift lever: "N" (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul>	Idle 20.0 - 35.5%
	2,500 rpm	12.0 - 30.0%
MASS AIRFLOW	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: "OFF"</li> <li>● Shift lever: "N" (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul>	Idle 1.4 - 4.0 g·m/s
	2,500 rpm	5.0 - 10.0 g·m/s

**On Board Diagnosis Logic**

UBS003MC

These self-diagnoses have the one trip detection logic.

**NOTE:**

If DTC P0102 or P0103 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-1028](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0102 0102	Mass air flow sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Intake air leaks</li> <li>● Mass air flow sensor</li> </ul>
P0103 0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Mass air flow sensor</li> </ul>

**FAIL-SAFE MODE**

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

### DTC Confirmation Procedure

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### PROCEDURE FOR DTC P0102

 **With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-758, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

 **With GST**

Follow the procedure "With CONSULT-II" above.

#### PROCEDURE FOR DTC P0103

 **With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait 5 seconds at most.
4. If DTC is detected, go to [EC-758, "Diagnostic Procedure"](#) .  
If DTC is not detected, go to next step.
5. Start engine and wait at least 5 seconds.
6. If DTC is detected, go to [EC-758, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

 **With GST**

Follow the procedure "With CONSULT-II" above.

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J  
K  
L  
M

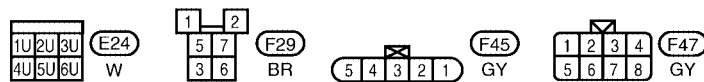
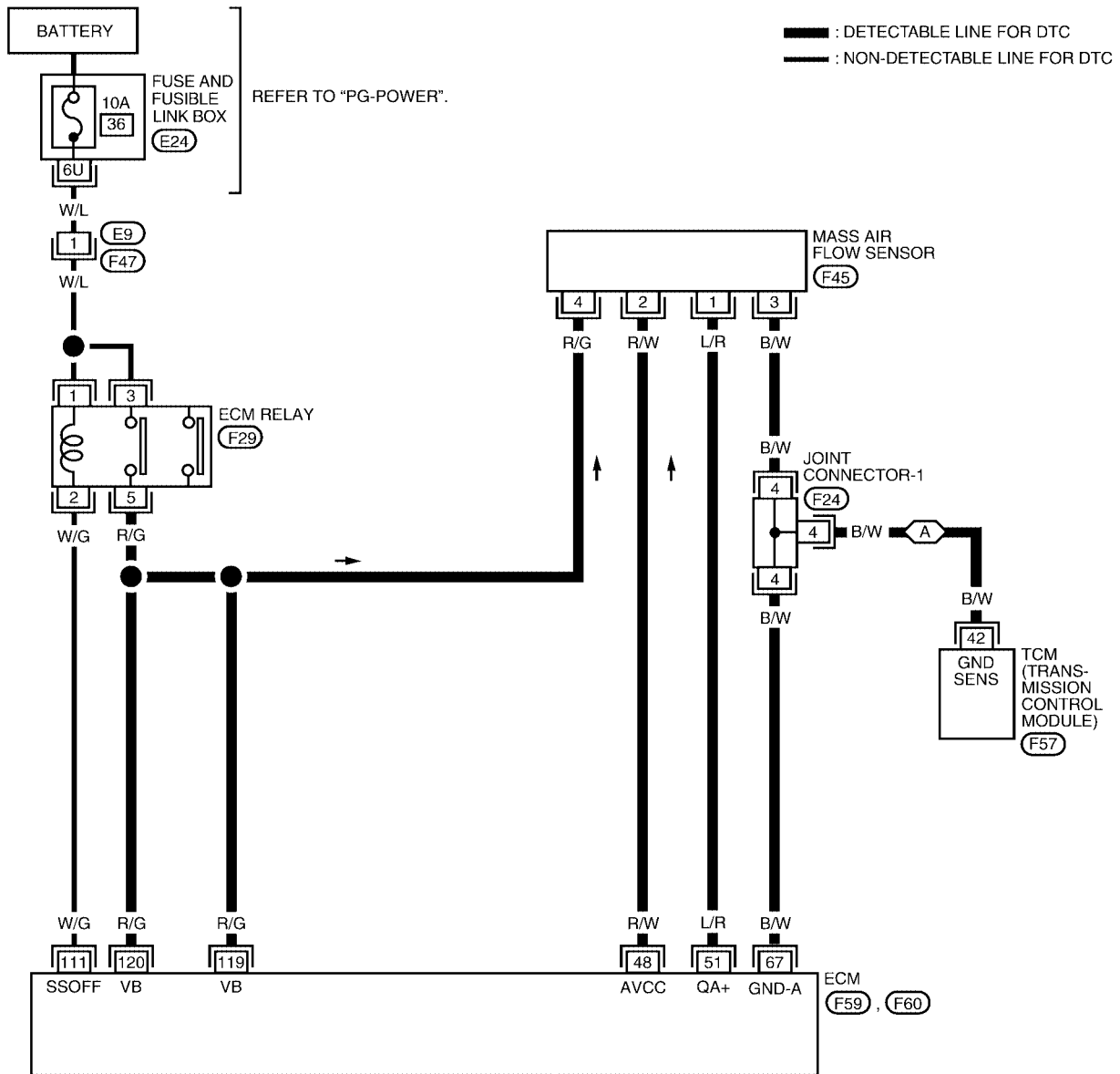
# DTC P0102, P0103 MAF SENSOR

[QG18DE (SULEV)]

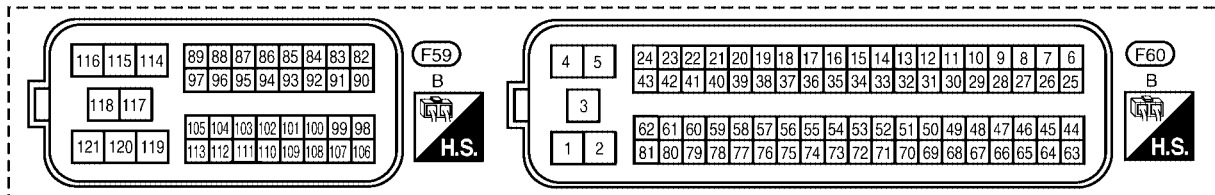
UBS003MF

## Wiring Diagram

### EC-MAFS-01



Refer to the following.  
 (F24) - JOINT CONNECTOR  
 (F57) - ELECTRICAL UNITS



BBWA0774E

# DTC P0102, P0103 MAF SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
48	R/W	Sensors' power supply	[Ignition switch "ON"]	Approximately 5V
51	L/R	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.0 - 1.7V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.5 - 2.1V
67	B/W	Mass air flow sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
111	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For 5 seconds after turning ignition switch "OFF"	0 - 1.0V
			[Ignition switch "OFF"] ● 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
119 120	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS003MG

### 1. INSPECTION START

Which malfunction (P0102 or P0103) is duplicated?

P0102 or P0103

P0102 >> GO TO 2.

P0103 >> GO TO 3.

### 2. CHECK INTAKE SYSTEM

Check the following for connections.

- Air duct
- Vacuum hoses
- Intake air passage between air duct to manifold

OK or NG

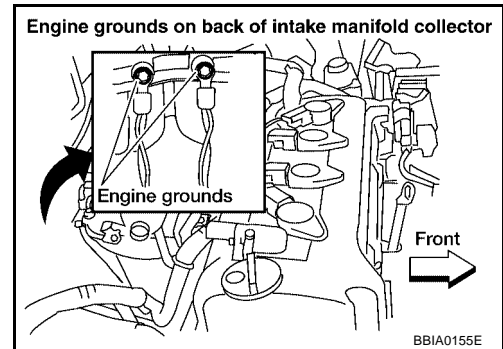
OK >> GO TO 3.

NG >> Reconnect the parts.

### 3. RETIGHTEN GROUND SCREWS

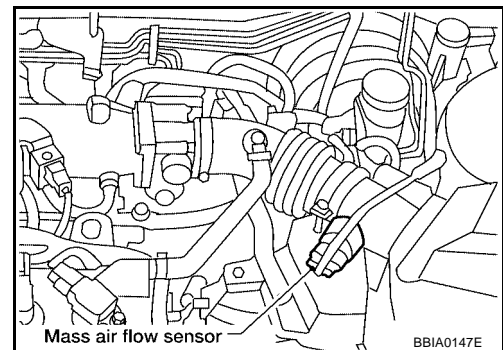
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 4.



### 4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow sensor harness connector.
2. Turn ignition switch "ON".

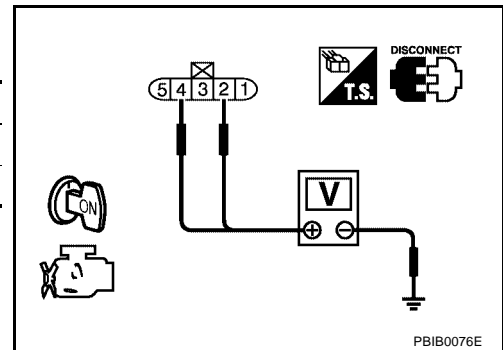


3. Check voltage between MAF terminals 2, 4 and ground with CONSULT-II or tester.

Terminal	Voltage
2	Approximately 5V
4	Battery voltage

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.



### 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between ECM relay and mass air flow sensor
- Harness for open or short between mass air flow sensor and ECM

>> Repair harness or connectors.



**6. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and engine ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.  
NG >> GO TO 7.

**7. DETECT MALFUNCTIONING PART**

Check the following.

- Joint connector-1
- Harness for open or short between mass air flow sensor and ECM
- Harness for open or short between mass air flow sensor and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR POEN AND SHORT**

1. Check harness continuity between MAF sensor terminal 1 and ECM terminal 51.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.  
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**9. CHECK MASS AIR FLOW SENSOR**

Refer to [EC-759, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.  
NG >> Replace mass air flow sensor.

**10. CHECK INTERMITTENT INCIDENT**

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

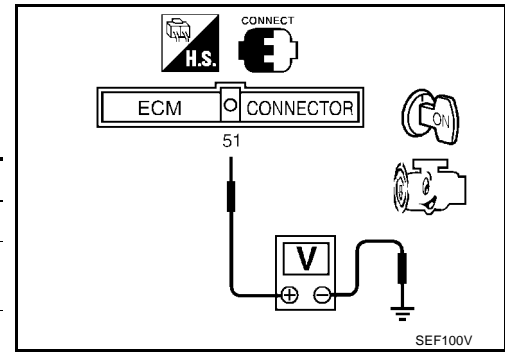
## Component Inspection MASS AIR FLOW SENSOR

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 51 (Mass air flow sensor signal) and ground.

Conditions	Voltage V
Ignition switch "ON" (Engine stopped.)	Less than 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.7
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 2.4
Idle to about 4,000 rpm*	1.0 - 1.7 to Approx. 4.0

\*: Check for linear voltage rise in response to increases to about 4,000 rpm in engine speed.

4. If the voltage is out of specification, proceed the following.
  - Turn ignition switch "OFF".
  - Disconnect mass air flow sensor harness connector and reconnect it again.
  - Perform step 2 and 3 again.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.
6. If NG, clean or replace mass air flow sensor.



DTC P0112, P0113 IAT SENSOR

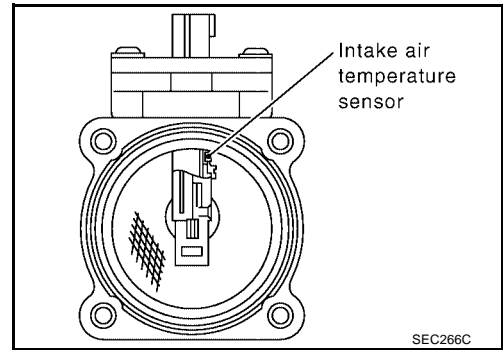
PF0:22630

Component Description

UBS003MJ

The intake air temperature sensor is built-into mass air flow sensor. The sensor detects intake air temperature and transmits a signal to the ECM.

The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.

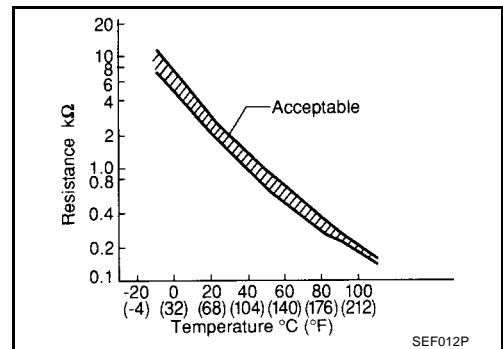


SEC266C

<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
25 (77)	3.32	1.9 - 2.1
80 (176)	1.23	0.31 - 0.37

\*: These data are reference values and are measured between ECM terminal 34 (Intake air temperature sensor) and ground.



SEF012P

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

UBS003MK

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0112 0112	Intake air temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Intake air temperature sensor</li> </ul>
P0113 0113	Intake air temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

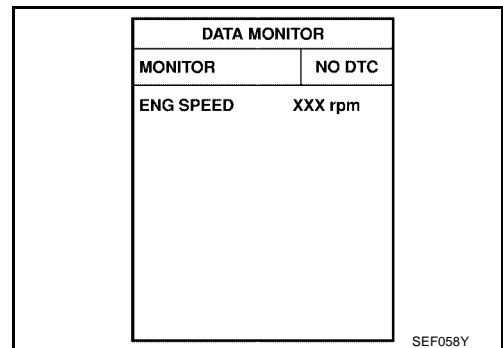
UBS003ML

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-758, "Diagnostic Procedure"](#)



SEF058Y



**WITH GST**

Follow the procedure "With CONSULT-II" above.




# DTC P0112, P0113 IAT SENSOR

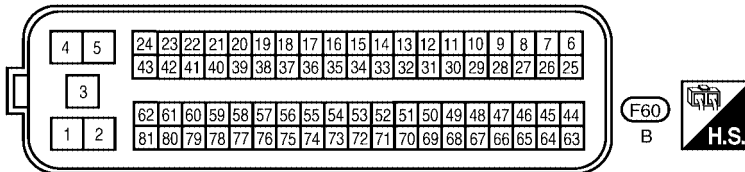
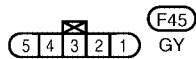
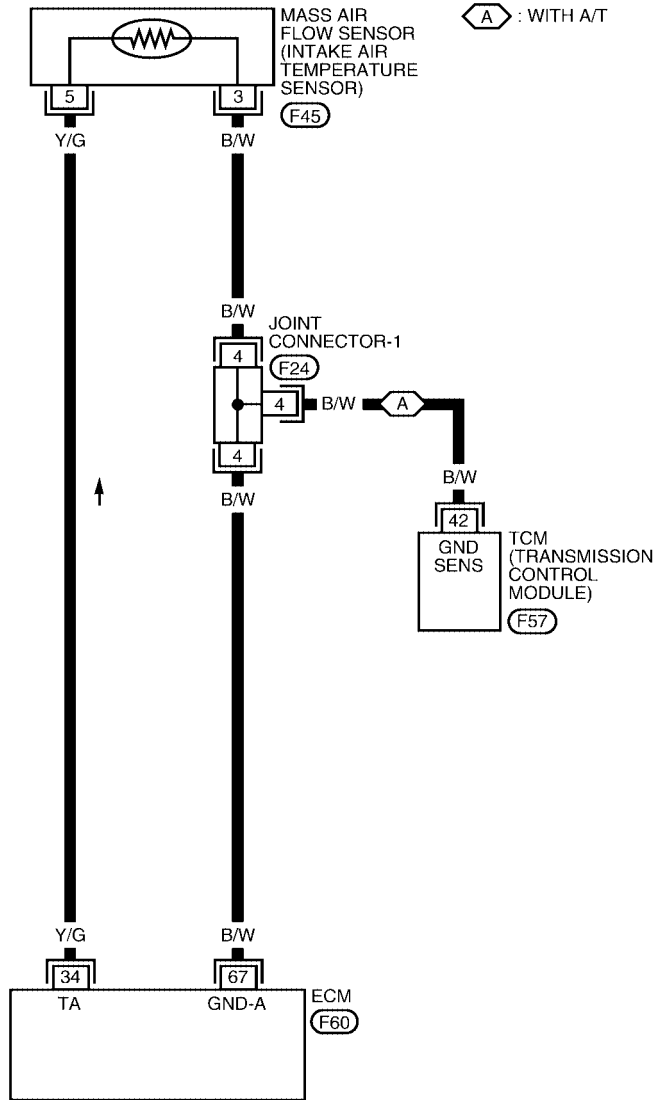
[QG18DE (SULEV)]

UBS003MM

## Wiring Diagram

EC-IATS-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : WITH A/T



Refer to the following.

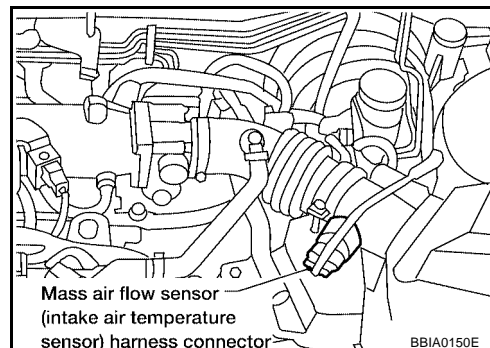
-  - JOINT CONNECTOR
-  - ELECTRICAL UNITS

BBWA0775E

## Diagnostic Procedure

### 1. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect mass air flow sensor (intake air temperature sensor is built-into) sensor harness connector.
3. Turn ignition switch "ON".

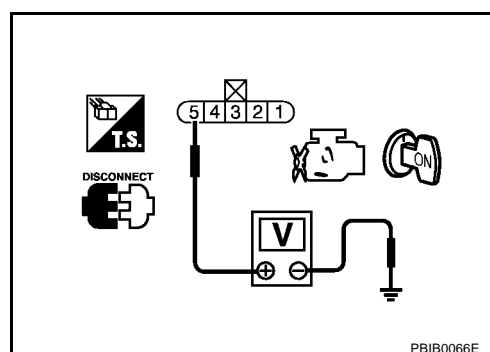


4. Check voltage between MAF sensor terminal 5 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

#### OK or NG

- OK >> GO TO 3.  
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.



### 2. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between terminal 3 and engine ground. Refer to wiring diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

#### OK or NG

- OK >> GO TO 4.  
 NG >> GO TO 3.

### 3. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-1
- Harness for open or short between TCM and intake air temperature sensor
- Harness for open or short between ECM and intake air temperature sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

### 4. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-759, "Component Inspection"](#).

#### OK or NG

- OK >> GO TO 5.  
 NG >> Replace intake air temperature sensor.

**5. CHECK INTERMITTENT INCIDENT**

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

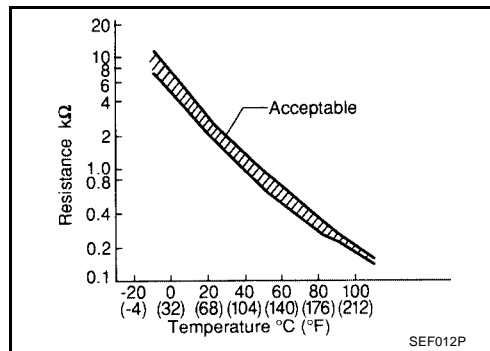
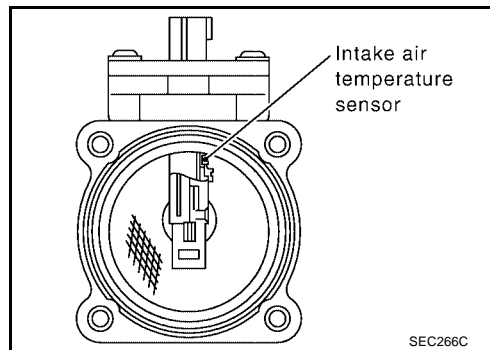
**Component Inspection  
INTAKE AIR TEMPERATURE SENSOR**

UBS003MO

1. Check resistance between intake air temperature sensor terminals 3 and 5 under the following conditions.

Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

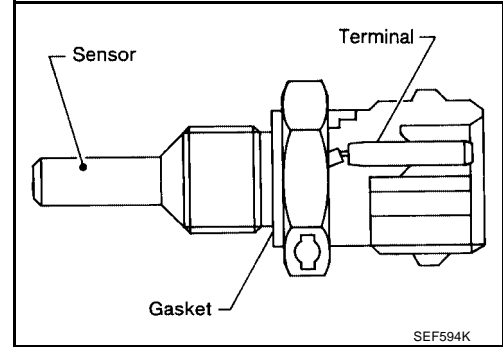
2. If NG, replace mass air flow sensor (with intake air temperature sensor).



## DTC P0117, P0118 ECT SENSOR

### Component Description

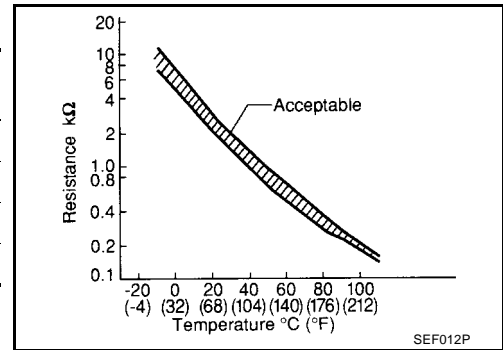
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



### <Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

\*: These data are reference values and are measured between ECM terminal 73 (Engine coolant temperature sensor) and ground.



### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may damage the ECM's transistor. Use ground other than ECM, such as body ground.**

### On Board Diagnosis Logic

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0117 0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Engine coolant temperature sensor</li> </ul>
P0118 0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	



# DTC P0117, P0118 ECT SENSOR

[QG18DE (SULEV)]

## FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode	
Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch "ON" or "START". CONSULT-II displays the engine coolant temperature decided by ECM.	
	Condition	Engine coolant temperature decided (CONSULT-II display)
	Just as ignition switch is turned ON or Start	40°C (104°F)
	More than approx. 4 minutes after ignition ON or Start	80°C (176°F)
	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while the engine is running.		

## DTC Confirmation Procedure

UBS001T4

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-763, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

### WITH GST

Follow the procedure "With CONSULT-II" above.

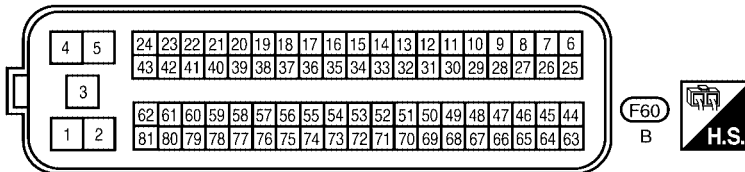
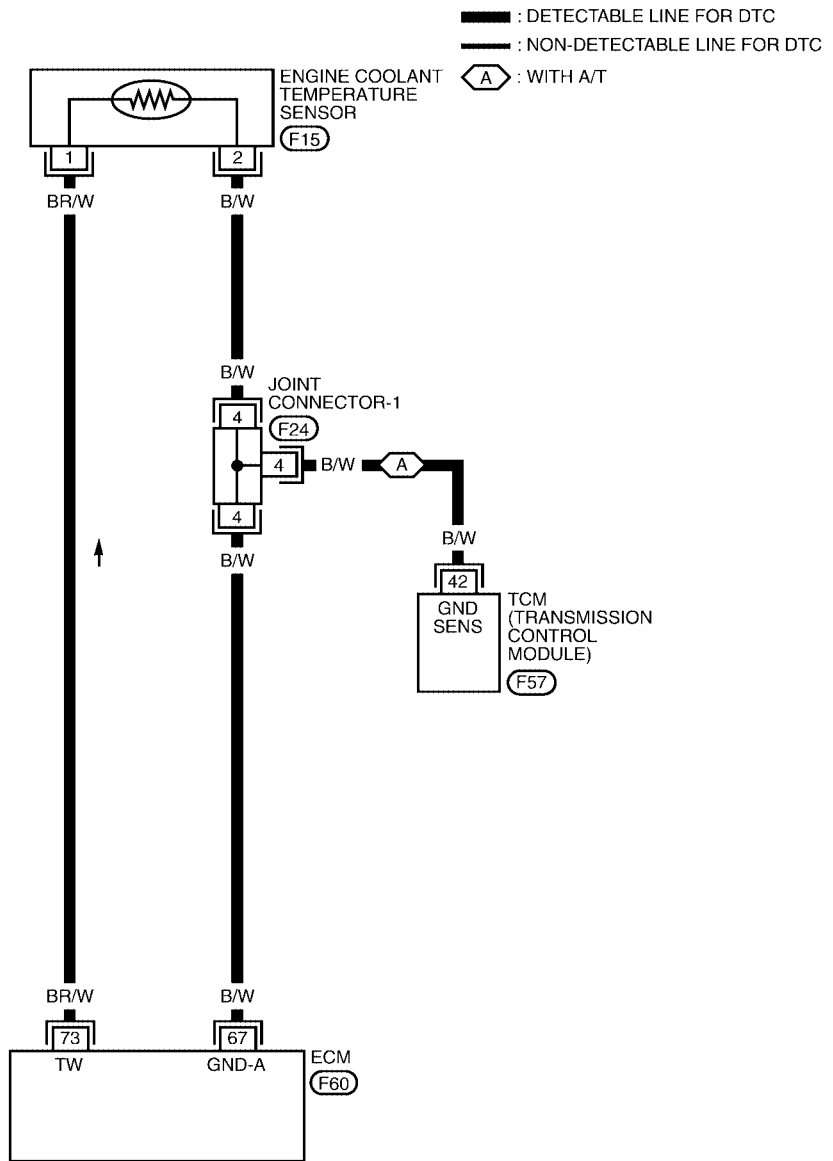
# DTC P0117, P0118 ECT SENSOR

[QG18DE (SULEV)]

UBS001T5

## Wiring Diagram

EC-ECTS-01



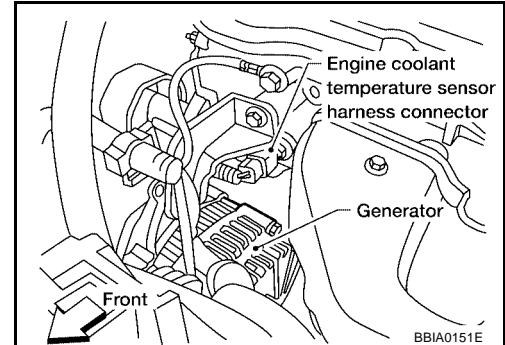
Refer to the following.

- F24 - JOINT CONNECTOR
- F57 - ELECTRICAL UNITS

BBWA0776E

**Diagnostic Procedure****1. CHECK ETC SENSOR POWER SUPPLY CIRCUIT**

1. Turn ignition switch "OFF".
2. Disconnect engine coolant temperature (ECT) sensor harness connector.
3. Turn ignition switch "ON".

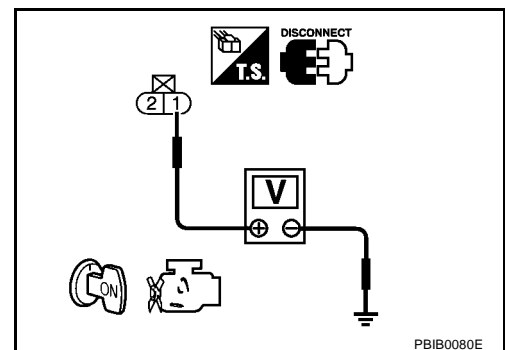


4. Check voltage between ECT terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 2.  
 NG >> Repair or replace harness or connectors.

**2. CHECK ETC SENSOR GROUND CIRCUIT FOR OPEN AND SHORRT**

1. Turn ignition switch "OFF".
2. Check harness continuity between ECT terminal 2 and engine ground. Refer to wiring diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.  
 NG >> GO TO 3.

**3. DETECT MALFUNCTIONING PART**

Check the following.

- Joint connector-1
- Harness for open or short between TCM and engine coolant temperature sensor
- Harness for open or short between ECM and engine coolant temperature sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

**4. CHECK ENGINE COOLANT TEMPERATURE SENSOR**

Refer to [EC-764, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.  
 NG >> Replace engine coolant temperature sensor.

**5. CHECK INTERMITTENT INCIDENT**

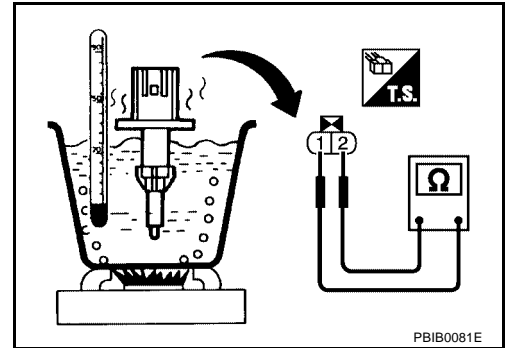
Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection  
ENGINE COOLANT TEMPERATURE SENSOR**

UBS001T7

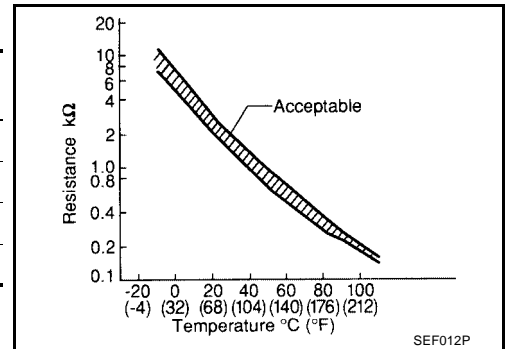
1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



**<Reference data>**

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

\*: These data are reference values and are measured between ECM terminal 73 (Engine coolant temperature sensor) and ground.



2. If NG, replace engine coolant temperature sensor.

**Removal and Installation  
ENGINE COOLANT TEMPERATURE SENSOR**

UBS001T8

Refer to [EM-12, "OUTER COMPONENT PARTS"](#) .

DTC P0122, P0123 TP SENSOR

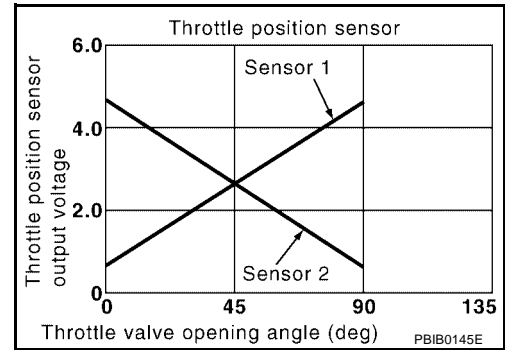
PF16119

Component Description

UBS00687

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

UBS00688

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	<ul style="list-style-type: none"> <li>Ignition switch: ON (Engine stopped)</li> </ul>	Accelerator pedal: Fully released	More than 0.36V
	<ul style="list-style-type: none"> <li>Shift lever D: (A/T model) 1st: (M/T model)</li> </ul>	Accelerator pedal: Fully depressed	Less than 4.75V

\*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

UBS00689

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122 0122	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	<ul style="list-style-type: none"> <li>Harness or connectors (The TP sensor 2 circuit is open or shorted.) (APP sensor 2 circuit is shorted.)</li> <li>Electric throttle control actuator (TP sensor 2)</li> <li>Accelerator pedal position sensor (APP sensor)</li> </ul>
P0123 0123	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

**DTC Confirmation Procedure****NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-768, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

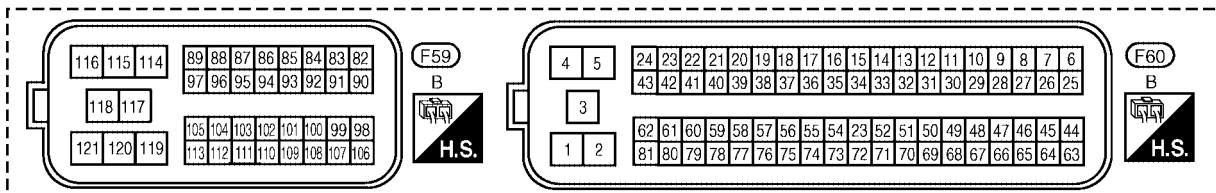
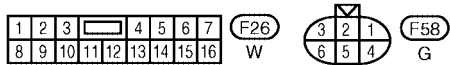
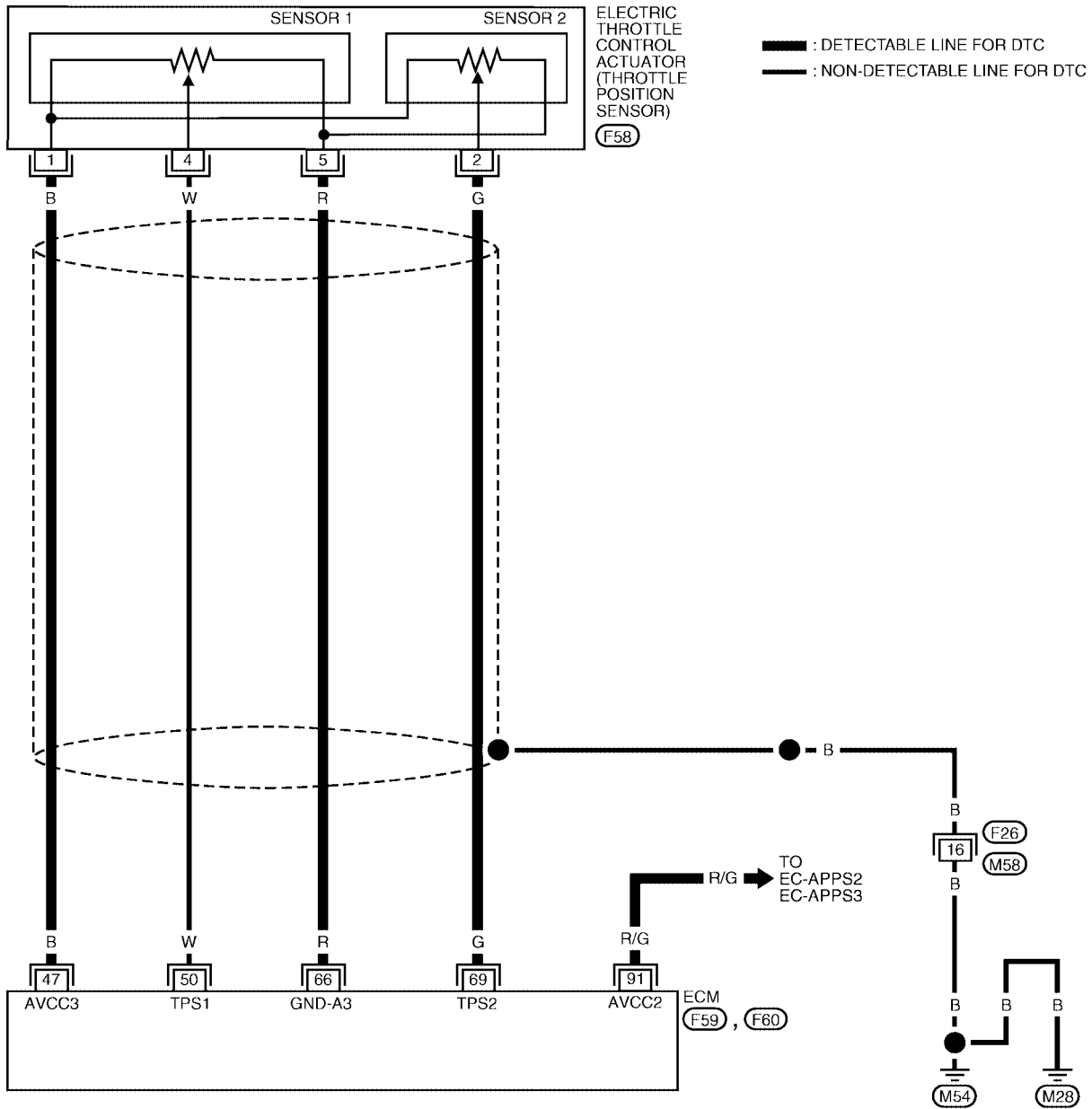
# DTC P0122, P0123 TP SENSOR

[QG18DE (SULEV)]

UBS0068B

## Wiring Diagram

EC-TPS2-01



BBWA1380E

# DTC P0122, P0123 TP SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	B	Sensor power supply (Throttle position sensor)	[Ignition switch "ON"]	Approximately 5V
50	W	Throttle position sensor 1	[Ignition switch "ON"]	More than 0.36V
			[Ignition switch "ON"]	Less than 4.75V
66	R	Sensor ground (Throttle position sensor)	[Engine is running]	Approximately 0V
69	G	Throttle position sensor 2	[Ignition switch "ON"]	Less than 4.75V
			[Ignition switch "ON"]	More than 0.36V
91	R/G	Sensors power supply (Accelerator pedal position sensor 2)	[Ignition switch "ON"]	Approximately 5V

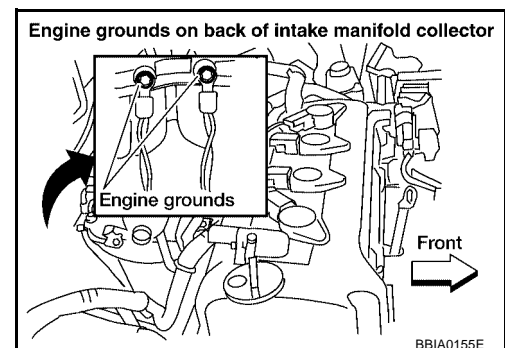
## Diagnostic Procedure

UBS0068C

### 1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

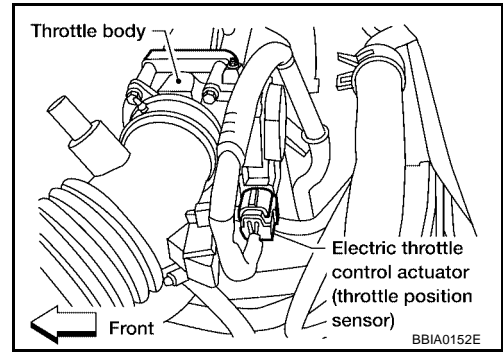
>> GO TO 2.





**2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT-I**

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

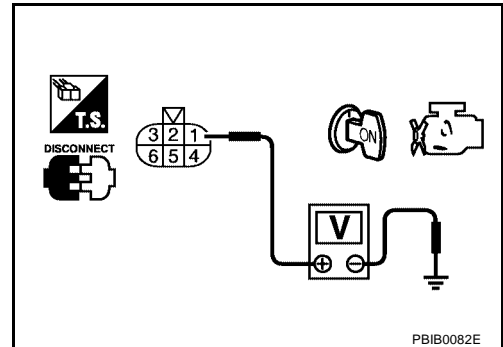


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 3.



**3. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT-II**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 1 and ECM terminal 47. Refer to Wiring Diagram.

**Continuity should exist.**

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace open circuit.

**4. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT-III**

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Electric throttle control actuator terminal 1	<a href="#">EC-767</a>
91	APP sensor terminal 1	<a href="#">EC-1134</a>

OK or NG

- OK >> GO TO 5.
- NG >> Repair short to ground or short to power in harness or connectors.

**5. CHECK APP SENSOR**

Refer to [EC-1132, "DTC P2127, P2128 APP SENSOR"](#) .

OK or NG

- OK >> GO TO 11.
- NG >> GO TO 6.

---

**6. REPLACE ACCELERATOR PEDAL ASSEMBLY**

---

1. Replace accelerator pedal assembly.
2. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> INSPECTION END

---

**7. CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT**

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and electric throttle control actuator terminal 5.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

**8. CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

---

1. Check harness continuity between ECM terminal 69 and electric throttle control actuator terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

**9. CHECK THROTTLE POSITION SENSOR**

---

Refer to [EC-771, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> GO TO 10.

---

**10. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

---

1. Replace the electric throttle control actuator.
2. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> INSPECTION END

---

**11. CHECK INTERMITTENT INCIDENT**

---

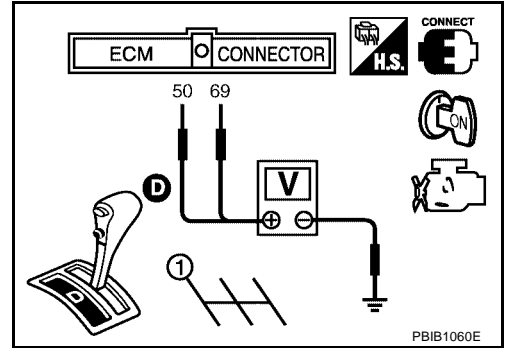
Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection**  
**THROTTLE POSITION SENSOR**

1. Reconnect all harness connectors disconnected.
2. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 50 (TP sensor 1 signal), 69 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
50 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
69 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-635, "Idle Air Volume Learning"](#) .

**Remove and Installation**  
**ELECTRIC THROTTLE CONTROL ACTUATOR**

Refer to [EM-12, "Removal and Installation"](#) .

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

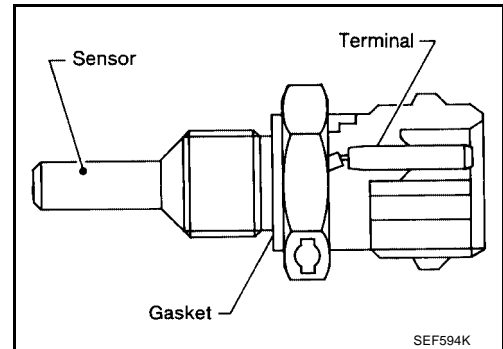
### DTC P0125 ECT SENSOR

#### Component Description

**NOTE:**

If DTC P0125 is displayed with P0117, P0118, first perform trouble diagnosis for DTC P0117, P0118, [EC-760](#).

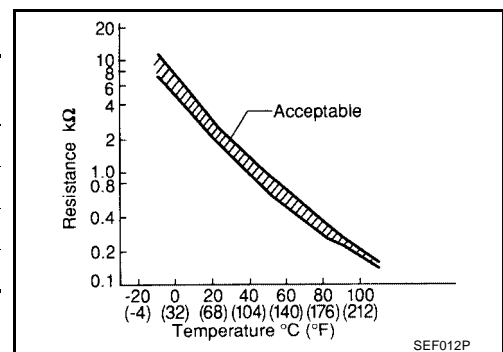
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



#### <Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

\*: These data are reference values and are measured between ECM terminal 73 (Engine coolant temperature sensor) and ground.



**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may damage the ECM's transistor. Use ground other than ECM, such as body ground.

#### On Board Diagnosis Logic

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0125 0125	Insufficient engine coolant temperature for closed loop fuel control	<ul style="list-style-type: none"> <li>● Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine.</li> <li>● Engine coolant temperature is insufficient for closed loop fuel control.</li> </ul>	<ul style="list-style-type: none"> <li>● Harness or connectors (High resistance in the circuit)</li> <li>● Engine coolant temperature sensor</li> <li>● Thermostat</li> </ul>

**DTC Confirmation Procedure****CAUTION:**

Be careful not to overheat engine.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Check that "COOLAN TEMP/S" is above 15°C (59°F).  
**If it is above 15°C (59°F), the test result will be OK. If it is below 15°C (59°F), go to following step.**
4. Start engine and run it for 65 minutes at idle speed.  
**If "COOLAN TEMP/S" increases to more than 15°C (59°F) within 65 minutes, stop engine because the test result will be OK.**
5. If DTC is detected, go to [EC-773, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

**WITH GST**

Follow the procedure "With CONSULT-II" above.

**Diagnostic Procedure****1. CHECK ENGINE COOLANT TEMPERATURE SENSOR**

Refer to [EC-773, "Component Inspection"](#).

OK or NG

OK >> GO TO 2.

NG >> Replace engine coolant temperature sensor.

**2. CHECK THERMOSTAT OPERATION**

When the engine is cooled [lower than 75°C (167°F)], grasp lower radiator hose and confirm the engine coolant does not flow.

OK or NG

OK >> GO TO 3.

NG >> Repair or replace thermostat. Refer to [CO-11, "THERMOSTAT AND THERMOSTAT HOUSING"](#).

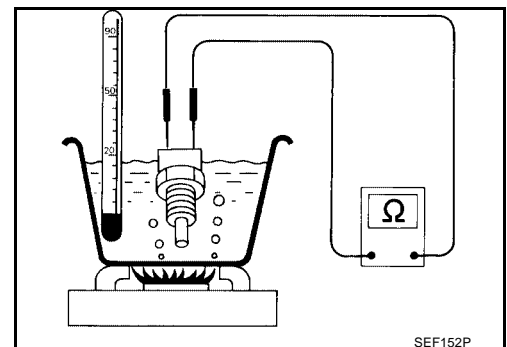
**3. CHECK INTERMITTENT INCIDENT**

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> INSPECTION END

**Component Inspection  
ENGINE COOLANT TEMPERATURE SENSOR**

Check resistance as shown in the figure.



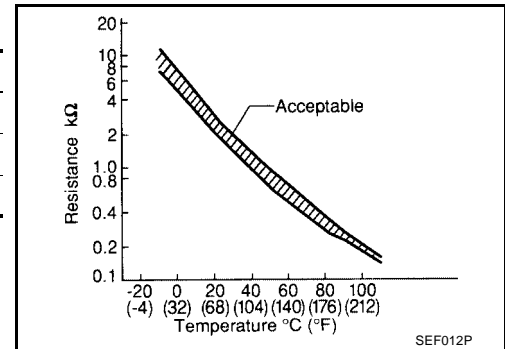
# DTC P0125 ECT SENSOR

[QG18DE (SULEV)]

## <Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.0
90 (194)	0.236 - 0.260

If NG, replace engine coolant temperature sensor.



UBS001TO

## Removal and Installation ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EM-12, "OUTER COMPONENT PARTS"](#).

**DTC P0127 IAT SENSOR**

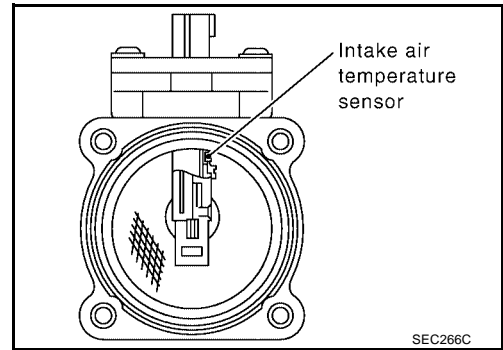
PF2:22630

**Component Description**

UBS003N6

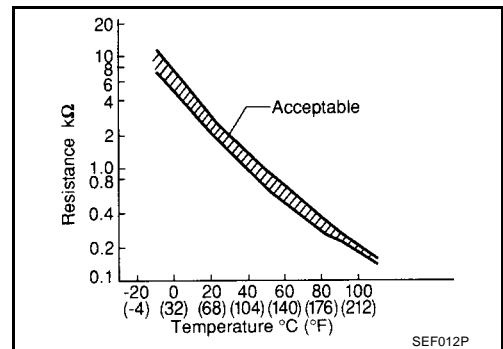
The intake air temperature sensor is built into mass air flow sensor. The sensor detects intake air temperature and transmits a signal to the ECM.

The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



**<Reference data>**

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.43	7.9 - 9.3
25 (77)	3.32	1.9 - 2.1
80 (176)	1.23	0.31 - 0.37



\*: These data are reference values and are measured between ECM terminal 34 (Intake air temperature sensor) and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

**On Board Diagnosis Logic**

UBS003N7

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0127 0127	Intake air temperature too high	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Intake air temperature sensor</li> </ul>

**DTC Confirmation Procedure**

UBS003N8

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**CAUTION:**

Always drive vehicle at a safe speed.

**TESTING CONDITION:**

This test may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

**WITH CONSULT-II**

1. Wait until engine coolant temperature is less than 90°C (194°F)
  - a. Turn ignition switch "ON".
  - b. Select "DATA MONITOR" mode with CONSULT-II.
  - c. Check the engine coolant temperature.
  - d. If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch "OFF" and cool down engine.
    - Perform the following steps before engine coolant temperature is above 90°C (194°F).
2. Turn ignition switch "ON".
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Start engine.
5. Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.
6. If 1st trip DTC is detected, go to [EC-776, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

**Diagnostic Procedure**

UBS003NA

**1. CHECK INTAKE AIR TEMPERATURE SENSOR**

Refer to [EC-777, "Component Inspection"](#).

OK or NG

- OK >> GO TO 2.
- NG >> Replace intake air temperature sensor.

**2. CHECK INTERMITTENT INCIDENT**

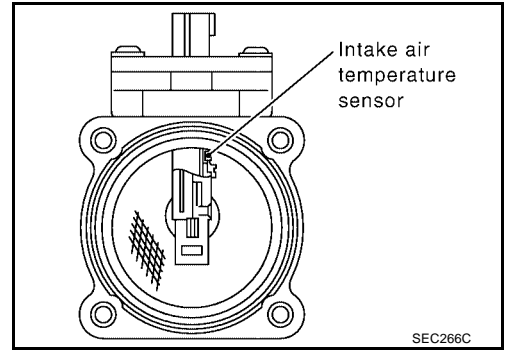
Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

**>> INSPECTION END**



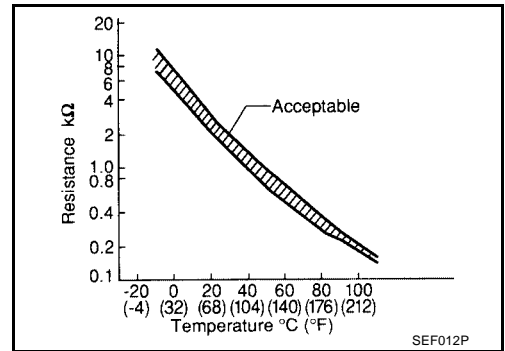
**Component Inspection**  
**INTAKE AIR TEMPERATURE SENSOR**

1. Check resistance between intake air temperature sensor terminals 3 and 5 under the following conditions.



Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

2. If NG, replace mass air flow sensor (with intake air temperature sensor).



A  
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**DTC P0128 THERMOSTAT FUNCTION**

**On Board Diagnosis Logic**

UBS001TP

Engine coolant temperature has not risen enough to open the thermostat even though the engine has run long enough.

This is due to a leak in the seal or the thermostat stuck open.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0128 0128	Thermostat function	The engine coolant temperature does not reach to specified temperature even though the engine has run long enough.	<ul style="list-style-type: none"> <li>● Thermostat</li> <li>● Leakage from sealing portion of thermostat</li> <li>● Engine coolant temperature sensor</li> </ul>

**DTC Confirmation Procedure**

UBS001TR

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- For best results, perform at ambient temperature of **-10°C (14°F) or higher.**
- For best results, perform at engine coolant temperature of **-10°C (14°F) to 68°C (154°F).**

 **WITH CONSULT-II**

1. Replace thermostat with new one. Refer to [CO-11, "THERMOSTAT AND THERMOSTAT HOUSING"](#) . Use only a genuine NISSAN thermostat as a replacement. If an incorrect thermostat is used, the MIL may come on.
2. Turn ignition switch “ON”.
3. Select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-II.
4. Check that the “COOLAN TEMP/S” is above 68°C (154°F).  
If it is below 68°C (154°F), go to following step.  
If it is above 68°C (154°F), stop engine and cool down the engine to less than 60°C (140°F), then retry from step 1.
5. Drive vehicle for 10 consecutive minutes under the following conditions.

VHCL SPEED SE	80 - 120 km/h (50 - 75 MPH)
---------------	-----------------------------

If 1st trip DTC is detected, go to [EC-778, "Diagnostic Procedure"](#) .

 **WITH GST**

1. Follow the procedure “WITH CONSULT-II” above.

**Diagnostic Procedure**

UBS001TS

**1. CHECK ENGINE COOLANT TEMPERATURE SENSOR**

Refer to [EC-779, "Component Inspection"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> Replace engine coolant temperature sensor.

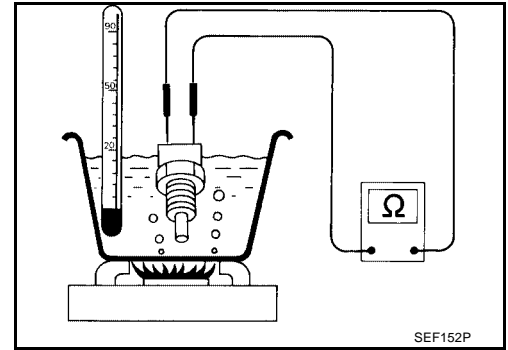
# DTC P0128 THERMOSTAT FUNCTION

[QG18DE (SULEV)]

UBS00611

## Component Inspection ENGINE COOLANT TEMPERATURE SENSOR

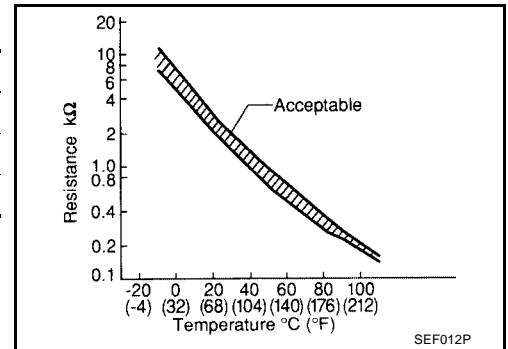
Check resistance as shown in the figure.



### <Reference data>

Temperature °C (°F)	Resistance k $\Omega$
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.0
90 (194)	0.236 - 0.260

If NG, replace engine coolant temperature sensor.



## Removal and Installation ENGINE COOLANT TEMPERATURE SENSOR

Refer to [CO-11, "THERMOSTAT AND THERMOSTAT HOUSING"](#).

UBS001TT

**DTC P0138 HO2S2**

**Component Description**

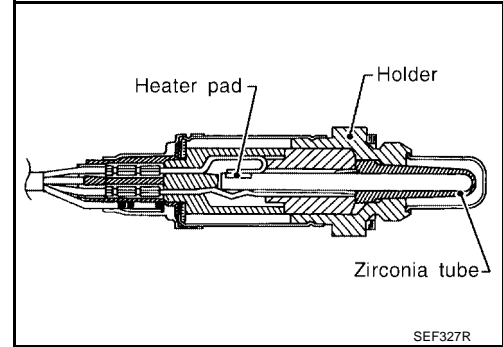
UBS0068F

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS0068G

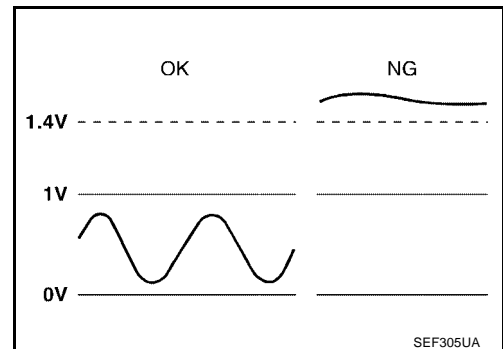
Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	Revving engine from idle to 3,000 rpm quickly 0 - 0.3V ↔ 0.6 - 1.0V
HO2S2 MNTR (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	Revving engine from idle to 3,000 rpm quickly LEAN ↔ RICH

**On Board Diagnosis Logic**

UBS0068H

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity before the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of rear heated oxygen sensor 2, ECM monitors whether the or not the voltage is too high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0138 0138 (Bank 1)	Heated oxygen sensor 2 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Heated oxygen sensor 2</li> </ul>

**DTC Confirmation Procedure****CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
5. Let engine idle for two minutes.
6. If 1st trip DTC is detected, go to [EC-783, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

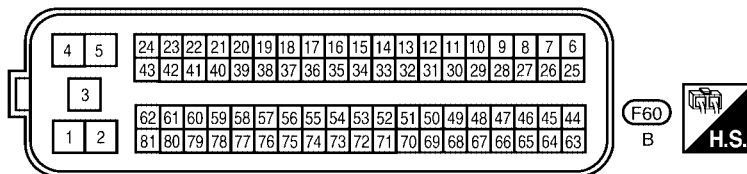
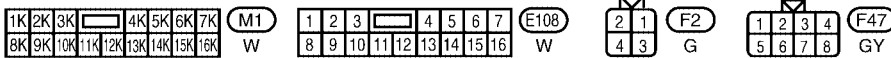
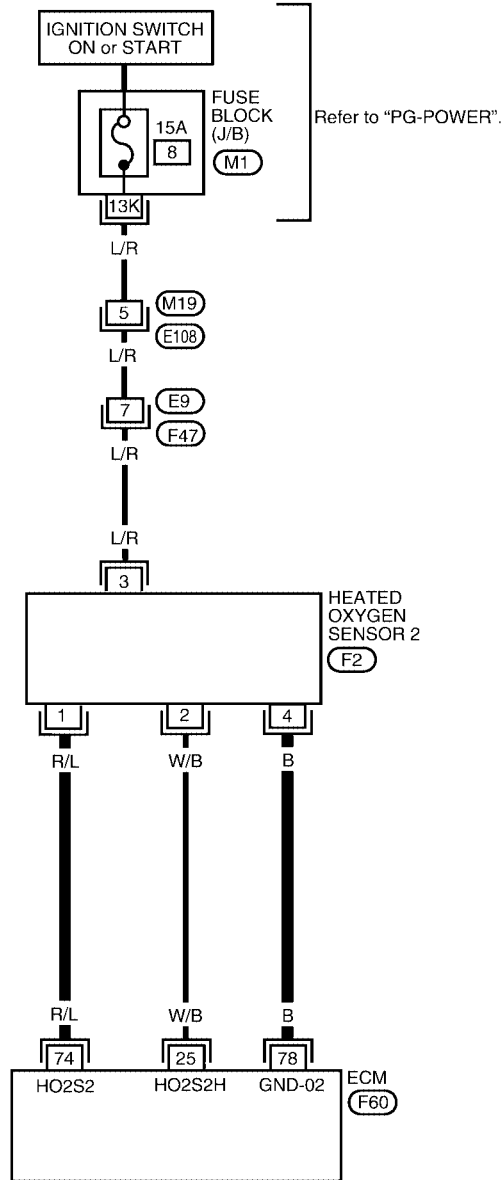
**WITH GST**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for two minutes.
5. Turn ignition switch "OFF" and wait at least 10 seconds.
6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
7. Let engine idle for two minutes.
8. Select "Mode 3" with GST.
9. If NG, go to [EC-783, "Diagnostic Procedure"](#) .
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

Wiring Diagram

EC-HO2S2-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	R/L	Heated oxygen sensor 2	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Revving engine from idle up to 3,000 rpm quickly after the following conditions are met.</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	0 - Approximately 1.0V
78	B	Sensor ground (Heated oxygen sensor)	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Idle speed</li> </ul>	Approximately 0V

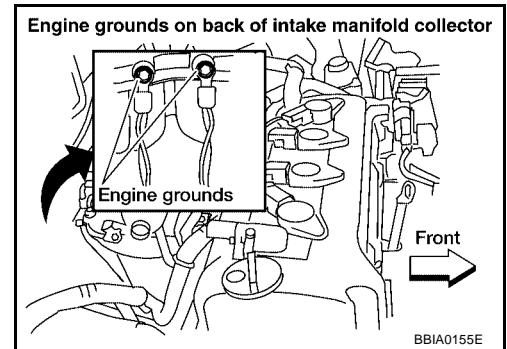
**Diagnostic Procedure**

UBS0068K

**1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

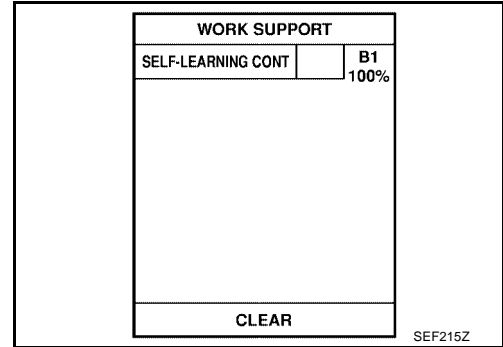
>> GO TO 2.



## 2. CLEAR THE SELF-LEARNING DATA

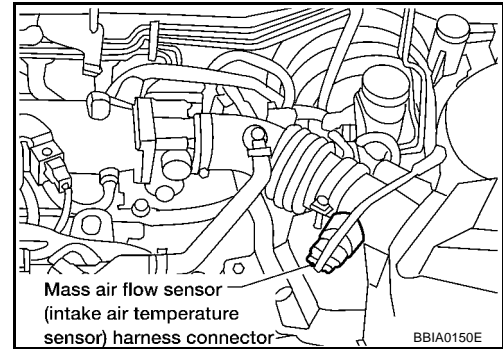
### ④ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0172 detected?**  
**Is it difficult to start engine?**



### ⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-651, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0172 detected?**  
**Is it difficult to start engine?**



#### Yes or No

- Yes >> Perform trouble diagnosis for DTC P0172. Refer to [EC-802](#).
- No >> GO TO 3.

## 3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

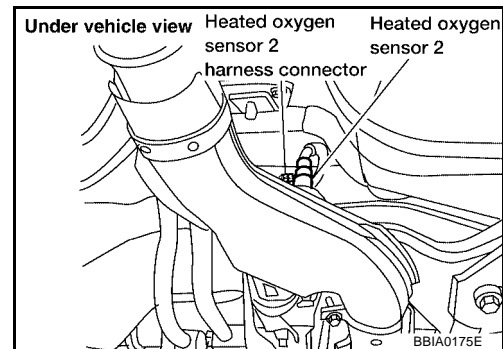
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 78 and HO2S2 terminal 4.  
Refer to Wiring Diagram.

**Continuity should exist.**

5. Also check harness for short to ground and short to power.

#### OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.





**4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Check harness continuity between ECM terminal 74 and HO2S2 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Check harness continuity between ECM terminal 74 or HO2S2 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**5. CHECK HEATED OXYGEN SENSOR 2**

Refer to [EC-785, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace heated oxygen sensor 2.

**6. CHECK INTERMITTENT INCIDENT**

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection  
HEATED OXYGEN SENSOR 2**

UBS0068L

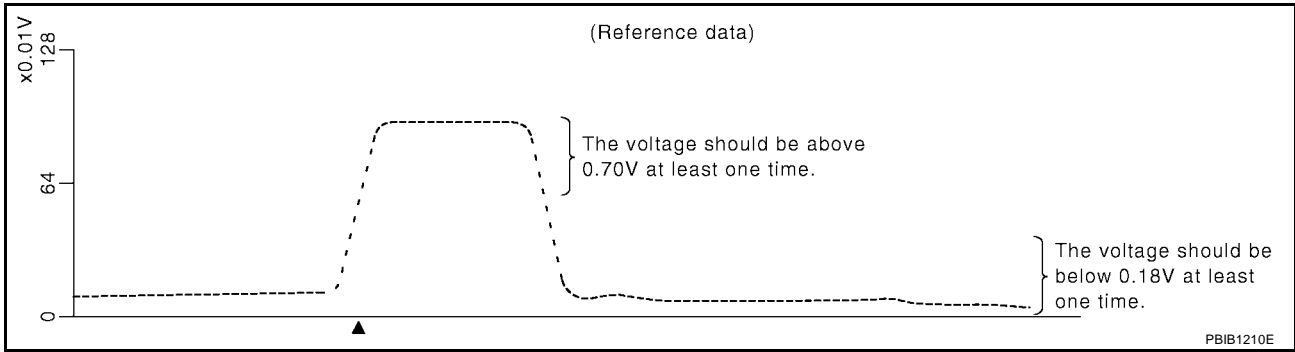
**With CONSULT-II**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

6. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .



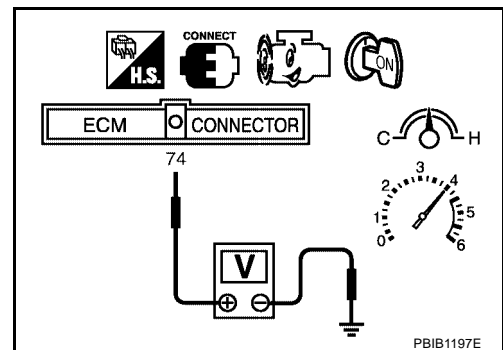
"HO2S2 (B1)" should be above 0.70V at least once when the "FUEL INJECTION" is +25%.  
 "HO2S2 (B1)" should be below 0.18V at least once when the "FUEL INJECTION" is -25%.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**⊗ Without CONSULT-II**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed at between 3,500 to 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
 (Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.70V at least once during this procedure.**  
**If the voltage is above 0.70V at step 6, step 7 is not necessary.**
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T) "3rd" gear position (M/T).  
**The voltage should be below 0.18V at least once during this procedure.**
8. If NG, replace heated oxygen sensor 2.



**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation  
 HEATED OXYGEN SENSOR 2**

Refer to [EX-3, "EXHAUST SYSTEM"](#) .

UBS0068M

**DTC P0139 HO2S2**

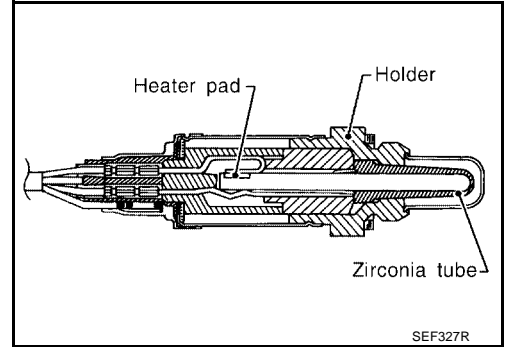
**Component Description**

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



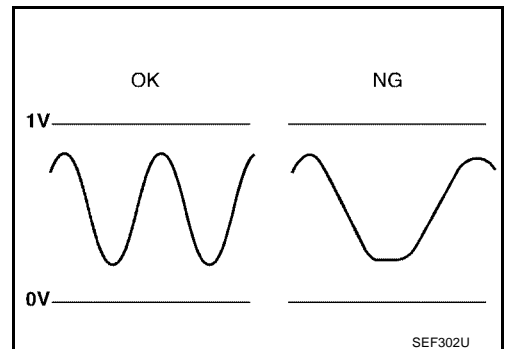
**CONSULT-II Reference Value in Data Monitor Mode**

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul> Revving engine from idle to 3,000 rpm quickly	0 - 0.3V ↔ 0.6 - 1.0V
HO2S2 MNTR (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul> Revving engine from idle to 3,000 rpm quickly	LEAN ↔ RICH

**On Board Diagnosis Logic**

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the switching response of the sensor's voltage is faster than specified during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0139 0139	Heated oxygen sensor 2 circuit slow response	It takes more time for the sensor to respond between rich and lean than the specified time.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Heated oxygen sensor 2</li> <li>● Fuel pressure</li> <li>● Injectors</li> <li>● Intake air leaks</li> </ul>

**DTC Confirmation Procedure**

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

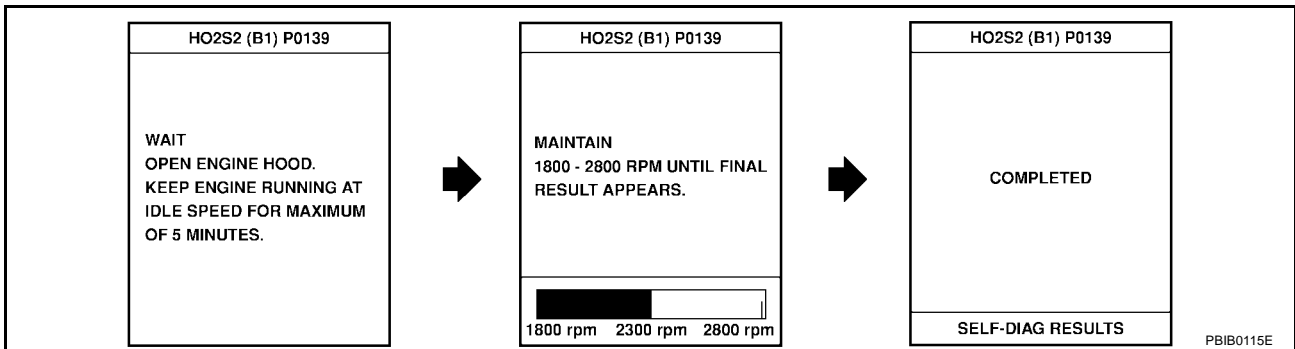
For the best results, perform “DTC WORK SUPPORT” at a temperature of 0 to 30°C (32 to 86°F)

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch “OFF” and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

SEF189Y

5. Select “HO2S2 (B1) P0139” of “HO2S2” in “DTC WORK SUPPORT” mode with CONSULT-II and follow the instruction of CONSULT-II.



6. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”.  
 If “NG” is displayed, refer to [EC-791](#).  
 If “CAN NOT BE DIAGNOSED” is displayed, perform the following.
  - a. Turn ignition switch “OFF” and leave the vehicle in a cool place (soak the vehicle).
  - b. Turn ignition switch “ON” and select “COOLANTEMP/S” in “DATA MONITOR” mode with CONSULT-II.
  - c. Start engine and warm it up while monitoring “COOLANTEMP/S” indication on CONSULT-II.
  - d. When “COOLANTEMP/S” indication reaches to 70°C (158°F), go to step 3.

**Overall Function Check**

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a DTC might not be confirmed.

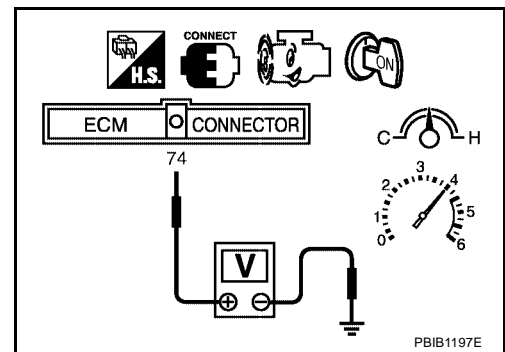
**WITH GST**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch “OFF” and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and engine ground.

## DTC P0139 HO2S2

[QG18DE (SULEV)]

6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
(Depress and release accelerator pedal as soon as possible.)  
**A change of voltage should be more than 0.06V for 1 second during this procedure.**  
**If the voltage can be confirmed in step 6, step 7 is not necessary.**
7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T) "3rd" gear position (M/T).  
**A change of voltage should be more than 0.06V for 1 second during this procedure.**
8. If NG, go to [EC-791, "Diagnostic Procedure"](#) .



A

EC

C

D

E

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H

I

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K

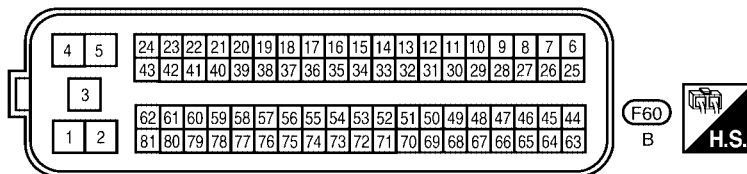
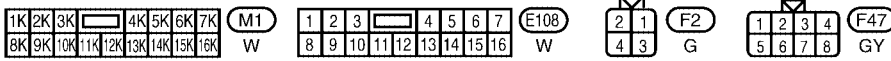
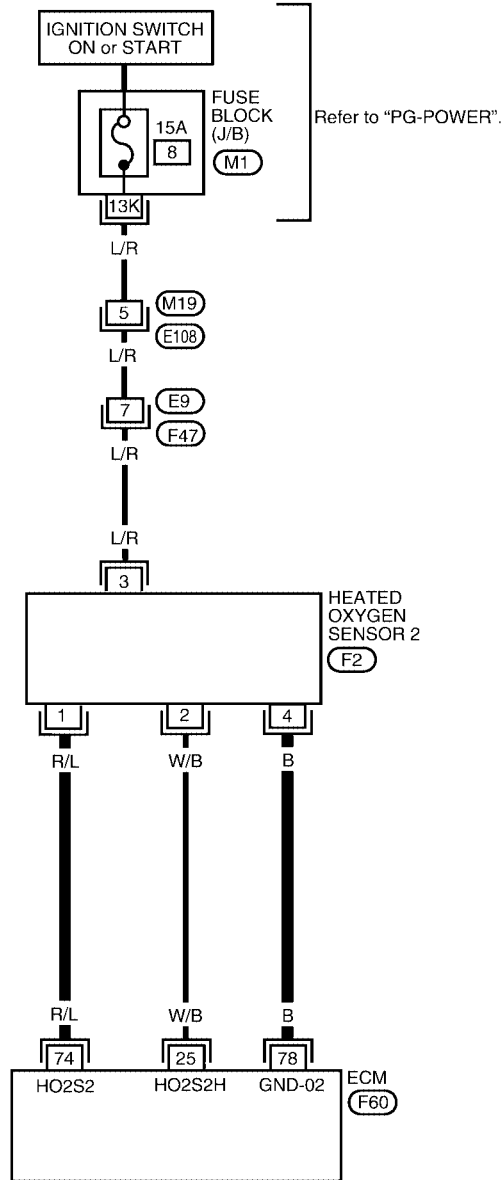
L

M

Wiring Diagram

EC-HO2S2-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	R/L	Heated oxygen sensor 2	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Revving engine from idle up to 3,000 rpm quickly after the following conditions are met.</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	0 - Approximately 1.0V
78	B	Sensor ground (Heated oxygen sensor)	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Idle speed</li> </ul>	Approximately 0V

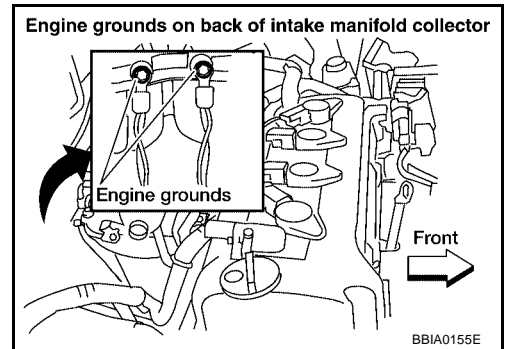
**Diagnostic Procedure**

UBS0068T

**1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

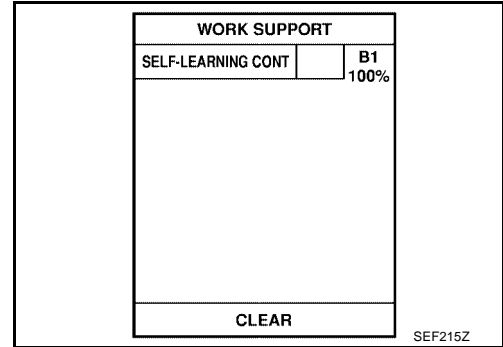
>> GO TO 2.



## 2. CLEAR THE SELF-LEARNING DATA

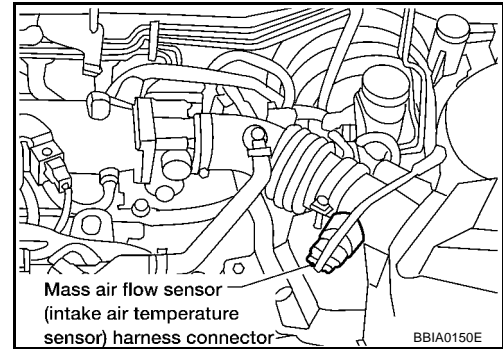
### ④ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 or P0172 detected?**  
**Is it difficult to start engine?**



### ⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-651, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 or P0172 detected?**  
**Is it difficult to start engine?**



#### Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to [EC-795](#) or [EC-802](#).
- No >> GO TO 3.

## 3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

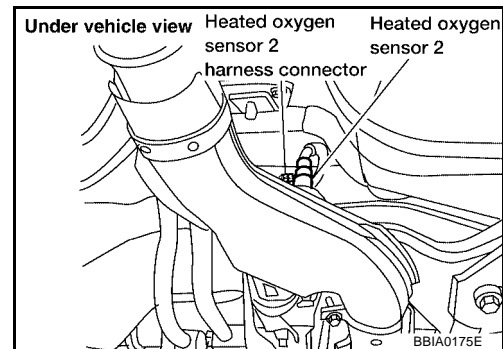
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 78 and HO2S2 terminal 4.  
Refer to Wiring Diagram.

**Continuity should exist.**

5. Also check harness for short to ground and short to power.

#### OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.





**4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Check harness continuity between ECM terminal 74 and HO2S2 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Check harness continuity between ECM terminal 74 or HO2S2 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**5. CHECK HEATED OXYGEN SENSOR 2**

Refer to [EC-793, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace heated oxygen sensor 2.

**6. CHECK INTERMITTENT INCIDENT**

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection  
HEATED OXYGEN SENSOR 2**

UBS0068U

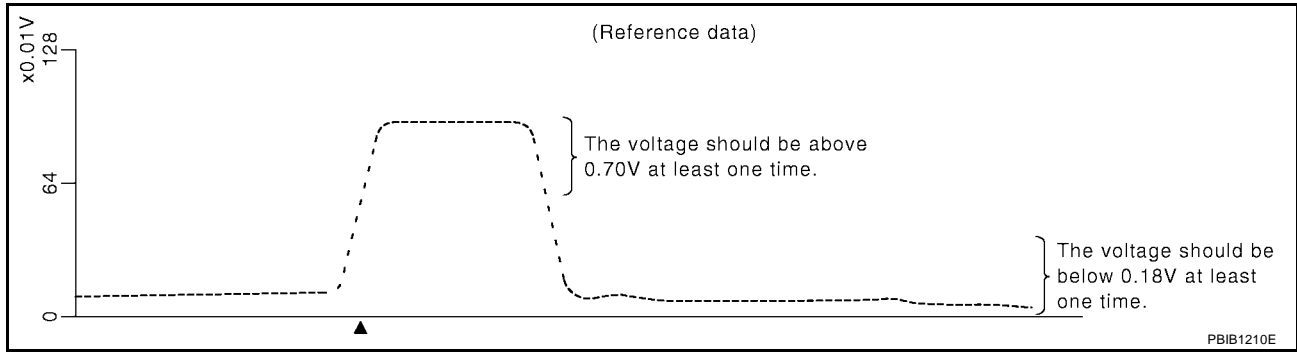
**With CONSULT-II**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

6. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .



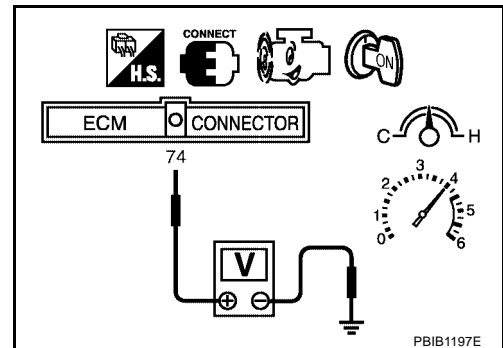
"HO2S2 (B1)" should be above 0.70V at least once when the "FUEL INJECTION" is +25%.  
 "HO2S2 (B1)" should be below 0.18V at least once when the "FUEL INJECTION" is -25%.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**⊗ Without CONSULT-II**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
 (Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.70V at least once during this procedure.**  
**If the voltage is above 0.70V at step 6, step 7 is not necessary.**
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position.  
**The voltage should be below 0.18V at least once during this procedure.**
8. If NG, replace heated oxygen sensor 2.



**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation  
 HEATED OXYGEN SENSOR 2**

Refer to [EX-3, "EXHAUST SYSTEM"](#) .

UBS0068V

# DTC P0171 FUEL INJECTION SYSTEM FUNCTION

[QG18DE (SULEV)]

## DTC P0171 FUEL INJECTION SYSTEM FUNCTION

PF16600

### On Board Diagnosis Logic

UBS001UU

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the air fuel ratio (A/F) sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.

In case the amount of the compensation value is extremely large (The actual mixture ratio is too lean.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection & mixture ratio control	Injectors

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0171 0171	Fuel injection system too learn	<ul style="list-style-type: none"> <li>Fuel injection system does not operate properly.</li> <li>The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)</li> </ul>	<ul style="list-style-type: none"> <li>Intake air leaks</li> <li>Air fuel ratio (A/F) sensor 1</li> <li>Injectors</li> <li>Exhaust gas leaks</li> <li>Incorrect fuel pressure</li> <li>Lack of fuel</li> <li>Mass air flow sensor</li> <li>Incorrect PCV hose connection</li> </ul>

### DTC Confirmation Procedure

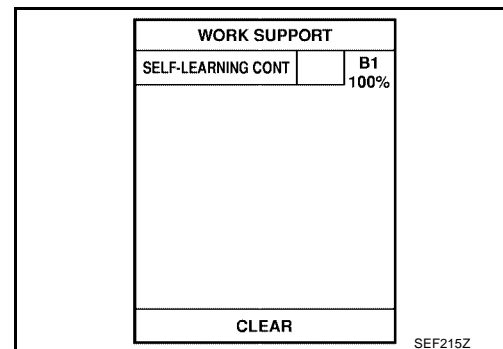
UBS001UV

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### Ⓟ WITH CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Turn ignition switch "ON" and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
- Clear the self-learning control coefficient by touching "CLEAR".
- Select "DATA MONITOR" mode with CONSULT-II.



SEF215Z

## DTC P0171 FUEL INJECTION SYSTEM FUNCTION

[QG18DE (SULEV)]

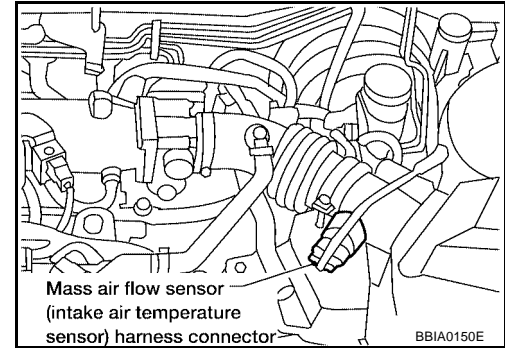
6. Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to [EC-798, "Diagnostic Procedure"](#).
7. If it is difficult to start engine at step 6, the fuel injection system has a malfunction.
8. Crank engine while depressing accelerator pedal. If engine starts, go to [EC-798, "Diagnostic Procedure"](#). If engine does not start, visually check for exhaust and intake air leak.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

### WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 3 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Select "MODE 7" with GST. Make sure DTC P0102 is detected.
6. Select "MODE 4" with GST and erase the DTC P0102.
7. Start engine again and run it for at least 10 minutes at idle speed.
8. Select "MODE 7" with GST. The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to [EC-798, "Diagnostic Procedure"](#).
9. If it is difficult to start engine at step 8, the fuel injection system has a malfunction.
10. Crank engine while depressing accelerator pedal. If engine starts, go to [EC-798, "Diagnostic Procedure"](#). If engine does not start, visually check for exhaust and intake air leak.



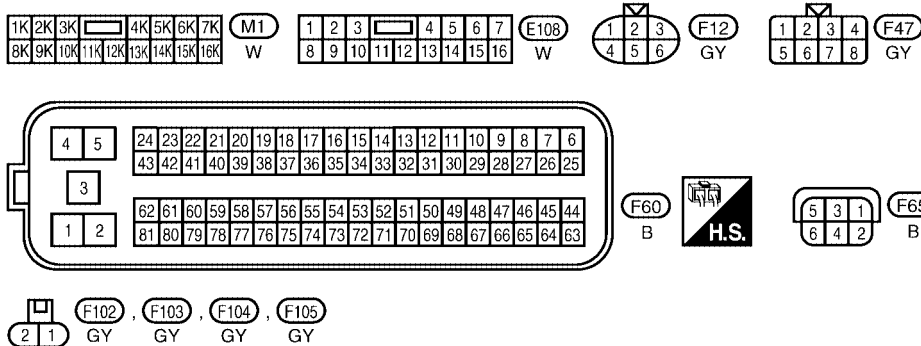
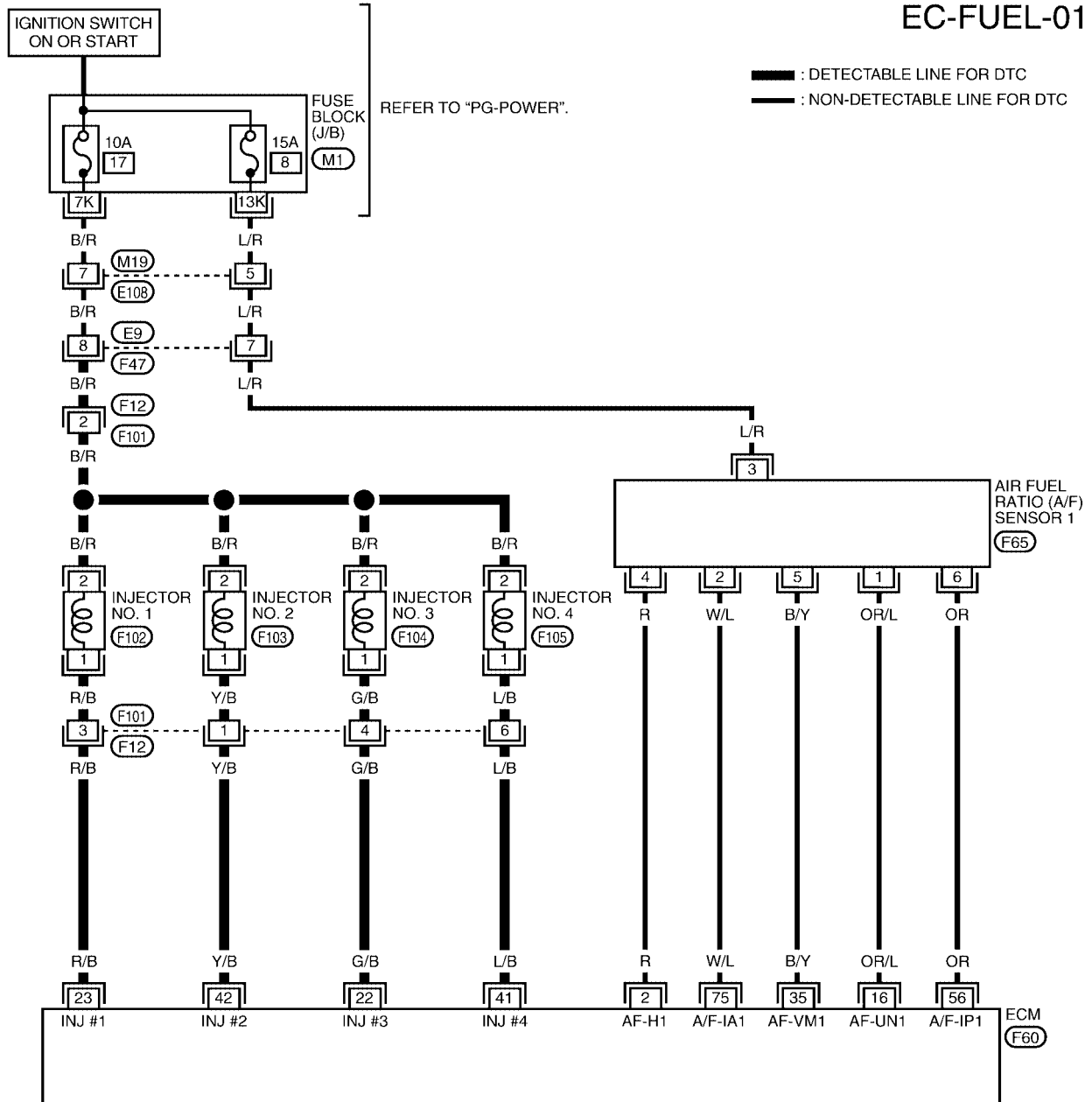
# DTC P0171 FUEL INJECTION SYSTEM FUNCTION

[QG18DE (SULEV)]

UBS001UW

## Wiring Diagram

EC-FUEL-01



BBWA0799E

# DTC P0171 FUEL INJECTION SYSTEM FUNCTION

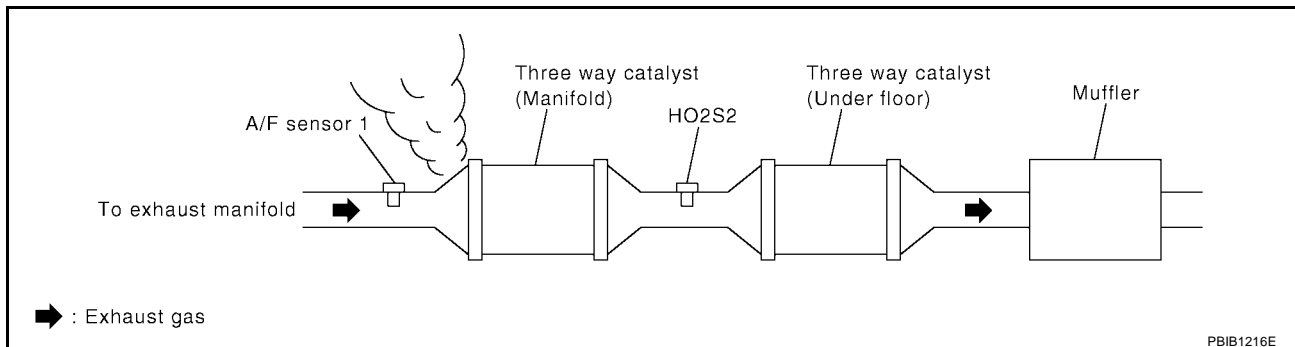
[QG18DE (SULEV)]

UBS001UX

## Diagnostic Procedure

### 1. CHECK EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before three way catalyst (manifold).



OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace.

### 2. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Listen for an intake air leak after the mass air flow sensor.
2. Check PCV hose connection.

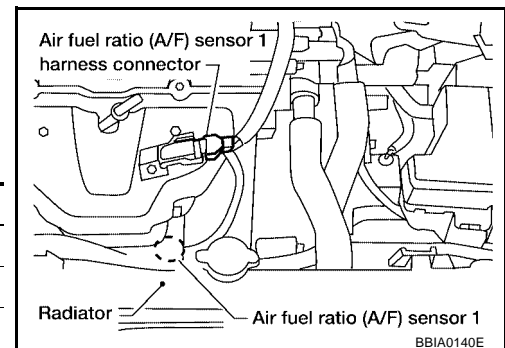
OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace.

### 3. CHECK AIR FUEL RATIO (A/F) SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect A/F sensor 1 harness connector and ECM harness connector.
3. Check harness continuity between ECM terminals and A/F sensor 1 terminals as follows. Refer to Wiring Diagram.

ECM terminal	A/F sensor 1
16	1
35	5
56	6
75	2



**Continuity should exist.**

4. Check harness continuity between ECM terminals 16, 35, 56, 75 and ground, or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.

**Continuity should not exist.**

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**4. CHECK FUEL PRESSURE**

1. Release fuel pressure to zero.  
Refer to [EC-638](#) .
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-637, "Fuel Pressure Check"](#) .

**At idling: 350 kPa (3.57 kg/cm<sup>2</sup> , 51 psi)**

OK or NG

OK >> GO TO 6.

NG >> GO TO 5.

**5. DETECT MALFUNCTIONING PART**

Check the following.

- Fuel pump and circuit Refer to [EC-1174](#) .
- Fuel lines. Refer to [MA-19, "Checking Fuel Lines"](#) .
- Fuel filter for clogging

OK or NG

OK >> Replace fuel pressure regulator.

NG >> Repair or replace.

**6. CHECK MASS AIR FLOW SENSOR**

 **With CONSULT-II**

1. Install all removed parts.
2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.

**at idling: 1.4 - 4.0 g-m/sec**  
**at 2,500 rpm: 5.0 - 10.0 g-m/sec**

 **With GST**

1. Install all removed parts.
2. Check mass air flow sensor signal in MODE 1 with GST.

**at idling: 1.4 - 4.0 g-m/sec**  
**at 2,500 rpm: 5.0 - 10.0 g-m/sec**

OK or NG

OK >> GO TO 7.

NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-740](#) .

## 7. CHECK FUNCTION OF INJECTORS

### With CONSULT-II

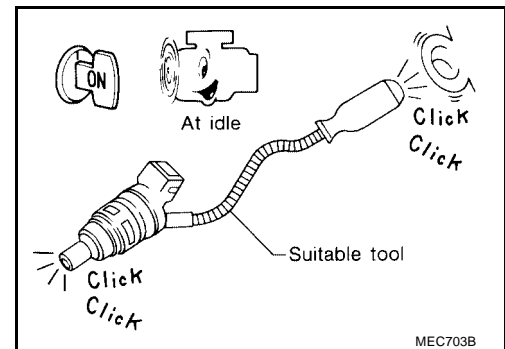
1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

### Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.  
**Clicking noise should be heard.**



### OK or NG

- OK >> GO TO 8.
- NG >> Perform trouble diagnosis for [EC-1168, "INJECTOR"](#).

## 8. REMOVE INJECTOR

1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch "OFF".
3. Remove injector with fuel tube assembly. Refer to [EM-19, "FUEL INJECTOR AND FUEL TUBE"](#).  
Keep fuel hose and all injectors connected to injector gallery. The injector harness connectors should remain connected.

>> GO TO 9.



# DTC P0171 FUEL INJECTION SYSTEM FUNCTION

[QG18DE (SULEV)]

## 9. CHECK INJECTOR

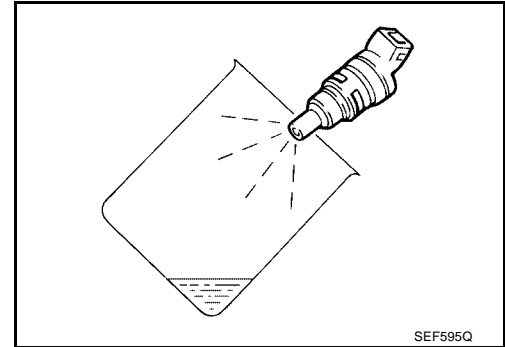
1. Disconnect all ignition wires.
2. Place pans or saucers under each injector.
3. Crank engine for about 3 seconds. Make sure that fuel sprays out from injectors.

**Fuel should be sprayed evenly for each cylinder.**

### OK or NG

OK >> GO TO 10.

NG >> Replace injectors from which fuel does not spray out.  
Always replace O-ring with new one.



## 10. CHECK INTERMITTENT INCIDENT

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

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# DTC P0172 FUEL INJECTION SYSTEM FUNCTION

[QG18DE (SULEV)]

## DTC P0172 FUEL INJECTION SYSTEM FUNCTION

PF1:16600

### On Board Diagnosis Logic

UBS001UY

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the air fuel ratio (A/F) sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.

In case the amount of the compensation value is extremely large (The actual mixture ratio is too rich.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection & mixture ratio control	Injectors

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0172 0172	Fuel injection system too rich	<ul style="list-style-type: none"> <li>Fuel injection system does not operate properly.</li> <li>The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)</li> </ul>	<ul style="list-style-type: none"> <li>Air fuel ratio (A/F) sensor 1</li> <li>Injectors</li> <li>Exhaust gas leaks</li> <li>Incorrect fuel pressure</li> <li>Mass air flow sensor</li> </ul>

### DTC Confirmation Procedure

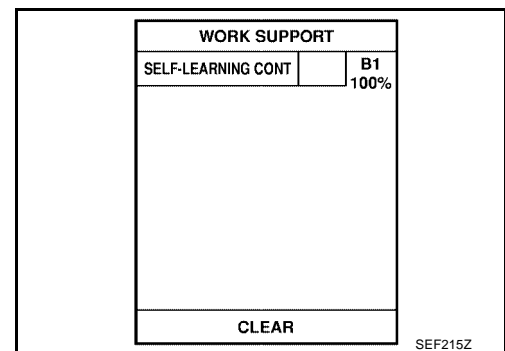
UBS001UZ

#### NOTE:

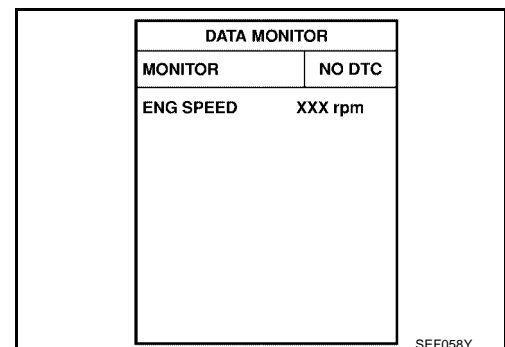
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### WITH CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Turn ignition switch "ON" and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
- Clear the self-learning control coefficient by touching "CLEAR" or "START".
- Select "DATA MONITOR" mode with CONSULT-II.



- Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to [EC-805, "Diagnostic Procedure"](#).
- If it is difficult to start engine at step 6, the fuel injection system has a malfunction.
- Crank engine while depressing accelerator pedal. If engine starts, go to [EC-805, "Diagnostic Procedure"](#). If engine does not start, remove ignition plugs and check for fouling, etc.



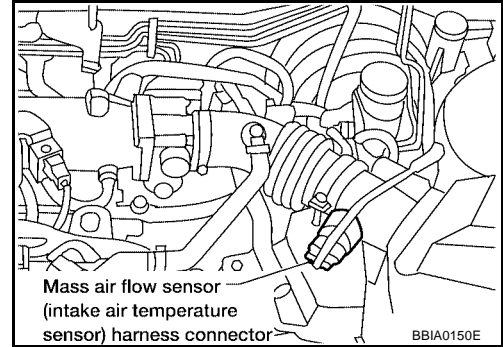
# DTC P0172 FUEL INJECTION SYSTEM FUNCTION

[QG18DE (SULEV)]



## WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 3 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Select "MODE 7" with GST. Make sure DTC P0102 is detected.
6. Select "MODE 4" with GST and erase the DTC P0102.
7. Start engine again and run it for at least 10 minutes at idle speed.
8. Select "MODE 7" with GST. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to [EC-805, "Diagnostic Procedure"](#).
9. If it is difficult to start engine at step 8, the fuel injection system has a malfunction.
10. Crank engine while depressing accelerator pedal.  
If engine starts, go to [EC-805, "Diagnostic Procedure"](#). If engine does not start, remove ignition plugs and check for fouling, etc.



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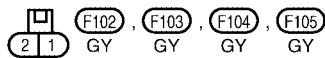
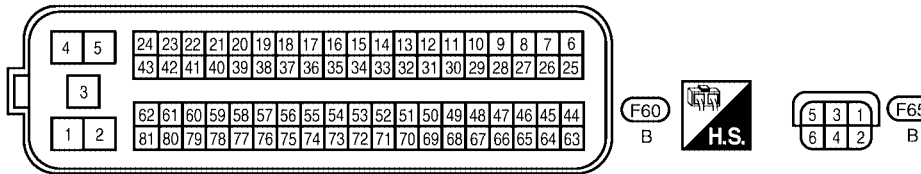
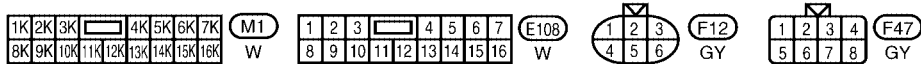
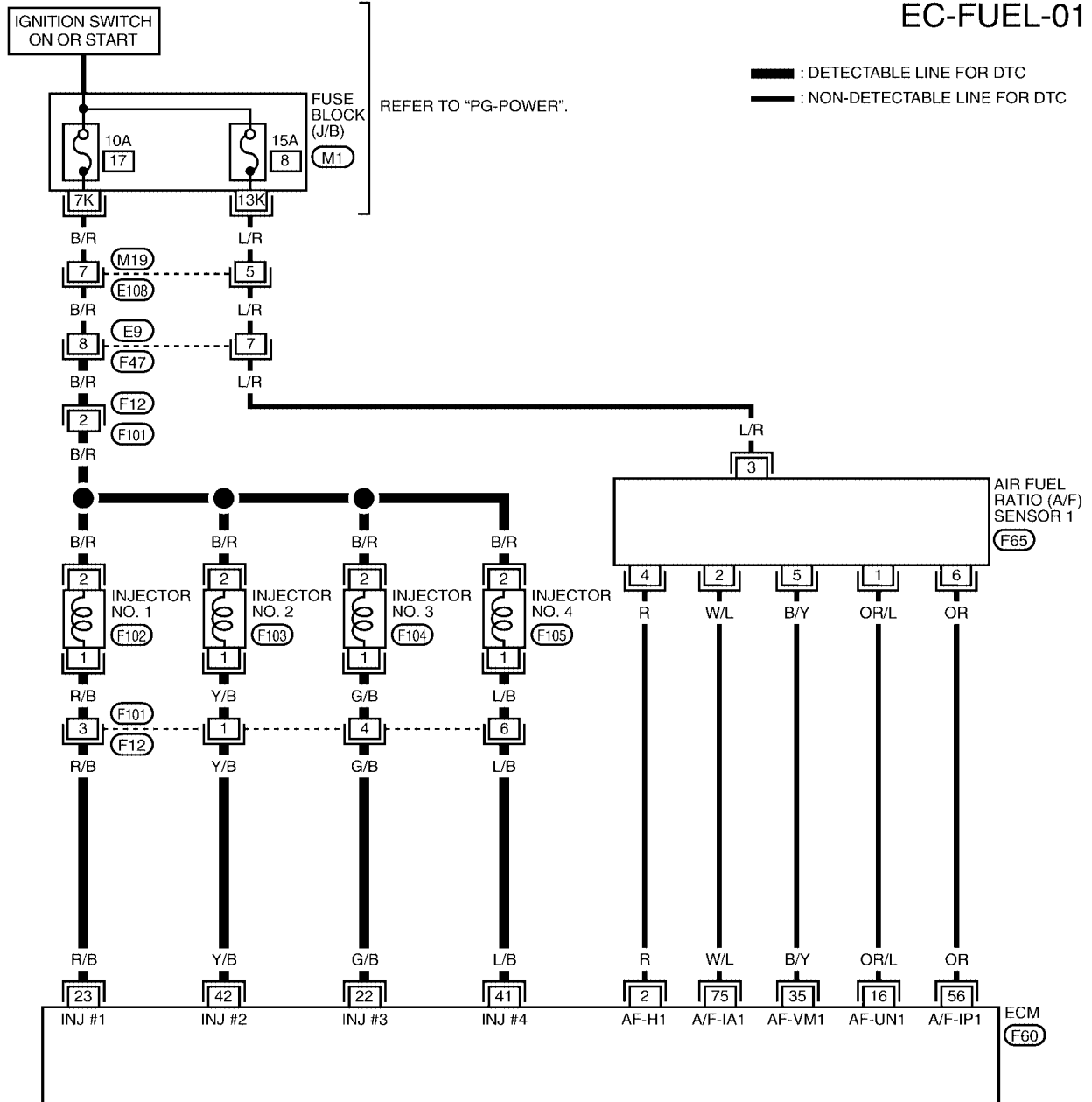
# DTC P0172 FUEL INJECTION SYSTEM FUNCTION

[QG18DE (SULEV)]

UBS001V0

## Wiring Diagram

EC-FUEL-01

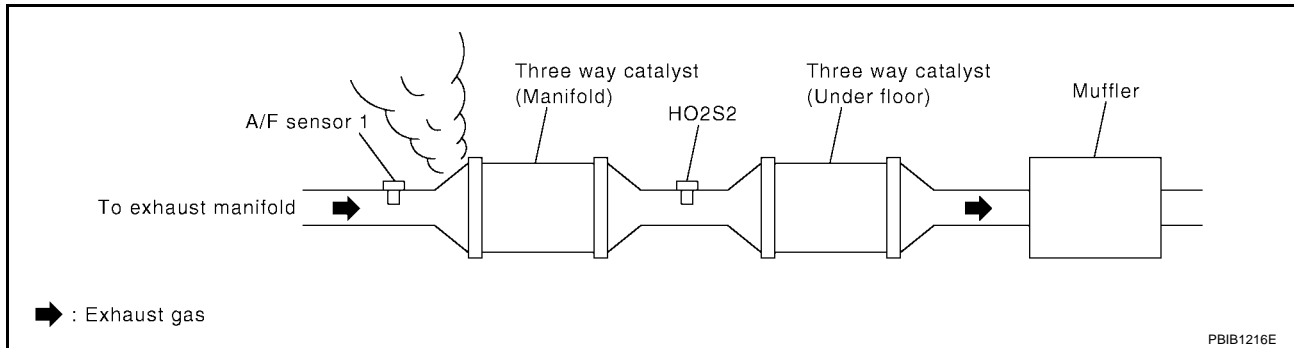


BBWA0799E

## Diagnostic Procedure

### 1. CHECK FOR EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before three way catalyst (manifold).



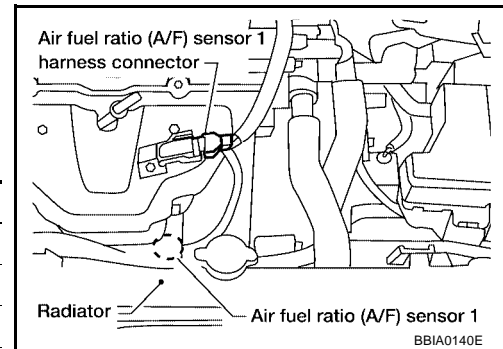
**OK or NG**

- OK >> GO TO 2.
- NG >> Repair or replace.

### 2. CHECK AIR FUEL RATIO (A/F) SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect A/F sensor 1 harness connector and ECM harness connector.
3. Check harness continuity between ECM terminals and A/F sensor 1 terminals as follows. Refer to Wiring Diagram.

ECM terminal	A/F sensor 1
16	1
35	5
56	6
75	2



**Continuity should exist.**

4. Check harness continuity between ECM terminals 16, 35, 56, 75 and ground, or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.

**Continuity should not exist.**

5. Also check harness for short to ground and short to power.

**OK or NG**

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

### 3. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-637](#).
2. Install fuel pressure gauge and check fuel pressure.

**At idling: Approximately 350 kPa (3.57 kg/cm<sup>2</sup> , 51 psi)**

**OK or NG**

- OK >> GO TO 5.
- NG >> GO TO 4.

---

## 4. DETECT MALFUNCTIONING PART

---

Check the following.

- Fuel pump and circuit (Refer to [EC-1174](#) .)

OK or NG

- OK >> Replace fuel pressure regulator.  
NG >> Repair or replace.

---

## 5. CHECK MASS AIR FLOW SENSOR

---

 **With CONSULT-II**

1. Install all removed parts.
2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.

**at idling : 1.4 - 4.0 g-m/sec**  
**at 2,500 rpm : 5.0 - 10.0 g-m/sec**

 **With GST**

1. Install all removed parts.
2. Check mass air flow sensor signal in MODE 1 with GST.

**at idling : 1.4 - 4.0 g-m/sec**  
**at 2,500 rpm : 5.0 - 10.0 g-m/sec**

OK or NG

- OK >> GO TO 6.  
NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-740](#) .

**6. CHECK FUNCTION OF INJECTORS**

**With CONSULT-II**

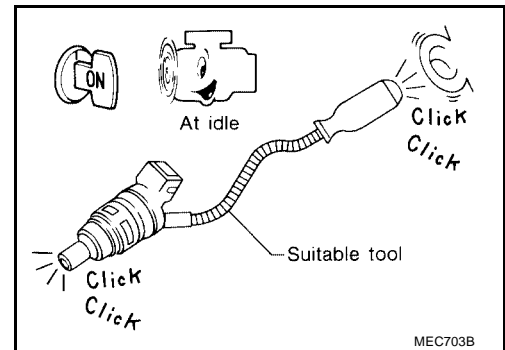
1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

**Without CONSULT-II**

1. Start engine.
2. Listen to each injector operating sound.  
**Clicking noise should be heard.**



OK or NG

- OK >> GO TO 7.
- NG >> Perform trouble diagnosis for "Injector", [EC-1168](#) .

**7. REMOVE INJECTOR**

1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch "OFF".
3. Remove injector assembly. Refer to [EM-19, "FUEL INJECTOR AND FUEL TUBE"](#) .  
Keep fuel hose and all injectors connected to injector gallery.

>> GO TO 8.

**8. CHECK INJECTOR**

1. Disconnect all injector harness connectors.
2. Disconnect all ignition coil harness connectors.
3. Prepare pans or saucers under each injectors.
4. Crank engine for about 3 seconds.  
Make sure fuel does not drip from injector.

OK or NG

- OK (Does not drip)>>GO TO 9.
- NG (Drips)>>Replace the injectors from which fuel is dripping. Always replace O-ring with new one.

## DTC P0172 FUEL INJECTION SYSTEM FUNCTION

[QG18DE (SULEV)]

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### 9. CHECK INTERMITTENT INCIDENT

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Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

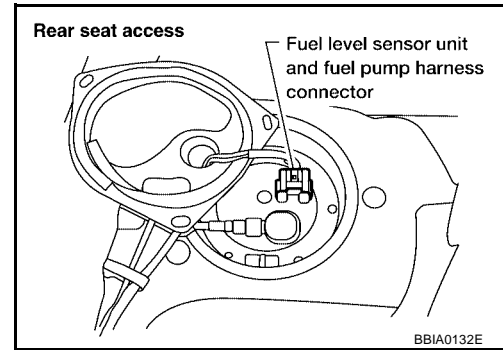
>> INSPECTION END



### DTC P0181 FTT SENSOR

#### Component Description

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



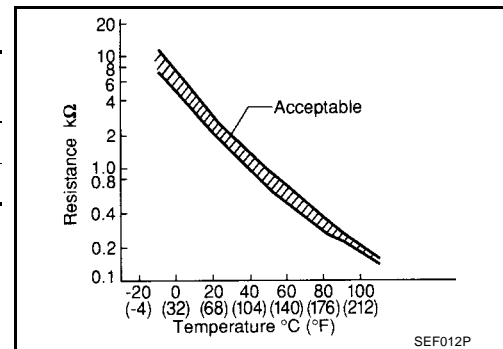
#### <Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

\*: These data are reference values and are measured between ECM terminal 107 (Fuel tank temperature sensor) and ground.

#### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may damage the ECM's transistor. Use ground other than ECM, such as body ground.**



#### On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0181 0181	Fuel tank temperature sensor circuit range/performance	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Fuel tank temperature sensor</li> </ul>

#### DTC Confirmation Procedure

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 10 seconds.  
If 1st trip DTC is detected, go to .  
If the result is OK, go to following step.
4. Check "COOLAN TEMP/S" signal.  
If the signal is less than 60°C (140°F), the result will be OK.  
If the signal is above 60°C (140°F), go to the following step.
5. Cool engine down until "COOLAN TEMP/S" signal is less than 60°C (140°F).
6. Wait at least 10 seconds.
7. If 1st trip DTC is detected, go to [EC-812. "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
INT/A TEMP/S	XXX °C

SEF475Y



**WITH GST**

Follow the procedure "With CONSULT-II" above.

# DTC P0181 FTT SENSOR

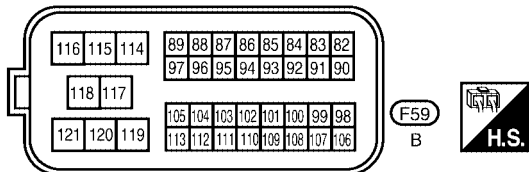
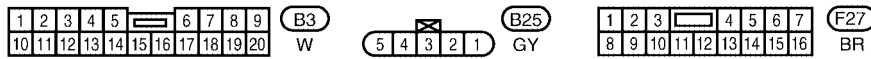
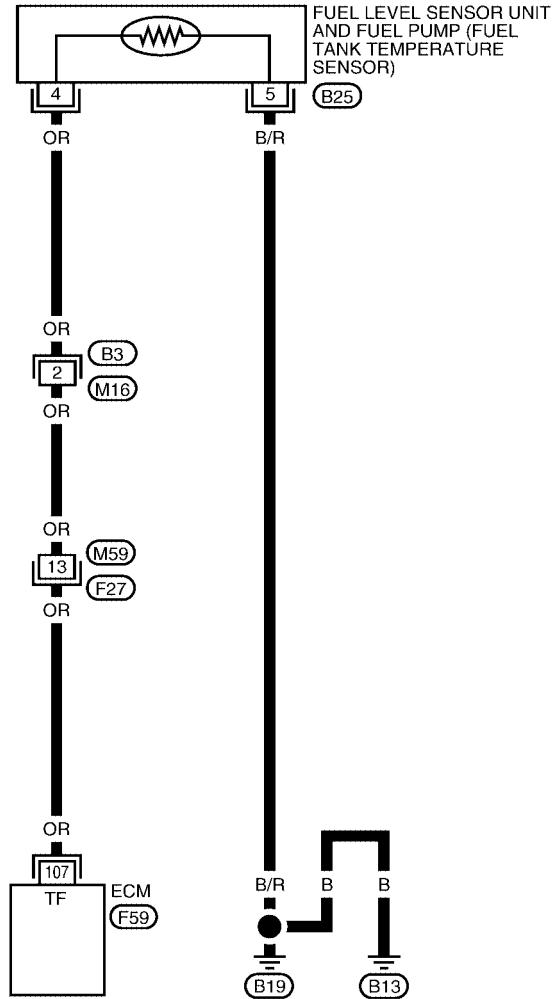
[QG18DE (SULEV)]

## Wiring Diagram

UBS003NG

EC-FTTS-01

— : DETECTABLE LINE FOR DTC  
 — : NON-DETECTABLE LINE FOR DTC

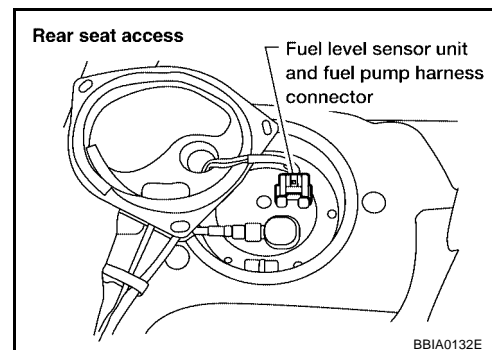


BBWA0285E

## Diagnostic Procedure

### 1. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Turn ignition switch "ON".

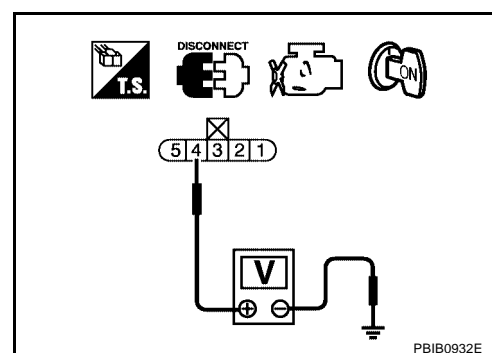


4. Check voltage between fuel level sensor unit and fuel pump terminal 4 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 3.  
NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M59, F27
- Harness connectors B3, M16
- Harness for open or short between ECM and fuel level sensor unit and fuel pump

>> Repair harness or connector.

### 3. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between fuel level sensor unit and fuel pump terminal 5 and body ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.  
NG >> Repair open circuit or short to power in harness or connectors.

### 4. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to, [EC-813, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.  
NG >> Replace fuel level sensor unit.

**5. CHECK INTERMITTENT INCIDENT**

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

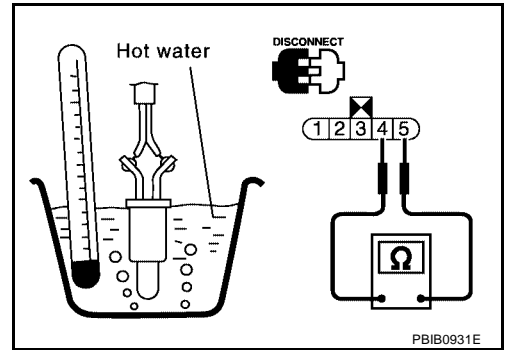
>> INSPECTION END

**Component Inspection  
FUEL TANK TEMPERATURE SENSOR**

UBS003NI

Check resistance by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90



UBS003NJ

**Removal and Installation  
FUEL TANK TEMPERATURE SENSOR**

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

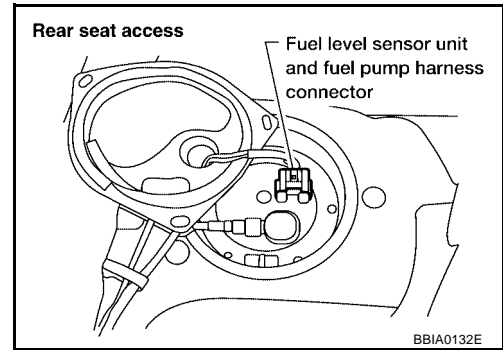
DTC P0182, P0183 FTT SENSOR

PFP:22630

Component Description

UBS003NK

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



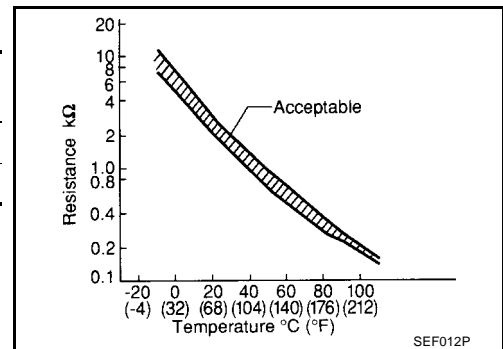
<Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

\*: These data are reference values and are measured between ECM terminal 107 (Fuel tank temperature sensor) and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may damage the ECM's transistor. Use ground other than ECM, such as body ground.



On Board Diagnosis Logic

UBS003NL

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0182 0182	Fuel tank temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Fuel tank temperature sensor</li> </ul>
P0183 0183	Fuel tank temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

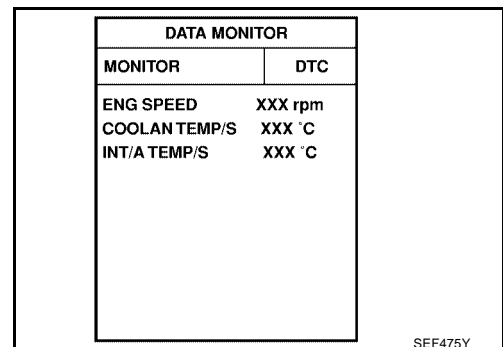
UBS003NM

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-816, "Diagnostic Procedure"](#)



**WITH GST**

Follow the procedure "With CONSULT-II" above.

# DTC P0182, P0183 FTT SENSOR

[QG18DE (SULEV)]

## Wiring Diagram

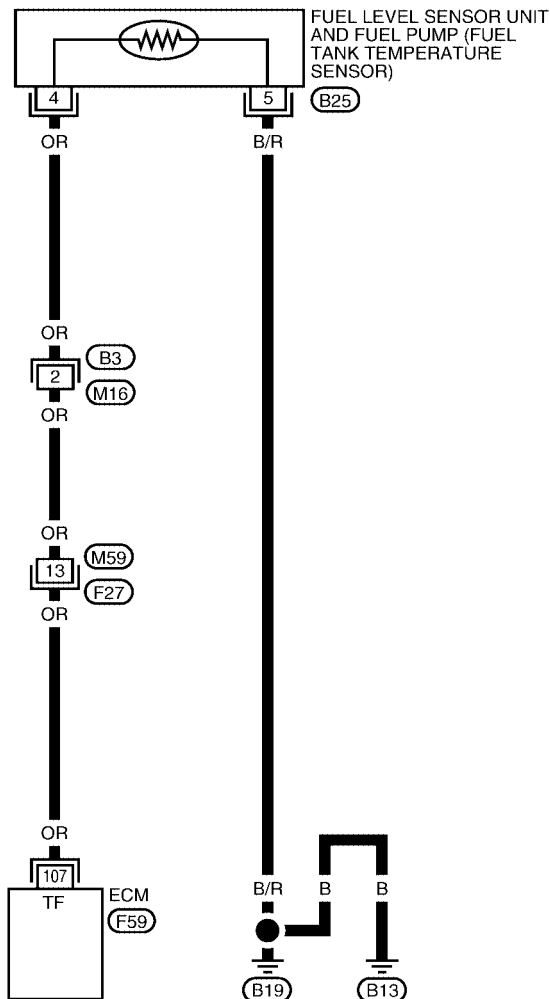
UBS003NN

EC-FTTS-01

A

EC

— : DETECTABLE LINE FOR DTC  
 — : NON-DETECTABLE LINE FOR DTC



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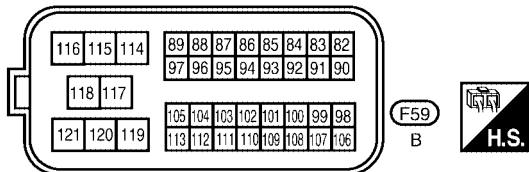
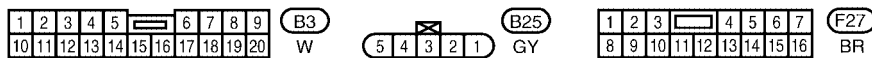
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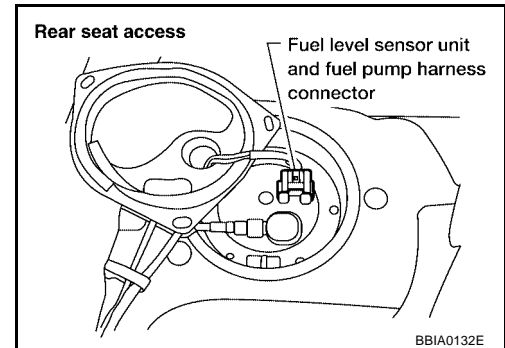


BBWA0285E

## Diagnostic Procedure

### 1. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Turn ignition switch "ON".

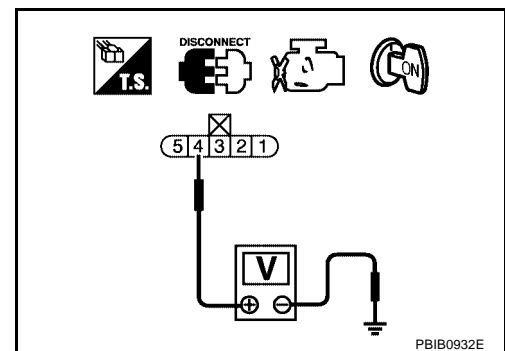


4. Check voltage between fuel level sensor unit and fuel pump terminal 4 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 3.  
NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M59, F27
- Harness connectors B3, M16
- Harness for open or short between ECM and fuel level sensor unit and fuel pump

>> Repair harness or connector.

### 3. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between fuel level sensor unit and fuel pump terminal 5 and body ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.  
NG >> Repair open circuit or short to power in harness or connectors.

### 4. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to, [EC-817, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.  
NG >> Replace fuel level sensor unit and fuel pump.



**5. CHECK INTERMITTENT INCIDENT**

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

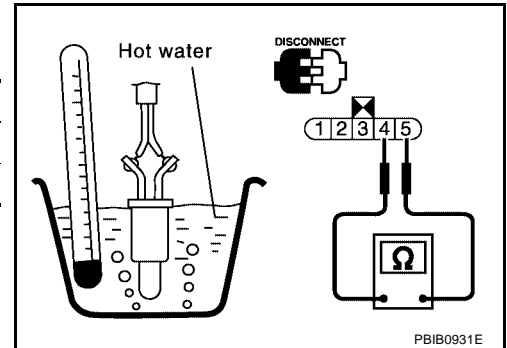
**Component Inspection**  
**FUEL TANK TEMPERATURE SENSOR**

UBS003NP

Check resistance by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

If NG, replace fuel level sensor unit and fuel pump.



UBS003NQ

**Removal and Installation**  
**FUEL TANK TEMPERATURE SENSOR**

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

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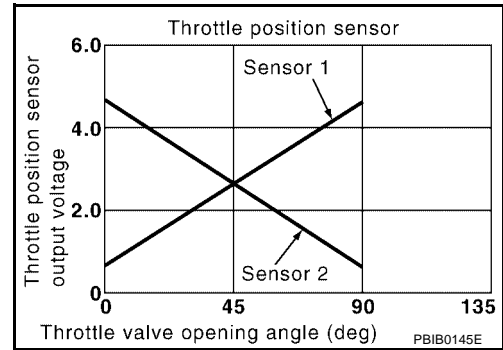
DTC P0222, P0223 TP SENSOR

Component Description

UBS003WN

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

UBS003WO

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	<ul style="list-style-type: none"> <li>Ignition switch: ON (Engine stopped)</li> <li>Shift lever D: (A/T model) 1st: (M/T model)</li> </ul>	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

\*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

UBS003WP

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222 0222	Throttle position sensor 1 circuit low input	An excessively low voltage from the TP sensor 1 is sent to ECM.	<ul style="list-style-type: none"> <li>Harness or connectors (The TP sensor 1 circuit is open or shorted.) (APP sensor 2 circuit is shorted.)</li> <li>Electric throttle control actuator (TP sensor 1)</li> <li>Accelerator pedal position sensor (APP sensor 2)</li> </ul>
P0223 0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

**DTC Confirmation Procedure****NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-821, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

A

EC

C

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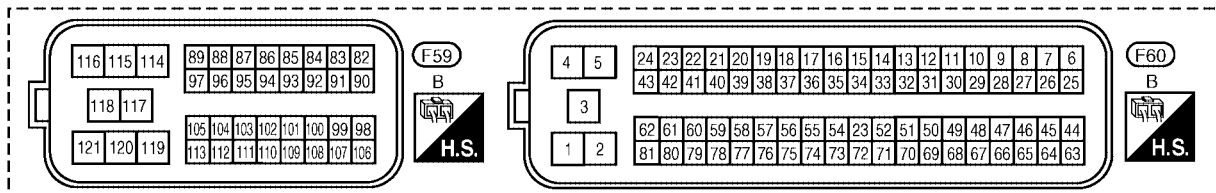
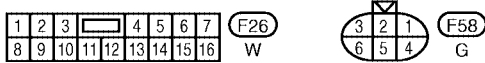
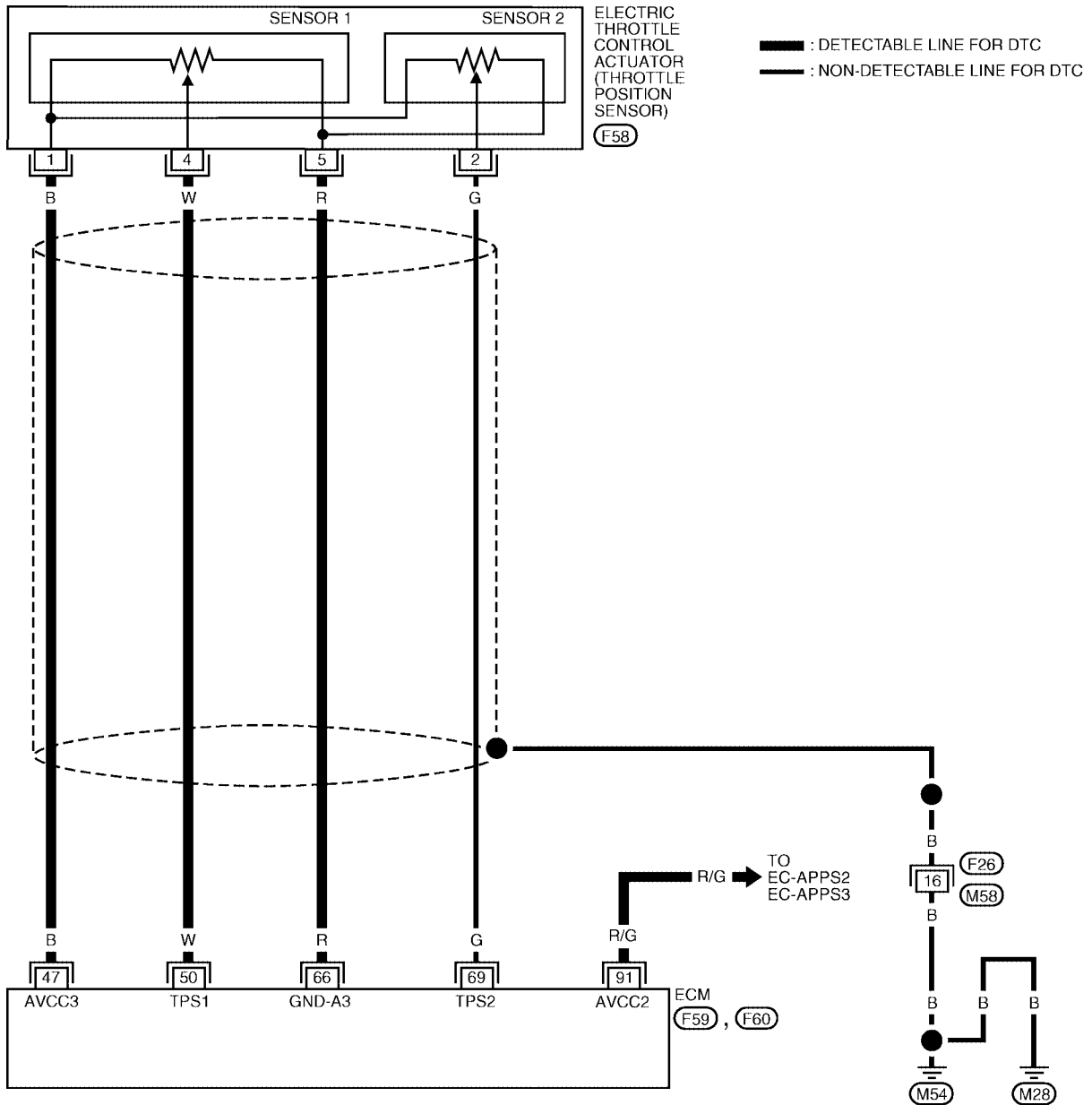
# DTC P0222, P0223 TP SENSOR

[QG18DE (SULEV)]

UBS003WR

## Wiring Diagram

EC-TPS1-01



BBWA1381E

# DTC P0222, P0223 TP SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	B	Sensor power supply (Throttle position sensor)	[Ignition switch "ON"]	Approximately 5V
50	W	Throttle position sensor 1	[Ignition switch "ON"]	More than 0.36V
			[Ignition switch "ON"]	Less than 4.75V
66	R	Sensor ground (Throttle position sensor)	[Engine is running]	Approximately 0V
69	G	Throttle position sensor 2	[Ignition switch "ON"]	Less than 4.75V
			[Ignition switch "ON"]	More than 0.36V
91	R/G	Sensor power supply (Accelerator pedal position sensor)	[Ignition switch "ON"]	Approximately 5V

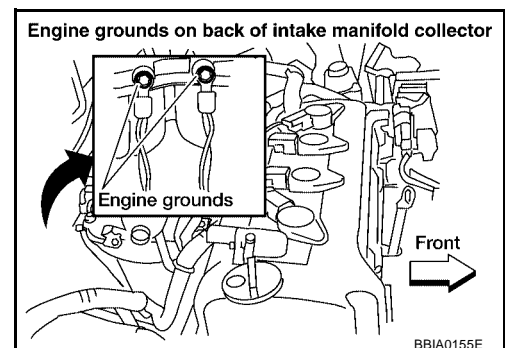
## Diagnostic Procedure

### 1. RETIGHTEN GROUND SCREWS

UBS003WS

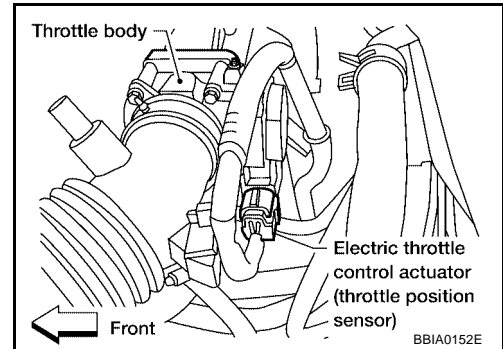
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

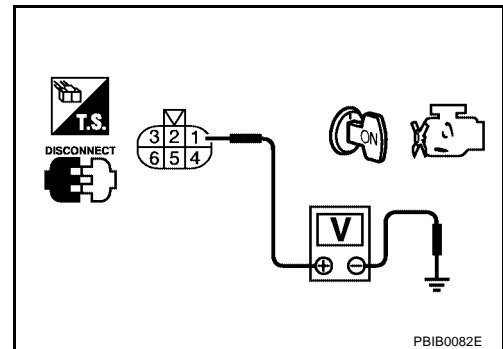


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 7.  
 NG >> GO TO 3.



## 3. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 1 and ECM terminal 47. Refer to Wiring Diagram.

**Continuity should exist.**

OK or NG

- OK >> GO TO 4.  
 NG >> Repair or replace open circuit.

## 4. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT-III

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Electric throttle control actuator terminal 1	<a href="#">EC-262</a>
91	APP sensor terminal 1	<a href="#">EC-513</a>

OK or NG

- OK >> GO TO 5.  
 NG >> Repair short to ground or short to power in harness or connectors.

## 5. CHECK APP SENSOR

Refer to [EC-517](#) .

OK or NG

- OK >> GO TO 11.  
 NG >> GO TO 6.

**6. REPLACE ACCELERATOR PEDAL ASSEMBLY**

1. Replace accelerator pedal assembly.
2. Perform [EC-52, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-53, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-53, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**7. CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and electric throttle control actuator terminal 5. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 50 and electric throttle control actuator terminal 4. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**9. CHECK THROTTLE POSITION SENSOR**

Refer to [EC-824, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> GO TO 10.

**10. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**11. CHECK INTERMITTENT INCIDENT**

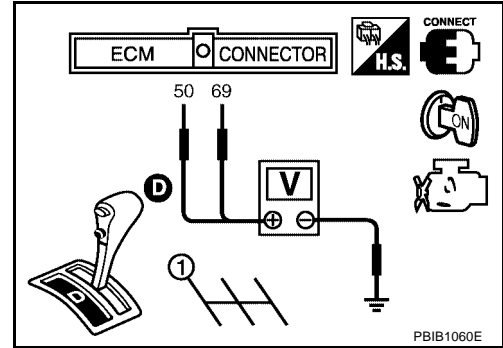
Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection**  
**THROTTLE POSITION SENSOR**

1. Reconnect all harness connectors disconnected.
2. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 50 (TP sensor 1 signal), 69 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
50 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
69 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-635, "Idle Air Volume Learning"](#) .

**Removal and Installation**  
**ELECTRIC THROTTLE CONTROL ACTUATOR**

Refer to [EM-12, "OUTER COMPONENT PARTS"](#) .



# DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

[QG18DE (SULEV)]

## DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

PFP:00020

### On Board Diagnosis Logic

UBS001VI

When a misfire occurs, engine speed will fluctuate. If the engine speed fluctuates enough to cause the crankshaft position (CKP) sensor (POS) signal to vary, ECM can determine that a misfire is occurring.

Sensor	Input Signal to ECM	ECM function
Crankshaft position sensor (POS)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

- One Trip Detection Logic (Three Way Catalyst Damage)**  
 On the first trip that a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.  
 When a misfire condition occurs, the ECM monitors the CKP sensor signal every 200 engine revolutions for a change.  
 When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off.  
 If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink.  
 When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on.  
 If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.
- Two Trip Detection Logic (Exhaust quality deterioration)**  
 For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MIL will only light when the misfire is detected on a second trip. During this condition, the ECM monitors the CKP sensor signal every 1,000 engine revolutions.  
 A misfire malfunction can be detected on any one cylinder or on multiple cylinders.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0300 0300	Multiple cylinder misfire detected	Multiple cylinder misfire.	<ul style="list-style-type: none"> <li>● Improper spark plug</li> <li>● Insufficient compression</li> </ul>
P0301 0301	No.1 cylinder misfire detected	No. 1 cylinder misfires.	<ul style="list-style-type: none"> <li>● Incorrect fuel pressure</li> <li>● The injector circuit is open or shorted</li> </ul>
P0302 0302	No. 2 cylinder misfire detected	No. 2 cylinder misfires.	<ul style="list-style-type: none"> <li>● Injectors</li> <li>● Intake air leak</li> </ul>
P0303 0303	No. 3 cylinder misfire detected	No. 3 cylinder misfires.	<ul style="list-style-type: none"> <li>● The ignition signal circuit is open or shorted</li> </ul>
P0304 0304	No. 4 cylinder misfire detected	No. 4 cylinder misfires.	<ul style="list-style-type: none"> <li>● Lack of fuel</li> <li>● Drive plate</li> <li>● Air fuel ratio (A/F) sensor 1</li> <li>● Incorrect PCV hose connection</li> </ul>

## DTC Confirmation Procedure

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON", and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine again and drive at 1,500 to 3,000 rpm for at least 3 minutes.

**Hold the accelerator pedal as steady as possible.**

**NOTE:**

Refer to the freeze frame data for the test driving conditions.

5. If 1st trip DTC is detected, go to [EC-826, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

PBIB0164E

**WITH GST**

Follow the procedure "With CONSULT-II" above.

## Diagnostic Procedure

### 1. CHECK FOR INTAKE AIR LEAK

1. Start engine and run it at idle speed.
2. Listen for the sound of the intake air leak.
3. Check PCV hose connection.

OK or NG

- OK >> GO TO 2.
- NG >> Discover air leak location and repair.

### 2. CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, TWC (Manifold three way catalyst) and muffler for dents.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace it.

### 3. PERFORM POWER BALANCE TEST

 **With CONSULT-II**

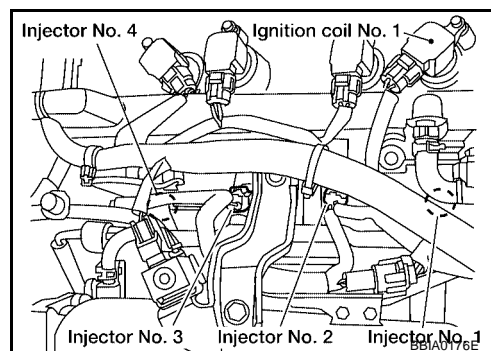
1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

 **Without CONSULT-II**

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?



Yes or No

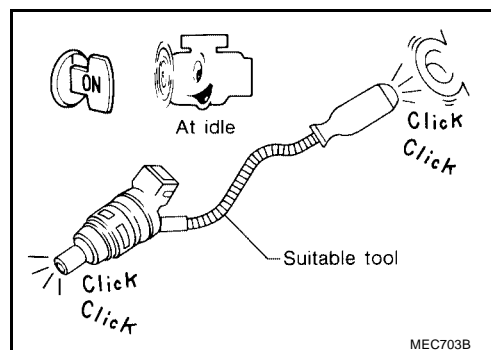
- Yes >> GO TO 4.
- No >> GO TO 7.

### 4. CHECK INJECTOR

Does each injector make an operating sound at idle?

Yes or No

- Yes >> GO TO 5.
- No >> Check injector(s) and circuit(s). Refer to [EC-1168](#).

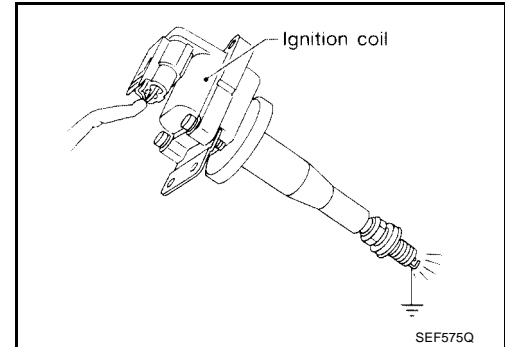


## 5. CHECK IGNITION SPARK

1. Remove ignition coil assembly from rocker cover.
2. Remove spark plug from ignition coil assembly.
3. Connect a known good spark plug to ignition coil.
4. Place end of spark plug against a suitable ground crank engine.
5. Check for spark.

### OK or NG

- OK >> GO TO 6.  
NG >> Check ignition coil, power transistor and their circuits.  
Refer to [EC-1156, "IGNITION SIGNAL"](#) .

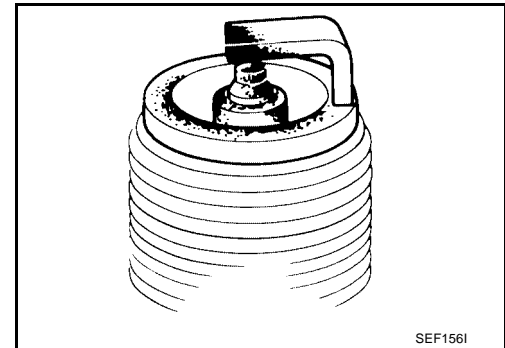


## 6. CHECK SPARK PLUGS

Check the spark plugs and check for fouling, etc.

### OK or NG

- OK >> GO TO 7.  
NG >> Repair or replace spark plug (s) with standard type one (s). For spark plug type ignition coil. Refer to [EM-12](#) .



## 7. CHECK COMPRESSION PRESSURE

Refer to [EM-52, "CHECKING COMPRESSION PRESSURE"](#) .

Check compression pressure.

<b>Standard:</b>	<b>1,324 kPa (13.5 kg/cm<sup>2</sup> , 192 psi)/300 rpm</b>
<b>Minimum:</b>	<b>1,128 kPa (11.5 kg/cm<sup>2</sup> , 164 psi)/300 rpm</b>
<b>Difference between each cylinder:</b>	<b>98 kPa (1.0 kg/cm<sup>2</sup> , 14 psi)/300 rpm</b>

### OK or NG

- OK >> GO TO 8.  
NG >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

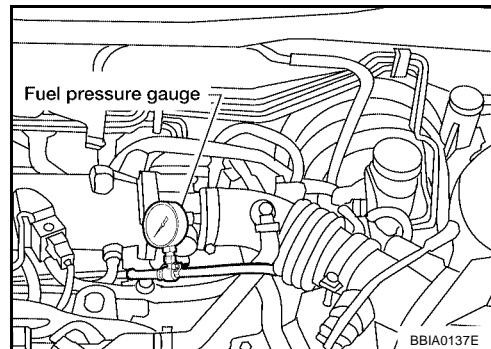
## 8. CHECK FUEL PRESSURE

1. Install all removed parts.
2. Release fuel pressure to zero. Refer to [EC-637, "FUEL PRESSURE RELEASE"](#).
3. Install fuel pressure gauge and check fuel pressure.

**At idle: Approx. 350 kPa (3.57 kg/cm<sup>2</sup> , 51 psi)**

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 9.



## 9. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to [EC-1174, "FUEL PUMP"](#) .)
- Fuel pressure regulator (Refer to [FL-3](#) .)
- Fuel lines (Refer to [MA-19, "Checking Fuel Lines"](#) .)
- Fuel filter for clogging

>> Repair or replace.

## 10. CHECK IGNITION TIMING

Perform [EC-669, "Basic Inspection"](#) .

Items	Specifications	
	Target idle speed	A/T
M/T		650 ± 50 rpm
Ignition timing	A/T	18 ± 5°BTDC (in "P" or "N" position)
	M/T	7 ± 5°BTDC

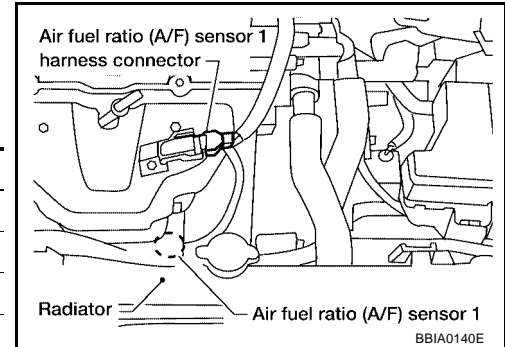
OK or NG

- OK >> GO TO 11.
- NG >> Adjust ignition timing.

## 11. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector and A/F sensor 1 harness connector.
3. Check harness continuity between the following terminals. Refer to "Wiring Diagram".

ECM terminal	A/F sensor 1 terminal
16	1
35	5
56	6
75	2



**Continuity should exist.**

4. Check harness continuity between ECM terminals 16, 35, 56, 75 or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.

**Continuity should not exist.**

5. Also check harness for short to power.

OK or NG

OK >> GO TO 12.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 12. CHECK A/F SENSOR 1 HEATER

Refer to [EC-935, "Component Inspection"](#).

OK or NG

OK >> GO TO 13.

NG >> Replace A/F sensor 1.

## 13. CHECK MASS AIR FLOW SENSOR

**With CONSULT-II**

Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.

**at idling: 1.4 - 4.0 g-m/sec**

**at 2,500 rpm: 5.0 - 10.0 g-m/sec**

**With GST**

Check mass air flow sensor signal in MODE 1 with GST.

**at idling: 1.4 - 4.0 g-m/sec**

**at 2,500 rpm: 5.0 - 10.0 g-m/sec**

OK or NG

OK >> GO TO 15.

NG >> GO TO 14.

## 14. CHECK CONNECTORS

Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds.

Refer to [EC-740, "DTC P0101 MAF SENSOR"](#), [EC-748, "DTC P0102, P0103 MAF SENSOR"](#) and [EC-940, "DTC P1102 MAF SENSOR"](#).

OK or NG

OK >> GO TO 15.

NG >> Repair or replace it.

---

## 15. CHECK SYMPTOM MATRIX CHART

---

Check items on the rough idle symptom in [EC-674, "Symptom Matrix Chart"](#) .

OK or NG

OK >> GO TO 16.

NG >> Repair or replace.

---

## 16. ERASE THE 1ST TRIP DTC

---

Some tests may cause a 1st trip DTC to be set.

Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to [EC-651, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) .

>> GO TO 17.

---

## 17. CHECK INTERMITTENT INCIDENT

---

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

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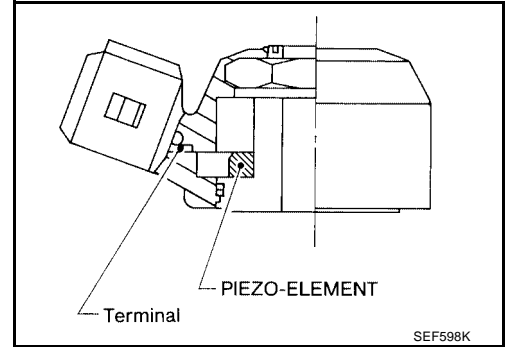
M

**DTC P0327, P0328 KS**

**Component Description**

UBS001VL

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.



**On Board Diagnosis Logic**

UBS001VM

The MIL will not light up for these diagnoses.

DTC No.	Trouble Diagnosis Name	DTC Detected Condition	Possible Cause
P0327 0327	Knock sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Knock sensor</li> </ul>
P0328 0328	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

**DTC Confirmation Procedure**

UBS001VN

**NOTE:**

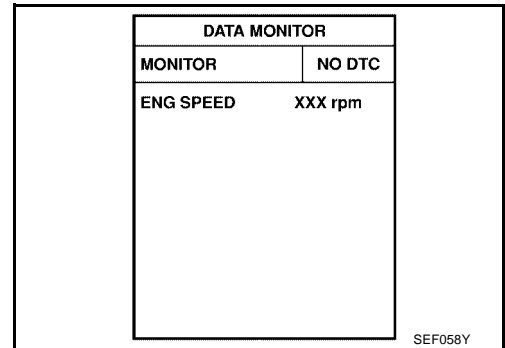
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and run it for at least 5 seconds at idle speed.
3. If 1st trip DTC is detected, go to [EC-834, "Diagnostic Procedure"](#)



**WITH GST**

Follow the procedure "With CONSULT-II" above.

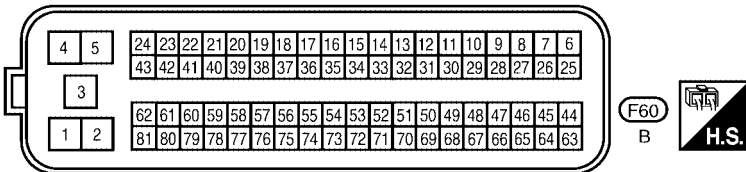
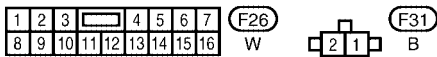
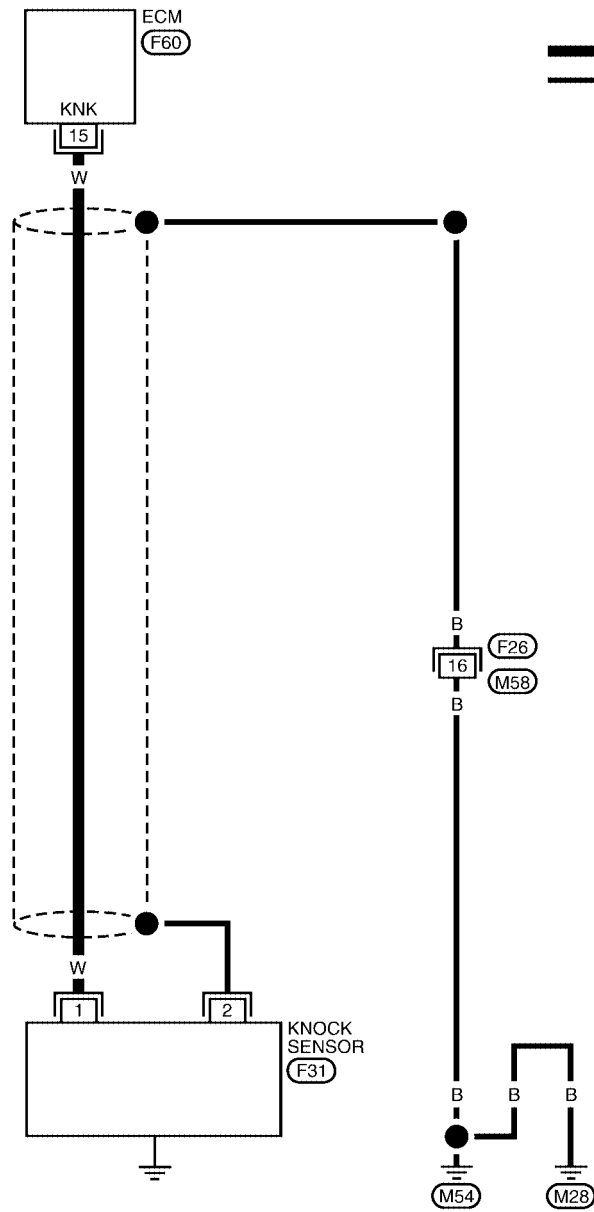


Wiring Diagram

UBS001VO

EC-KS-01

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BBWA0782E

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
15	W	Knock sensor	[Engine is running] ● Idle speed	Approximately 2.5V

**Diagnostic Procedure**

UBS001VP

**1. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-I**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check resistance between ECM terminal 15 and engine ground. Refer to Wiring Diagram.

**NOTE:**

**It is necessary to use an ohmmeter which can measure more than 10 M $\Omega$ .**

**Resistance: Approximately 530 - 590k $\Omega$  [at 20°C (68°F)]**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.  
NG >> GO TO 2.

**2. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-II**

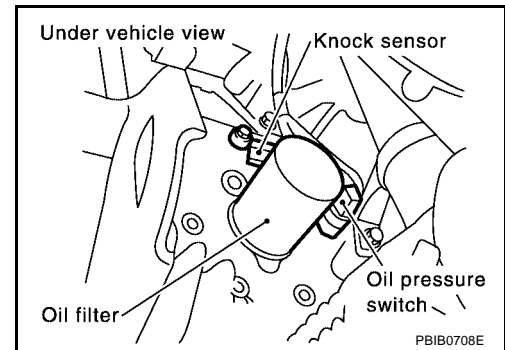
1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector and knock sensor harness connector.
3. Check harness continuity between knock sensor terminal 1 and ECM terminal 15. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 3.  
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**3. CHECK KNOCK SENSOR**

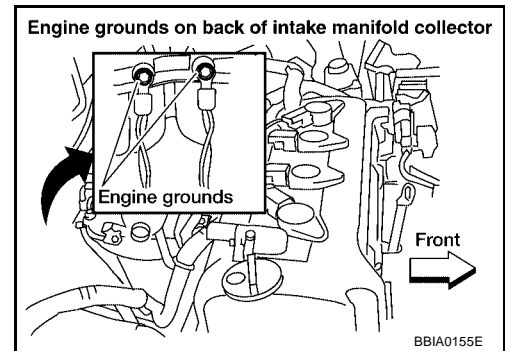
Refer to [EC-835, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.  
NG >> Replace knock sensor.

#### 4. RETIGHTEN GROUND SCREWS

Loosen and retighten engine ground screws.



>> GO TO 5.

#### 5. CHECK INTERMITTENT INCIDENT

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> INSPECTION END

#### Component Inspection KNOCK SENSOR

UBS001VQ

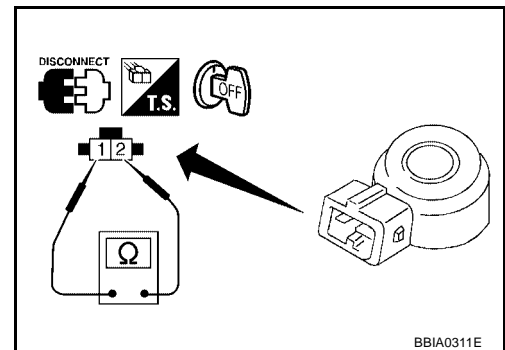
Use an ohmmeter which can measure more than 10 MΩ.

1. Disconnect knock sensor harness connector.
2. Check resistance between terminal 1 and ground.

**Resistance: 530 - 590 kΩ [at 20°C (68°F)]**

#### CAUTION:

Discard any knock sensors that have been dropped or physically damaged. Use only new ones.



UBS001VR

#### Removal and Installation KNOCK SENSOR

Refer to [EM-67, "CYLINDER BLOCK"](#).

**DTC P0335 CKP SENSOR (POS)**

**Component Description**

UBS001VS

The crankshaft position sensor (POS) is located on the cylinder block rear housing facing the gear teeth (cogs) of the signal plate at the end of the crankshaft. It detects the fluctuation of the engine revolution.

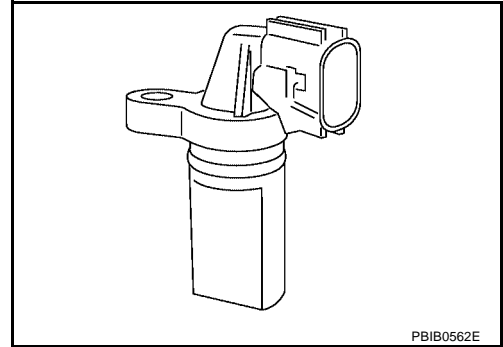
The sensor consists of a permanent magnet and Hall IC.

When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.



PBIB0562E

**CONSULT-II Reference Value in Data Monitor Mode**

UBS0061Y

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
ENG SPEED	<ul style="list-style-type: none"> <li>Tachometer: Connect</li> <li>Run engine and compare tachometer indication with the CONSULT-II value.</li> </ul>	Almost the same speed as the CONSULT-II value.

**On Board Diagnosis Logic**

UBS001VT

Specification data are reference values.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335 0335	Crankshaft position sensor (POS) circuit	<ul style="list-style-type: none"> <li>The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking.</li> <li>The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running.</li> <li>The crankshaft position sensor (POS) signal is not in the normal pattern during engine running.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Crankshaft position sensor (POS)</li> <li>Signal plate</li> </ul>

**DTC Confirmation Procedure**

UBS001VU

**NOTE:**

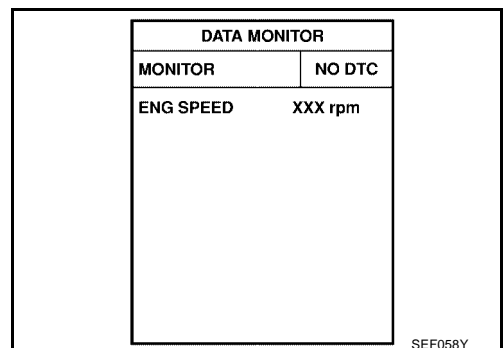
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V with ignition switch "ON".

**WITH CONSULT-II**

- Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
- If 1st trip DTC is detected, go to [EC-839, "Diagnostic Procedure"](#).  
If 1st trip DTC is not detected, go to next step.
- Maintaining engine speed at more than 800 rpm for at least 5 seconds.
- If 1st trip DTC is detected, go to [EC-839, "Diagnostic Procedure"](#).



SEF058Y



### WITH GST

Follow the procedure "With CONSULT-II" above.

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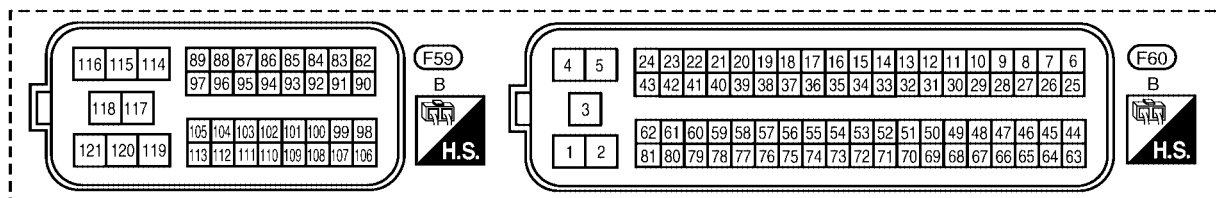
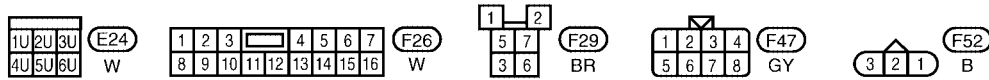
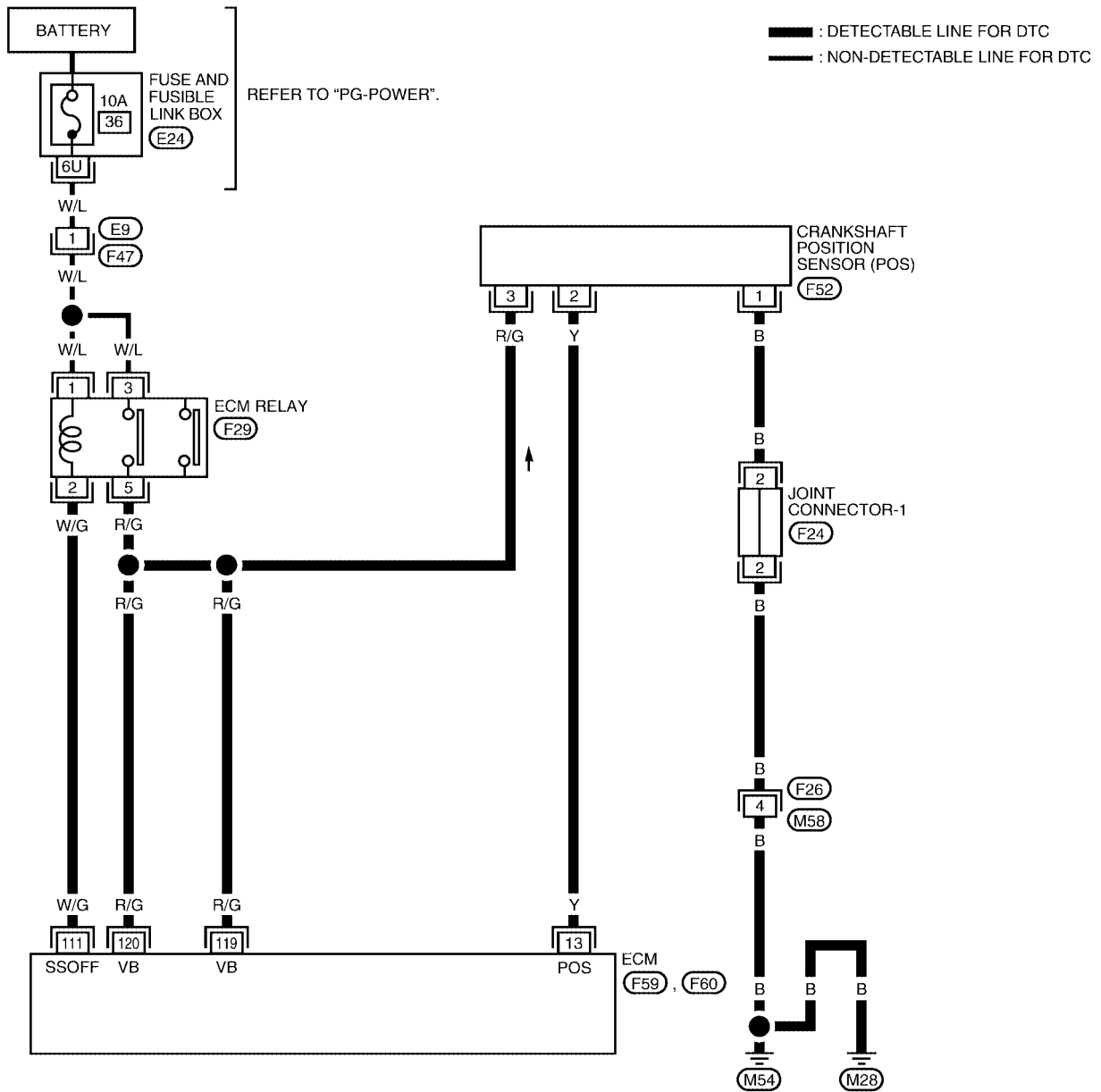
# DTC P0335 CKP SENSOR (POS)

[QG18DE (SULEV)]

UBS001VV

## Wiring Diagram

EC-POS-01



BBWA0783E

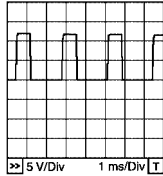
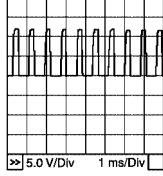
# DTC P0335 CKP SENSOR (POS)

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
13	Y	Crankshaft position sensor (POS)	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>Approximately 3.0V★</p>  <p>PBIB0527E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Engine speed is 2,000 rpm.</li> </ul>	<p>Approximately 3.0V★</p>  <p>PBIB0528E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

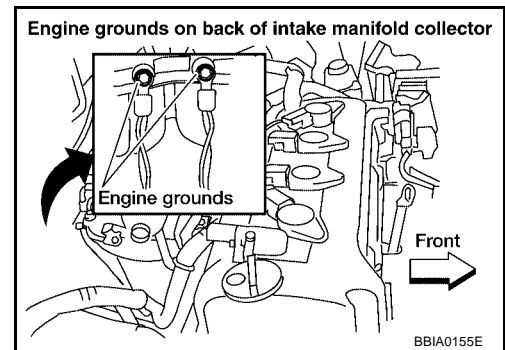
## Diagnostic Procedure

UBS001VW

### 1. RETIGHTEN GROUND SCREWS

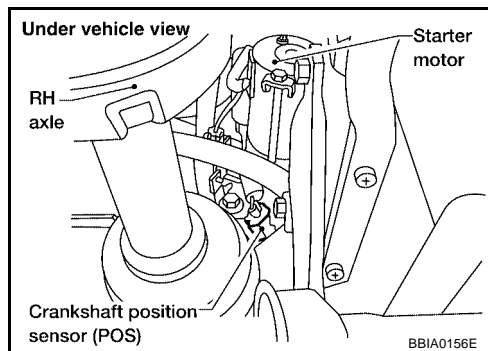
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK POWER SUPPLY

1. Disconnect crankshaft position (CKP) sensor (POS) harness connector.
2. Turn ignition switch "ON".



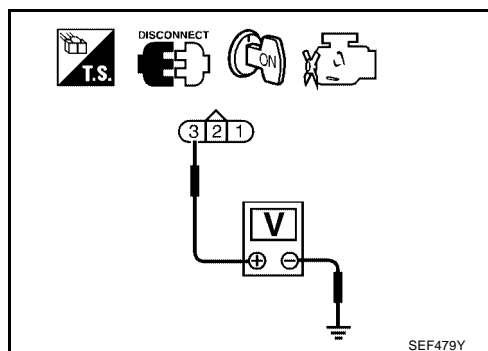
3. Check voltage between CKP sensor (POS) harness connector terminal 3 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.  
NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open and short between ECM and crankshaft position sensor (POS)
- Harness for open or short between ECM relay and crankshaft position sensor (POS)

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between CKP sensor (POS) terminal 1 and engine ground. Refer to the wiring diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.  
NG >> Repair open circuit or short to power in harness or connectors.

## 5. CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 13 and CKP sensor (POS) terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



**6. CHECK CRANKSHAFT POSITION SENSOR (POS)**

Refer to [EC-841, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace crankshaft position sensor (POS).

**7. CHECK INTERMITTENT INCIDENT**

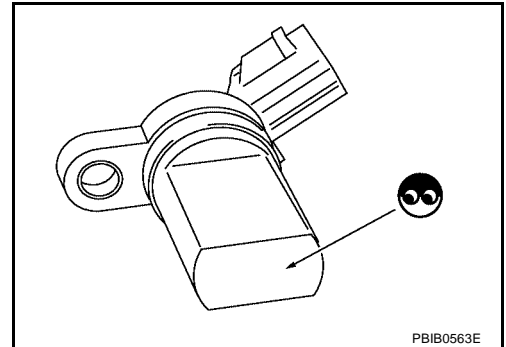
Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection  
CRANKSHAFT POSITION SENSOR (POS)**

UBS001VX

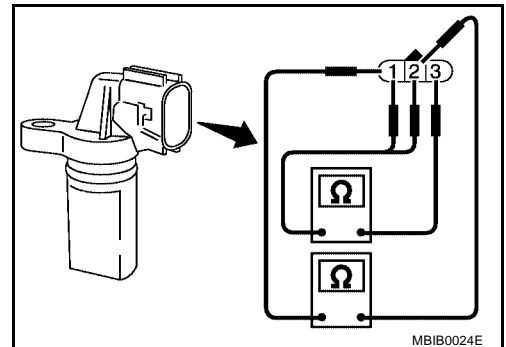
1. Disconnect crankshaft position sensor (POS) harness connector.
2. Loosen the fixing bolt of the sensor.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance $\Omega$ [at 25°C (77°F)]
3 (+) - 1 (-)	Except 0 or $\infty$
3 (+) - 2 (-)	
2 (+) - 1 (-)	

If NG, replace crankshaft position sensor (POS).



**Removal and Installation  
CRANKSHAFT POSITION SENSOR (POS)**

UBS001VY

Refer to [EM-67, "CYLINDER BLOCK"](#) .

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## DTC P0340 CMP SENSOR (PHASE)

### Component Description

UBS001VZ

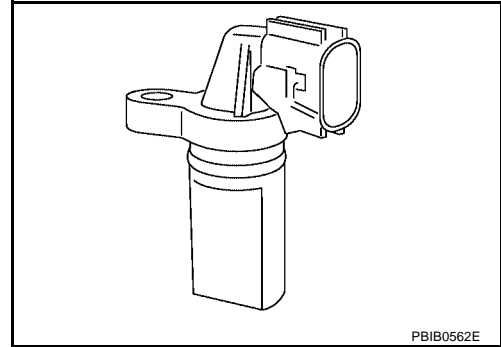
The camshaft position sensor (PHASE) senses the retraction with intake valve camshaft to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position. When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.



### On Board Diagnosis Logic

UBS001W0

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340 0340	Camshaft position sensor (PHASE) circuit	<ul style="list-style-type: none"> <li>● The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking.</li> <li>● The cylinder No. signal is not sent to ECM during engine running.</li> <li>● The cylinder No. signal is not in the normal pattern during engine running.</li> </ul>	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Camshaft position sensor (PHASE)</li> <li>● Camshaft (Intake)</li> <li>● Starter motor (Refer to <a href="#">SC-9</a> .)</li> <li>● Starting system circuit (Refer to <a href="#">SC-9</a> .)</li> <li>● Dead (Weak) battery</li> </ul>

### DTC Confirmation Procedure

UBS001W1

**NOTE:**

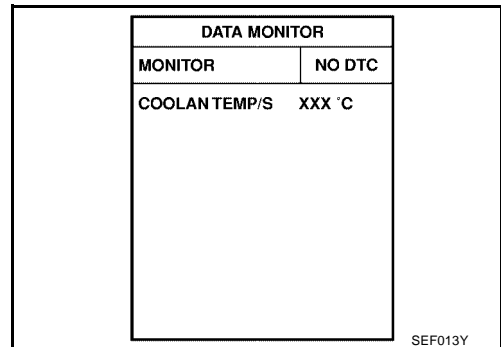
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

**Before performing the following procedure, confirm that battery voltage is more than 10V with ignition switch "ON".**

**Ⓟ WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
4. If 1st trip DTC is detected, go to [EC-844, "Diagnostic Procedure"](#).  
If 1st trip DTC is not detected, go to next step.
5. Maintaining engine speed at more than 800 rpm for at least 5 seconds.
6. If 1st trip DTC is detected, go to [EC-844, "Diagnostic Procedure"](#).



**Ⓢ WITH GST**

Follow the procedure "With CONSULT-II" above.

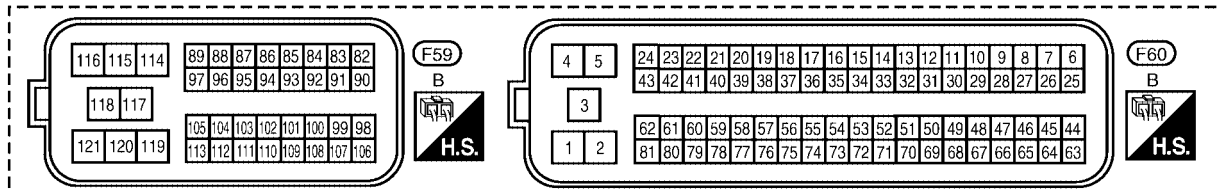
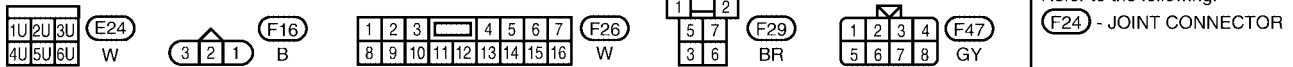
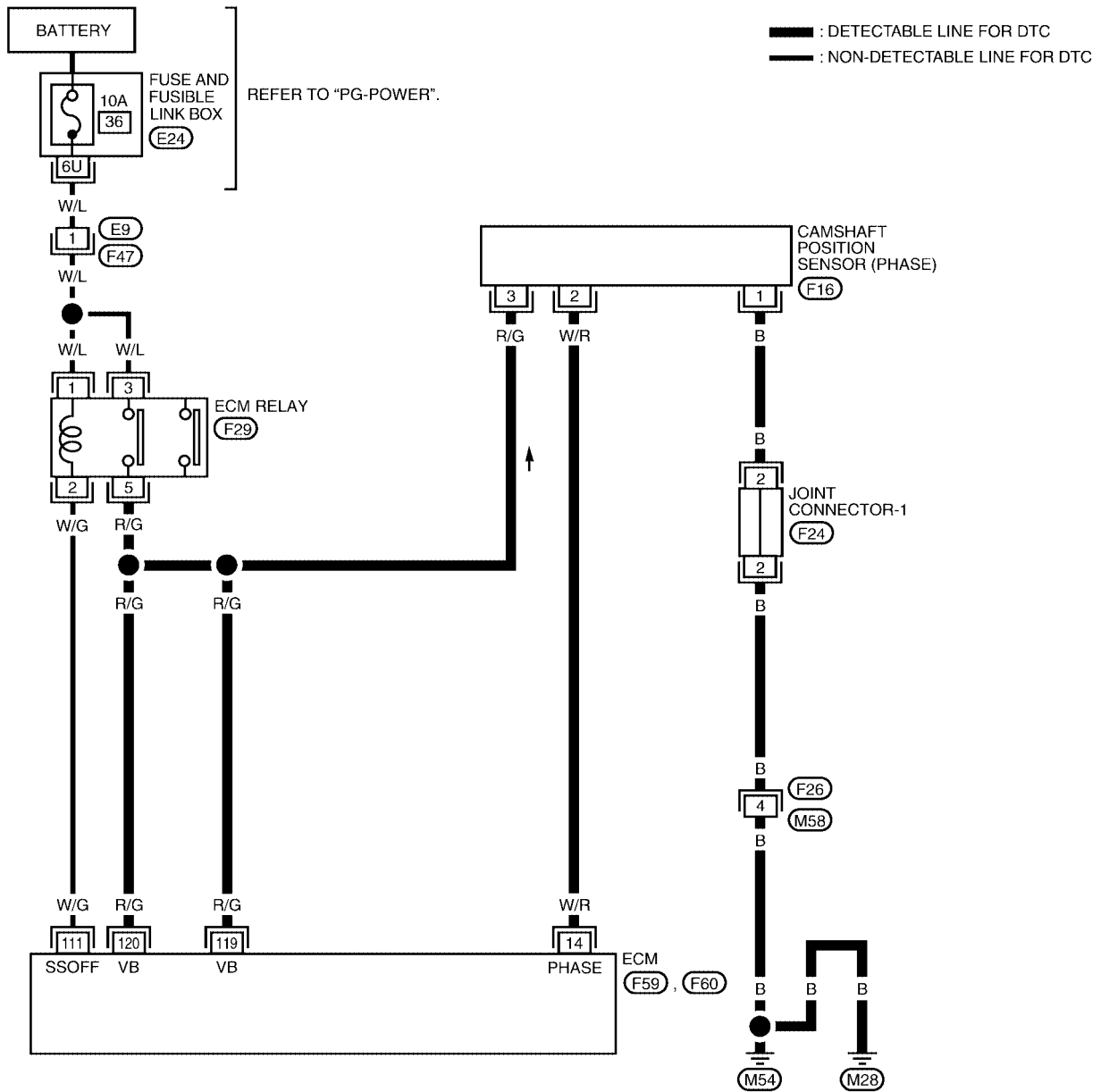
# DTC P0340 CMP SENSOR (PHASE)

[QG18DE (SULEV)]

UBS001W2

## Wiring Diagram

### EC-PHASE-01



BBWA0784E

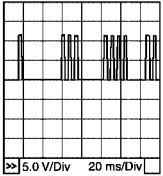
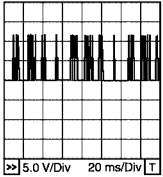
# DTC P0340 CMP SENSOR (PHASE)

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	W/R	Camshaft position sensor (PHASE)	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>1.0 - 4.0V★</p>  <p>5.0 V/Div 20 ms/Div</p> <p>PBIB0525E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Engine speed is 2,000 rpm.</li> </ul>	<p>1.0 - 4.0V★</p>  <p>5.0 V/Div 20 ms/Div</p> <p>PBIB0526E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS001W3

### 1. CHECK STARTING SYSTEM

Turn ignition switch to "START" position.

**Does the engine turn over?**

**Does the starter motor operate?**

Yes or No

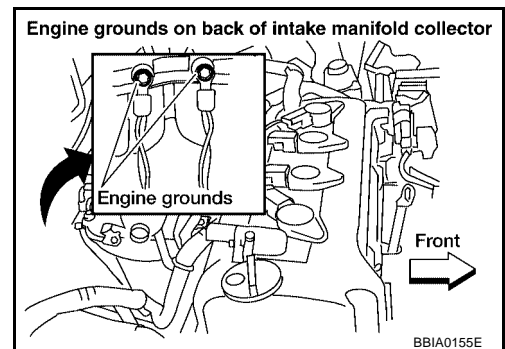
Yes >> GO TO 2.

No >> Check starting system. (Refer to [SC-9, "STARTING SYSTEM"](#) .)

### 2. RETIGHTEN GROUND SCREWS

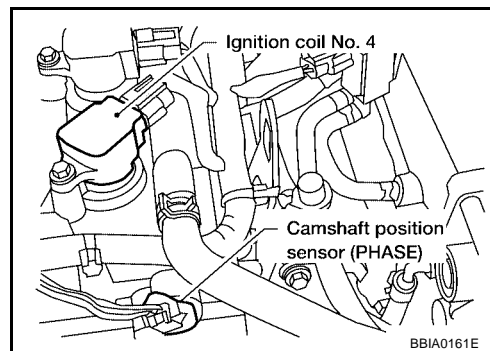
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 3.



### 3. CHECK CMP SENSOR (PHASE) POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor (PHASE) harness connector.
2. Turn ignition switch "ON".



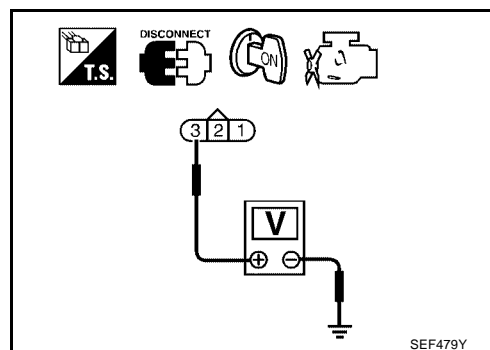
3. Check voltage between CMP sensor (PHASE) terminal 3 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.  
NG >> GO TO 4.



### 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between camshaft position sensor (PHASE) and ECM relay
- Harness for open or short between camshaft position sensor (PHASE) and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

### 5. CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between (CMP) sensor (PHASE) terminal 1 and engine ground. Refer to the wiring diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 6.  
NG >> Repair open circuit or short to power in harness or connectors.

### 6. CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between CMP sensor (PHASE) terminal 2 and ECM terminal 14. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.  
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-847, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace camshaft position sensor (PHASE).

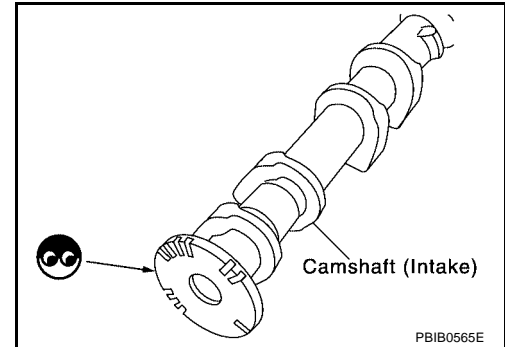
## 8. CHECK CAMSHAFT (INTAKE)

Check the following.

- Accumulation of debris to the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end

OK or NG

- OK >> GO TO 9.
- NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



## 9. CHECK INTERMITTENT INCIDENT

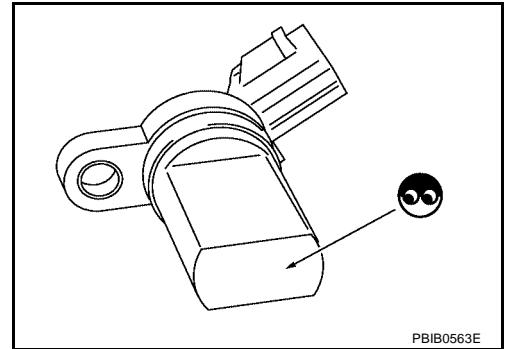
Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

UBS001W4

**Component Inspection**  
**CAMSHAFT POSITION SENSOR (PHASE)**

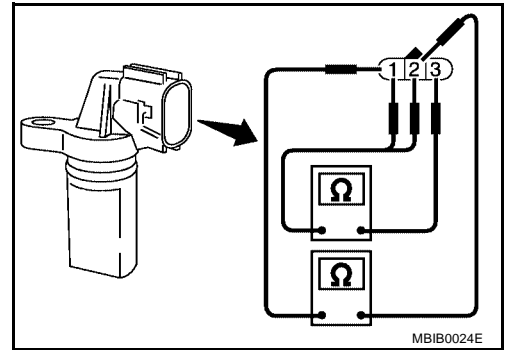
1. Loosen the fixing bolt of the sensor.
2. Disconnect camshaft position sensor (PHASE) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



PBIB0563E

5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance $\Omega$ [at 25°C (77°F)]
3 (+) - 1 (-)	Except 0 or $\infty$
3 (+) - 2 (-)	
2 (+) - 1 (-)	



MBIB0024E

**Removal and Installation**  
**CAMSHAFT POSITION SENSOR (PHASE)**

Refer to [EM-39, "TIMING CHAIN"](#) .

UBS001W5

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# DTC P0420 THREE WAY CATALYST FUNCTION

[QG18DE (SULEV)]

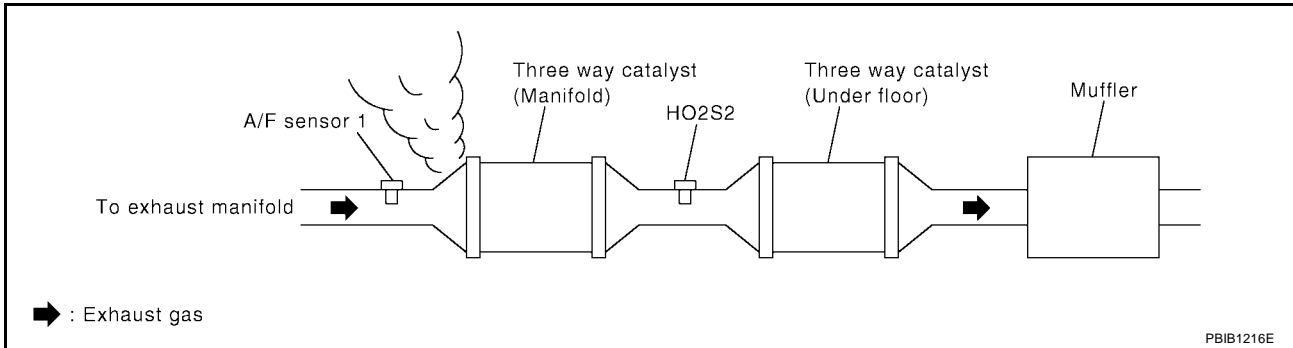
## DTC P0420 THREE WAY CATALYST FUNCTION

PF2:20905

### On Board Diagnosis Logic

UBS001WZ

The ECM monitors the switching frequency ratio of air fuel ratio (A/F) sensor 1 and heated oxygen sensor 2.



A three way catalyst (manifold) with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2. As oxygen storage capacity decreases, the heated oxygen sensor 2 switching frequency will increase.

When the frequency ratio of air fuel ratio (A/F) sensor 1 and heated oxygen sensor 2 approaches a specified limit value, the three way catalyst (manifold) malfunction is diagnosed.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0420 0420	Catalyst system efficiency below threshold	<ul style="list-style-type: none"> <li>• Three way catalyst 1 does not operate properly.</li> <li>• Three way catalyst 1 does not have enough oxygen storage capacity.</li> </ul>	<ul style="list-style-type: none"> <li>• Three way catalyst (manifold)</li> <li>• Exhaust tube</li> <li>• Intake air leaks</li> <li>• Fuel injectors</li> <li>• Fuel injector leaks</li> <li>• Spark plug</li> <li>• Improper ignition timing</li> </ul>

### DTC Confirmation Procedure

UBS001X0

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### Ⓟ WITH CONSULT-II

#### TESTING CONDITION:

**Do not hold engine speed for more than the specified minutes below.**

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
5. Let engine idle for one minute.
6. Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
7. Open engine hood.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

SEF189Y



# DTC P0420 THREE WAY CATALYST FUNCTION

[QG18DE (SULEV)]

8. Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-II.
9. Rev engine up to 2,500 to 3,500 rpm and hold it for 3 consecutive minutes, then release the accelerator pedal completely. If "CMPLT" of "CATALYST" changed to "COMPLT", GO TO STEP 12.
10. Wait 5 seconds at idle.

SRT WORK SUPPORT	
CATALYST	CMPLT
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	INCMP
EGR SYSTEM	INCMP
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
B/FUEL SCHDL	XXX msec
A/F ALPHA-B1	XXX V
COOLAN TEMP/S	XX °C
A/F SEN1 (B1)	XXX V

SEF534Z

11. Rev engine up to 2,000 to 3,000 rpm and maintain it until "IMCMP" of "CATALYST" changes to "CMPLT" (it will take approximately 5 minutes). If not "CMPLT", stop engine and cool it down to less than 70°C (158°F) and then retest step 1.

SRT WORK SUPPORT	
CATALYST	CMPLT
HO2S HTR	CMPLT
HO2S	INCMP
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec

PBI0567E

12. Select "SELF-DIAG RESULTS" mode with CONSULT-II.
13. Confirm that the 1st trip DTC is not detected. If the 1st trip DTC is detected, go to [EC-850, "Diagnostic Procedure"](#).

SELF DIAG RESULTS	
DTC RESULTS	TIME
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	

SEF535Z

## Overall Function Check

UBS001X1

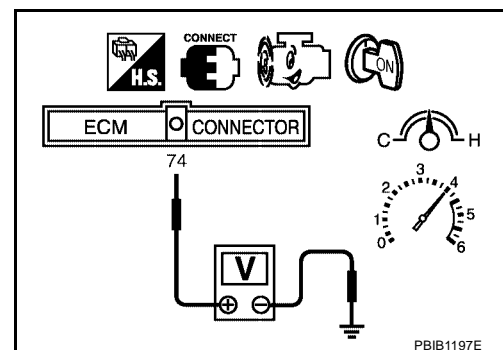
Use this procedure to check the overall function of the three way catalyst (manifold). During this check, a 1st trip DTC might not be confirmed.

### WITH GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Open engine hood.
6. Set voltmeter probe between ECM terminal 74 and ground.
7. Keep engine speed at 2,500 rpm constant under no load.
8. Make sure that the voltage does not vary for more than 5 seconds.

If the voltage fluctuation cycle takes less than 5 seconds, go to [EC-850, "Diagnostic Procedure"](#).

- 1 cycle: 0.6 - 1.0 V → 0 - 0.3 V → 0.6 - 1.0 V



# DTC P0420 THREE WAY CATALYST FUNCTION

[QG18DE (SULEV)]

UBS001X2

## Diagnostic Procedure

### 1. CHECK EXHAUST SYSTEM

Visually check exhaust tubes and muffler for dent.

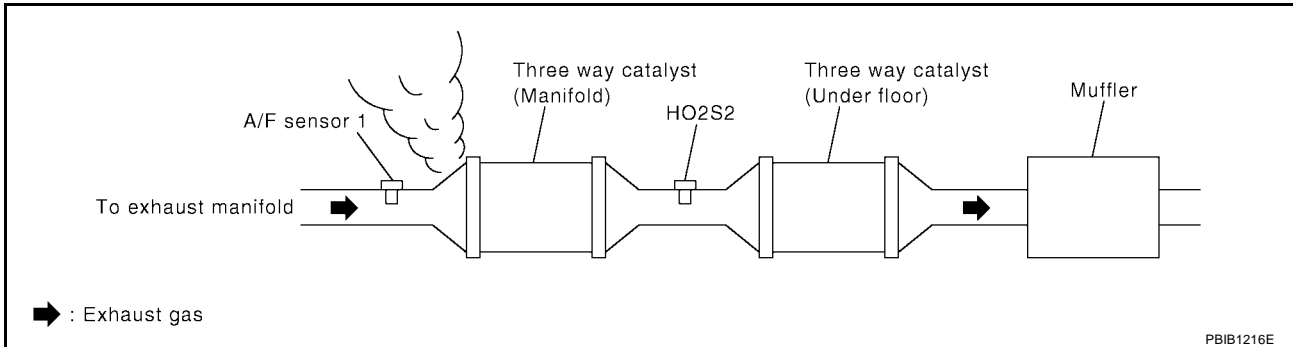
OK or NG

OK >> GO TO 2.

NG >> Repair or replace.

### 2. CHECK EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before the three way catalyst (manifold).



OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

### 3. CHECK INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

OK >> GO TO 4.

NG >> Repair or replace.

### 4. CHECK IGNITION TIMING

Check for ignition timing. Refer to [EC-669, "Basic Inspection"](#).

Items	Specifications	
Target idle speed	A/T	800 ± 50 rpm (in "P" or "N" position)
	M/T	650 ± 50 rpm
Ignition timing	A/T	18 ± 5°BTDC (in "P" or "N" position)
	M/T	7 ± 5°BTDC

OK or NG

OK >> GO TO 5.

NG >> Follow the "Basic Inspection".

# DTC P0420 THREE WAY CATALYST FUNCTION

[QG18DE (SULEV)]

## 5. CHECK INJECTORS

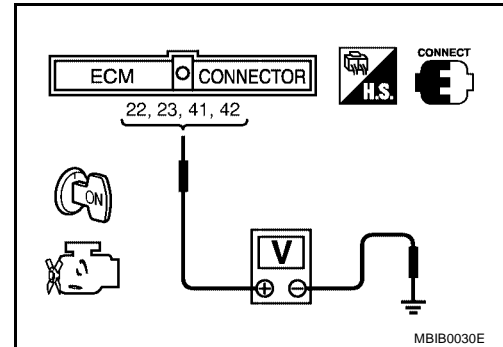
1. Refer to Wiring Diagram for Injectors, [EC-1169](#) .
2. Stop engine and then turn ignition switch "ON".
3. Check voltage between ECM terminals 22, 23, 41, 42 and ground with CONSULT-II or tester.

**Battery voltage should exist.**

OK or NG

OK >> GO TO 6.

NG >> Perform "Diagnostic Procedure" INJECTOR, [EC-1169](#) .



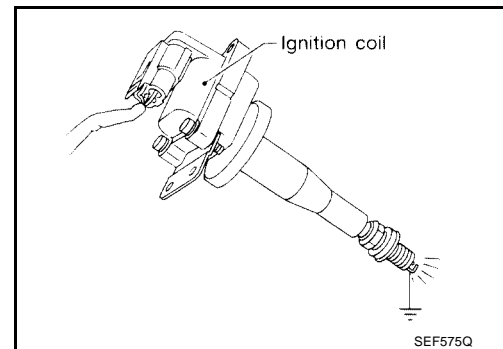
## 6. CHECK IGNITION SPARK

1. Turn ignition switch "OFF".
2. Disconnect ignition coil assembly from rocker cover.
3. Connect a known-good spark plug to the ignition coil assembly.
4. Place end of spark plug against a suitable ground and crank engine.
5. Check for spark.

OK or NG

OK >> GO TO 7.

NG >> Check ignition coil with power transistor and their circuit.



## 7. CHECK INJECTOR

1. Turn ignition switch "OFF".
2. Remove injector assembly. Refer to [EM-19, "FUEL INJECTOR AND FUEL TUBE"](#) . Keep fuel hose and all injectors connected to injector gallery.
3. Disconnect ignition coil assembly harness connector.
4. Turn ignition switch "ON". Make sure fuel does not drip from injector.

OK or NG

OK (Does not drip)>>GO TO 8.

NG (Drips)>>Replace the injector(s) from which fuel is dripping.

## 8. CHECK INTERMITTENT INCIDENT

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

Trouble is fixed>>**INSPECTION END**

Trouble is not fixed>>Replace three way catalyst (manifold).

DTC P0441 EVAP CONTROL SYSTEM

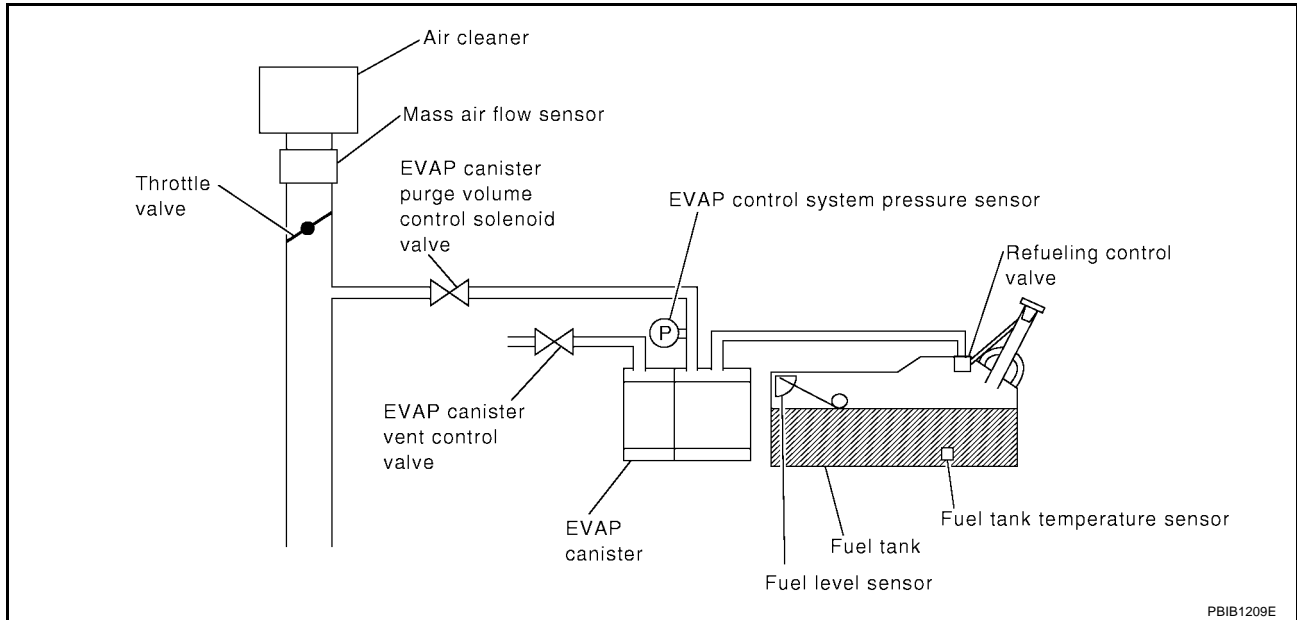
PF1:14950

System Description

UBS001X3

NOTE:

If DTC P0441 is displayed with other DTC such as P2122, P2123 P2127, P2128, P2138, first perform trouble diagnosis for other DTC.



In this evaporative emission (EVAP) control system, purge flow occurs during non-closed throttle conditions. Purge volume is related to air intake volume. Under normal purge conditions (non-closed throttle), the EVAP canister purge volume control solenoid valve is open to admit purge flow. Purge flow exposes the EVAP control system pressure sensor to intake manifold vacuum.

On Board Diagnosis Logic

UBS001X4

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a malfunction is determined.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0441 0441	EVAP control system incorrect purge flow	EVAP control system does not operate properly, EVAP control system has a leak between intake manifold and EVAP control system pressure sensor.	<ul style="list-style-type: none"> <li>● EVAP canister purge volume control solenoid valve stuck closed</li> <li>● EVAP control system pressure sensor and the circuit</li> <li>● Loose, disconnected or improper connection of rubber tube</li> <li>● Blocked rubber tube</li> <li>● Cracked EVAP canister</li> <li>● EVAP canister purge volume control solenoid valve circuit</li> <li>● Accelerator pedal position sensor</li> <li>● Blocked purge port</li> <li>● EVAP canister vent control valve</li> </ul>

**DTC Confirmation Procedure**

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

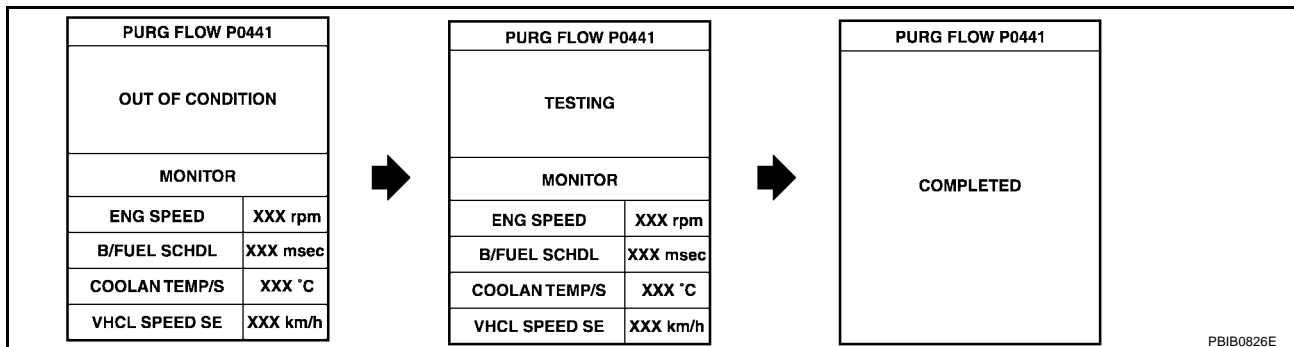
**TESTING CONDITION:**

Always perform test at a temperature of 0°C (32°F) or more.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch “OFF” and wait at least 10 seconds.
3. Start engine and let it idle for at least 70 seconds.
4. Select “PURG FLOW P0441” of “EVAPORATIVE SYSTEM” in “DTC CONFIRMATION” mode with CONSULT-II.
5. Touch “START”.  
If “COMPLETED” is displayed, go to step 7.
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take at least 35 seconds.)

Selector lever	Suitable position
Vehicle speed	32 - 120 km/h (20 - 75 MPH)
ENG SPEED	500 - 3,800 rpm
B/FUEL SCHDL	1.0 - 8.2 msec
Engine coolant temperature	More than 70°C (158°F)



If “TESTING” is not changed for a long time, retry from step 2.

7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to [EC-854, "Diagnostic Procedure"](#).

**Overall Function Check**

Use this procedure to check the overall monitoring function of the EVAP control system purge flow monitoring. During this check, a 1st trip DTC might not be confirmed.

**WITH GST**

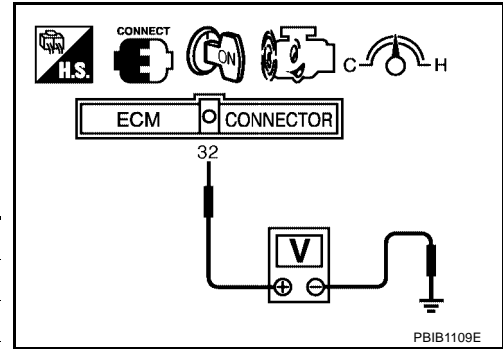
1. Lift up drive wheels.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch “OFF”, wait at least 10 seconds.
4. Start engine and wait at least 70 seconds.

# DTC P0441 EVAP CONTROL SYSTEM

[QG18DE (SULEV)]

- Set voltmeter probes to ECM terminals 32 (EVAP control system pressure sensor signal) and ground.
- Check EVAP control system pressure sensor value at idle speed and note it.
- Establish and maintain the following conditions for at least 1 minute.

Air conditioner switch	ON
Headlamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Gear position	Any position other than "P", "N" or "R"



- Verify that EVAP control system pressure sensor value stays 0.1V less than the value at idle speed (measured at step 6) for at least 1 second.
- If NG, go to [EC-854, "Diagnostic Procedure"](#).

## Diagnostic Procedure

UBS001X8

### 1. CHECK EVAP CANISTER

- Turn ignition switch "OFF".
- Check EVAP canister for cracks.

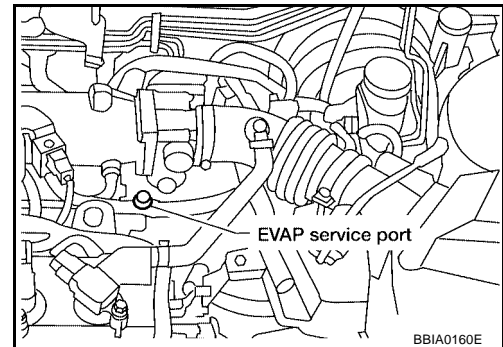
#### OK or NG

- OK (With CONSULT-II)>>GO TO 2.
- OK (Without CONSULT-II)>>GO TO 3.
- NG >> Replace EVAP canister.

### 2. CHECK PURGE FLOW

#### With CONSULT-II

- Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.
- Start engine and let it idle.
- Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.
- Rev engine up to 2,000 rpm.



- Touch "Qd" and "Qu" on CONSULT-II screen to adjust "PURG VOL CONT/V" opening and check vacuum existence.

PURG VOL CONT/V	VACUUM
100.0%	Should exist.
0.0%	should not exist.

#### OK or NG

- OK >> GO TO 7.
- NG >> GO TO 4.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
THRTL POS SEN	X.XX V

PBIB0721E

**3. CHECK PURGE FLOW**

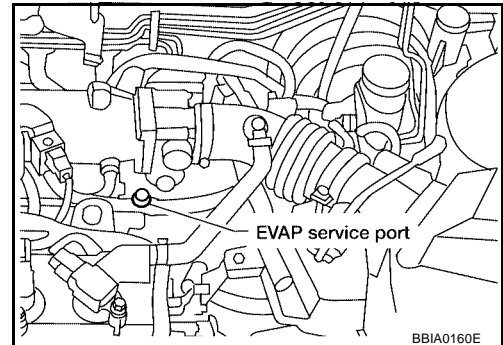
**⊗ Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum gauge indication when revving engine up to 2,000 rpm.

**Vacuum should exist.**

6. Release the accelerator pedal fully and let idle.

**Vacuum should not exist.**



OK or NG

- OK >> GO TO 7.
- NG >> GO TO 4.

**4. CHECK EVAP PURGE LINE**

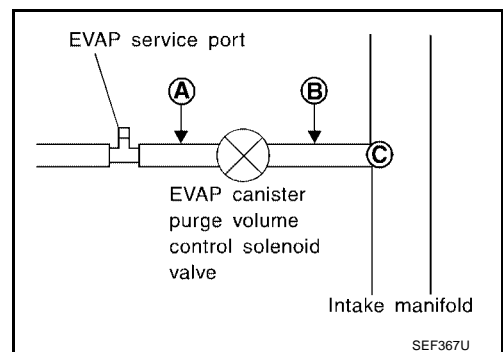
1. Turn ignition switch "OFF".
2. Check EVAP purge line for improper connection or disconnection. Refer to [EC-1206, "EVAPORATIVE EMISSION LINE DRAWING"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Repair it.

**5. CHECK EVAP PURGE HOSE AND PURGE PORT**

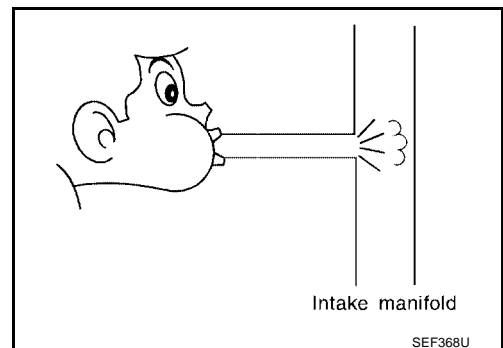
1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B**.
2. Blow air into each hose and EVAP purge port **C**.



3. Check that air flows freely.

OK or NG

- OK (With CONSULT-II)>>GO TO 6.
- OK (Without CONSULT-II)>>GO TO 7.
- NG >> Repair or clean hoses and/or purge port.



**6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

 **With CONSULT-II**

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
THRTL POS SEN	X.XX V

PBIB0721E

**7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

Refer to [EC-867](#) .

OK or NG

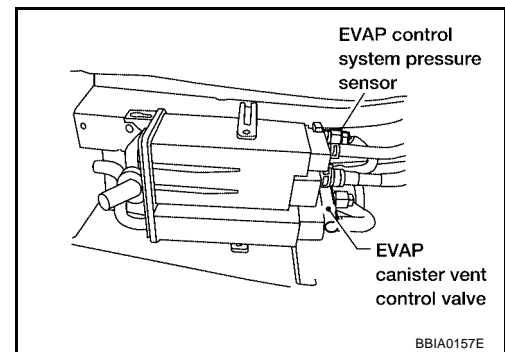
- OK >> GO TO 8.
- NG >> Replace EVAP canister purge volume control solenoid valve.

**8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR**

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

OK or NG

- OK >> GO TO 9.
- NG >> Replace EVAP control system pressure sensor.



**9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION**

Refer to "DTC Confirmation Procedure" for DTC P0452, [EC-880](#) P0453, [EC-886](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace EVAP control system pressure sensor.

**10. CHECK RUBBER TUBE FOR CLOGGING**

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 11.
- NG >> Clean the rubber tube using an air blower.

**11. CHECK EVAP CANISTER VENT CONTROL VALVE**

Refer to [EC-878](#) .

OK or NG

- OK >> GO TO 12.
- NG >> Replace EVAP canister vent control valve.



---

**12. CHECK EVAP PURGE LINE**

---

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.  
Refer to [EC-1206, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK >> GO TO 13.
- NG >> Replace it.

---

**13. CLEAN EVAP PURGE LINE**

---

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 14.

---

**14. CHECK INTERMITTENT INCIDENT**

---

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

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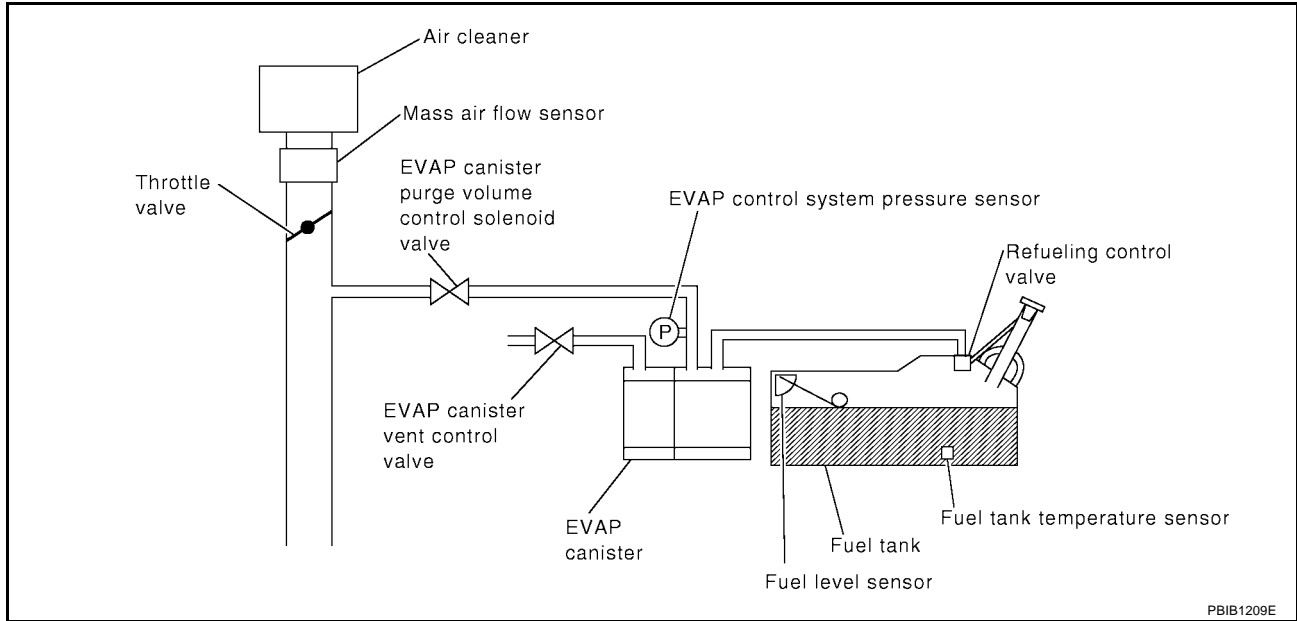
DTC P0442 EVAP CONTROL SYSTEM

PF14950

On Board Diagnosis Logic

UBS001X9

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum. If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following "Vacuum test" conditions. The EVAP canister vent control valve is closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve will then be opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.



PBIB1209E

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0442 0442	EVAP control system small leak detected (negative pressure)	EVAP control system has a leak, EVAP control system does not operate properly.	<ul style="list-style-type: none"> <li>● Incorrect fuel tank vacuum relief valve</li> <li>● Incorrect fuel filler cap used</li> <li>● Fuel filler cap remains open or fails to close.</li> <li>● Foreign matter caught in fuel filler cap.</li> <li>● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>● Foreign matter caught in EVAP canister vent control valve.</li> <li>● EVAP canister or fuel tank leaks</li> <li>● EVAP purge line (pipe and rubber tube) leaks</li> <li>● EVAP purge line rubber tube bent</li> <li>● Loose or disconnected rubber tube</li> <li>● EVAP canister vent control valve and the circuit</li> <li>● EVAP canister purge volume control solenoid valve and the circuit</li> <li>● Fuel tank temperature sensor</li> <li>● O-ring of EVAP canister vent control valve is missing or damaged</li> <li>● EVAP canister is saturated with water</li> <li>● EVAP control system pressure sensor</li> <li>● Fuel level sensor and the circuit</li> <li>● Refueling EVAP vapor cut valve</li> <li>● ORVR system leaks</li> </ul>

**CAUTION:**

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

## DTC Confirmation Procedure

UBS001XB

**NOTE:**

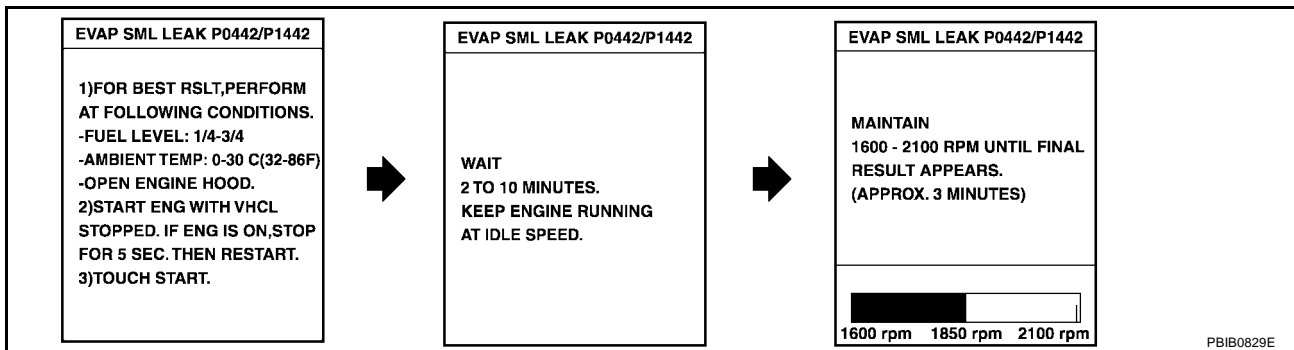
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Always perform test at a temperature of 0 to 30°C (32 to 86°F).
- Open engine hood before conducting following procedure.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
4. Check the following conditions are met.  
**COOLAN TEMP/S: 0 - 70°C (32 - 158°F)**  
**INT/A TEMP SE: 0 - 60°C (32 - 140°F)**
5. Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.  
 Follow the instruction displayed.



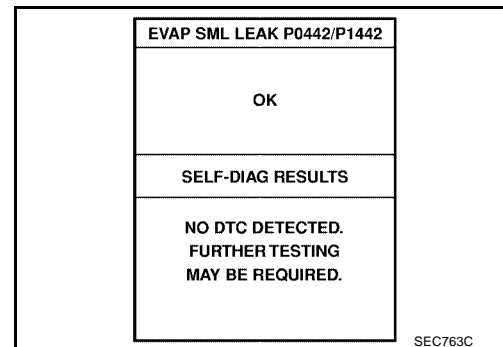
**NOTE:**

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to [EC-669, "Basic Inspection"](#).

6. Make sure that "OK" is displayed.  
 If "NG" is displayed, refer to [EC-860, "Diagnostic Procedure"](#).

**NOTE:**

**Make sure that EVAP hoses are connected to the EVAP canister purge volume control solenoid valve properly.**



**WITH GST**

**NOTE:**

Be sure to read the explanation of "Driving Pattern" on [EC-649](#) before driving vehicle.

1. Start engine.

2. Drive vehicle according to “Driving Pattern”, [EC-649](#) .
3. Stop vehicle.
4. Select “MODE 1” with GST.
  - If SRT of EVAP system is not set yet, go to the following step.
  - If SRT of EVAP system is set, the result will be OK.
5. Turn ignition switch “OFF” and wait at least 10 seconds.
6. Start engine.  
**It is not necessary to cool engine down before driving.**
7. Drive vehicle again according to the “Driving Pattern”, [EC-649](#) .
8. Stop vehicle.
9. Select “MODE 3” with GST.
  - If P0442 is displayed on the screen, go to [EC-860, "Diagnostic Procedure"](#) .
  - If P0441 is displayed on the screen, go to “Diagnostic Procedure” for DTC P0441, [EC-854](#) .
  - If P0442 and P0441 are not displayed on the screen, go to the following step.
10. Select “MODE 1” with GST.
  - If SRT of EVAP system is set, the result will be OK.
  - If SRT of EVAP system is not set, go to step 6.

## Diagnostic Procedure

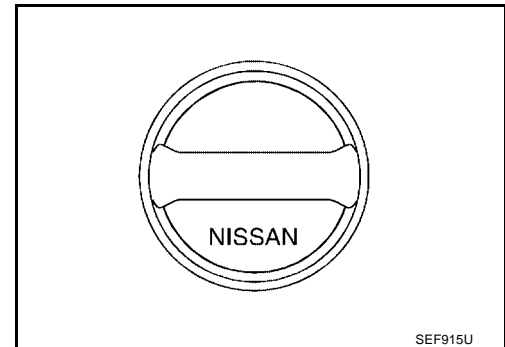
UBS001XC

### 1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch “OFF”.
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK     >> GO TO 2.  
 NG     >> Replace with genuine NISSAN fuel filler cap.



### 2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

- OK     >> GO TO 3.  
 NG     >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.  
           2. Retighten until ratcheting sound is heard.

### 3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

- OK     >> GO TO 5.  
 NG     >> GO TO 4.

**4. CHECK FUEL TANK VACUUM RELIEF VALVE**

1. Wipe clean valve housing.
2. Check valve opening pressure and vacuum.

**Pressure:**

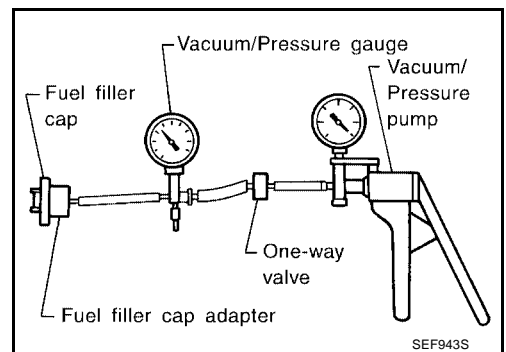
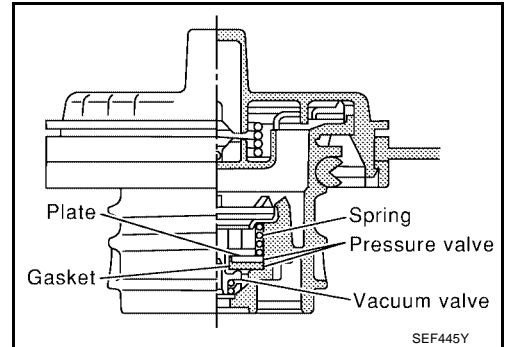
15.3 - 20.0 kPa (0.156 - 0.204 kg/cm<sup>2</sup> , 2.22 - 2.90 psi)

**Vacuum:**

-6.0 to -3.3 kPa (-0.061 to -0.035 kg/cm<sup>2</sup> , -0.87 to -0.50 psi)

**CAUTION:**

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.



OK or NG

- OK >> GO TO 5.
- NG >> Replace fuel filler cap with a genuine one.

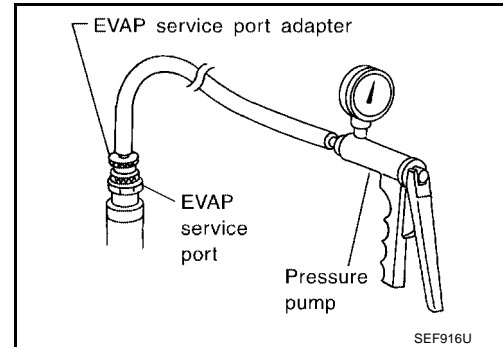
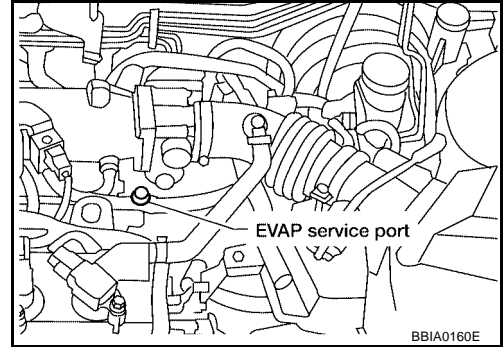
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**5. INSTALL THE PRESSURE PUMP**

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely. For the location of EVAP service port, refer to [EC-1206, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

**NOTE:**

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



Models with CONSULT-II>>GO TO 6.  
Models without CONSULT-II>>GO TO 7.

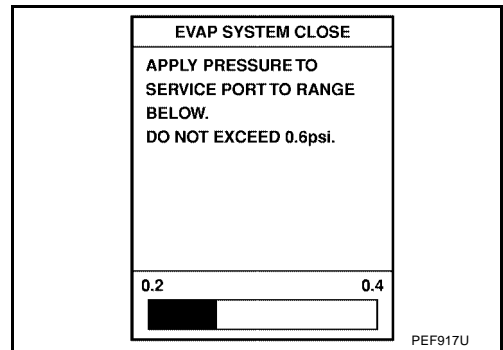
**6. CHECK FOR EVAP LEAK**

**Ⓜ With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

**NOTE:**

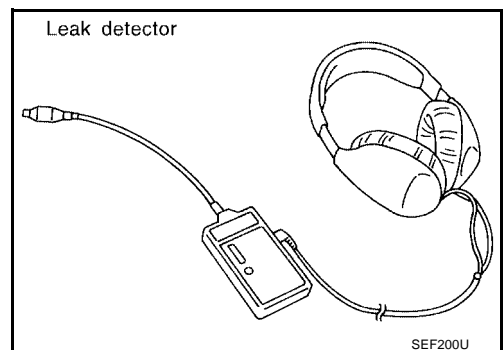
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1206, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

**OK or NG**

- OK >> GO TO 8.
- NG >> Repair or replace.



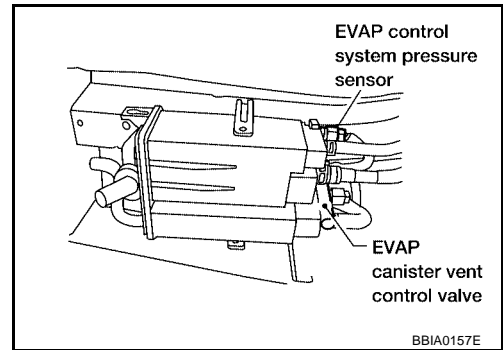
**7. CHECK FOR EVAP LEAK**

⊗ **Without CONSULT-II**

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

**NOTE:**

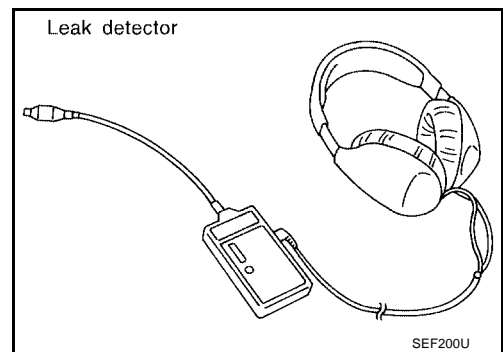
- **Never use compressed air or a high pressure pump.**
- **Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi) of pressure in the system.**



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1206, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK >> GO TO 8.  
 NG >> Repair or replace.



**8. CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT**

Refer to [EC-859, "DTC Confirmation Procedure"](#) .

OK or NG

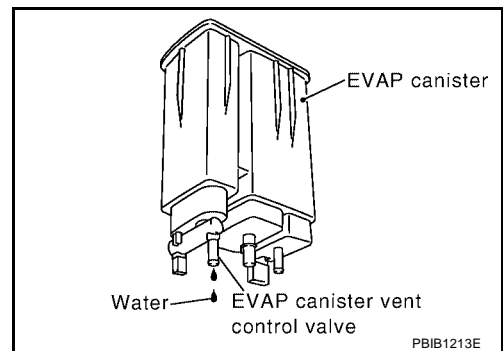
- OK >> GO TO 9.  
 NG >> Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

**9. CHECK IF EVAP CANISTER SATURATED WITH WATER**

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 10.  
 No (With CONSULT-II)>>GO TO 12.  
 No (Without CONSULT-II)>>GO TO 13.



## 10. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

**The weight should be less than 1.9 kg (4.2 lb).**

OK or NG

- OK (With CONSULT-II)>>GO TO 12.
- OK (Without CONSULT-II)>>GO TO 13.
- NG >> GO TO 11.

## 11. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose cennected to EVAP canister for clogging or poor connection

>> Repair hose or replace EVAP canister.

## 12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

 **With CONSULT-II**

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

**Vuccum should exist.**

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
THRTL POS SEN	X. XX V

PBIB0726E

## 13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

 **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

**Vacuum should exist.**

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 14.



**14. CHECK VACUUM HOSE**

Check vacuum hoses for clogging or disconnection. Refer to [EC-1206, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK >> GO TO 15.
- NG >> Repair or reconnect the hose.

**15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

Refer to [EC-872, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 16.
- NG >> Replace EVAP canister purge volume control solenoid valve.

**16. CHECK FUEL TANK TEMPERATURE SENSOR**

Refer to [EC-813, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 17.
- NG >> Replace fuel level sensor unit.

**17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR**

Refer to [EC-885, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 18.
- NG >> Replace EVAP control system pressure sensor.

**18. CHECK EVAP PURGE LINE**

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to [EC-1205, "EVAPORATIVE EMISSION SYSTEM"](#) .

OK or NG

- OK >> GO TO 19.
- NG >> Repair or reconnect the hose.

**19. CLEAN EVAP PURGE LINE**

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 20.

**20. CHECK EVAP/ORVR LINE**

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-1212, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#) .

OK or NG

- OK >> GO TO 21.
- NG >> Repair or replace hoses and tubes.

**21. CHECK SIGNAL LINE AND RECIRCULATION LINE**

Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

- OK >> GO TO 22.
- NG >> Repair or replace hoses, tubes or filler neck tube.

---

## 22. CHECK REFUELING EVAP VAPOR CUT VALVE

---

Refer to [EC-1215, "Component Inspection"](#) .

OK or NG

OK >> GO TO 23.

NG >> Replace refueling EVAP vapor cut valve with fuel tank.

---

## 23. CHECK FUEL LEVEL SENSOR

---

Refer to [DI-26, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

OK >> GO TO 24.

NG >> Replace fuel level sensor unit.

---

## 24. CHECK INTERMITTENT INCIDENT

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Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

# DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QG18DE (SULEV)]

## DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

PFP:14920

### Description SYSTEM DESCRIPTION

UBS001XD

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*2	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*2		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Air fuel ratio (A/F) sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Vehicle speed signal*1	Vehicle speed		

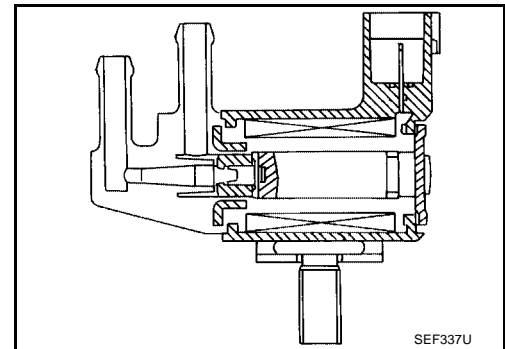
\*1: This signal is sent to the ECM through CAN communication line.

\*2: The ECM determines the start signal status by the signal of engine speed and battery voltage.

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

### COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



### CONSULT-II Reference Value in Data Monitor Mode

UBS001XE

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PURG VOL C/V	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch "OFF"</li> <li>● Shift lever: "N" (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul>	Idle (Vehicle stopped)	0%
		2,000 rpm	—

# DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QG18DE (SULEV)]

## On Board Diagnosis Logic

*UBS001XF*

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0444 0444	EVAP canister purge volume control solenoid valve circuit open	An excessively low voltage signal is sent to ECM through the valve	<ul style="list-style-type: none"> <li>● Harness or connectors (The solenoid valve circuit is open or shorted.)</li> <li>● EVAP canister purge volume control solenoid valve</li> </ul>
P0445 0445	EVAP canister purge volume control solenoid valve circuit shorted	An excessively high voltage signal is sent to ECM through the valve	<ul style="list-style-type: none"> <li>● Harness or connectors (The solenoid valve circuit is shorted.)</li> <li>● EVAP canister purge volume control solenoid valve</li> </ul>

## DTC Confirmation Procedure

*UBS001XH*

### NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

**Before performing the following procedure, confirm battery voltage is more than 11V at idle.**

### WITH CONSULT-II

1. Turn ignition switch “ON”.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 13 seconds.
4. If 1st trip DTC is detected, go to [EC-870, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

### WITH GST

Follow the procedure “WITH CONSULT-II” above.

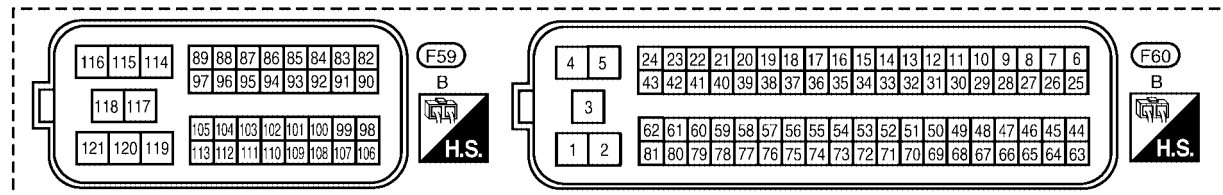
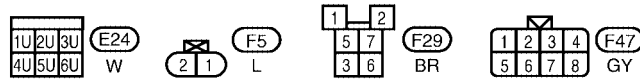
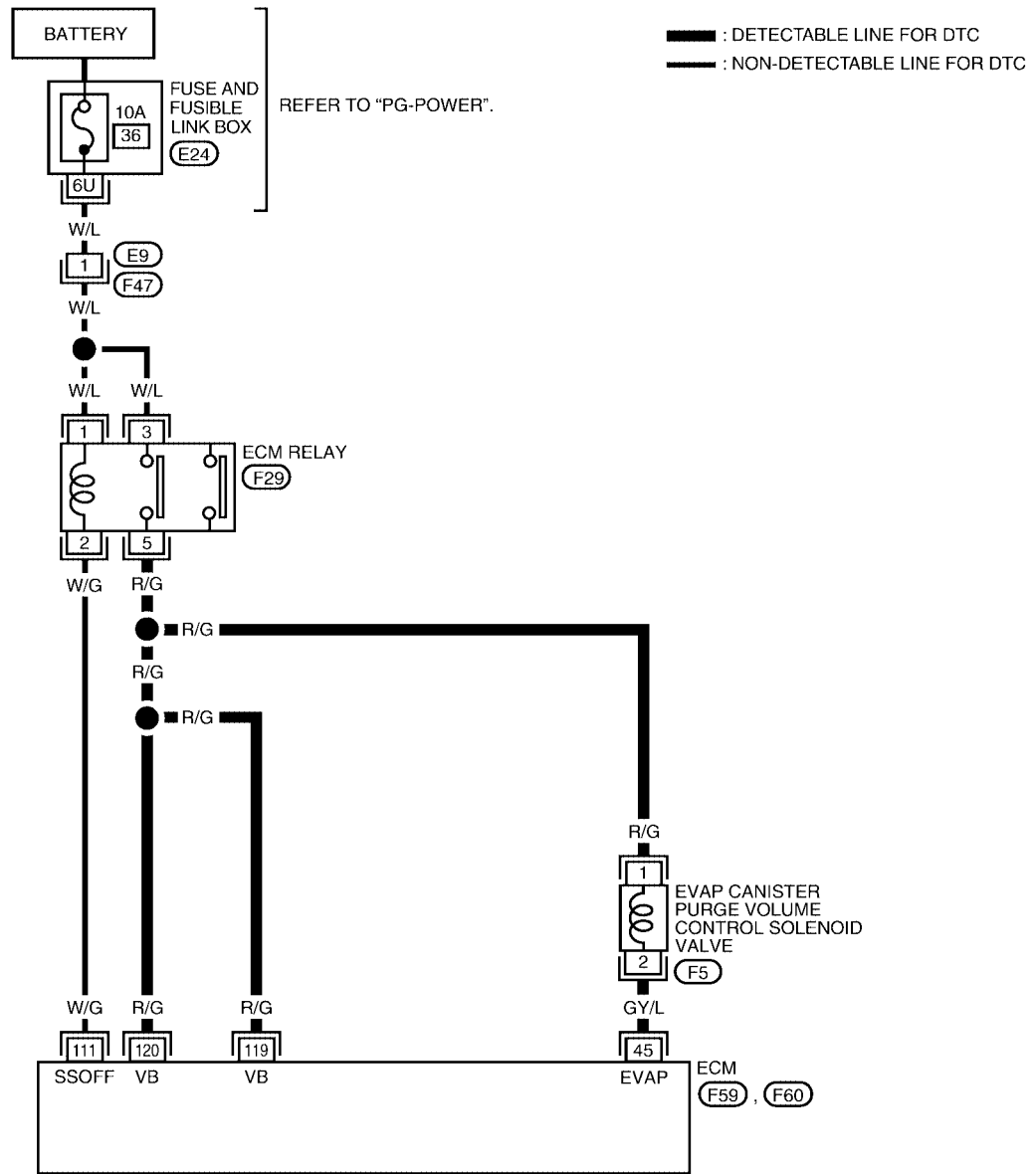
# DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QG18DE (SULEV)]

UBS001X1

## Wiring Diagram

EC-PGC/V-01



BBWA0785E

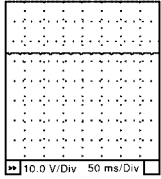
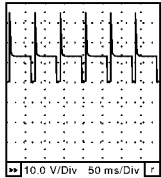
# DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
45	GY/L	EVAP canister purge volume control solenoid valve	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>SEC990C</p>
			<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine).</li> </ul>	<p>Approximately 10V★</p>  <p>SEC991C</p>

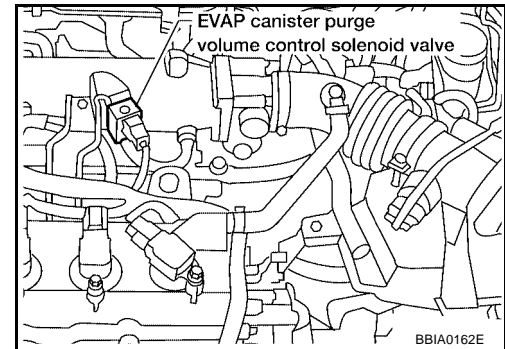
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS001XJ

### 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Turn ignition switch "ON".

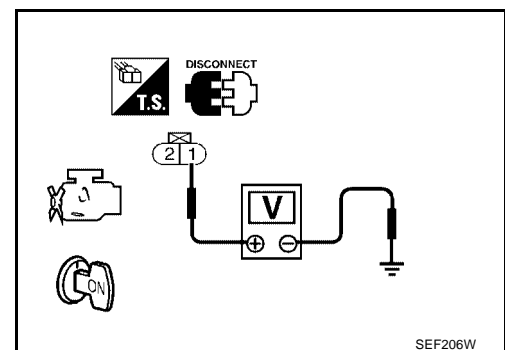


4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



## 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM relay.

>> Repair harness or connectors.

## 3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 45 and EVAP canister purge volume control solenoid valve terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK (With CONSULT-II)>>GO TO 4.

OK (Without CONSULT-II)>>GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

**With CONSULT-II**

1. Reconnect all harness connectors disconnected.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

OK >> GO TO 6.

NG >> GO TO 5.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
THRTL POS SEN	X.XX V

PBIB0721E

## 5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-872, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace EVAP canister purge volume control solenoid valve.

## 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

# DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QG18DE (SULEV)]

UBS006J

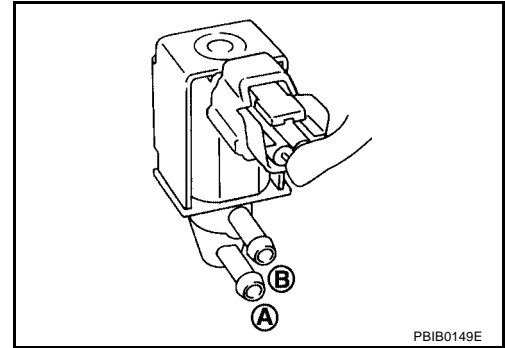
## Component Inspection

### EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

#### With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

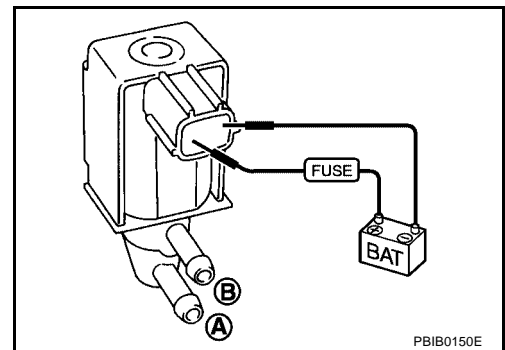
Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100.0%	Yes
0.0%	No



#### Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No



## Removal and Installation

### EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EM-12, "OUTER COMPONENT PARTS"](#).

UBS006K



# DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (SULEV)]

## DTC P0447 EVAP CANISTER VENT CONTROL VALVE

PF14935

### Component Description

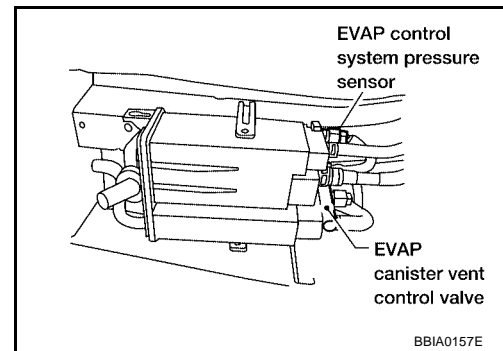
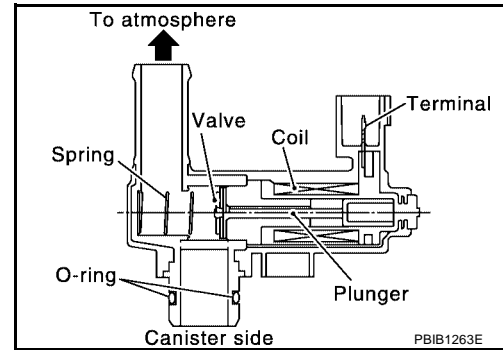
UBS001XK

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System" diagnoses.



### CONSULT-II Reference Value in Data Monitor Mode

UBS001XL

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

### On Board Diagnosis Logic

UBS001XM

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0447 0447	EVAP canister vent control valve circuit open	An improper voltage signal is sent to ECM through EVAP canister vent control valve.	<ul style="list-style-type: none"> <li>● Harness or connectors (The valve circuit is open or shorted.)</li> <li>● EVAP canister vent control valve</li> </ul>

### DTC Confirmation Procedure

UBS001XO

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

#### Ⓟ WITH CONSULT-II

1. Turn ignition switch "ON".

# DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (SULEV)]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait at least 8 seconds.
4. If 1st trip DTC is detected, go to [EC-876, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



## WITH GST

Follow the procedure "WITH CONSULT-II" above.

# DTC P0447 EVAP CANISTER VENT CONTROL VALVE

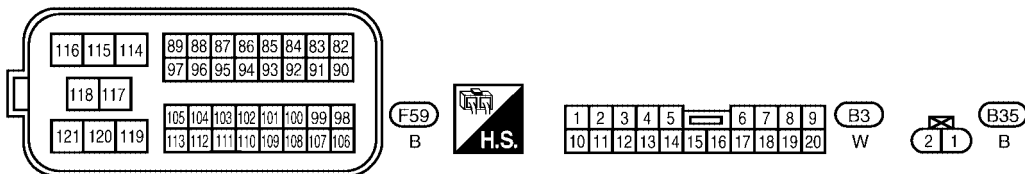
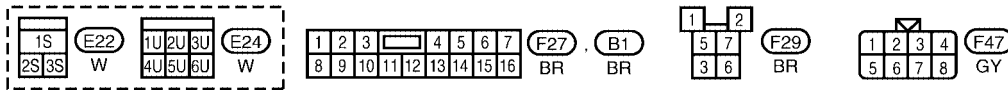
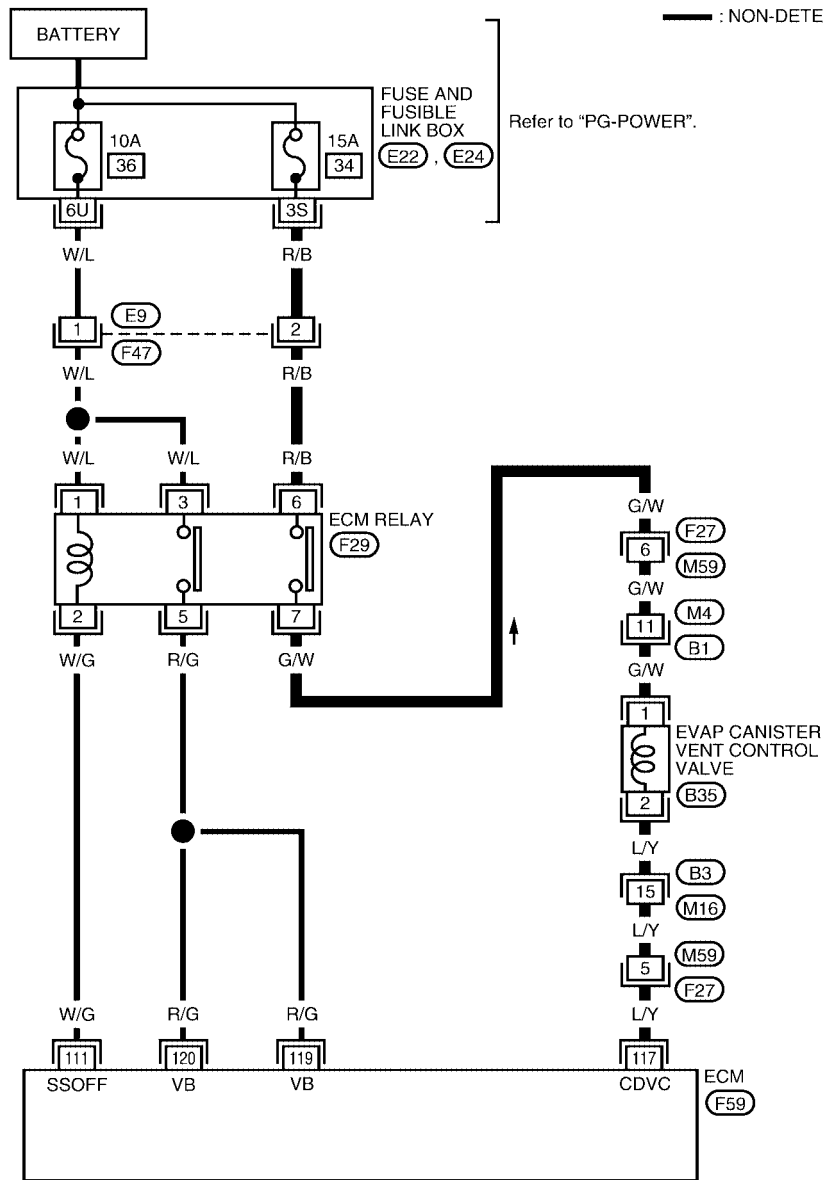
[QG18DE (SULEV)]

## Wiring Diagram

UBS001XP

EC-VENT/V-01

— : DETECTABLE LINE FOR DTC  
 - - - : NON-DETECTABLE LINE FOR DTC



BBWA0291E

# DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For 5 seconds after turning ignition switch "OFF"	0 - 1.5V
			[Ignition switch "OFF"] ● 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
117	L/Y	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
119 120	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS001XQ

### 1. INSPECTION START

1. Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

### 2. CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

Ⓢ With CONSULT-II

1. Turn ignition switch "OFF" and then turn "ON".
2. Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-II.
3. Touch "ON/OFF" on CONSULT-II screen.
4. Check for operating sound of the valve.  
**Clicking noise should be heard.**

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 3.

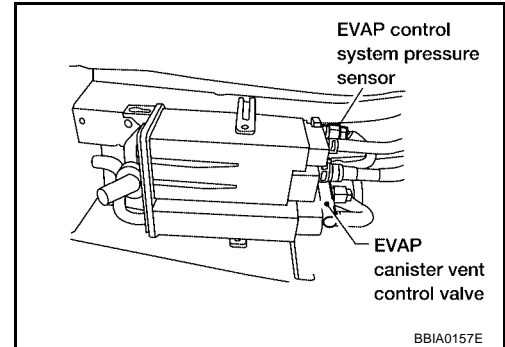
ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
THRTL POS SEN	X. XX V

PBIB0726E

# DTC P0447 EVAP CANISTER VENT CONTROL VALVE [QG18DE (SULEV)]

## 3. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect EVAP canister vent control valve harness connector.
3. Turn ignition switch "ON".

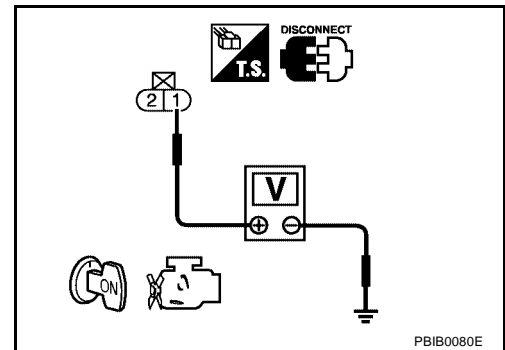


4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



## 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F27, M59
- Harness connectors B1, M4
- Harness for open or short between EVAP canister vent control valve and ECM relay

>> Repair harness or connectors.

## 5. CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 117 and EVAP canister vent control valve terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

# DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (SULEV)]

## 6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B3, M16
- Harness connectors M59, F27
- Harness for open or short between EVAP canister vent control valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

OK >> GO TO 8.

NG >> Clean the rubber tube using an air blower.

## 8. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-878, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace EVAP canister vent control valve.

## 9. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

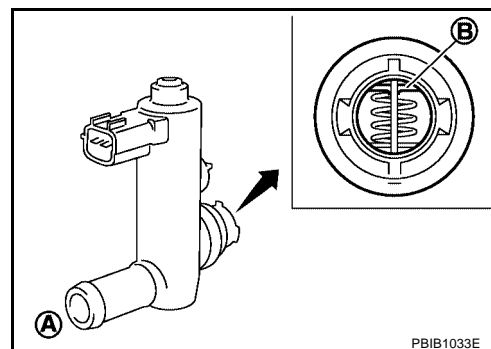
>> INSPECTION END

### Component Inspection EVAP CANISTER VENT CONTROL VALVE

UBS00613

#### Ⓟ With CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.  
If NG, replace EVAP canister vent control valve.  
If OK, go to next step.
3. Reconnect harness connectors disconnected.
4. Turn ignition switch "ON".



# DTC P0447 EVAP CANISTER VENT CONTROL VALVE [QG18DE (SULEV)]

5. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
6. Check air passage continuity and operation delay time.  
**Make sure new O-ring is installed properly.**

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

**Operation takes less than 1 second.**

If NG, replace EVAP canister vent control valve.  
If OK, go to next step.

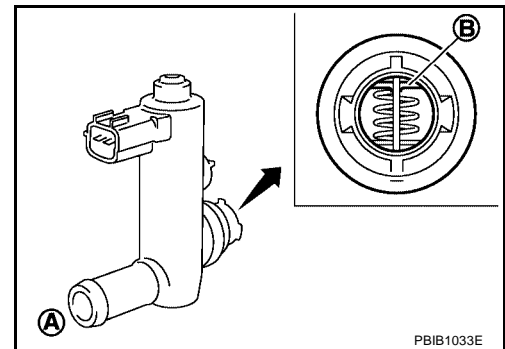
7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform step 6 again.

**⊗ Without CONSULT-II**

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
THRTL POS SEN	X.XX V

PBIB0721E



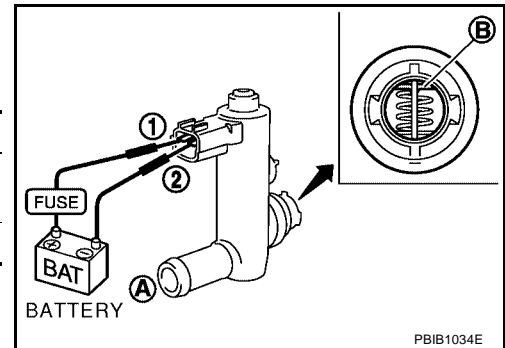
3. Check air passage continuity and operation delay time under the following conditions.  
**Make sure new O-ring is installed properly.**

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

**Operation takes less than 1 second.**

If NG, replace EVAP canister vent control valve.  
If OK, go to next step.

4. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
5. Perform step 3 again.



# DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (SULEV)]

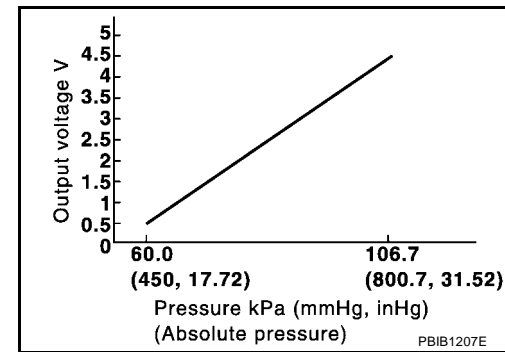
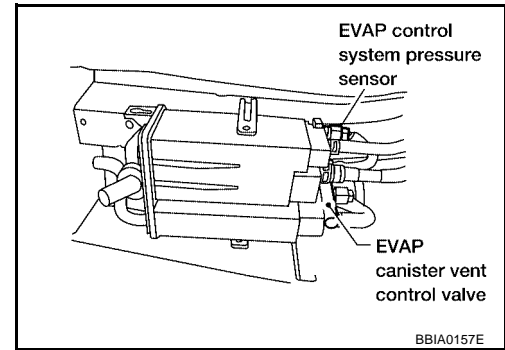
## DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

PF2:25085

### Component Description

UBS003NR

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.



### CONSULT-II Reference Value in Data Monitor Mode

UBS003NS

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 1.8 - 4.8V

### On Board Diagnosis Logic

UBS003NT

#### NOTE:

If DTC P0452 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-1028](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0452 0452	EVAP control system pressure sensor low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● EVAP control system pressure sensor</li> </ul>



# DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (SULEV)]

UBS003NV

## DTC Confirmation Procedure

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

Always perform test at a temperature of 0°C (32°F) or more.

### WITH CONSULT-II

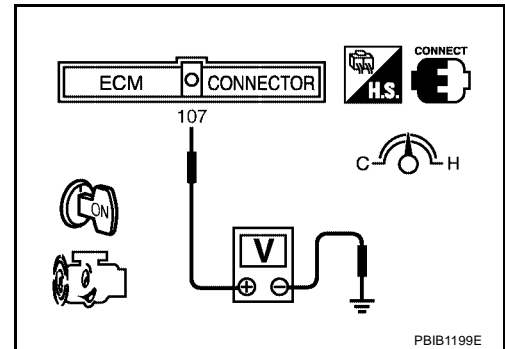
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
7. If 1st trip DTC is detected, go to [EC-883, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y

### WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 107 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and wait at least 20 seconds.
5. Select "MODE 7" with GST.
6. If 1st trip DTC is detected, go to [EC-883, "Diagnostic Procedure"](#)

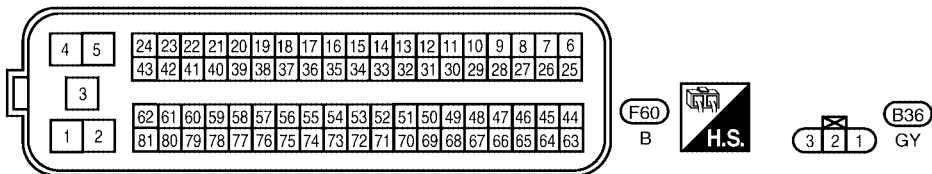
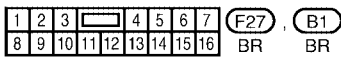
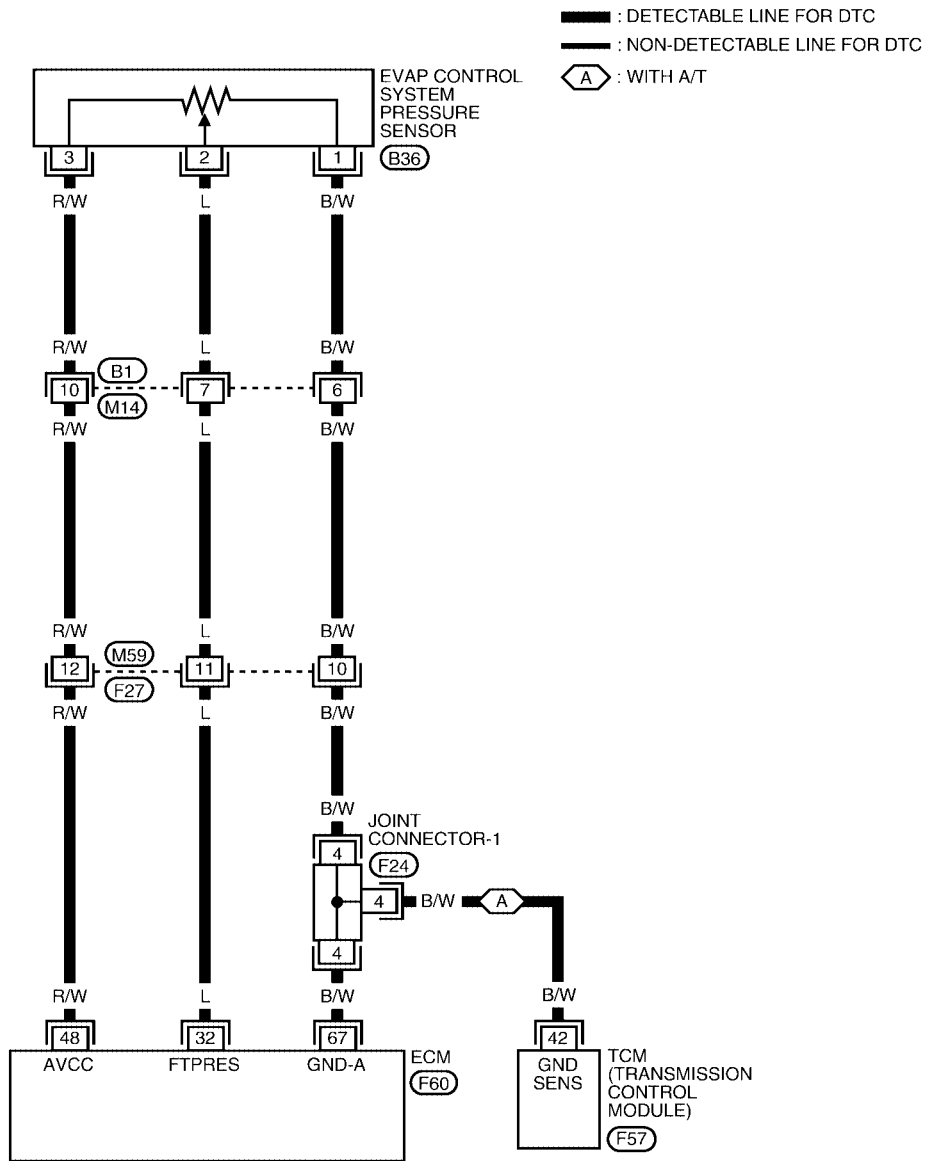


# DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (SULEV)]

UBS003NW

## Wiring Diagram

EC-PRE/SE-01



Refer to the following.

- F24 - JOINT CONNECTOR
- F57 - ELECTRICAL UNITS

BBWA0786E

# DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	L	EVAP control system pressure sensor	[Ignition switch "ON"]	Approximately 1.8 - 4.8V
48	L/W	Sensors' power supply	[Ignition switch "ON"]	Approximately 5V
67	B/W	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V

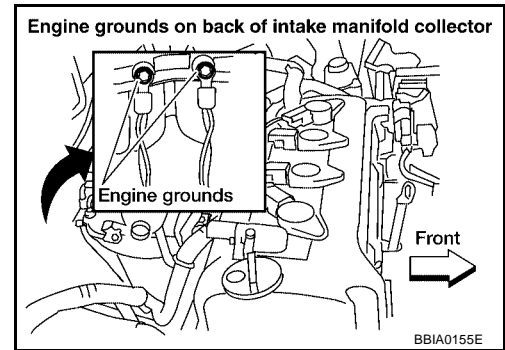
## Diagnostic Procedure

UBS003NX

### 1. RETIGHTEN GROUND SCREWS

Loosen and retighten engine ground screws.

>> GO TO 2.



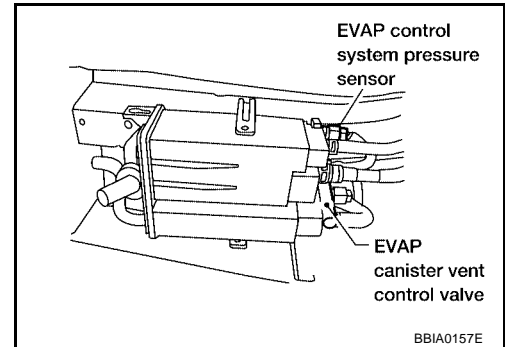
### 2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check sensor harness connector for water.

**Water should not exist.**

OK or NG

- OK >> GO TO 3.  
 NG >> Repair or replace harness connector.



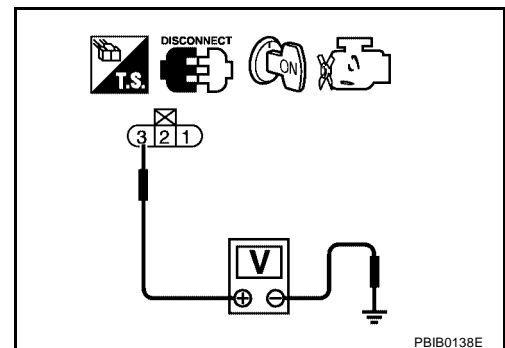
### 3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "ON".
2. Check voltage between EVAP control system pressure sensor terminal 3 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 5.  
 NG >> GO TO 4.



# DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (SULEV)]

---

## 4. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair harness or connectors.

## 5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Check harness continuity between EVAP control system pressure sensor terminal 1 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

## 6. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Joint connector-1
- Harness for open or short between EVAP control system pressure sensor and TCM
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 32 and EVAP control system pressure sensor terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 8.

# DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (SULEV)]

## 8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Harness for open or short between ECM and EVAP control system pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-885, "Component Inspection"](#) .

OK or NG

OK >> GO TO 10.

NG >> Replace EVAP control system pressure sensor.

## 10. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection EVAP CONTROL SYSTEM PRESSURE SENSOR

UBS00614

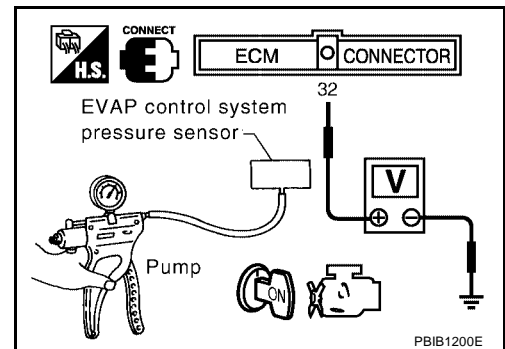
1. Remove EVAP control system pressure sensor with its harness connector connected.
2. Remove EVAP control system pressure sensor from EVAP canister.  
**Do not reuse the O-ring, replace it with a new one.**
3. Install a vacuum pump to EVAP control system pressure sensor.
4. Turn ignition switch "ON" and check output voltage between ECM terminal 32 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 to 2.5V lower than above value

**CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).

5. If NG, replace EVAP control system pressure sensor.



# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (SULEV)]

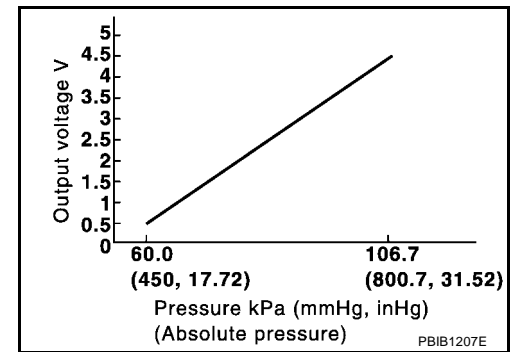
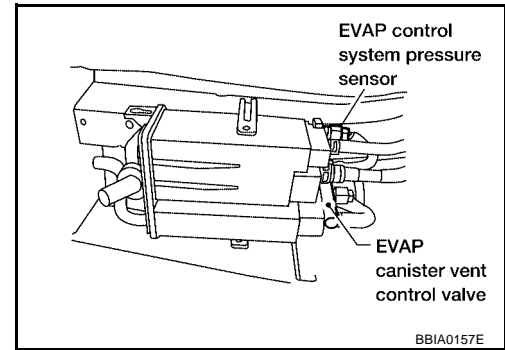
## DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

PF P:25085

### Component Description

UBS003NY

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.



### CONSULT-II Reference Value in Data Monitor Mode

UBS003NZ

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 1.8 - 4.8V

### On Board Diagnosis Logic

UBS00300

#### NOTE:

If DTC P0453 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-1028](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0453 0453	EVAP control system pressure sensor high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● EVAP control system pressure sensor</li> <li>● EVAP canister vent control valve</li> <li>● EVAP canister</li> <li>● Rubber hose to EVAP canister vent control valve</li> <li>● EVAP canister purge volume control solenoid valve</li> </ul>

# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (SULEV)]

UBS00302

## DTC Confirmation Procedure

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

Always perform test at a temperature of 0°C (32°F) or more.

### WITH CONSULT-II

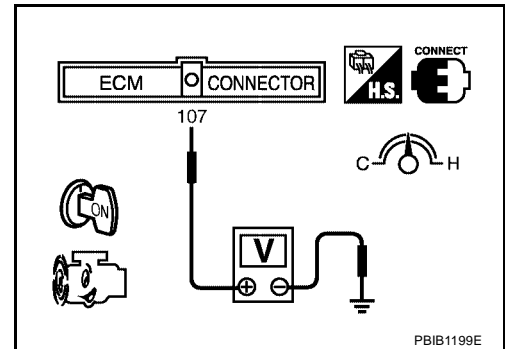
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
7. If 1st trip DTC is detected, go to [EC-889, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y

### WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 107 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and wait at least 20 seconds.
5. Select "MODE 7" with GST.
6. If 1st trip DTC is detected, go to [EC-889, "Diagnostic Procedure"](#)

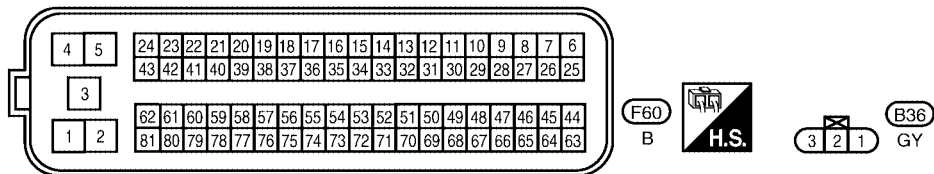
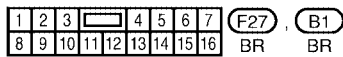
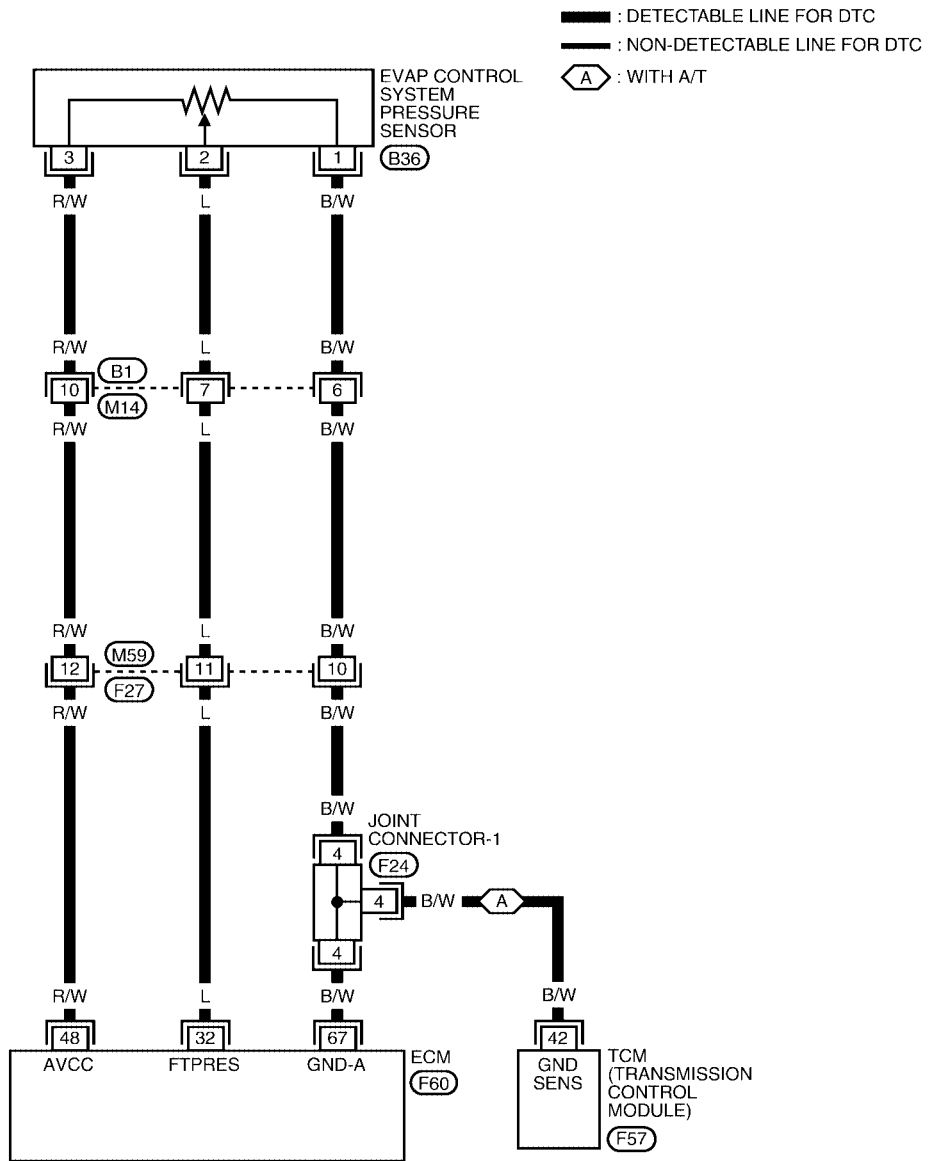


# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (SULEV)]

UBS00303

## Wiring Diagram

EC-PRE/SE-01



Refer to the following.

- F24 - JOINT CONNECTOR
- F57 - ELECTRICAL UNITS

BBWA0786E



# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	L	EVAP control system pressure sensor	[Ignition switch "ON"]	Approximately 1.8 - 4.8V
48	R/W	Sensors' power supply	[Ignition switch "ON"]	Approximately 5V
67	B/W	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V

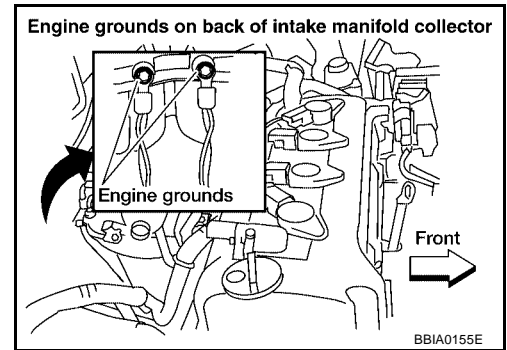
## Diagnostic Procedure

UBS00304

### 1. RETIGHTEN GROUND SCREWS

Loosen and retighten engine ground screws.

>> GO TO 2.



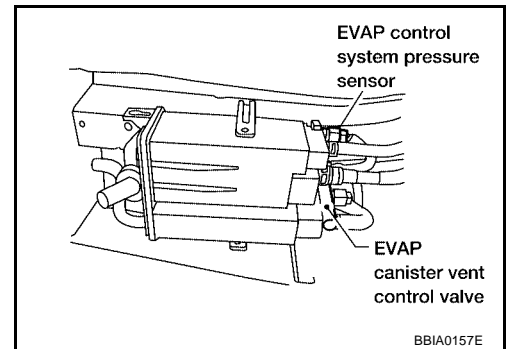
### 2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check sensor harness connector for water.

**Water should not exist.**

OK or NG

- OK >> GO TO 3.  
 NG >> Repair or replace harness connector.



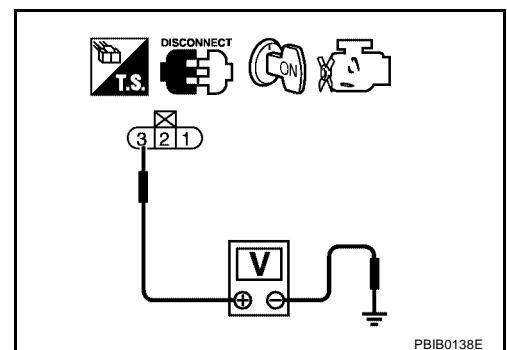
### 3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "ON".
2. Check voltage between EVAP control system pressure sensor terminal 3 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 5.  
 NG >> GO TO 4.



# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (SULEV)]

---

## 4. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair harness or connectors.

## 5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Check harness continuity between EVAP control system pressure sensor terminal 1 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

## 6. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Joint connector-1
- Harness for open or short between EVAP control system pressure sensor and TCM
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 32 and EVAP control system pressure sensor terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 8.

# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (SULEV)]

## 8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Harness for open or short between ECM and EVAP control system pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 9. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

OK >> GO TO 10.

NG >> Clean the rubber tube using an air blower.

## 10. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-878, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> Replace EVAP canister vent control valve.

## 11. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-892, "Component Inspection"](#) .

OK or NG

OK >> GO TO 12.

NG >> Replace EVAP control system pressure sensor.

## 12. CHECK RUBBER TUBE

Check obstructed rubber tube connected to EVAP canister vent control valve.

OK or NG

OK >> GO TO 13.

NG >> Clean rubber tube using an air blower, repair or replace rubber tube.

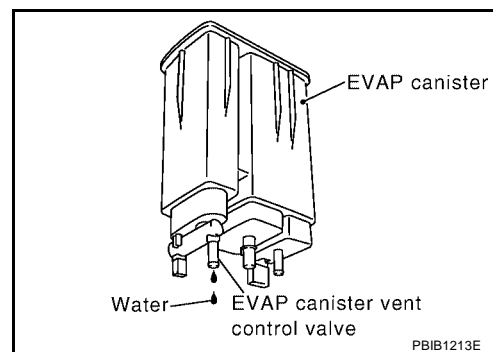
## 13. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Check if water will drain from the EVAP canister.

Yes or No

Yes >> GO TO 14.

No >> GO TO 16.



# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR [QG18DE (SULEV)]

## 14. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

**The weight should be less than 1.9 kg (4.2 lb).**

OK or NG

OK >> GO TO 16.

NG >> GO TO 15.

## 15. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose connected to EVAP canister for clogging or poor connection

>> Repair hose or replace EVAP canister.

## 16. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

## Component Inspection EVAP CONTROL PRESSURE SENSOR

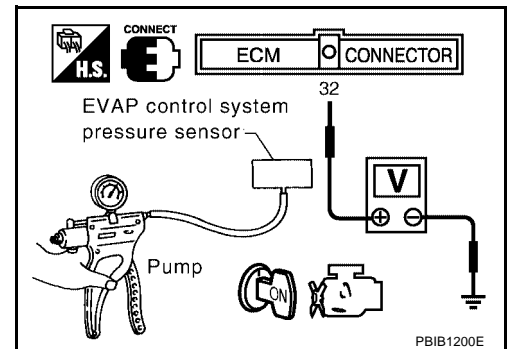
UBS00615

1. Remove EVAP control system pressure sensor with its harness connector connected.
2. Remove EVAP control system pressure sensor from EVAP canister.  
**Do not reuse the O-ring, replace it with a new one.**
3. Install a vacuum pump to EVAP control system pressure sensor.
4. Turn ignition switch "ON" and check output voltage between ECM terminal 32 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 to 2.5V lower than above value

### CAUTION:

- Always calibrate the vacuum pump gauge when using it.
  - Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).
5. If NG, replace EVAP control system pressure sensor.



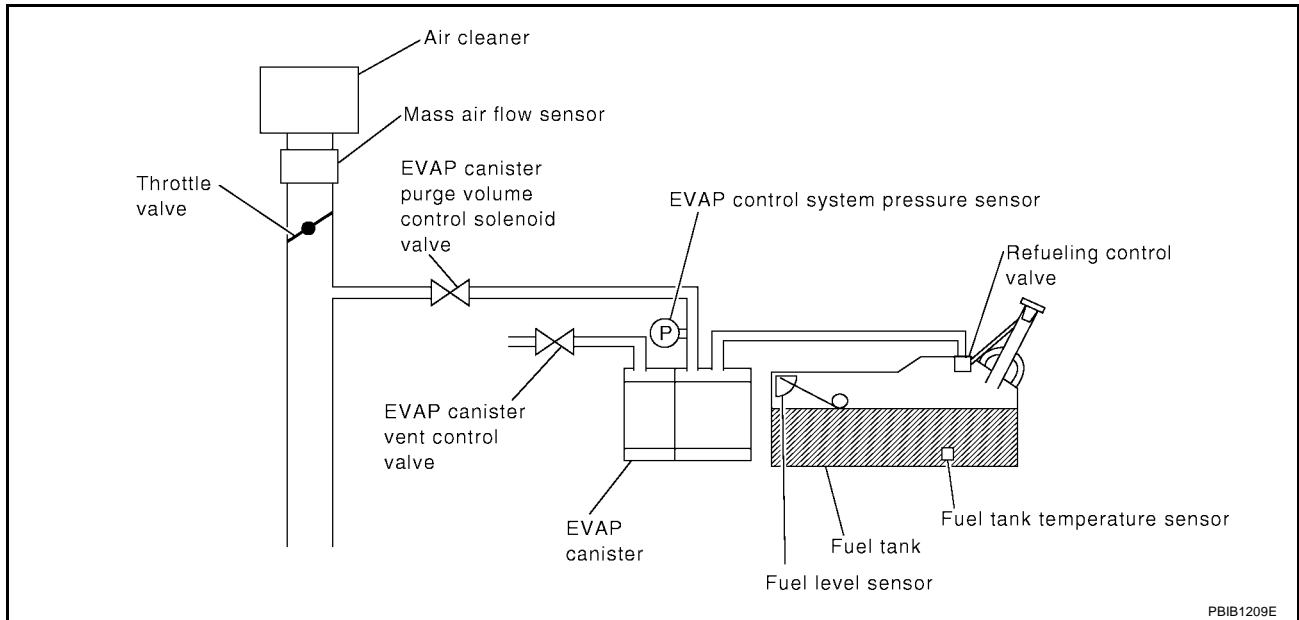
DTC P0455 EVAP CONTROL SYSTEM

PF14950

On Board Diagnosis Logic

UBS001XY

This diagnosis detects a very large leak (fuel filler cap fell off etc.) in EVAP system between the fuel tank and EVAP canister purge volume control solenoid valve.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0455 0455	EVAP control system gross leak detected	EVAP control system has a very large leak such as fuel filler cap fell off, EVAP control system does not operate properly.	<ul style="list-style-type: none"> <li>● Fuel filler cap remains open or fails to close.</li> <li>● Incorrect fuel tank vacuum relief valve</li> <li>● Incorrect fuel filler cap used</li> <li>● Foreign matter caught in fuel filler cap.</li> <li>● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>● Foreign matter caught in EVAP canister vent control valve.</li> <li>● EVAP canister or fuel tank leaks</li> <li>● EVAP purge line (pipe and rubber tube) leaks</li> <li>● EVAP purge line rubber tube bent.</li> <li>● Loose or disconnected rubber tube</li> <li>● EVAP canister vent control valve and the circuit</li> <li>● EVAP canister purge volume control solenoid valve and the circuit</li> <li>● Fuel tank temperature sensor</li> <li>● O-ring of EVAP canister vent control valve is missing or damaged.</li> <li>● EVAP control system pressure sensor</li> <li>● Refueling EVAP vapor cut valve</li> <li>● ORVR system leaks</li> </ul>

## DTC Confirmation Procedure

**CAUTION:**

Never remove fuel filler cap during the DTC Confirmation Procedure.

**NOTE:**

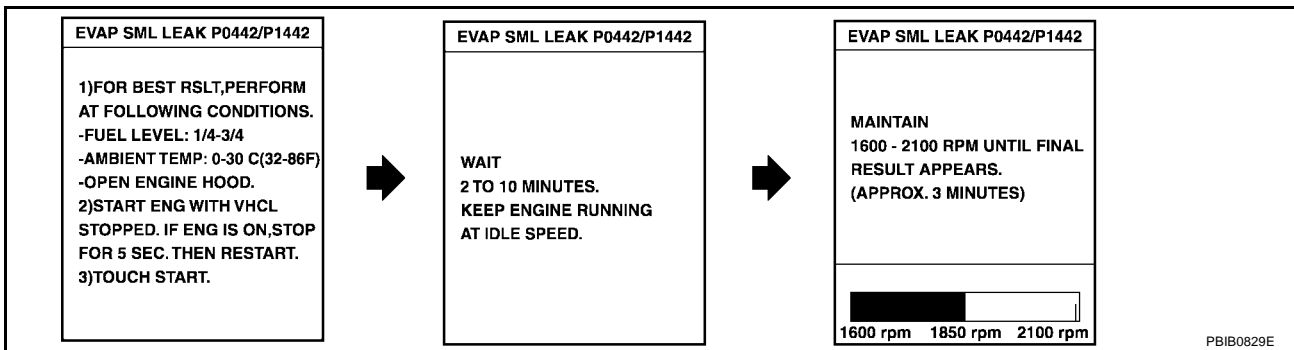
- Make sure that EVAP hose are connected to EVAP canister purge volume control solenoid valve properly.
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Open engine hood before conducting the following procedure.

**WITH CONSULT-II**

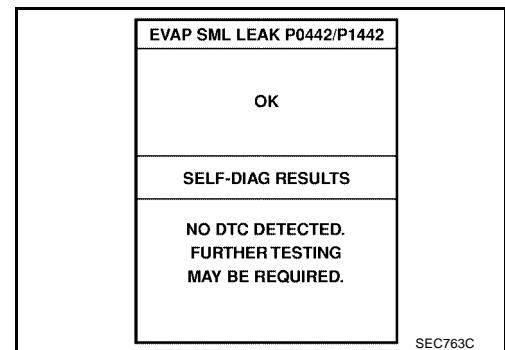
1. Tighten fuel filler cap securely until ratcheting sound is heard.
2. Turn ignition switch "ON".
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that the following conditions are met.  
**COOLANT TEMP/S: 0 - 70°C (32 - 158°F)**  
**INT/A TEMP SE: 0 - 60°C (32 - 140°F)**
6. Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.  
 Follow the instruction displayed.



**NOTE:**

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to [EC-669, "Basic Inspection"](#).

7. Make sure that "OK" is displayed.  
 If "NG" is displayed, select "SELF-DIAG RESULTS" mode with CONSULT-II and make sure that "EVAP GROSS LEAK [P0455]" is displayed. If it is displayed, refer to [EC-895, "Diagnostic Procedure"](#).  
 If P0442 is displayed, perform "Diagnostic Procedure" for DTC P0442, [EC-860](#).



**WITH GST**

**NOTE:**

Be sure to read the explanation of "Driving Pattern" on [EC-649](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to "Driving Pattern", [EC-649](#) .
3. Stop vehicle.
4. Select "MODE 1" with GST.
  - If SRT of EVAP system is not set yet, go to the following step.
  - If SRT of EVAP system is set, the result will be OK.
5. Turn ignition switch "OFF" and wait at least 10 seconds.
6. Start engine.
 

**It is not necessary to cool engine down before driving.**
7. Drive vehicle again according to the "Driving Pattern", [EC-649](#) .
8. Stop vehicle.
9. Select "MODE 3" with GST.
  - If P0455 is displayed on the screen, go to [EC-895, "Diagnostic Procedure"](#) .
  - If P0442 is displayed on the screen, go to "Diagnostic Procedure", for DTC P0442, [EC-860](#) .
  - If P0441 is displayed on the screen, go to "Diagnostic Procedure" for DTC P0441, [EC-854](#) .
  - If P0441, P0442 and P0455 are not displayed on the screen, go to the following step.
10. Select "MODE 1" with GST.
  - If SRT of EVAP system is set, the result will be OK.
  - If SRT of EVAP system is not set, go to step 6.

## Diagnostic Procedure

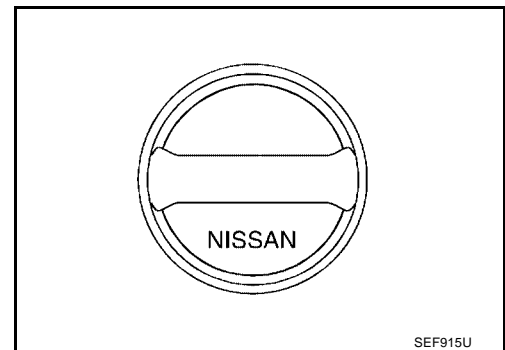
UBS001Y1

### 1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch "OFF".
2. Check for genuine NISSAN fuel filler cap design.

#### OK or NG

- OK >> GO TO 2.  
 NG >> Replace with genuine NISSAN fuel filler cap.



### 2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

#### OK or NG

- OK >> GO TO 3.  
 NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.  
 2. Retighten until ratcheting sound is heard.

### 3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

#### OK or NG

- OK >> GO TO 5.  
 NG >> GO TO 4.

#### 4. CHECK FUEL TANK VACUUM RELIEF VALVE

1. Wipe clean valve housing.
2. Check valve opening pressure and vacuum.

**Pressure:**

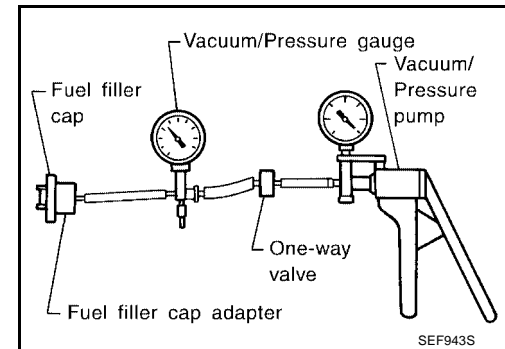
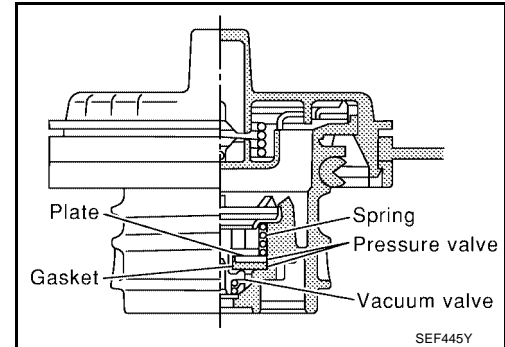
**15.3 - 20.0 kPa**

**(0.156 - 0.204 kg/cm<sup>2</sup> , 2.22 - 2.90 psi)**

**Vacuum:**

**-6.0 to -3.4 kPa**

**(-0.061 to -0.035 kg/cm<sup>2</sup> , -0.87 to -0.48 psi)**



**CAUTION:**

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.

OK or NG

- OK >> GO TO 5.
- NG >> Replace fuel filler cap with a genuine one.

#### 5. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks, improper connection or disconnection.

Refer to [EC-1205, "EVAPORATIVE EMISSION SYSTEM"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Repair or reconnect the hose.

#### 6. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 7.

#### 7. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control is installed properly.  
Refer to [EC-1209, "Removal and Installation"](#)
- EVAP canister vent control valve.  
Refer to [EC-878, "Component Inspection"](#)

OK or NG

- OK >> GO TO 8.
- NG >> Repair or replace EVAP canister vent control valve and O-ring.

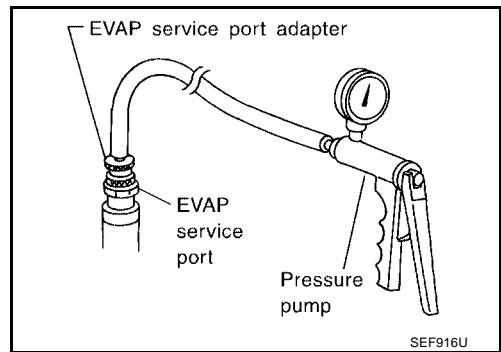
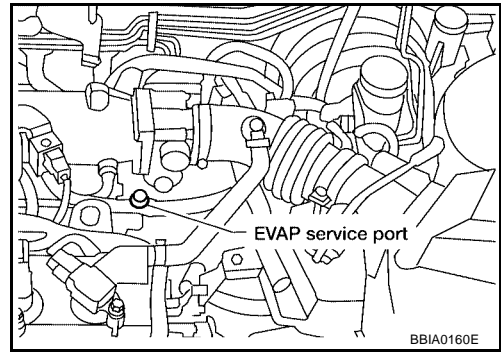


**8. INSTALL THE PRESSURE PUMP**

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.

**NOTE:**

**Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.**



Models with CONSULT-II >> GO TO 9.  
Models without CONSULT-II >> GO TO 10.

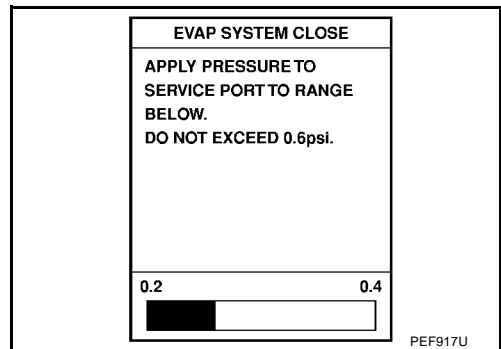
**9. CHECK FOR EVAP LEAK**

**With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

**NOTE:**

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi) of pressure in the system.

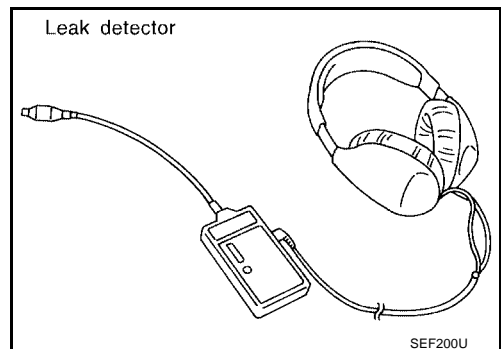


4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details.

Refer to [EC-1206, "EVAPORATIVE EMISSION LINE DRAWING"](#).

OK or NG

- OK >> GO TO 11.
- NG >> Repair or replace.



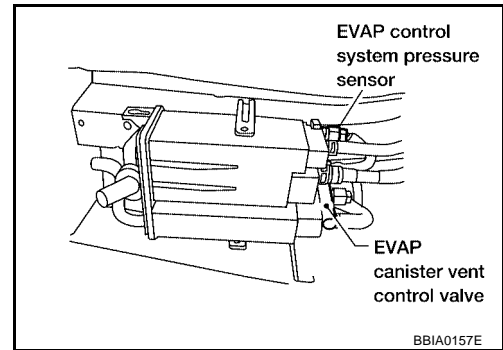
**10. CHECK FOR EVAP LEAK**

⊗ **Without CONSULT-II**

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

**NOTE:**

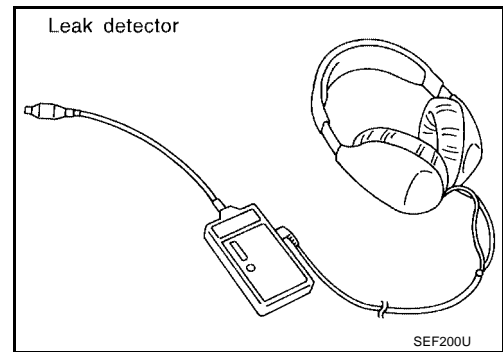
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1206, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

- OK >> GO TO 12.  
 NG >> Repair or replace.



**11. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION**

Ⓟ **With CONSULT-II**

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

**Vacuum should exist.**

OK or NG

- OK >> GO TO 14.  
 NG >> GO TO 13.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
THRTL POS SEN	X. XX V

P8IB0726E

**12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION**

⊗ **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

**Vacuum should exist.**

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 13.

**13. CHECK VACUUM HOSE**

Check vacuum hoses for clogging or disconnection. Refer to [EC-1206, "EVAPORATIVE EMISSION LINE DRAWING"](#).

OK or NG

- OK (With CONSULT-II)>>GO TO 14.
- OK (Without CONSULT-II)>>GO TO 15.
- NG >> Repair or reconnect the hose.

**14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

Ⓟ **With CONSULT-II**

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 15.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
THRTL POS SEN	X. XX V

PBIB0721E

**15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

Refer to [EC-872, "Component Inspection"](#).

OK or NG

- OK >> GO TO 16.
- NG >> Replace EVAP canister purge volume control solenoid valve.

**16. CHECK FUEL TANK TEMPERATURE SENSOR**

Refer to [EC-813, "Component Inspection"](#).

OK or NG

- OK >> GO TO 17.
- NG >> Replace fuel level sensor unit.

---

## 17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

---

Refer to [EC-885, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 18.
- NG >> Replace EVAP control system pressure sensor.

---

## 18. CHECK EVAP/ORVR VAPOR LINE

---

Check refueling EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-1212, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#) .

OK or NG

- OK >> GO TO 19.
- >> Repair or replace hoses and tubes.

---

## 19. CHECK SIGNAL LINE AND RECIRCULATION LINE

---

Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

- OK >> GO TO 20.
- >> Repair or replace hoses, tubes or filler neck tube.

---

## 20. CHECK REFUELING EVAP VAPOR CUT VALVE

---

Refer to [EC-1215, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 21.
- >> Replace refueling EVAP vapor cut valve with fuel tank.

---

## 21. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

DTC P0456 EVAP CONTROL SYSTEM

PF1:14950

On Board Diagnosis Logic

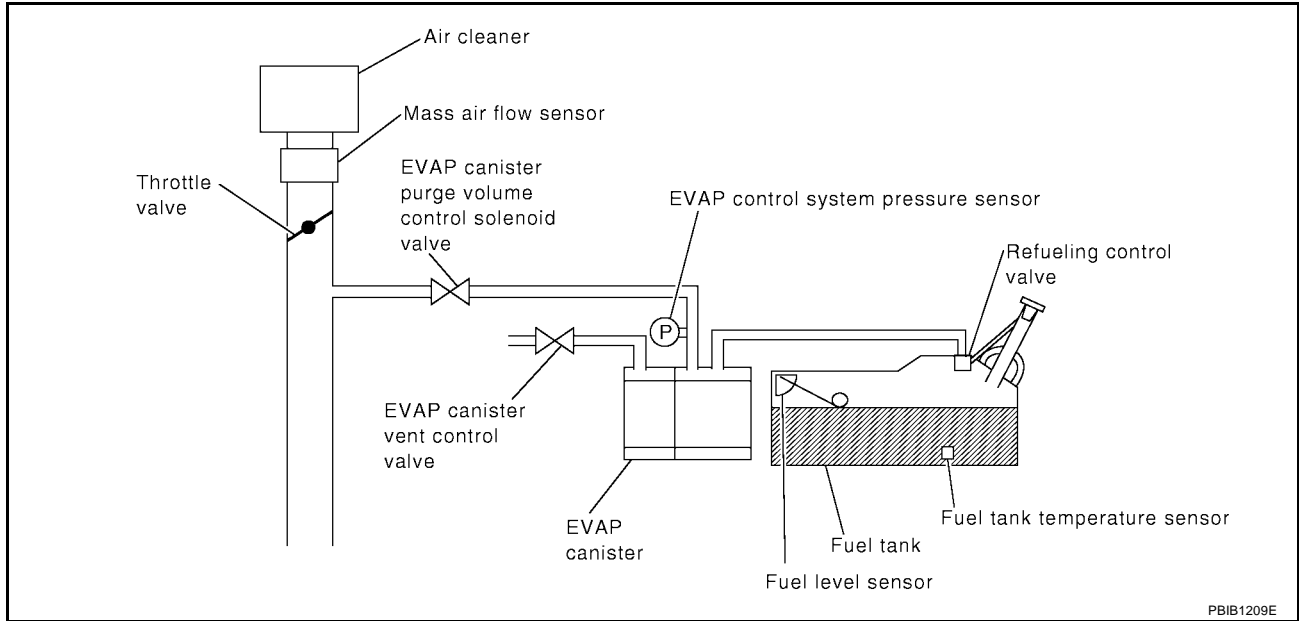
UBS0068W

This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the intake manifold vacuum in the same way as conventional EVAP small leak diagnosis.

If ECM judges a leak which corresponds to a very small leak, the very small leak P0456 will be detected.

If ECM judges a leak equivalent to a small leak, EVAP small leak P0442 will be detected.

If ECM judges there are no leaks, the diagnosis will be OK.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0456 0456	Evaporative emission control system very small leak (negative pressure check)	<ul style="list-style-type: none"> <li>● EVAP system has a very small leak.</li> <li>● EVAP system does not operate properly.</li> </ul>	<ul style="list-style-type: none"> <li>● Incorrect fuel tank vacuum relief valve</li> <li>● Incorrect fuel filler cap used</li> <li>● Fuel filler cap remains open or fails to close.</li> <li>● Foreign matter caught in fuel filler cap.</li> <li>● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>● Foreign matter caught in EVAP canister vent control valve.</li> <li>● EVAP canister or fuel tank leaks</li> <li>● EVAP purge line (pipe and rubber tube) leaks</li> <li>● EVAP purge line rubber tube bent</li> <li>● Loose or disconnected rubber tube</li> <li>● EVAP canister vent control valve and the circuit</li> <li>● EVAP canister purge volume control solenoid valve and the circuit</li> <li>● Fuel tank temperature sensor</li> <li>● O-ring of EVAP canister vent control valve is missing or damaged</li> <li>● EVAP canister is saturated with water</li> <li>● EVAP control system pressure sensor</li> <li>● Refueling EVAP vapor cut valve</li> <li>● ORVR system leaks</li> <li>● Fuel level sensor and the circuit</li> <li>● Foreign matter caught in EVAP canister purge volume control solenoid valve</li> </ul>

**CAUTION:**

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

## DTC Confirmation Procedure

UBS0068X

**NOTE:**

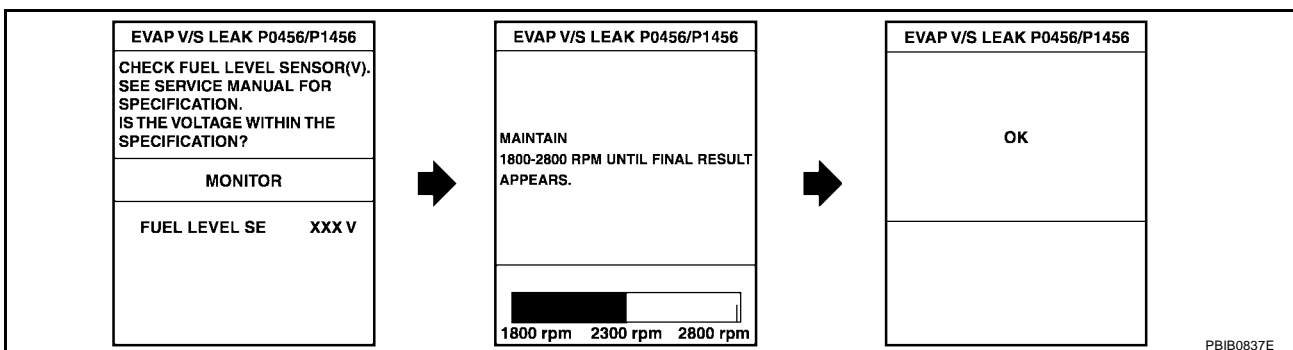
- If DTC P0456 is displayed with P0442, perform first trouble diagnosis for DTC P0456.
- After repair, make sure that the hoses and clips are installed properly.
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- Open engine hood before conducting following procedure.
- If any of following conditions are met just before the DTC confirmation procedure, leave the vehicle for more than 1 hour.
  - Fuel filler cap is removed.
  - Refilled or drained the fuel.
  - EVAP component parts is/are removed.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Make sure the following conditions are met.  
**FUEL LEVEL SE: 0.25 - 1.4V**  
**COOLAN TEMP/S: 0 - 32°C (32 - 90°F)**  
**FUEL T/TMP SE: 0 - 35°C (32 - 95°F)**  
**INT A/TEMP SE: More than 0°C (32°F)**  
 If NG, turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle) or refilling/draining fuel until the output voltage condition of the "FUEL LEVEL SE" meets within the range above and leave the vehicle for more than 1 hour. Then start from step 1).
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Turn ignition switch "ON".
5. Select "EVAP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.  
 Follow the instruction displayed.



6. Make sure that "OK" is displayed.  
 If "NG" is displayed, refer to [EC-904, "Diagnostic Procedure"](#).

**NOTE:**

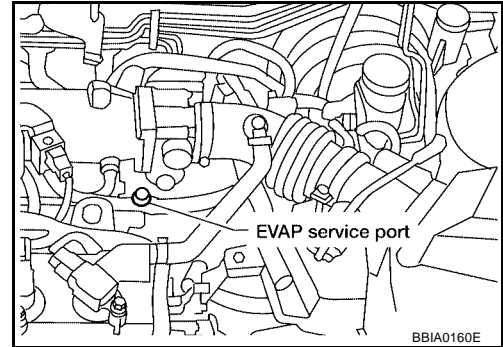
- If the engine speed cannot be maintained within the range displayed on CONSULT-II screen, go to [EC-669, "Basic Inspection"](#).
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

**Overall Function Check****WITH GST**

Use this procedure to check the overall function of the EVAP very small leak function. During this check, a DTC might not be confirmed.

**CAUTION:**

- Never use compressed air, doing so may damage the EVAP system.
  - Do not start engine.
  - Do not exceeded 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi).
1. Attach the EVAP service port adapter securely to the EVAP service port.



2. Set the pressure pump and a hose.
3. Also set a vacuum gauge via 3-way connector and a hose.
4. Turn ignition switch "ON".
5. Connect GST and select mode 8.
6. Using mode 8 control the EVAP canister vent control valve (close).
7. Apply pressure and make sure the following conditions are satisfied.

**Pressure to be applied: 2.7 kPa (20 mmHg, 0.79 inHg)**

**Time to be waited after the pressure drawn in to the EVAP system and the pressure to be dropped: 60 seconds and the pressure should not be dropped more than 0.4 kPa (3 mmHg, 0.12 inHg).**

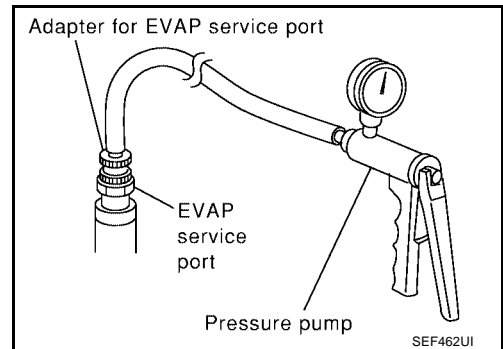
If NG, go to [EC-904, "Diagnostic Procedure"](#) .

If OK, go to next step.

8. Disconnect GST.
9. Start engine and warm it up to normal operating temperature.
10. Turn ignition switch "OFF" and wait at least 10 seconds.
11. Restart engine and let it idle for 90 seconds.
12. Keep engine speed at 2,000 rpm for 30 seconds.
13. Turn ignition switch "OFF".

**NOTE:**

**For more information, refer to GST instruction manual.**

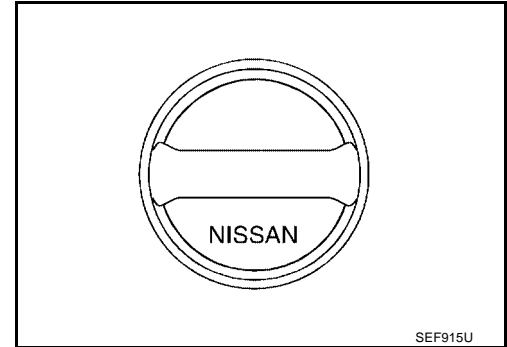


**Diagnostic Procedure****1. CHECK FUEL FILLER CAP DESIGN**

1. Turn ignition switch "OFF".
2. Check for genuine NISSAN fuel filler cap design.

**OK or NG**

- OK >> GO TO 2.  
NG >> Replace with genuine NISSAN fuel filler cap.

**2. CHECK FUEL FILLER CAP INSTALLATION**

Check that the cap is tightened properly by rotating the cap clockwise.

**OK or NG**

- OK >> GO TO 3.  
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.  
2. Retighten until ratcheting sound is heard.

**3. CHECK FUEL FILLER CAP FUNCTION**

Check for air releasing sound while opening the fuel filler cap.

**OK or NG**

- OK >> GO TO 5.  
NG >> GO TO 4.

**4. CHECK FUEL TANK VACUUM RELIEF VALVE**

Refer to [EC-1208, "FUEL TANK VACUUM RELIEF VALVE \(BUILT INTO FUEL FILLER CAP\)"](#).

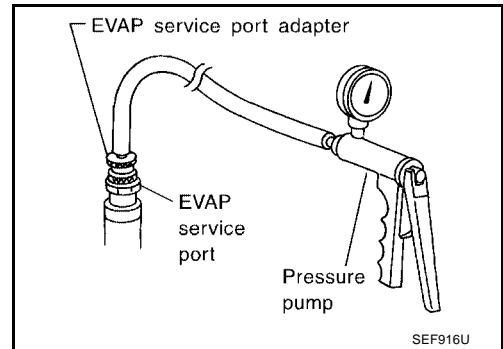
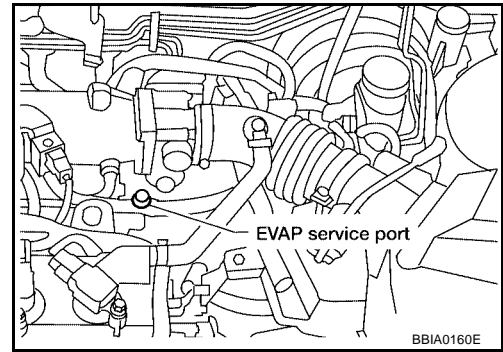
**OK or NG**

- OK >> GO TO 5.  
NG >> Replace fuel filler cap with a genuine one.



## 5. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.



**NOTE:**

**Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.**

Models with CONSULT-II>>GO TO 6.

Models without CONSULT-II>>GO TO 7.

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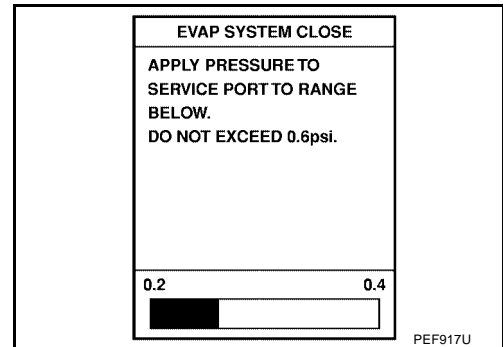
**6. CHECK FOR EVAP LEAK**

**With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

**NOTE:**

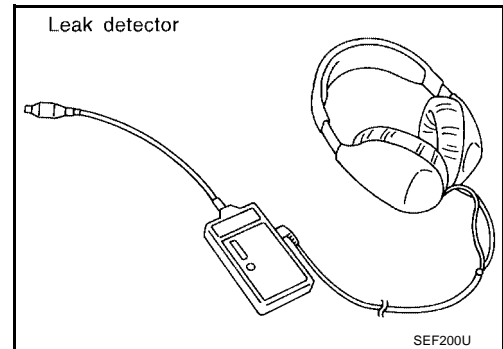
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1206, "EVAPORATIVE EMISSION LINE DRAWING"](#).

**OK or NG**

- OK >> GO TO 8.
- NG >> Repair or replace.



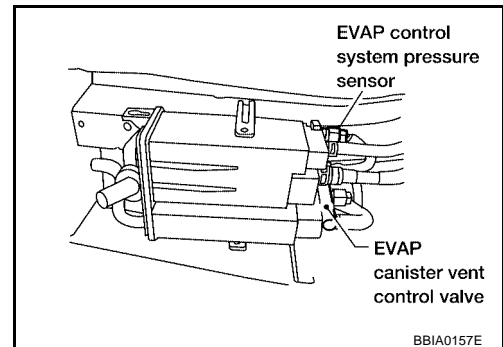
**7. CHECK FOR EVAP LEAK**

**Without CONSULT-II**

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

**NOTE:**

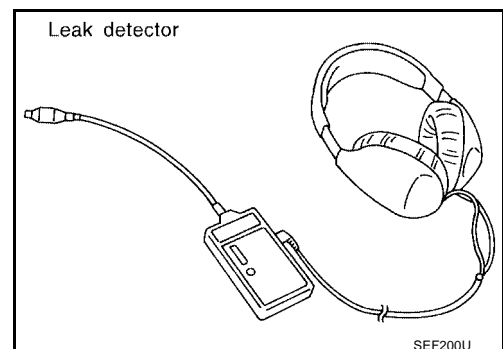
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1206, "EVAPORATIVE EMISSION LINE DRAWING"](#).

**OK or NG**

- OK >> GO TO 8.
- NG >> Repair or replace.



**8. CHECK EVAP CANISTER VENT CONTROL VALVE**

Check the following.

- EVAP canister vent control valve is installed properly. Refer to [EC-1209, "Removal and Installation"](#)
- EVAP canister vent control valve (Refer to [EC-878, "Component Inspection"](#))

OK or NG

OK >> GO TO 9.

NG >> Repair or replace EVAP canister vent control valve and O-ring.

**9. CHECK IF EVAP CANISTER SATURATED WITH WATER**

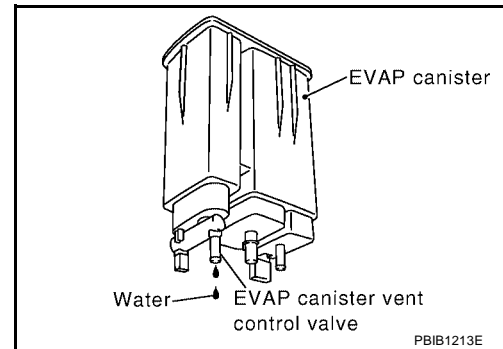
1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 10.

No (With CONSULT-II)>>GO TO 12.

No (Without CONSULT-II)>>GO TO 13.

**10. CHECK EVAP CANISTER**

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

**The weight should be less than 1.9 kg (4.2 lb).**

OK or NG

OK (With CONSULT-II)>>GO TO 12.

OK (Without CONSULT-II)>>GO TO 13.

NG >> GO TO 11.

**11. DETECT MALFUNCTIONING PART**

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

## 12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

**With CONSULT-II**

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
THRTL POS SEN	X. XX V

PBIB0721E

OK or NG

- OK >> GO TO 15.  
 NG >> GO TO 14.

## 13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

**Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

**Vacuum should exist.**

OK or NG

- OK >> GO TO 16.  
 NG >> GO TO 14.

## 14. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-615, "Vacuum Hose Drawing"](#) .

OK or NG

- OK >> GO TO 15.  
 NG >> Repair or reconnect the hose.

## 15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-872, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 16.  
 NG >> Replace EVAP canister purge volume control solenoid valve.

## 16. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to [EC-813, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 17.  
 NG >> Replace fuel level sensor unit.

**17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR**

Refer to [EC-885, "Component Inspection"](#) .

OK or NG

OK >> GO TO 18.

NG >> Replace EVAP control system pressure sensor.

**18. CHECK EVAP PURGE LINE**

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection.

Refer to [EC-1206, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

OK >> GO TO 19.

NG >> Repair or reconnect the hose.

**19. CLEAN EVAP PURGE LINE**

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 20.

**20. CHECK EVAP/ORVR LINE**

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-1212, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#) .

OK or NG

OK >> GO TO 22.

NG >> Repair or replace hoses and tubes.

**21. CHECK SIGNAL LINE AND RECIRCULATION LINE**

Check signal line recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 22.

NG >> Repair or replace hose, tube or filler neck tube.

**22. CHECK REFUELING EVAP VAPOR CUT VALVE**

Refer to [EC-1215, "Component Inspection"](#) .

OK or NG

OK >> GO TO 23.

NG >> Replace refueling EVAP vapor cut valve with fuel tank.

**23. CHECK FUEL LEVEL SENSOR**

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

OK or NG

OK >> GO TO 24.

NG >> Replace fuel level sensor unit.

**24. CHECK INTERMITTENT INCIDENT**

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

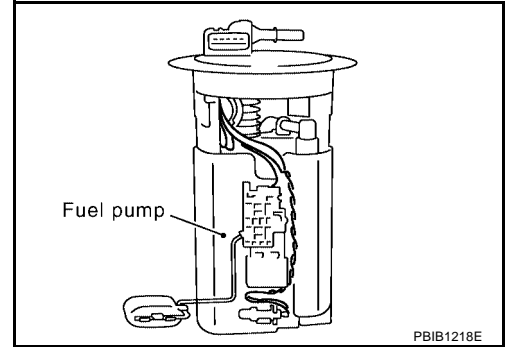
>> **INSPECTION END**

**DTC P0460 FUEL LEVEL SENSOR**

**Component Description**

UBS001Y2

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM through CAN communication line. It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



**On Board Diagnostic Logic**

UBS001Y3

**NOTE:**

If DTC P0460 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to “DTC U1000, U1001 CAN COMMUNICATION LINE”, [EC-728](#).

When the vehicle is parked, naturally the fuel level in the fuel tank is stable. It means that output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0460 0460	Fuel level sensor circuit noise	Even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Fuel level sensor</li> </ul>

**DTC Confirmation Procedure**

UBS001Y5

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch “ON”.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and wait maximum of 2 consecutive minutes.
4. If 1st trip DTC is detected, go to [EC-911, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

**WITH GST**

Follow the procedure “WITH CONSULT-II” above.

**Diagnostic Procedure****1. CHECK FUEL GAUGE OPERATION**Refer to [FL-3](#) .

OK or NG

OK &gt;&gt; GO TO 2.

NG >> Follow the instruction of "METER AND GAUGES". Refer to [DI-3](#) .**2. CHECK FUEL LEVEL SENSOR AND CIRUIT**Refer to [FL-3](#) .

OK or NG

OK &gt;&gt; GO TO 3.

NG &gt;&gt; Repair or replace malfunctioning parts.

**3. CHECK INTERMITTENT INCIDENT**Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

&gt;&gt; INSPECTION END

**Removal and Installation  
FUEL LEVEL SENSOR**Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

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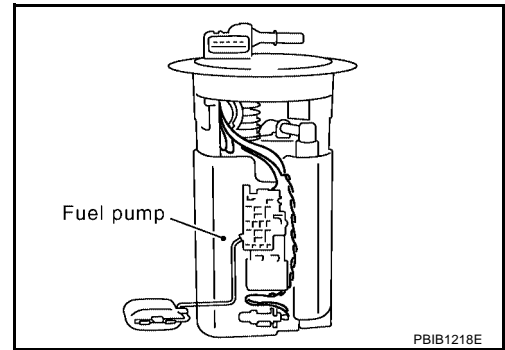
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## DTC P0461 FUEL LEVEL SENSOR

UBS001Y8

### Component Description

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM through CAN communication line. It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



UBS001Y9

### On Board Diagnostic Logic

#### NOTE:

If DTC P0461 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to "DTC U1000, U1001 CAN COMMUNICATION LINE", [EC-728](#).

Driving long distances naturally affect fuel gauge level.

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0461 0461	Fuel level sensor circuit range/performance	The output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Fuel level sensor</li> </ul>

### Overall Function Check

UBS001YB

Use this procedure to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed.

#### WARNING:

When performing following procedure, be sure to observe the handling of the fuel. Refer to [FL-2, "FUEL SYSTEM"](#).

#### TESTING CONDITION:

Before starting overall function check, preparation of draining fuel and refilling fuel is required.

#### WITH CONSULT-II

#### NOTE:

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line, refer to [EC-637, "FUEL PRESSURE RELEASE"](#).
3. Remove the fuel feed hose on the fuel level sensor unit.
4. Connect a spare fuel hose where the fuel feed hose was removed.
5. Turn ignition switch "OFF" and wait at least 10 seconds then turn "ON".
6. Select "FUEL LEVEL SE" in "DATA MONITOR" mode with CONSULT-II.
7. Check "FUEL LEVEL SE" output voltage and note it.
8. Select "FUEL PUMP" in "ACTIVE TEST" mode with CONSULT-II.
9. Touch "ON" and drain fuel approximately 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it.
10. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
11. Check "FUEL LEVEL SE" output voltage and note it.

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEP195Y



12. Check "FUEL LEVEL SE" output voltage and confirm whether the voltage changes more than 0.03V during step 7 to 11.  
If NG, go to "Diagnostic Procedure" [EC-913](#) .

 **WITH GST**

**NOTE:**

Start from step 8, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line, refer to [EC-637, "FUEL PRESSURE RELEASE"](#) .
3. Remove the fuel feed hose on the fuel level sensor unit.
4. Connect a spare fuel hose where the fuel feed hose was removed.
5. Turn ignition switch "ON".
6. Drain fuel by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.
7. Confirm that the fuel gauge indication varies.
8. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
9. Confirm that the fuel gauge indication varies.
10. If NG, go to "Diagnostic Procedure", [EC-913](#) .

**Diagnostic Procedure**

UBS006J0

**1. CHECK FUEL GAUGE OPERATION**

Refer to [FL-3](#)

OK or NG

- OK >> GO TO 2.  
NG >> Follow the instruction of [DI-16](#) .

**2. CHECK FUEL LEVEL SENSOR AND CIRCUIT**

Refer to [DI-26, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

- OK >> GO TO 3.  
NG >> Repair or replace malfunctioning parts.

**3. CHECK INTERMITTENT INCIDENT**

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Removal and Installation**  
**FUEL LEVEL SENSOR**

UBS006J1

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

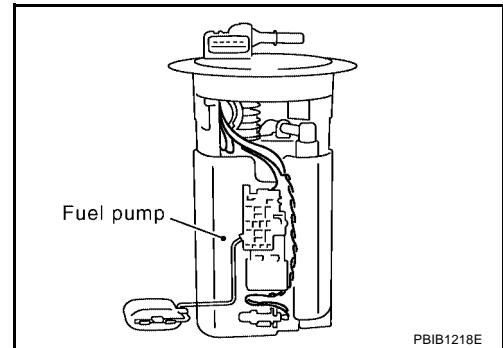
**DTC P0462, P0463 FUEL LEVEL SENSOR**

PFP:25060

**Component Description**

UBS001YC

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM through CAN communication. It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



PBIB1218E

**On Board Diagnostic Logic**

UBS001YD

**NOTE:**

If DTC P0462 or P0463 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to “DTC U1000, U1001 CAN COMMUNICATION LINE”, [EC-728](#).

ECM receives two signals from the fuel level sensor circuit.

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the former, to detect open or short circuit malfunction.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0462 0462	Fuel level sensor circuit low input	An excessively low voltage is sent from the sensor to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Fuel level sensor</li> </ul>
P0463 0463	Fuel level sensor circuit high input	An excessively high voltage is sent from the sensor to ECM.	

**DTC Confirmation Procedure**

UBS001YF

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 11V at ignition switch “ON”.

**WITH CONSULT-II**

1. Turn ignition switch “ON”.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-915, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

**WITH GST**

Follow the procedure “WITH CONSULT-II” above.

# DTC P0462, P0463 FUEL LEVEL SENSOR

[QG18DE (SULEV)]

## Diagnostic Procedure

UBS001YH

### 1. CHECK FUEL GAUGE OPERATION

Refer to [DI-16, "Meter/Gauge Operation and Odo/Trip Meter Segment Check in Diagnosis Mode"](#) .

OK or NG

OK >> GO TO 2.

NG >> Follow the instruction of "METER AND GAUGES". Refer to [DI-16, "Meter/Gauge Operation and Odo/Trip Meter Segment Check in Diagnosis Mode"](#) .

### 2. CHECK FUEL LEVEL SENSOR AND CIRCUIT

Refer to [DI-26, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace malfunctioning parts.

### 3. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

## Removal and Installation FUEL LEVEL SENSOR

UBS006J2

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

**DTC P0500 VSS**

PF:32702

**Component Description**

UBS001YI

**NOTE:**

If DTC P0500 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-728, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

The vehicle speed sensor is installed in the transaxle. It contains a pulse generator which provides a vehicle speed signal to the combination meter. The combination meter then sends a signal to the ECM through CAN communication line.

**On Board Diagnosis Logic**

UBS001YJ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0500 0500	Vehicle speed sensor	The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven.	<ul style="list-style-type: none"> <li>● Harness or connectors (The CAN communication line is open or shorted)</li> <li>● Harness or connectors (The vehicle speed signal circuit is open or shorted)</li> <li>● Vehicle speed sensor</li> <li>● Combination meter</li> </ul>

**DTC Confirmation Procedure**

UBS001YK

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Steps 1 and 2 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

**WITH CONSULT-II**

1. Start engine (TCS switch "OFF").
2. Read "VHCL SPEED SE" in "DATA MONITOR" mode with CONSULT-II. The vehicle speed on CONSULT-II should exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.  
If NG, go to [EC-917, "Diagnostic Procedure"](#).  
If OK, go to following step.
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Warm engine up to normal operating temperature.
5. Maintain the following conditions for at least 50 consecutive seconds.

ENG SPEED	1,800 - 6,000 rpm (A/T) 2,000 - 6,000 rpm (M/T)
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	More than 4.8 msec
Selector lever	Except "P" or "N" position
PW/ST SIGNAL	OFF

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
B/FUEL SCHDL	XXX msec
PW/ST SIGNAL	OFF
VHCL SPEED SE	XXX km/h

SEF196Y

6. If 1st trip DTC is detected, go to [EC-917, "Diagnostic Procedure"](#)

**Overall Function Check**

UBS001YL

Use this procedure to check the overall function of the vehicle speed signal circuit. During this check, a 1st trip DTC might not be confirmed.

**WITH GST**

1. Lift up drive wheels.

2. Start engine.
3. Read vehicle speed sensor signal in "MODE 1" with GST.  
The vehicle speed sensor on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
4. If NG, go to [EC-917, "Diagnostic Procedure"](#) .

## Diagnostic Procedure

UBS001YN

### 1. CHECK VEHICLE SPEED SENSOR CIRCUIT

Refer to [DI-3, "METERS AND GAUGES"](#) .

#### OK or NG

- OK >> GO TO 2.  
NG >> Repair or replace.

### 2. CHECK COMBINATION METER

Check combination meter function.  
Refer to [DI-8, "Combination Meter"](#) .

>> INSPECTION END

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**DTC P0506 ISC SYSTEM**

**Description**

UBS0030C

**NOTE:**

If DTC P0506 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

**On Board Diagnosis Logic**

UBS0030E

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0506 0506	Idle speed control system RPM lower than expected	The idle speed is less than the target idle speed by 100 rpm or more.	<ul style="list-style-type: none"> <li>● Electric throttle control actuator</li> <li>● Intake air leak</li> </ul>

**DTC Confirmation Procedure**

UBS0030F

**NOTE:**

- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.
- If the target idle speed is out of the specified value, perform “Idle Air Volume Learning”, [EC-635](#), before conducting “DTC Confirmation Procedure”. For the target idle speed, refer to the “Service Data and Specifications (SDS)”, [EC-1222](#).

**TESTING CONDITION:**

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C (14°F).

**WITH CONSULT-II**

1. Open engine hood.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch “OFF” and wait at least 10 seconds.
4. Turn ignition switch “ON” again and select “DATA MONITOR” mode with CONSULT-II.
5. Start engine and run it for at least 1 minute at idle speed.
6. If 1st trip DTC is detected, go to [EC-919](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

**WITH GST**

Follow the procedure “WITH CONSULT-II” above.

**Diagnostic Procedure****1. CHECK INTAKE AIR LEAK**

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

**OK or NG**

- OK >> GO TO 2.  
NG >> Discover air leak location and repair.

**2. REPLACE ECM**

1. Stop engine.
2. Replace ECM.
3. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .
4. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

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**DTC P0507 ISC SYSTEM**

**Description**

UBS0030J

**NOTE:**

If DTC P0507 is displayed with other DTC, first perform the trouble diagnosis for the other DTC.

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

**On Board Diagnosis Logic**

UBS0030L

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0507 0507	Idle speed control system RPM higher than expected	The idle speed is more than the target idle speed by 200 rpm or more.	<ul style="list-style-type: none"> <li>● Electric throttle control actuator</li> <li>● Intake air leak</li> <li>● PCV system</li> </ul>

**DTC Confirmation Procedure**

UBS0030M

**NOTE:**

- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.
- If the target idle speed is out of the specified value, perform "Idle Air Volume Learning", [EC-635](#), before conducting "DTC Confirmation Procedure". For the target idle speed, refer to the "Service Data and Specifications (SDS)", [EC-1222](#).

**TESTING CONDITION:**

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C (14°F).

**WITH CONSULT-II**

1. Open engine hood.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Turn ignition switch "ON" again and select "DATA MONITOR" mode with CONSULT-II.
5. Start engine and run it for at least 1 minute at idle speed.
6. If 1st trip DTC is detected, go to [EC-921, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.



**Diagnostic Procedure****1. CHECK PCV HOSE CONNECTION**

Confirm that PCV hose is connected correctly.

OK or NG

OK >> GO TO 2.

NG >> Repair or replace.

**2. CHECK INTAKE AIR LEAK**

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

OK >> GO TO 3.

NG >> Discover air leak location and repair.

**3. REPLACE ECM**

1. Stop engine.
2. Replace ECM.
3. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .
4. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

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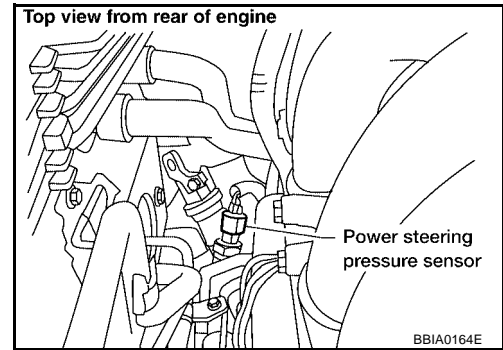
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## DTC P0550 PSP SENSOR

### Component Description

UBS003WV

Power steering pressure (PSP) sensor is installed to the power steering high-pressure tube and detects a power steering load. This sensor is a potentiometer which transforms the power steering load into output voltage, and emits the voltage signal to the ECM. The ECM controls the electric throttle control actuator and adjusts the throttle valve opening angle to increase the engine speed and adjusts the idle speed for the increased load.



### CONSULT-II Reference Value in Data Monitor Mode

UBS003WV

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PW/ST SIGNAL	<ul style="list-style-type: none"> <li>Engine: After warming up, idle the engine</li> </ul>	Steering wheel is in neutral position. (Forward direction)	OFF
		Steering wheel is turned.	ON

### On Board Diagnosis Logic

UBS003WX

The MIL will not light up for this diagnosis.

**NOTE:**

If DTC P0550 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-1028](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0550 0550	Power steering pressure sensor circuit	An excessively low or high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Power steering pressure sensor</li> </ul>

### DTC Confirmation Procedure

UBS003WY

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

- Turn ignition switch "ON".
- Select "DATA MONITOR" mode with CONSULT-II.
- Start engine and let it idle for at least 5 seconds.
- If 1st trip DTC is detected, go to [EC-924, "Diagnostic Procedure"](#).

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.




# DTC P0550 PSP SENSOR

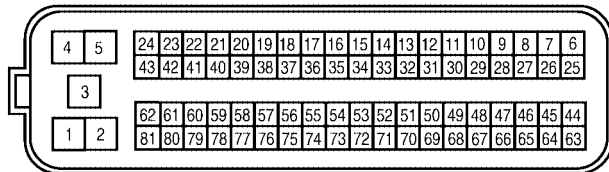
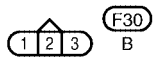
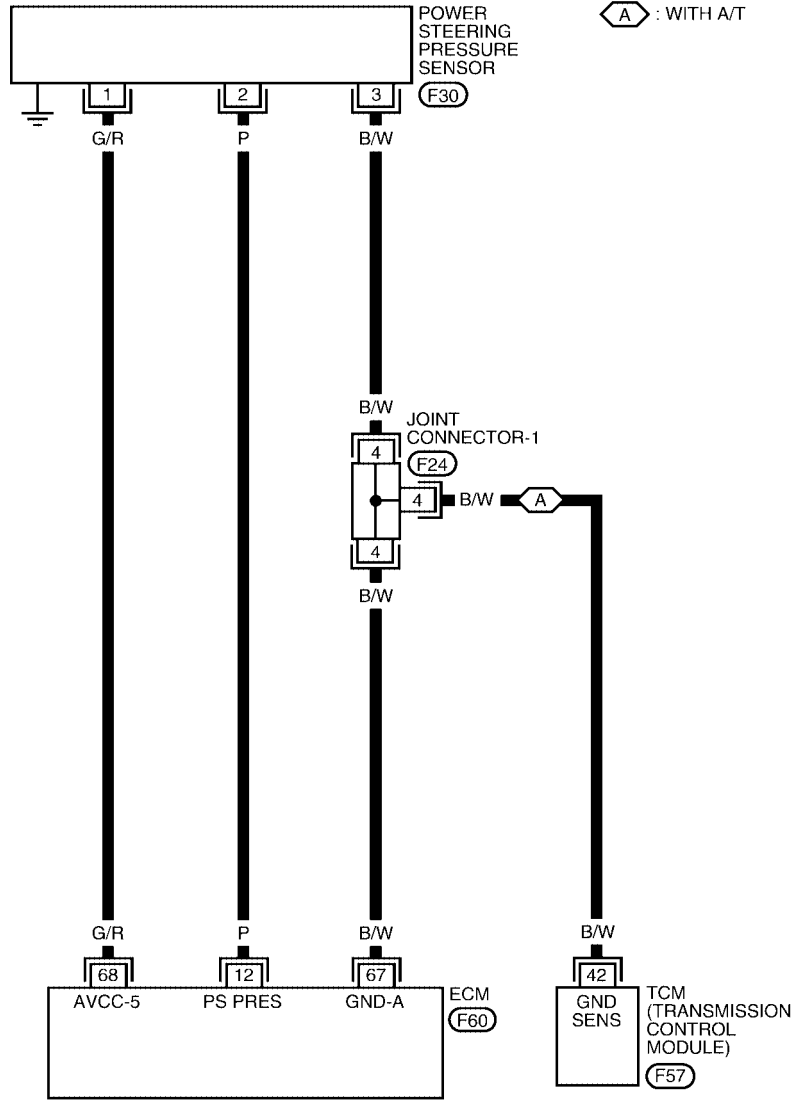
[QG18DE (SULEV)]

## Wiring Diagram

UBS003WZ

EC-PS/SEN-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : WITH A/T



Refer to the following.

-  - JOINT CONNECTOR
-  - ELECTRICAL UNITS

BBWA0787E

# DTC P0550 PSP SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
12	P	Power steering pressure sensor	[Engine is running] ● Steering wheel is being turned.	0.5 - 4.0V
			[Engine is running] ● Steering wheel is not being turned.	0.4 - 0.8V
67	B/W	Sensor ground (Power steering pressure sensor)	[Engine is running] ● Idle speed	Approximately 0V
68	G/R	Sensor power supply (Power steering pressure sensor)	[Ignition switch "ON"]	Approximately 5V

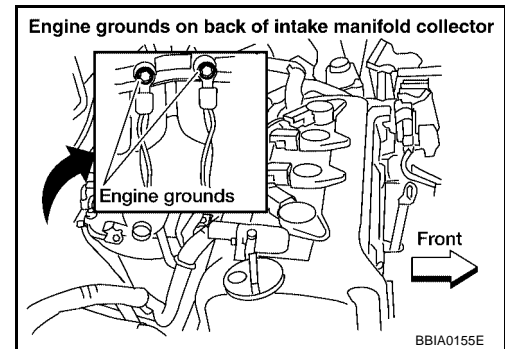
## Diagnostic Procedure

UBS003X0

### 1. RETIGHTEN GROUND SCREWS

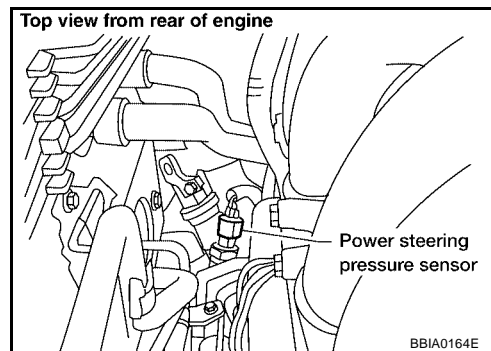
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK PSP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect PSP sensor harness connector.
2. Turn ignition switch "ON".

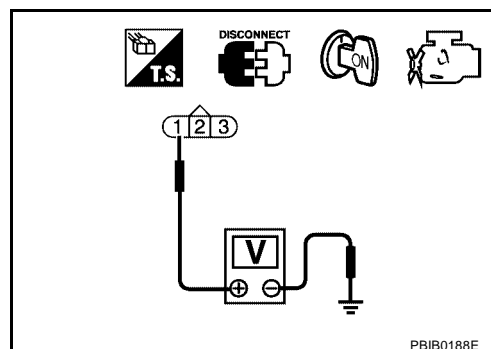


3. Check voltage between PSP sensor terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 4.  
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.



## 3. CHECK PSP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between PSP sensor terminal 3 and engine ground.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.  
 NG >> GO TO 4.

## 4. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-1
- Harness for open or short between power steering pressure sensor and ECM
- Harness for open or short between power steering pressure sensor and TCM

>> Repair open circuit or short to power in harness or connectors.

## 5. CHECK PSP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 12 and PSP sensor terminal 2.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK PSP SENSOR**

Refer to [EC-926, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.  
 NG >> Replace PSP sensor.

**7. CHECK INTERMITTENT INCIDENT**

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

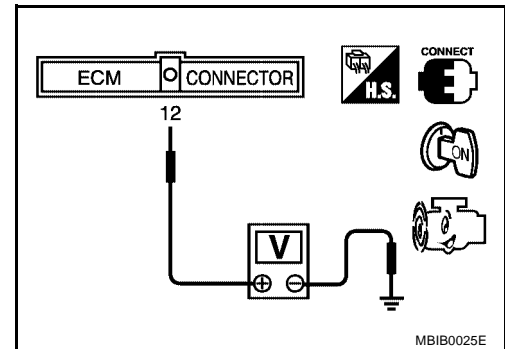
>> INSPECTION END

### Component Inspection POWER STEERING PRESSURE SENSOR

UBS003X1

1. Reconnect all harness connectors disconnected.
2. Start engine and let it idle.
3. Check voltage between ECM terminal 12 and ground under the following conditions.

Condition	Voltage
Steering wheel is being turned fully.	0.5 - 4.0V
Steering wheel is not being turned.	0.4 - 0.8V



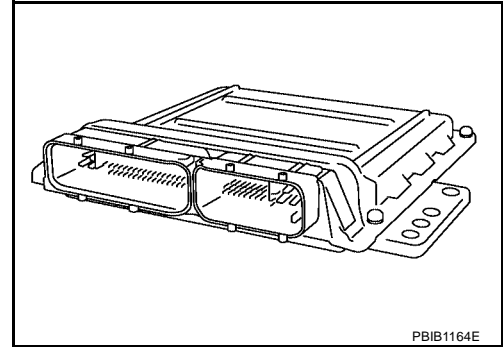
**DTC P0605 ECM**

PF2:23710

**Component Description**

UBS006FV

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



UBS006FW

**On Board Diagnosis Logic**

This self-diagnosis has one or two trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0605 0605	Engine control module	A)	ECM calculation function is malfunctioning.	● ECM
		B)	ECM EEP-ROM system is malfunctioning.	
		C)	ECM self shut-off function is malfunctioning.	

**FAIL-SAFE MODE**

ECM enters in fail-safe mode when the malfunction A is detected.

Detected items	Engine operation condition in fail-safe mode
Malfunction A	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

**DTC Confirmation Procedure**

UBS006FX

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B". If there is no problem on "PROCEDURE FOR MALFUNCTION B", perform "PROCEDURE FOR MALFUNCTION C".

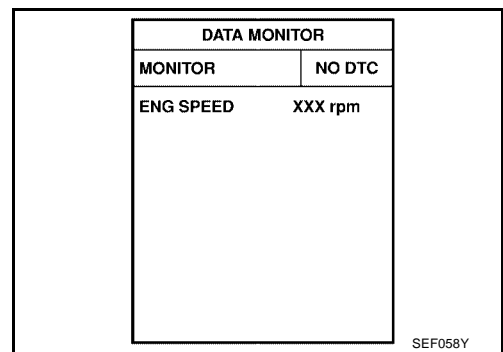
**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**PROCEDURE FOR MALFUNCTION A**

**With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If 1st trip DTC is detected, go to [EC-928, "Diagnostic Procedure"](#)



**With GST**

Follow the procedure "With CONSULT-II" above.

**PROCEDURE FOR MALFUNCTION B**

**With CONSULT-II**

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
4. If 1st trip DTC is detected, go to [EC-928, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**With GST**

Follow the procedure "With CONSULT-II" above.

**PROCEDURE FOR MALFUNCTION C**

**With CONSULT-II**

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
4. Repeat step 3 for, 32 times.
5. If 1st trip DTC is detected, go to [EC-928, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**With GST**

Follow the procedure "With CONSULT-II" above.

**Diagnostic Procedure**

UBS006FY

**1. INSPECTION START**

**With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "SELF DIAG RESULTS" mode with CONSULT-II.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure".**  
See [EC-927](#) .
5. Is the 1st trip DTC P0605 displayed again?

**With GST**

1. Turn ignition switch "ON".
2. Select MODE 4 with GST.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure".**  
See [EC-927](#) .
5. Is the 1st trip DTC P0605 displayed again?

Yes or No

- Yes >> GO TO 2.  
No >> **INSPECTION END**



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## 2. REPLACE ECM

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1. Replace ECM.
2. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> INSPECTION END

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# DTC P1031, P1032 A/F SENSOR HEATER

[QG18DE (SULEV)]

## DTC P1031, P1032 A/F SENSOR HEATER

PFP:22693

### Description SYSTEM DESCRIPTION

UBS001ZB

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Air fuel ratio (A/F) sensor 1 heater control	Air fuel ratio (A/F) sensor 1 heater
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF duty control of the A/F sensor 1 heater corresponding to the engine operating condition to keep the temperature of A/F sensor 1 element at the specified range.

### CONSULT-II Reference Value in Data Monitor Mode

UBS001ZC

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
A/F S1 HTR (B1)	● Engine: After warming up, idle the engine	0 - 100%

### On Board Diagnosis Logic

UBS001ZD

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1031 1031 (Bank 1)	Air fuel ratio (A/F) sensor 1 heater control circuit low	The current amperage in the heated air fuel ratio (A/F) sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated air fuel ratio (A/F) sensor 1 heater.)	<ul style="list-style-type: none"> <li>● Harness or connectors (The heated A/F sensor 1 heater circuit is open or shorted.)</li> <li>● Heater A/F sensor 1 heater</li> </ul>
P1032 1032 (Bank 1)	Air fuel ratio (A/F) sensor 1 heater control circuit high	The current amperage in the heated air fuel ratio (A/F) sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated air fuel ratio (A/F) sensor 1 heater.)	<ul style="list-style-type: none"> <li>● Harness or connectors (The heated A/F sensor 1 heater circuit is shorted.)</li> <li>● Heater A/F sensor 1 heater</li> </ul>

### DTC Confirmation Procedure

UBS001ZE

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

**Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V at idle.**

**With CONSULT-II**

#### Ⓜ WITH CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and run it for at least 10 seconds at idle speed.
3. If 1st trip DTC is detected, go to [EC-933, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



## WITH GST

1. Start engine and run it for at least 10 seconds at idle speed.
  2. Turn ignition switch "OFF" and wait at least 10 seconds.
  3. Start engine and run it for at least 10 seconds at idle speed.
  4. Select "MODE 3" with GST.
  5. If DTC is detected, go to [EC-933, "Diagnostic Procedure"](#) .
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

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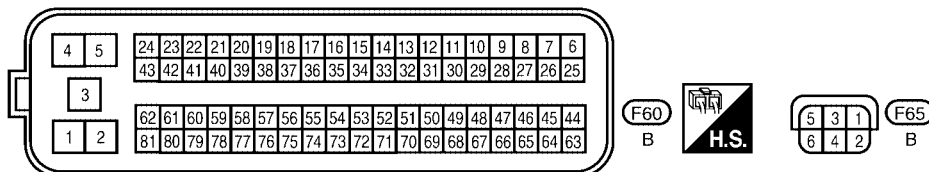
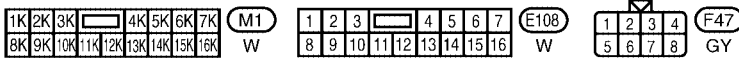
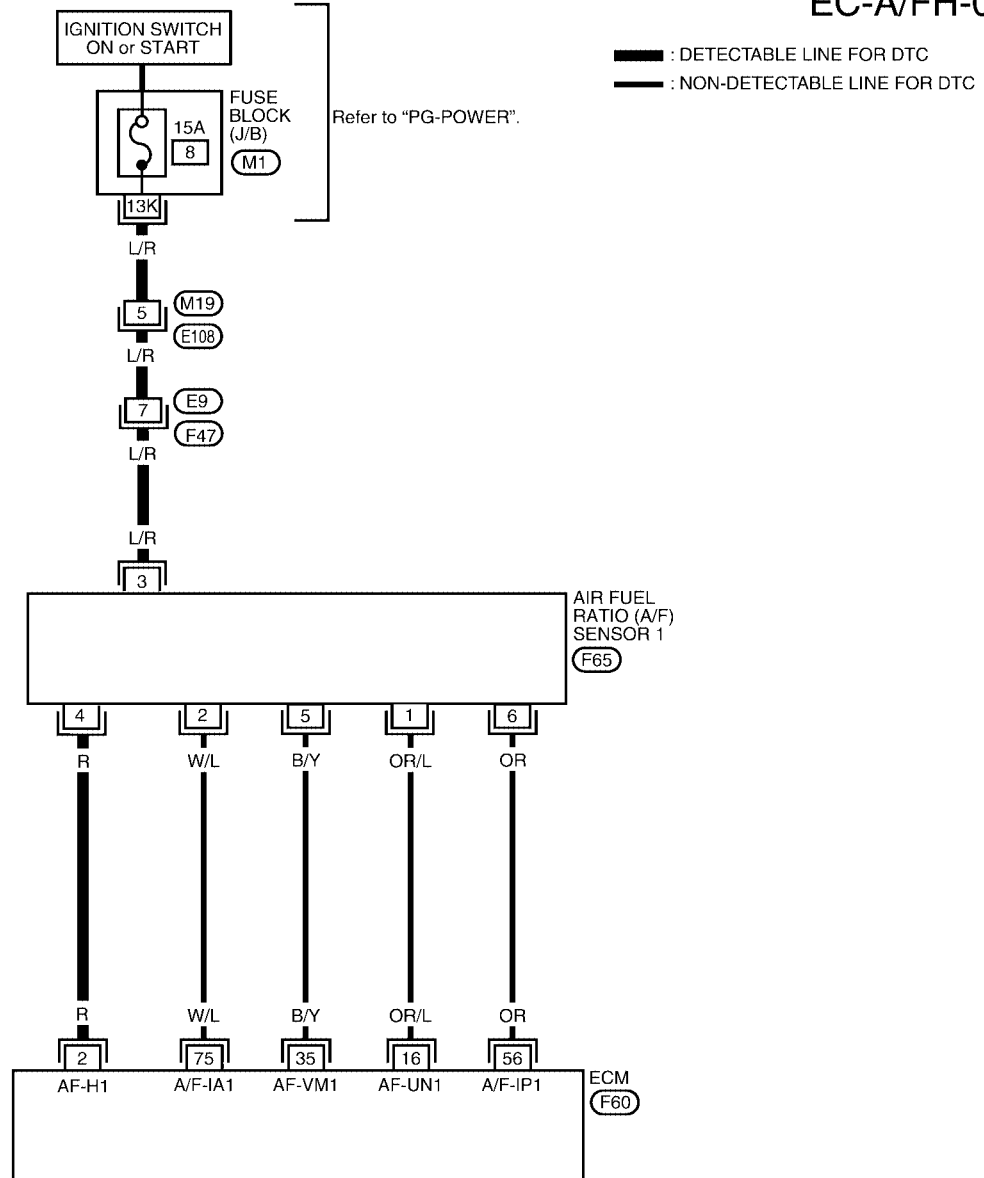
# DTC P1031, P1032 A/F SENSOR HEATER

[QG18DE (SULEV)]

UBS006H1

## Wiring Diagram

EC-A/FH-01



BBWA0602E

# DTC P1031, P1032 A/F SENSOR HEATER

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

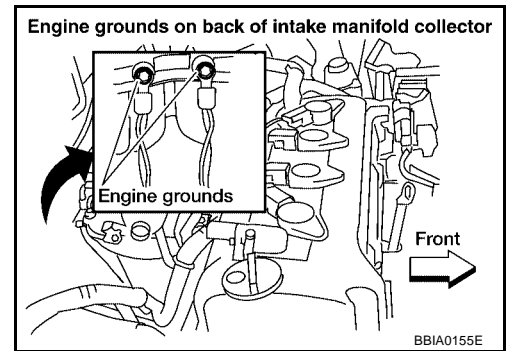
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
2	R	A/F sensor 1 heater	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 5V

## Diagnostic Procedure

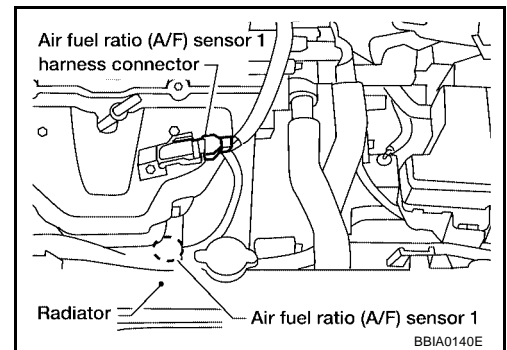
UBS001ZG

### 1. CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.



3. Disconnect air fuel ratio (A/F) sensor 1 harness connector.
4. Turn ignition switch "ON".

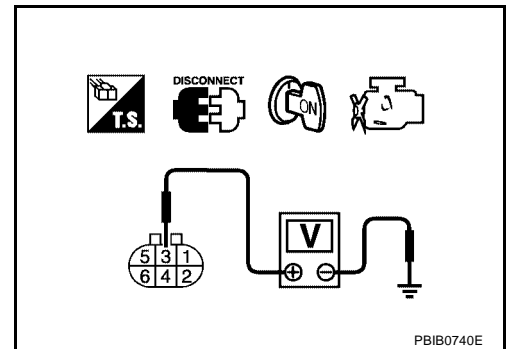


5. Check voltage between A/F sensor 1 terminal 3 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



---

## 2. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M19, E108
- Harness connectors E9, F47
- Fuse block (J/B) connector M1
- 15A fuse
- Harness for open or short between A/F sensor 1 and fuse

>> Repair or replace harness or connectors.

---

## 3. CHECK A/F SENSOR 1 HEATER OUTPUT SIGNAL CIRCUIT

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 2 and A/F sensor 1 terminal 4. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 4. CHECK A/F SENSOR 1 HEATER

---

Refer to [EC-935, "Component Inspection"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace A/F sensor 1.

---

## 5. CHECK INTERMITTENT INCIDENT

---

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace A/F sensor 1.

NG >> Repair or replace.

**Component Inspection****AIR FUEL RATIO (A/F) SENSOR 1 HEATER**

Check resistance between terminals 3 and 4.

**Resistance: 2.3 - 4.3Ω at 25°C (77°F)**

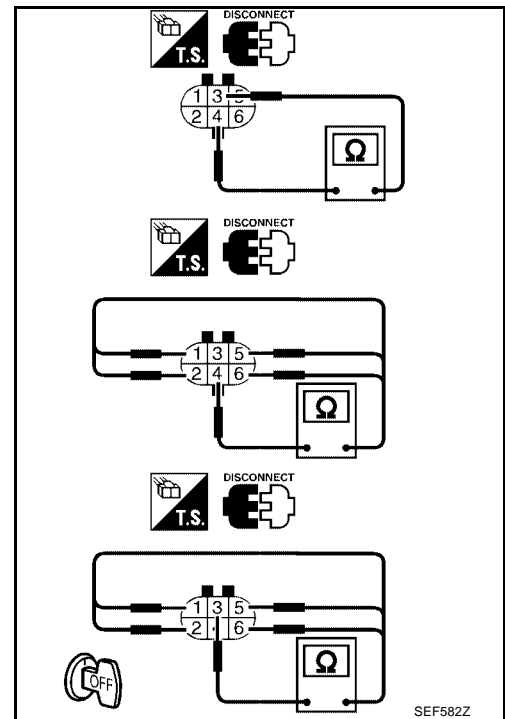
Check continuity between terminals 3 and 1, 2, 5, 6, terminals 4 and 1, 2, 5, 6.

**Continuity should not exist.**

If NG, replace the A/F sensor 1.

**CAUTION:**

- Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new A/F sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation****AIR FUEL RATIO SENSOR HEATER**

Refer to [EM-12, "Removal and Installation"](#).

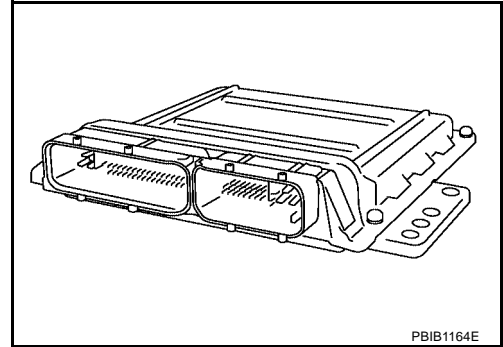
**DTC P1065 ECM POWER SUPPLY**

PF2:23710

**Component Description**

UBS003X2

Battery voltage is supplied to the ECM even when the ignition switch is turned OFF for the ECM memory function of the DTC memory, the air-fuel ratio feedback compensation value memory, the idle air volume learning value memory, etc.



**On Board Diagnosis Logic**

UBS003X3

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1065 1065	ECM power supply circuit	ECM back-up RAM system does not function properly.	<ul style="list-style-type: none"> <li>● Harness or connectors [ECM power supply (back-up) circuit is open or shorted.]</li> <li>● ECM</li> </ul>

**DTC Confirmation Procedure**

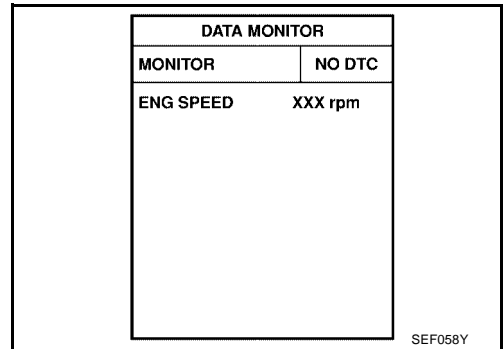
UBS003X4

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch “ON” and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. Turn ignition switch “OFF”, wait at least 10 seconds, and then turn “ON”.
5. Repeat steps 3 and 4 four times.
6. If 1st trip DTC is detected, go to [EC-938, "Diagnostic Procedure"](#)



**WITH GST**

Follow the procedure “WITH CONSULT-II” above.



# DTC P1065 ECM POWER SUPPLY

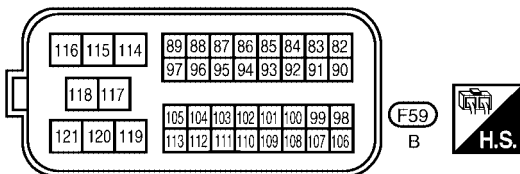
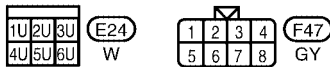
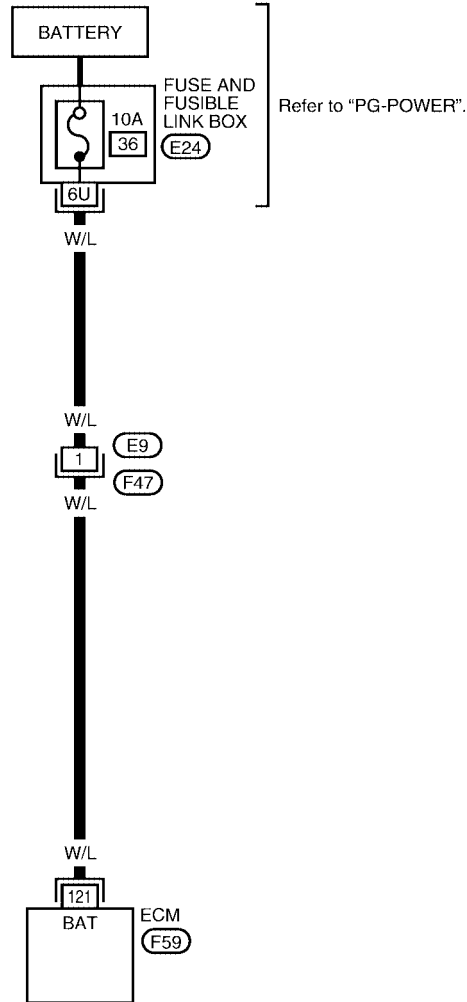
[QG18DE (SULEV)]

UBS003X5

## Wiring Diagram

### EC-ECM/PW-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



BBWA0294E

# DTC P1065 ECM POWER SUPPLY

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
121	W/L	Power supply for ECM (Buck-up)	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS003X6

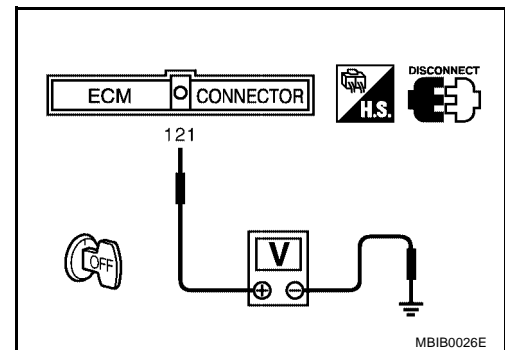
### 1. CHECK ECM POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check voltage between ECM terminal 121 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E9, F47
- 10A fuse
- Harness for open or short between ECM and battery

>> Repair or replace harness or connectors.

### 3. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit short to ground or short to power in harness or connectors.

**4. PERFORM DTC CONFIRMATION PROCEDURE****Ⓟ With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "SELF DIAG RESULTS" mode with CONSULT-II.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure".**  
See [EC-936](#) .
5. Is the 1st trip DTC P1065 displayed again?

**Ⓢ With GST**

1. Turn ignition switch "ON".
2. Select MODE 4 with GST.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure".**  
See [EC-936](#) .
5. Is the 1st trip DTC P1065 displayed again?

Yes or No

Yes &gt;&gt; GO TO 5.

No >> **INSPECTION END****5. REPLACE ECM**

1. Replace ECM.
2. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

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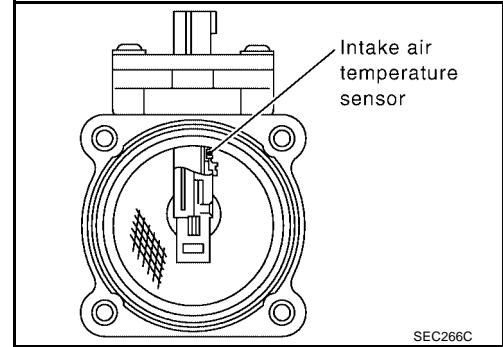
L

M

**DTC P1102 MAF SENSOR**

**Component Description**

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss. Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.



**CONSULT-II Reference Value in Data Monitor Mode**

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS A/F SE-B1	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" (A/T), Neutral (M/T) ● No-load	Idle 1.0 - 1.7V
		2,500 rpm 1.5 - 2.4V
CAL/LD VALUE	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" (A/T), Neutral (M/T) ● No-load	Idle 20.0 - 35.5%
		2,500 rpm 12.0 - 27.0%
MASS AIRFLOW	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" (A/T), Neutral (M/T) ● No-load	Idle 1.4 - 4.0 g·m/s
		2,500 rpm 5.0 - 10.0 g·m/s

**On Board Diagnosis Logic**

This self-diagnosis has the one trip detection logic.

**NOTE:**

If DTC P1102 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-1028](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1102 1102	Mass air flow sensor circuit range/performance problem	A voltage from the sensor is constantly approx. 1.0V when engine is running.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Mass air flow sensor</li> </ul>

**FAIL-SAFE MODE**

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

### DTC Confirmation Procedure

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait at least 5 seconds.
4. If DTC is detected, go to [EC-943, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

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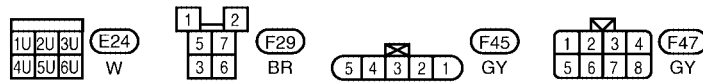
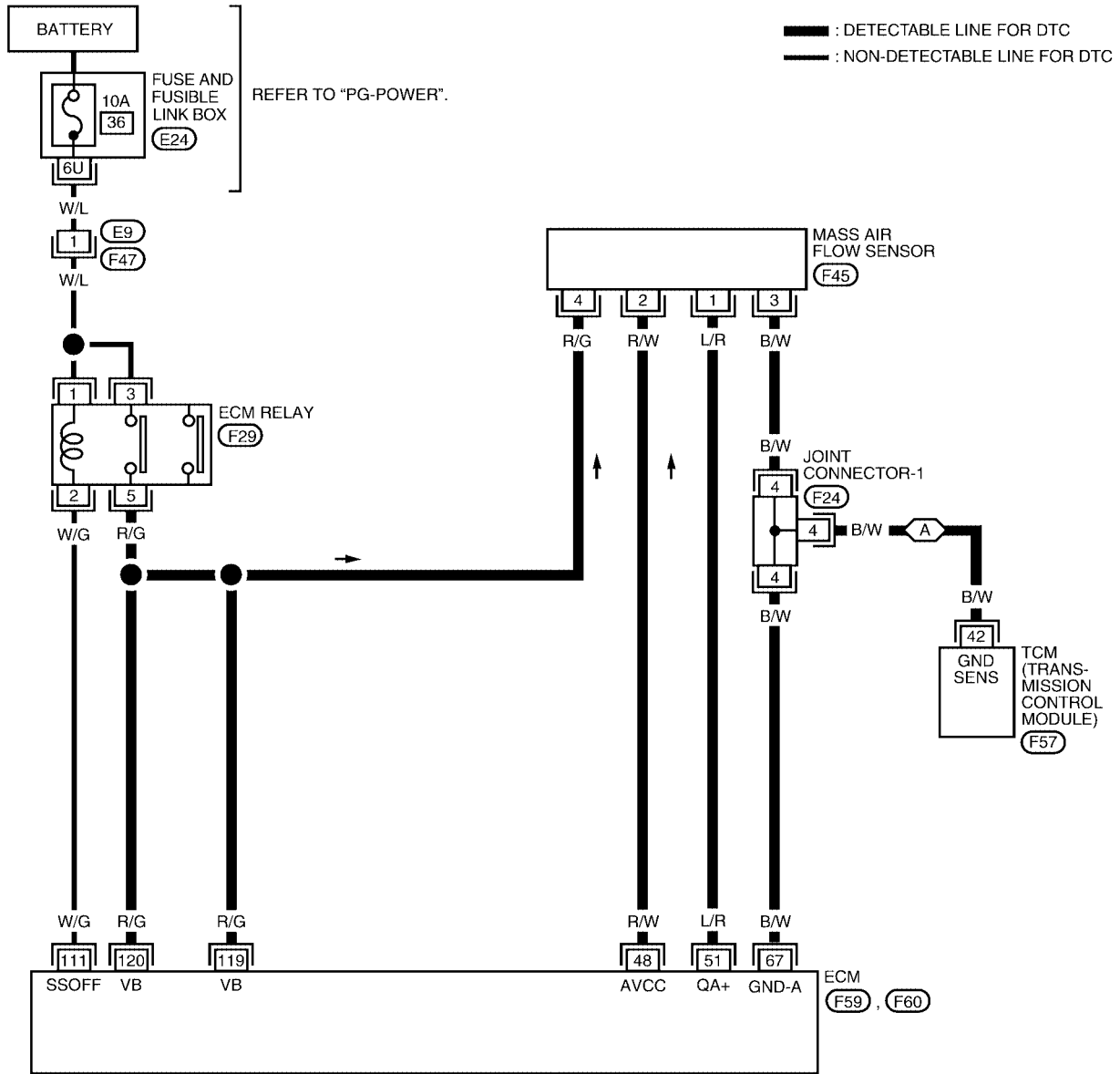
# DTC P1102 MAF SENSOR

[QG18DE (SULEV)]

UBS0030V

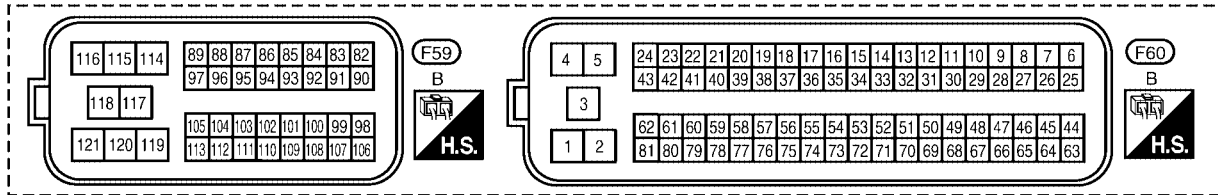
## Wiring Diagram

EC-MAFS-01



Refer to the following.

- (F24) - JOINT CONNECTOR
- (F57) - ELECTRICAL UNITS



BBWA0774E

# DTC P1102 MAF SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
48	R/W	Sensors' power supply (Mass air flow sensor)	[Ignition switch "ON"]	Approximately 5V
51	L/R	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.0 - 1.7V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.5 - 2.1V
67	B/W	Mass air flow sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
111	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For 5 seconds after turning ignition switch "OFF"	0 - 1.0V
			[Ignition switch "OFF"] ● 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
119 120	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

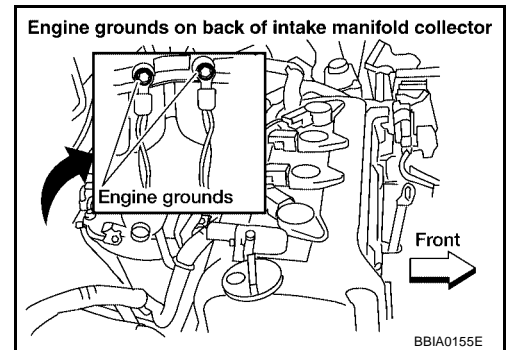
## Diagnostic Procedure

UBS0030W

### 1. RETIGHTEN GROUND SCREWS

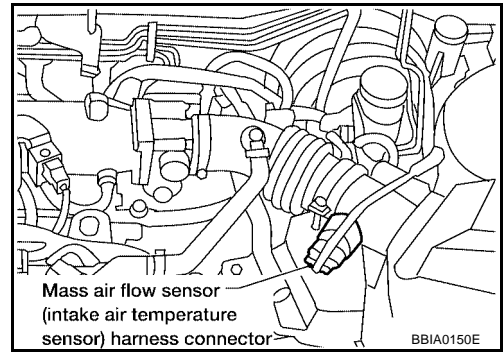
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK MASS AIR FLOW (MAF) SENSOR POWER SUPPLY CIRCUIT

1. Disconnect MAF sensor harness connector.
2. Turn ignition switch "ON".

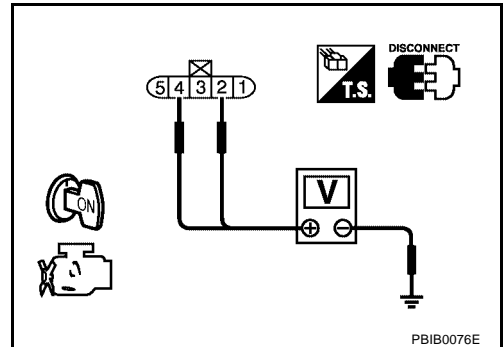


3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.

Terminal	Voltage
2	Approximately 5V
4	Battery voltage

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between ECM relay and mass air flow sensor
- Harness for open or short between mass air flow sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and engine ground.

**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-1.
- Harness for open or short between mass air flow sensor and ECM.
- Harness for open or short between mass air flow sensor and TCM.

>> Repair open circuit or short to power in harness or connectors.



---

**6. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

---

1. Check harness continuity between MAF sensor terminal 1 and ECM terminal 51.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

**7. CHECK MASS AIR FLOW SENSOR**

---

Refer to [EC-946, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace mass air flow sensor.

---

**8. CHECK INTERMITTENT INCIDENT**

---

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

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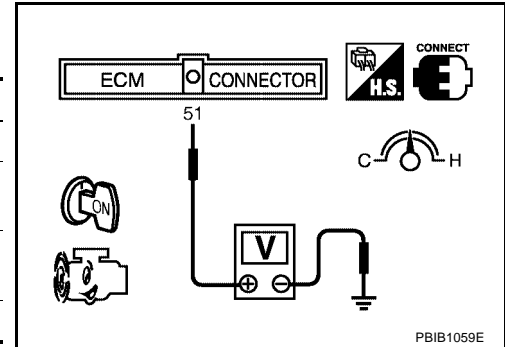
## Component Inspection MASS AIR FLOW SENSOR

1. Turn ignition switch "ON".
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 51 (Mass air flow sensor signal) and ground.

Conditions	Voltage V
Ignition switch "ON" (Engine stopped.)	Less than 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.7
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 2.4
Idle to about 4,000 rpm*	1.0 - 1.7 to Approx. 4.0

\*: Check for linear voltage rise in response to increases to about 4,000 rpm in engine speed.

4. If the voltage is out of specification, proceed the following.
  - Turn ignition switch "OFF".
  - Disconnect mass air flow sensor harness connector and reconnect it again.
  - Perform steps 2 and 3 again.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.
6. If NG, clean or replace mass air flow sensor.

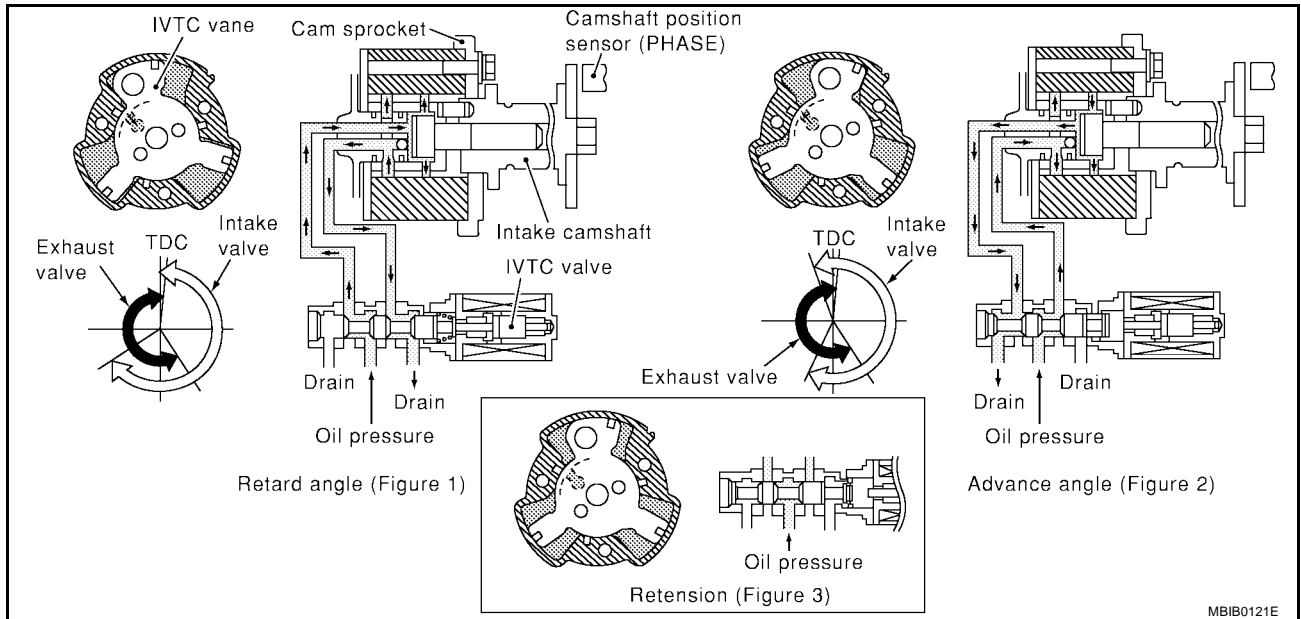


DTC P1111 IVT CONTROL SOLENOID VALVE

Description  
SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS)	Engine speed	Intake valve timing control	Intake valve timing control solenoid valve
Camshaft position sensor (PHASE)			
Engine coolant temperature sensor	Engine coolant temperature		
Vehicle speed signal*	Vehicle speed		

\*: This signal is sent to the ECM through CAN communication line.



This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

COMPONENT DESCRIPTION

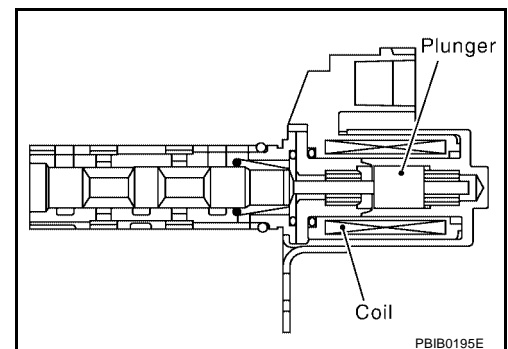
Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

The intake valve timing control solenoid valve changes the oil amount and direction of flow through intake valve timing control unit or stops oil flow.

The longer pulse width advances valve angle.

The shorter pulse width retards valve angle.

When ON and OFF pulse widths become equal, the solenoid valve stops oil pressure flow to fix the intake valve angle at the control position.



# DTC P1111 IVT CONTROL SOLENOID VALVE

[QG18DE (SULEV)]

## CONSULT-II Reference Value in Data Monitor Mode

UBS006G4

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
INT/V SOL (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N (A/T), Neutral (M/T)</li> <li>● Air conditioner switch: OFF</li> <li>● No-load</li> </ul>	Idle	0% - 2%
		When revving engine up to 2,000 rpm quickly	Approx. 0% - 80%

## On Board Diagnosis Logic

UBS006G5

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1111 1111	Intake valve timing control solenoid valve circuit	An improper voltage is sent to the ECM through intake valve timing control solenoid valve.	<ul style="list-style-type: none"> <li>● Harness or connectors (Solenoid valve circuit is open or shorted.)</li> <li>● Intake valve timing control solenoid valve</li> </ul>

## DTC Confirmation Procedure

UBS006G6

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### ④ WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If 1st trip DTC is detected, go to [EC-950. "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

### ④ WITH GST

Following the procedure "WITH CONSULT-II" above.

# DTC P1111 IVT CONTROL SOLENOID VALVE

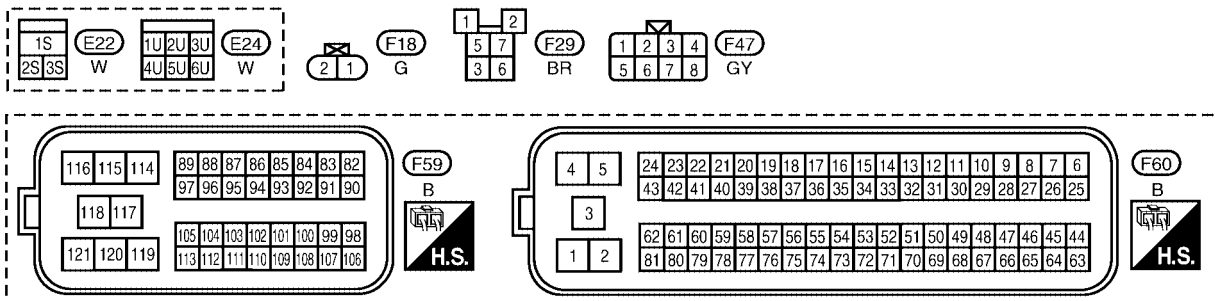
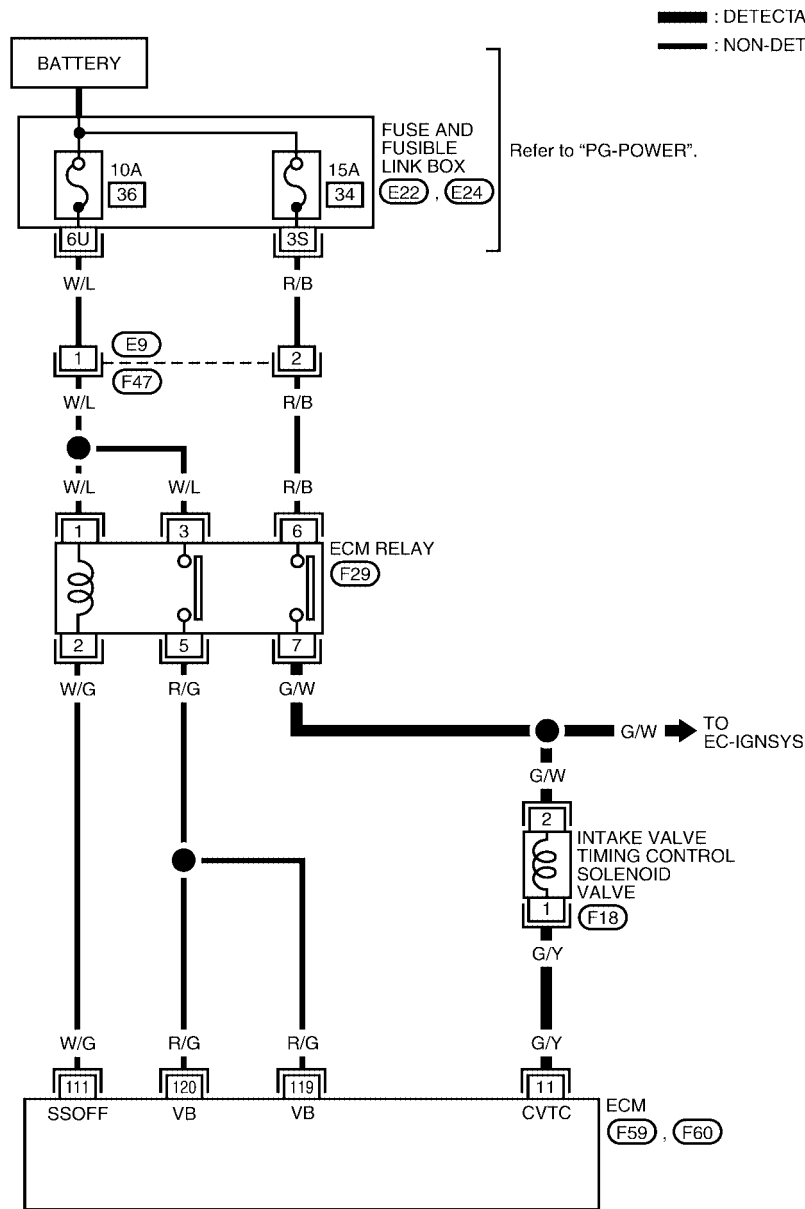
[QG18DE (SULEV)]

## Wiring Diagram

UBS006G7

EC-IVC-01

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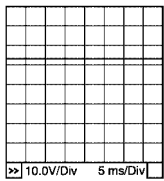
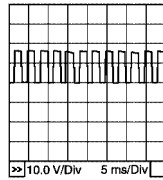
# DTC P1111 IVT CONTROL SOLENOID VALVE

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
11	G/Y	Intake valve timing control solenoid valve	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>MBIB0052E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,500 rpm</li> </ul>	<p>7 - 10V★</p>  <p>PBIB0532E</p>

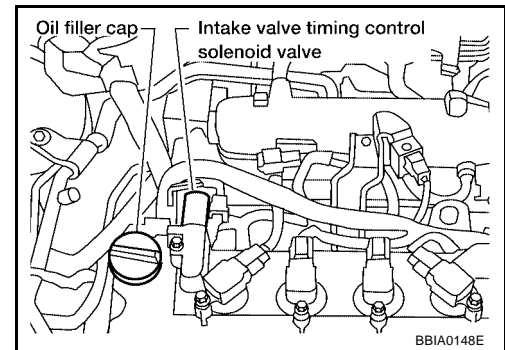
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS006G8

### 1. CHECK IVT CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Turn ignition switch "ON".

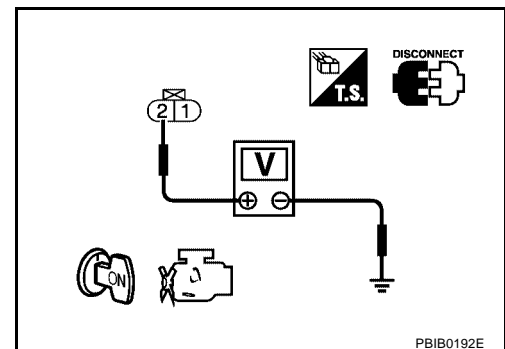


4. Check voltage between intake valve timing control solenoid valve terminal 2 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 2.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



# DTC P1111 IVT CONTROL SOLENOID VALVE

[QG18DE (SULEV)]

## 2. CHECK IVT CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 11 and intake valve timing control solenoid valve terminal 1. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 3. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-951, "Component Inspection"](#) .

OK or NG

OK >> GO TO 4.

NG >> Replace intake valve timing control solenoid valve.

## 4. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

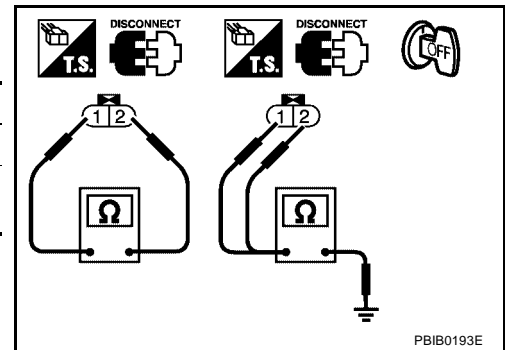
>> INSPECTION END

### Component Inspection INTAKE VALVE TIMING CONTROL SOLENOID VALVE

UBS006G9

1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve terminals 1 and 2 under the following conditions.

Terminals	Resistance
1 and 2	Approximately 8Ω at 20°C (68°F)
1 or 2 and ground	$\infty\Omega$ (Continuity should not exist)



UBS006GA

### Removal and Installation INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EM-39, "TIMING CHAIN"](#) .

# DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

## [QG18DE (SULEV)]

### DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

PF16119

#### Component Description

UBS003X7

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc. The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

#### On Board Diagnosis Logic

UBS003X8

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1121 1121	Electric throttle control actuator	A)	Electric throttle control actuator does not function properly due to the return spring malfunction.	● Electric throttle control actuator
		B)	Throttle valve opening angle in fail-safe mode is not in specified range.	
		C)	ECM detects the throttle valve is stuck open. <b>This self-diagnosis has the one trip detection logic.</b>	

#### FAIL-SAFE MODE

When the malfunction A or B is detected in the two consecutive trip, the ECM enters fail-safe mode and the MIL lights up.

When the malfunction C is detected even in the 1st trip, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Malfunction A	The ECM controls the electric throttle control actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.
Malfunction B	ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.
Malfunction C	While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in "N" or "P" position, and engine speed will not exceed 1,000 rpm or more.

#### DTC Confirmation Procedure

UBS003X9

##### NOTE:

- Perform "PROCEDURE FOR MALFUNCTION A AND B" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION C".
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### PROCEDURE FOR MALFUNCTION A AND B

##### With CONSULT-II

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Shift selector lever to "D" position (A/T), "1st" position (M/T) and wait at least 2 seconds.
4. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
5. If 1st trip DTC is detected, go to [EC-953, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

##### With GST

Follow the procedure "With CONSULT-II" above.



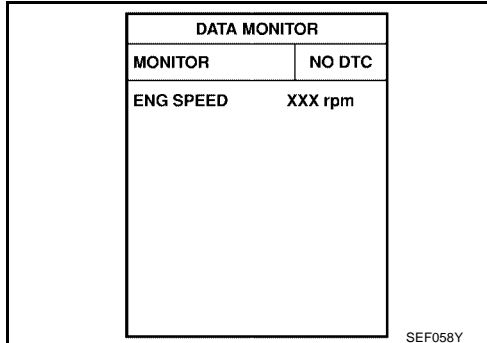
# DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

## [QG18DE (SULEV)]

### PROCEDURE FOR MALFUNCTION C

#### With CONSULT-II

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Shift selector lever to "D" position (A/T), "1st" position (M/T) and wait at least 2 seconds.
4. Shift selector lever to "N" or "P" position.
5. Start engine and let it idle for 3 seconds.
6. If DTC is detected, go to [EC-953, "Diagnostic Procedure"](#) .



DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### With GST

Follow the procedure "With CONSULT-II" above.

### Diagnostic Procedure

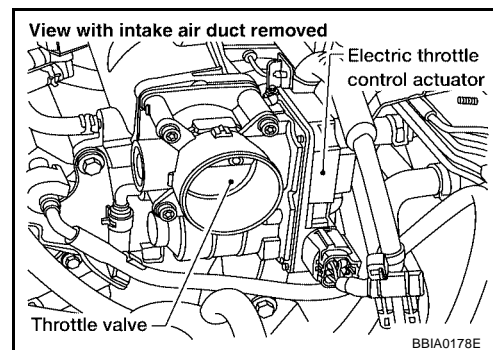
UBS003XA

#### 1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if a foreign matter is caught between the throttle valve and the housing.

#### OK or NG

- OK >> GO TO 2.  
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



#### 2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> INSPECTION END

# DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

[QG18DE (SULEV)]

## DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

PF16119

### Description

UBS003XB

#### NOTE:

If DTC P1122 is displayed with DTC P1121 or 1126, first perform the trouble diagnosis for DTC P1121 or P1126. Refer to [EC-952](#) or [EC-961](#).

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc.

The throttle control motor is operated by the ECM and it opens and closes the throttle valve.

The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

### On Board Diagnosis Logic

UBS003XC

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1122 1122	Electric throttle control performance problem	Electric throttle control function does not operate properly.	<ul style="list-style-type: none"><li>● Harness or connectors (Throttle control motor circuit is open or shorted)</li><li>● Electric throttle control actuator</li></ul>

### FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

### DTC Confirmation Procedure

UBS003XD

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### WITH CONSULT-II

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-956, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### WITH GST

Follow the procedure "WITH CONSULT-II" above.

# DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

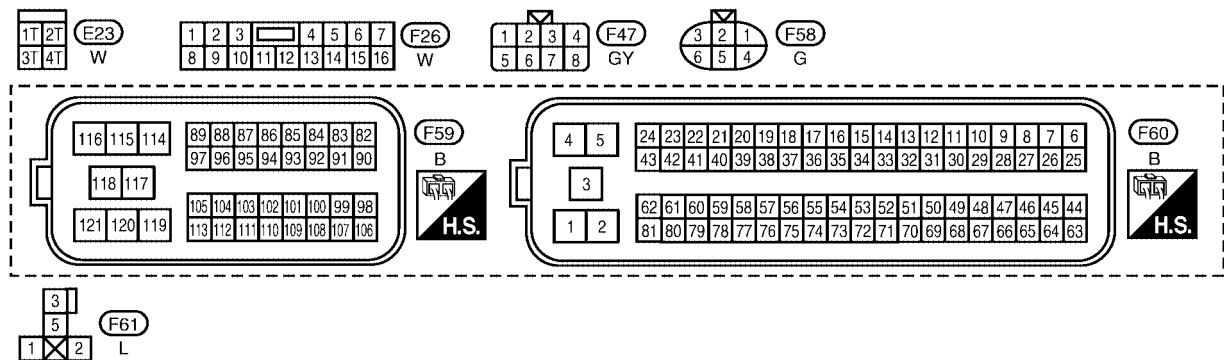
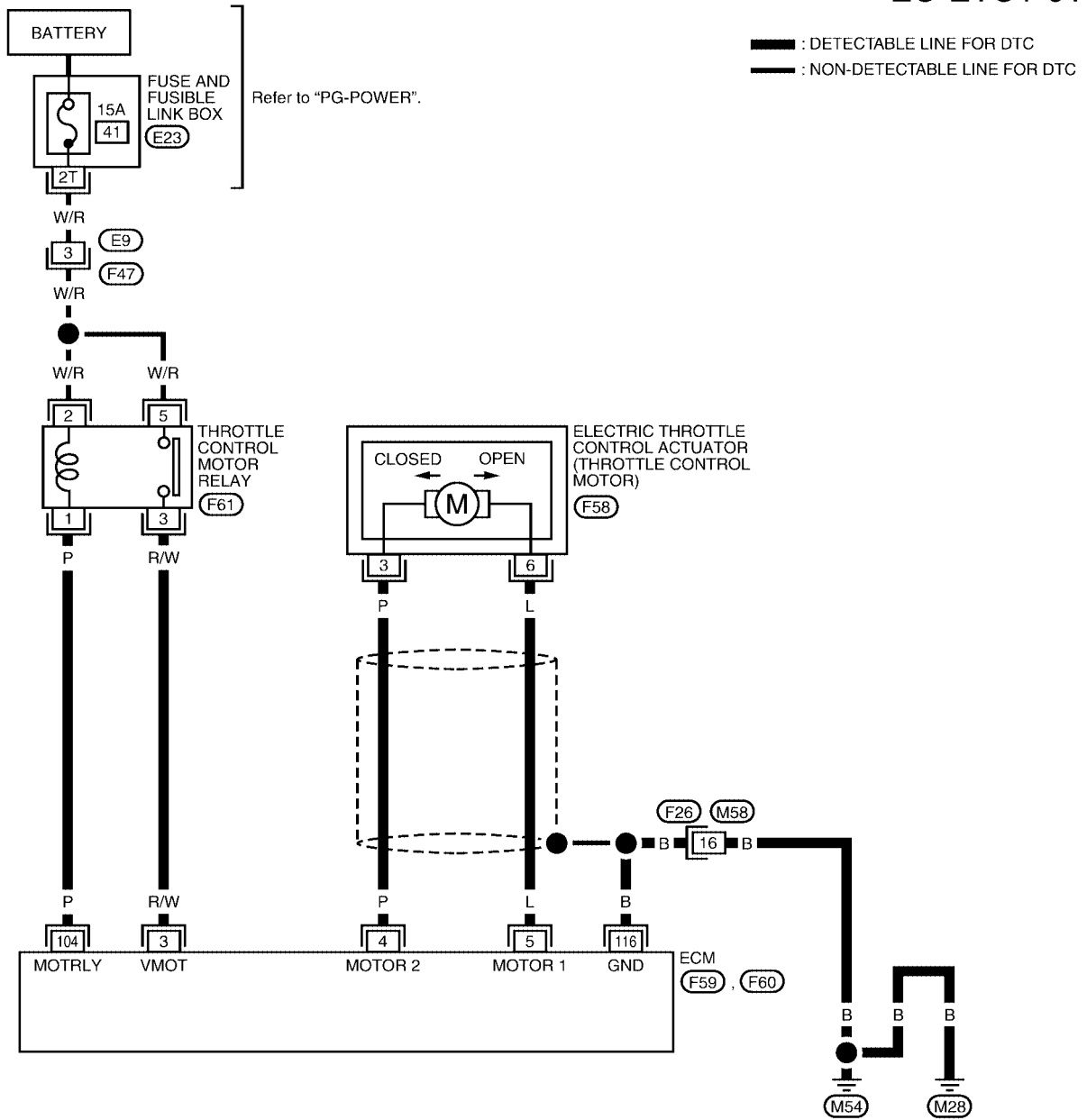
[QG18DE (SULEV)]

## Wiring Diagram

UBS003XE

EC-ETC1-01

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



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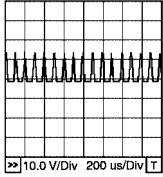
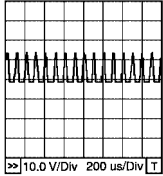
# DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	R/W	Throttle control motor power supply	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
4	P	Throttle control motor (Close)	[Ignition switch "ON"] <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Gear position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal is releasing</li> </ul>	0 - 14V★  PBIB0534E
5	L	Throttle control motor (Open)	[Ignition switch "ON"] <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Gear position is "D" (A/T models)</li> <li>● Shift lever position is "1st" (M/T models)</li> <li>● Accelerator pedal is depressing</li> </ul>	0 - 14V★  PBIB0533E
104	P	Throttle control motor relay	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

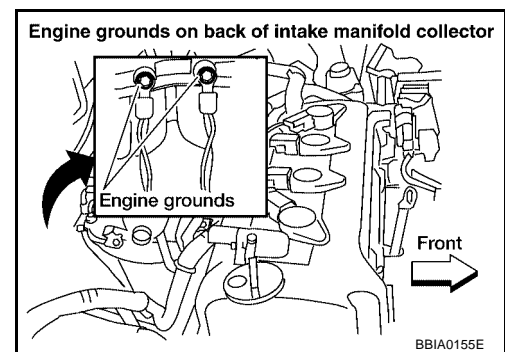
## Diagnostic Procedure

UBS003XF

### 1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF"
2. Loosen and retighten engine ground screws.

>> GO TO 2.



# DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

## [QG18DE (SULEV)]

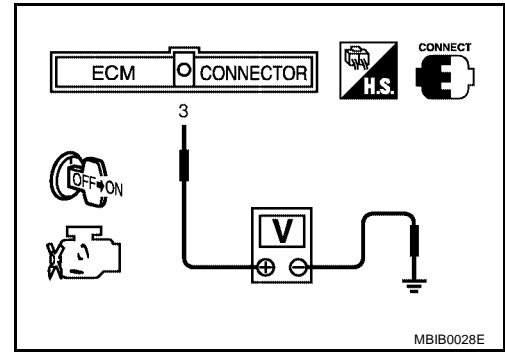
### 2. CHECK THROTTLE CONTROL MOTOR RELAY SIGNAL CIRCUIT

Check voltage between ECM terminal 3 and ground under the following conditions with CONSULT-II or tester.

Ignition switch	Voltage
OFF	Approximately 0V
ON	Battery voltage (11 - 14V)

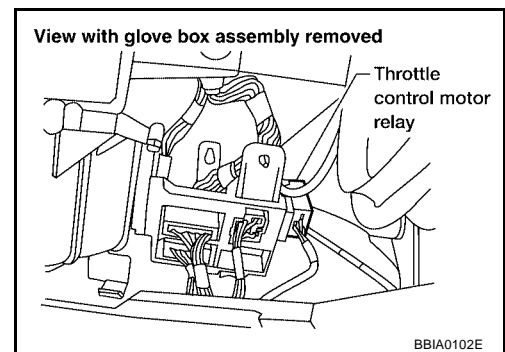
OK or NG

- OK >> GO TO 8.
- NG >> GO TO 3.



### 3. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect throttle control motor relay.

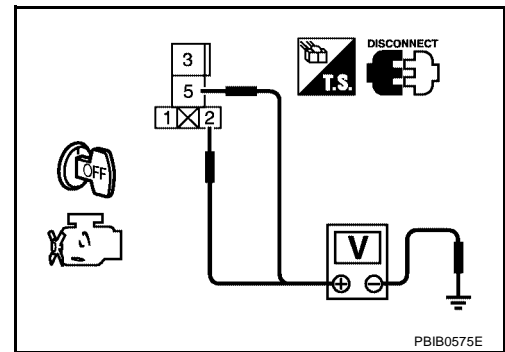


3. Check voltage between throttle control motor relay terminals 2, 5 and ground.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



### 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E9, F47
- 15A fuse
- Harness for open or short between throttle control motor relay and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

# DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

[QG18DE (SULEV)]

## 5. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 3 and throttle control motor relay terminal 3.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 6. CHECK THROTTLE CONTROL MOTOR RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check continuity between ECM terminal 104 and throttle control motor relay terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK THROTTLE CONTROL MOTOR RELAY

Refer to [EC-959, "Component Inspection"](#) .

OK or NG

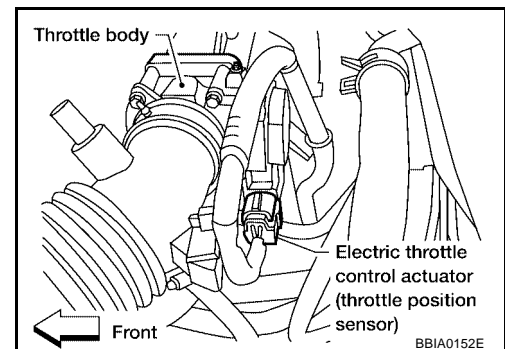
OK >> GO TO 11.

NG >> Replace throttle control motor relay.

## 8. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch "OFF".
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals.  
Refer to Wiring Diagram.

Electric throttle control actuator terminal	ECM terminal	Continuity
3	4	Should exist
	5	Should not exist
6	4	Should not exist
	5	Should exist



5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

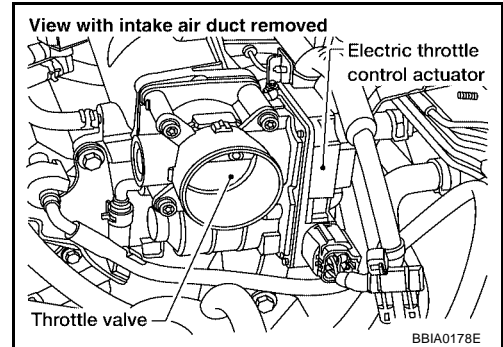
# DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION [QG18DE (SULEV)]

## 9. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve and the housing.

OK or NG

- OK >> GO TO 10.  
 NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



## 10. CHECK THROTTLE CONTROL MOTOR

Refer to [EC-959, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.  
 NG >> GO TO 12.

## 11. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> GO TO 12.  
 NG >> Repair or replace harness or connectors.

## 12. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> INSPECTION END

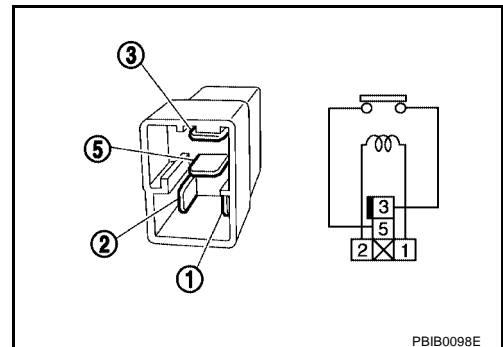
### Component Inspection THROTTLE CONTROL MOTOR RELAY

UBS006IL

1. Apply 12V direct current between relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

3. If NG, replace throttle control motor relay.



### THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.

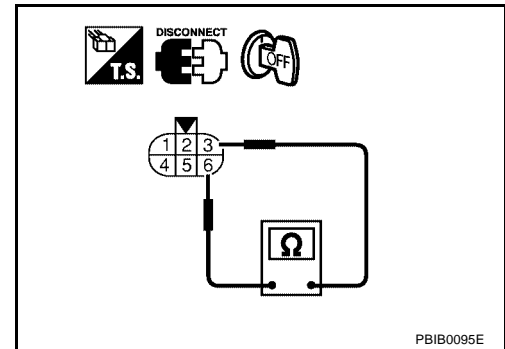
## DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

[QG18DE (SULEV)]

2. Check resistance between terminals 3 and 6.

**Resistance: Approximately 1 - 15  $\Omega$  [at 25 °C (77°F)]**

3. If NG, replace electric throttle control actuator and go to next step.
4. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-635, "Idle Air Volume Learning"](#) .



UBS006IM

### Removal and Installation ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EM-12, "OUTER COMPONENT PARTS"](#) .



# DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY [QG18DE (SULEV)]

## DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

PF16119

### Component Description

UBS003XI

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

### CONSULT-II Reference Value in Data Monitor Mode

UBS003XJ

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL RELAY	● Ignition switch: ON	ON

### On Board Diagnosis Logic

UBS003XK

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1124 1124	Throttle control motor relay circuit short	ECM detects the throttle control motor relay is stuck ON.	<ul style="list-style-type: none"> <li>● Harness or connectors (Throttle control motor relay circuit is shorted)</li> <li>● Throttle control motor relay</li> </ul>
P1126 1126	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low.	<ul style="list-style-type: none"> <li>● Harness or connectors (Throttle control motor relay circuit is open)</li> <li>● Throttle control motor relay</li> </ul>

### FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

### DTC Confirmation Procedure

UBS003XL

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### PROCEDURE FOR DTC P1124

##### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

##### With CONSULT-II

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If DTC is detected, go to [EC-964, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

# DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY [QG18DE (SULEV)]

## With GST

Follow the procedure "With CONSULT-II" above.

### PROCEDURE FOR DTC P1126

#### With CONSULT-II

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-964, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

## With GST

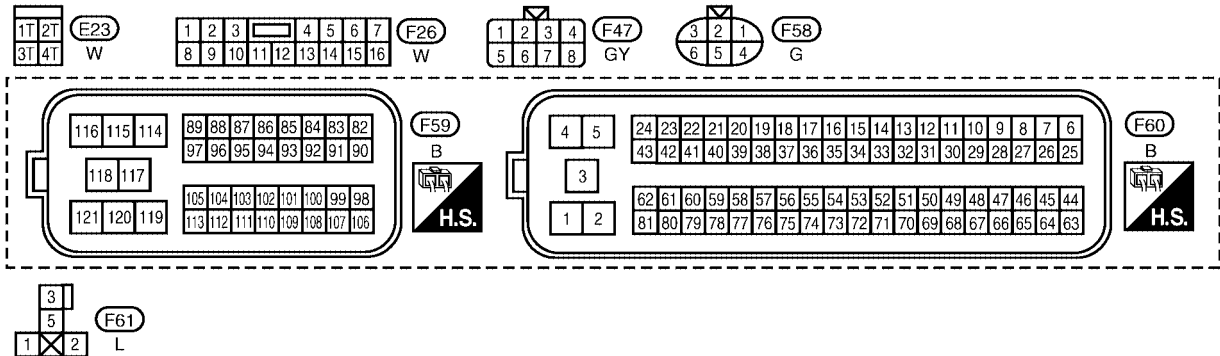
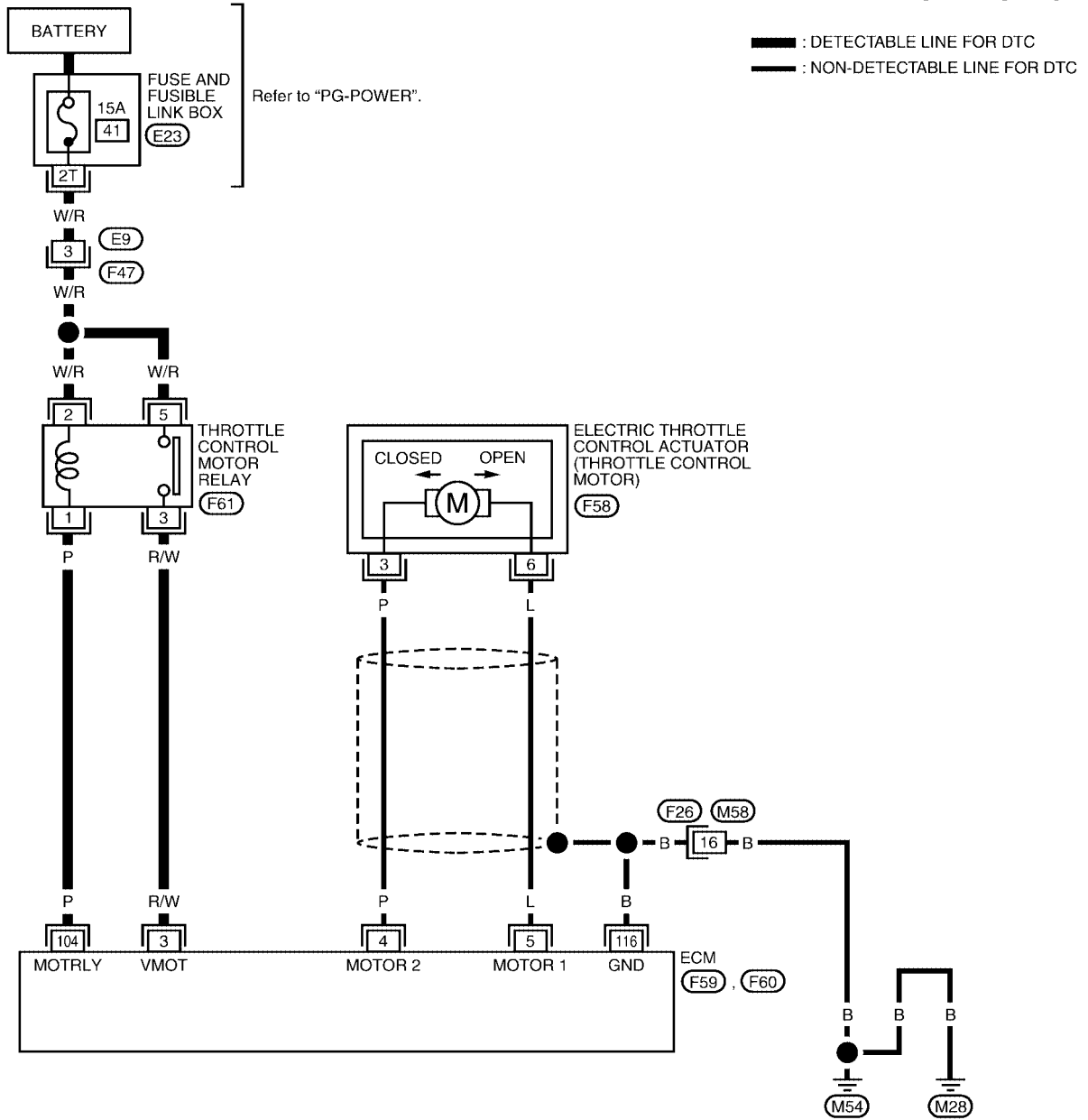
Follow the procedure "With CONSULT-II" above.

# DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY [QG18DE (SULEV)]

## Wiring Diagram

UBS003XM

EC-ETC2-01



BBWA0790E

# DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY [QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

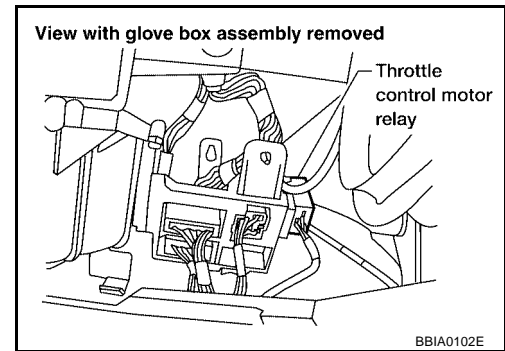
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	R/W	Throttle control motor power supply	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
104	P	Throttle control motor relay	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V

## Diagnostic Procedure

UBS003XN

### 1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect throttle control motor relay harness connector.

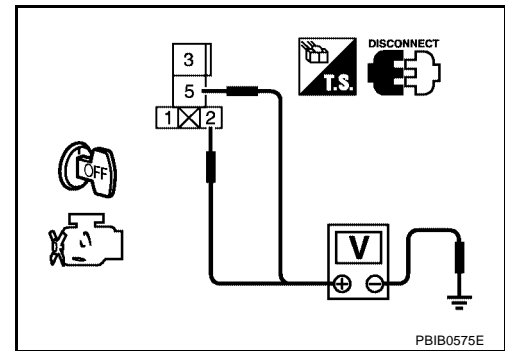


3. Check voltage between throttle control motor relay terminal 2, 5 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E9, F47
- Fuse and fusible link connector E23
- 15A fuse
- Harness for open or short between throttle control motor relay and battery

>> Repair or replace harness or connectors.

# DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY [QG18DE (SULEV)]

## 3. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check continuity between ECM terminal 3 and throttle control motor relay terminal 3.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK THROTTLE CONTROL MOTOR RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check continuity between ECM terminal 104 and throttle control motor relay terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 5. CHECK THROTTLE CONTROL MOTOR RELAY

Refer to [EC-965, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace throttle control motor relay.

## 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

**>> INSPECTION END**

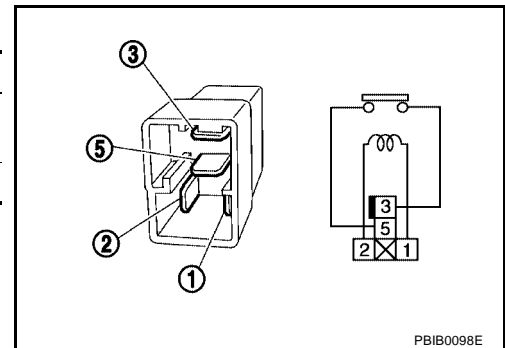
### Component Inspection THROTTLE CONTROL MOTOR RELAY

UBS0061A

1. Apply 12V direct current between relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

3. If NG, replace throttle control motor relay.



# DTC P1128 THROTTLE CONTROL MOTOR

[QG18DE (SULEV)]

## DTC P1128 THROTTLE CONTROL MOTOR

PF16119

### Component Description

UBS003X0

The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

### On Board Diagnosis Logic

UBS003XP

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1128 1128	Throttle control motor circuit short	ECM detects short in both circuits between ECM and throttle control motor.	<ul style="list-style-type: none"><li>● Harness or connectors (Throttle control motor circuit is shorted.)</li><li>● Electric throttle control actuator (Throttle control motor)</li></ul>

### FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

### DTC Confirmation Procedure

UBS003XQ

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### WITH CONSULT-II

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-968, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### WITH GST

Follow the procedure "WITH CONSULT-II" above.

# DTC P1128 THROTTLE CONTROL MOTOR

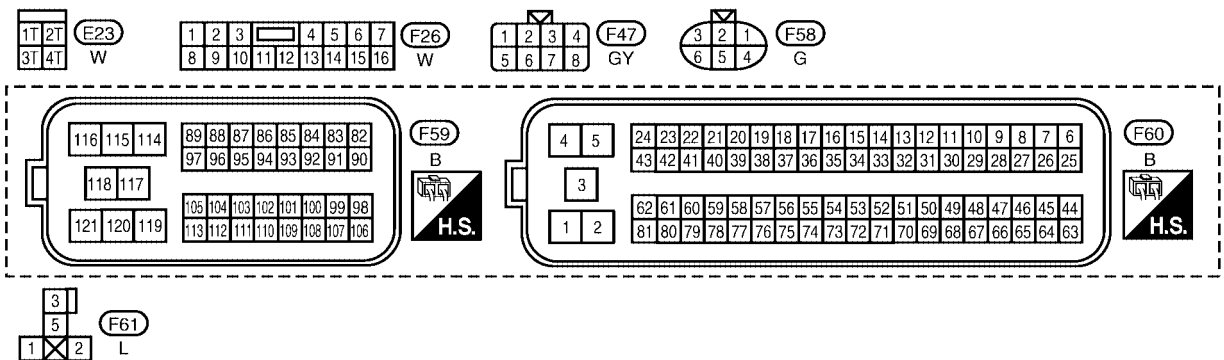
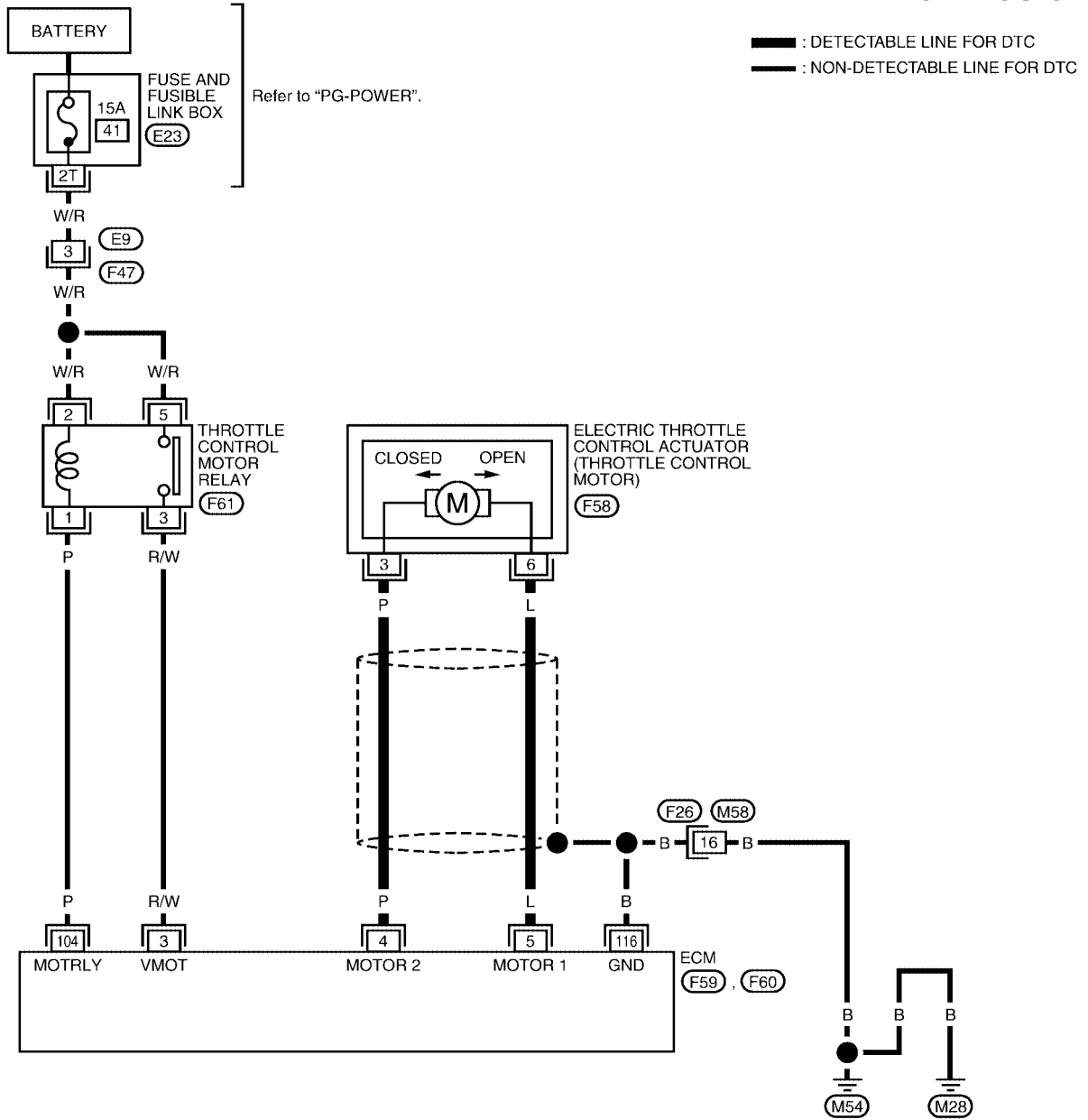
[QG18DE (SULEV)]

UBS003XR

## Wiring Diagram

EC-ETC3-01

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



BBWA0791E

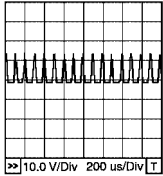
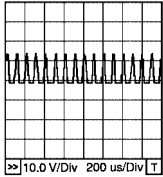
# DTC P1128 THROTTLE CONTROL MOTOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	P	Throttle control motor (Close)	<p><b>[Ignition switch "ON"]</b></p> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Gear position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal is releasing</li> </ul>	<p>0 - 14V★</p>  <p>PBIB0534E</p>
5	L	Throttle control motor (Open)	<p><b>[Ignition switch "ON"]</b></p> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Gear position is "D" (A/T models)</li> <li>● Shift lever position is "1st" (M/T models)</li> <li>● Accelerator pedal is depressing</li> </ul>	<p>0 - 14V★</p>  <p>PBIB0533E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

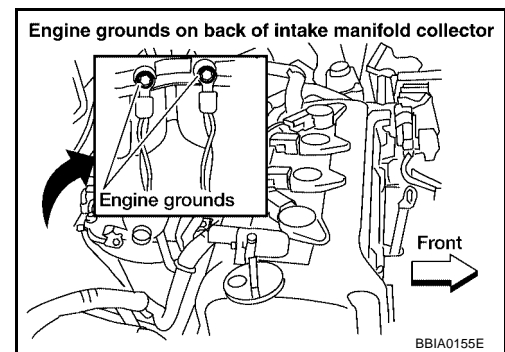
## Diagnostic Procedure

UBS003XS

### 1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.





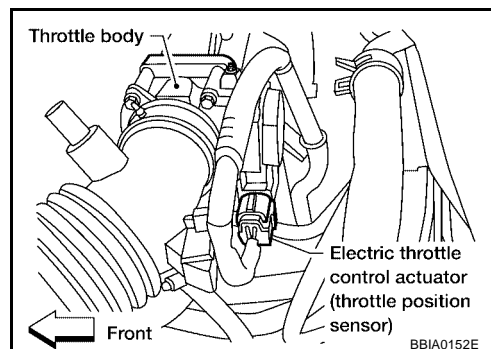
# DTC P1128 THROTTLE CONTROL MOTOR

[QG18DE (SULEV)]

## 2. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch "OFF".
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

Electric throttle control actuator terminal	ECM terminal	Continuity
3	4	Should exist
	5	Should not exist
6	4	Should not exist
	5	Should exist



5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 3. CHECK THROTTLE CONTROL MOTOR

Refer to [EC-969, "Component Inspection"](#) .

OK or NG

OK >> GO TO 4.

NG >> GO TO 5.

## 4. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> GO TO 5.

NG >> Repair or replace harness or connectors.

## 5. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> INSPECTION END

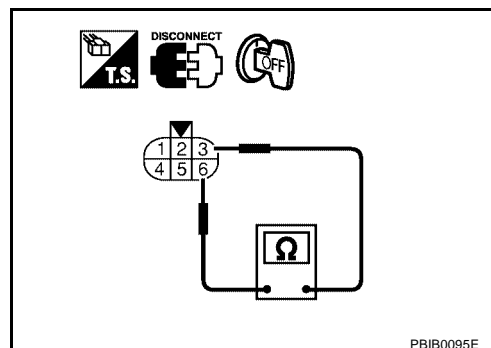
### Component Inspection THROTTLE CONTROL MOTOR

UBS003XT

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 and 6.

**Resistance: Approximately 1 - 15  $\Omega$  [at 25 °C (77°F)]**

3. If NG, replace electric throttle control actuator and go to next step.
4. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-635, "Idle Air Volume Learning"](#) .



## DTC P1128 THROTTLE CONTROL MOTOR

[QG18DE (SULEV)]

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### Removal and Installation ELECTRIC THROTTLE CONTROL ACTUATOR

UBS003XU

Refer to [EM-12, "OUTER COMPONENT PARTS"](#) .

DTC P1132 SWIRL CONTROL VALVE

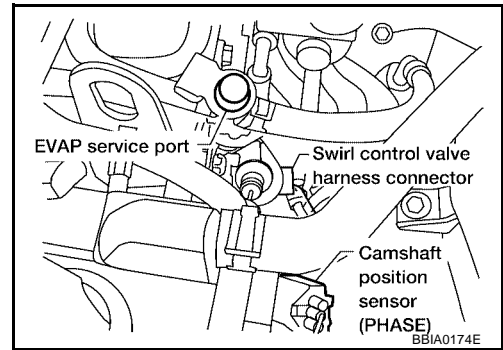
PFP:00000

Component Description

UBS00691

Swirl control valve consists of actuator and valve. The valve is installed in the intake manifold, and the actuator is connected to the rear end of the valve shaft.

The swirl control valve uses a step motor which has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes. When no change in the control position is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.



CONSULT-II Reference Value in Data Monitor Mode

UBS00692

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
SWL C/V (B1)	● Engine: Idle the engine	Engine coolant temperature is below 44°C (111°F)	0 - 5 step
		Engine coolant temperature is above 45°C (113°F)	115 - 120 step
SWL/C POSI SE	● Engine: Idle the engine	Engine coolant temperature is below 44°C (111°F)	Approx. 0 deg.
		Engine coolant temperature is above 45°C (113°F)	Approx. 80 deg.

On Board Diagnosis Logic

UBS00693

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1132 1132	Swirl control valve circuit	An improper voltage signal is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The swirl control valve circuit is open or shorted.)</li> <li>● Swirl control valve control solenoid valve</li> </ul>

DTC Confirmation Procedure

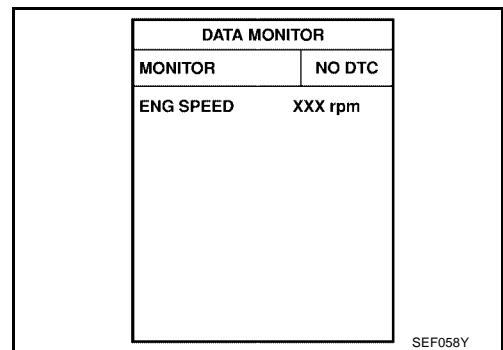
UBS00695

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 10 seconds.
4. Turn ignition switch "OFF" and wait at least 10 seconds.
5. Turn ignition switch "ON" and wait at least 2 seconds.
6. Start engine and let it idle for at least 10 seconds.
7. Maintain engine speed at about 2,000 rpm for at least 10 seconds.
8. Turn ignition switch "OFF", wait at least 10 seconds and then turn "ON".  
If 1st trip DTC is detected, go to [EC-974, "Diagnostic Procedure"](#)
- If 1st trip DTC is not detected, go to next step.
9. Perform step 5 through 8 three times.



SEF058Y

## DTC P1132 SWIRL CONTROL VALVE

[QG18DE (SULEV)]

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### WITH GST

Follow the procedure "With CONSULT-II" above.

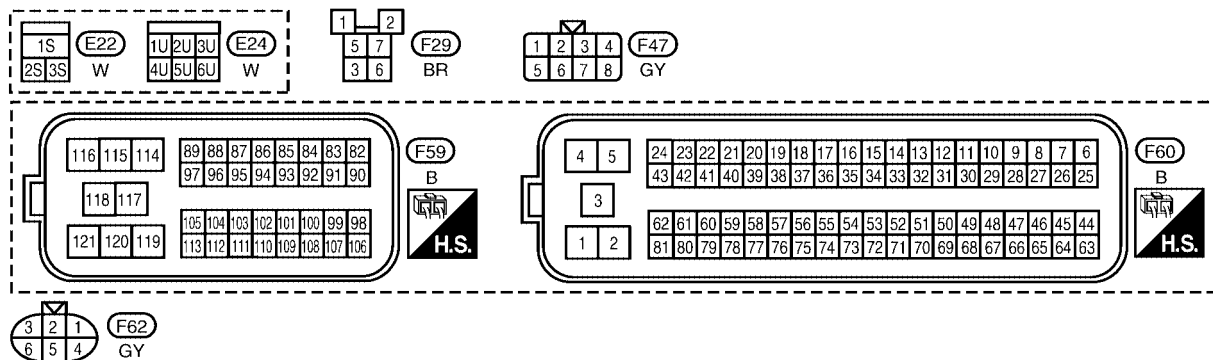
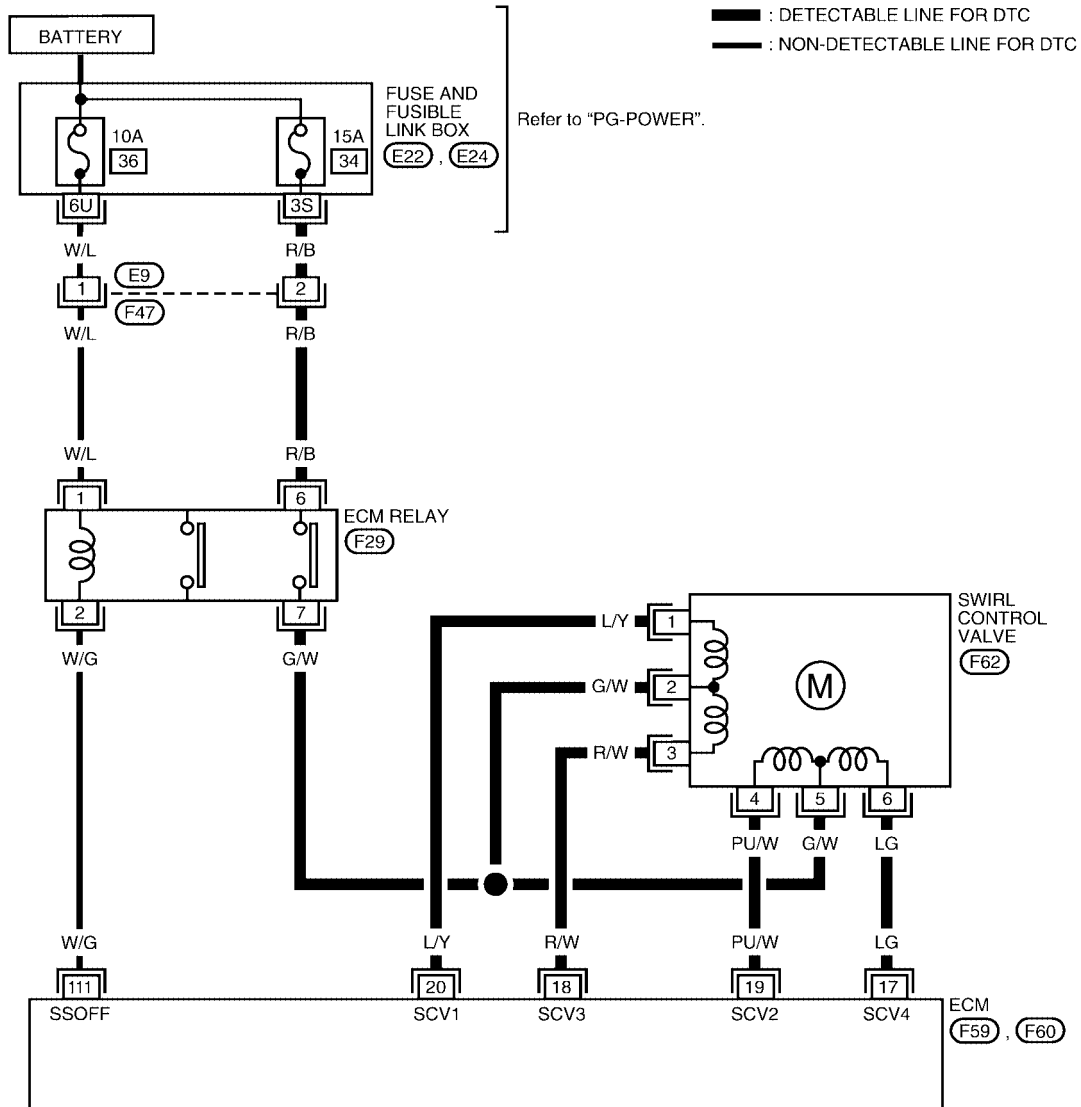
# DTC P1132 SWIRL CONTROL VALVE

[QG18DE (SULEV)]

UBS00696

## Wiring Diagram

EC-SWL/V-01



BBWA0800E

# DTC P1132 SWIRL CONTROL VALVE

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

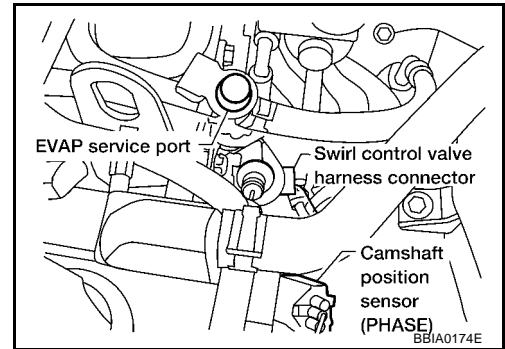
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
17	LG	Swirl control valve	<b>[Engine is running]</b> ● Idle speed	0.1 - 14V
18	R/W			
19	PU/W			
20	L/Y			

## Diagnostic Procedure

UBS00697

### 1. CHECK SWIRL CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect swirl control valve harness connector.
3. Turn ignition switch "ON".

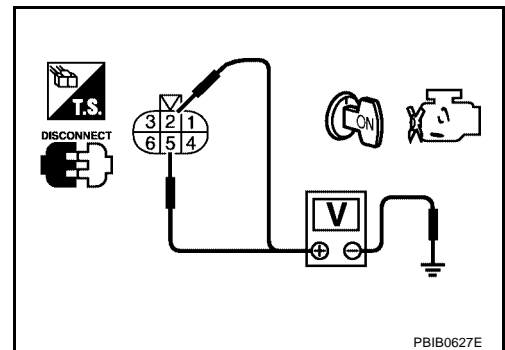


4. Check voltage between swirl control valve terminals 2, 5 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 2.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



# DTC P1132 SWIRL CONTROL VALVE

[QG18DE (SULEV)]

## 2. CHECK SWIRL CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals and swirl control valve terminals as follows. Refer to Wiring Diagram.

ECM terminal	Swirl volume control valve
17	6
18	3
19	4
20	1

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 3. CHECK SWIRL CONTROL VALVE

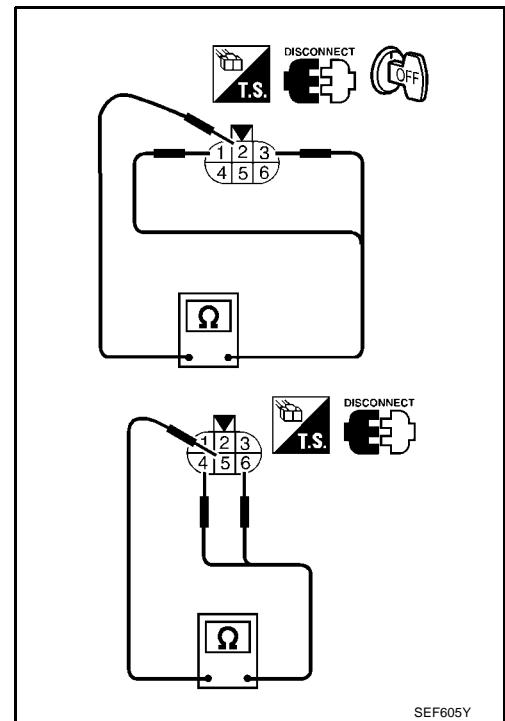
Check resistance between swirl control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.

**Resistance: 20.5 - 23.5Ω [At 20°C (68°F)]**

OK or NG

OK >> GO TO 4.

NG >> Replace intake manifold assembly.



## 4. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

## Removal and Installation SWIRL CONTROL VALVE

Refer to [EM-12, "Removal and Installation"](#) .

UBS00698

# DTC P1137 SWIRL CONTROL VALVE CONTROL POSITION SENSOR [QG18DE (SULEV)]

## DTC P1137 SWIRL CONTROL VALVE CONTROL POSITION SENSOR

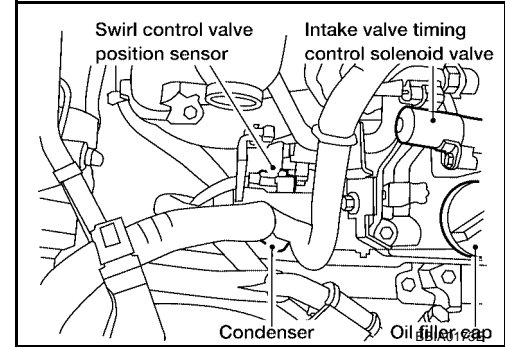
PFP:23731

### Component Description

UBS00699

Swirl control valve position sensor is installed on the intake manifold. The sensor is connected to the front end of the valve shaft of the swirl control valve.

The sensor responds to the valve shaft movement. This sensor is a kind of potentiometer which transforms the swirl control valve position into output voltage, and emits the voltage signal to the ECM.



### CONSULT-II Reference Value in Data Monitor Mode

UBS0069A

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
SWL C/V (B1)	<ul style="list-style-type: none"> <li>● Engine speed: Idle</li> </ul>	Engine coolant temperature is below 44°C (111°F).	0 - 5 step
		Engine coolant temperature is above 45°C (113°F).	115 - 120 step
SWL/C POSI SE	<ul style="list-style-type: none"> <li>● Engine speed: Idle</li> <li>● Engine coolant temperature is below 44°C (111°F).</li> </ul>		Approximately 0 deg
		<ul style="list-style-type: none"> <li>● Engine speed: Idle</li> <li>● Engine coolant temperature is above 45°C (113°F).</li> </ul>	Approximately 80 deg

### On Board Diagnosis Logic

UBS0069B

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1137 1137	Swirl control valve control position sensor circuit	An excessively low or high voltage from the sensor is ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (Swirl control valve position sensor circuit is open or shorted.)</li> <li>● Swirl control valve position sensor</li> <li>● Harness or connectors (Swirl control valve circuit is open or shorted.)</li> <li>● Swirl control valve</li> </ul>



# DTC P1137 SWIRL CONTROL VALVE CONTROL POSITION SENSOR [QG18DE (SULEV)]

UBS0069D

## DTC Confirmation Procedure

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### ⓑ WITH CONSULT-II

1. Turn ignition switch "OFF" and wait at least 10 seconds.
2. Turn ignition switch "ON".
3. Select "DATA MONITOR" mode with CONSULT-II and wait at least 5 seconds.  
If 1st trip DTC is detected, go to [EC-980, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

### Ⓒ WITH GST

Follow the procedure "WITH CONSULT-II" above.

A

EC

C

D

E

F

G

H

I

J

K

L

M

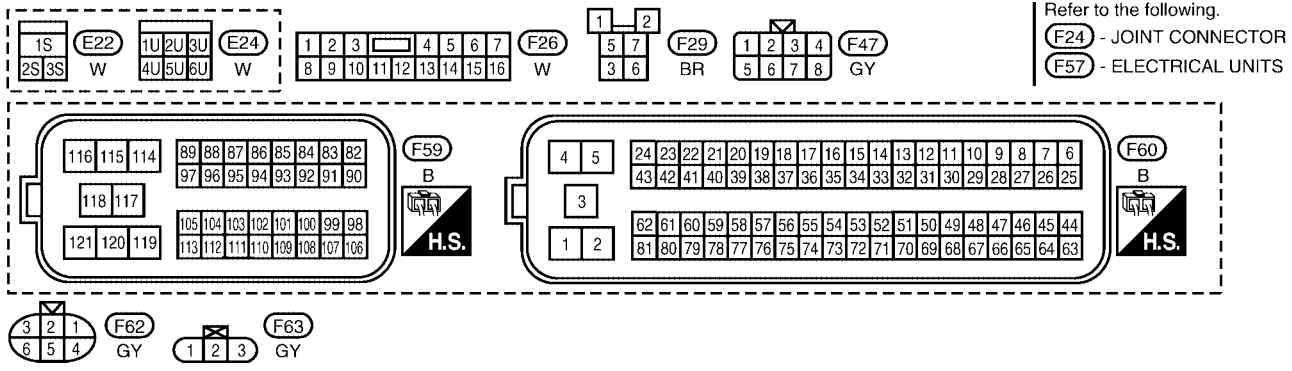
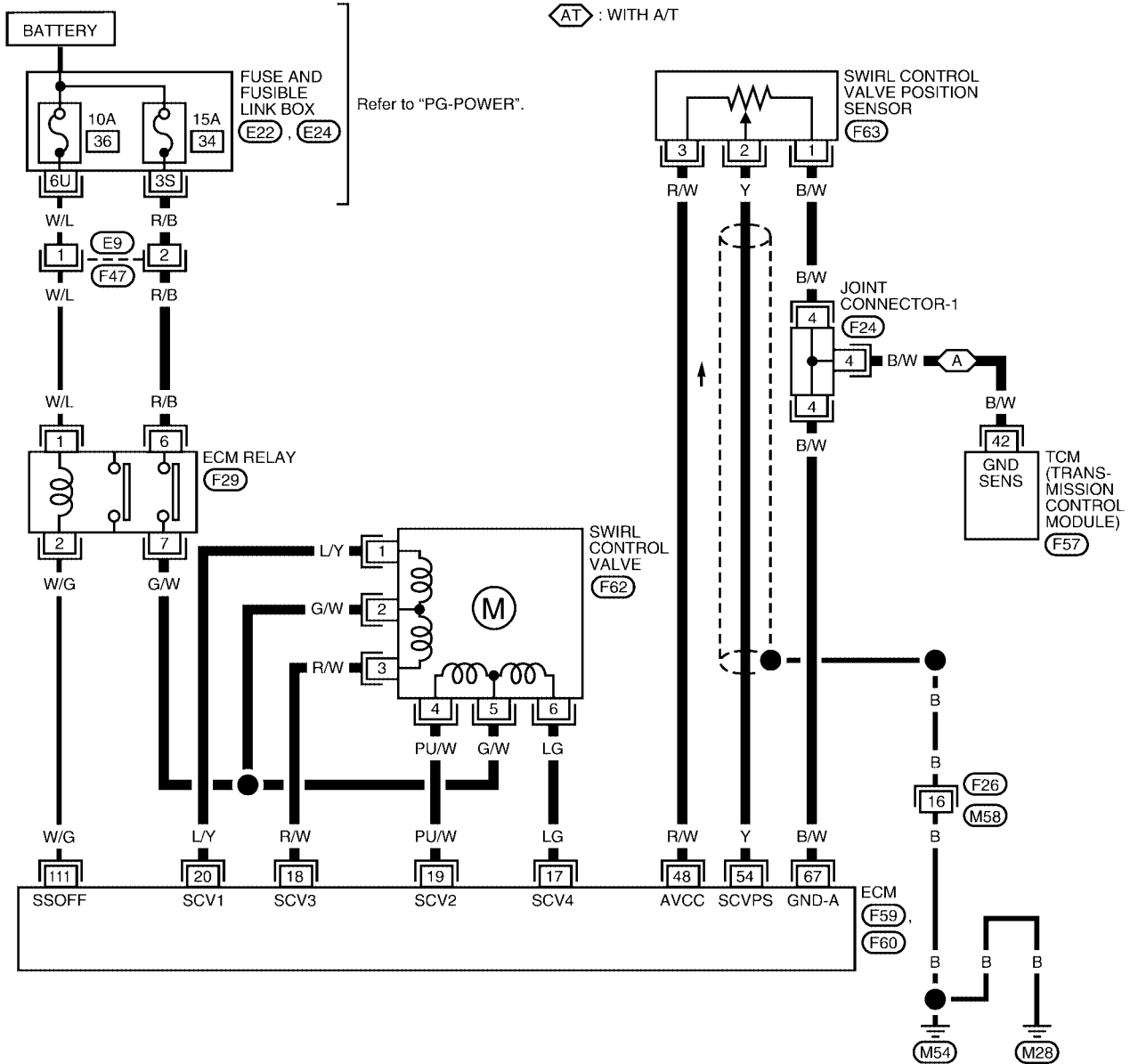
# DTC P1137 SWIRL CONTROL VALVE CONTROL POSITION SENSOR [QG18DE (SULEV)]

UBS0069E

## Wiring Diagram

EC-SWL/S-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC  
AT : WITH A/T



BBWA0801E

# DTC P1137 SWIRL CONTROL VALVE CONTROL POSITION SENSOR [QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
17 18 19 20	LG R/W PU/W L/Y	Swirl control valve	<b>[Engine is running]</b> ● Idle speed	0.1 - 14V
54	Y	Swirl control valve position sensor	<b>[Engine is running]</b> ● Idle speed ● Engine coolant temperature is below 44°C (111°F).	Approximately 5V
			<b>[Engine is running]</b> ● <b>Warm-up condition</b> ● Idle speed ● Engine coolant temperature is above 45°C (113°F).	0 - 1.0V
67	B/W	Sensor ground (Mass air flow sensor)	<b>[Engine is running]</b> ● <b>Warm-up condition</b> ● Idle speed	Approximately 0V
111	W/G	ECM relay (Self shut-off)	<b>[Engine is running]</b> <b>[Ignition switch "OFF"]</b> ● For 5 seconds after turning ignition switch "OFF"	0 - 1.0V
			<b>[Ignition switch "OFF"]</b> ● 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

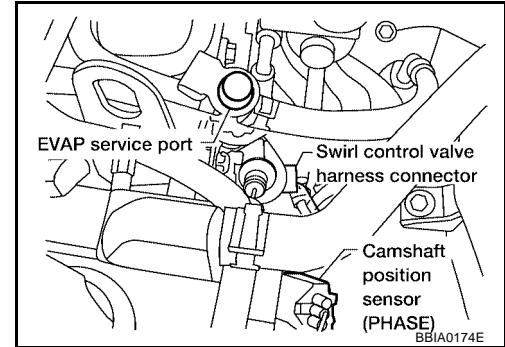
# DTC P1137 SWIRL CONTROL VALVE CONTROL POSITION SENSOR [QG18DE (SULEV)]

UBS0069F

## Diagnostic Procedure

### 1. CHECK SWIRL CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect swirl control valve harness connector.
3. Turn ignition switch "ON".

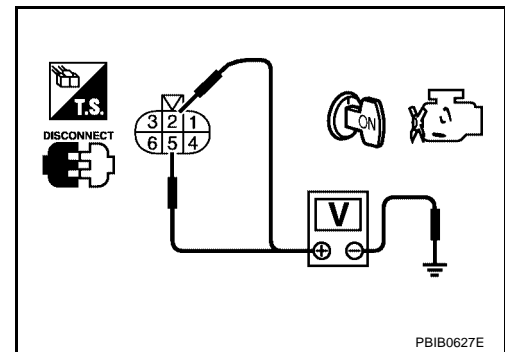


4. Check voltage between swirl control valve terminals 2, 5 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 2.  
 NG >> Repair open circuit or short to ground or short to power in harness connectors.



### 2. CHECK SWIRL CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals and swirl control valve terminals as follows. Refer to Wiring Diagram.

ECM terminal	Swirl volume control valve
17	6
18	3
19	4
20	1

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 3.  
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.

# DTC P1137 SWIRL CONTROL VALVE CONTROL POSITION SENSOR [QG18DE (SULEV)]

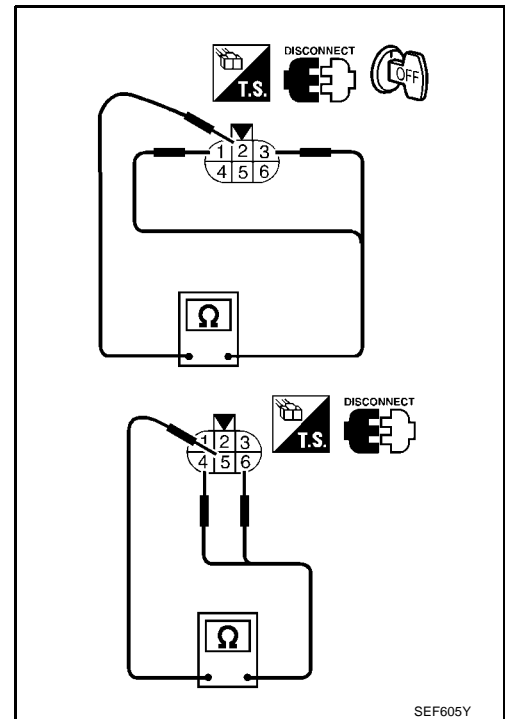
## 3. CHECK SWIRL CONTROL VALVE

Check resistance between swirl control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.

**Resistance: 20.5 - 23.5  $\Omega$  [at 20°C (68°F)]**

OK or NG

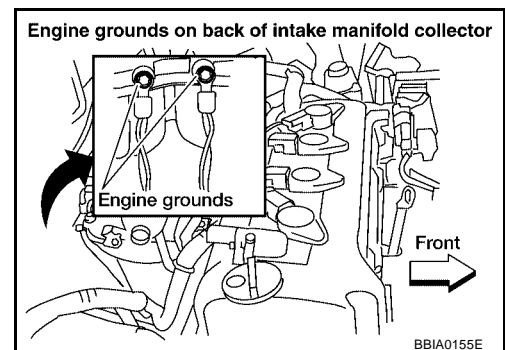
- OK >> GO TO 4.
- NG >> Replace intake manifold collector assembly.



## 4. RETIGHTEN GROUND SCREWS

Loosen and retighten engine ground screws.

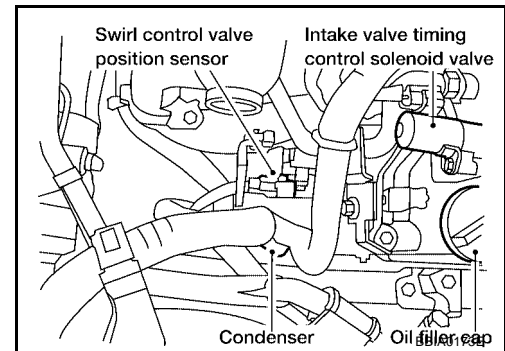
>> GO TO 5.



# DTC P1137 SWIRL CONTROL VALVE CONTROL POSITION SENSOR [QG18DE (SULEV)]

## 5. CHECK SWIRL CONTROL VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect swirl control valve position sensor harness connector.
2. Turn ignition switch "ON".

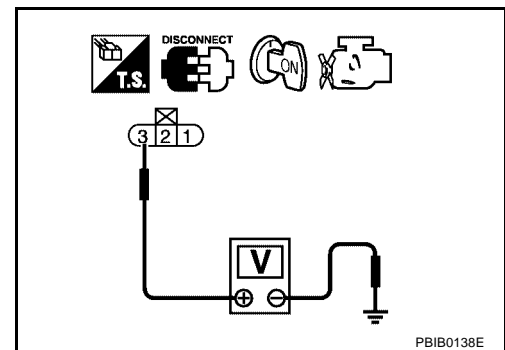


3. Check voltage between swirl control valve position sensor terminal 3 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 6.  
NG >> Repair open circuit or short to ground or short to power in harness connectors.



## 6. CHECK SWIRL CONTROL VALVE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between swirl control valve position sensor terminal 1 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 8.  
NG >> GO TO 7.

## 7. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-1
- Harness for open or short between swirl control valve position sensor and TCM
- Harness for open or short between swirl control valve position sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

# DTC P1137 SWIRL CONTROL VALVE CONTROL POSITION SENSOR [QG18DE (SULEV)]

## 8. CHECK SWIRL CONTROL VALVE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 54 and swirl control valve position sensor terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK (With CONSULT-II)>>GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 9. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace intake manifold assembly.

NG >> Repair or replace.

## Removal and Installation SWIRL CONTROL VALVE CONTROL POSITION SENSOR

UBS0069G

Refer to [EM-12, "Removal and Installation"](#) .

**DTC P1138 SWIRL CONTROL VALVE**

**Description  
SYSTEM DESCRIPTION**

Sensor	Input Signal to ECM	ECM function	Actuator
Throttle position sensor	Throttle position	Swirl control valve control	Swirl control valve
Battery	Battery voltage*		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Swirl control valve position sensor	Swirl control valve position		

\*: The ECM determines the start signal status by the signal of engine speed and battery voltage.

Swirl control valve has a valve portion in the intake passage of each cylinder. While idling and during low engine coolant temperature, the swirl control valve closes, Thus the velocity of the air in the intake passage increases, promoting the vaporization of the fuel and producing a swirl in the combustion chamber.

Because of this operation, this system tends to increase the burning speed of the gas mixture, improve fuel consumption, and increase the stability in running conditions.

Also, except when idling and during low engine coolant temperature, this system opens the swirl control valve. In this condition, this system tends to increase power by improving intake efficiency via reduction of intake flow resistance, intake flow.

The swirl control valve is operated by the ECM.

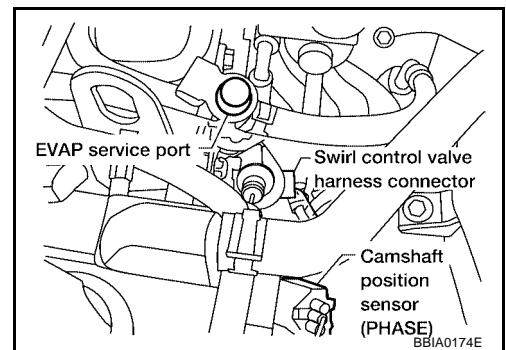
Throttle position sensor (Idle position)	Engine coolant temperature	Swirl control valve
OFF	—	Open
ON	Above 45°C (113°F)	Open
	Below 44°C (111°F)	Close

**COMPONENT DESCRIPTION**

**Swirl Control Valve**

Swirl control valve consists of actuator and valve. The valve is installed in the intake manifold, and the actuator is connected to the rear end of the valve shaft.

The swirl control valve uses a step motor which has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes. When no change in the control position is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

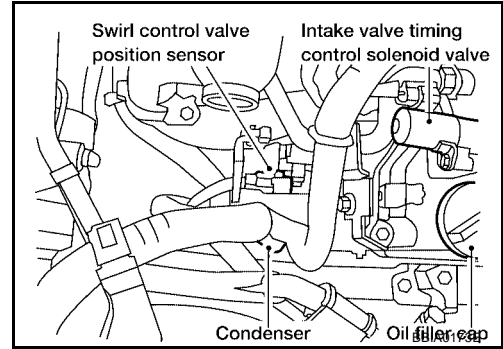




## Swirl Control Valve Position Sensor

Swirl control valve position sensor is installed on the intake manifold. The sensor is connected to the front end of the valve shaft of the swirl control valve.

The sensor responds to the valve shaft movement. This sensor is a kind of potentiometer which transforms the swirl control valve position into output voltage, and emits the voltage signal to the ECM.



## CONSULT-II Reference Value in Data Monitor Mode

UBS0069I

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
SWL C/V (B1)	● Engine speed: Idle	Engine coolant temperature is below 44°C (111°F).	0 - 5 step
		Engine coolant temperature is above 45°C (113°F).	115 - 120 step

## On Board Diagnosis Logic

UBS0069J

DTC No.	Trouble diagnosis name	DTC Detecting Condition	Possible Cause
P1138 1138	Swirl control valve control system performance	The target opening angle of swirl control valve controlled by ECM and the input signal from swirl control valve position sensor is not in the normal rang.	<ul style="list-style-type: none"> <li>● Harness or connectors (Swirl control valve position sensor circuit is open or shorted.)</li> <li>● Swirl control valve position sensor</li> <li>● Harness or connectors (Swirl control valve circuit is open or shorted.)</li> <li>● Swirl control valve</li> </ul>

## DTC Confirmation Procedure

UBS0069L

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### With CONSULT-II

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 10 seconds.
4. Turn ignition switch "OFF" and wait at least 10 seconds.
5. Turn ignition switch "ON" and wait at least 2 seconds.
6. Start engine and let it idle for at least 10 seconds.
7. Maintain engine speed at about 2,000 rpm for at least 10 seconds.
8. Turn ignition switch "OFF", wait at least 10 seconds and then turn "ON".  
If 1st trip DTC is detected, go to [EC-988, "Diagnostic Procedure"](#).  
If 1st trip DTC is not detected, go to next step.
9. Perform step 5 through 8 three times.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

#### With GST

Follow the procedure "With CONSULT-II" above.

# DTC P1138 SWIRL CONTROL VALVE

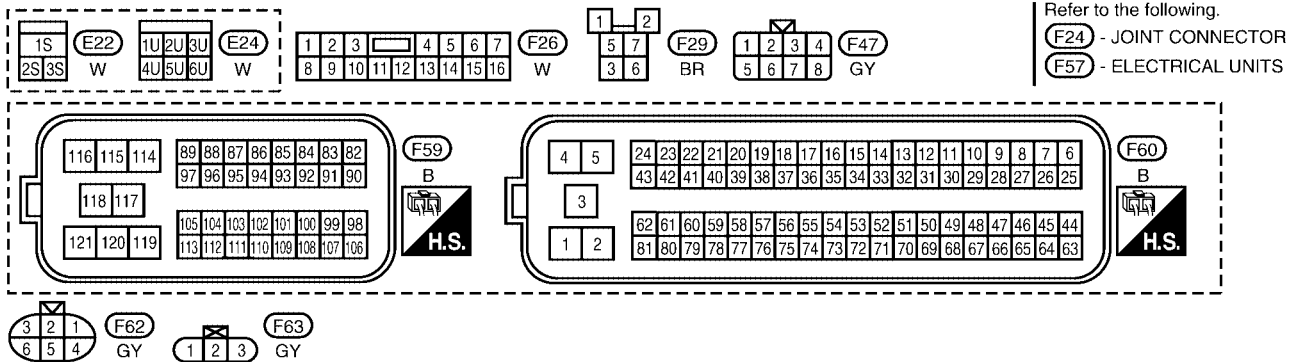
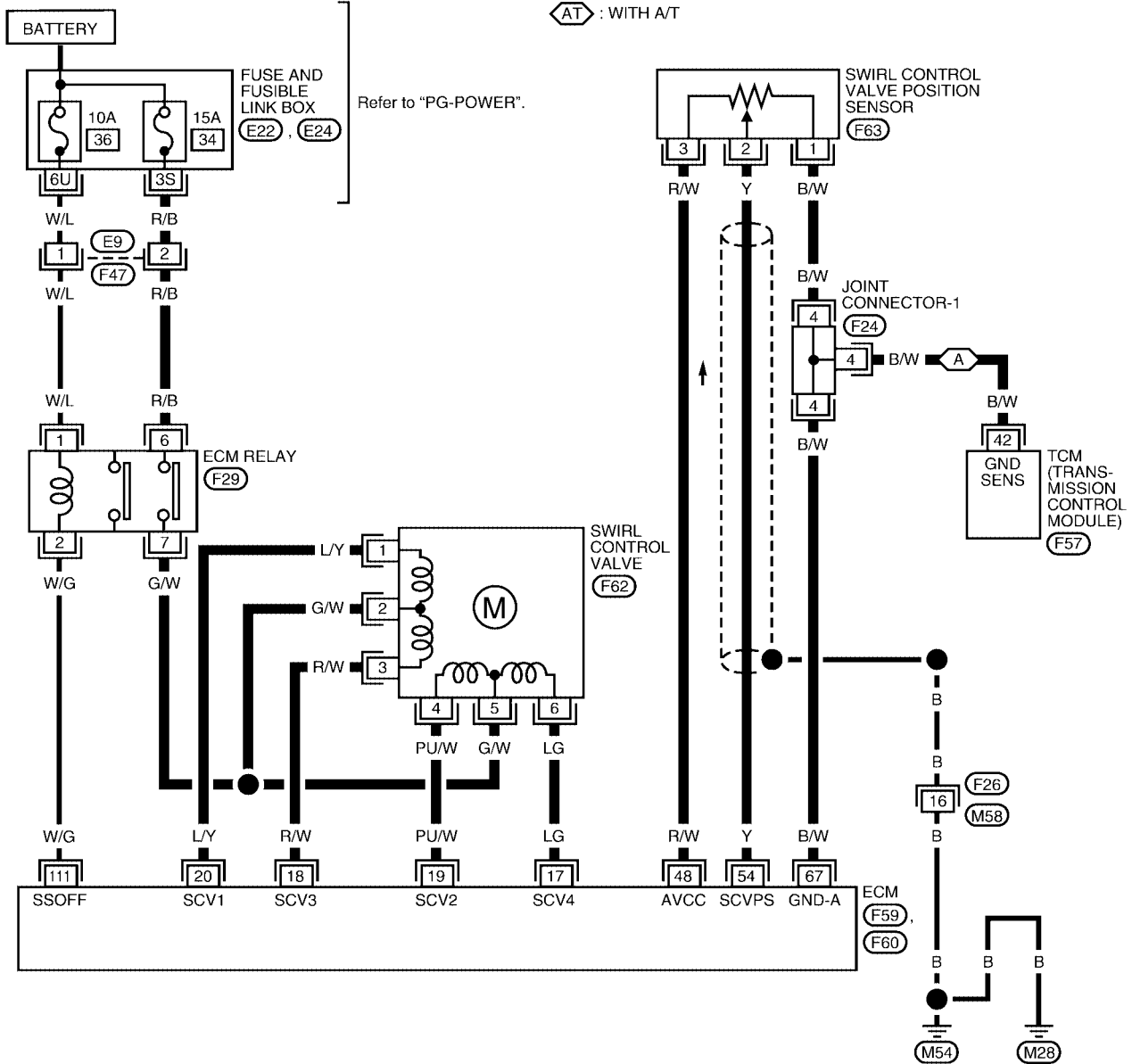
[QG18DE (SULEV)]

UBS0069M

## Wiring Diagram

EC-SWL/S-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- ⊕** : WITH A/T



BBWA0801E

# DTC P1138 SWIRL CONTROL VALVE

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

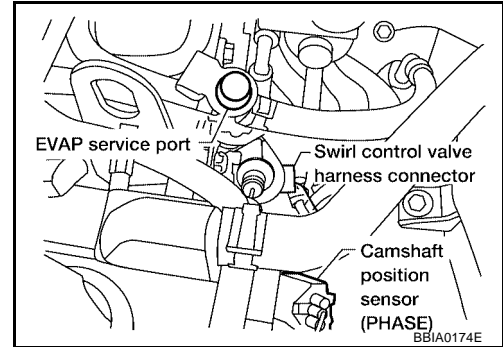
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
17 18 19 20	LG R/W PU/W L/Y	Swirl control valve	<b>[Engine is running]</b> ● Idle speed	0.1 - 14V
54	Y	Swirl control valve position sensor	<b>[Engine is running]</b> ● Idle speed ● Engine coolant temperature is below 44°C (111°F).	Approximately 5V
			<b>[Engine is running]</b> ● <b>Warm-up condition</b> ● Idle speed ● Engine coolant temperature is above 45°C (113°F).	0 - 1.0V
67	B/W	Sensor ground (Mass air flow sensor)	<b>[Engine is running]</b> ● <b>Warm-up condition</b> ● Idle speed	Approximately 0V
111	W/G	ECM relay (Self shut-off)	<b>[Engine is running]</b> <b>[Ignition switch "OFF"]</b> ● For 5 seconds after turning ignition switch "OFF"	0 - 1.0V
			<b>[Ignition switch "OFF"]</b> ● 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

**Diagnostic Procedure**

**1. CHECK SWIRL CONTROL VALVE POWER SUPPLY CIRCUIT**

1. Turn ignition switch "OFF".
2. Disconnect swirl control valve harness connector.
3. Turn ignition switch "ON".

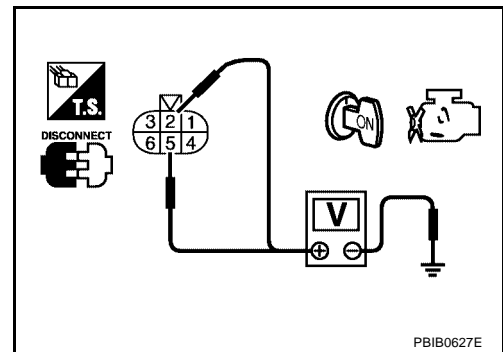


4. Check voltage between swirl control valve terminals 2, 5 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 2.
- NG >> Repair open circuit or short to ground or short to power in harness connectors.



**2. CHECK SWIRL CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. disconnect ECM harness connector.
3. Check harness continuity between ECM terminals and swirl control valve terminals as follows. Refer to Wiring Diagram.

ECM terminal	Swirl volume control valve
17	6
18	3
19	4
20	1

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 3.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

# DTC P1138 SWIRL CONTROL VALVE

[QG18DE (SULEV)]

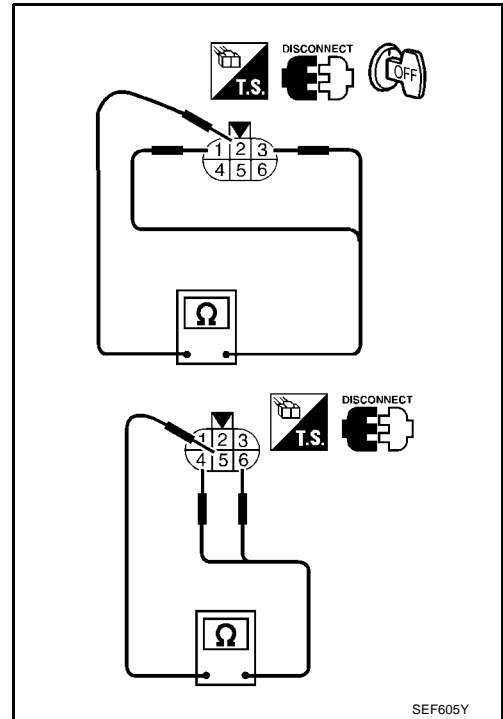
## 3. CHECK SWIRL CONTROL VALVE

Check resistance between swirl control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.

**Resistance: 20.5 - 23.5Ω [At 20°C (68°F)]**

OK or NG

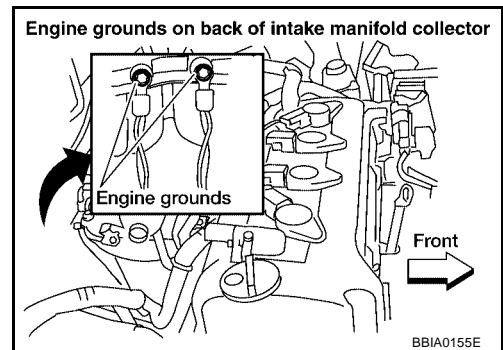
- OK >> GO TO 4.
- NG >> Replace intake manifold collector assembly.



## 4. RETIGHTEN GROUND SCREWS

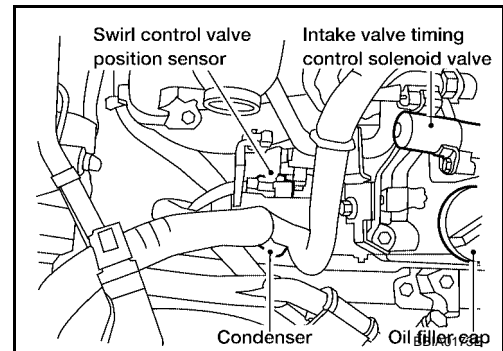
Loosen and retighten engine ground screws.

>> GO TO 5.



## 5. CHECK SWIRL CONTROL VALVE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect swirl control valve position sensor harness connector.
2. Turn ignition switch "ON".

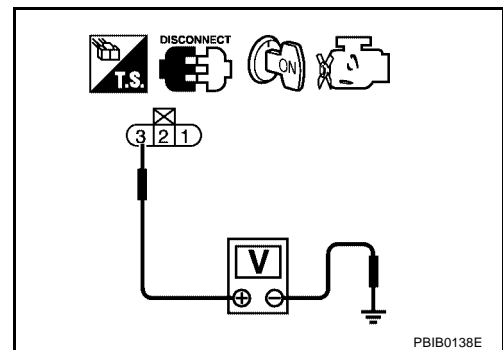


3. Check voltage between swirl control valve position sensor terminal 3 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 6.
- NG >> Repair open circuit or short to ground or short to power in harness connectors.



## 6. CHECK SWIRL CONTROL VALVE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between swirl control valve position sensor terminal 1 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

## 7. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-1
- Harness for open or short between swirl control valve position sensor and TCM
- Harness for open or short between swirl control valve position sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK SWIRL CONTROL VALVE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 54 and swirl control valve position sensor terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

**OK or NG**

OK (With CONSULT-II)>>GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**9. CHECK INTERMITTENT INCIDENT**

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

**OK or NG**

OK >> Replace intake manifold assembly.

NG >> Repair or replace.

**Removal and Installation  
SWIRL CONTROL VALVE**

UBS00690

Refer to [EM-12, "Removal and Installation"](#) .

**DTC P1146 HO2S2**

**Component Description**

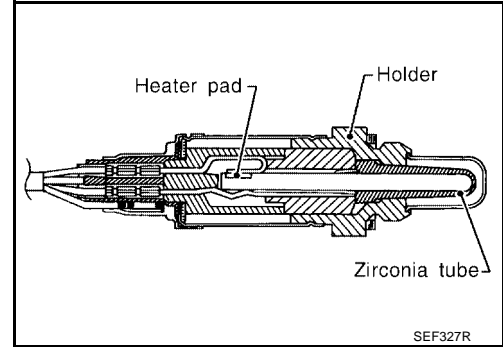
UBS0069P

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS0069Q

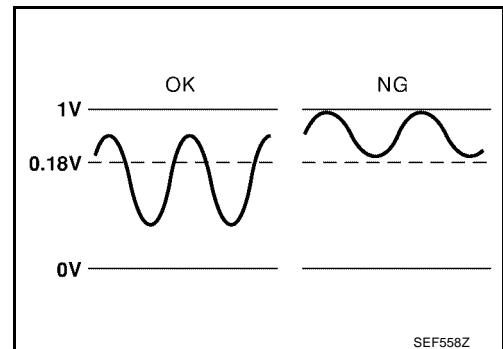
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	Revving engine from idle to 3,000 rpm quickly	0 - 0.3V ↔ 0.6 - 1.0V
HO2S2 MNTR (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	Revving engine from idle to 3,000 rpm quickly	LEAN ↔ RICH

**On Board Diagnosis Logic**

UBS0069R

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the minimum voltage of sensor is sufficiently low during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1146 1146	Heated oxygen sensor 2 minimum voltage monitoring	The minimum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Heated oxygen sensor 2</li> <li>● Fuel pressure</li> <li>● Injectors</li> </ul>



## DTC Confirmation Procedure

### NOTE:

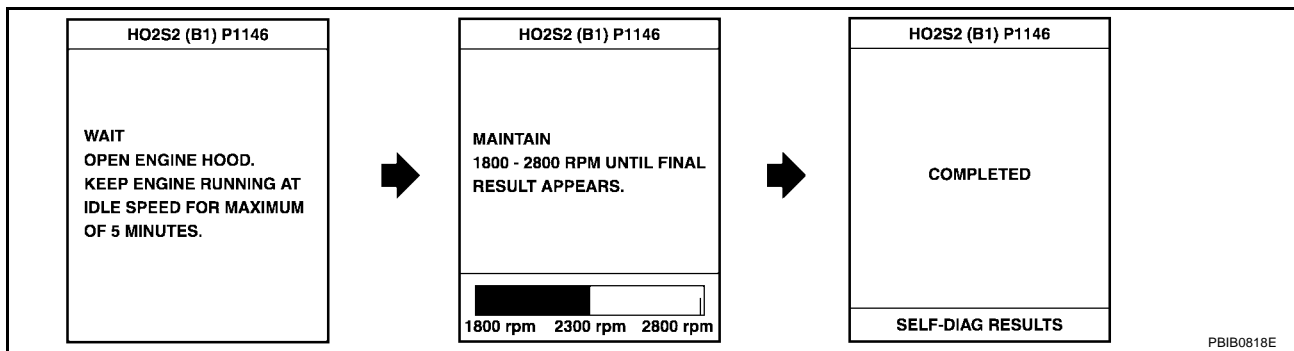
If "DTC confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### WITH CONSULT-II

#### TESTING CONDITION:

For the best results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Select "HO2S2 (B1) P1146" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II and follow the instruction of CONSULT-II.



6. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".  
If "NG" is displayed, refer to [EC-996. "Diagnostic Procedure"](#).  
If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
  - a. Turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle).
  - b. Turn ignition switch "ON" and select "COOLANTEMP/S" in "DATA MONITOR" mode with CONSULT-II.
  - c. Start engine and warm it up while monitoring "COOLANEMP/S" indication on CONSULT-II.
  - d. When "COOLANTEMP/S" indication reaches to 70°C (158°F), go to step 3.

## Overall Function Check

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a DTC might not be confirmed.

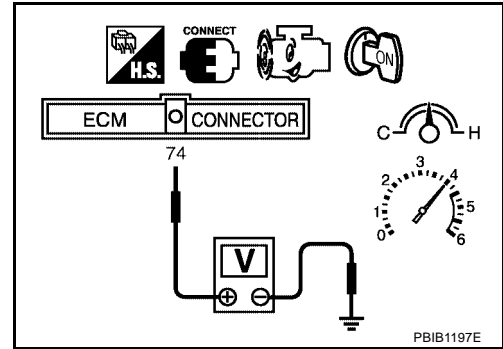
### WITH GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle one minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and engine ground.

## DTC P1146 HO2S2

[QG18DE (SULEV)]

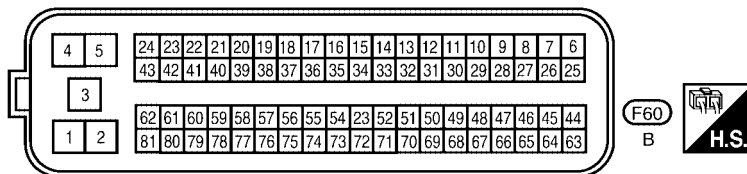
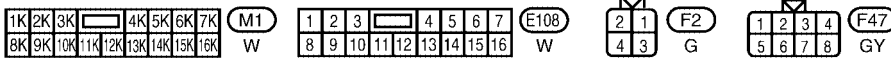
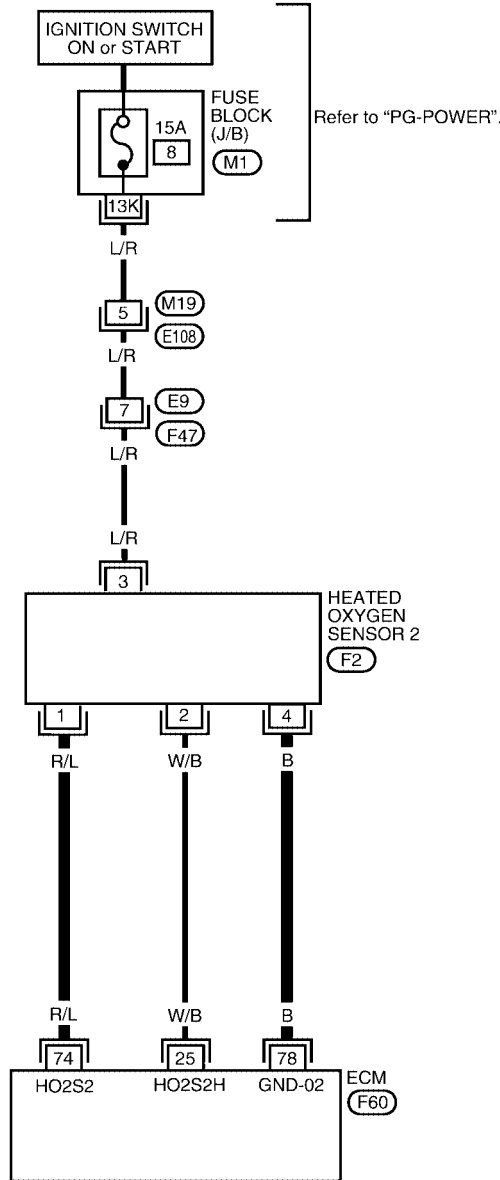
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
(Depress and release accelerator pedal as soon as possible.)  
**The voltage should be below 0.18V at least once during this procedure.**  
**If the voltage can be confirmed in step 6, step 7 is not necessary.**
7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T) "3rd" gear position (M/T).  
**The voltage should be below 0.18V at least once during this procedure.**
8. If NG, go to [EC-996, "Diagnostic Procedure"](#).



Wiring Diagram

EC-HO2S2-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	R/L	Heated oxygen sensor 2	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Revving engine from idle up to 3,000 rpm quickly after the following conditions are met.</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	0 - Approximately 1.0V
78	B	Sensor ground (Heated oxygen sensor)	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Idle speed</li> </ul>	Approximately 0V

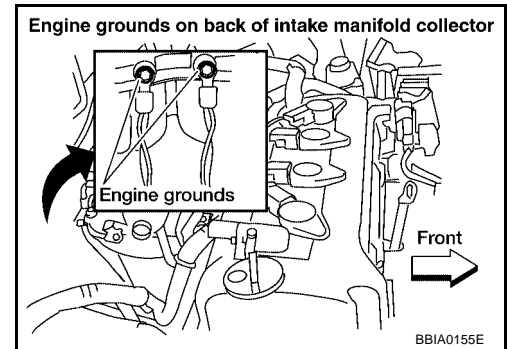
**Diagnostic Procedure**

UBS0069V

**1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

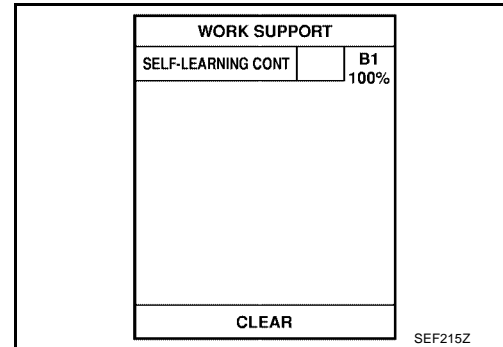
>> GO TO 2.



## 2. CLEAR THE SELF-LEARNING DATA

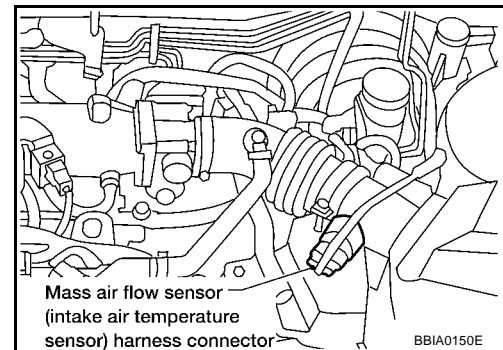
### ④ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0172 detected?  
Is it difficult to start engine?**



### ⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-651, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0172 detected?  
Is it difficult to start engine?**



#### Yes or No

- Yes >> Perform trouble diagnosis for DTC P0172. Refer to [EC-802](#) .  
No >> GO TO 3.

## 3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

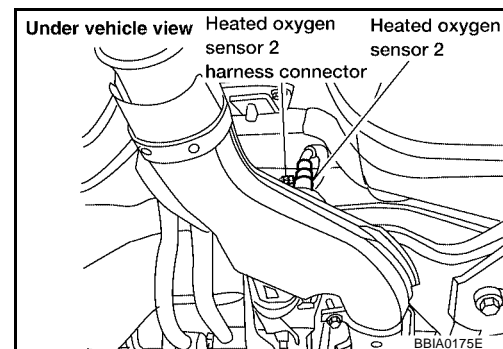
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 78 and HO2S2 terminal 4.  
Refer to Wiring Diagram.

**Continuity should exist.**

5. Also check harness for short to ground and short to power.

#### OK or NG

- OK >> GO TO 4.  
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



#### 4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 74 and HO2S2 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Check harness continuity between ECM terminal 74 or HO2S2 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

#### 5. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-998, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace heated oxygen sensor 2.

#### 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection HEATED OXYGEN SENSOR 2

UBS0069W

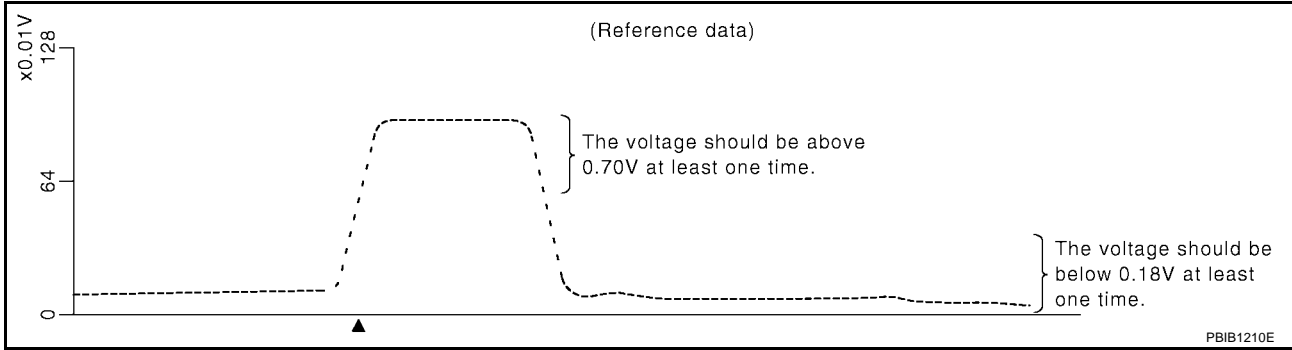
#### With CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle and wait until 2 minutes have passed from starting the engine.
5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
A/F SEN1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S3 (B1)	XXX V

SEF519Z

6. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .



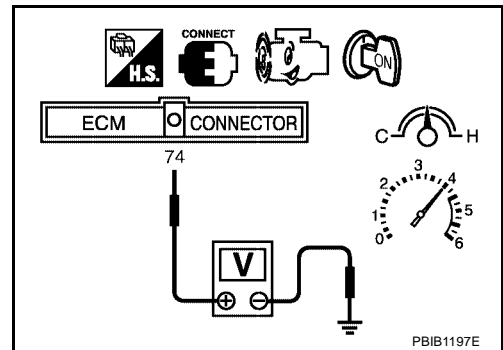
"HO2S2 (B1)" should be above 0.70V at least once when the "FUEL INJECTION" is +25%.  
 "HO2S2 (B1)" should be below 0.18V at least once when the "FUEL INJECTION" is -25%.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ **Without CONSULT-II**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
 (Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.70V at least once during this procedure.**  
**If the voltage is above 0.70V at step 6, step 7 is not necessary.**
7. Keep vehicle at idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T) "3rd" gear position.  
**The voltage should be below 0.18V at least once during this procedure.**
8. If NG, replace heated oxygen sensor 2.



**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation**  
**HEATED OXYGEN SENSOR 2**

Refer to [EX-3. "EXHAUST SYSTEM"](#) .

UBS0069X

**DTC P1147 HO2S2**

**Component Description**

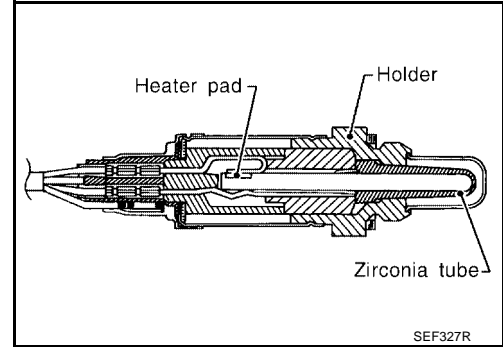
UBS0069Y

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS0069Z

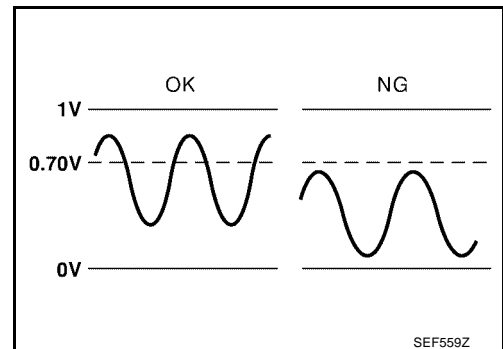
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	Revving engine from idle to 3,000 rpm quickly	0 - 0.3V ↔ 0.6 - 1.0V
HO2S2 MNTR (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load</li> </ul>	Revving engine from idle to 3,000 rpm quickly	LEAN ↔ RICH

**On Board Diagnosis Logic**

UBS006A0

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity before the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1147 1147	Heated oxygen sensor 2 maximum voltage monitoring	The maximum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit open or shorted.)</li> <li>● Heated oxygen sensor 2</li> <li>● Fuel pressure</li> <li>● Injectors</li> <li>● Intake air leaks</li> </ul>



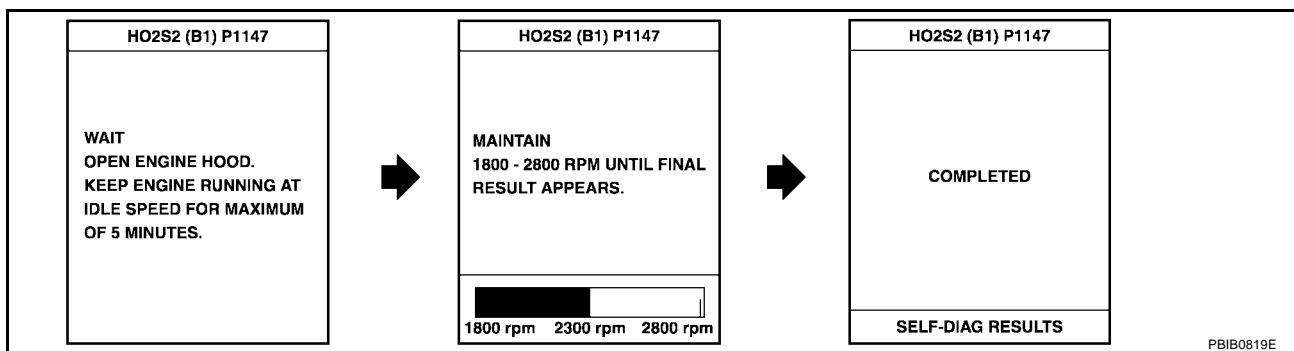
**DTC Confirmation Procedure****NOTE:**

If "DTC confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II****TESTING CONDITION:**

For the best results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Select "HO2S2 (B1) P1147" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II and follow the instruction of CONSULT-II.



6. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".  
If "NG" is displayed, refer to [EC-1004](#).  
If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
  - a. Turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle).
  - b. Turn ignition switch "ON" and select "COOLANTEMP/S" in "DATA MONITOR" mode with CONSULT-II.
  - c. Start engine and warm it up while monitoring "COOLANEMP/S" indication on CONSULT-II.
  - d. When "COOLANTEMP/S" indication reaches to 70°C (158°F), go to step 3.

**Overall Function Check**

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a DTC might not be confirmed.

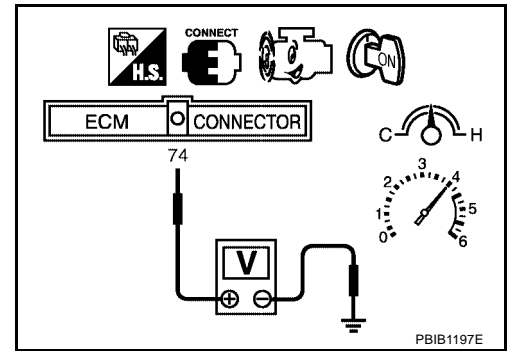
**WITH GST**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle one minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and engine ground.

## DTC P1147 HO2S2

[QG18DE (SULEV)]

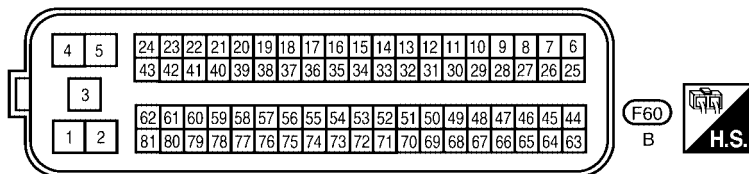
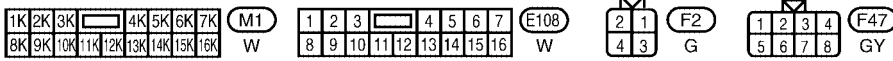
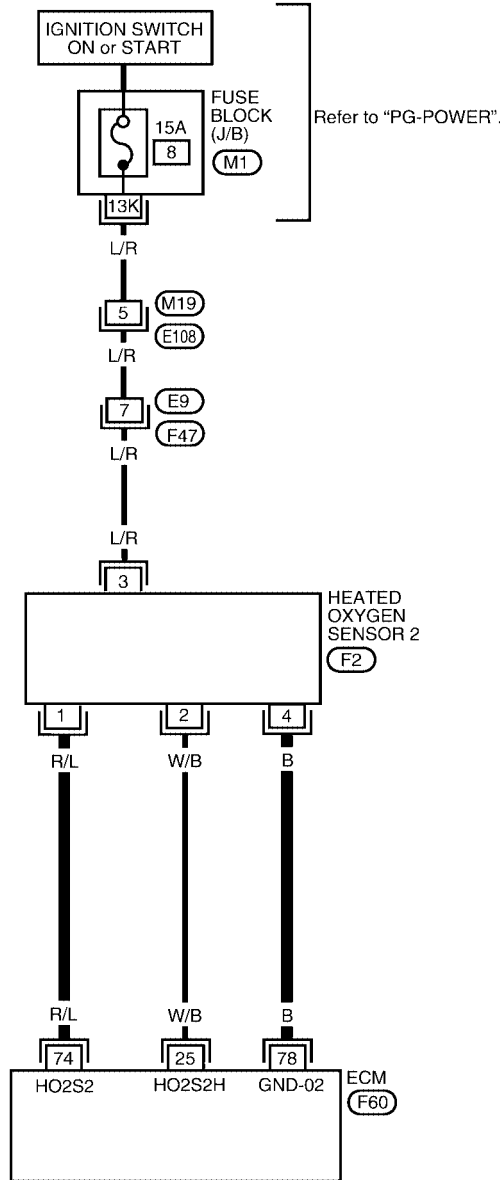
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
(Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.70V at least once during this procedure.**  
**If the voltage can be confirmed in step 6, step 7 is not necessary.**
7. Keep vehicle idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T) "3rd" gear position (M/T).  
**The voltage should be above 0.70V at least once during this procedure.**
8. If NG, go to [EC-1004, "Diagnostic Procedure"](#).



Wiring Diagram

EC-HO2S2-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	R/L	Heated oxygen sensor 2	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Revving engine from idle up to 3,000 rpm quickly after the following conditions are met.</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	0 - Approximately 1.0V
78	B	Sensor ground (Heated oxygen sensor)	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● <b>Warm-up condition</b></li> <li>● Idle speed</li> </ul>	Approximately 0V

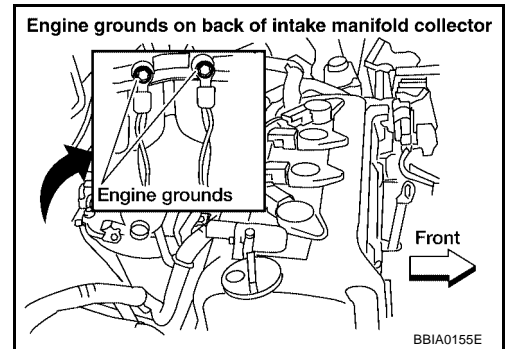
**Diagnostic Procedure**

UBS006A4

**1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

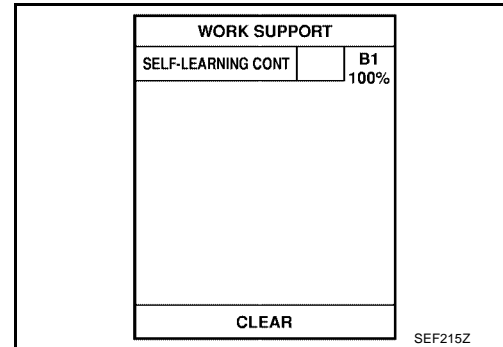
>> GO TO 2.



## 2. CLEAR THE SELF-LEARNING DATA

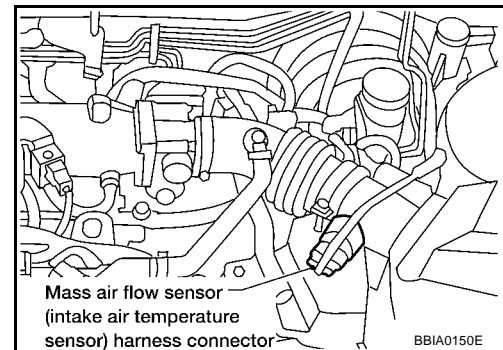
### ④ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 detected?  
Is it difficult to start engine?**



### ⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-651, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 detected?  
Is it difficult to start engine?**



#### Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171. Refer to [EC-795](#) .  
No >> GO TO 3.

## 3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

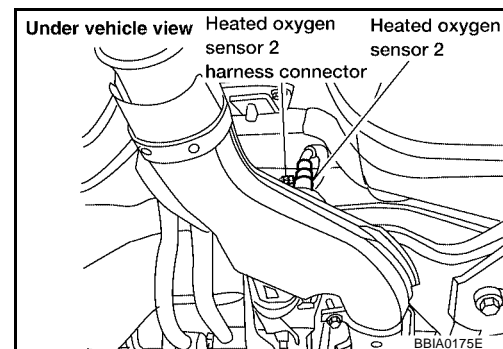
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 78 and HO2S2 terminal 4.  
Refer to Wiring Diagram.

**Continuity should exist.**

5. Also check harness for short to ground and short to power.

#### OK or NG

- OK >> GO TO 4.  
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



#### 4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 74 and HO2S2 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Check harness continuity between ECM terminal 74 or HO2S2 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

#### 5. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-1006, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace heated oxygen sensor 2.

#### 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection HEATED OXYGEN SENSOR 2

UBS006A5

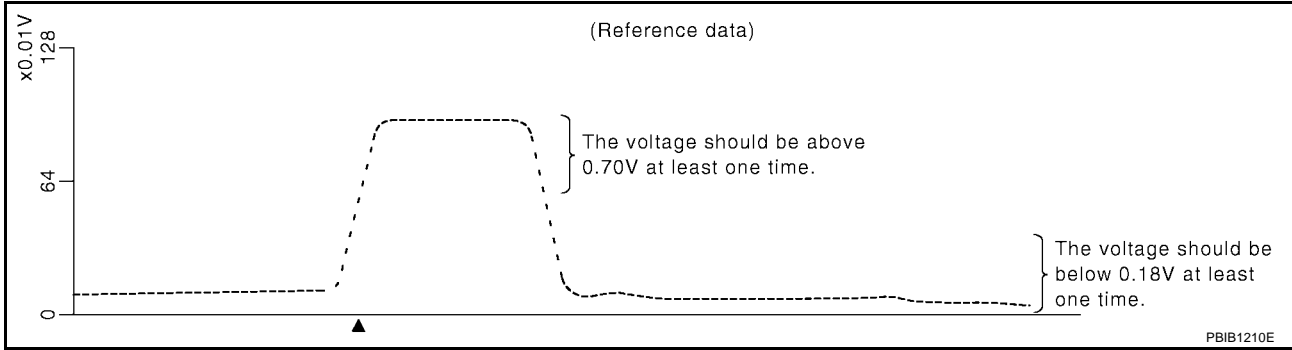
#### With CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle one minute.
5. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
A/F SEN1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S3 (B1)	XXX V

SEF519Z

6. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .



"HO2S2 (B1)" should be above 0.70V at least once when the "FUEL INJECTION" is +25%.  
 "HO2S2 (B1)" should be below 0.18V at least once when the "FUEL INJECTION" is -25%.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

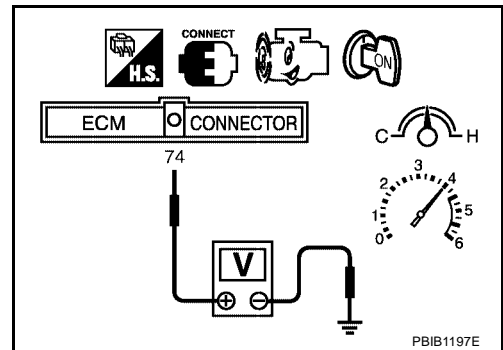
⊗ **Without CONSULT-II**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.

(Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.70V at least once during this procedure.**

**If the voltage is above 0.70V at step 6, step 7 is not necessary.**

7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T) "3rd gear" position.  
**The voltage should be below 0.18V at least once during this procedure.**



8. If NG, replace heated oxygen sensor 2.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation  
 HEATED OXYGEN SENSOR 2**

UBS006A6

Refer to [EX-3. "EXHAUST SYSTEM"](#) .

# DTC P1148 CLOSED LOOP CONTROL

[QG18DE (SULEV)]

## DTC P1148 CLOSED LOOP CONTROL

PFP:22690

### On Board Diagnosis Logic

UBS006A7

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1148 1148	Closed loop control function	The closed loop control function for bank 1 does not operate even when vehicle is driving in the specified condition.	<ul style="list-style-type: none"><li>● The air fuel ratio (A/F) sensor 1 circuit is open or shorted.</li><li>● Air fuel ratio (A/F) sensor 1</li><li>● Air fuel ratio (A/F) sensor 1 heater</li></ul>

DTC P1148 is displayed with another DTC for air fuel ratio (A/F) sensor 1. Perform the trouble diagnosis for the corresponding DTC.



# DTC P1217 ENGINE OVER TEMPERATURE

[QG18DE (SULEV)]

## DTC P1217 ENGINE OVER TEMPERATURE

PF0:0000

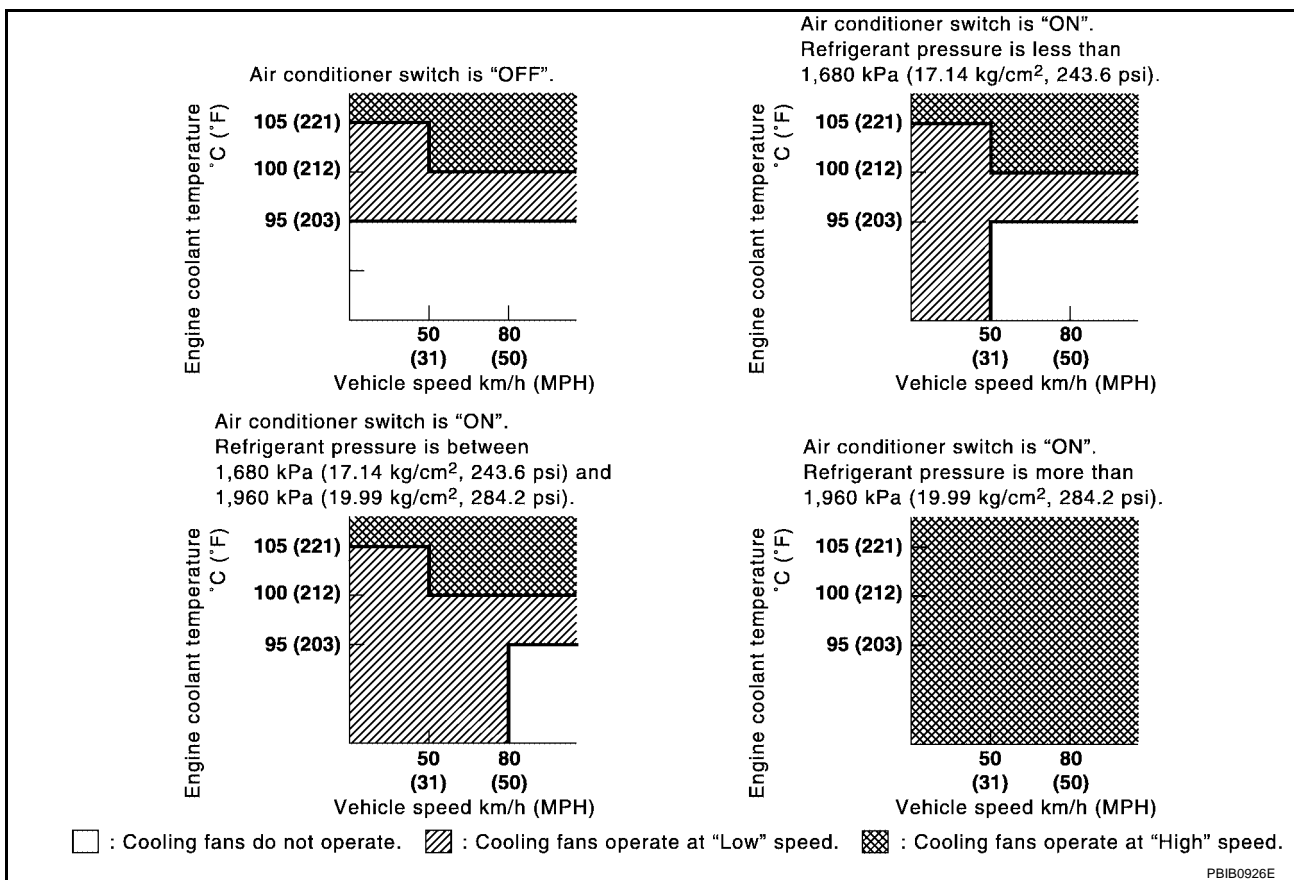
### System Description COOLING FAN CONTROL

UBS0021S

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed sensor	Vehicle speed	Cooling fan control	Cooling fan relay(s)
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner "ON" signal		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

### OPERATION



### CONSULT-II Reference Value in Data Monitor Mode

UBS0021T

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
AIR COND SIG	● Engine: After warming up, idle the engine	A/C switch "OFF"
		A/C switch: "ON" (Compressor operates)
		OFF
		ON

# DTC P1217 ENGINE OVER TEMPERATURE

[QG18DE (SULEV)]

MONITOR ITEM	CONDITION		SPECIFICATION
COOLING FAN	<ul style="list-style-type: none"> <li>After warming up engine, idle the engine.</li> <li>Air conditioner switch: OFF</li> </ul>	Engine coolant temperature is 94°C (201°F) or less	OFF
		Engine coolant temperature is between 95°C (203°F) and 104°C (219°F)	LOW
		Engine coolant temperature is 105°C (221°F) or more	HIGH

## On Board Diagnosis Logic

UBS0021U

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.

When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P1217 1217	Engine over temperature (Overheat)	<ul style="list-style-type: none"> <li>Cooling fan does not operate properly (Overheat).</li> <li>Cooling fan system does not operate properly (Overheat).</li> <li>Engine coolant was not added to the system using the proper filling method.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (The cooling fan circuit is open or shorted.)</li> <li>Cooling fan</li> <li>Radiator hose</li> <li>Radiator</li> <li>Radiator cap</li> <li>Water pump</li> <li>Thermostat</li> </ul> <p>For more information, refer to <a href="#">EC-1021, "Main 12 Causes of Overheating"</a>.</p>

### CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to [MA-16, "Changing Engine Coolant"](#). Also, replace the engine oil. Refer to [MA-20, "Changing Engine Oil"](#).

- Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to [MA-14, "Anti-freeze Coolant Mixture Ratio"](#).
- After refilling coolant, run engine to ensure that no water-flow noise is emitted.

## Overall Function Check

UBS0021V

Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

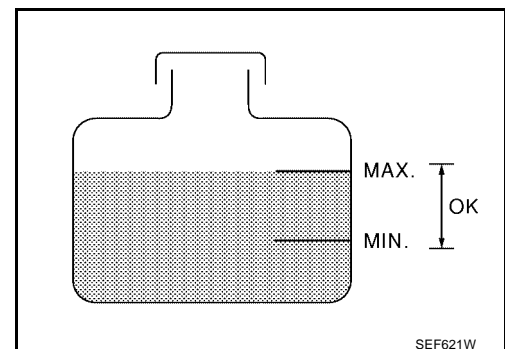
### WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.

Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

### WITH CONSULT-II

- Check the coolant level in the reservoir tank and radiator.  
**Allow engine to cool before checking coolant level.**  
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to [EC-1013, "Diagnostic Procedure"](#).
- Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-1013, "Diagnostic Procedure"](#).
- Turn ignition switch "ON".



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# DTC P1217 ENGINE OVER TEMPERATURE

[QG18DE (SULEV)]

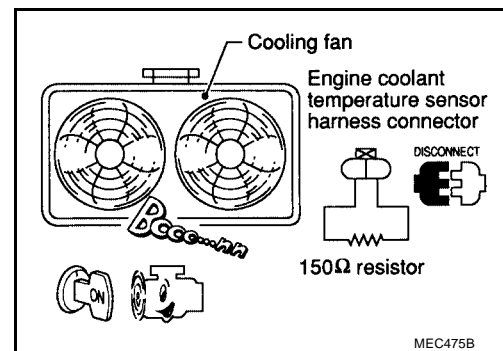
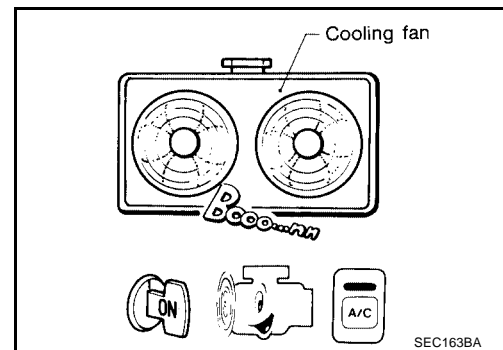
4. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
5. If the results are NG, go to [EC-1013, "Diagnostic Procedure"](#).

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLANT TEMP/S	XXX °C

SEF646X

## WITH GST

1. Check the coolant level in the reservoir tank and radiator.  
**Allow engine to cool before checking coolant level.**  
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to [EC-1013, "Diagnostic Procedure"](#).
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-1013, "Diagnostic Procedure"](#).
3. Start engine.  
**Be careful not to overheat engine.**
4. Set temperature control lever to full cold position.
5. Turn air conditioner switch "ON".
6. Turn blower fan switch "ON".
7. Run engine at idle for a few minutes with air conditioner operating.  
**Be careful not to overheat engine.**
8. Make sure that cooling fan operates at low speed.  
If NG, go to [EC-1013, "Diagnostic Procedure"](#).  
If OK, go to the following step.
9. Turn ignition switch "OFF".
10. Turn air conditioner switch and blower fan switch "OFF".
11. Disconnect engine coolant temperature sensor harness connector.
12. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
13. Restart engine and make sure that cooling fan operates at higher speed than low speed.  
**Be careful not to overheat engine.**
14. If NG, go to [EC-1013, "Diagnostic Procedure"](#).



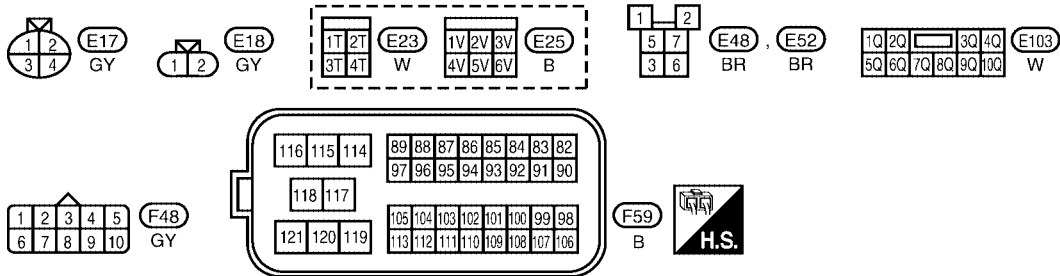
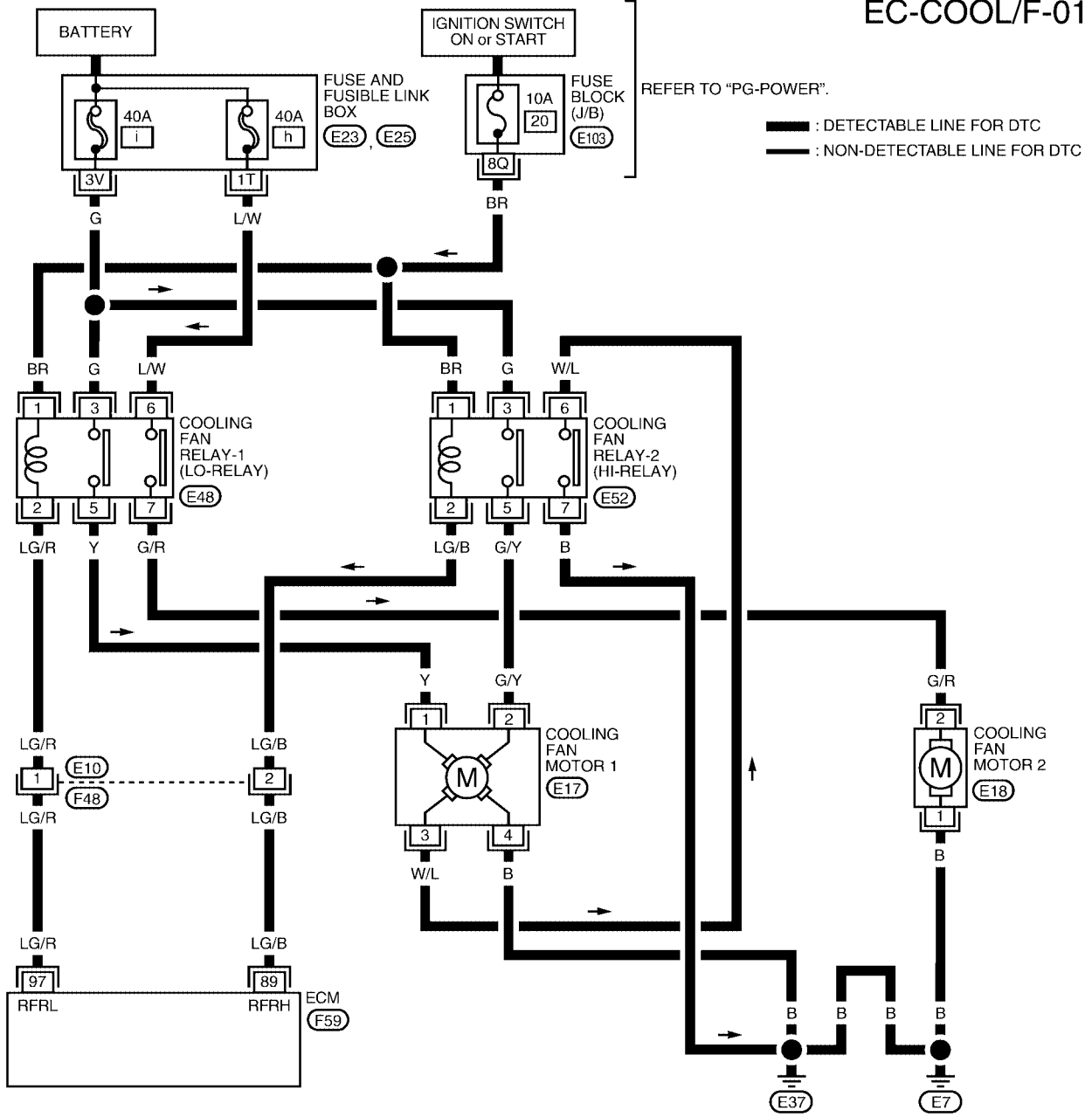
# DTC P1217 ENGINE OVER TEMPERATURE

[QG18DE (SULEV)]

UBS0021W

## Wiring Diagram

EC-COOL/F-01



BBWA0300E

# DTC P1217 ENGINE OVER TEMPERATURE

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
89	LG/B	Cooling fan relay (High)	[Engine is running] ● Cooling fan is not operating	BATTERY VOLTAGE (11-14V)
			[Engine is running] ● Cooling fan is high speed operating	0 - 1.0V
97	LG/R	Cooling fan relay (Low)	[Ignition switch "ON"] ● Cooling fan is not operating	BATTERY VOLTAGE (11-14V)
			[Ignition switch "ON"] ● Cooling fan is operating	0 - 1.0V

## Diagnostic Procedure

UBS0021X

### 1. INSPECTION START

Do you have CONSULT-II?

Yes or No

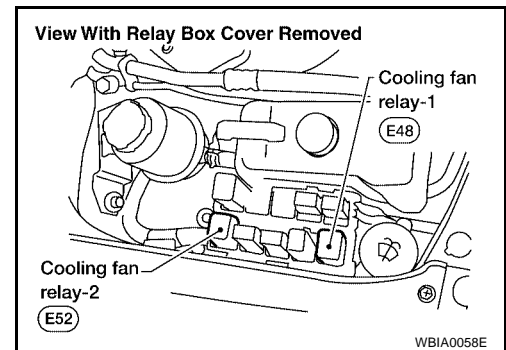
Yes >> GO TO 2.

No >> GO TO 4.

### 2. CHECK COOLING FAN LOW SPEED OPERATION

 **With CONSULT-II**

1. Disconnect cooling fan relay-2.
2. Turn ignition switch "ON".



3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
4. Make sure that cooling fans-1 and -2 operate at low speed.

OK or NG

OK >> GO TO 3.

NG >> Check cooling fan low speed control circuit. (Go to PROCEDURE A, [EC-1017](#).)

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLANT TEMP/S	XXX °C

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# DTC P1217 ENGINE OVER TEMPERATURE

[QG18DE (SULEV)]

## 3. CHECK COOLING FAN HIGH SPEED OPERATION

### With CONSULT-II

1. Turn ignition switch "OFF".
2. Reconnect cooling fan relay-2.
3. Turn ignition switch "ON".
4. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
5. Make sure that cooling fan-1 operates at high speed.

OK or NG

OK >> GO TO 6.

NG >> Check cooling fan high speed control circuit. (Go to PROCEDURE B, [EC-1020](#).)

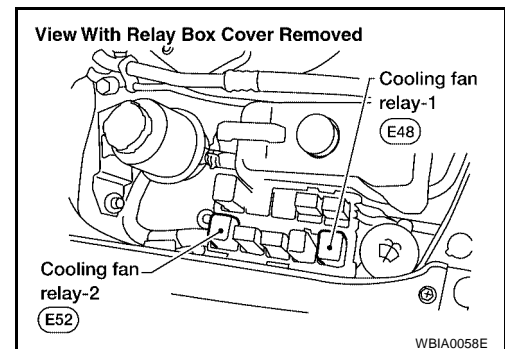
ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLAN TEMP/S	XXX °C

SEF646X

## 4. CHECK COOLING FAN LOW SPEED OPERATION

### Without CONSULT-II

1. Disconnect cooling fan relays-2.
2. Start engine and let it idle.
3. Set temperature lever at full cold position.
4. Turn air conditioner switch "ON".
5. Turn blower fan switch "ON".

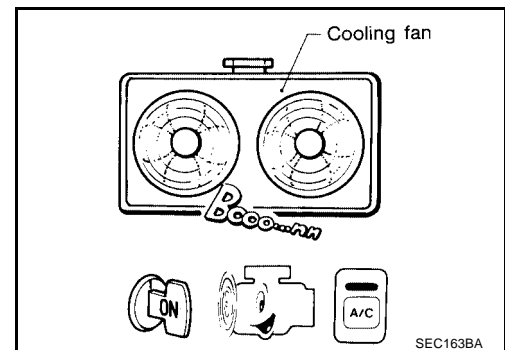


6. Make sure that cooling fans-1 and -2 operate at low speed.

OK or NG

OK >> GO TO 5.

NG >> Check cooling fan low speed control circuit. (Go to PROCEDURE A, [EC-1017](#).)



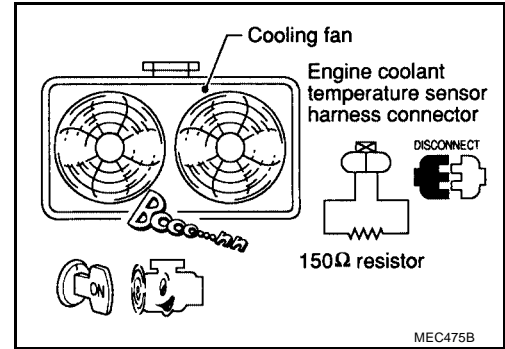
**5. CHECK COOLING FAN HIGH SPEED OPERATION**

⊗ **Without CONSULT-II**

1. Turn ignition switch "OFF".
2. Reconnect cooling fan relay-2.
3. Turn air conditioner switch and blower fan switch "OFF".
4. Disconnect engine coolant temperature sensor harness connector.
5. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
6. Restart engine and make sure that cooling fan-1 operates at high speed.

OK or NG

- OK >> GO TO 6.  
 NG >> Check cooling fan high speed control circuit. (Go to PROCEDURE B, [EC-1020](#) .)



**6. CHECK COOLING SYSTEM FOR LEAK**

Apply pressure to the cooling system with a tester, and check if the pressure drops.

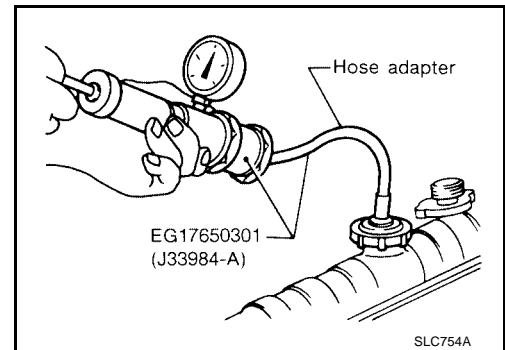
**Testing pressure: 157 kPa (1.6 kg/cm<sup>2</sup> , 23 psi)**

**CAUTION:**

Higher than the specified pressure may cause radiator damage. Pressure should not drop.

OK or NG

- OK >> GO TO 8.  
 NG >> GO TO 7.



**7. DETECT MALFUNCTIONING PART**

Check the following for leak.

- Hose
- Radiator
- Water pump (Refer to [CO-9, "WATER PUMP"](#) .)

>> Repair or replace.

**8. CHECK RADIATOR CAP**

Apply pressure to cap with a tester.

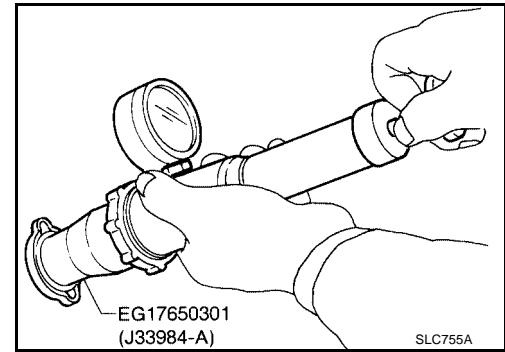
**Radiator cap relief pressure:**

**59 - 98 kPa (0.6 - 1.0 kg/cm<sup>2</sup> , 9 - 14 psi)**

OK or NG

OK >> GO TO 9.

NG >> Replace radiator cap.

**9. CHECK THERMOSTAT**

1. Check valve seating condition at normal room temperatures.

**It should seat tightly.**

2. Check valve opening temperature and valve lift.

**Valve opening temperature:**

**76.5°C (170°F) [standard]**

**Valve lift:**

**More than 9 mm/90°C (0.35 in/194°F)**

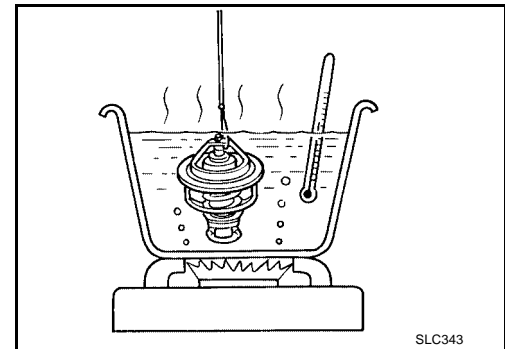
3. Check if valve is closed at 5°C (9°F) below valve opening temperature.

For details, refer to [CO-11, "THERMOSTAT AND THERMOSTAT HOUSING"](#).

OK or NG

OK >> GO TO 10.

NG >> Replace thermostat.

**10. CHECK ENGINE COOLANT TEMPERATURE SENSOR**

Refer to [EC-1022, "Component Inspection"](#).

OK or NG

OK >> GO TO 11.

NG >> Replace engine coolant temperature sensor.

**11. CHECK MAIN 12 CAUSES**

If the cause cannot be isolated, go to [EC-1021, "Main 12 Causes of Overheating"](#).

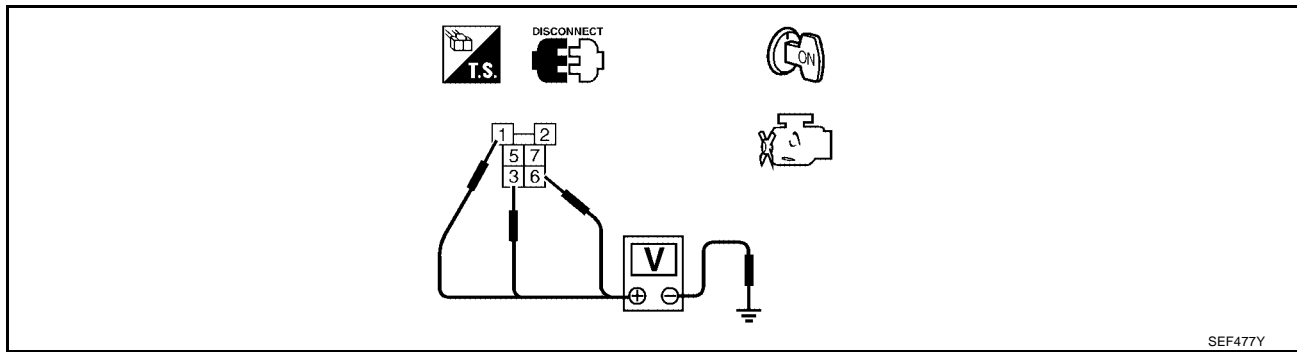
**>> INSPECTION END**



## PROCEDURE A

**1. CHECK POWER SUPPLY**

1. Turn ignition switch "OFF".
2. Disconnect cooling fan relay-1.
3. Turn ignition switch "ON".
4. Check voltage between cooling fan relay-1 terminals 1, 3, 6 and ground with CONSULT-II or tester.



**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.  
 NG >> GO TO 2.

**2. DETECT MALFUNCTIONING PART**

Check the following.

- 10A fuse
- 40A fusible links
- Harness for open or short between cooling fan relay-1 and fuse
- Harness for open or short between cooling fan relay-1 and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 3. CHECK COOLING FAN GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
3. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-1 terminal 1, cooling fan motor-1 terminal 4 and ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

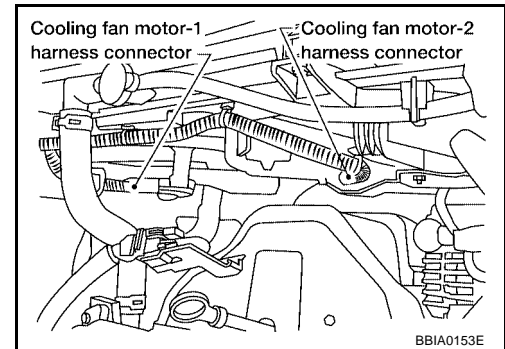
4. Also check harness for short to ground and short to power.
5. Check harness continuity between cooling fan relay-1 terminal 7 and cooling fan motor-2 terminal 2, cooling fan motor-2 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

6. Also check harness for short to ground and short to power.

OK or NG

- OK    >> GO TO 4.  
 NG    >> Repair open circuit or short to ground or short to power in harness or connectors.



## 4. CHECK OUTPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 97 and cooling fan relay-1 terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK    >> GO TO 6.  
 NG    >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E10, F48
- Harness for open or short between cooling fan relay-1 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 6. CHECK COOLING FAN RELAY-1

Refer to [EC-1022, "Component Inspection"](#) .

OK or NG

- OK    >> GO TO 7.  
 NG    >> Replace cooling fan relay.

## 7. CHECK COOLING FAN MOTORS-1 AND -2

Refer to [EC-1022, "Component Inspection"](#) .

OK or NG

- OK    >> GO TO 8.  
 NG    >> Replace cooling fan motors.

# DTC P1217 ENGINE OVER TEMPERATURE

[QG18DE (SULEV)]

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## 8. CHECK INTERMITTENT INCIDENT

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Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

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## PROCEDURE B

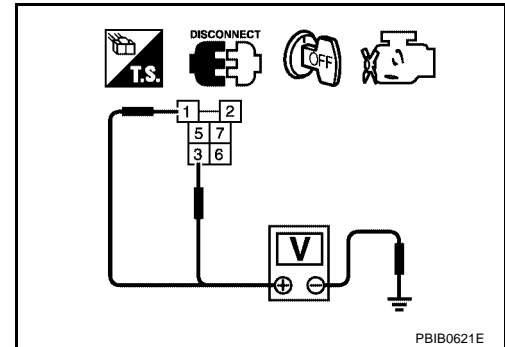
### 1. CHECK COOLING FAN POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan relay-2.
3. Turn ignition switch "ON".
4. Check voltage between cooling fan relay-2 terminals 1, 3 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK    >> GO TO 3.  
 NG    >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- Fuse and fusible link box connector E25
- Fuse block (J/B) connector E103
- 10A fuse
- 40A fusible link
- Harness for open or short between cooling fan relay-2 and fuse
- Harness for open or short between cooling fan relay-2 and fusible link

>> Repair harness or connectors.

### 3. CHECK COOLING FAN GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-2 harness connector.
3. Check harness continuity between cooling fan relay-2 terminal 5 and cooling fan motor-1 terminal 2, cooling fan relay-2 terminal 6 and cooling fan motor-1 terminal 3, cooling fan relay-2 terminal 7 and ground. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK    >> GO TO 4.  
 NG    >> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 89 and cooling fan relay-2 terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E10, F48
- Harness for open or short between cooling fan relay-2 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 6. CHECK COOLING FAN RELAY-2

Refer to [EC-1022, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace cooling fan relays.

## 7. CHECK COOLING FAN MOTORS-1 AND -2

Refer to [EC-1022, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace cooling fan motors.

## 8. CHECK INTERMITTENT INCIDENT

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

**>> INSPECTION END**

## Main 12 Causes of Overheating

UBS0021Y

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> <li>● Blocked radiator</li> <li>● Blocked condenser</li> <li>● Blocked radiator grille</li> <li>● Blocked bumper</li> </ul>	● Visual	No blocking	—
	2	● Coolant mixture	● Coolant tester	50 - 50% coolant mixture	See <a href="#">MA-13, "RECOMMENDED FLUIDS AND LUBRICANTS"</a> .
	3	● Coolant level	● Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	See <a href="#">MA-16, "Changing Engine Coolant"</a> .
	4	● Radiator cap	● Pressure tester	59 - 98 kPa (0.6 - 1.0 kg/cm <sup>2</sup> , 9 - 14 psi) (Limit)	See <a href="#">CO-7, "System Check"</a> .

# DTC P1217 ENGINE OVER TEMPERATURE

[QG18DE (SULEV)]

Engine	Step	Inspection item	Equipment	Standard	Reference page
ON*2	5	● Coolant leaks	● Visual	No leaks	See <a href="#">CO-7, "System Check"</a> .
ON*2	6	● Thermostat	● Touch the upper and lower radiator hoses	Both hoses should be hot	See <a href="#">CO-11, "THERMOSTAT AND THERMOSTAT HOUSING"</a> and <a href="#">CO-13, "RADIATOR"</a> .
ON*1	7	● Cooling fan	● CONSULT-II	Operating	See trouble diagnosis for DTC P1217 ( <a href="#">EC-1009</a> ) .
OFF	8	● Combustion gas leak	● Color checker chemical tester 4 Gas analyzer	Negative	—
ON*3	9	● Coolant temperature gauge	● Visual	Gauge less than 3/4 when driving	—
		● Coolant overflow to reservoir tank	● Visual	No overflow during driving and idling	See <a href="#">MA-16, "Changing Engine Coolant"</a> .
OFF*4	10	● Coolant return from reservoir tank to radiator	● Visual	Should be initial level in reservoir tank	See <a href="#">MA-16, "ENGINE MAINTENANCE (QG18DE ENGINE)"</a> .
OFF	11	● Cylinder head	● Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See <a href="#">EM-58, "Inspection after Disassembly"</a> .
	12	● Cylinder block and pistons	● Visual	No scuffing on cylinder walls or piston	See <a href="#">EM-69, "Inspection"</a> .

\*1: Turn the ignition switch ON.

\*2: Engine running at 3,000 rpm for 10 minutes.

\*3: Drive at 90 km/h (56 MPH) for 30 minutes and then let idle for 10 minutes.

\*4: After 60 minutes of cool down time.

For more information, refer to [CO-5, "OVERHEATING CAUSE ANALYSIS"](#) .

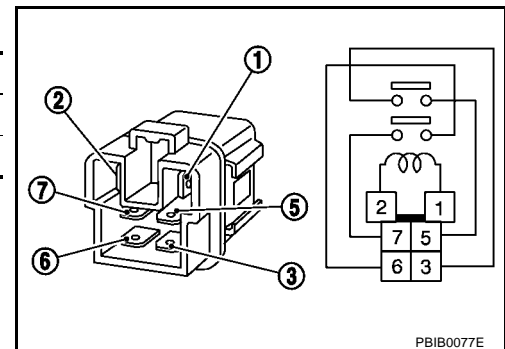
## Component Inspection COOLING FAN RELAYS-1 AND -2

UBS0021Z

Check continuity between terminals 3 and 5, 6 and 7.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

If NG, replace relay.



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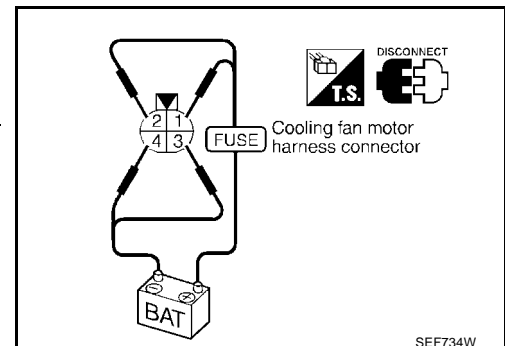
## COOLING FAN MOTOR-1

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

	Speed	Terminals	
		(+)	(-)
Cooling fan motor	Low	1	4
	High	1, 2	3, 4

**Cooling fan motor should operate.**

If NG, replace cooling fan motor.



SEF734W

## COOLING FAN MOTOR-2

1. Disconnect cooling fan motor harness connectors.

# DTC P1217 ENGINE OVER TEMPERATURE

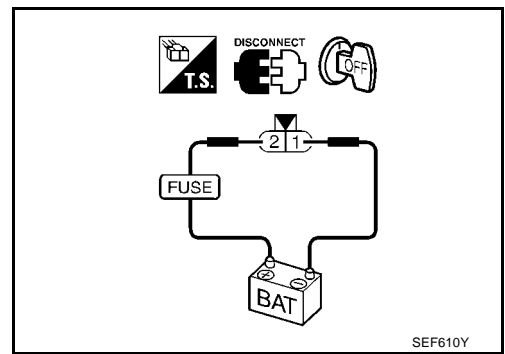
[QG18DE (SULEV)]

- Supply cooling fan motor terminals with battery voltage and check operation.

	Terminals	
	(+)	(-)
Cooling fan motor	2	1

**Cooling fan motor should operate.**

If NG, replace cooling fan motor.



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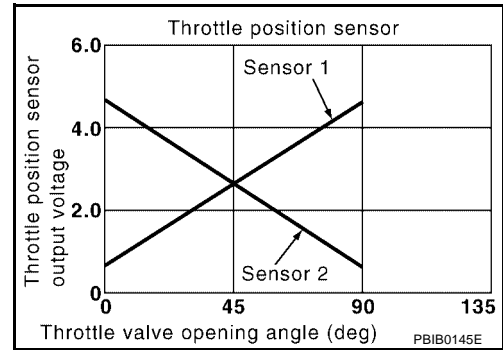
**DTC P1225 TP SENSOR**

**Component Description**

UBS003Y7

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



**On Board Diagnosis Logic**

UBS003Y8

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225 1225	Closed throttle position learning performance problem	Closed throttle position learning value is excessively low.	<ul style="list-style-type: none"> <li>Electric throttle control actuator (TP sensor 1 and 2)</li> </ul>

**DTC Confirmation Procedure**

UBS003Y9

**NOTE:**

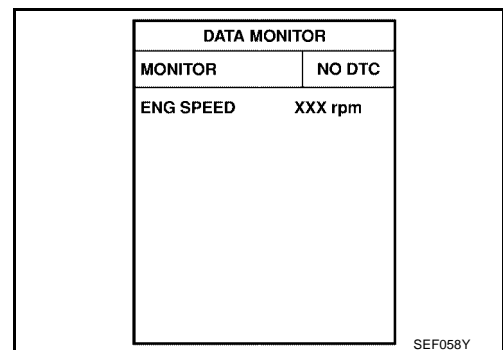
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds.
4. Turn ignition switch "ON".
5. If 1st trip DTC is detected, go to [EC-1025, "Diagnostic Procedure"](#).



SEF058Y

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

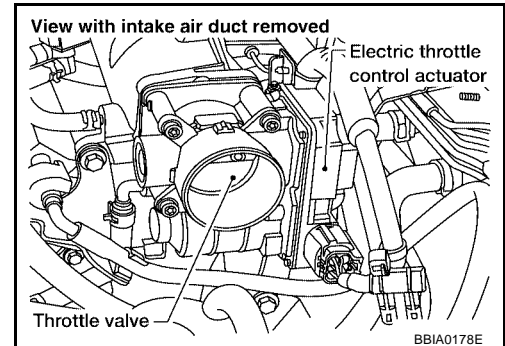


**Diagnostic Procedure****1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY**

1. Turn ignition switch "OFF".
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve and the housing.

**OK or NG**

- OK >> GO TO 2.  
 NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

**2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**Removal and Installation**  
**ELECTRIC THROTTLE CONTROL ACTUATOR**

Refer to [EM-12, "OUTER COMPONENT PARTS"](#) .

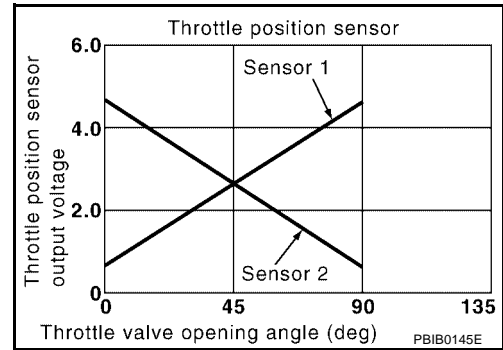
**DTC P1226 TP SENSOR**

**Component Description**

UBS003YC

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



**On Board Diagnosis Logic**

UBS003YD

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226 1226	Closed throttle position learning performance problem	Closed throttle position learning is not performed successfully, repeatedly.	<ul style="list-style-type: none"> <li>Electric throttle control actuator (TP sensor 1 and 2)</li> </ul>

**DTC Confirmation Procedure**

UBS003YE

**NOTE:**

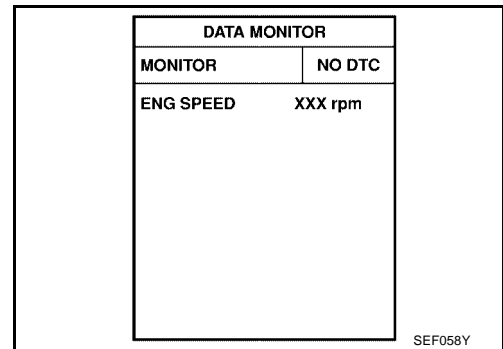
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds.
4. Turn ignition switch "ON".
5. Repeat steps 3 and 4, 32 times.
6. If 1st trip DTC is detected, go to [EC-1027, "Diagnostic Procedure"](#).



**WITH GST**

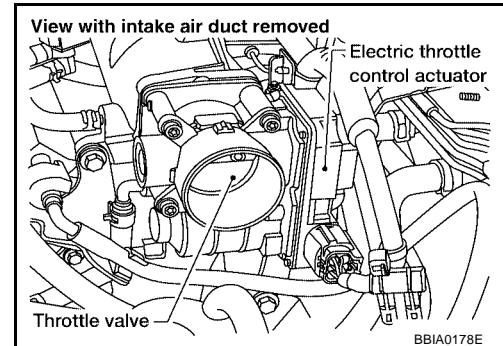
Follow the procedure "With CONSULT-II" above.

**Diagnostic Procedure****1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY**

1. Turn ignition switch "OFF".
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve and the housing.

**OK or NG**

- OK >> GO TO 2.  
 NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

**2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**Removal and Installation**  
**ELECTRIC THROTTLE CONTROL ACTUATOR**

Refer to [EM-12, "OUTER COMPONENT PARTS"](#) .

## DTC P1229 SENSOR POWER SUPPLY

PFP:16119

### On Board Diagnosis Logic

UBS006AB

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1229 1229	Sensor power supply circuit short	ECM detects a voltage of power source for sensor is excessively low or high.	<ul style="list-style-type: none"> <li>● Harness or connectors (APP sensor 1 circuit is shorted.) (Mass air flow sensor is shorted.) (PSP sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.)</li> <li>● Accelerator pedal position sensor (APP sensor 1)</li> <li>● Power steering pressure sensor</li> <li>● Mass air flow sensor</li> <li>● Refrigerant pressure sensor</li> <li>● EVAP control system pressure sensor</li> </ul>

### FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

### DTC Confirmation Procedure

UBS006AC

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 8V at idle.

#### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-1030, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### WITH GST

Follow the procedure "WITH CONSULT-II" above.

# DTC P1229 SENSOR POWER SUPPLY

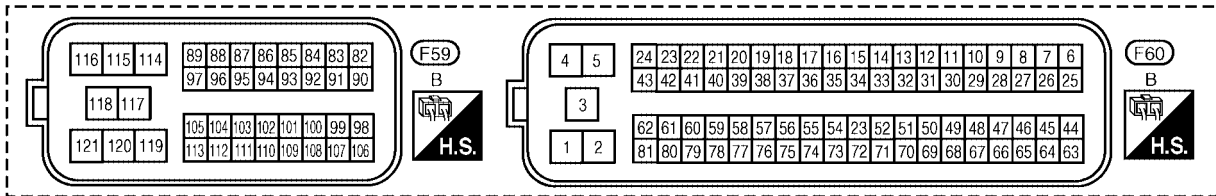
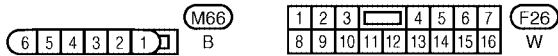
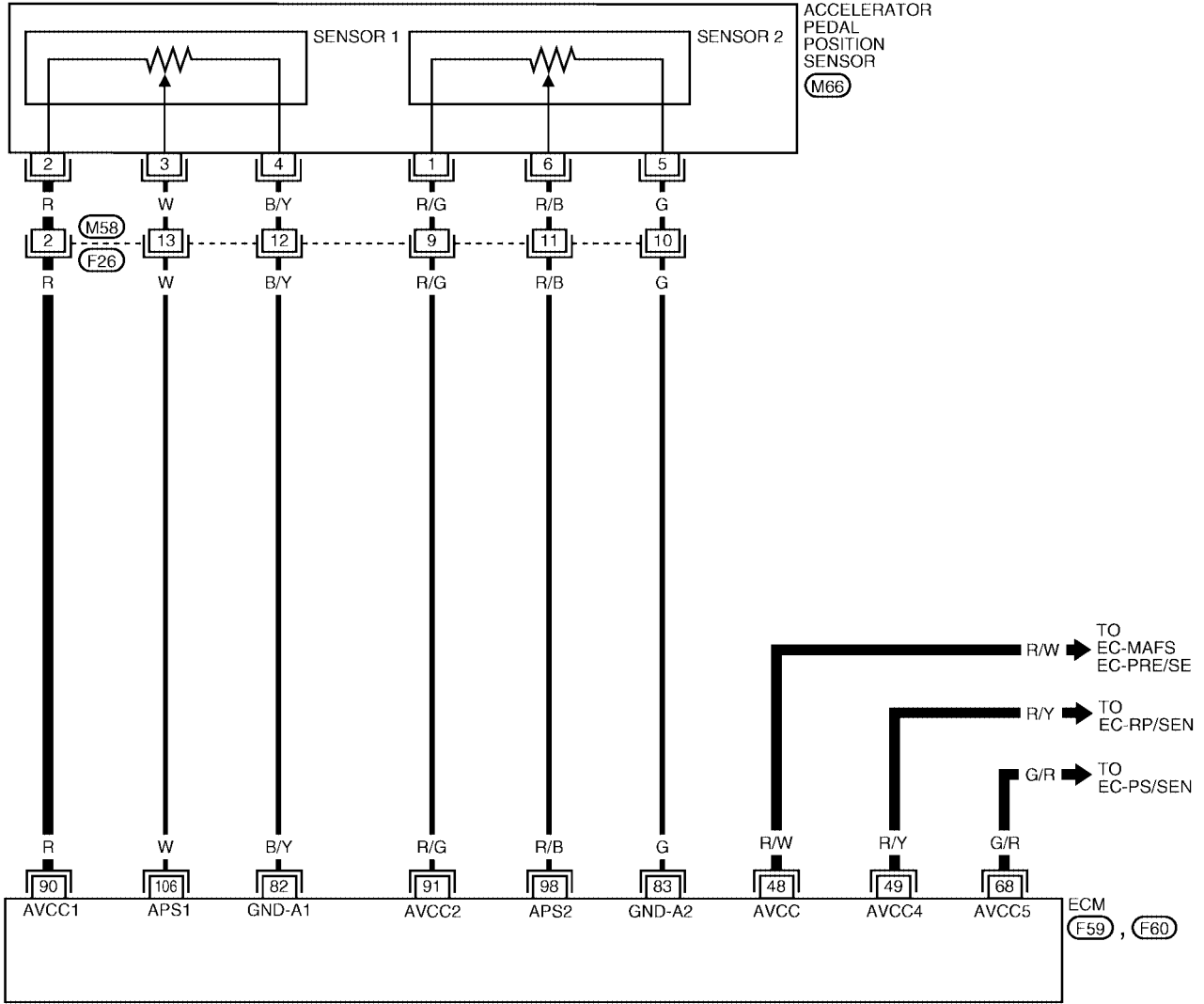
[QG18DE (SULEV)]

## Wiring Diagram

UBS006AD

EC-APPS1-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



BBWA1385E

# DTC P1229 SENSOR POWER SUPPLY

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
48	R/W	Sensor power supply	[Ignition switch "ON"]	Approximately 5V
49	R/Y	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch "ON"]	Approximately 5V
68	G/R	Sensor power supply (Power steering pressure sensor)	[Ignition switch "ON"]	Approximately 5V
90	R	Sensor power supply (Accelerator pedal position sensor 1)	[Ignition switch "ON"]	Approximately 5V

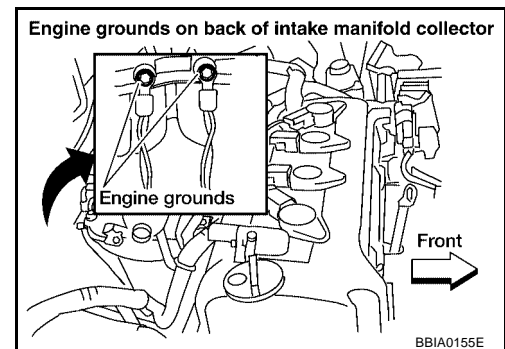
## Diagnostic Procedure

UBS006AE

### 1. RETIGHTEN GROUND SCREWS

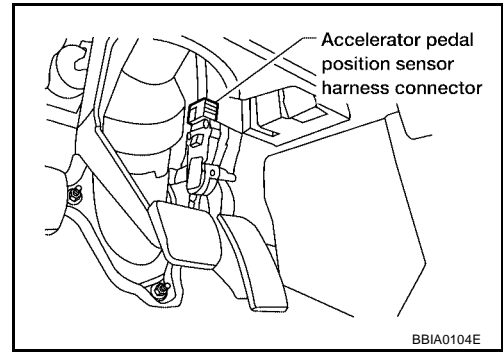
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



**2. CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT**

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

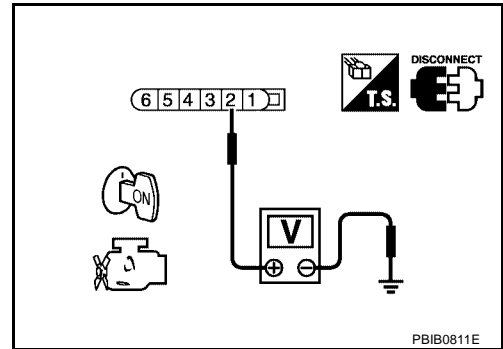


3. Check voltage between APP sensor terminal 2 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 3.



**3. CHECK SENSOR POWER SUPPLY CIRCUITS**

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
90	APP sensor terminal 2	<a href="#">EC-1127</a>
48	Mass air flow sensor terminal 2	<a href="#">EC-743</a>
48	EVAP control system pressure sensor terminal 3	<a href="#">EC-882</a>
49	Refrigerant pressure sensor terminal 1	<a href="#">EC-1181</a>
68	PSP sensor terminal 1	<a href="#">EC-923</a>

OK or NG

- OK >> GO TO 4.
- NG >> Repair short to ground or short to power in harness or connectors.

**4. CHECK COMPONENTS**

Check the following.

- Refrigerant pressure sensor (Refer to [MTC-55, "Electrical Component Inspection"](#) .)
- Power steering pressure sensor (Refer to [EC-926, "Component Inspection"](#) .)
- EVAP control system pressure sensor (Refer to [EC-885, "Component Inspection"](#) .)
- Mass air flow sensor (Refer to [EC-747, "Component Inspection"](#) .)

OK or NG

- OK >> GO TO 7.
- NG >> Replace malfunctioning component.

---

## 5. CHECK APP SENSOR

---

Refer to [EC-1131, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

---

## 6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

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1. Replace electric throttle control actuator.
2. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> INSPECTION END

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## 7. CHECK INTERMITTENT INCIDENT

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Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END



DTC P1271 A/F SENSOR

PF2:22693

UBS00220

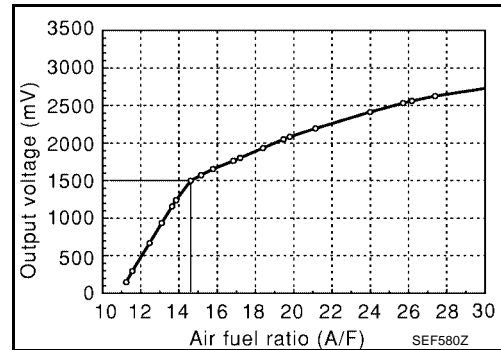
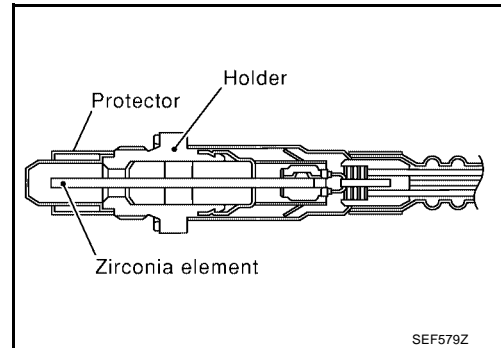
Component Description

The A/F sensor is a planar dual-cell limit current sensor. The sensor element of the A/F sensor is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range ( $0.7 < \lambda < \text{air}$ ).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.

An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at  $\lambda = 1$ . Therefore, the A/F sensor is able to indicate air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).



CONSULT-II Reference Value in Data Monitor Mode

UBS00221

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
A/F SEN1 (B1)	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Maintaining engine speed at 2,000 rpm</li> </ul>	Fluctuates around 1.5V

On Board Diagnosis Logic

UBS00222

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal is not inordinately low.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P1271 1271	Air fuel ratio (A/F) sensor 1 circuit no activity detected	<ul style="list-style-type: none"> <li>The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 0V.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Air fuel ratio (A/F) sensor 1</li> </ul>

DTC Confirmation Procedure

UBS00223

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

Ⓜ WITH CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Select "A/F SEN1 (B1)" in "DATA MONITOR" mode with CONSULT-II.

# DTC P1271 A/F SENSOR

[QG18DE (SULEV)]

- Check "A/F SEN1 (B1)" indication.  
If the indication is constantly approx. 0V, go to [EC-1037, "Diagnostic Procedure"](#).  
If the indication is not constantly approx. 0V, go to next step.
- Select "A/F SEN1 (B1) P1278/P1279" of "A/F SEN1" in "DTC WORK SUPPORT" mode.
- Touch "START".

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
A/F SEN1 (B1)	XXX V

SEF581Z

- When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen.

ENG SPEED	1,500 - 3,000 rpm
Vehicle speed	70 - 120 km/h (43 - 75 MPH)
B/FUEL SCHDL	1.0 - 8.0 msec
Selector lever	<ul style="list-style-type: none"> <li>• "D" position with "OD" ON (A/T)</li> <li>• "4th" position (M/T)</li> </ul>

If "TESTING" is not displayed after 20 seconds, retry from step 2.

A/F SEN1 (B1) P1278/P1279	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h

PBIB0756E

- Following the instructions of CONSULT-II screen, set "D" position with "OD" OFF (A/T) or "3rd" position (M/T) and release accelerator pedal fully.

A/F SEN1 (B1) P1278/P1279	
TESTING	
SELECT 3RD GEAR AND THEN RELEASE ACCELERATOR PEDAL OFF	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h

PBIB0757E

- Make sure that "TESTING" changes to "COMPLETED".  
If "TESTING" changed to "OUT OF CONDITION", retry from step 6.
- Touch "BACK" and "MODE", then select "SELF-DIAG RESULT" mode.  
If P1271 is displayed, go to [EC-1037, "Diagnostic Procedure"](#).  
If another DTC is displayed, go to the corresponding "Diagnostic Procedure".

A/F SEN1 (B1) P1278/P1279	
COMPLETED	

PBIB0758E

## Overall Function Check

UBS00224

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

### WITH GST

- Start engine and warm it up to normal operating temperature.
- Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in "D" position with "OD" OFF (A/T) or "3rd" position (M/T).

# DTC P1271 A/F SENSOR

[QG18DE (SULEV)]

**NOTE:**

Keep the accelerator pedal as steady as possible during the cruising.

3. Set "D" position with "OD" ON (A/T) or "4rd" position (M/T), then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

**NOTE:**

Never apply brake during releasing the accelerator pedal.

4. Repeat steps 2 to 3 five times.
5. Stop the vehicle and turn ignition switch "OFF".
6. Wait at least 10 seconds and restart engine.
7. Repeat steps 2 to 3 five times.
8. Stop the vehicle and connect GST to the vehicle.
9. Make sure that no DTC is displayed.  
If the DTC is displayed, go to [EC-1037, "Diagnostic Procedure"](#).

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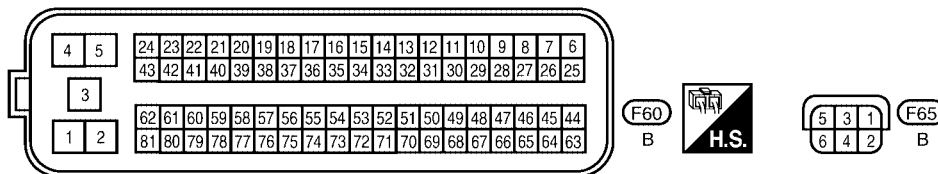
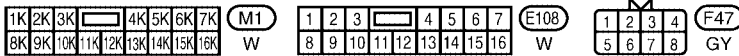
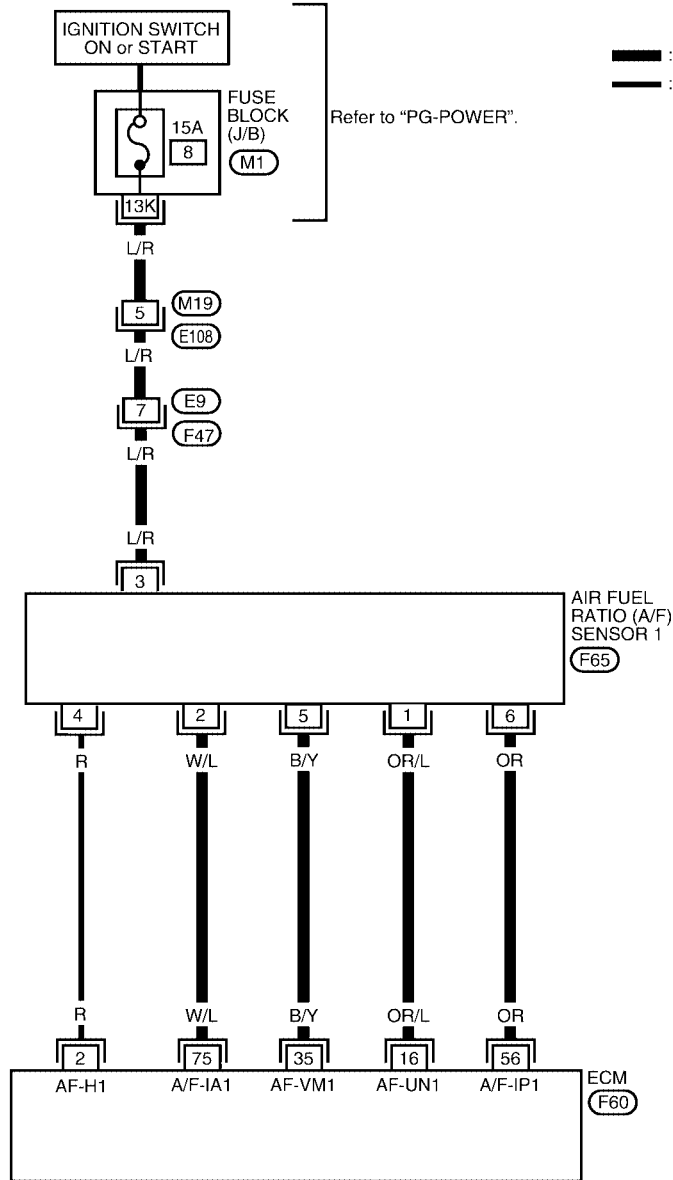
# DTC P1271 A/F SENSOR

[QG18DE (SULEV)]

UBS00225

## Wiring Diagram

EC-A/F-01



BBWA0603E

# DTC P1271 A/F SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

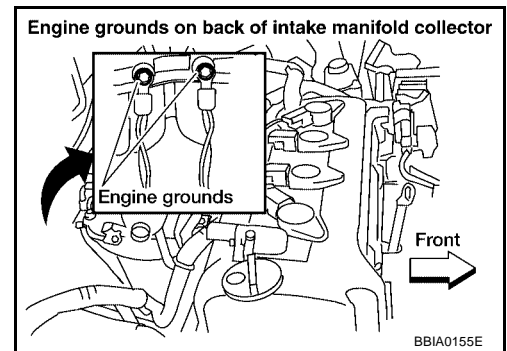
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	OR/L	A/F sensor 1	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 3.1V
35	B/Y			Approximately 2.6V
56	OR			2 - 3V
75	W/L			2 - 3V

## Diagnostic Procedure

UBS00226

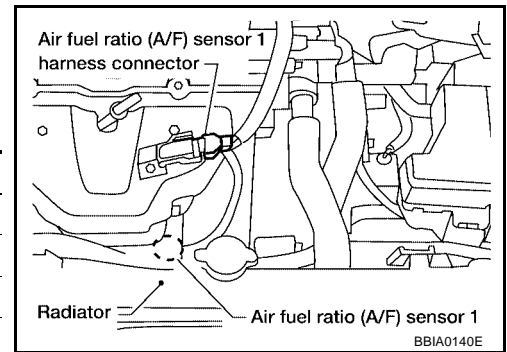
### 1. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.



3. Disconnect ECM harness connector and A/F sensor 1 harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

ECM terminal	A/F sensor terminal
16	1
35	5
56	6
75	2



**Continuity should exist.**

5. Check harness continuity between ECM terminals 16, 35, 56, 75 or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.

**Continuity should not exist.**

6. Also check harness for short to power.

OK or NG

OK >> GO TO 2.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 2. CHECK INTERMITTENT INCIDENT

---

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

### OK or NG

OK >> Replace A/F sensor 1.

NG >> Repair or replace.

### **Removal and Installation**

#### **AIR FUEL RATIO SENSOR**

UBS00227

Refer to [EM-12, "Removal and Installation"](#) .

**DTC P1272 A/F SENSOR**

PF2:22693

UBS00228

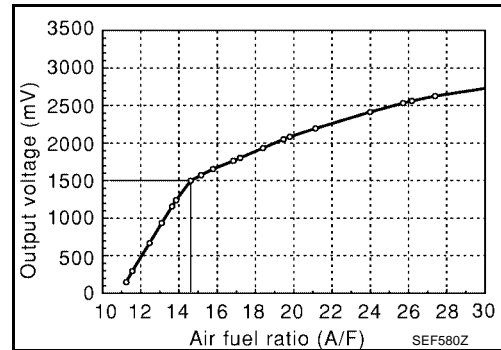
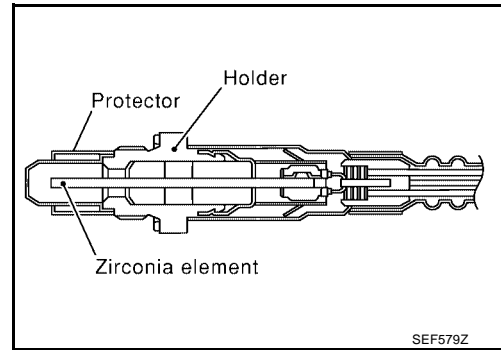
**Component Description**

The A/F sensor is a planar dual-cell limit current sensor. The sensor element of the A/F sensor is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range ( $0.7 < \lambda < \text{air}$ ).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.

An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at  $\lambda = 1$ . Therefore, the A/F sensor is able to indicate air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).



**CONSULT-II Reference Value in Data Monitor Mode**

UBS00229

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
A/F SEN1 (B1)	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Maintaining engine speed at 2,000 rpm</li> </ul>	Fluctuates around 1.5V

**On Board Diagnosis Logic**

UBS0022A

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal is not inordinately high.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P1272 1272	Air fuel ratio (A/F) sensor 1 circuit no activity detected	<ul style="list-style-type: none"> <li>The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 4.5V.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Air fuel ratio (A/F) sensor 1</li> </ul>

**DTC Confirmation Procedure**

UBS0022B

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

- Start engine and warm it up to normal operating temperature.
- Select "A/F SEN1 (B1)" in "DATA MONITOR" mode with CONSULT-II.

# DTC P1272 A/F SENSOR

[QG18DE (SULEV)]

- Check "A/F SEN1 (B1)" indication.  
If the indication is constantly approx. 4.5V, go to [EC-1043, "Diagnostic Procedure"](#).  
If the indication is not constantly approx. 4.5V, go to next step.
- Select "A/F SEN1 (B1) P1278/P1279" of "A/F SEN1" in "DTC WORK SUPPORT" mode.
- Touch "START".

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
A/F SEN1 (B1)	XXX V

SEF581Z

- When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen.

ENG SPEED	1,500 - 3,000 rpm
Vehicle speed	70 - 120 km/h (43 - 75 MPH)
B/FUEL SCHDL	1.0 - 8.0 msec
Selector lever	<ul style="list-style-type: none"> <li>• "D" position with "OD" ON (A/T)</li> <li>• "4th" position (M/T)</li> </ul>

If "TESTING" is not displayed after 20 seconds, retry from step 2.

A/F SEN1 (B1) P1278/P1279	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h

PBIB0756E

- Following the instructions of CONSULT-II screen, set "D" position with "OD" OFF (A/T) or "3rd" position (M/T) and release accelerator pedal fully.

A/F SEN1 (B1) P1278/P1279	
TESTING	
SELECT 3RD GEAR AND THEN RELEASE ACCELERATOR PEDAL OFF	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h

PBIB0757E

- Make sure that "TESTING" changes to "COMPLETED".  
If "TESTING" changed to "OUT OF CONDITION", retry from step 6.
- Touch "BACK" and "MODE", then select "SELF-DIAG RESULT" mode.  
If P1272 is displayed, go to [EC-1043, "Diagnostic Procedure"](#).  
If another DTC is displayed, go to the corresponding "Diagnostic Procedure".

A/F SEN1 (B1) P1278/P1279	
COMPLETED	

PBIB0758E

## Overall Function Check

UBS0022C

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

### WITH GST

- Start engine and warm it up to normal operating temperature.
- Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in "D" position with "OD" OFF (A/T) or "3rd" position (M/T).



# DTC P1272 A/F SENSOR

[QG18DE (SULEV)]

**NOTE:**

Keep the accelerator pedal as steady as possible during the cruising.

3. Set "D" position with "OD" ON (A/T) or "4th" position (M/T), then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

**NOTE:**

Never apply brake during releasing the accelerator pedal.

4. Repeat steps 2 to 3 five times.
5. Stop the vehicle and turn ignition switch "OFF".
6. Wait at least 10 seconds and restart engine.
7. Repeat steps 2 to 3 five times.
8. Stop the vehicle and connect GST to the vehicle.
9. Make sure that no DTC is displayed.  
If the DTC is displayed, go to [EC-1043, "Diagnostic Procedure"](#).

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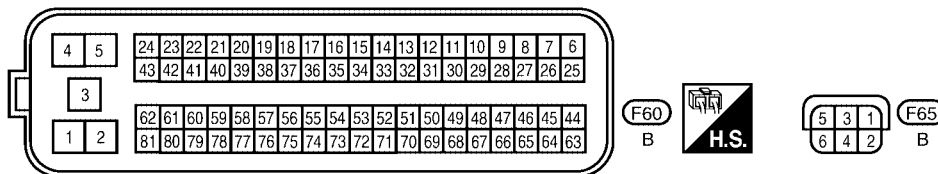
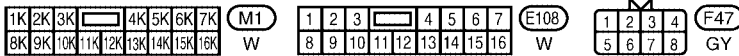
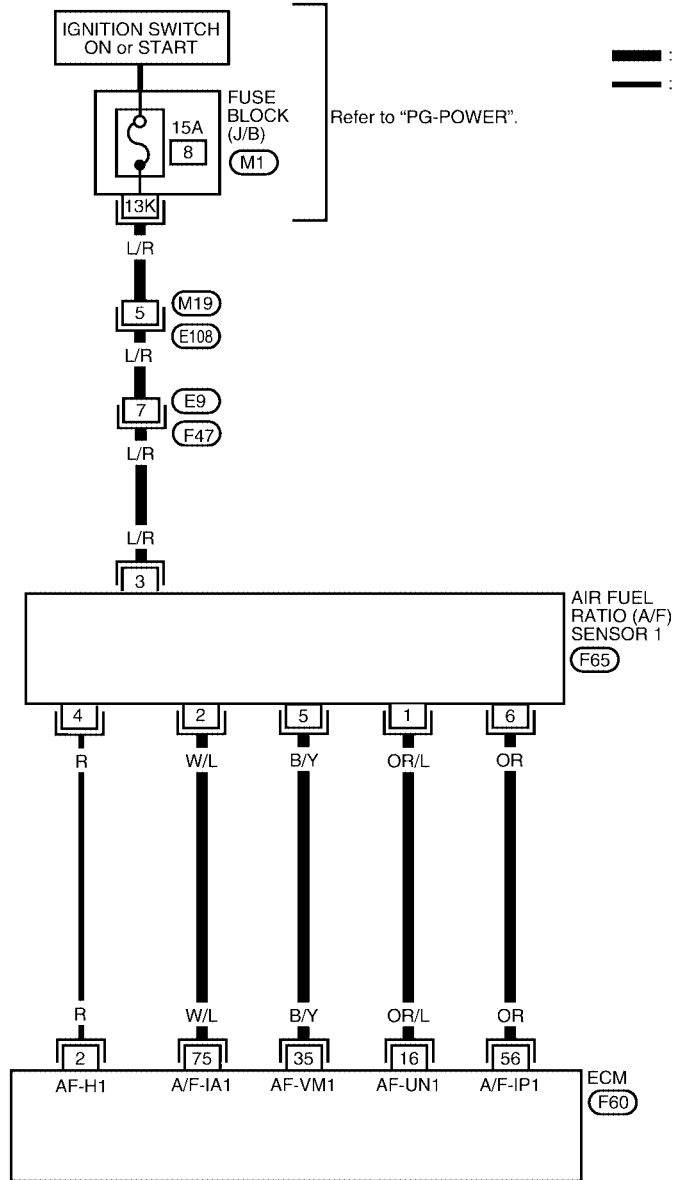
# DTC P1272 A/F SENSOR

[QG18DE (SULEV)]

UBS0022D

## Wiring Diagram

EC-A/F-01



BBWA0603E

# DTC P1272 A/F SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

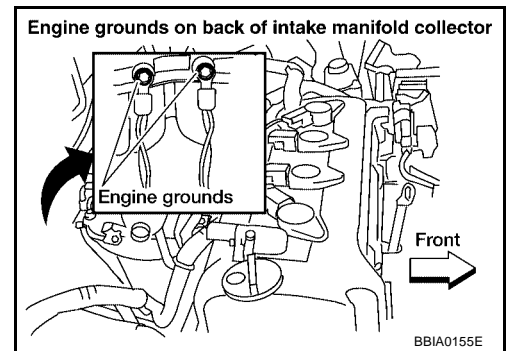
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	OR/L	A/F sensor 1	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 3.1V
35	B/Y			Approximately 2.6V
56	OR			2 - 3V
75	W/L			2 - 3V

## Diagnostic Procedure

UBS0022E

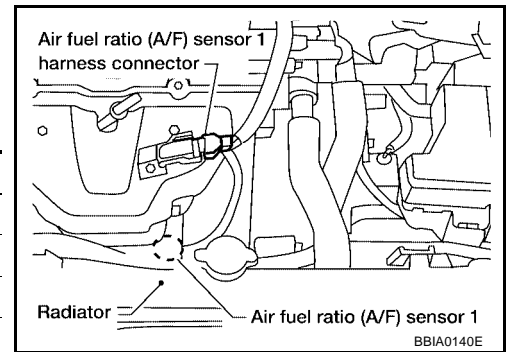
### 1. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

- Turn ignition switch "OFF".
- Loosen and retighten engine ground screws.



- Disconnect ECM harness connector and A/F sensor 1 harness connector.
- Check harness continuity between the following terminals. Refer to Wiring Diagram.

ECM terminal	A/F sensor terminal
16	1
35	5
56	6
75	2



**Continuity should exist.**

- Check harness continuity between ECM terminals 16, 35, 56, 75 or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.

**Continuity should not exist.**

- Also check harness for short to power.

OK or NG

OK >> GO TO 2.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 2. CHECK INTERMITTENT INCIDENT

---

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

### OK or NG

OK >> Replace A/F sensor 1.

NG >> Repair or replace.

### **Removal and Installation**

#### **AIR FUEL RATIO SENSOR**

UBS0022F

Refer to [EM-12, "Removal and Installation"](#) .

DTC P1273 A/F SENSOR

PF2:22693

Component Description

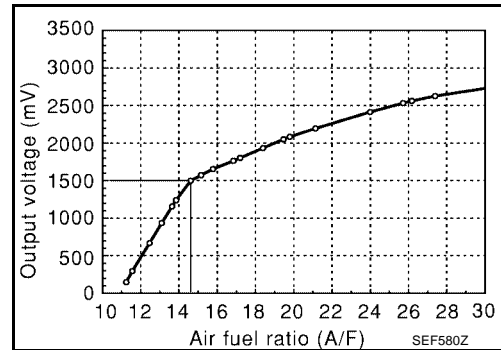
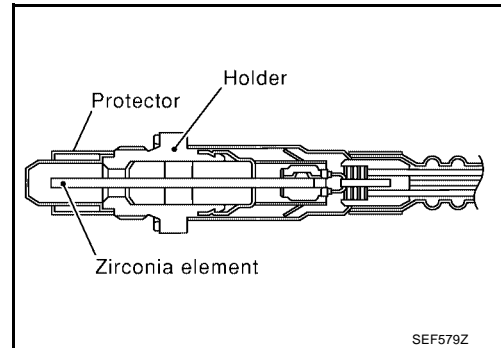
UBS0022G

The A/F sensor is a planar dual-cell limit current sensor. The sensor element of the A/F sensor is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range ( $0.7 < \lambda < \text{air}$ ).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.

An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at  $\lambda = 1$ . Therefore, the A/F sensor is able to indicate air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).



CONSULT-II Reference Value in Data Monitor Mode

UBS0022H

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
A/F SEN1 (B1)	<ul style="list-style-type: none"> <li>Engine: After warming up</li> <li>Maintaining engine speed at 2,000 rpm</li> </ul>	Fluctuates around 1.5V

On Board Diagnosis Logic

UBS0022I

To judge the malfunction, the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal is monitored not to be shifted "lean" side or "rich" side. When the A/F signal is shifting to the lean side, the malfunction will be detected.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P1273 1273	Air fuel ratio (A/F) sensor 1 lean shift monitoring	<ul style="list-style-type: none"> <li>The output voltage computed by ECM from the A/F sensor 1 signal is shifted to the lean side for a specified period.</li> </ul>	<ul style="list-style-type: none"> <li>Air fuel ratio (A/F) sensor 1</li> <li>Air fuel ratio (A/F) sensor heater 1</li> <li>Fuel pressure</li> <li>Injectors</li> <li>Intake air leaks</li> </ul>

DTC Confirmation Procedure

UBS0022J

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "A/F SEN1 (B1) P1273" of "A/F SEN1" in "DTC WORK SUPPORT" mode.
3. Touch "START".

# DTC P1273 A/F SENSOR

[QG18DE (SULEV)]

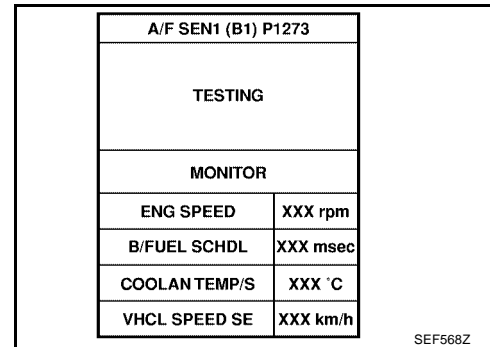
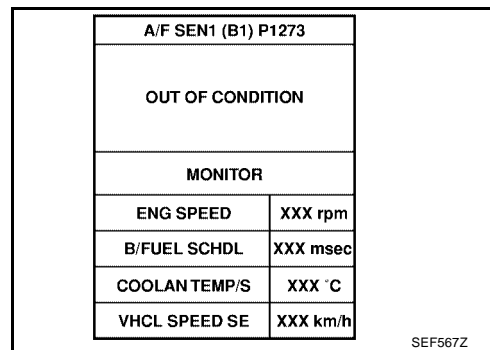
4. Maintain the following conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 400 to 800 seconds.)

**NOTE:**

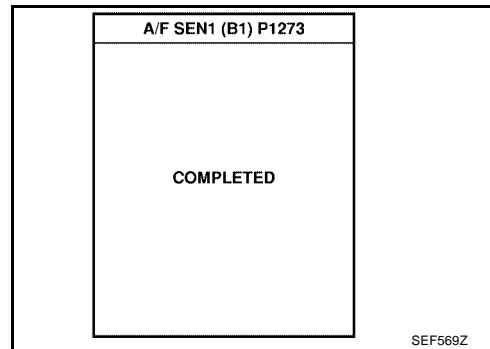
Keep the accelerator pedal as steady as possible.

ENG SPEED	Below 3,000 rpm
B/FUEL SCHDL	Below 9.0 msec
Selector lever	“P” or “N” position

If “TESTING” is not displayed after 20 minutes, retry from step 2.



5. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”.  
If “NG” is displayed, go to [EC-1049, "Diagnostic Procedure"](#).



## Overall Function Check

UBS0022K

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

 **WITH GST**

1. Start engine and warm it up to normal operating temperature.
2. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in “D” position with “OD” OFF (A/T) or “3rd” position (M/T).

**NOTE:**

Keep accelerator pedal as steady as possible during the cruising.

3. Set “D” position with “OD” ON (A/T) or “4th” position (M/T), then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

**NOTE:**

Never apply brake during releasing the accelerator pedal.

4. Repeat steps 2 to 3 five times.
5. Stop the vehicle and turn ignition switch “OFF”.
6. Wait at least 10 seconds and restart engine.
7. Repeat steps 2 to 3 five times.
8. Stop the vehicle and connect GST to the vehicle.
9. Make sure that no DTC is displayed.

# DTC P1273 A/F SENSOR

[QG18DE (SULEV)]

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If the DTC is displayed, go to [EC-1049, "Diagnostic Procedure"](#) .

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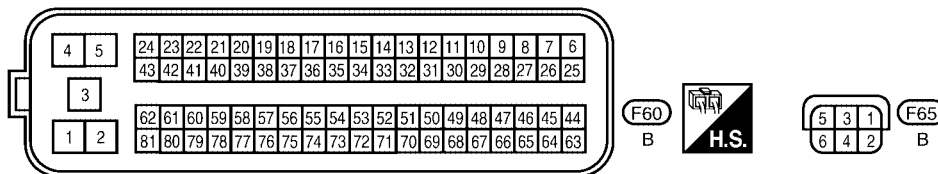
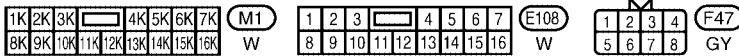
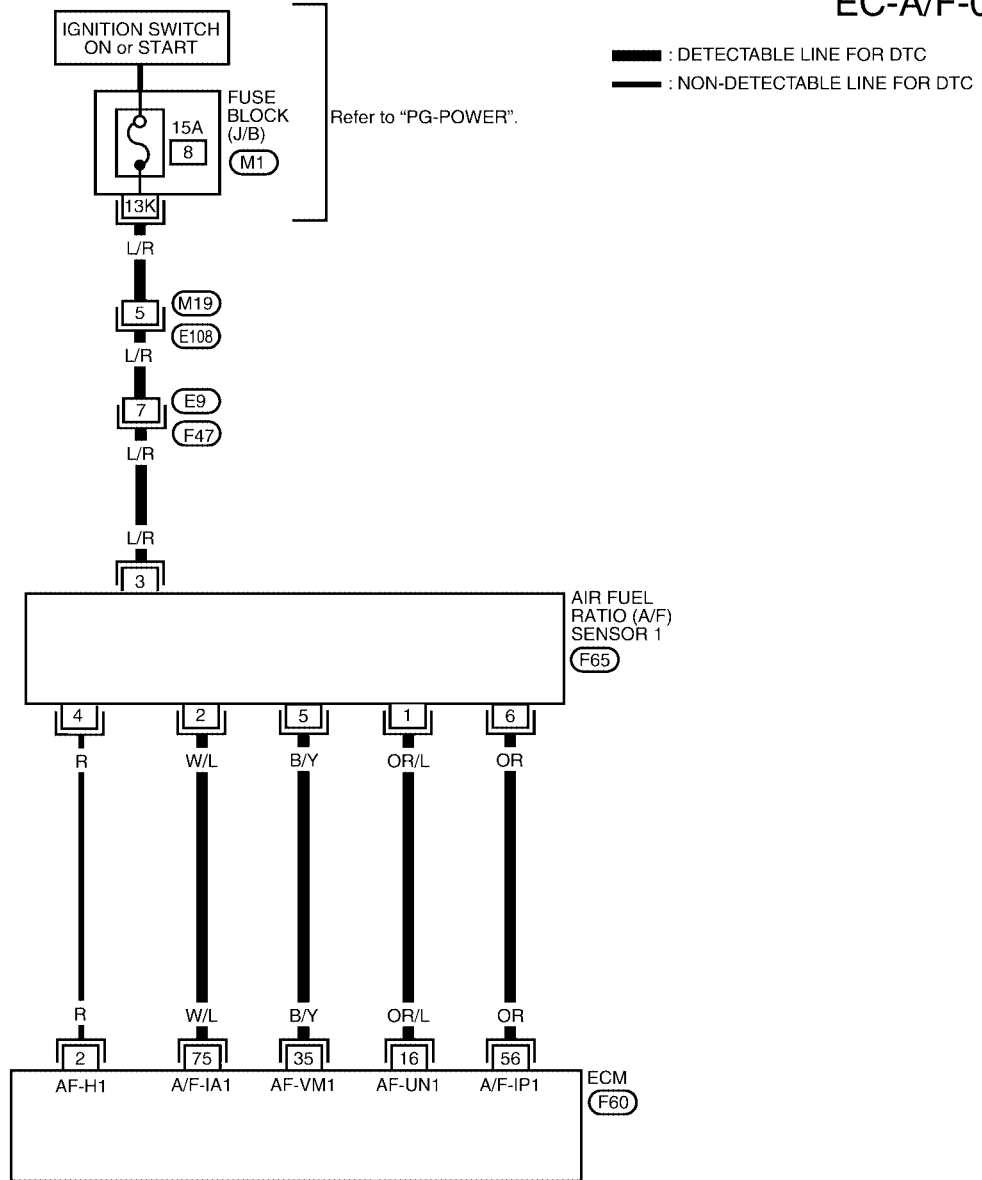
# DTC P1273 A/F SENSOR

[QG18DE (SULEV)]

UBS0022L

## Wiring Diagram

EC-A/F-01



BBWA0603E



# DTC P1273 A/F SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	OR/L	A/F sensor 1	<b>[Engine is running]</b> <ul style="list-style-type: none"><li>● Warm-up condition</li><li>● Idle speed</li></ul>	Approximately 3.1V
35	B/Y			Approximately 2.6V
56	OR			2 - 3V
75	W/L			2 - 3V

## Diagnostic Procedure

UBS0022M

### 1. RETIGHTEN AIR FUEL RATIO (A/F) SENSOR 1

1. Turn ignition switch "OFF".
2. Loosen and retighten the air fuel ratio (A/F) sensor 1.

**Tightening torque: 40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)**

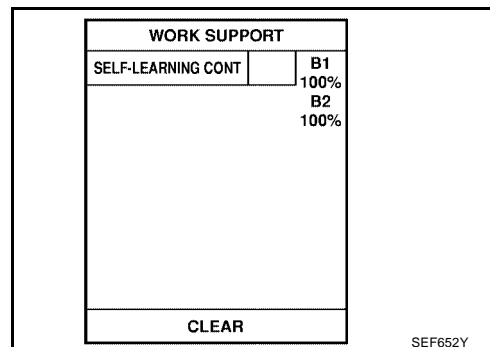
>> GO TO 2.

## 2. CLEAR THE SELF-LEARNING DATA.

### ④ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.

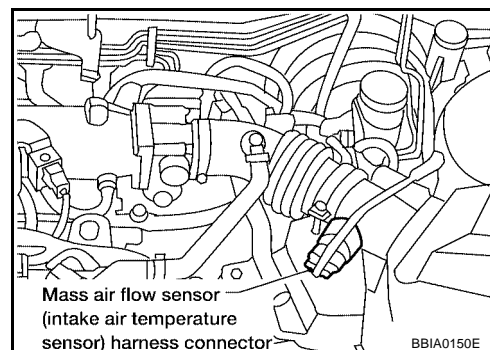
**Is the 1st trip DTC P0171 detected? Is it difficult to start engine?**



### ⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0102 is displayed.
6. Erase the 1st trip DTC memory. Refer to [EC-651, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

**Is the 1st trip DTC P0171 detected? Is it difficult to start engine?**



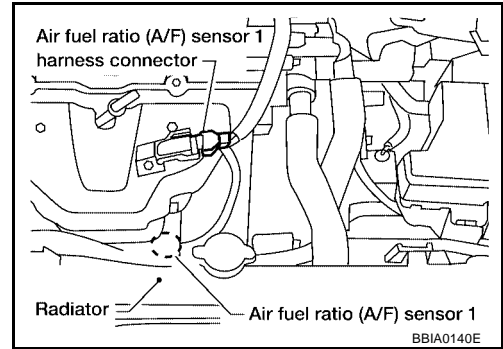
#### Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171. Refer to [EC-795](#).
- No >> GO TO 3.

**3. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector and A/F sensor 1 harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

ECM terminal	A/F sensor terminal
16	1
35	5
56	6
75	2



**Continuity should exist.**

4. Check harness continuity between ECM terminals 16, 35, 56, 75 or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.

**Continuity should not exist.**

5. Also check harness for short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**4. CHECK A/F SENSOR 1 HEATER**

Refer to [EC-935, "Component Inspection"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace A/F sensor 1.

**5. CHECK INTERMITTENT INCIDENT**

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace A/F sensor 1.

NG >> Repair or replace.

**Removal and Installation  
AIR FUEL RATIO SENSOR**

UBS0022N

Refer to [EM-12, "Removal and Installation"](#) .

**DTC P1274 A/F SENSOR**

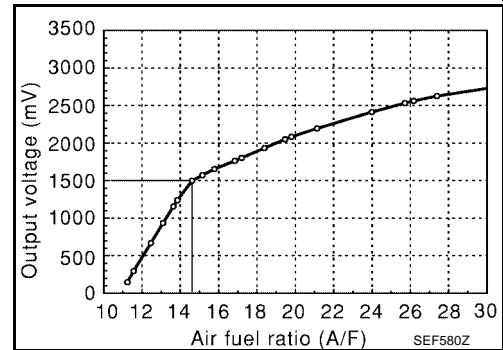
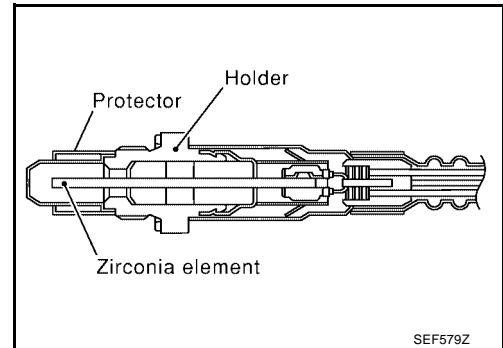
**Component Description**

The A/F sensor is a planar dual-cell limit current sensor. The sensor element of the A/F sensor is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range ( $0.7 < \lambda < \text{air}$ ).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.

An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at  $\lambda = 1$ . Therefore, the A/F sensor is able to indicate air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).



**CONSULT-II Reference Value in Data Monitor Mode**

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
A/F SEN1 (B1)	<ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul>	Maintaining engine speed at 2,000 rpm	Fluctuates around 1.5V

**On Board Diagnosis Logic**

To judge the malfunction, the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal is monitored not to be shifted to the "lean" side or "rich" side. When the A/F signal is shifting to the rich side, the malfunction will be detected.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P1274 1274	Air fuel ratio (A/F) sensor 1 rich shift monitoring	<ul style="list-style-type: none"> <li>The A/F signal computed by ECM from the A/F sensor 1 signal is shifted to the rich side for a specified period.</li> </ul>	<ul style="list-style-type: none"> <li>Air fuel ratio (A/F) sensor 1</li> <li>Air fuel ratio (A/F) sensor heater 1</li> <li>Fuel pressure</li> <li>Injectors</li> </ul>

**DTC Confirmation Procedure**

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Select "A/F SEN1 (B1) P1274" of "A/F SEN1" in "DTC WORK SUPPORT" mode.
3. Touch "START".

# DTC P1274 A/F SENSOR

[QG18DE (SULEV)]

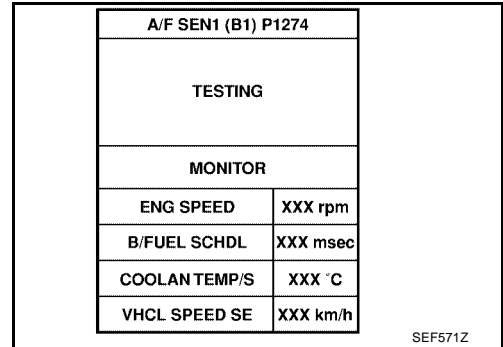
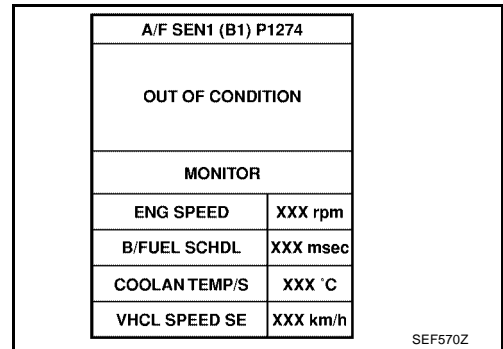
4. Maintain the following conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 400 to 800 seconds.)

**NOTE:**

Keep the accelerator pedal as steady as possible.

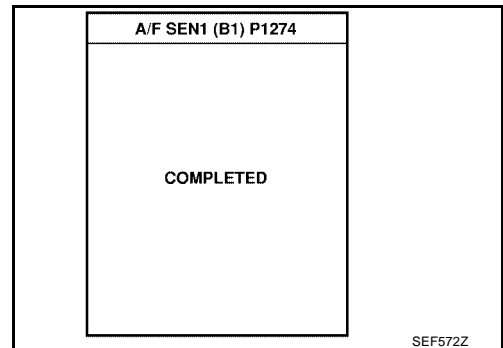
ENG SPEED	Below 3,000 rpm
B/FUEL SCHDL	Below 9.0 msec
Selector lever	“P” or “N” position

If “TESTING” is not displayed after 20 minutes, retry from step 2.



5. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”.

If “NG” is displayed, go to [EC-1056, "Diagnostic Procedure"](#) .



## Overall Function Check

UBS0022S

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

 **WITH GST**

1. Start engine and warm it up to normal operating temperature.
2. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in “D” position with “OD” OFF (A/T) or “3rd” position (M/T).

**NOTE:**

Keep accelerator pedal as steady as possible during the cruising.

3. Set “D” position with “OD” ON (A/T) or “4th” position (M/T), then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

**NOTE:**

Never apply brake during releasing the accelerator pedal.

4. Repeat steps 2 to 3 five times.
5. Stop the vehicle and turn ignition switch “OFF”.
6. Wait at least 10 seconds and restart engine.
7. Repeat steps 2 to 3 five times.
8. Stop the vehicle and connect GST to the vehicle.
9. Make sure that no DTC is displayed.

## DTC P1274 A/F SENSOR

[QG18DE (SULEV)]

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If the DTC is displayed, go to [EC-1056, "Diagnostic Procedure"](#) .

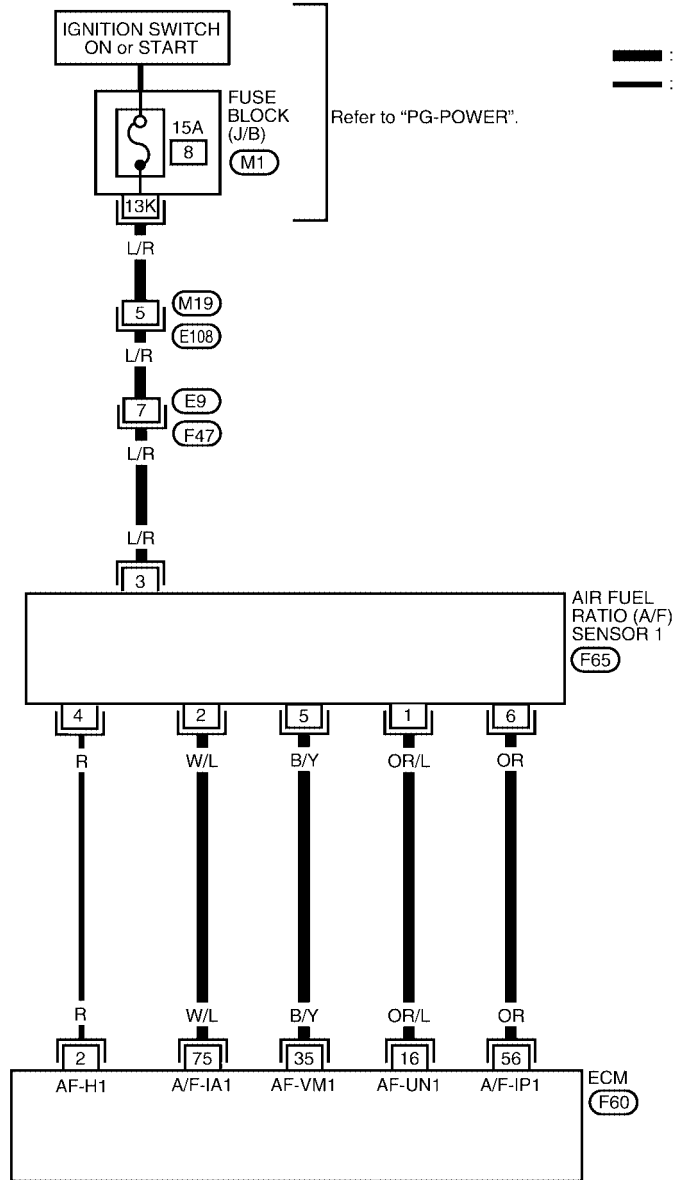
# DTC P1274 A/F SENSOR

[QG18DE (SULEV)]

UBS0022T

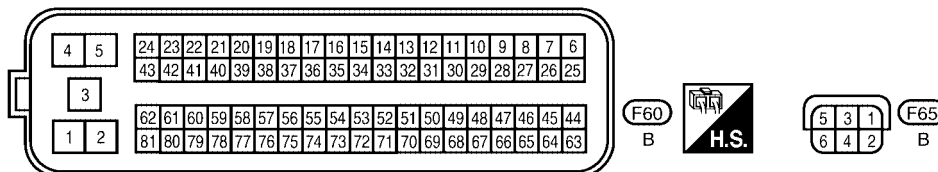
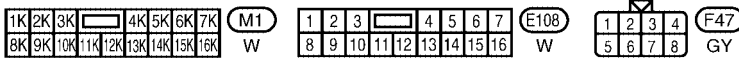
## Wiring Diagram

EC-A/F-01



— : DETECTABLE LINE FOR DTC  
— : NON-DETECTABLE LINE FOR DTC

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



BBWA0803E

# DTC P1274 A/F SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	OR/L	A/F sensor 1	<b>[Engine is running]</b> <ul style="list-style-type: none"><li>● Warm-up condition</li><li>● Idle speed</li></ul>	Approximately 3.1V
35	B/Y			Approximately 2.6V
56	OR			2 - 3V
75	W/L			2 - 3V

## Diagnostic Procedure

UBS0022U

### 1. RETIGHTEN AIR FUEL RATIO (A/F) SENSOR 1

1. Turn ignition switch "OFF".
2. Loosen and retighten the air fuel ratio (A/F) sensor 1.

**Tightening torque: 40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)**

>> GO TO 2.

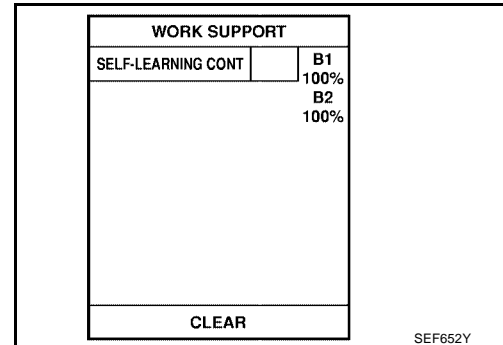


**2. CLEAR THE SELF-LEARNING DATA**

**With CONSULT-II**

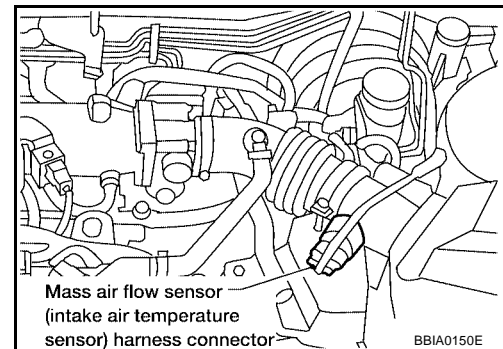
1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.

**Is the 1st trip DTC P0172 detected? Is it difficult to start engine?**



**Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
  2. Turn ignition switch "OFF".
  3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.
  4. Stop engine and reconnect mass air flow sensor harness connector.
  5. Make sure 1st trip DTC P0102 is displayed.
  6. Erase the 1st trip DTC memory. Refer to [EC-651, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
  7. Make sure DTC P0000 is displayed.
  8. Run engine for at least 10 minutes at idle speed.
- Is the 1st trip DTC P0172 detected? Is it difficult to start engine?**



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0172. Refer to [EC-802](#).
- No >> GO TO 3.

**3. CHECK HARNESS CONNECTOR**

1. Turn ignition switch "OFF".
2. Disconnect A/F sensor 1 harness connector.
3. Check harness connector for water.  
**Water should not exit.**

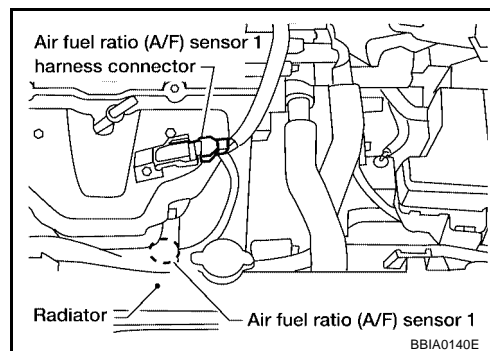
OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace harness connector.

#### 4. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector and A/F sensor 1 harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

ECM terminal	A/F sensor terminal
16	1
35	5
56	6
75	2



**Continuity should exist.**

4. Check harness continuity between ECM terminals 16, 35, 56, 75 or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.

**Continuity should not exist.**

5. Also check harness for short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

#### 5. CHECK A/F SENSOR 1 HEATER

Refer to [EC-935, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace A/F sensor 1.

#### 6. CHECK INTERMITTENT INCIDENT

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace A/F sensor 1.

NG >> Repair or replace.

#### Removal and Installation AIR FUEL RATIO SENSOR

Refer to [EM-12, "Removal and Installation"](#) .

UBS0022V

**DTC P1276 A/F SENSOR**

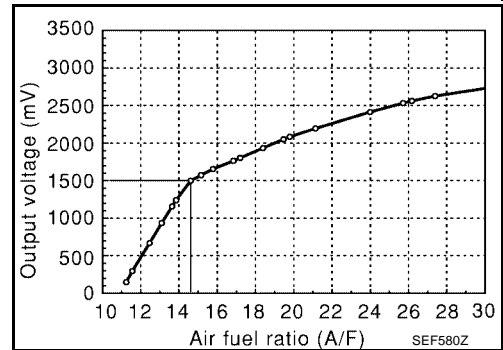
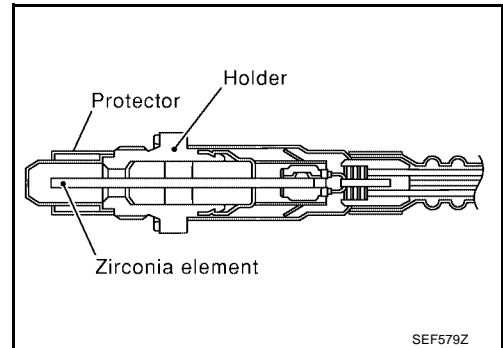
**Component Description**

The A/F sensor is a planar dual-cell limit current sensor. The sensor element of the A/F sensor is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range ( $0.7 < \lambda < \text{air}$ ).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.

An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at  $\lambda = 1$ . Therefore, the A/F sensor is able to indicate air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).



**CONSULT-II Reference Value in Data Monitor Mode**

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
A/F SEN1 (B1)	<ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul> Maintaining engine speed at 2,000 rpm	Fluctuates around 1.5V

**On Board Diagnosis Logic**

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal fluctuates according to fuel feedback control.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P1276 1276	Air fuel ratio (A/F) sensor 1 circuit high voltage	<ul style="list-style-type: none"> <li>The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 1.5V.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Air fuel ratio (A/F) sensor 1</li> </ul>

**DTC Confirmation Procedure**

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Select "A/F SEN1 (B1)" of "DATA MONITOR" mode with CONSULT-II.
3. Check "A/F SEN1 (B1)" indication.

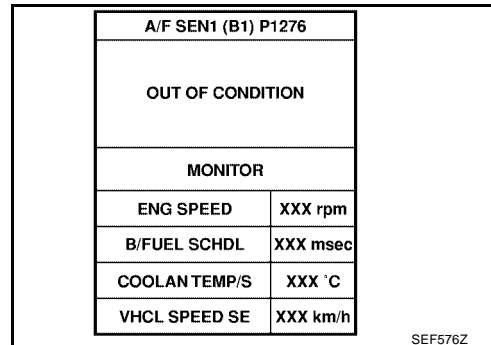
If the indication is constantly approx. 1.5V and does not fluctuates, go to [EC-1063, "Diagnostic Procedure"](#)

If the indication fluctuates around 1.5V, go to next step.

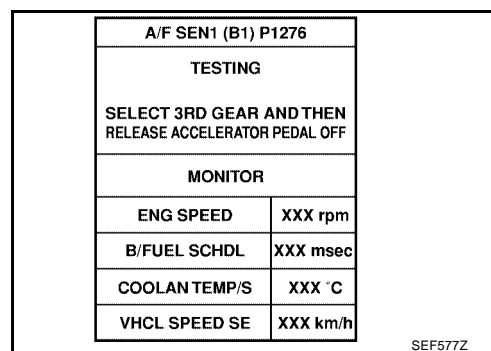
4. Select "A/F SEN1 (B1) P1276" of "A/F SEN1" in "DTC WORK SUPPORT" mode.
5. Touch "START".
6. When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen.

ENG SPEED	1,500 - 3,000 rpm
Vehicle speed	70 - 120 km/h (43 - 75 MPH)
B/FUEL SCHDL	1.0 - 8.0 msec
Selector lever	<ul style="list-style-type: none"> <li>● "D" position with "OD" ON (A/T)</li> <li>● "4th" position (M/T)</li> </ul>

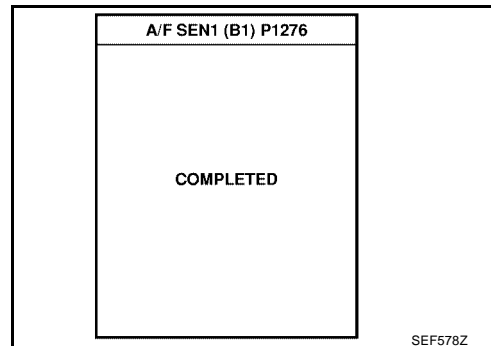
**If "TESTING" is not displayed after 20 seconds, retry from step 2.**



7. Following the instructions of CONSULT-II screen, set "D" position with "OD" OFF (A/T) or "3rd" position (M/T) and release accelerator pedal fully.



8. Make sure that "TESTING" changes to "COMPLETED".  
**If "TESTING" changed to "OUT OF CONDITION", retry from step 6.**
9. Make sure that "OK" is displayed after touching "SELF-DIAG RESULT".  
If "NG" is displayed, go to [EC-1063, "Diagnostic Procedure"](#).



## Overall Function Check

UBS00230

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

### WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in "D" position with "OD" OFF (A/T) or "3rd" position (M/T).

**NOTE:**

Keep the accelerator pedal as steady as possible during the cruising.

3. Set "D" position with "OD" ON (A/T) or "4th" position (M/T), then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

**NOTE:**

Never apply brake during releasing the accelerator pedal.

4. Repeat steps 2 to 3 five times.
5. Stop the vehicle and turn ignition switch "OFF".
6. Wait at least 10 seconds and restart engine.

## DTC P1276 A/F SENSOR

[QG18DE (SULEV)]

7. Repeat steps 2 to 3 five times.
8. Stop the vehicle and connect GST to the vehicle.
9. Make sure that no DTC is displayed.  
If the DTC is displayed, go to [EC-1063, "Diagnostic Procedure"](#).

A

EC

C

D

E

F

G

H

I

J

K

L

M

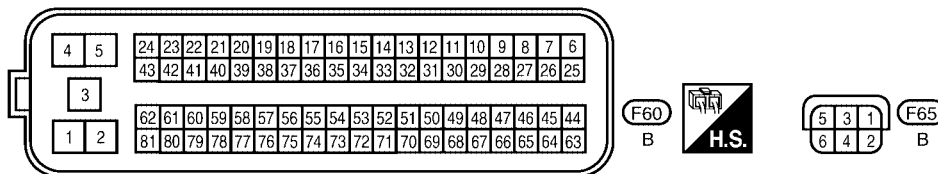
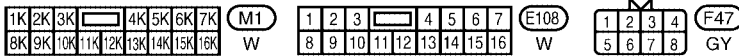
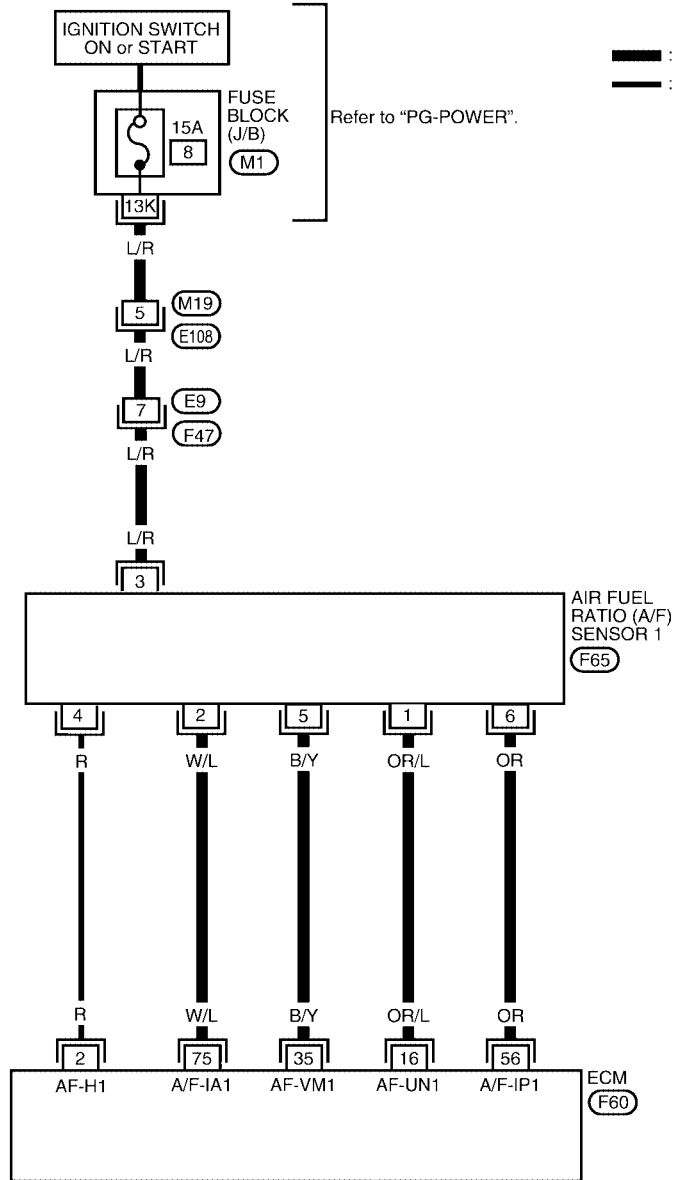
# DTC P1276 A/F SENSOR

[QG18DE (SULEV)]

UBS00231

## Wiring Diagram

EC-A/F-01



BBWA0603E

# DTC P1276 A/F SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

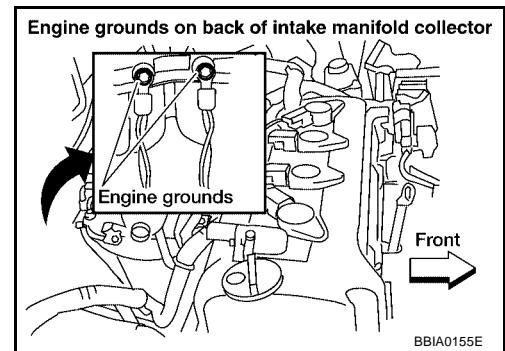
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	OR/L	A/F sensor 1	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 3.1V
35	B/Y			Approximately 2.6V
56	OR			2 - 3V
75	W/L			2 - 3V

## Diagnostic Procedure

UBS00232

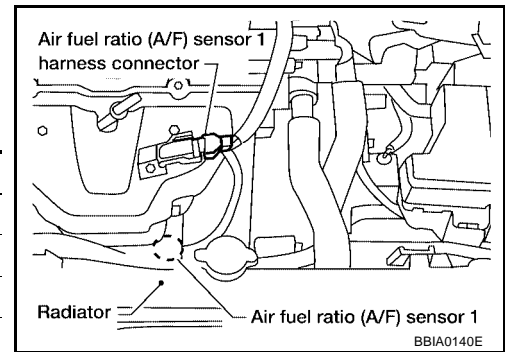
### 1. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.



3. Disconnect ECM harness connector and A/F sensor 1 harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

ECM terminal	A/F sensor terminal
16	1
35	5
56	6
75	2



**Continuity should exist.**

5. Check harness continuity between ECM terminals 16, 35, 56, 75 or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.

**Continuity should not exist.**

6. Also check harness for short to power.

OK or NG

OK >> GO TO 2.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 2. CHECK INTERMITTENT INCIDENT

---

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace A/F sensor 1.

NG >> Repair or replace.

### Removal and Installation AIR FUEL RATIO SENSOR

UBS00233

Refer to [EM-12, "Removal and Installation"](#) .



**DTC P1278 A/F SENSOR**

PDF:22693

UBS0030Z

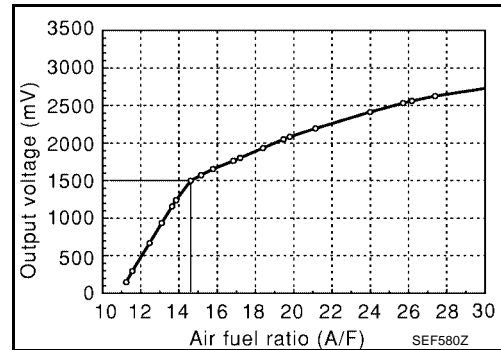
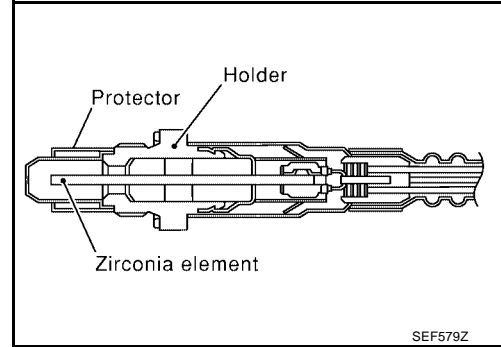
**Component Description**

The A/F sensor is a planar dual-cell limit current sensor. The sensor element of the A/F sensor is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range ( $0.7 < \lambda < \text{air}$ ).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.

An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at  $\lambda = 1$ . Therefore, the A/F sensor is able to indicate air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).



**CONSULT-II Reference Value in Data Monitor Mode**

UBS003P0

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
A/F SEN1 (B1)	<ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul> Maintaining engine speed at 2,000 rpm	Fluctuates around 1.5V

**On Board Diagnosis Logic**

UBS003P1

To judge the malfunction of air fuel ratio (A/F) sensor 1, this diagnosis measures response time of the A/F signal computed by ECM from the air fuel ration (A/F) sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and the air fuel ration (A/F) sensor 1 temperature index. Judgment is based on whether the compensated time (the A/F signal cycling time index) is inordinately long or not.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P1278 1278	Air fuel ratio (A/F) sensor 1 circuit slow response	<ul style="list-style-type: none"> <li>The response (from RICH to LEAN) of the A/F signal computed by ECM from A/F sensor 1 signal takes more than the specified time.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Air fuel ratio (A/F) sensor 1</li> <li>Air fuel ratio (A/F) sensor heater 1</li> <li>Fuel pressure</li> <li>Injectors</li> <li>Intake air leaks</li> <li>Exhaust gas leaks</li> <li>PCV</li> <li>Mass air flow sensor</li> </ul>

**DTC Confirmation Procedure**

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

1. Perform [EC-635, "Idle Air Volume Learning"](#) . Make sure that “CMPLT” is displayed on CONSULT-II screen. If “INCMP” is displayed, follow the instruction for “Idle Air Volume Learning”.
2. Select “A/F SEN1 (B1) P1278/P1279” of “A/F SEN1” in “DTC WORK SUPPORT” mode.
3. Touch “START”.
4. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen.

ENG SPEED	1,500 - 3,000 rpm
Vehicle speed	70 - 120 km/h (43 - 75 MPH)
B/FUEL SCHDL	1.0 - 8.0 msec
Selector lever	<ul style="list-style-type: none"> <li>● “D” position with “OD” ON (A/T)</li> <li>● “4th” position (M/T)</li> </ul>

If “TESTING” is not displayed after 20 seconds, retry from step 2.

A/F SEN1 (B1) P1278/P1279	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h

PBIB0756E

5. Following the instructions of CONSULT-II screen, set “D” position with “OD” OFF (A/T) or “3rd” position (M/T) and release accelerator pedal fully.

A/F SEN1 (B1) P1278/P1279	
TESTING	
SELECT 3RD GEAR AND THEN RELEASE ACCELERATOR PEDAL OFF	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h

PBIB0757E

6. Make sure that “TESTING” changes to “COMPLETED”.  
If “TESTING” changed to “OUT OF CONDITION”, retry from step 6.
7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULT”.  
If “NG” is displayed, go to [EC-1069, "Diagnostic Procedure"](#) .

A/F SEN1 (B1) P1278/P1279	
COMPLETED	

PBIB0758E

**Overall Function Check**

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

 **WITH GST**

1. Perform [EC-635, "Idle Air Volume Learning"](#) . Make sure the result is OK. If NG, follow the instruction for "Idle Air Volume Learning".
2. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in "D" position with "OD" OFF (A/T) or "3rd" position (M/T).

**NOTE:**

Keep the accelerator pedal as steady as possible during the cruising.

3. Set "D" position with "OD" ON (A/T) or "4th" position (M/T), then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

**NOTE:**

Never apply brake during releasing the accelerator pedal.

4. Repeat steps 2 to 3 five times.
5. Stop the vehicle and turn ignition switch "OFF".
6. Wait at least 10 seconds and restart engine.
7. Repeat steps 2 to 3 five times.
8. Stop the vehicle and connect GST to the vehicle.
9. Make sure that no DTC is displayed.  
If the DTC is displayed, go to [EC-1069, "Diagnostic Procedure"](#) .

A

EC

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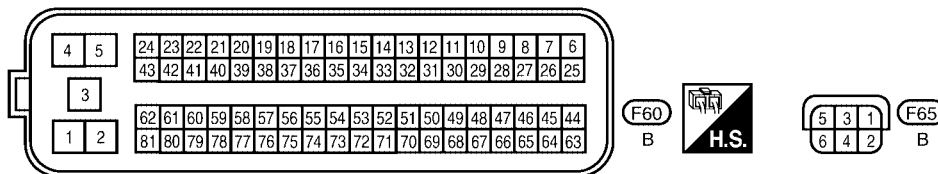
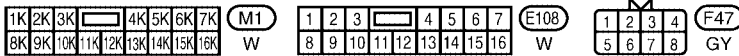
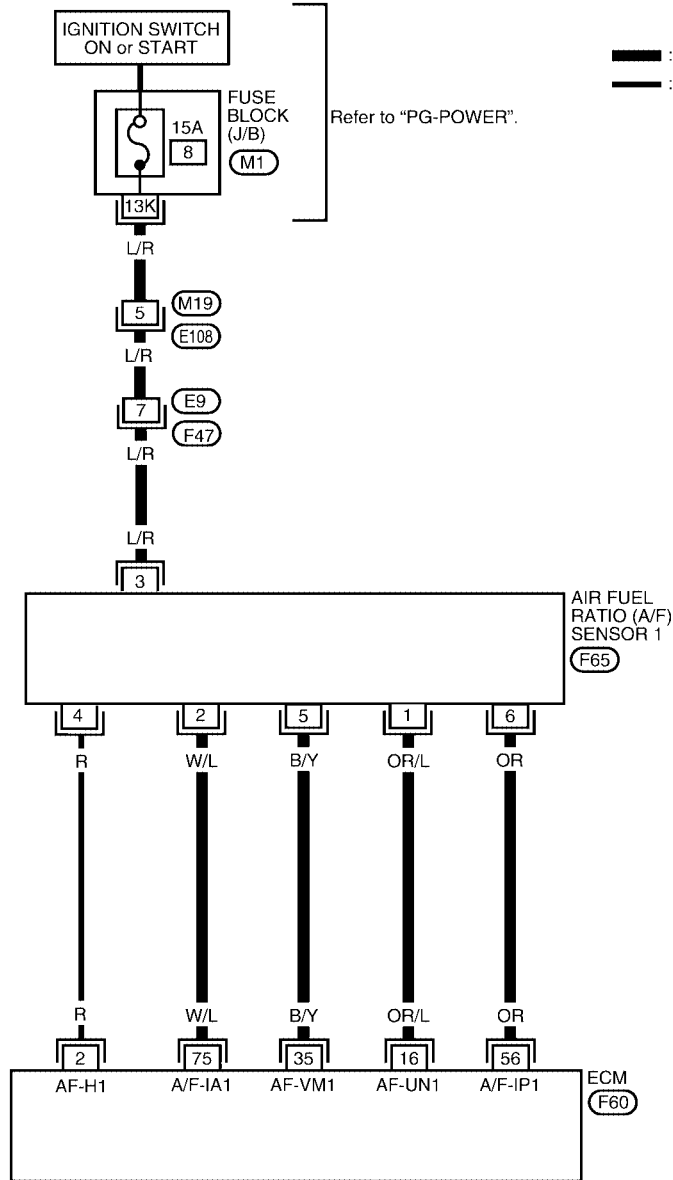
# DTC P1278 A/F SENSOR

[QG18DE (SULEV)]

UBS003P4

## Wiring Diagram

EC-A/F-01



BBWA0603E

# DTC P1278 A/F SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	OR/L	A/F sensor 1	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 3.1V
35	B/Y			Approximately 2.6V
56	OR			2 - 3V
75	W/L			2 - 3V

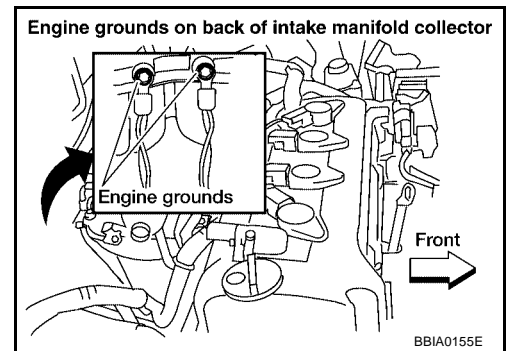
## Diagnostic Procedure

UBS003P5

### 1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



### 2. RETIGHTEN AIR FUEL RATIO (A/F) SENSOR 1

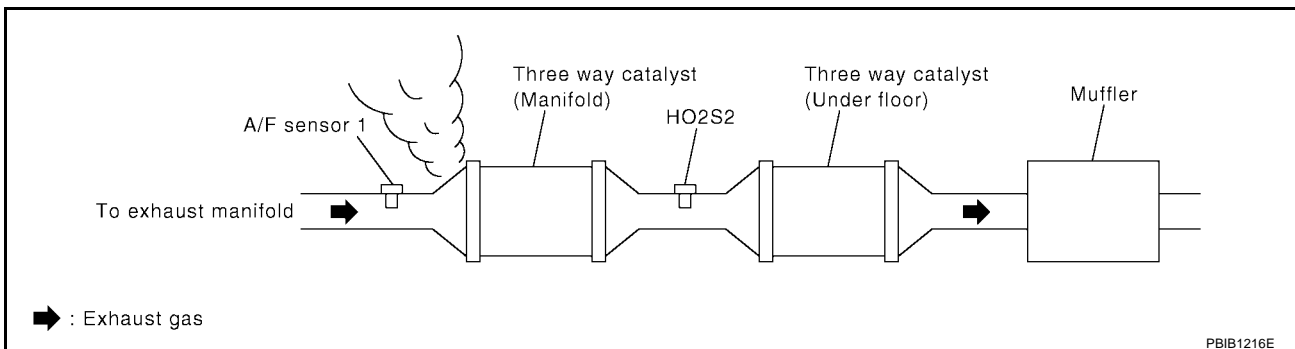
Loosen and retighten the air fuel ratio (A/F) sensor 1.

**Tightening torque: 40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)**

>> GO TO 3.

### 3. CHECK EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before three way catalyst (manifold).



OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace.

#### 4. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

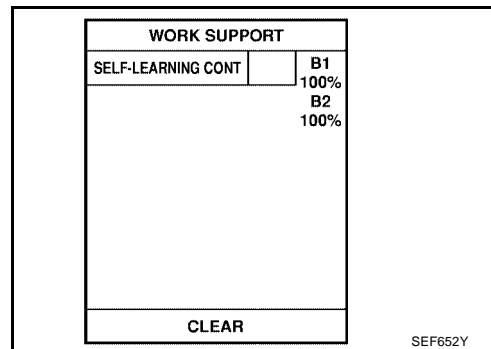
OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace.

#### 5. CLEAR THE SELF-LEARNING DATA

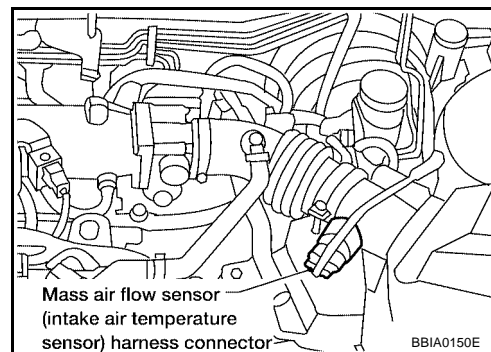
##### With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR" or "START".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?**



##### Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0102 is displayed.
6. Erase the 1st trip DTC memory. Refer to [EC-651, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?**



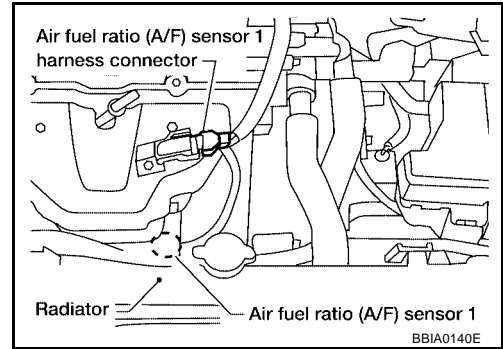
Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171, P0172. Refer to [EC-795](#), [EC-802](#).
- No >> GO TO 6.

**6. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector and A/F sensor 1 harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

ECM terminal	A/F sensor terminal
16	1
35	5
56	5
75	2



**Continuity should exist.**

4. Check harness continuity between ECM terminals 16, 35, 56, 75 or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.

**Continuity should exist.**

5. Also check harness for short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**7. CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER**

Refer to [EC-935, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace A/F sensor 1.

**8. CHECK MASS AIR FLOW SENSOR**

Refer to [EC-747, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace mass air flow sensor.

**9. CHECK PCV VALVE**

Refer to [EC-1218, "POSITIVE CRANKCASE VENTILATION"](#) .

OK or NG

OK >> GO TO 10.

NG >> Repair or replace PCV valve.

**10. CHECK INTERMITTENT INCIDENT**

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace A/F sensor 1.

NG >> Repair or replace.

---

**Removal and Installation**  
**AIR FUEL RATIO SENSOR**

Refer to [EM-12, "OUTER COMPONENT PARTS"](#) .



**DTC P1279 A/F SENSOR**

PFM:22693

**Component Description**

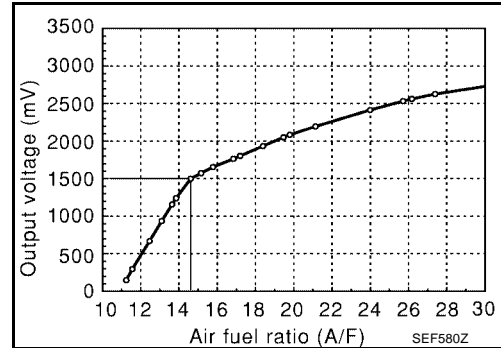
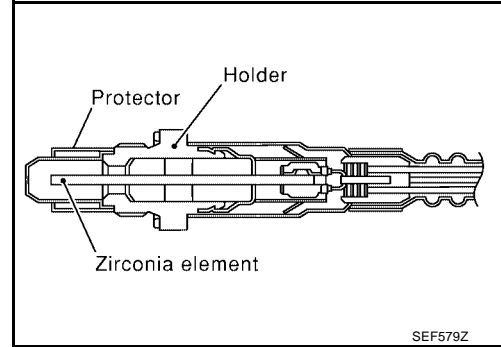
UBS003P7

The A/F sensor is a planar dual-cell limit current sensor. The sensor element of the A/F sensor is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement  $\lambda = 1$ , but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide  $\lambda$  range ( $0.7 < \lambda < \text{air}$ ).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.

An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at  $\lambda = 1$ . Therefore, the A/F sensor is able to indicate air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).



**CONSULT-II Reference Value in Data Monitor Mode**

UBS003P8

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
A/F SEN1 (B1)	<ul style="list-style-type: none"> <li>Engine: After warming up</li> </ul> Maintaining engine speed at 2,000 rpm	Fluctuates around 1.5V

**On Board Diagnosis Logic**

UBS003P9

To judge the malfunction of air fuel ratio (A/F) sensor 1, this diagnosis measures response time of the A/F signal computed by ECM from the air fuel ration (A/F) sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and the air fuel ration (A/F) sensor 1 temperature index. Judgment is based on whether the compensated time (the A/F signal cycling time index) is inordinately long or not.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P1279 1279	Air fuel ratio (A/F) sensor 1 circuit slow response	<ul style="list-style-type: none"> <li>The response (from LEAN to RICH) of the A/F signal computed by ECM from A/F sensor 1 signal takes more than the specified time.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted.)</li> <li>Air fuel ratio (A/F) sensor 1</li> <li>Air fuel ratio (A/F) sensor heater 1</li> <li>Fuel pressure</li> <li>Injectors</li> <li>Intake air leaks</li> <li>Exhaust gas leaks</li> <li>PCV</li> <li>Mass air flow sensor</li> </ul>

**DTC Confirmation Procedure**

UBS003PA

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

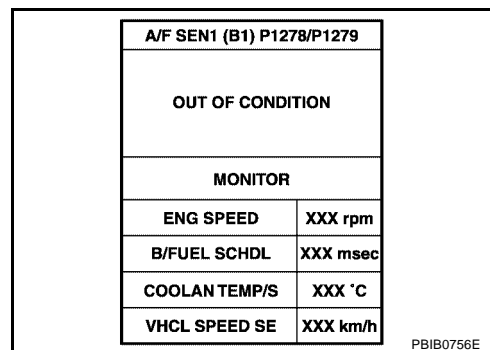
Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

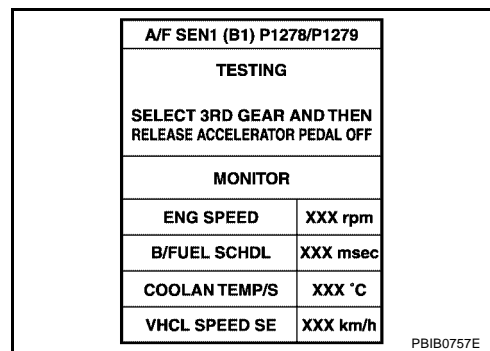
1. Perform [EC-635, "Idle Air Volume Learning"](#) . Make sure that “CMPLT” is displayed on CONSULT-II screen. If “INCMP” is displayed, follow the instruction for “Idle Air Volume Learning”.
2. Select “A/F SEN1 (B1) P1278/P1279” of “A/F SEN1” in “DTC WORK SUPPORT” mode.
3. Touch “START”.
4. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen.

ENG SPEED	1,500 - 3,000 rpm
Vehicle speed	70 - 120 km/h (43 - 75 MPH)
B/FUEL SCHDL	1.0 - 8.0 msec
Selector lever	<ul style="list-style-type: none"> <li>● “D” position with “OD” ON (A/T)</li> <li>● “4th” position (M/T)</li> </ul>

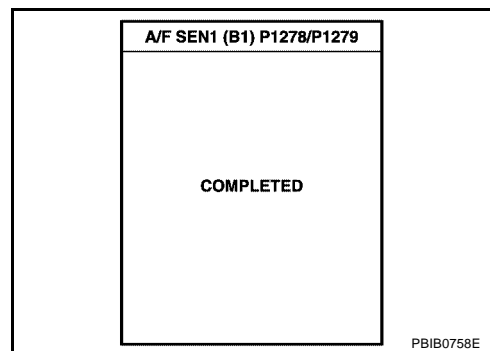
**If “TESTING” is not displayed after 20 seconds, retry from step 2.**



5. Following the instructions of CONSULT-II screen, set “D” position with “OD” OFF (A/T) or “3rd” position (M/T) and release accelerator pedal fully.



6. Make sure that “TESTING” changes to “COMPLETED”.  
**If “TESTING” changed to “OUT OF CONDITION”, retry from step 6.**
7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULT”.  
If “NG” is displayed, go to [EC-1077, "Diagnostic Procedure"](#) .



### Overall Function Check

UBS003PB

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

**WITH GST**

1. Perform [EC-635, "Idle Air Volume Learning"](#) . Make sure the result is OK. If NG, follow the instruction for “Idle Air Volume Learning”.
2. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in “D” position with “OD” OFF (A/T) or “3rd” position (M/T).

**NOTE:**

Keep the accelerator pedal as steady as possible during the cruising.

## DTC P1279 A/F SENSOR

[QG18DE (SULEV)]

3. Set "D" position with "OD" ON (A/T) or "4th" position (M/T), then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

A

**NOTE:**

Never apply brake during releasing the accelerator pedal.

4. Repeat steps 2 to 3 five times.
5. Stop the vehicle and turn ignition switch "OFF".
6. Wait at least 10 seconds and restart engine.
7. Repeat steps 2 to 3 five times.
8. Stop the vehicle and connect GST to the vehicle.
9. Make sure that no DTC is displayed.  
If the DTC is displayed, go to [EC-1077, "Diagnostic Procedure"](#).

EC

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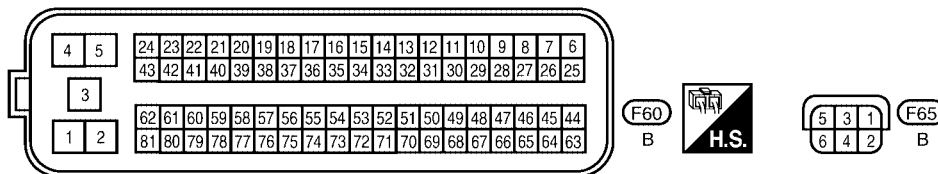
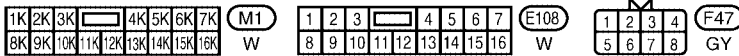
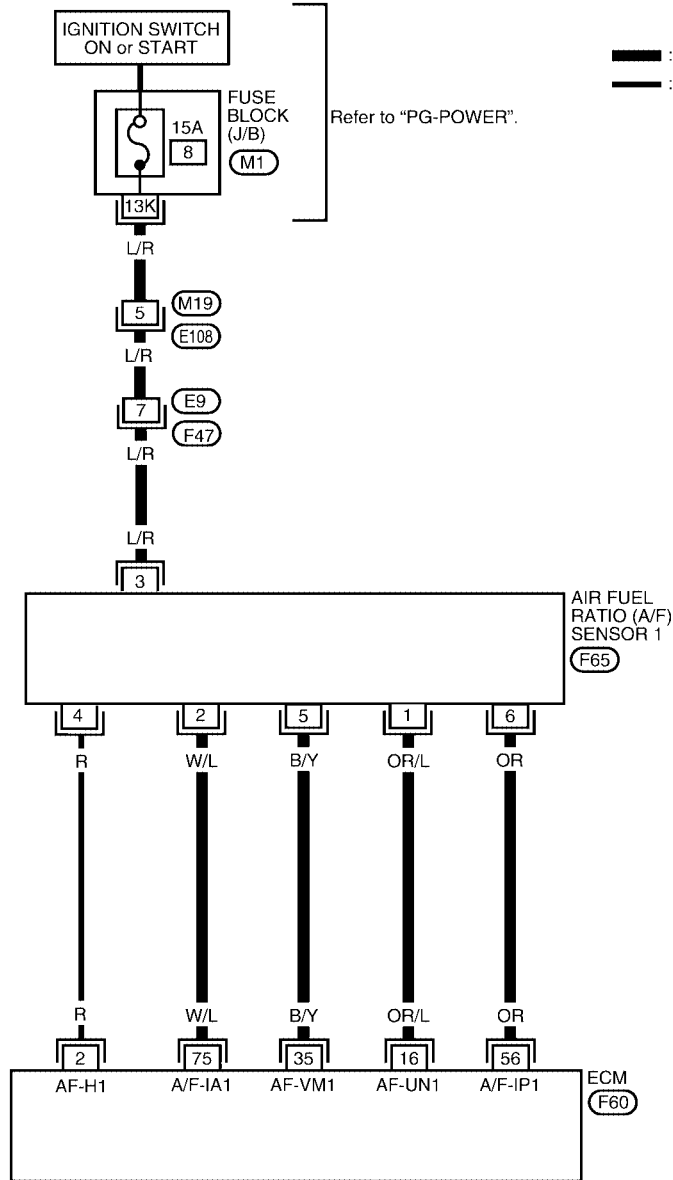
# DTC P1279 A/F SENSOR

[QG18DE (SULEV)]

UBS003PC

## Wiring Diagram

EC-A/F-01



BBWA0603E

# DTC P1279 A/F SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	OR/L	A/F sensor 1	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 3.1V
35	B/Y			Approximately 2.6V
56	OR			2 - 3V
75	W/L			2 - 3V

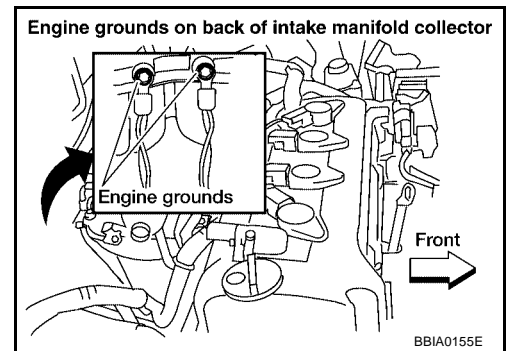
## Diagnostic Procedure

UBS003PD

### 1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



### 2. RETIGHTEN AIR FUEL RATIO (A/F) SENSOR 1

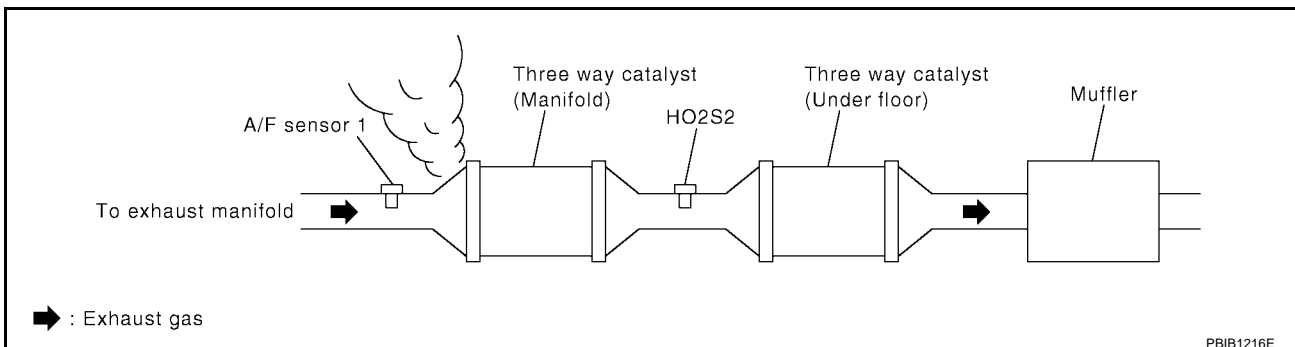
Loosen and retighten the air fuel ratio (A/F) sensor 1.

**Tightening torque: 40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)**

>> GO TO 3.

### 3. CHECK EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before three way catalyst (manifold).



OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace.

## 4. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

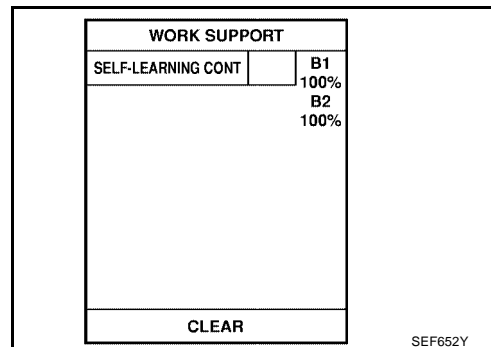
OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace.

## 5. CLEAR THE SELF-LEARNING DATA

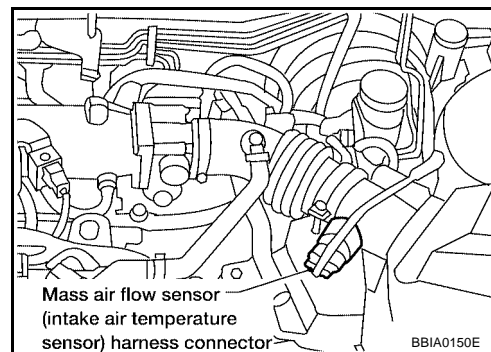
### With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR" or "START".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?**



### Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0102 is displayed.
6. Erase the 1st trip DTC memory. Refer to [EC-651, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?**



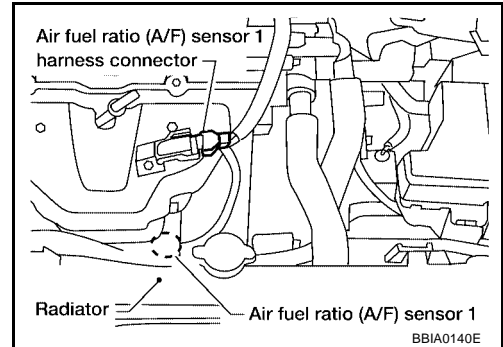
Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171, P0172. Refer to [EC-795](#), [EC-802](#).
- No >> GO TO 6.

**6. CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector and A/F sensor 1 harness connector.
3. Check harness continuity between the following terminals. Refer to Wiring Diagram.

ECM terminal	A/F sensor terminal
16	1
35	5
56	6
75	2



**Continuity should exist.**

4. Check harness continuity between ECM terminals 16, 35, 56, 75 or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.

**Continuity should exist.**

5. Also check harness for short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**7. CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER**

Refer to [EC-935, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace A/F sensor 1.

**8. CHECK MASS AIR FLOW SENSOR**

Refer to [EC-747, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace mass air flow sensor.

**9. CHECK PCV VALVE**

Refer to [EC-1218, "POSITIVE CRANKCASE VENTILATION"](#) .

OK or NG

OK >> GO TO 10.

NG >> Repair or replace PCV valve.

**10. CHECK INTERMITTENT INCIDENT**

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> Replace A/F sensor 1.

NG >> Repair or replace.

---

**Removal and Installation**  
**AIR FUEL RATIO SENSOR**

UBS003PE

Refer to [EM-12, "OUTER COMPONENT PARTS"](#) .



# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QG18DE (SULEV)]

## DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

PFP:14920

### Description SYSTEM DESCRIPTION

UBS0023N

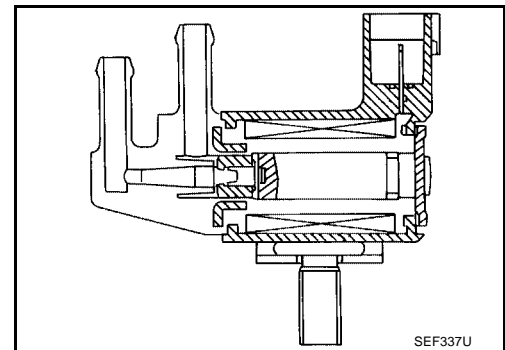
Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed* and cylinder position	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Air fuel ratio (A/F) sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Vehicle speed sensor	Vehicle speed		

\*: ECM determines the start signal status by the signals of engine speed and battery voltage.

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

### COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



### CONSULT-II Reference Value in Data Monitor Mode

UBS0023O

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
PURG VOL C/V	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: "OFF"</li> <li>● Shift lever: "N" (A/T), Neutral (M/T)</li> <li>● No-load</li> </ul>	Idle
		2,000 rpm
		0%
		—

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QG18DE (SULEV)]

UBS0023P

## On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1444 1444	EVAP canister purge volume control solenoid valve	The canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed.	<ul style="list-style-type: none"> <li>● EVAP control system pressure sensor</li> <li>● EVAP canister purge volume control solenoid valve (The valve is stuck open.)</li> <li>● EVAP canister vent control valve</li> <li>● EVAP canister</li> <li>● Hoses (Hoses are connected incorrectly or clogged.)</li> </ul>

## DTC Confirmation Procedure

UBS0023R

### NOTE:

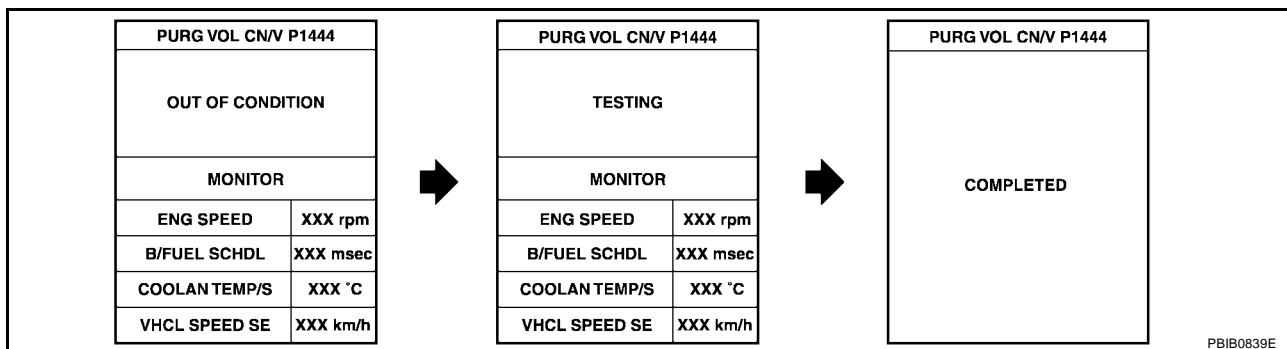
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

**Always perform test at a temperature of 0°C (32°F) or more.**

### WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch “OFF” and wait at least 10 seconds.
3. Turn ignition switch “ON”.
4. Select “PURG VOL CN/V P1444” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
5. Touch “START”.



6. Start engine and let it idle until “TESTING” on CONSULT-II changes to “COMPLETED”. (It will take approximately 10 seconds.)  
**If “TESTING” is not displayed after 5 minutes, retry from step 2.**
7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to [EC-1085, "Diagnostic Procedure"](#).

### WITH GST

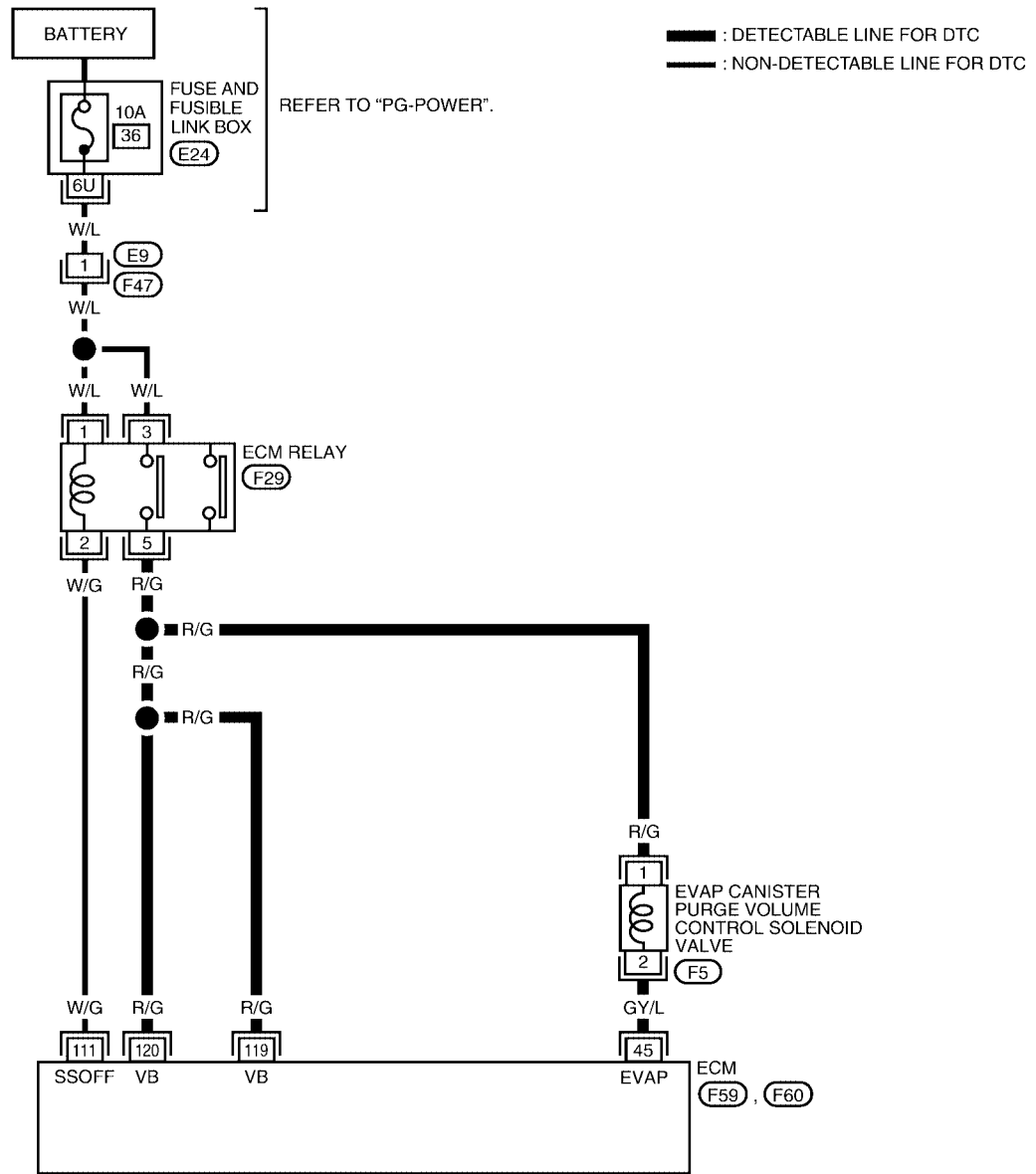
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch “OFF” and wait at least 10 seconds.
3. Start engine and let it idle for at least 20 seconds.
4. Select “MODE 7” with GST.
5. If 1st trip DTC is detected, go to [EC-1085, "Diagnostic Procedure"](#).

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QG18DE (SULEV)]

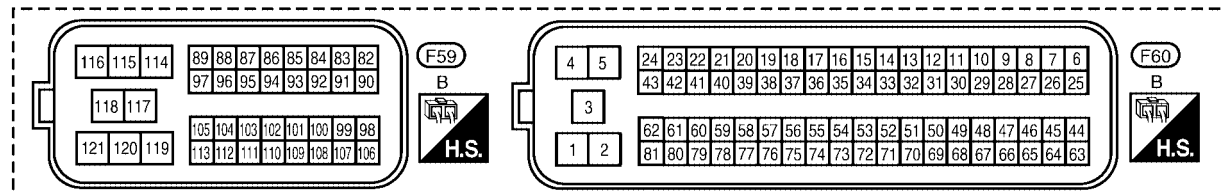
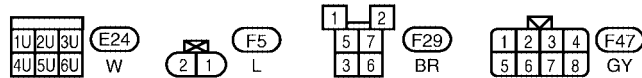
## Wiring Diagram

UBS0023S

EC-PGC/V-01



A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



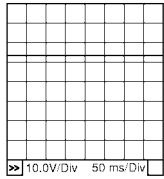
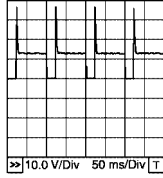
BBWA0785E

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
45	GY/L	EVAP canister purge volume control solenoid valve	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right;">PBIB0050E</p>
			<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine)</li> </ul>	<p>Approximately 10V★</p>  <p style="text-align: right;">PBIB0520E</p>
111	W/G	ECM relay (Self shut-off)	<p><b>[Engine is running]</b> <b>[Ignition switch "OFF"]</b></p> <ul style="list-style-type: none"> <li>● For 5 seconds after turning ignition switch "OFF"</li> </ul>	0 - 1.0V
			<p><b>[Ignition switch "OFF"]</b></p> <ul style="list-style-type: none"> <li>● 5 seconds passed after turning ignition switch "OFF"</li> </ul>	BATTERY VOLTAGE (11 - 14V)
119 120	R/G R/G	Power supply for ECM	<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

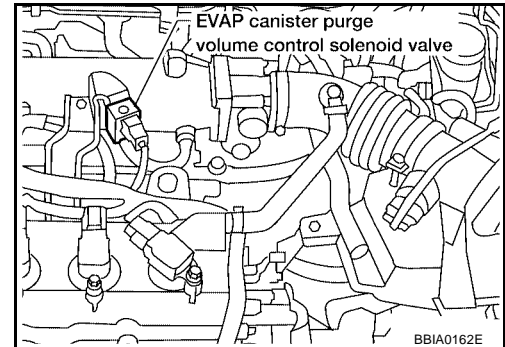
# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QG18DE (SULEV)]

UBS0023T

## Diagnostic Procedure

### 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Turn ignition switch "ON".

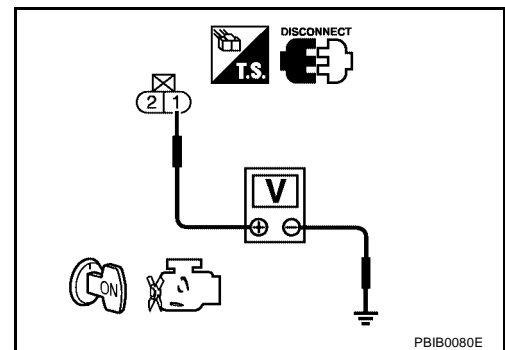


4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and engine ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM relay
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

>> Repair harness or connectors.

### 3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 45 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QG18DE (SULEV)]

## 4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

**Water should not exist.**

OK or NG

- OK >> GO TO 5.  
NG >> Replace EVAP control system pressure sensor.

## 5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-885, "Component Inspection"](#).

OK or NG

- OK (With CONSULT-II)>>GO TO 6.  
OK (Without CONSULT-II)>>GO TO 7.  
NG >> Replace EVAP control system pressure sensor.

## 6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

 **With CONSULT-II**

1. Turn ignition switch "OFF".
2. Reconnect harness connectors disconnected.
3. Start engine.
4. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 8.  
NG >> GO TO 7.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
THRTL POS SEN	X. XX V

PBIB0721E

## 7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-892, "Component Inspection"](#).

OK or NG

- OK >> GO TO 8.  
NG >> Replace EVAP canister purge volume control solenoid valve.

## 8. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 9.  
NG >> Clean the rubber tube using an air blower.

## 9. CHECK EVAP CANISTER VENT CONTROL VALVE-II

Refer to [EC-878, "Component Inspection"](#).

OK or NG

- OK >> GO TO 11.  
NG >> Replace EVAP canister vent control valve.

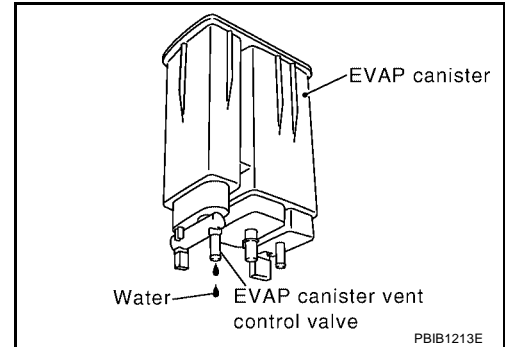
# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QG18DE (SULEV)]

## 10. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will drain from the EVAP canister.

OK or NG

- OK >> GO TO 11.  
NG >> GO TO 13.



## 11. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.

**The weight should be less than 1.9 kg (4.2 lb).**

OK or NG

- OK >> GO TO 13.  
NG >> GO TO 12.

## 12. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

## 13. CHECK INTERMITTENT INCIDENT

Refer to [EC-137, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

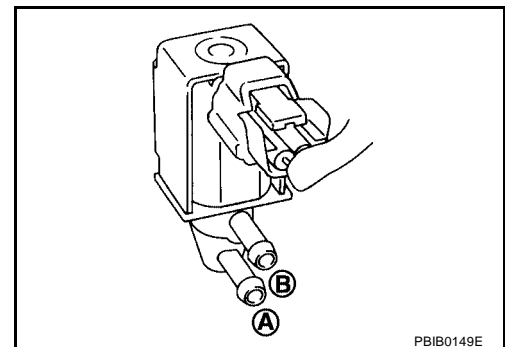
### Component Inspection EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

UBS0061B

Ⓟ With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100.0%	Yes
0.0%	No

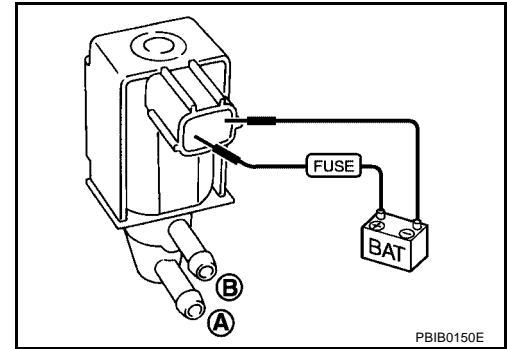


# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QG18DE (SULEV)]

## ⊗ Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No





# DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (SULEV)]

## DTC P1446 EVAP CANISTER VENT CONTROL VALVE

PF14935

### Component Description

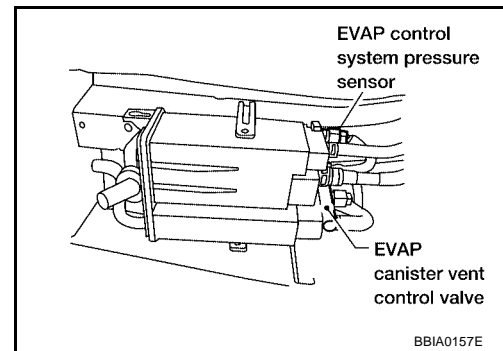
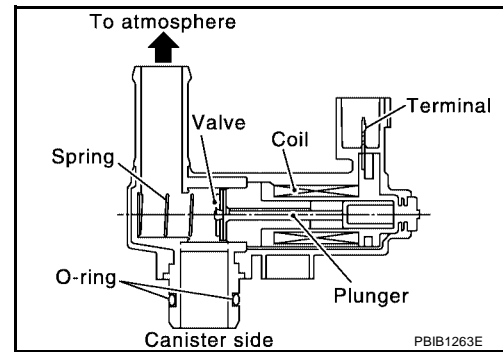
UBS0023U

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System" diagnoses.



### CONSULT-II Reference Value in Data Monitor Mode

UBS0023V

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

### On Board Diagnosis Logic

UBS0023W

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1446 1446	EVAP canister vent control valve close	EVAP canister vent control valve remains closed under specified driving conditions.	<ul style="list-style-type: none"> <li>● EVAP canister vent control valve</li> <li>● EVAP control system pressure sensor and the circuit</li> <li>● Blocked rubber tube to EVAP canister vent control valve</li> <li>● EVAP canister is saturated with water</li> </ul>

### DTC Confirmation Procedure

UBS0023Y

#### CAUTION:

Always drive vehicle at a safe speed.

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

# DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (SULEV)]

## ④ WITH CONSULT-II

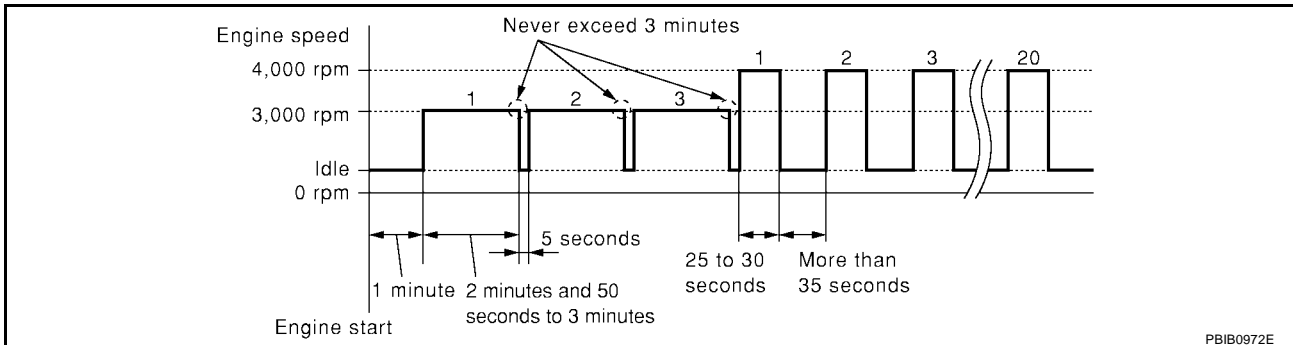
1. Turn ignition switch "ON" and wait at least 5 seconds.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
4. Start engine and let it idle for at least 1 minute.
5. Repeat next procedures 3 times.
  - a. Increase the engine speed up to 3,000 to 3,500 rpm and keep it for 2 minutes and 50 seconds to 3 minutes.  
**Never exceed 3 minutes.**
  - b. Fully released accelerator pedal and keep engine idle for about 5 seconds.
6. If 1st trip DTC is detected, go to [EC-996, "Diagnostic Procedure"](#)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

If 1st trip DTC is not detected, go to the next step.

7. Repeat next procedure 20 times.
  - a. Quickly increase the engine speed up to 4,000 to 4,500 rpm or more and keep it for 25 to 30 seconds.
  - b. Fully released accelerator pedal and keep engine idle for at least 35 seconds.



8. If 1st trip DTC is detected, go to [EC-996, "Diagnostic Procedure"](#) .

## ④ WITH GST

Follow the procedure "WITH CONSULT-II" above.

# DTC P1446 EVAP CANISTER VENT CONTROL VALVE

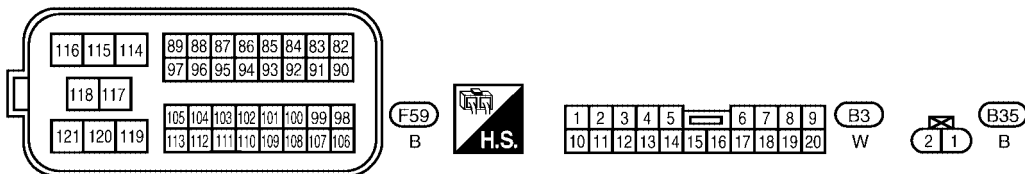
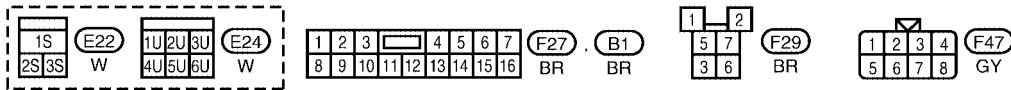
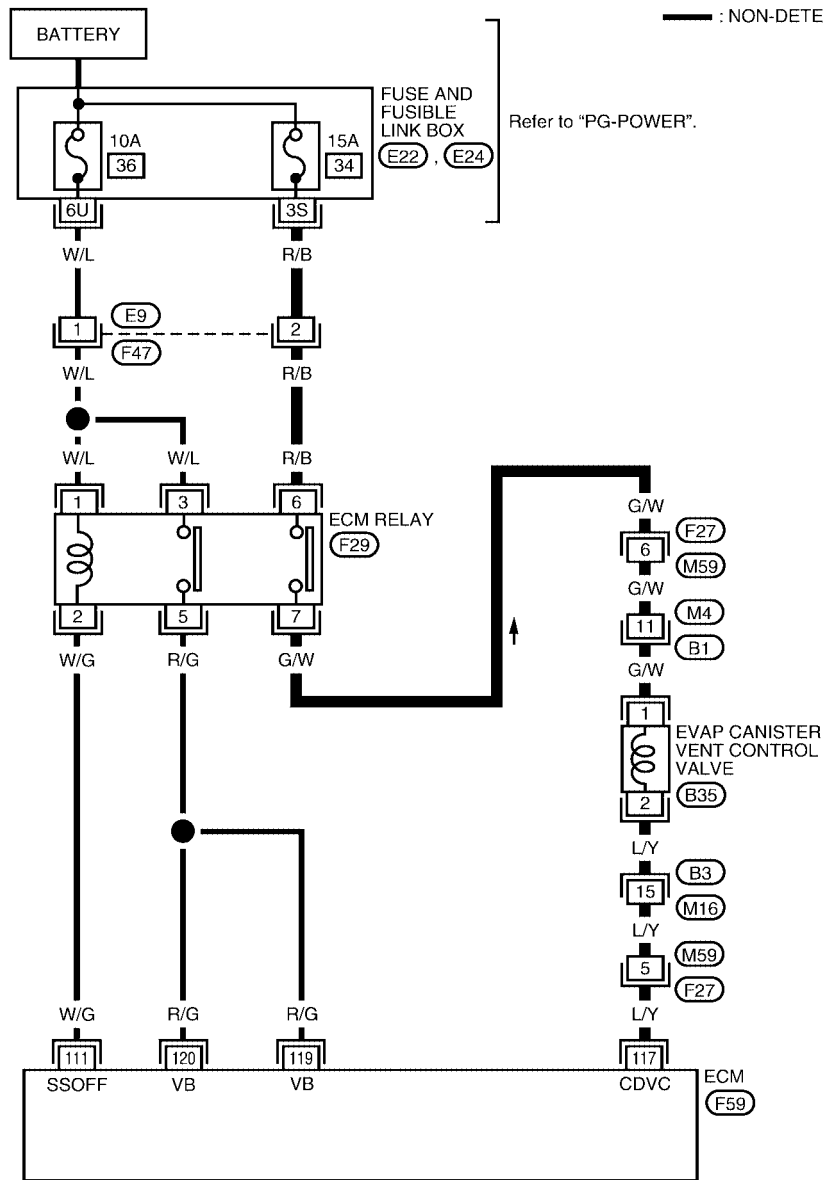
[QG18DE (SULEV)]

## Wiring Diagram

UBS0023Z

EC-VENT/V-01

— : DETECTABLE LINE FOR DTC  
 - - - : NON-DETECTABLE LINE FOR DTC



BBWA0291E

# DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] <ul style="list-style-type: none"><li>For 5 seconds after turning ignition switch "OFF"</li></ul>	0 - 1.0V
			[Ignition switch "OFF"] <ul style="list-style-type: none"><li>5 seconds passed after turning ignition switch "OFF"</li></ul>	BATTERY VOLTAGE (11 - 14V)
117	L/Y	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
119 120	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

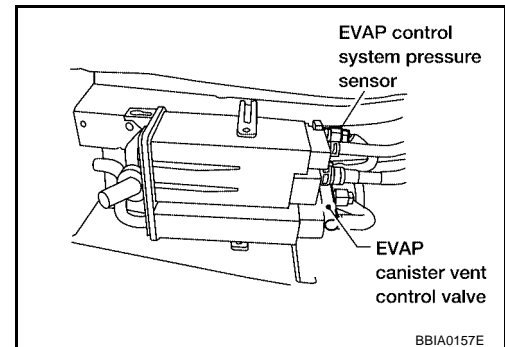
UBS00240

### 1. CHECK RUBBER TUBE

1. Turn ignition switch "OFF".
2. Disconnect rubber tube connected to EVAP canister vent control valve.
3. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 2.  
NG >> Clean rubber tube using an air blower.



### 2. CHECK EVAP CANISTER VENT CONTROL VALVE-I

Refer to [EC-998, "Component Inspection"](#).

OK or NG

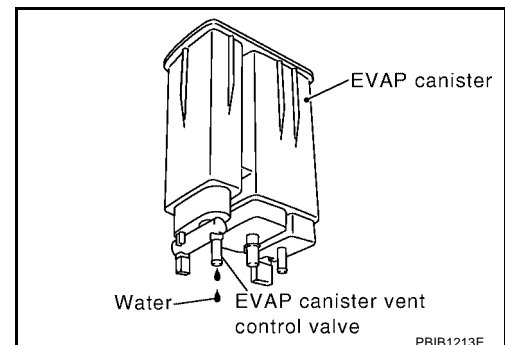
- OK >> GO TO 3.  
NG >> Replace EVAP canister vent control valve.

### 3. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will drain from the EVAP canister.

Yes or No

- Yes >> GO TO 4.  
No >> GO TO 6.



# DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (SULEV)]

## 4. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.

**The weight should be less than 1.9 kg (4.2 lb).**

OK or NG

OK >> GO TO 6.

NG >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

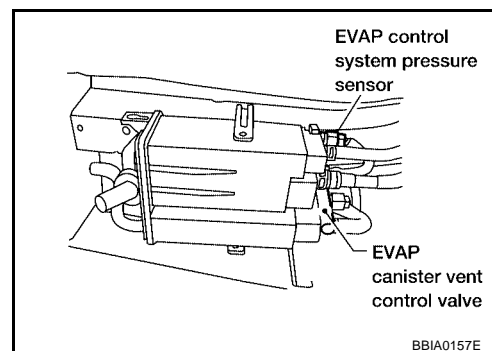
- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

## 6. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

**Water should not exist.**



OK or NG

OK >> GO TO 7.

NG >> Replace EVAP control system pressure sensor.

## 7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-892, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace EVAP control system pressure sensor.

## 8. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection EVAP CANISTER VENT CONTROL VALVE

UBS006ID

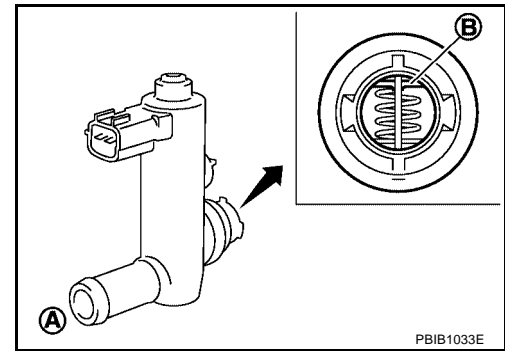
Ⓟ With CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.

# DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[QG18DE (SULEV)]

- Check portion **B** of EVAP canister vent control valve for being rusted.  
If NG, replace EVAP canister vent control valve.  
If OK, go to next step.
- Reconnect harness connectors disconnected.
- Turn ignition switch "ON".



PBIB1033E

- Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- Check air passage continuity and operation delay time.

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

**Operation takes less than 1 second.**

**Make sure new O-ring is installed properly.**

If NG, replace EVAP canister vent control valve.

If OK, go to next step.

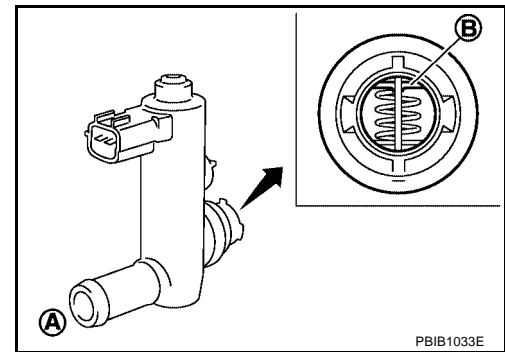
- Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
- Perform step 5 again.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 (B1)	XXX V

PBIB0834E

## ⊗ Without CONSULT-II

- Remove EVAP canister vent control valve from EVAP canister.
- Check portion **B** of EVAP canister vent control valve for being rusted.



PBIB1033E

- Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

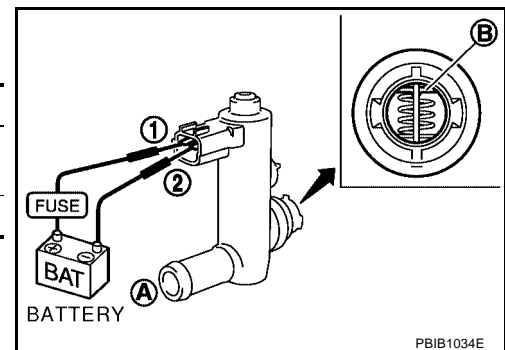
**Operation takes less than 1 second.**

**Make sure new O-ring is installed properly.**

If NG, replace EVAP canister vent control valve.

If OK, go to next step.

- Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
- Perform step 3 again.



PBIB1034E

# DTC P1564 ASCD STEERING SWITCH

[QG18DE (SULEV)]

## DTC P1564 ASCD STEERING SWITCH

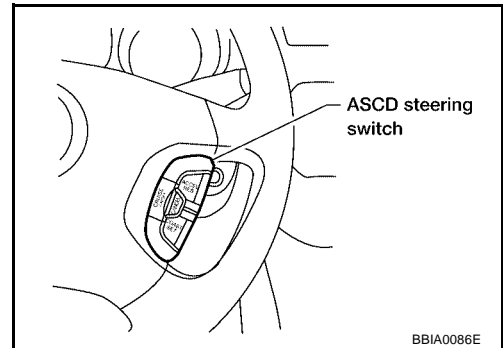
PF2:25551

### Component Description

UBS006AF

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated.

Refer to [EC-1220, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



### CONSULT-II Reference Value in Data Monitor Mode

UBS006AG

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN SW	● Ignition switch: ON	CRUISE switch: Depressed	ON
		CRUISE switch: Released	OFF
CANCEL SW	● Ignition switch: ON	CRUISE switch: Depressed	ON
		CRUISE switch: Released	OFF
RESUME/ACC SW	● Ignition switch: ON	ACCEL/RES switch: Depressed	ON
		ACCEL/RES switch: Released	OFF
SET SW	● Ignition switch: ON	COAST/SET switch: Depressed	ON
		COAST/SET switch: Released	OFF

### On Board Diagnosis Logic

UBS006AH

This self-diagnosis has the one trip detection logic.  
The MIL will not light up for this diagnosis.

#### NOTE:

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-927](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1564 1564	ASCD steering switch	<ul style="list-style-type: none"> <li>● An excessively high voltage signal from the ASCD steering switch is sent to ECM.</li> <li>● ECM detects that input signal from the ASCD steering switch is out of the specified range.</li> <li>● ECM detects that the ASCD steering switch is stuck ON.</li> </ul>	<ul style="list-style-type: none"> <li>● Harness or connectors (The switch circuit is open or shorted.)</li> <li>● ASCD steering switch</li> <li>● ECM</li> </ul>

### DTC Confirmation Procedure

UBS006AI

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 10 seconds.
4. Press "CRUISE" switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press "ACCEL/RES" switch for at least 10 seconds, then release it and wait at least 10 seconds.

## DTC P1564 ASCD STEERING SWITCH

[QG18DE (SULEV)]

6. Press "COAST/SET" switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. Press "CANCEL" switch for at least 10 seconds, then release it and wait at least 10 seconds.
8. If trip DTC is detected, go to [EC-1099, "Diagnostic Procedure"](#).



### **WITH GST**

Follow the procedure "WITH CONSULT-II" above.



# DTC P1564 ASCD STEERING SWITCH

[QG18DE (SULEV)]

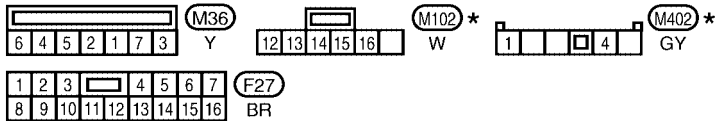
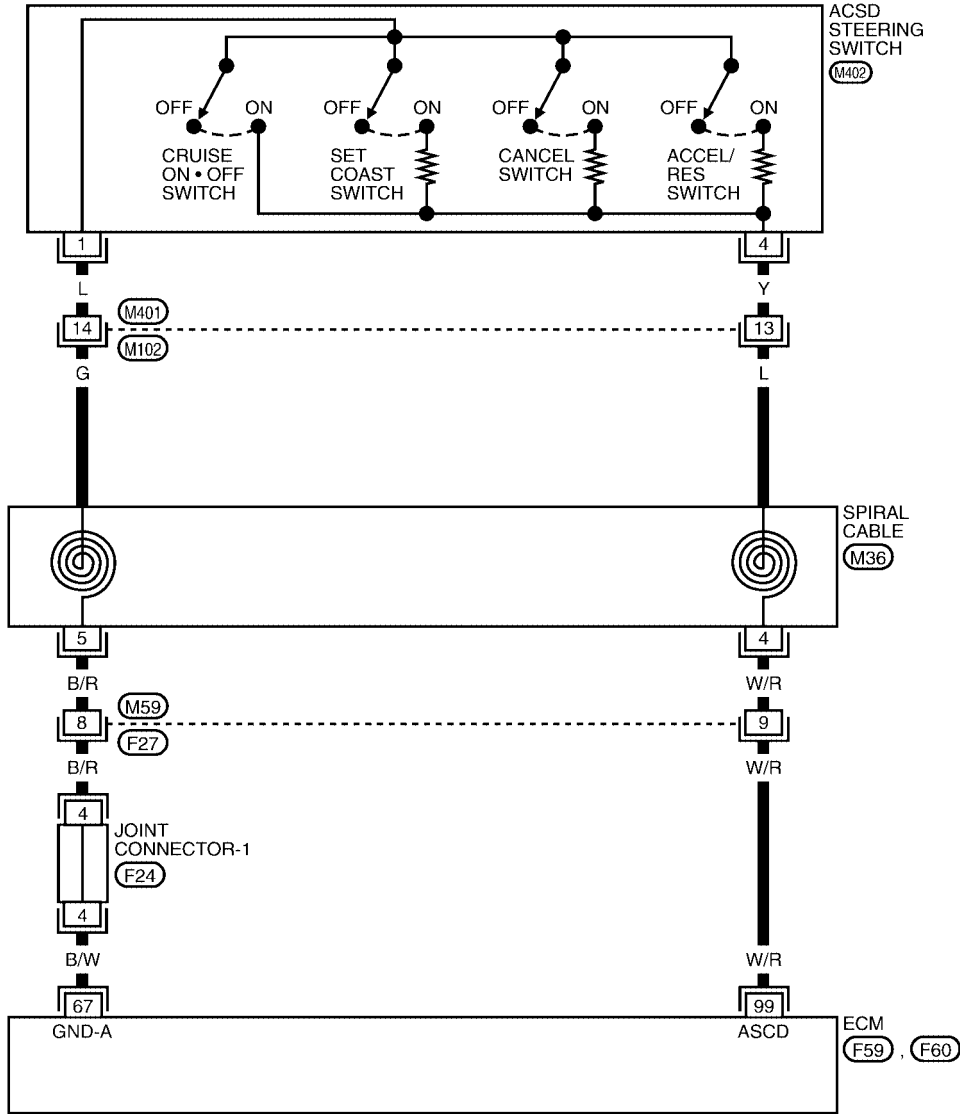
## Wiring Diagram

UBS006AJ

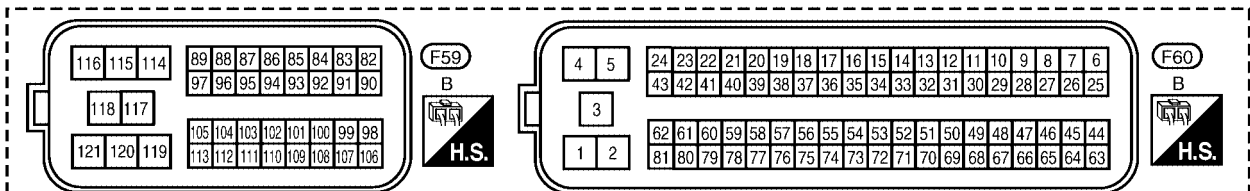
EC-ASC/SW-01

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

**—** : DETECTABLE LINE FOR DTC  
**—** : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.  
 F24 - JOINT CONNECTOR



\*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

BBWA0793E

## DTC P1564 ASCD STEERING SWITCH

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
67	B/W	Sensor ground (Mass air flow sensor)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 0V
99	W/R	ASCD steering switch	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● ASCD steering switch is "OFF".</li> </ul>	Approximately 4V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● CRUISE switch is "ON".</li> </ul>	Approximately 0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● CANCEL switch is "ON".</li> </ul>	Approximately 1V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● COAST/SET switch is "ON".</li> </ul>	Approximately 2V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● ACCEL/RESUME switch is "ON".</li> </ul>	Approximately 3V

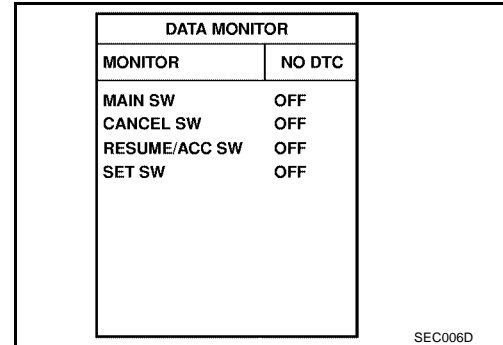
## Diagnostic Procedure

### 1. CHECK ASCD STEERING SWITCH CIRCUIT

#### With CONSULT-II

1. Turn ignition switch "ON".
2. Select "MAIN SW", "RESUME/ACC SW", "SET SW" and "CANCEL SW" in "DATA MONITOR" mode with CONSULT-II.
3. Check each item indication under the following conditions.

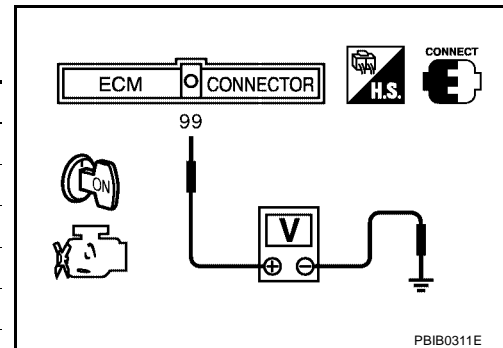
Switch	Monitor item	Condition	Indication
CRUISE	MAIN SW	Pressed	ON
		Released	OFF
COAST/SET	SET SW	Pressed	ON
		Released	OFF
ACCEL/RES	RESUME/ACC SW	Pressed	ON
		Released	OFF
CANCEL	CANCEL SW	Pressed	ON
		Released	OFF



#### Without CONSULT-II

1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 99 and ground with pressing each button.

Switch	Condition	Voltage [V]
CRUISE SW	Pressed	Approx. 0
	Released	Approx. 4
COAST/SET SW	Pressed	Approx. 2
	Released	Approx. 4
ACCEL/RES SW	Pressed	Approx. 3
	Released	Approx. 4
CANCEL SW	Pressed	Approx. 1
	Released	Approx. 4



#### OK or NG

- OK >> GO TO 7.  
 NG >> GO TO 2.

### 2. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

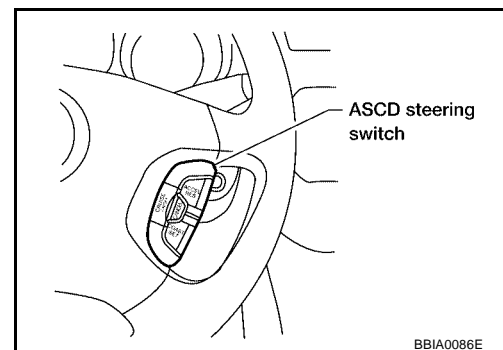
1. Turn ignition switch "OFF".
2. Disconnect ASCD steering switch harness connector.
3. Check harness continuity between switch terminal 1 and ground. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

#### OK or NG

- OK >> GO TO 4.  
 NG >> GO TO 3.



---

## 3. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M401, M102
- Harness connectors M59, F27
- Joint connector-1
- Spiral cable
- Harness for open and short between ECM and ASCD steering switch

>> Repair open circuit or short to power in harness or connectors.

---

## 4. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 99 and ASCD steering switch terminal 4.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

---

## 5. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M401, M102
- Harness connectors M59, F27
- Spiral cable
- Harness for open and short between ECM and ASCD steering switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 6. CHECK ASCD STEERING SWITCH

---

Refer to [EC-1101, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace ASCD steering switch.

---

## 7. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

# DTC P1564 ASCD STEERING SWITCH

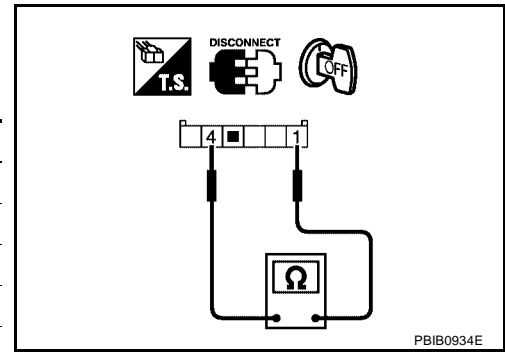
[QG18DE (SULEV)]

UBS006AL

## Component Inspection ASCD STEERING SWITCH

1. Disconnect ASCD steering switch.
2. Check continuity between ASCD steering switch terminals 1 and 4 with pushing each switch.

Switch	Condition	Resistance [ $\Omega$ ]
CRUISE SW	Pressed	Approx. 0
	Released	Approx. 4,000
COAST/SET SW	Pressed	Approx. 660
	Released	Approx. 4,000
ACCEL/RES SW	Pressed	Approx. 1,480
	Released	Approx. 4,000
CANCEL SW	Pressed	Approx. 250
	Released	Approx. 4,000



A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

## DTC P1572 ASCD BRAKE SWITCH

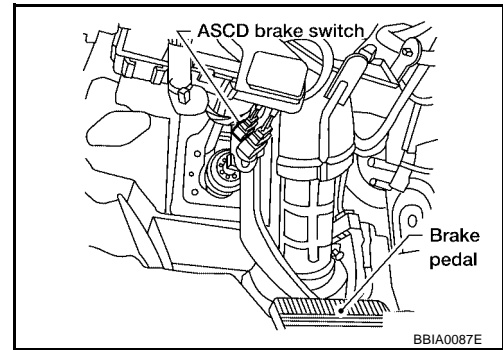
PFP:25320

### Component Description

UBS006AM

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).

Refer to for the ASCD function [EC-1220, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) .



### CONSULT-II Reference Value in Data Monitor Mode

UBS006AN

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW1	● Ignition switch: ON	Clutch pedal (M/T) and brake pedal: Fully released	ON
		Clutch pedal (M/T) and brake pedal: Slightly depressed	OFF
BRAKE SW2	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

### On Board Diagnosis Logic

UBS006AO

**This self-diagnosis has the one trip detection logic.**

**The MIL will not light up for this diagnosis.**

**NOTE:**

- If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-927](#).
- This self-diagnosis has the one trip detection logic. When malfunction A is detected, DTC is not stored in ECM memory. And in that case, 1st trip DTC and 1st trip freeze frame data are displayed. 1st trip DTC is erased when ignition switch OFF. And even when malfunction A is detected in two consecutive trips, DTC is not stored in ECM memory.

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition		Possible Cause
P1572 1572	ASCD brake switch	A)	● When the vehicle speed is above 30km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to ECM at the same time.	<ul style="list-style-type: none"> <li>● Harness or connectors (The stop lamp switch circuit is shorted.)</li> <li>● Harness or connectors (The ASCD brake switch circuit is shorted.)</li> <li>● Harness or connectors (The ASCD clutch switch circuit is shorted.) (M/T models)</li> <li>● Stop lamp switch</li> <li>● ASCD brake switch</li> <li>● ASCD clutch switch (M/T models)</li> <li>● Incorrect stop lamp switch installation</li> <li>● Incorrect ASCD brake switch installation</li> <li>● Incorrect ASCD clutch switch installation (M/T models)</li> <li>● ECM</li> </ul>
		B)	● ASCD brake switch signal is not sent to ECM for extremely long time while the vehicle is driving	

## DTC Confirmation Procedure

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.
- Procedure for malfunction B is not described here. It takes extremely long time to complete procedure for malfunction B. By performing procedure for malfunction A, the incident that causes malfunction B can be detected.

**TESTING CONDITION:**

**Steps 4 and 5 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.**

**WITH CONSULT-II**

1. Start engine (TCS switch "OFF").
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Press CRUISE switch and make sure that CRUISE indicator lights up.
4. Drive the vehicle for at least 5 consecutive seconds under the following condition.

VHCL SPEED SE	More than 30 km/h (19 MPH)
Selector lever	Suitable position

If 1st trip DTC is detected, go to [EC-1106, "Diagnostic Procedure"](#) .

If 1st trip DTC is not detected, go to the following step.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
VHCL SPEED SE	XXX km/h
CRUISE LAMP	ON
BRAKE SW 1	ON
BRAKE SW 2	OFF

PBIB2386E

5. Drive the vehicle for at least 5 consecutive seconds under the following condition.

VHCL SPEED SE	More than 30 km/h (19 MPH)
Selector lever	Suitable position
Driving location	Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned vehicle speed.

6. If 1st trip DTC is detected, go to [EC-1106, "Diagnostic Procedure"](#) .

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

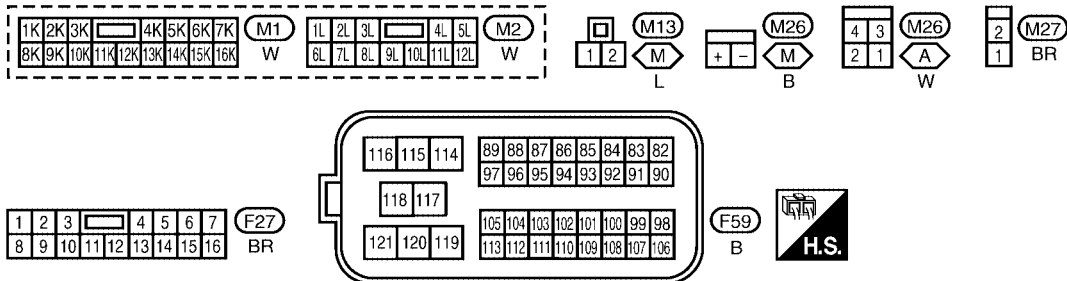
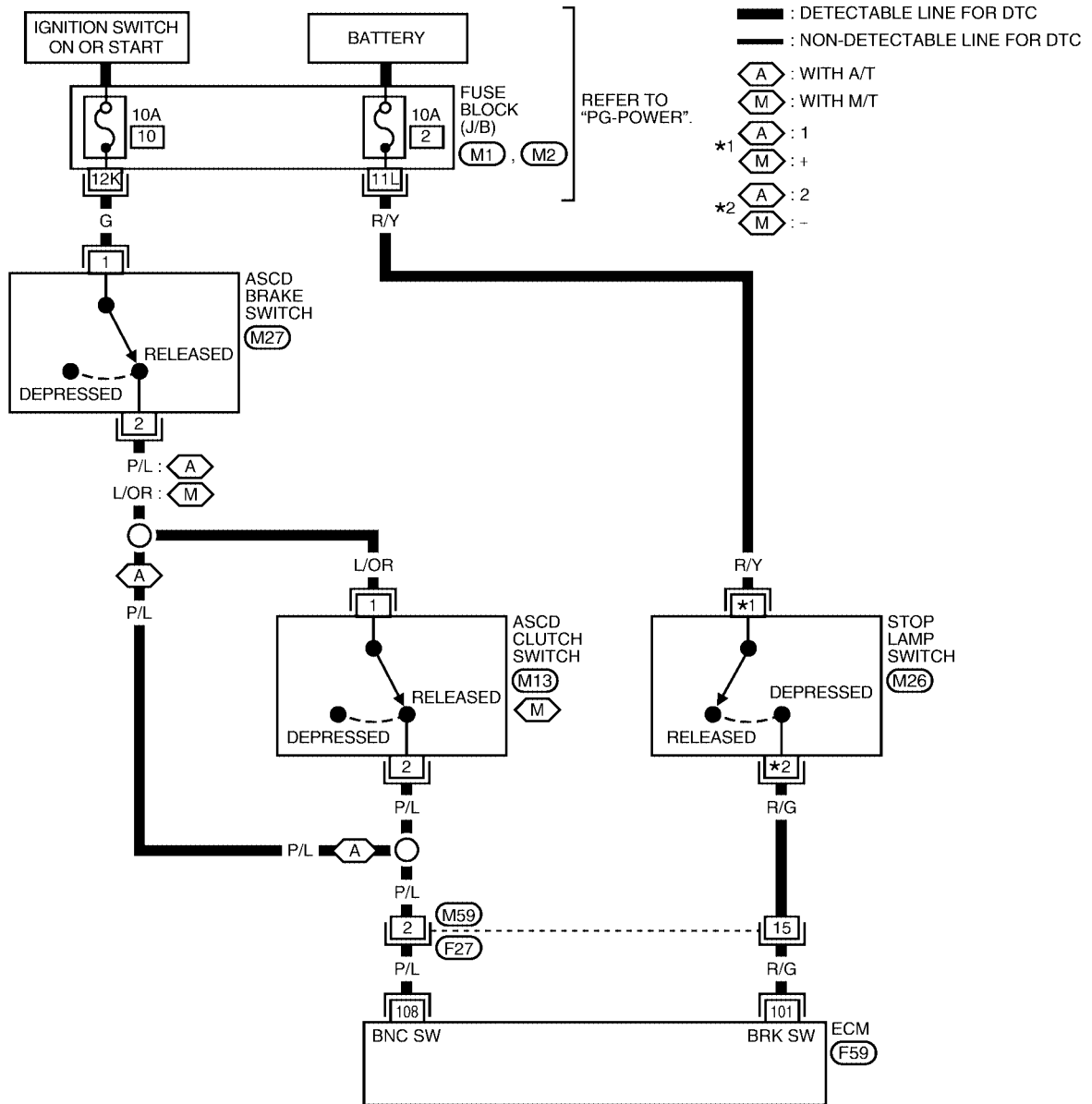
# DTC P1572 ASCD BRAKE SWITCH

[QG18DE (SULEV)]

UBS006AQ

## Wiring Diagram

EC-ASC/BS-01



BBWA0303E



# DTC P1572 ASCD BRAKE SWITCH

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	R/G	Stop lamp switch	<b>[Ignition switch "ON"]</b> ● Brake pedal fully released	Approximately 0V
			<b>[Ignition switch "ON"]</b> ● Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)
108	P/L	ASCD brake switch	<b>[Ignition switch "ON"]</b> ● Brake pedal is depressed ● Clutch pedal is depressed (M/T models)	Approximately 0V
			<b>[Ignition switch "ON"]</b> ● Brake pedal is depressed ● Clutch pedal is depressed (M/T models)	BATTERY VOLTAGE (11 - 14V)

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

## Diagnostic Procedure

### 1. CHECK OVERALL FUNCTION-I

#### With CONSULT-II

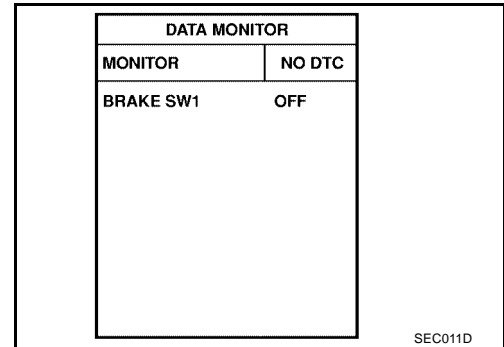
1. Turn ignition switch "ON".
2. Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-II.
3. Check "BRAKE SW1" indication under the following conditions.

#### A/T models

CONDITION	INDICATION
When brake pedal is depress	OFF
When brake pedal is fully released	ON

#### M/T models

CONDITION	INDICATION
When clutch pedal and/or brake pedal is depressed	OFF
When clutch pedal and brake pedal are fully released	ON



#### Without CONSULT-II

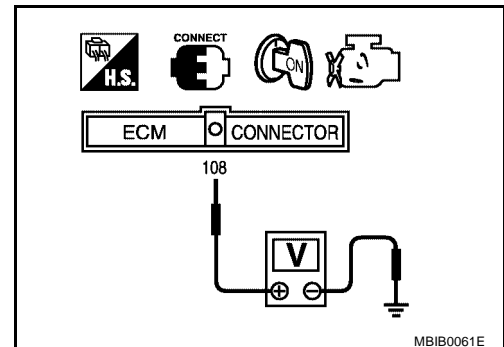
1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 108 and ground under the following conditions.

#### A/T models

CONDITION	VOLTAGE
When brake pedal is depress	Approximately 0V
When brake pedal is fully released	Battery voltage

#### M/T models

CONDITION	VOLTAGE
When clutch pedal and/or brake pedal is depressed	Approximately 0V
When clutch pedal and brake pedal are fully released	Battery voltage



#### OK or NG

- OK >> GO TO 2.
- NG (M/T models) >>GO TO 3.
- NG (A/T models) >>GO TO 4.

# DTC P1572 ASCD BRAKE SWITCH

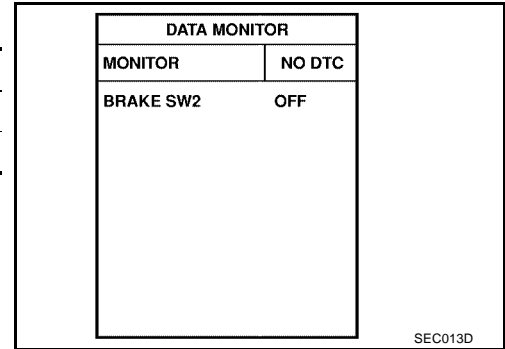
[QG18DE (SULEV)]

## 2. CHECK OVERALL FUNCTION-II

### With CONSULT-II

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

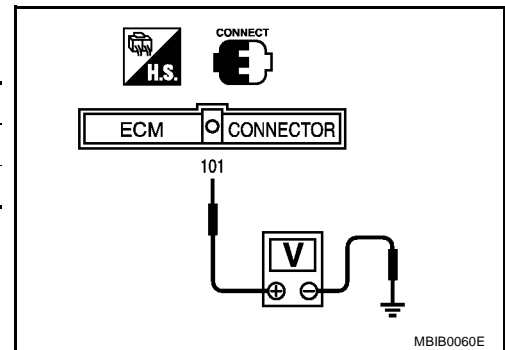
CONDITION	INDICATION
When brake pedal is released	OFF
When brake pedal is depressed	ON



### Without CONSULT-II

Check voltage between ECM terminal 101 and ground under the following conditions.

CONDITION	VOLTAGE
When brake pedal is released	Approximately 0V
When brake pedal is depressed	Battery voltage

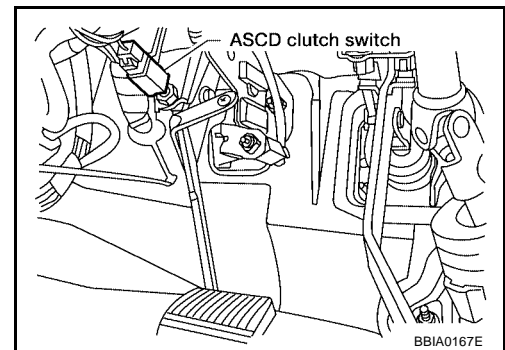


OK or NG

- OK >> GO TO 18.
- NG >> GO TO 13.

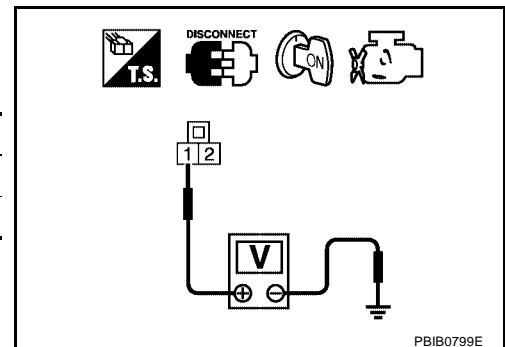
## 3. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch "ON".



4. Check voltage between ASCD clutch switch terminal 1 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
When brake pedal is released	Battery voltage
When brake pedal is depressed	Approx. 0V

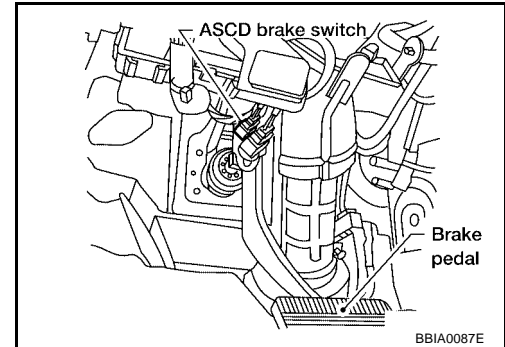


OK or NG

- OK >> GO TO 10.
- NG >> GO TO 4.

#### 4. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".

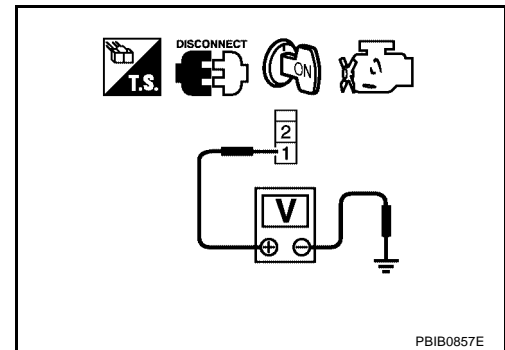


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK (M/T models)>>GO TO 6.
- OK (A/T models)>>GO TO 7.
- NG >> GO TO 5.



#### 5. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M1
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

#### 6. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between ASCD brake switch terminal 2 and ASCD clutch switch terminal 1. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

**7. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 108 and ASCD brake switch terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 9.  
NG >> GO TO 8.

---

**8. DETECT MALFUNCTIONING PART**

---

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and ASCD brake switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

**9. CHECK ASCD BRAKE SWITCH**

---

Refer to [EC-1738, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.  
NG >> Replace ASCD brake switch.

---

**10. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 108 and ASCD clutch switch terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 12.  
NG >> GO TO 11.

---

**11. DETECT MALFUNCTIONING PART**

---

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and ASCD clutch switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

**12. CHECK ASCD CLUTCH SWITCH**

---

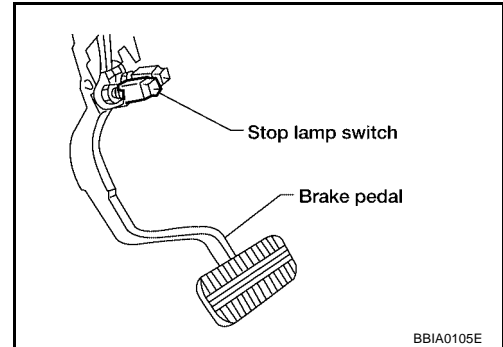
Refer to [EC-1738, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.  
NG >> Replace ASCD clutch switch.

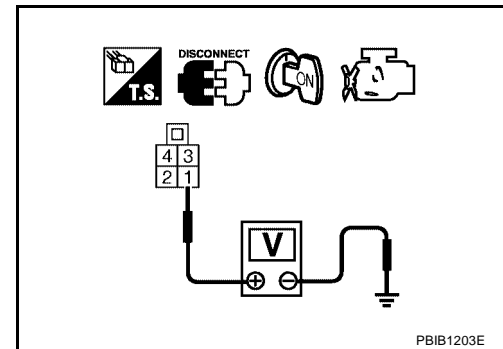
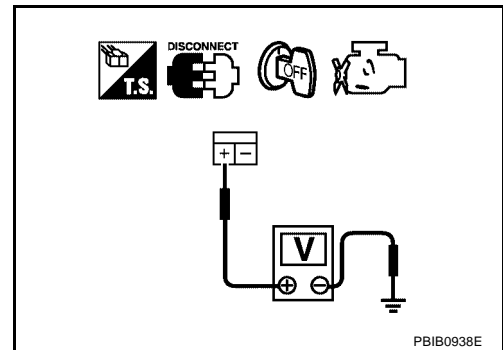
### 13. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect stop lamp switch harness connector.



3. Check voltage between stop lamp switch terminal + (M/T models) or 1 (A/T models) and ground with CONSULT-II or tester.

**Voltage: Battery voltage**



OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.

### 14. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M2
- 10A fuse
- Harness for open or short between stop lamp switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

**15. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 101 and stop lamp switch terminal – (M/T models) or 2 (A/T models).  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 17.
- NG >> GO TO 16.

**16. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

**17. CHECK STOP LAMP SWITCH**

Refer to [EC-1738, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 18.
- NG >> Replace stop lamp switch.

**18. CHECK INTERMITTENT INCIDENT**

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

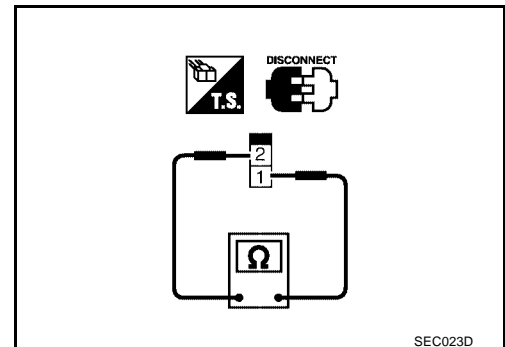
**Component Inspection  
ASC D BRAKE SWITCH**

UBS006AS

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Check harness continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should exist.
When brake pedal is depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to [BR-11, "BRAKE PEDAL AND BRACKET"](#) , and perform step 3 again.



SEC023D

**ASC D CLUTCH SWITCH (FOR M/T MODELS)**

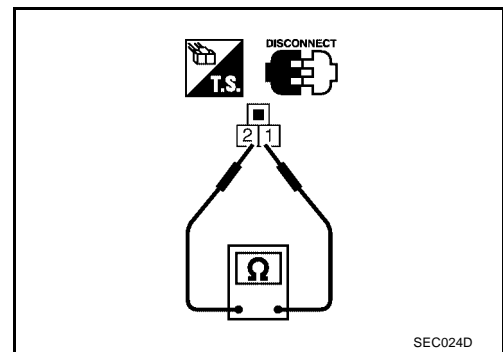
1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Check harness continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

# DTC P1572 ASCD BRAKE SWITCH

[QG18DE (SULEV)]

Condition	Continuity
When clutch pedal is fully released.	Should exist.
When clutch pedal is depressed.	Should not exist.

If NG, adjust ASCD clutch switch installation, refer to [CL-6](#), "[CLUTCH SYSTEM](#)", and perform step 3 again.

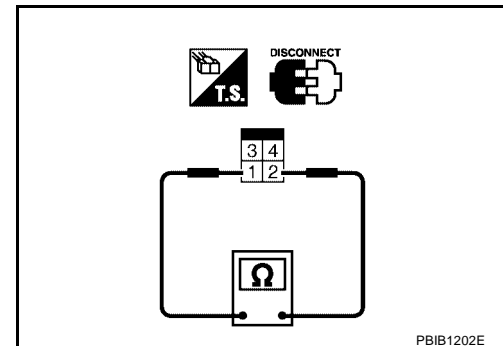
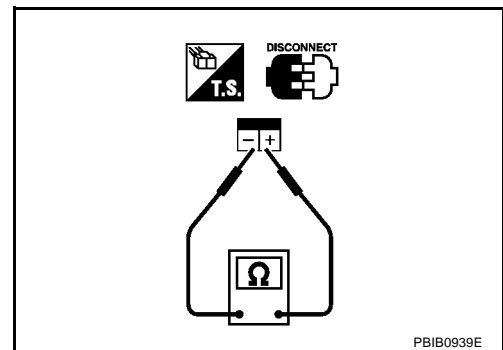


## STOP LAMP SWITCH

1. Turn ignition switch "OFF".
2. Disconnect stop lamp switch harness connector.
3. Check harness continuity between stop lamp switch terminals 1 and 2 (A/T models), + and - (M/T models) under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should not exist.
When brake pedal is depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-11](#), "[BRAKE PEDAL AND BRACKET](#)", and perform step 3 again.





# DTC P1574 ASCD VEHICLE SPEED SENSOR

[QG18DE (SULEV)]

## DTC P1574 ASCD VEHICLE SPEED SENSOR

PF3:31036

### Component Description

UBS006AT

The ECM receives two vehicle speed sensor signals via CAN communication line. One is sent from combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to [EC-1220, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for ASCD functions.

### On Board Diagnosis Logic

UBS006AU

This self-diagnosis has the one trip detection logic.  
The MIL will not light up for this diagnosis.

#### NOTE:

- If DTC P1574 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-728, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).
- If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to [EC-916, "DTC P0500 VSS"](#).
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-927, "DTC P0605 ECM"](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1574 1574	ASCD vehicle speed sensor	ECM detects a difference between two vehicle speed signals is out of the specified range.	<ul style="list-style-type: none"><li>● Harness or connectors (The CAN communication line is open or shorted.)</li><li>● Combination meter</li><li>● Vehicle speed sensor</li><li>● TCM</li><li>● ECM</li></ul>

### DTC Confirmation Procedure

UBS006AV

#### CAUTION:

Always drive vehicle at a safe speed.

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

Step 3 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

#### WITH CONSULT-II

1. Start engine (TCS switch "OFF").
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Drive the vehicle at more than 30 km/h (19 MPH).
4. If DTC is detected, go to [EC-1114, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### WITH GST

Follow the procedure "WITH CONSULT-II" above.

# DTC P1574 ASCD VEHICLE SPEED SENSOR

[QG18DE (SULEV)]

---

## Diagnostic Procedure

UBS006AW

### 1. CHECK DTC WITH TCM

---

Check DTC with TCM. Refer to [AT-38, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION"](#) .

OK or NG

OK >> GO TO 2.

NG >> Perform trouble shooting relevant to DTC indicated.

### 2. CHECK COMBINATION METER

---

Check combination meter function.

Refer to [DI-8, "Combination Meter"](#) .

>> **INSPECTION END**

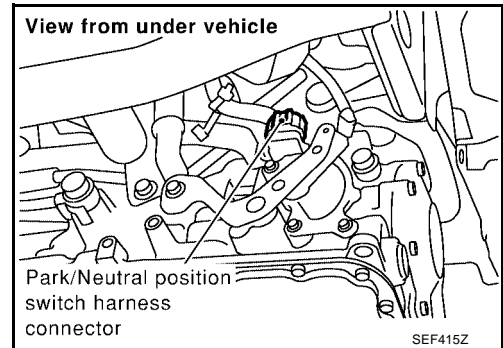
**DTC P1706 PNP SWITCH**

PFP:32006

**Component Description**

UBS0024Z

When the gear position is “P” or “N” (A/T models only), park/neutral position (PNP) switch is “ON”.  
ECM detects the park/neutral position when continuity with ground exists.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS00250

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
P/N POSI SW	● Ignition switch: ON	Shift lever: “P” or “N” (A/T models) Neutral (M/T models)	ON
		Except above	OFF

**On Board Diagnosis Logic**

UBS00251

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1706 1706	Park/neutral position switch	The signal of the park/neutral position (PNP) switch is not changed in the process of engine starting and driving.	<ul style="list-style-type: none"> <li>● Harness or connectors [The park/neutral position (PNP) switch circuit is open or shorted.]</li> <li>● Park/neutral position (PNP) switch</li> </ul>

**DTC Confirmation Procedure**

UBS00252

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

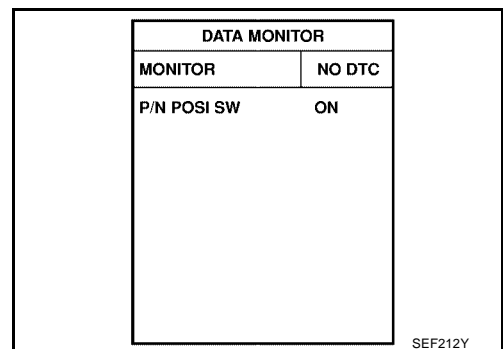
**WITH CONSULT-II**

1. Turn ignition switch “ON”.
2. Select “P/N POSI SW” in “DATA MONITOR” mode with CONSULT-II. Then check the “P/N POSI SW” signal under the following conditions.

Position (Selector lever)	Known good signal
“N” and “P” position	ON
Except the above position	OFF

If NG, go to [EC-1118, "Diagnostic Procedure"](#) .  
If OK, go to following step.

3. Select “DATA MONITOR” mode with CONSULT-II.
4. Start engine and warm it up to normal operating temperature.



# DTC P1706 PNP SWITCH

[QG18DE (SULEV)]

5. Maintain the following conditions for at least 50 consecutive seconds.

ENG SPEED	1,550 - 6,375 rpm (A/T) 1,850 - 6,375 rpm (M/T)
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	3.0 - 31.8 msec (A/T) 2.2 - 31.8 msec (M/T)
VHCL SPEED SE	More than 64 km/h (40 MPH)
Selector lever	Suitable position

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
P/N POSI SW	OFF
B/FUEL SCHDL	XXX msec

SEF213Y

6. If 1st trip DTC is detected, go to [EC-1118, "Diagnostic Procedure"](#).

## Overall Function Check

UBS00253

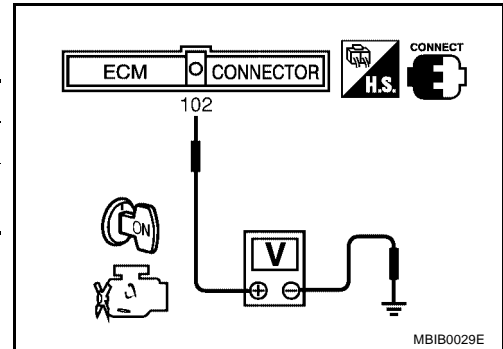
Use this procedure to check the overall function of the park/neutral position switch circuit. During this check, a 1st trip DTC might not be confirmed.

### ⊗ WITHOUT CONSULT-II

- Turn ignition switch "ON".
- Check voltage between ECM terminal 102 (PNP switch signal) and ground under the following conditions.

Condition (Gear position)	Voltage (V) (Known-good data)
"P" (A/T only) and "N" position	Approx. 0
Except the above position	A/T models: Battery voltage M/T models: Approximately 5V

3. If NG, go to [EC-1118, "Diagnostic Procedure"](#).



# DTC P1706 PNP SWITCH

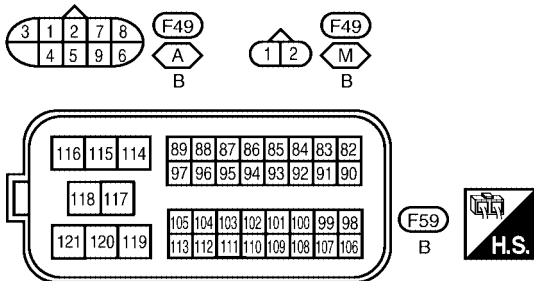
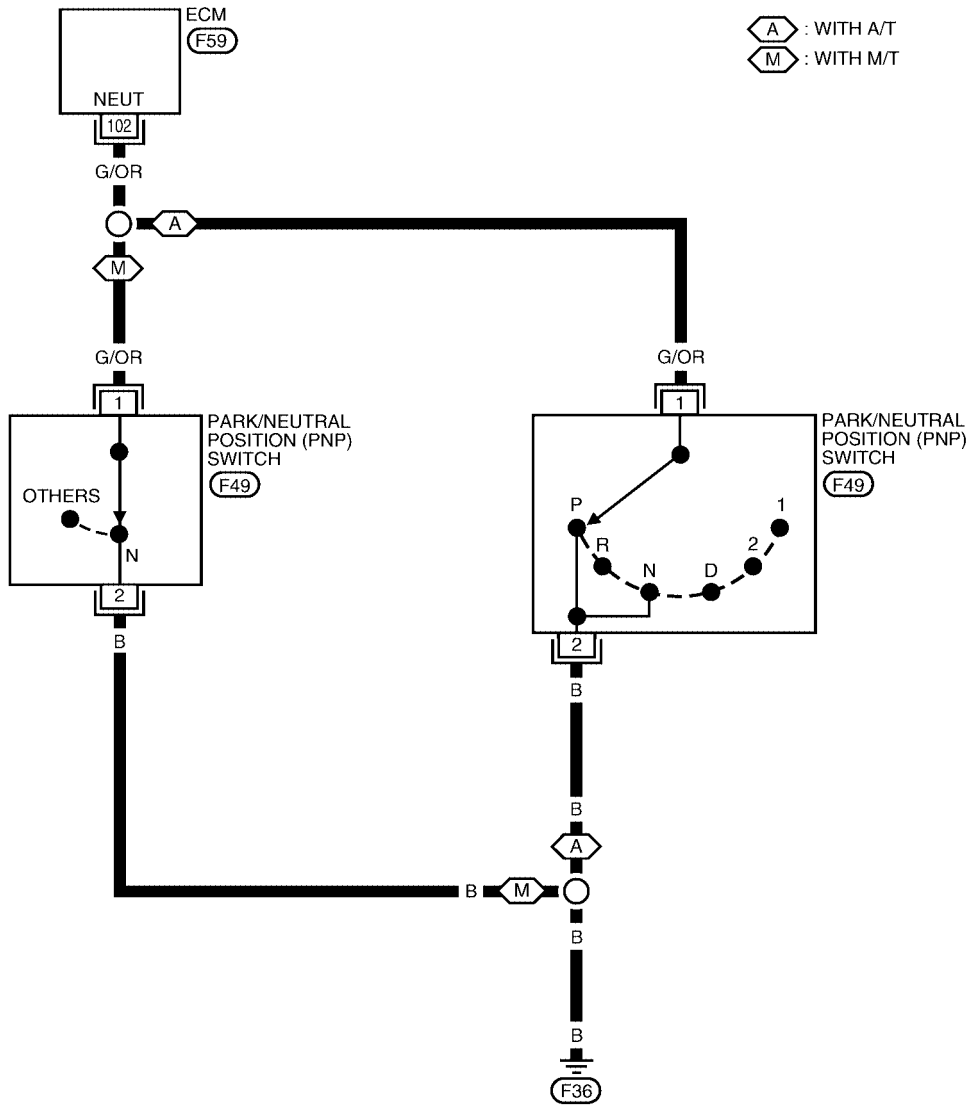
[QG18DE (SULEV)]

UBS00254

## Wiring Diagram

EC-PNP/SW-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- A** : WITH A/T
- M** : WITH M/T



BBWA0304E

# DTC P1706 PNP SWITCH

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
102	G/OR	PNP switch	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"><li>● Gear position is "P" or "N" (A/T models), "Neutral" (M/T models).</li></ul>	Approximately 0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"><li>● Except the above gear position</li></ul>	<b>A/T models</b> BATTERY VOLTAGE (11 - 14V) <b>M/T models</b> Approximately 5V

## Diagnostic Procedure

UBS00255

### 1. CHECK GROUND CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect PNP switch harness connector.
3. Check harness continuity between PNP switch terminal 2 and ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

OK >> GO TO 2.

NG >> Repair open circuit or short to power in harness or connectors.

### 2. CHECK INPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 102 and PNP switch terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

### 3. CHECK PNP SWITCH

Refer to [AT-116, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#) (A/T models) or [MT-78, "POSITION SWITCH"](#) (M/T models).

OK or NG

OK >> GO TO 4.

NG >> Replace PNP switch.

### 4. CHECK INTERMITTENT INCIDENT

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

## DTC P1805 BRAKE SWITCH

PFP:25320

### Description

UBS003YH

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driving.

### CONSULT-II Reference Value in Data Monitor Mode

UBS003YI

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
BRAKE SW	● Ignition switch: ON	Brake pedal: Fully released
		Brake pedal: Slightly depressed
		OFF
		ON

### On Board Diagnosis Logic

UBS003YJ

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805 1805	Brake switch	A brake switch signal is not sent to ECM for an extremely long time while the vehicle is driving.	<ul style="list-style-type: none"> <li>● Harness or connectors (Stop lamp switch circuit is open or shorted.)</li> <li>● Stop lamp switch</li> </ul>

### FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode.

Engine operating condition in fail-safe mode	
ECM controls the electric throttle control actuator by regulating the throttle opening to a small range. Therefore, acceleration will be poor.	
	Driving condition
When engine is idling	Normal
When accelerating	Poor acceleration

### DTC Confirmation Procedure

UBS003YK

#### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-II.
4. Select "DATA MONITOR" mode with CONSULT-II.
5. If 1st trip DTC is detected, go to [EC-1121, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### WITH GST

Follow the procedure "WITH CONSULT-II" above.

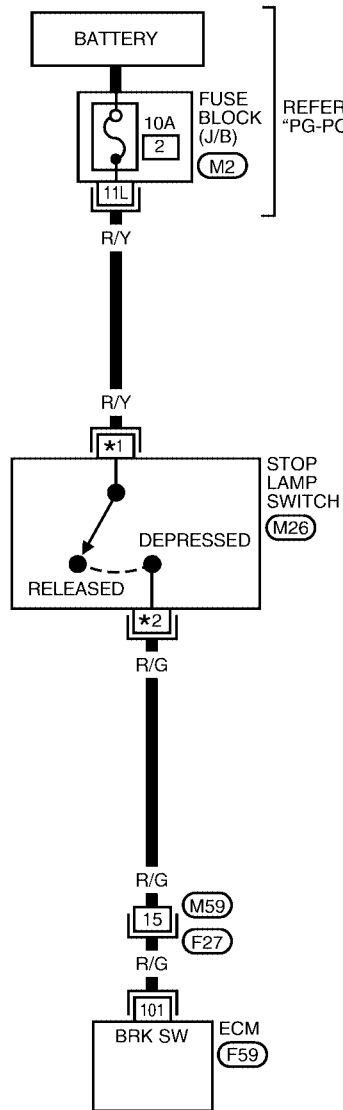
# DTC P1805 BRAKE SWITCH

[QG18DE (SULEV)]

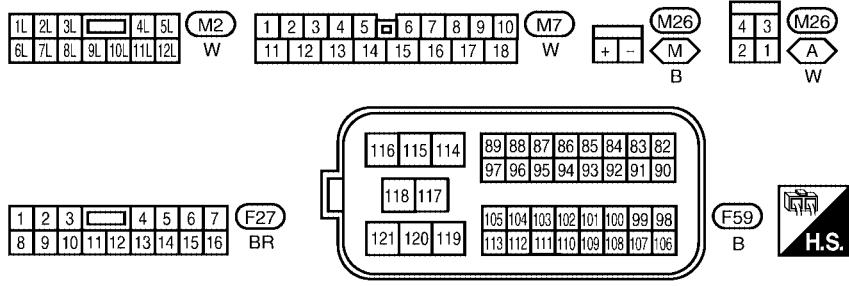
UBS003YL

## Wiring Diagram

### EC-BRK/SW-01



- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- A** : WITH A/T
- M** : WITH M/T
- \*1 **A** : 1
- M** : +
- \*2 **A** : 2
- M** : -



BBWA0305E



# DTC P1805 BRAKE SWITCH

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	R/G	Stop lamp switch	[Ignition switch "ON"] ● Brake pedal fully released	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS003YM

### 1. CHECK STOP LAMP SWITCH CIRCUIT

- Turn ignition switch "OFF".
- Check the stop lamp when depressing and releasing the brake pedal.

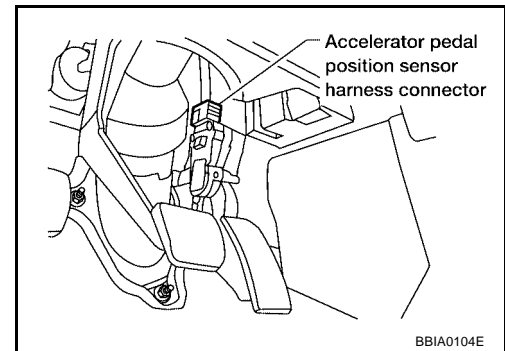
Brake pedal	Stop lamp
Fully released	Not illuminated
Depressed	Illuminated

**OK or NG**

- OK >> GO TO 4.
- NG >> GO TO 2.

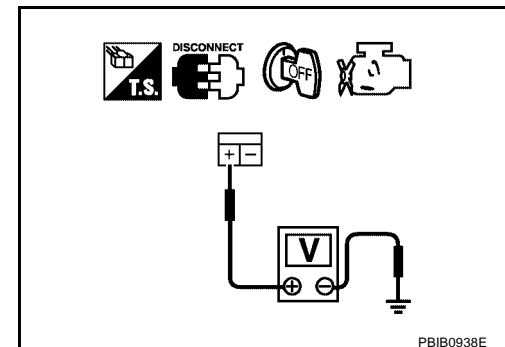
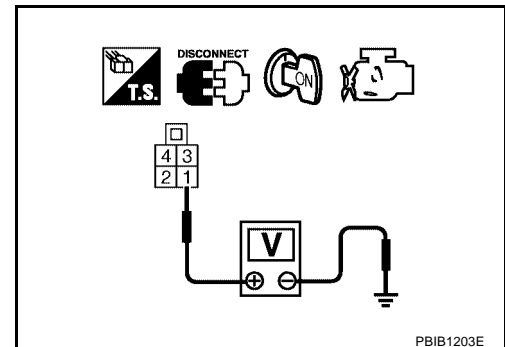
## 2. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch harness connector.



2. Check voltage between stop lamp switch terminal 1 (A/T models), + (M/T models) and ground with CONSULT-II or tester.

**Voltage: Battery voltage**



OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.

## 3. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- Fuse block (J/B) connector M2
- Harness for open and short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

**4. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

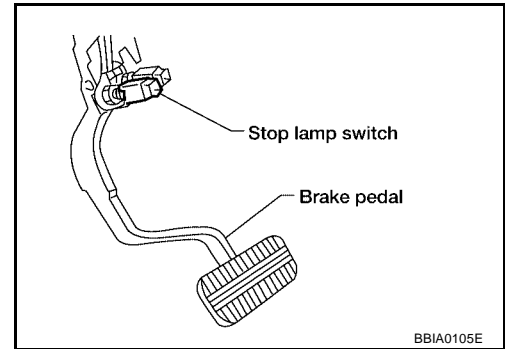
1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Disconnect stop lamp switch harness connector.
4. Check harness continuity between ECM terminal 101 and stop lamp switch terminal 2 (A/T models), – (M/T models). Refer to Wiring Diagram.

**Continuity should exist.**

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.



**5. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK STOP LAMP SWITCH**

Refer to [EC-1123, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace stop lamp switch.

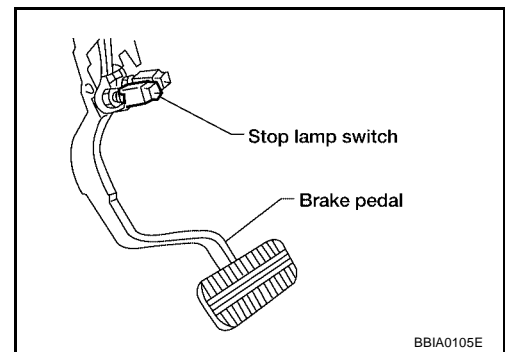
**7. CHECK INTERMITTENT INCIDENT**

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection  
STOP LAMP SWITCH**

1. Disconnect stop lamp switch harness connector.



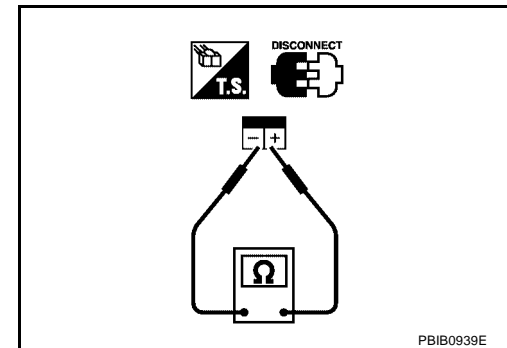
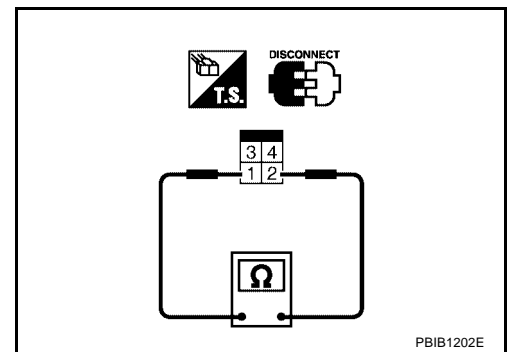
## DTC P1805 BRAKE SWITCH

[QG18DE (SULEV)]

2. Check continuity between stop lamp switch terminals 1 and 2 (A/T models), + and – (M/T models) under the following conditions.

Conditions	Continuity
Brake pedal fully released	Should not exist.
Brake pedal depressed	Should exist.

If NG, adjust brake pedal installation, refer to [BR-11, "BRAKE PEDAL AND BRACKET"](#), and perform step 2 again.



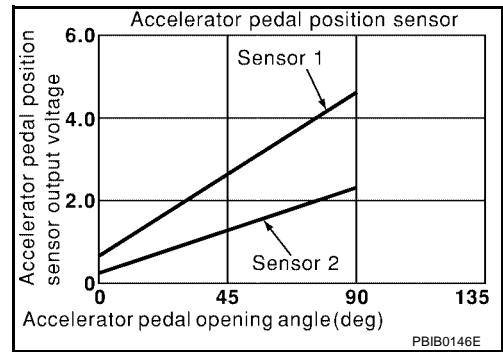
DTC P2122, P2123 APP SENSOR

Component Description

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.

Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.65 - 0.87V
		Accelerator pedal: Fully depressed	More than 4.3V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.56 - 0.96V
		Accelerator pedal: Fully depressed	More than 4.0V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Throttle valve: Idle position	ON
		Throttle valve: Slightly open	OFF

\*: Accelerator pedal sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

These self-diagnoses have the one trip detection logic.

NOTE:

If DTC P2122 or P2123 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-1028, "DTC P1229 SENSOR POWER SUPPLY"](#).

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2122 2122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	● Harness or connectors (The APP sensor 1 circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 1)
P2123 2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

**DTC Confirmation Procedure****NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-1129, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

# DTC P2122, P2123 APP SENSOR

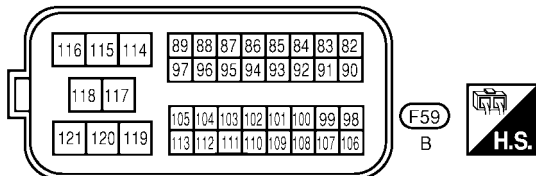
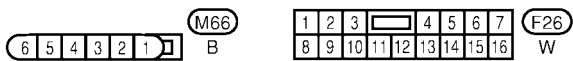
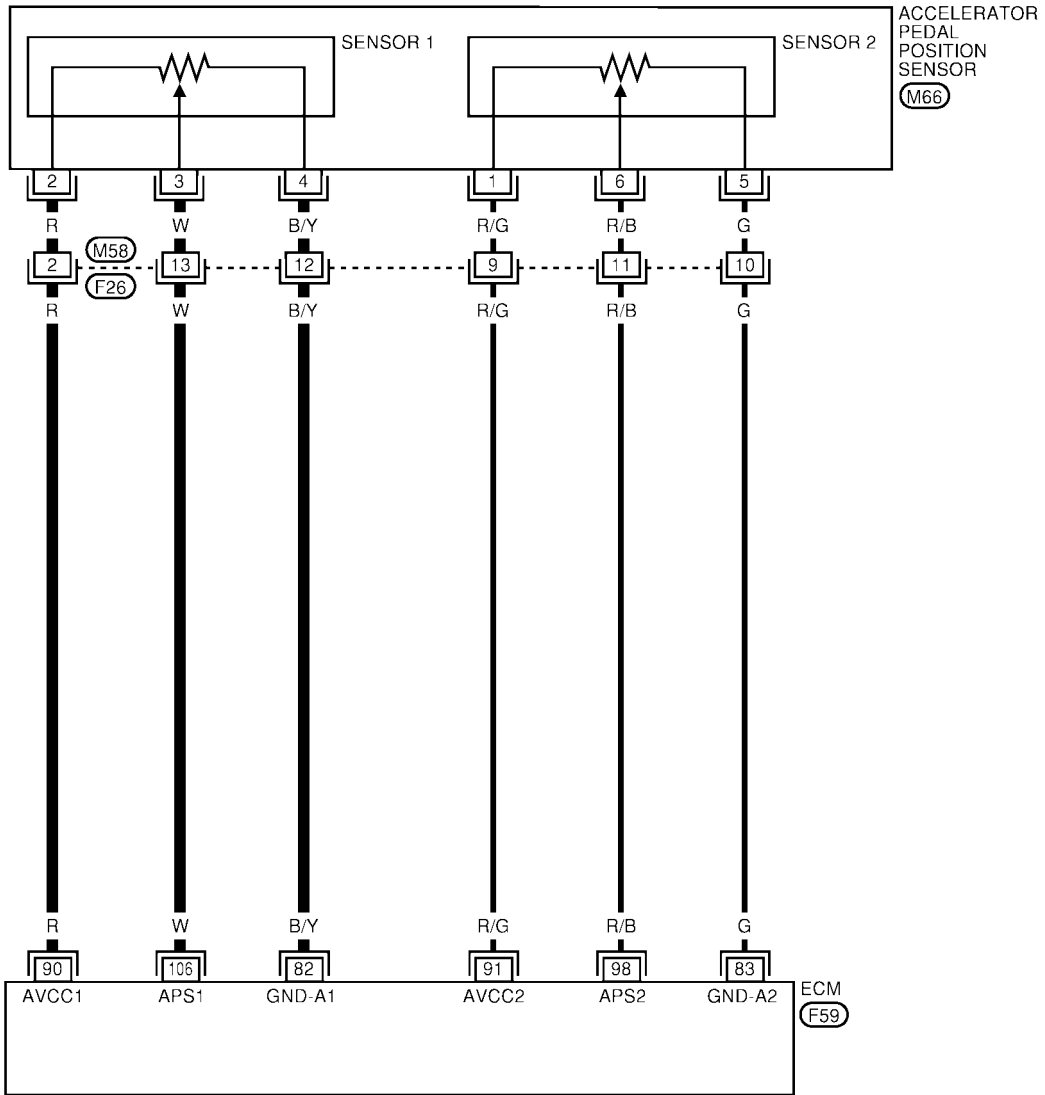
[QG18DE (SULEV)]

UBS006B1

## Wiring Diagram

EC-SEN/PW-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



WBWA0099E

# DTC P2122, P2123 APP SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

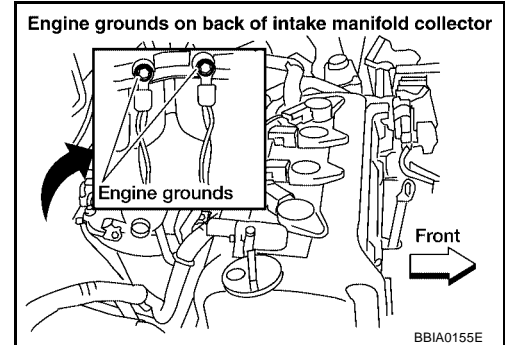
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B/Y	Sensor ground (Accelerator pedal position sensor 1)	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 0V
83	G	Sensor ground (Accelerator pedal position sensor 2)	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 0V
90	R	Sensor power supply (Accelerator pedal position sensor 1)	<b>[Ignition switch "ON"]</b>	Approximately 5V
91	R/G	Sensor power supply (Accelerator pedal position sensor 2)	<b>[Ignition switch "ON"]</b>	Approximately 5V
98	R/B	Accelerator pedal position sensor 2	<b>[Ignition switch "ON"]</b> ● Engine stopped ● Gear position is "D" (A/T models) ● Shift lever position is "1st" (M/T models) ● Accelerator pedal fully released	0.28 - 0.48V
			<b>[Ignition switch "ON"]</b> ● Engine stopped ● Gear position is "D" (A/T models) ● Shift lever position is "1st" (M/T models) ● Accelerator pedal fully depressed	More than 2.0V
106	W	Accelerator pedal position sensor 1	<b>[Ignition switch "ON"]</b> ● Engine stopped ● Gear position is "D" (A/T models) ● Shift lever position is "1st" (M/T models) ● Accelerator pedal fully released	0.65 - 0.87V
			<b>[Ignition switch "ON"]</b> ● Engine stopped ● Gear position is "D" (A/T models) ● Shift lever position is "1st" (M/T models) ● Accelerator pedal fully depressed	More than 4.3V



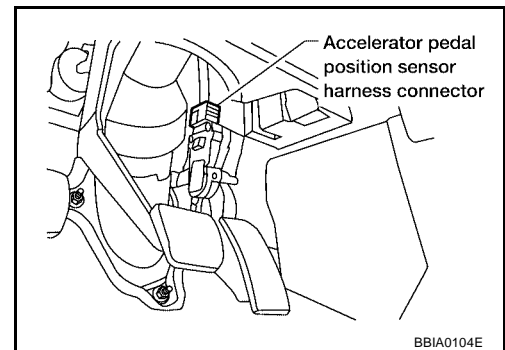
**Diagnostic Procedure****1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.

**2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT**

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

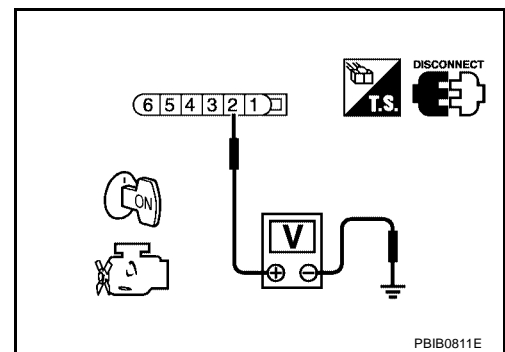


3. Check voltage between APP sensor terminal 2 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 4.  
 NG >> GO TO 3.

**3. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

#### 4. CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 4 and engine ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
NG >> GO TO 5.

---

#### 5. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

#### 6. CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 106 and APP sensor terminal 3.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.  
NG >> GO TO 7.

---

#### 7. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

#### 8. CHECK APP SENSOR

---

Refer to [EC-1131, "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.  
NG >> GO TO 9.

**9. REPLACE ACCELERATOR PEDAL ASSEMBLY**

1. Replace accelerator pedal assembly.
2. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**10. CHECK INTERMITTENT INCIDENT**

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

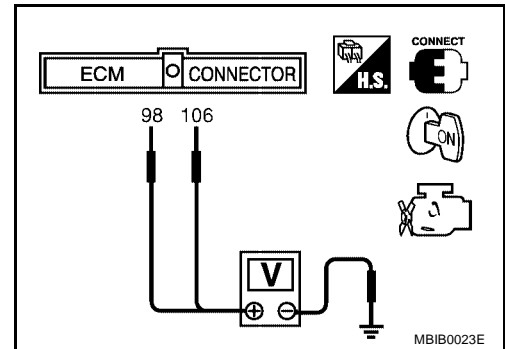
>> INSPECTION END

**Component Inspection  
ACCELERATOR PEDAL POSITION SENSOR**

UBS006B3

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.65 - 0.87V
	Fully depressed	More than 4.3V
98 (Accelerator pedal position sensor 2)	Fully released	0.28 - 0.48V
	Fully depressed	More than 2.0V



4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .
6. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
7. Perform [EC-635, "Idle Air Volume Learning"](#) .

**Removal and Installation  
ACCELERATOR PEDAL**

UBS006B4

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

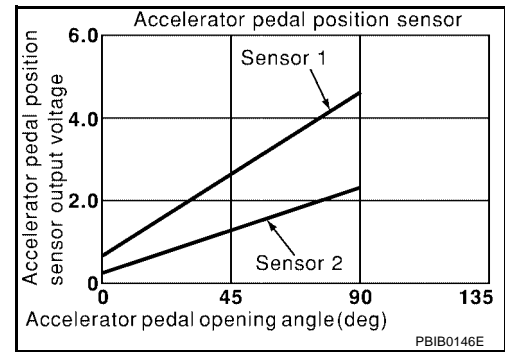
DTC P2127, P2128 APP SENSOR

Component Description

UBS006H2

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.



Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.

CONSULT-II Reference Value in Data Monitor Mode

UBS006H3

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.65 - 0.87V
		Accelerator pedal: Fully depressed	More than 4.3V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.56 - 0.96V
		Accelerator pedal: Fully depressed	More than 4.0V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Throttle valve: Idle position	ON
		Throttle valve: Slightly open	OFF

\*: Accelerator pedal sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

UBS006H4

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1227 1227	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The APP sensor 2 circuit is open or shorted.) (TP sensor circuit is shorted.)</li> <li>● Accelerator pedal position sensor (Accelerator pedal position sensor 2)</li> <li>● Electric throttle control actuator (TP sensor 1 and 2)</li> </ul>
P1228 1228	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

**DTC Confirmation Procedure**

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch “ON”.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-1136, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**WITH GST**

Follow the procedure “With CONSULT-II” above.

A  
EC  
C  
D  
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F  
G  
H  
I  
J  
K  
L  
M

# DTC P2127, P2128 APP SENSOR

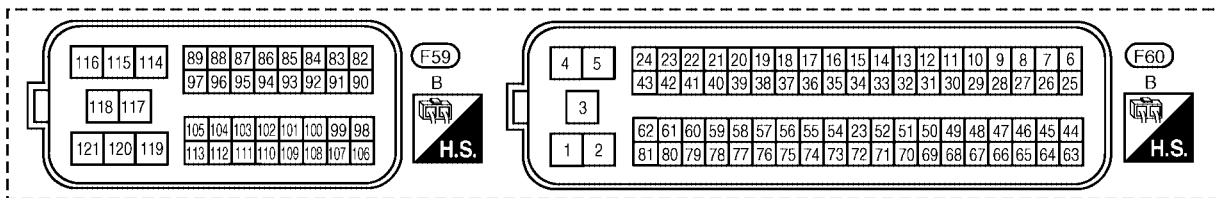
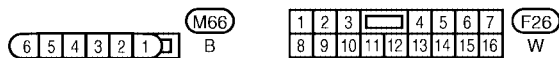
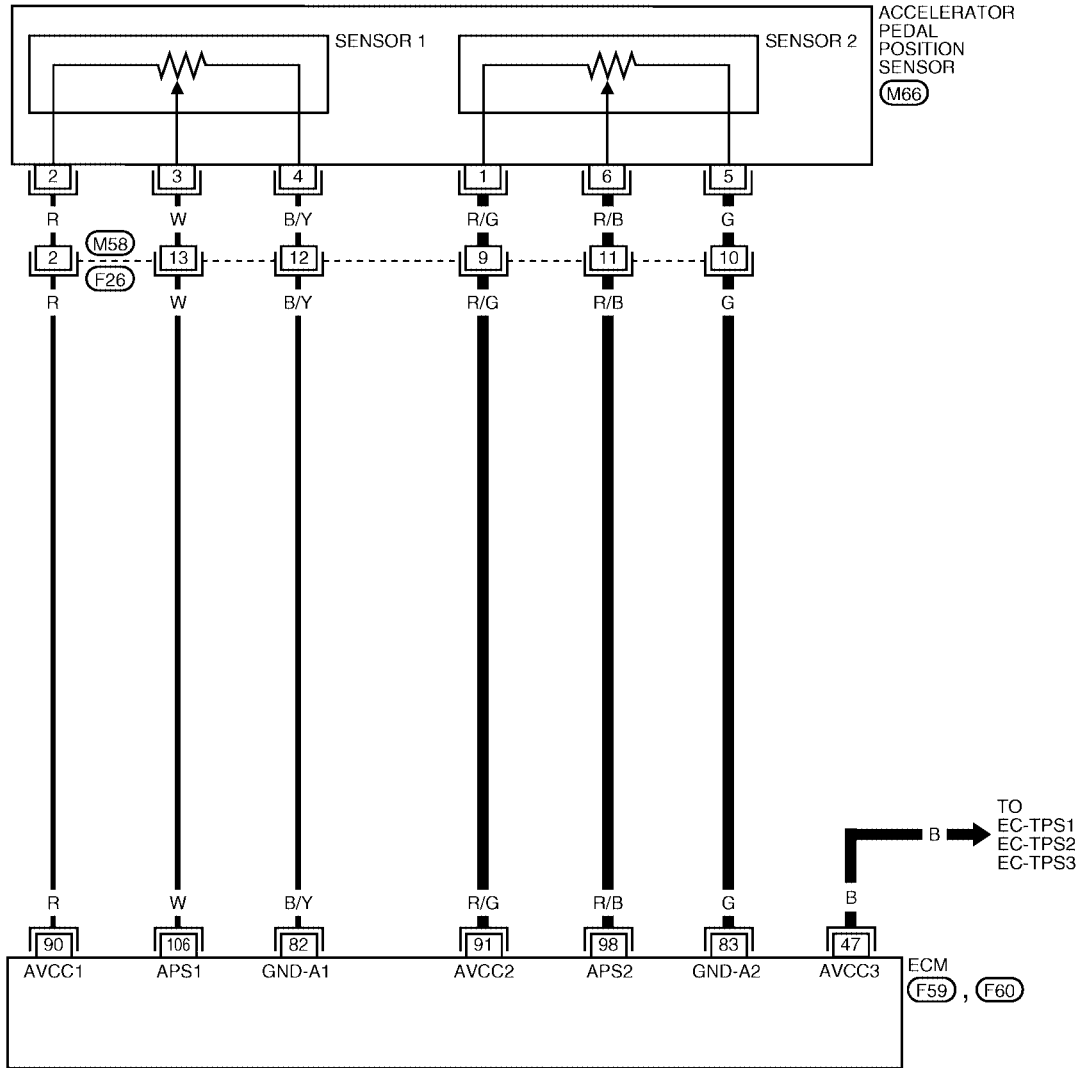
[QG18DE (SULEV)]

UBS006H6

## Wiring Diagram

EC-APPS2-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



BBWA1382E

# DTC P2127, P2128 APP SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

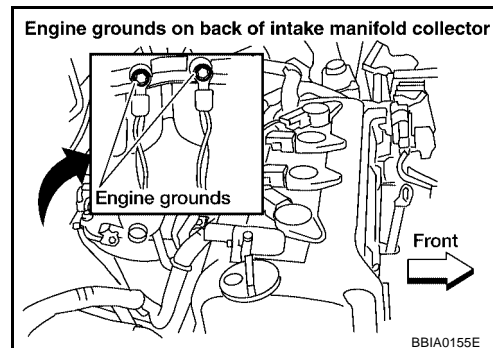
**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	B	Sensor power supply (Throttle position sensor)	[Ignition switch "ON"]	Approximately 5V
82	B/Y	Sensor ground (Accelerator pedal position sensor 1)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
83	G	Sensor ground (Accelerator pedal position sensor 2)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
90	R	Sensor power supply (Accelerator pedal position sensor 1)	[Ignition switch "ON"]	Approximately 5V
91	R/G	Sensor power supply (Accelerator pedal position sensor 2)	[Ignition switch "ON"]	Approximately 5V
98	R/B	Accelerator pedal position sensor 2	[Ignition switch "ON"] ● Engine stopped ● Gear position is "D" (A/T models) ● Shift lever position is "1st" (M/T models) ● Accelerator pedal fully released	0.28 - 0.48V
			[Ignition switch "ON"] ● Engine stopped ● Gear position is "D" (A/T models) ● Shift lever position is "1st" (M/T models) ● Accelerator pedal fully depressed	More than 2.0V
106	W	Accelerator pedal position sensor 1	[Ignition switch "ON"] ● Engine stopped ● Gear position is "D" (A/T models) ● Shift lever position is "1st" (M/T models) ● Accelerator pedal fully released	0.65 - 0.87V
			[Ignition switch "ON"] ● Engine stopped ● Gear position is "D" (A/T models) ● Shift lever position is "1st" (M/T models) ● Accelerator pedal fully depressed	More than 4.3V

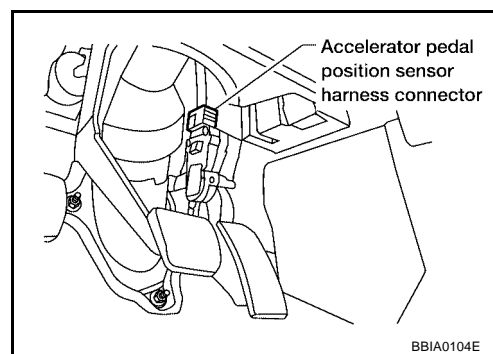
**Diagnostic Procedure****1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.

**2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I**

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

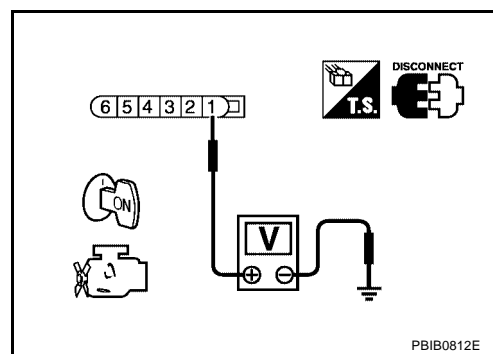


3. Check voltage between APP sensor terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 8.  
NG >> GO TO 3.

**3. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II**

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 1 and ECM terminal 91. Refer to Wiring Diagram.

**Continuity should exist.**

OK or NG

- OK >> GO TO 5.  
NG >> GO TO 4.



**4. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M58, F26
- Harness for open between ECM and accelerator pedal position sensor

>> Repair or replace open circuit.

**5. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III**

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
91	APP sensor terminal 1	<a href="#">EC-1134</a>
47	Electric throttle control actuator terminal 1	<a href="#">EC-767</a>

OK or NG

OK >> GO TO 6.

NG >> Repair short to ground or short to power in harness or connectors.

**6. CHECK THROTTLE POSITION SENSOR**

Refer to [EC-771, "Component Inspection"](#) .

OK or NG

OK >> GO TO 14.

NG >> GO TO 7.

**7. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

**8. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Check harness continuity between ECM terminal 83 APP sensor terminal 5.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 10.

NG >> GO TO 9.

**9. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 10. CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 98 and APP sensor terminal 6.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 12.  
NG >> GO TO 11.

---

## 11. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 12. CHECK APP SENSOR

---

Refer to [EC-1139, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 14.  
NG >> GO TO 13.

---

## 13. REPLACE ACCELERATOR PEDAL ASSEMBLY

---

1. Replace accelerator pedal assembly.
2. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

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## 14. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

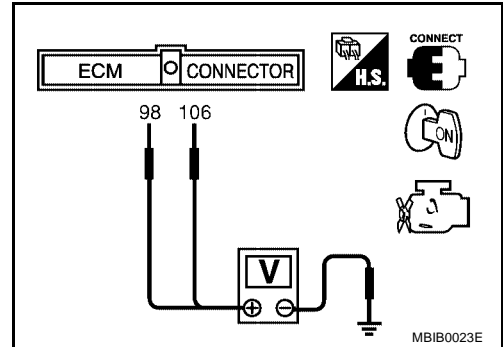
>> **INSPECTION END**

**Component Inspection**

**ACCELERATOR PEDAL POSITION SENSOR**

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.65 - 0.87V
	Fully depressed	More than 4.3V
98 (Accelerator pedal position sensor 2)	Fully released	0.28 - 0.48V
	Fully depressed	More than 2.0V



4. If NG, replace accelerator pedal assembly.
5. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .
6. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .
7. Perform [EC-635, "Idle Air Volume Learning"](#) .

**Removal and Installation**

**ACCELERATOR PEDAL**

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

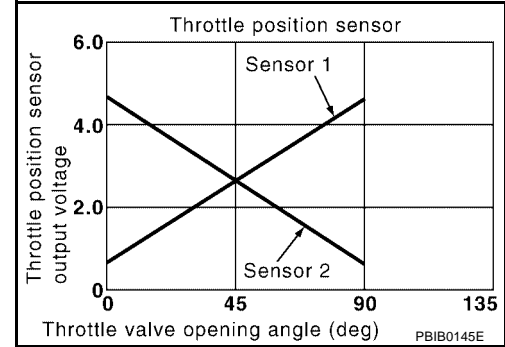
**DTC P2135 TP SENSOR**

**Component Description**

UBS006BD

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS006BE

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	<ul style="list-style-type: none"> <li>Ignition switch: ON (Engine stopped)</li> <li>Shift lever D: (A/T model) 1st: (M/T model)</li> </ul>	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

\*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

**On Board Diagnosis Logic**

UBS006BF

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135 2135	Throttle position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	<ul style="list-style-type: none"> <li>Harness or connector (The TP sensor 1 and 2 circuit is open or shorted.) (APP sensor circuit is shorted.)</li> <li>Electric throttle control actuator (TP sensor 1 and 2)</li> <li>Accelerator pedal position sensor (APP sensor 2)</li> </ul>

**FAIL-SAFE MODE**

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

**DTC Confirmation Procedure**

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch “ON”.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-1143, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**WITH GST**

Follow the procedure “WITH CONSULT-II” above.

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

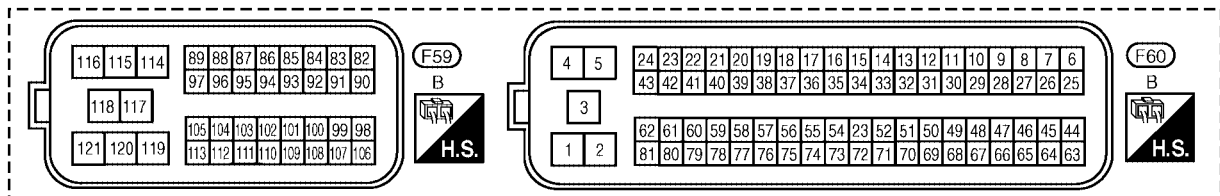
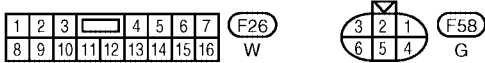
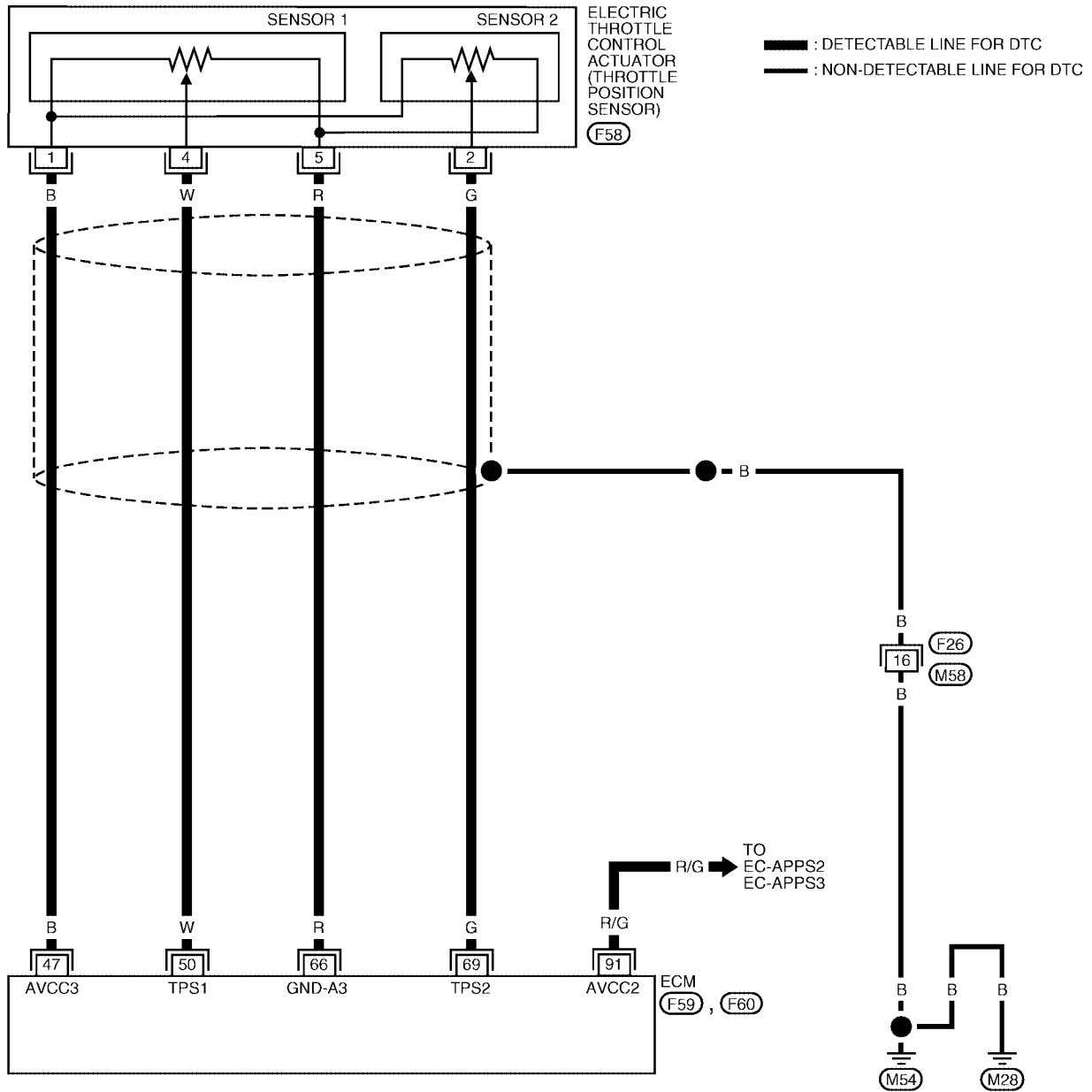
# DTC P2135 TP SENSOR

[QG18DE (SULEV)]

UBS006BH

## Wiring Diagram

EC-TPS3-01



BBWA1383E

# DTC P2135 TP SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

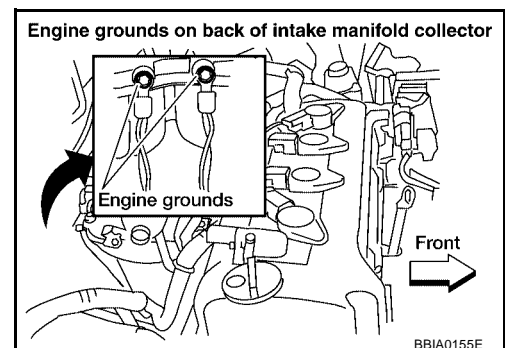
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	B	Sensor power supply (Throttle position sensor)	[Ignition switch "ON"]	Approximately 5V
50	W	Throttle position sensor 1	[Ignition switch "ON"]	More than 0.36V
			[Ignition switch "ON"]	Less than 4.75V
66	R	Sensor ground (Throttle position sensor)	[Engine is running]	Approximately 0V
69	G	Throttle position sensor 2	[Ignition switch "ON"]	Less than 4.75V
			[Ignition switch "ON"]	More than 0.36V
91	R/G	Sensor power supply (Accelerator pedal position sensor 2)	[Ignition switch "ON"]	Approximately 5V

## Diagnostic Procedure

### 1. RETIGHTEN GROUND SCREWS

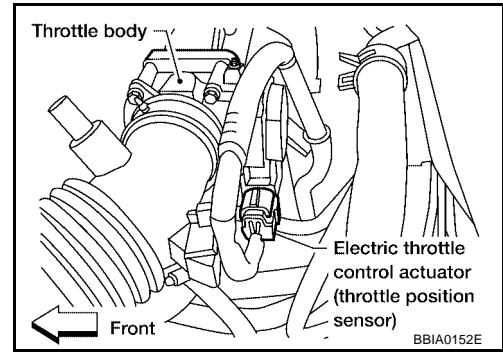
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

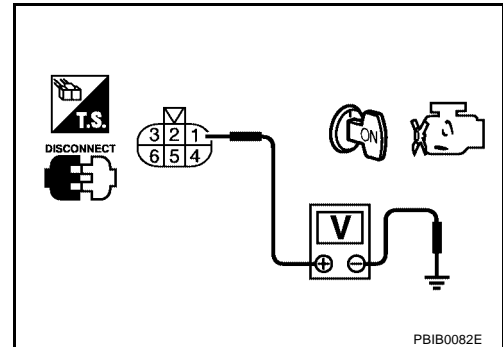


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 7.  
 NG >> GO TO 3.



## 3. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 1 and ECM terminal 47. Refer to Wiring Diagram.

**Continuity should exist.**

OK or NG

- OK >> GO TO 4.  
 NG >> Repair or replace open circuit.

## 4. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-III

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Electric throttle control actuator terminal 1	<a href="#">EC-1142</a>
91	APP sensor terminal 1	<a href="#">EC-1134</a>

OK or NG

- OK >> GO TO 5.  
 NG >> Repair short to ground or short to power in harness or connectors.

## 5. CHECK APP SENSOR

Refer to [EC-1139](#).

OK or NG

- OK >> GO TO 11.  
 NG >> GO TO 6.



**6. REPLACE ACCELERATOR PEDAL ASSEMBLY**

1. Replace accelerator pedal assembly.
2. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**7. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 5 engine ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Check harness continuity between ECM terminal 50 and electric throttle control actuator terminal 4, ECM terminal 69 and electric throttle control actuator terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**9. CHECK THROTTLE POSITION SENSOR**

Refer to [EC-1146, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> GO TO 10.

**10. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**11. CHECK INTERMITTENT INCIDENT**

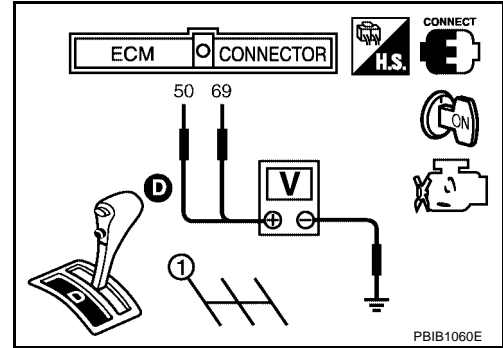
Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection**  
**THROTTLE POSITION SENSOR**

1. Reconnect all harness connectors disconnected.
2. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 50 (TP sensor 1 signal), 69 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
50 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
69 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



PBIB1060E

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-635, "Idle Air Volume Learning"](#) .

**Removal and Installation**  
**ELECTRIC THROTTLE CONTROL ACTUATOR**

Refer to [EM-12, "Removal and Installation"](#) .

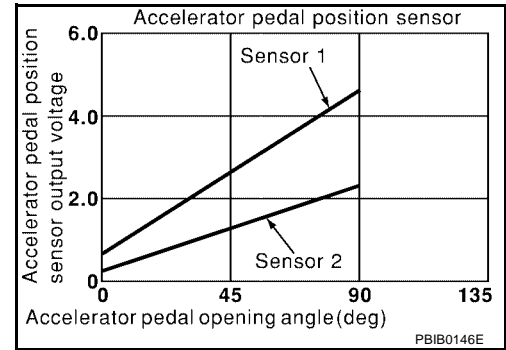
**DTC P2138 APP SENSOR**

**Component Description**

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.

Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



**CONSULT-II Reference Value in Data Monitor Mode**

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.65 - 0.87V
		Accelerator pedal: Fully depressed	More than 4.3V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.56 - 0.96V
		Accelerator pedal: Fully depressed	More than 4.0V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Throttle valve: Idle position	ON
		Throttle valve: Slightly open	OFF

\*: Accelerator pedal sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

**On Board Diagnosis Logic**

This self-diagnosis has the one trip detection logic.

**NOTE:**

If DTC P2138 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to [EC-1028](#)

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2138 2138	Accelerator pedal position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	<ul style="list-style-type: none"> <li>● Harness or connector (The APP sensor 1 and 2 circuit is open or shorted.) (TP sensor circuit is shorted)</li> <li>● Accelerator pedal position sensor 1 and 2</li> <li>● Electric throttle control actuator (TP sensor 1 and 2)</li> </ul>

**FAIL-SAFE MODE**

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

## DTC Confirmation Procedure

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

**Before performing the following procedure, confirm that battery voltage is more than 10V at idle.**

**WITH CONSULT-II**

1. Turn ignition switch “ON”.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-1151, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**WITH GST**

Follow the procedure “WITH CONSULT-II” above.

# DTC P2138 APP SENSOR

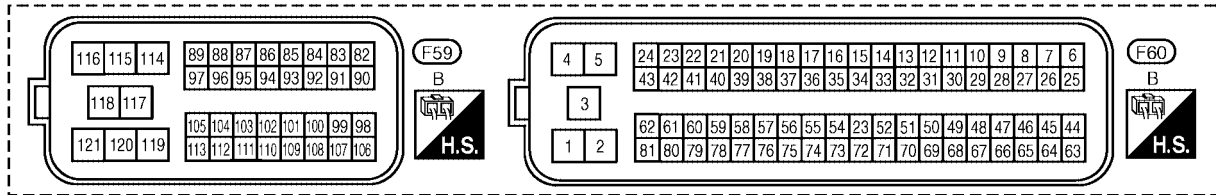
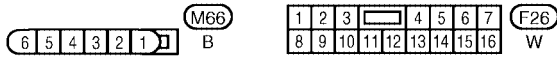
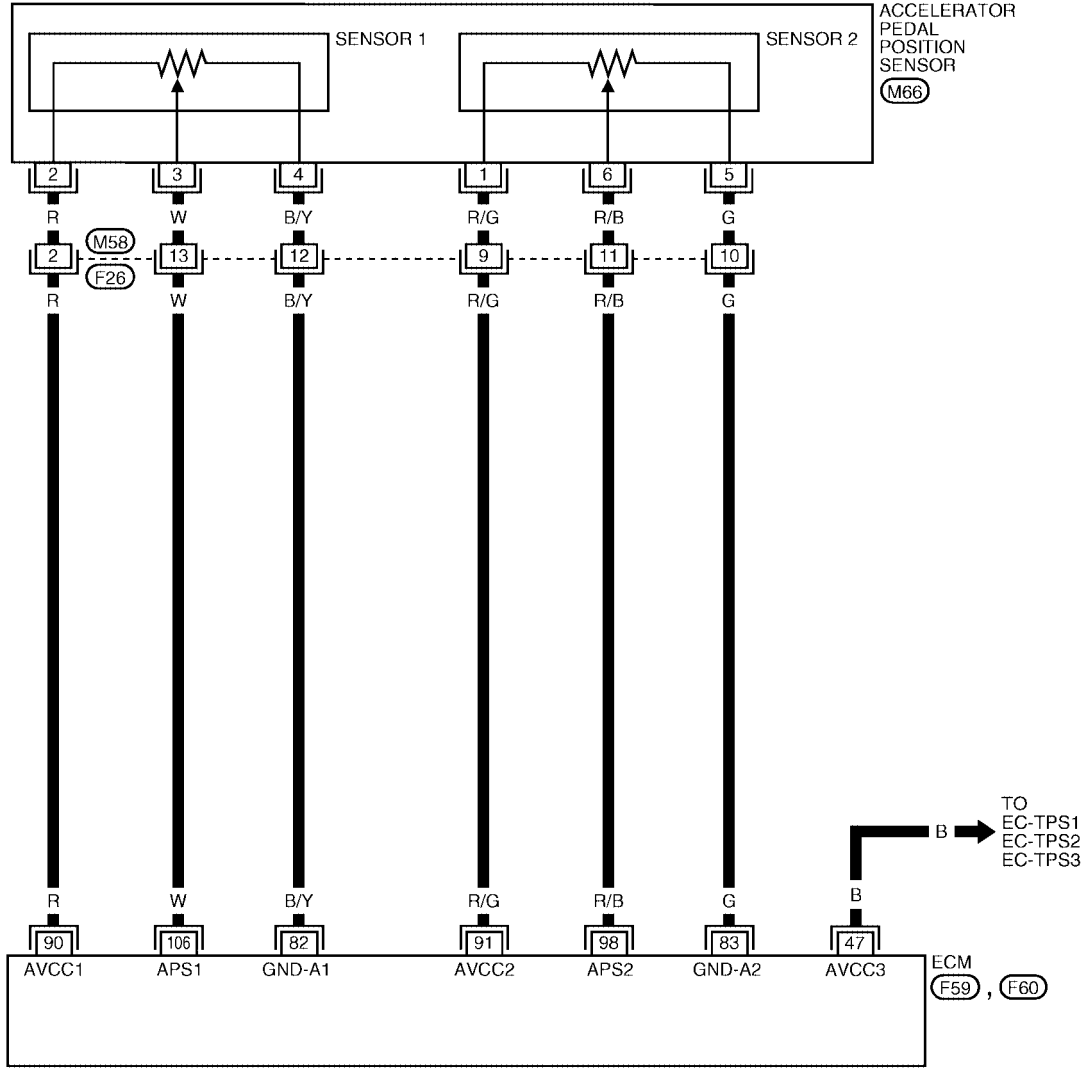
[QG18DE (SULEV)]

UBS006BP

## Wiring Diagram

EC-APPS3-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



BBWA1384E

# DTC P2138 APP SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

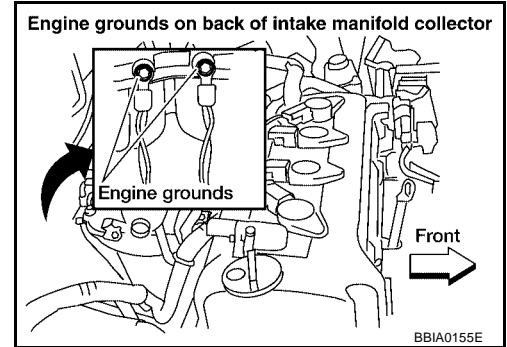
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	B	Sensor power supply (Throttle position sensor)	<b>[Ignition switch "ON"]</b>	Approximately 5V
82	B/Y	Sensor ground (Accelerator pedal position sensor 1)	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 0V
83	G	Sensor ground (Accelerator pedal position sensor 2)	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 0V
90	R	Sensor power supply (Accelerator pedal position sensor 1)	<b>[Ignition switch "ON"]</b>	Approximately 5V
91	R/G	Sensor power supply (Accelerator pedal position sensor 2)	<b>[Ignition switch "ON"]</b>	Approximately 5V
98	R/B	Accelerator pedal position sensor 2	<b>[Ignition switch "ON"]</b> ● Engine stopped ● Gear position is "D" (A/T models) ● Shift lever position is "1st" (M/T models) ● Accelerator pedal fully released	0.28 - 0.48V
			<b>[Ignition switch "ON"]</b> ● Engine stopped ● Gear position is "D" (A/T models) ● Shift lever position is "1st" (M/T models) ● Accelerator pedal fully depressed	More than 2.0V
106	W	Accelerator pedal position sensor 1	<b>[Ignition switch "ON"]</b> ● Engine stopped ● Gear position is "D" (A/T models) ● Shift lever position is "1st" (M/T models) ● Accelerator pedal fully released	0.65 - 0.87V
			<b>[Ignition switch "ON"]</b> ● Engine stopped ● Gear position is "D" (A/T models) ● Shift lever position is "1st" (M/T models) ● Accelerator pedal fully depressed	More than 4.3V

**Diagnostic Procedure**

**1. RETIGHTEN GROUND SCREWS**

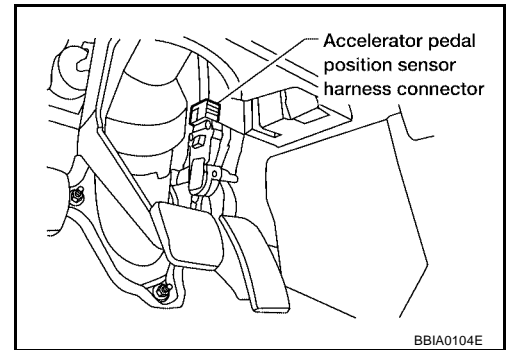
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



**2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT**

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

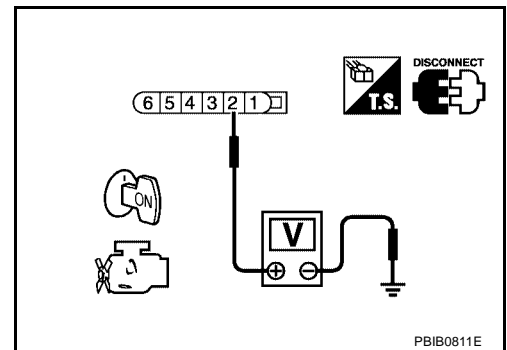


3. Check voltage between APP sensor terminal 2 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



**3. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

A  
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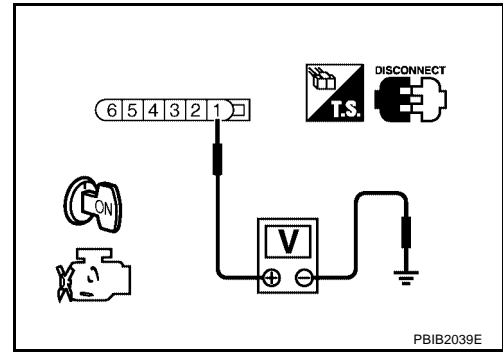
#### 4. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

Check voltage between APP sensor terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 5.



#### 5. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 1 and ECM terminal 91. Refer to Wiring Diagram.

**Continuity should exist.**

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

#### 6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M58, F26
- Harness for open between ECM and accelerator pedal position sensor

>> Repair or replace open circuit.

#### 7. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
91	APP sensor terminal 1	<a href="#">EC-1134</a>
47	Electric throttle control actuator terminal 1	<a href="#">EC-767</a>

OK or NG

- OK >> GO TO 8.
- NG >> Repair short to ground or short to power in harness or connectors.

#### 8. CHECK THROTTLE POSITION SENSOR

Refer to [EC-771, "Component Inspection"](#).

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 9.



**9. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

**10. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 82 and APP sensor terminal 4, ECM terminal 83 and APP sensor terminal 5.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 12.  
NG >> GO TO 11.

**11. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

**12. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Check harness continuity between ECM terminal 106 and APP sensor terminal 3, ECM terminal 98 and APP sensor terminal 6.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 14.  
NG >> GO TO 13.

**13. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

**14. CHECK APP SENSOR**

Refer to [EC-1155, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 16.  
NG >> GO TO 15.

---

## 15. REPLACE ACCELERATOR PEDAL ASSEMBLY

---

1. Replace accelerator pedal assembly.
2. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .
3. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
4. Perform [EC-635, "Idle Air Volume Learning"](#) .

>> INSPECTION END

## 16. CHECK INTERMITTENT INCIDENT

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Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

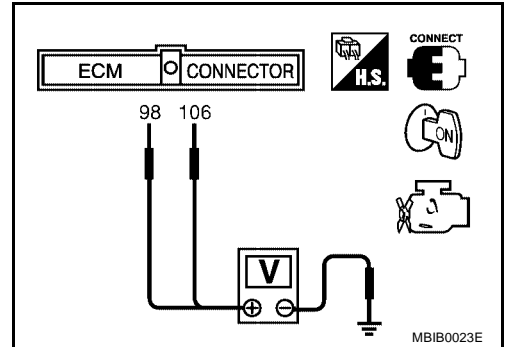
>> INSPECTION END

**Component Inspection**

**ACCELERATOR PEDAL POSITION SENSOR**

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.65 - 0.87V
	Fully depressed	More than 4.3V
98 (Accelerator pedal position sensor 2)	Fully released	0.28 - 0.48V
	Fully depressed	More than 2.0V



4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform [EC-634, "Accelerator Pedal Released Position Learning"](#) .
6. Perform [EC-634, "Throttle Valve Closed Position Learning"](#) .
7. Perform [EC-635, "Idle Air Volume Learning"](#) .

**Removal and Installation**

**ACCELERATOR PEDAL**

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

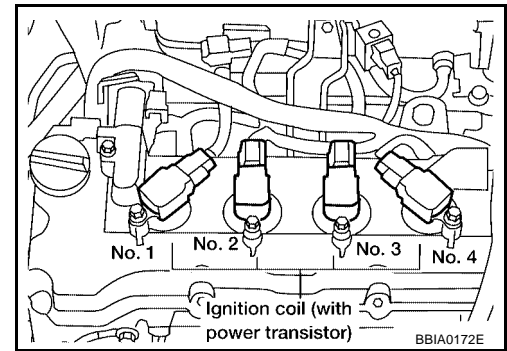
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### IGNITION SIGNAL

#### Component Description

#### IGNITION COIL & POWER TRANSISTOR

The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns on and off the ignition coil primary circuit. This on-off operation induces the proper high voltage in the coil secondary circuit.



# IGNITION SIGNAL

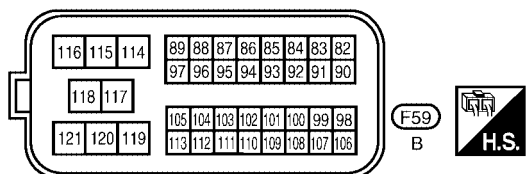
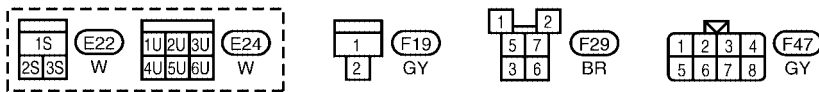
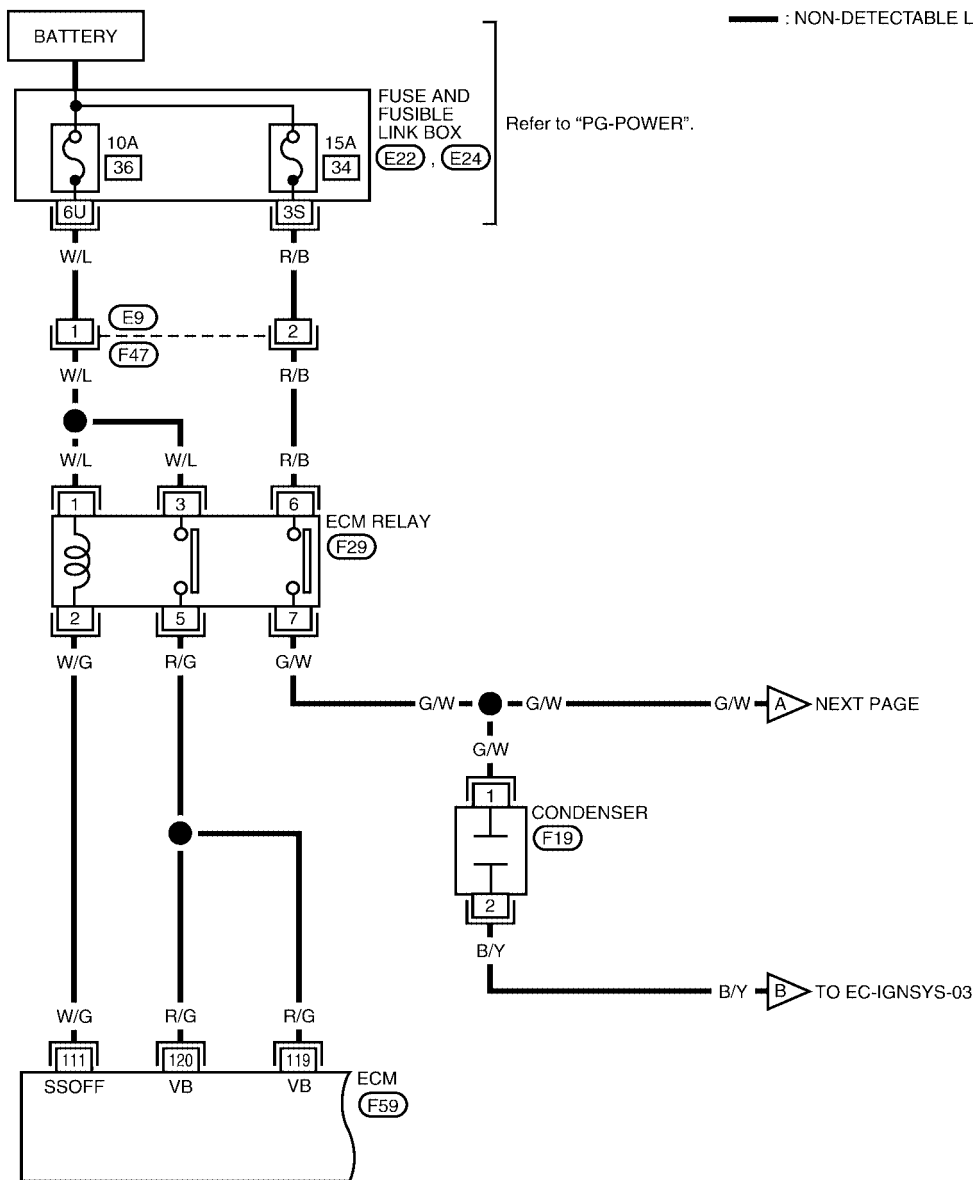
[QG18DE (SULEV)]

## Wiring Diagram

UBS006J6

### EC-IGNSYS-01

— : DETECTABLE LINE FOR DTC  
- - - : NON-DETECTABLE LINE FOR DTC



BBWA0310E

# IGNITION SIGNAL

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

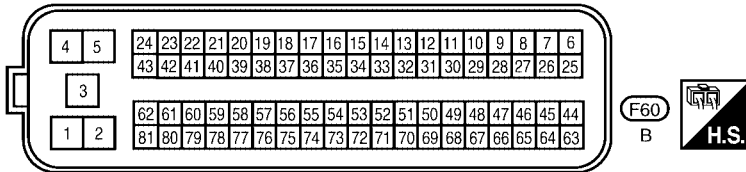
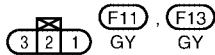
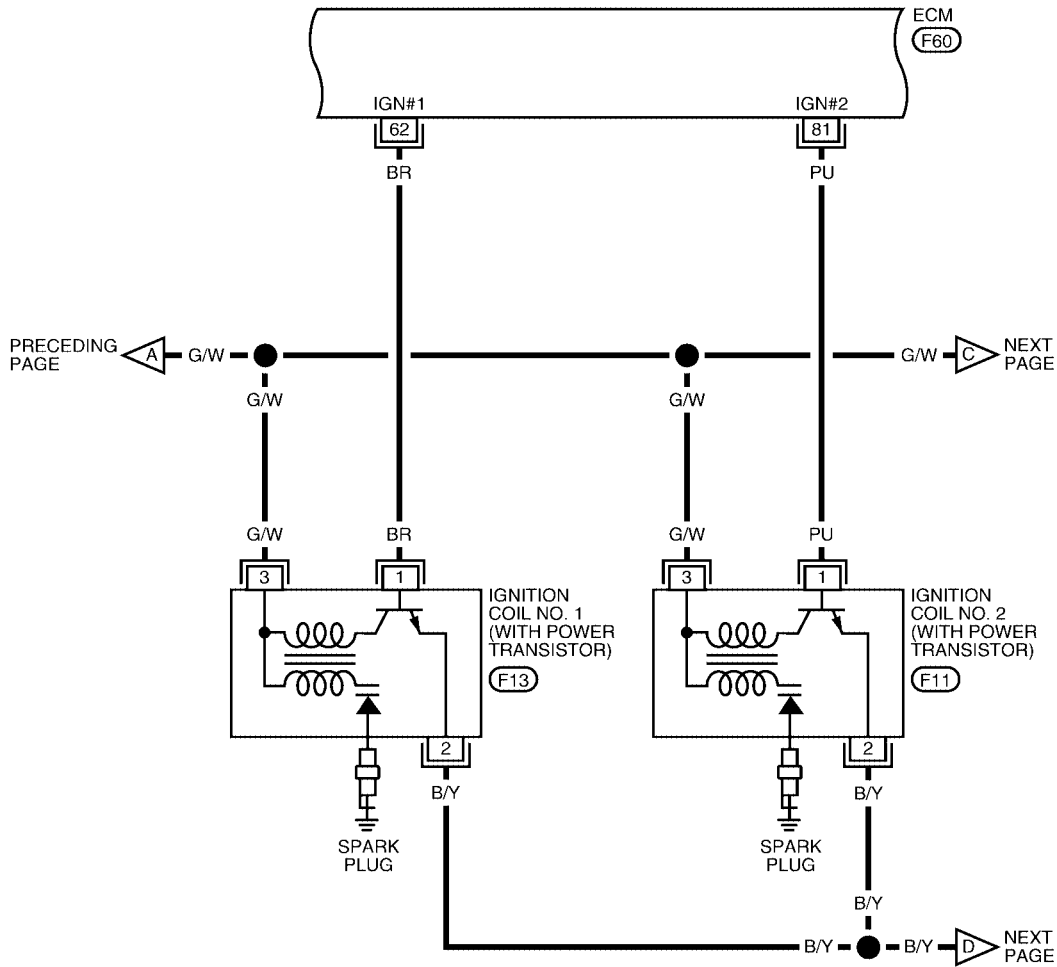
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	W/G	ECM relay (Self shut-off)	<b>[Engine is running]</b> <b>[Ignition switch "OFF"]</b> <ul style="list-style-type: none"><li>● For 5 seconds after turning ignition switch "OFF"</li></ul>	0 - 1.0V
			<b>[Ignition switch "OFF"]</b> <ul style="list-style-type: none"><li>● 5 seconds passed after turning ignition switch "OFF"</li></ul>	BATTERY VOLTAGE (11 - 14V)
119 120	R/G R/G	Power supply for ECM	<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)

# IGNITION SIGNAL

[QG18DE (SULEV)]

## EC-IGNSYS-02

— : DETECTABLE LINE FOR DTC  
 - - - : NON-DETECTABLE LINE FOR DTC



BBWA0795E

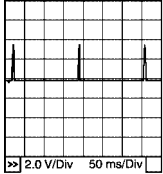
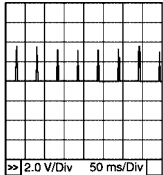
# IGNITION SIGNAL

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
62 81	BR PU	Ignition signal No. 1 Ignition signal No. 2	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>0 - 0.1V★</p>  <p>PBIB0521E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm.</li> </ul>	<p>0 - 0.2V★</p>  <p>PBIB0522E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

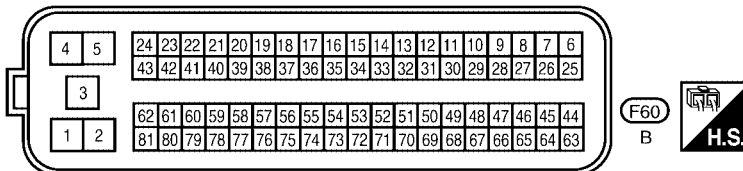
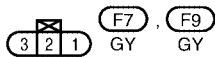
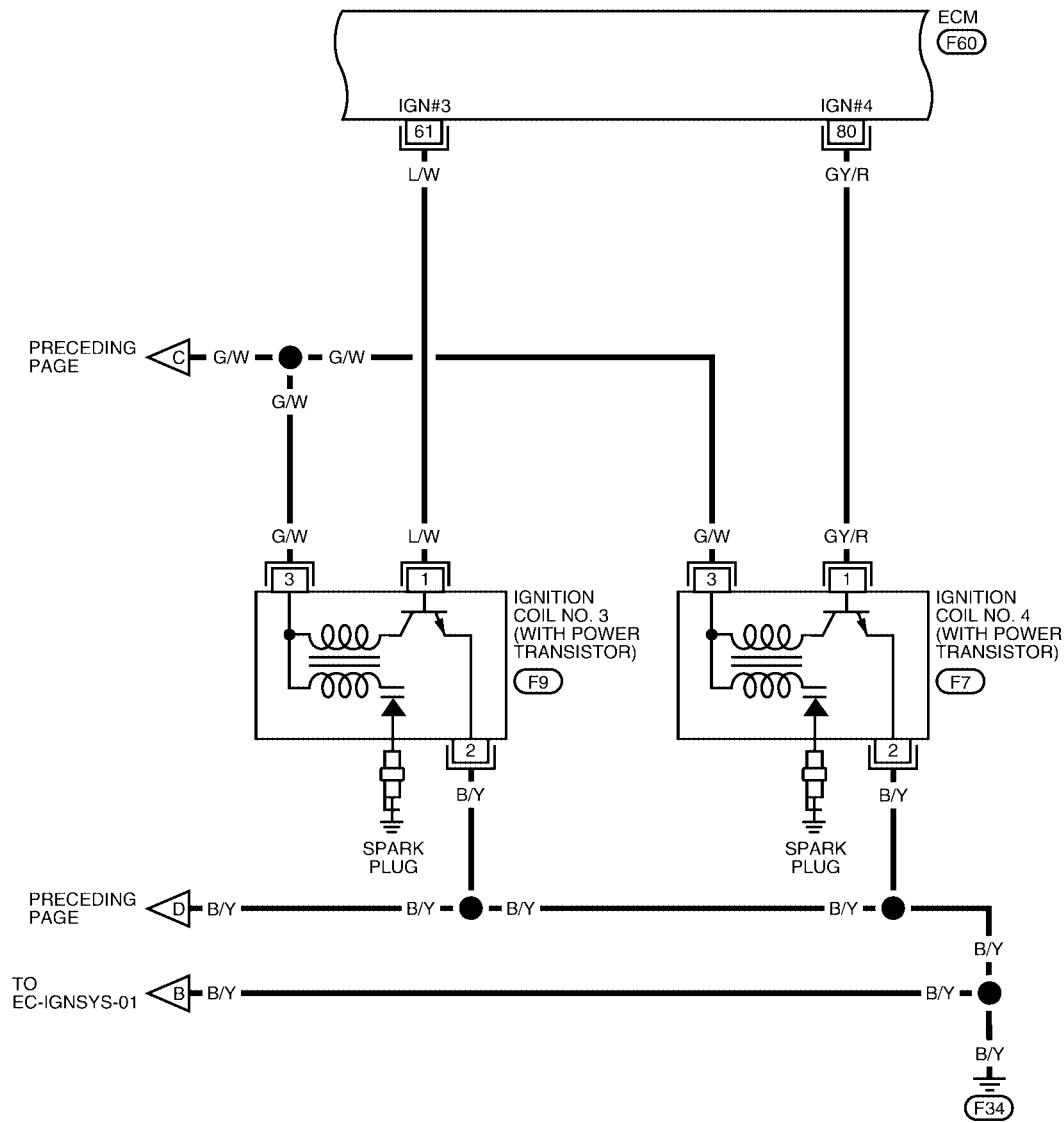


# IGNITION SIGNAL

[QG18DE (SULEV)]

EC-IGNSYS-03

— : DETECTABLE LINE FOR DTC  
 - - - : NON-DETECTABLE LINE FOR DTC



BBWA0796E

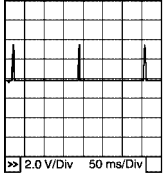
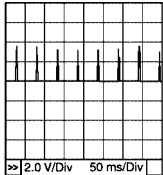
# IGNITION SIGNAL

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
61 80	L/W GY/R	Ignition signal No. 3 Ignition signal No. 4	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>0 - 0.1V★</p>  <p>PBIB0521E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm.</li> </ul>	<p>0 - 0.2V★</p>  <p>PBIB0522E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS006J7

### 1. CHECK ENGINE START

Turn ignition switch "OFF", and restart engine.

**Is engine running?**

Yes or No

Yes (With CONSULT-II)>>GO TO 2.

Yes (Without CONSULT-II)>>GO TO 3.

No >> GO TO 4.

### 2. CHECK OVERALL FUNCTION

④ **With CONSULT-II**

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.

2. Make sure that each circuit produces a momentary engine speed drop.

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 10.

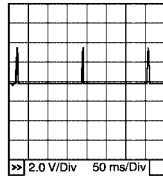
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

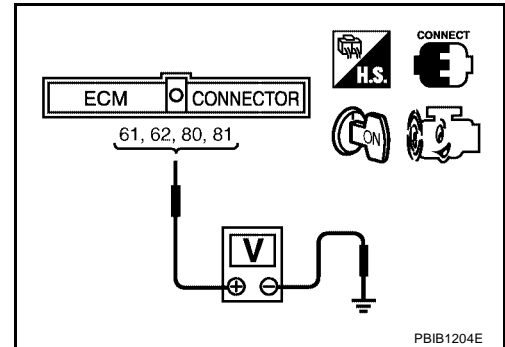
## 3. CHECK OVERALL FUNCTION

### ⊗ Without CONSULT-II

1. Let engine idle.
2. Read the voltage signal between ECM terminals 61, 62, 80, 81 and ground with an oscilloscope.
3. Verify that the oscilloscope screen shows the signal wave as shown below.



PBIB0521E



PBIB1204E

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 10.

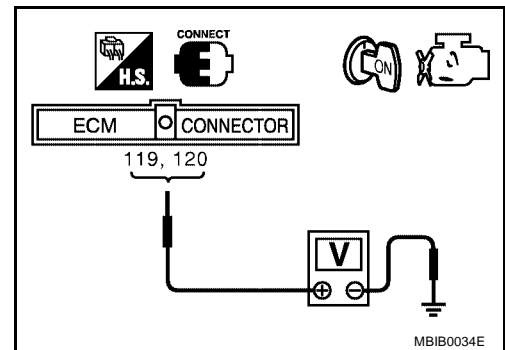
## 4. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch "ON".
2. Check voltage between ECM terminals 119, 120 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
- NG >> Go to [EC-721, "POWER SUPPLY CIRCUIT FOR ECM"](#)



MBIB0034E

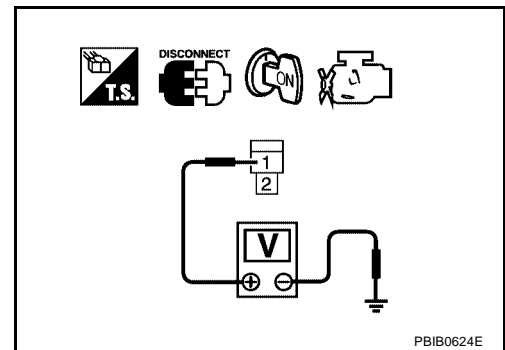
## 5. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch "OFF".
2. Disconnect condenser harness connector.
3. Turn ignition switch "ON".
4. Check voltage between condenser terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 6.



PBIB0624E

## 6. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

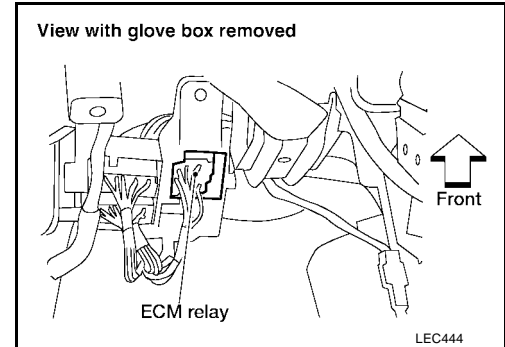
1. Turn ignition switch "OFF".
2. Disconnect ECM relay.
3. Check harness continuity between ECM relay terminal 7 and condenser terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.  
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.



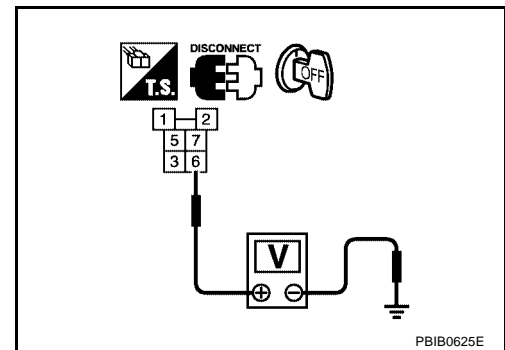
## 7. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-IV

Check voltage between ECM relay terminal 6 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 9.  
 NG >> GO TO 8.



## 8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E9, F47
- 15A fuse
- Harness for open or short between ECM relay and battery

>> Repair or replace harness or connectors.

## 9. CHECK ECM RELAY

Refer to [EC-1166, "Component Inspection"](#).

OK or NG

- OK >> GO TO 17.  
 NG >> Replace ECM relay.

## 10. CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect condenser harness connector.
3. Check harness continuity between condenser terminal 2 and ground.  
Refer to Wiring diagram.

**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 11.  
 NG >> Repair open circuit or short to power in harness or connector.

## 11. CHECK CONDENSER

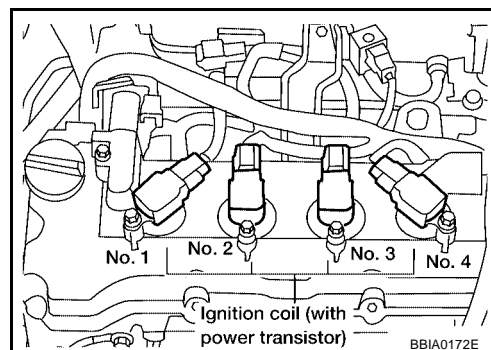
Refer to [EC-1166, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 12.  
 NG >> Replace condenser.

## 12. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

1. Turn ignition switch "OFF".
2. Reconnect all harness connectors disconnected.
3. Disconnect ignition coil harness connector.
4. Turn ignition switch "ON".

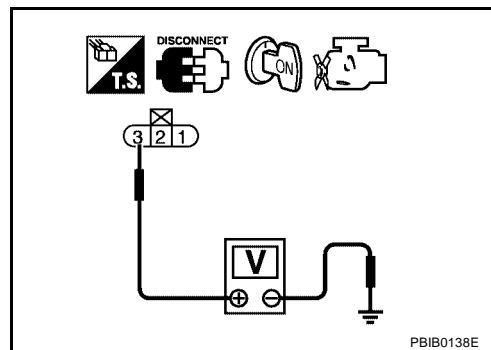


5. Check voltage between ignition coil terminal 3 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 14.  
 NG >> GO TO 13.



## 13. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between ignition coil and ECM relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 14. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between ignition coil terminal 2 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 15.  
 NG >> Repair open circuit or short to power in harness or connectors.

## 15. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 61, 62, 80, 81 and ignition coil terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 16.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 16. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to [EC-1166, "Component Inspection"](#) .

OK or NG

OK >> GO TO 17.

NG >> Replace ignition coil with power transistor.

## 17. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

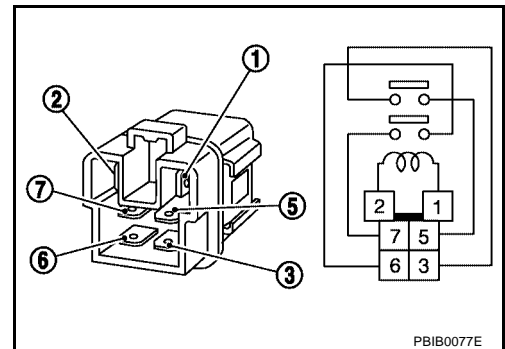
### Component Inspection ECM RELAY

UBS006J8

1. Apply 12V direct current between ECM relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5, 6 and 7.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No

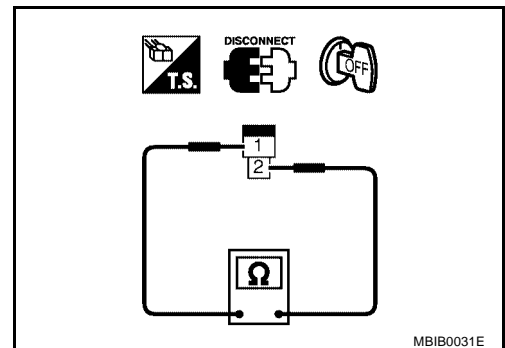
3. If NG, replace ECM relay.



### CONDENSER

1. Turn ignition switch "OFF".
2. Disconnect condenser harness connector.
3. Check resistance between condenser terminals 1 and 2.

**Resistance: Above 1 MΩ at 25°C (77°F)**



### IGNITION COIL WITH POWER TRANSISTOR

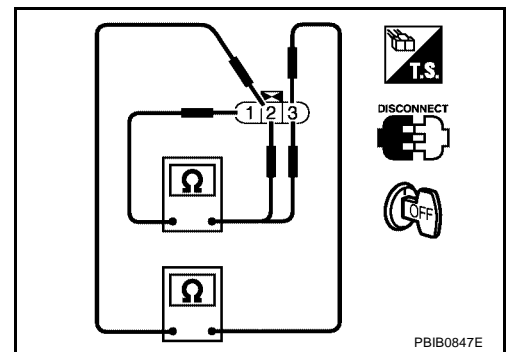
1. Turn ignition switch "OFF".
2. Disconnect ignition coil harness connector.

# IGNITION SIGNAL

[QG18DE (SULEV)]

3. Check resistance between ignition coil terminals as follows.

Terminal No.	Resistance $\Omega$ [at 25°C (77°F)]
3 and 1	Except 0 or $\infty$
3 and 2	Except 0
1 and 2	



UBS006J9

## Removal and Installation IGNITION COIL WITH POWER TRANSISTOR

Refer to [EM-12. "Removal and Installation"](#) .

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# INJECTOR

[QG18DE (SULEV)]

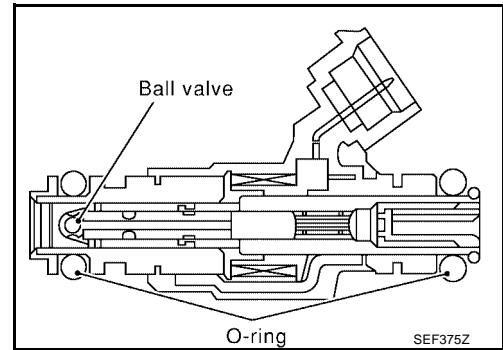
## INJECTOR

PF16600

### Component Description

UBS00256

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the injector circuit, the coil in the injector is energized. The energized coil pulls the needle valve back and allows fuel to flow through the injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.



### CONSULT-II Reference Value in Data Monitor Mode

UBS00257

MONITOR ITEM	CONDITION	SPECIFICATION	
INJ PULSE-B1	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" (A/T), Neutral (M/T) ● No-load	Idle 2,000 rpm	2.4 - 3.2 msec 1.9 - 3.2 msec
	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" (A/T), Neutral (M/T) ● No-load	Idle 2,000 rpm	1.0 - 1.6 msec 0.7 - 1.3 msec



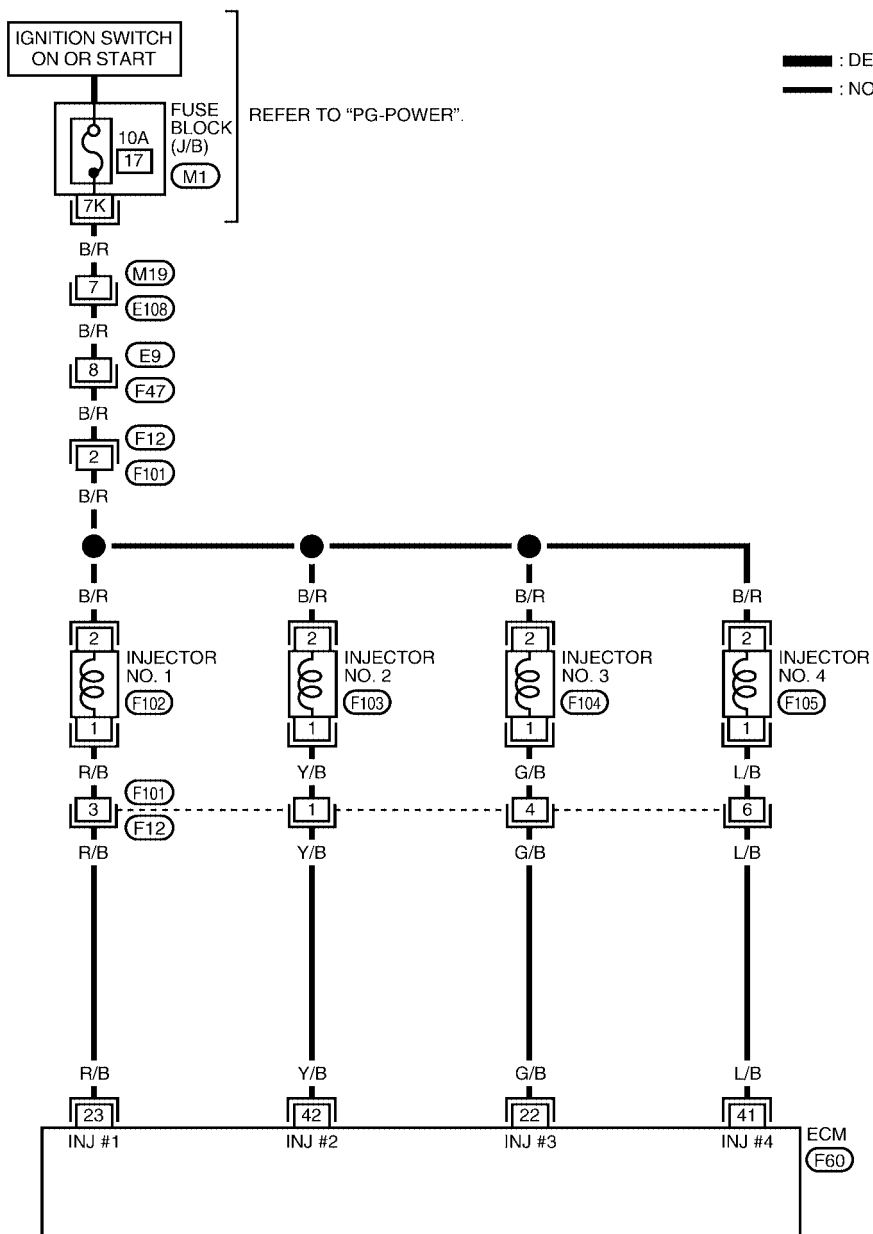
# INJECTOR

[QG18DE (SULEV)]

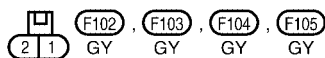
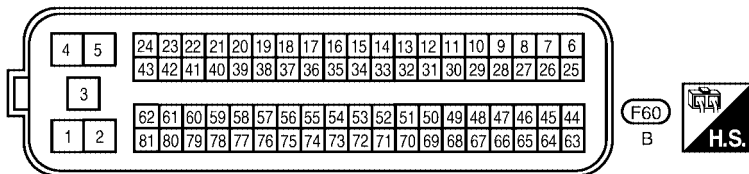
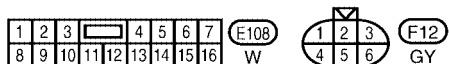
UBS00258

## Wiring Diagram

### EC-INJECT-01



— : DETECTABLE LINE FOR DTC  
 — : NON-DETECTABLE LINE FOR DTC



Refer to the following.  
 (M1) - FUSE BLOCK - JUNCTION BOX (J/B)

BBWA0797E

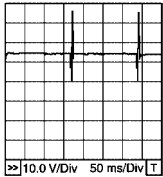
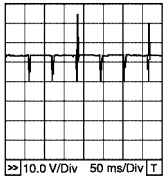
# INJECTOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
22 23 41 42	G/B R/B L/B Y/B	Injector No. 3 Injector No. 1 Injector No. 4 Injector No. 2	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>PBIB0529E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>PBIB0530E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS00259

### 1. INSPECTION START

Turn ignition switch to "START".

**Is any cylinder ignited?**

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

### 2. CHECK OVERALL FUNCTION

#### With CONSULT-II

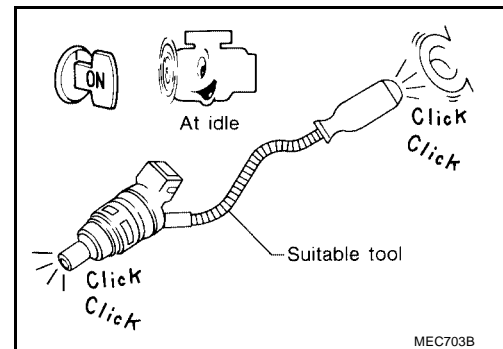
1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

#### Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.  
**Clicking noise should be heard.**



#### OK or NG

- OK >> **INSPECTION END**  
 NG >> GO TO 3.

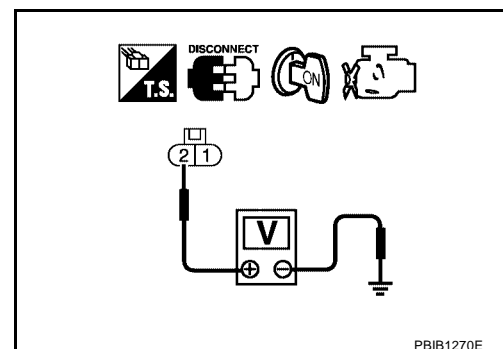
### 3. CHECK POWER SUPPLY CIRCUIT

1. Stop engine.
2. Disconnect injector harness connector.
3. Turn ignition switch "ON".
4. Check voltage between injector terminal 2 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

#### OK or NG

- OK >> GO TO 5.  
 NG >> GO TO 4.



---

#### 4. DETECT MALFUNCTIONING PART

---

Check the following.

- 10A fuse
- Harness connectors M19, E108
- Harness connectors E9, F47
- Harness connectors F12, F101
- Fuse block (J/B) connector M1
- 10A fuse
- Harness for open or short between injector and fuse

>> Repair harness or connectors.

---

#### 5. CHECK INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between injector harness connector terminal 1 and ECM terminals 22, 23, 41, 42.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

---

#### 6. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors F12, F101
- Harness for open or short between injector and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

#### 7. CHECK INJECTOR

---

Refer to [EC-1173, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace injector.

---

#### 8. CHECK INTERMITTENT INCIDENT

---

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

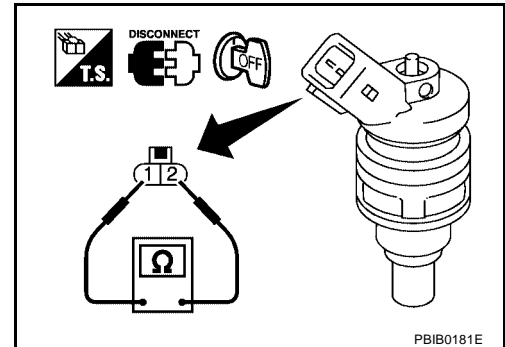
>> **INSPECTION END**

## Component Inspection

### INJECTOR

1. Disconnect injector harness connector.
2. Check resistance between terminals as shown in the figure.

**Resistance: 13.5 - 17.5Ω [at 20°C (68°F)]**



## Removal and Installation

### INJECTOR

Refer to [EM-19, "Removal and Installation"](#) .

A

EC

C

D

E

F

G

H

I

J

K

L

M

# FUEL PUMP

[QG18DE (SULEV)]

PF17042

## FUEL PUMP

### System Description SYSTEM DESCRIPTION

UBS0025E

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay
Battery	Battery voltage*		

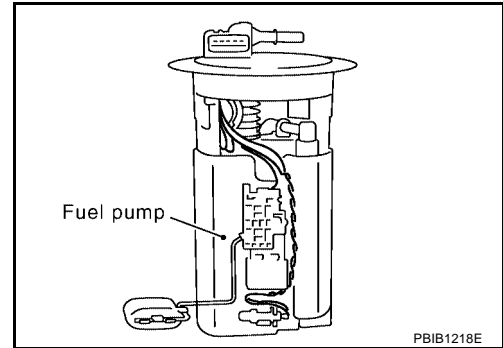
\*: ECM determines the start signal status by the signals of engine speed and battery voltage.

The ECM activates the fuel pump for several seconds after the ignition switch is turned on to improve engine startability. If the ECM receives a 180° signal from the camshaft position sensor, it knows that the engine is rotating, and causes the pump to perform. If the 180° signal is not received when the ignition switch is on, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 5 seconds
Engine running and cranking	Operates
When engine is stopped	Stops in 1 second
Except as shown above	Stops

### COMPONENT DESCRIPTION

A turbine type design fuel pump is used in the fuel tank.



### CONSULT-II Reference Value in Data Monitor Mode

UBS0025G

MONITOR ITEM	CONDITION	SPECIFICATION
FUEL PUMP RLY	<ul style="list-style-type: none"> <li>● Ignition switch is turned to ON (Operates for 5 seconds)</li> <li>● Engine running and cranking</li> <li>● When engine is stopped (Stops in 1 seconds)</li> </ul>	ON
	<ul style="list-style-type: none"> <li>● Except as shown above</li> </ul>	OFF

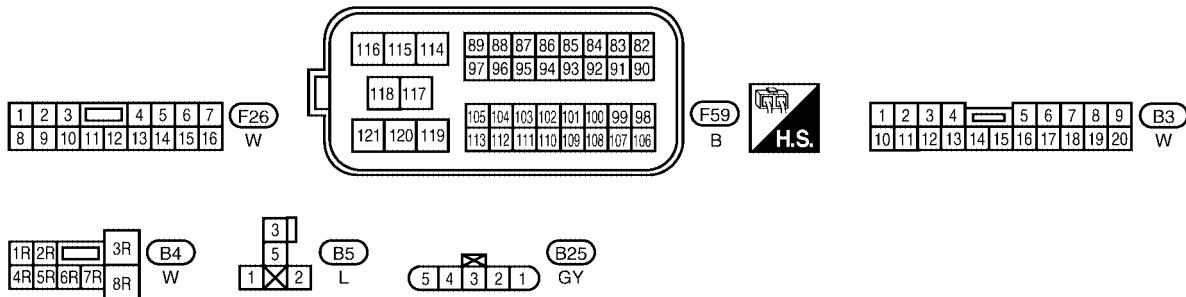
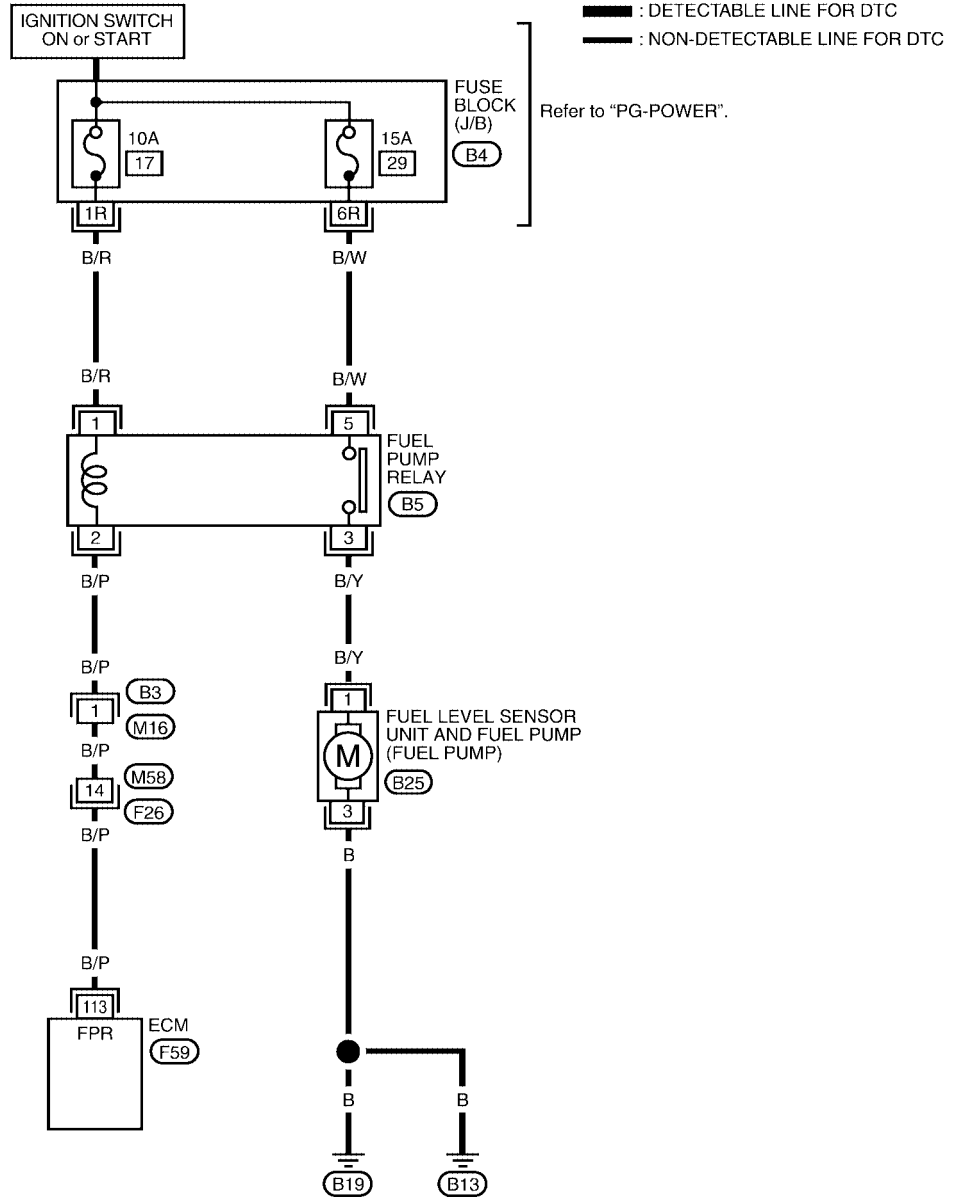
# FUEL PUMP

[QG18DE (SULEV)]

UBS0025H

## Wiring Diagram

### EC-F/PUMP-01



BBWA0314E

# FUEL PUMP

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
113	B/P	Fuel pump relay	[Ignition switch "ON"] ● For 1 second after turning ignition switch "ON"	0 - 1.0V
			[Engine is running] [Ignition switch "ON"] ● More than 1 second after turning ignition switch "ON".	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

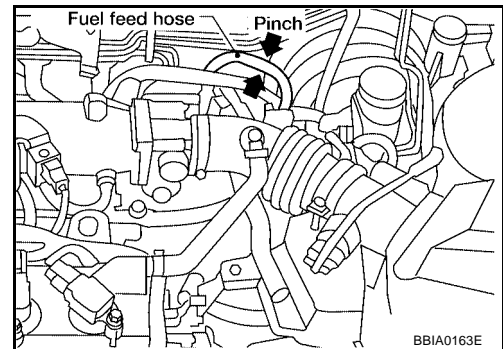
UBS0025I

### 1. CHECK OVERALL FUNCTION

1. Turn ignition switch "ON".
2. Pinch fuel feed hose with fingers.  
**Fuel pressure pulsation should be felt on the fuel feed hose for 5 seconds after ignition switch is turned "ON".**

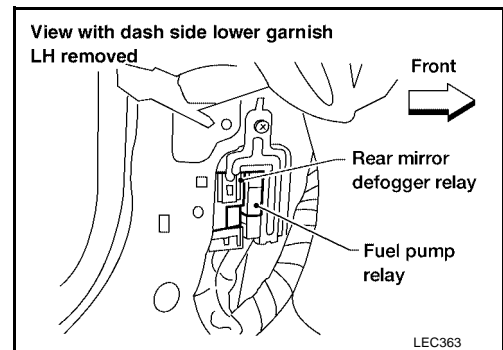
OK or NG

- OK >> **INSPECTION END**  
 NG >> GO TO 2.



### 2. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-1

1. Turn ignition switch "OFF".
2. Disconnect fuel pump relay.
3. Turn ignition switch "ON".

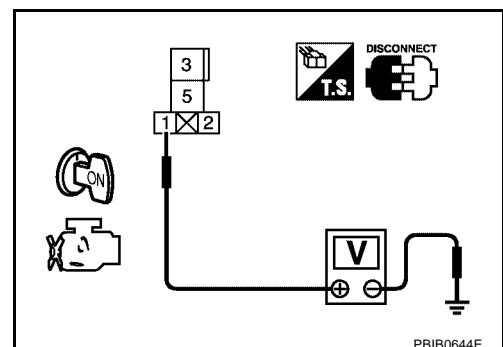


4. Check voltage between fuel pump relay terminals 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 4.  
 NG >> GO TO 3.





### 3. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- Fuse block (J/B) connector B4
- Harness for open or short between fuse and fuel pump relay

>> Repair harness or connectors.

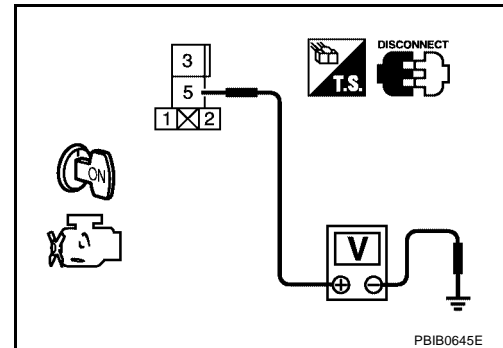
### 4. CHECK POWER SUPPLY-II

Check voltage between fuel pump relay terminal 5 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.



### 5. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector B4
- 15A fuse
- Harness for open or short between fuse and fuel pump relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

### 6. CHECK POWER GROUND CIRCUIT AND GROUND CIRCUIT FOR OPEN AND SHORT

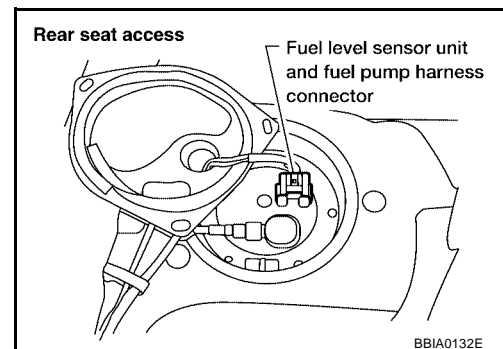
1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Check harness continuity between fuel level sensor unit and fuel pump terminal 3 and body ground, fuel level sensor unit and fuel pump terminal 1 and fuel pump relay terminal 3. Refer to wiring diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.



### 7. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between and fuel pump and body ground
- Harness for open or short between and fuel pump and fuel pump relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 8. CHECK OUTPUT SIGNAL CIRCUIT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 113 and fuel pump relay connector terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 10.  
NG >> GO TO 9.

---

## 9. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors B3, M16
- Harness connector M58, F26
- Harness for open or short between ECM and fuel pump relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 10. CHECK FUEL PUMP RELAY

---

Refer to [EC-1179, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.  
NG >> Replace fuel pump relay.

---

## 11. CHECK FUEL PUMP

---

Refer to [EC-1179, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 12.  
NG >> Replace fuel pump.

---

## 12. CHECK INTERMITTENT INCIDENT

---

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

# FUEL PUMP

[QG18DE (SULEV)]

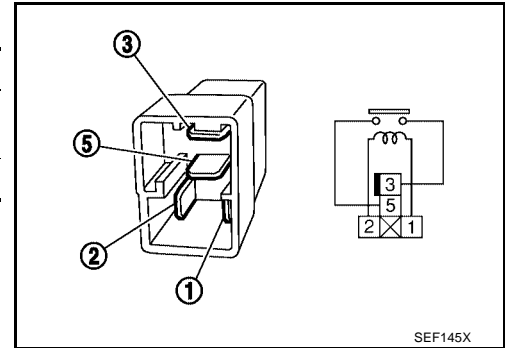
UBS0025J

## Component Inspection FUEL PUMP RELAY

Check continuity between terminals 3 and 5.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

If NG, replace relay.

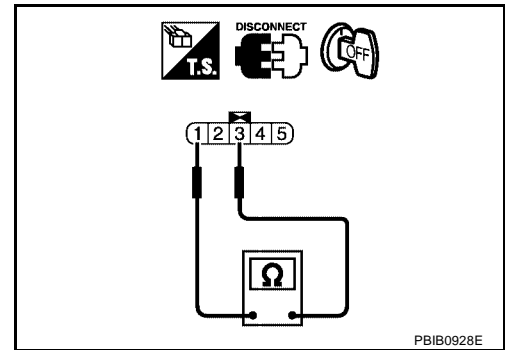


## FUEL PUMP

1. Disconnect fuel pump harness connector.
2. Check resistance between terminals 1 and 3.

**Resistance: 0.2 - 5.0Ω [at 25°C (77°F)]**

If NG, replace fuel pump.



## Removal and Installation FUEL PUMP

Refer to [FL-3, "Removal and Installation"](#) .

UBS0025K

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
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L  
M

# REFRIGERANT PRESSURE SENSOR

[QG18DE (SULEV)]

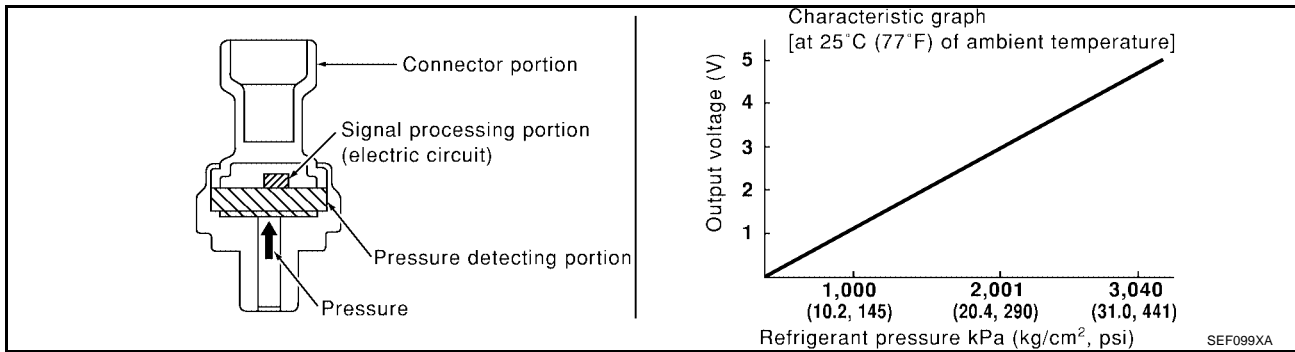
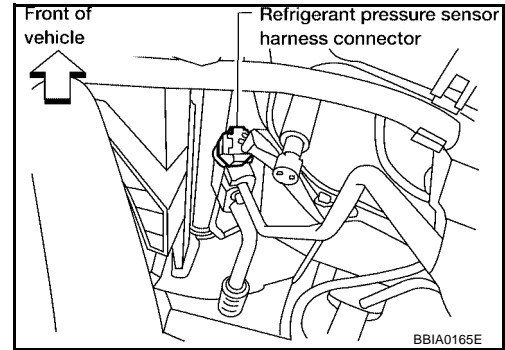
## REFRIGERANT PRESSURE SENSOR

PFP:92136

### Description

UBS0025R

The refrigerant pressure sensor is installed at the liquid tank of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.



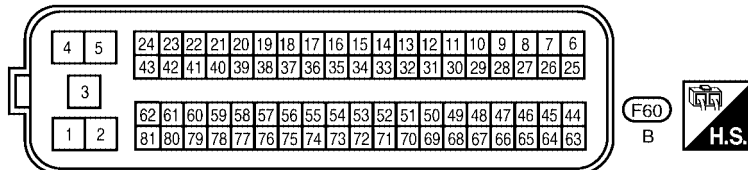
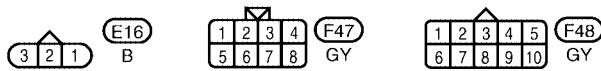
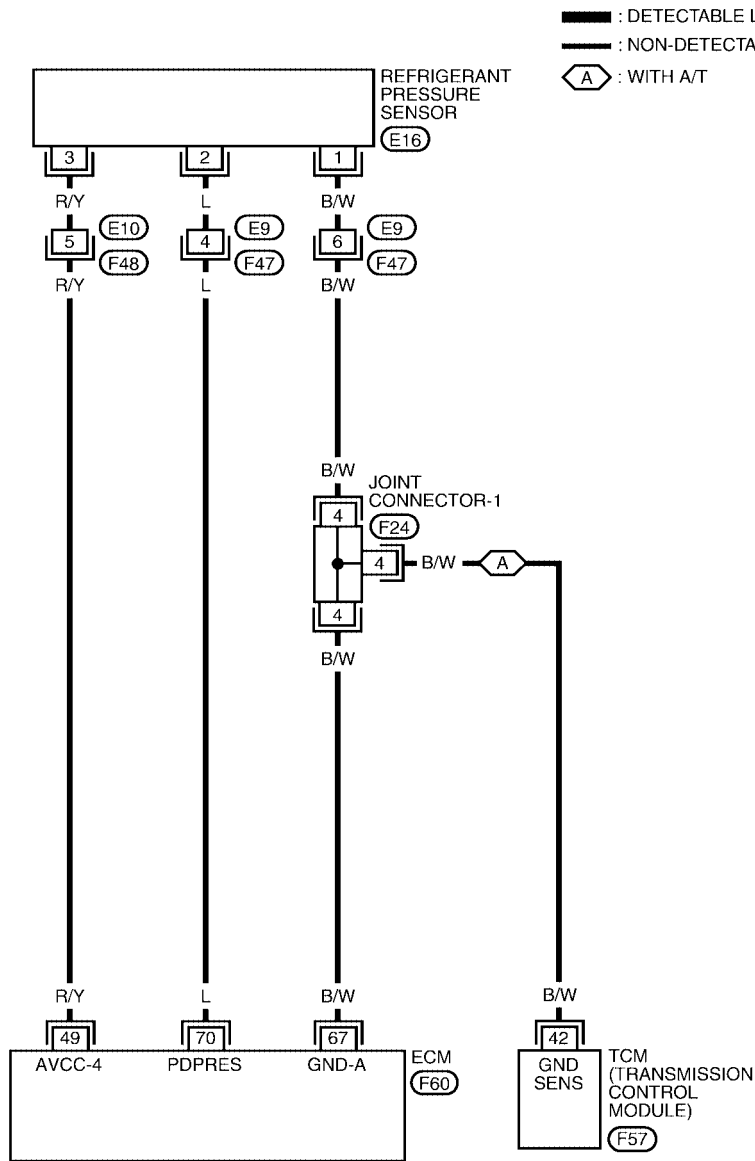
# REFRIGERANT PRESSURE SENSOR

[QG18DE (SULEV)]

## Wiring Diagram

UBS0025S

EC-RP/SEN-01



Refer to the following.

- (F24) - JOINT CONNECTOR
- (F57) - ELECTRICAL UNITS

BBWA0798E

# REFRIGERANT PRESSURE SENSOR

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
49	R/Y	Sensor power supply (Refrigerant pressure sensor)	[Ignition switch "ON"]	Approximately 5V
67	B/W	Sensor ground (Mass air flow sensor)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
70	L	Refrigerant pressure sensor	[Engine is running] ● Warm-up condition ● Both A/C switch and blower switch are "ON" (Compressor operates.)	1.0 - 4.0V

## Diagnostic Procedure

UBS0025T

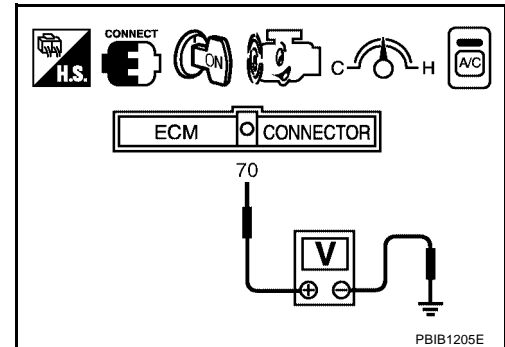
### 1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and fan control switch "ON".
3. Check voltage between ECM terminal 70 and ground with CONSULT-II or tester.

**Voltage: 1.0 - 4.0V**

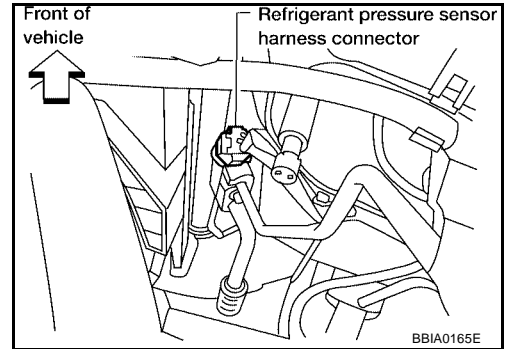
OK or NG

- OK >> **INSPECTION END**  
 NG >> GO TO 2.



## 2. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn A/C switch and fan control switch "OFF".
2. Stop engine.
3. Disconnect refrigerant pressure sensor harness connector.
4. Turn ignition switch "ON".

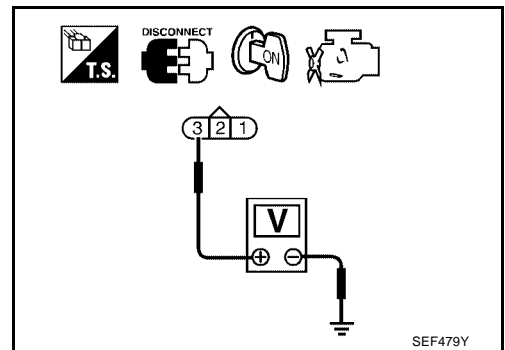


5. Check voltage between refrigerant pressure sensor terminal 3 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E10, F48
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair harness or connectors.

## 4. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between refrigerant pressure sensor terminal 1 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

---

## 5. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors E9, F47
- Joint connector-1
- Harness for open or short between TCM (transmission control module) and refrigerant pressure sensor
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to power in harness or connectors.

---

## 6. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 70 and refrigerant pressure sensor terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

---

## 7. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors E9, F47
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 8. CHECK REFRIGERANT PRESSURE SENSOR

---

Refer to [MTC-15, "Refrigerant Pressure Sensor"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace refrigerant pressure sensor.

---

## 9. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Removal and Installation REFRIGERANT PRESSURE SENSOR

Refer to [MTC-15, "REFRIGERATION SYSTEM"](#) .

UBS00616



# ELECTRICAL LOAD SIGNAL

[QG18DE (SULEV)]

## ELECTRICAL LOAD SIGNAL

PFP:25350

### CONSULT-II Reference Value in Data Monitor Mode

UBS0025U

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
LOAD SIGNAL	● Ignition switch: ON	Rear window defogger switch and/ or lighting switch is in 2nd	ON
		Rear window defogger switch is OFF and lighting switch is OFF	OFF

A

EC

C

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L

M

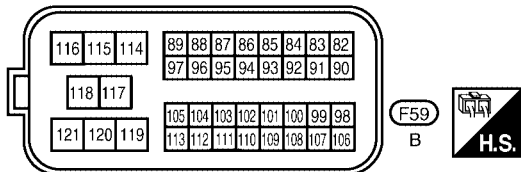
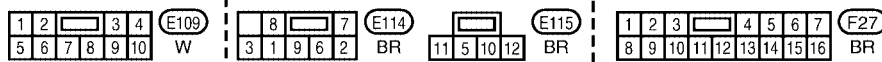
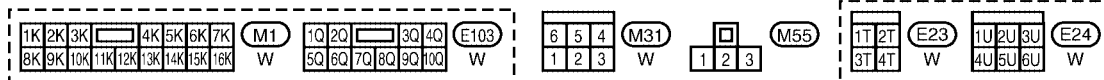
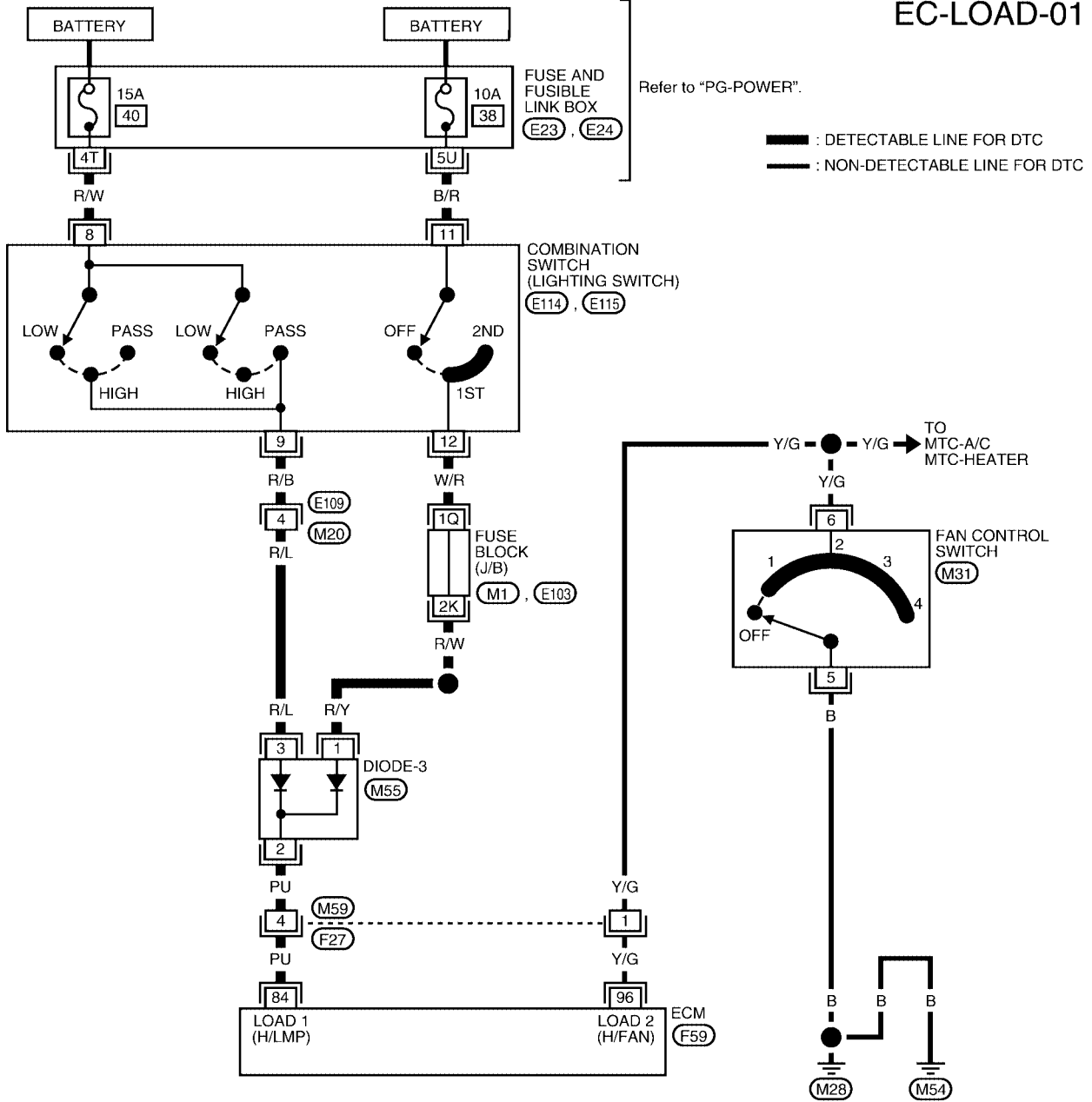
# ELECTRICAL LOAD SIGNAL

[QG18DE (SULEV)]

UBS0025V

## Wiring Diagram

### EC-LOAD-01



BBWA0401E

# ELECTRICAL LOAD SIGNAL

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
84	PU	Electrical load signal (Headlamp signal)	[Ignition switch "ON"] ● Lighting switch is "2ND" position	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"] ● Lighting switch is "OFF"	Approximately 0V
96	Y/G	Electrical load signal (Heater fan signal)	[Engine is running] ● Heater fan switch "ON"	Approximately 0V
			[Engine is running] ● Heater fan switch "OFF"	Approximately 5V

## Diagnostic Procedure

UBS0025W

### 1. INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes >> GO TO 2.

No >> GO TO 4.

### 2. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I

 **With CONSULT-II**

- Turn ignition switch "ON".
- Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.

Condition	LOAD SIGNAL
Lighting switch "1ST" position	ON
Lighting switch "OFF"	OFF

OK or NG

OK >> GO TO 3.

NG >> GO TO 7.

DATA MONITOR	
MONITORING	NO DTC
LOAD SIGNAL	ON

PBIB0103E

### 3. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II

 **With CONSULT-II**

Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.

Condition	LOAD SIGNAL
Lighting switch "2ND" and "HIGH" position	ON
Lighting switch "OFF"	OFF

OK or NG

OK >> GO TO 6.

NG >> GO TO 11.

DATA MONITOR	
MONITORING	NO DTC
LOAD SIGNAL	ON

PBIB0103E

## 4. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I

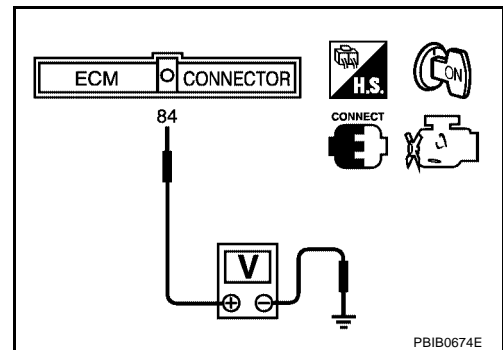
⊗ **Without CONSULT-II**

1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 84 and ground under the following conditions.

Condition	Voltage
Lighting switch "1ST" position	BATTERY VOLTAGE
Lighting switch "OFF"	0V

OK or NG

- OK >> GO TO 5.  
 NG >> GO TO 7.



## 5. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II

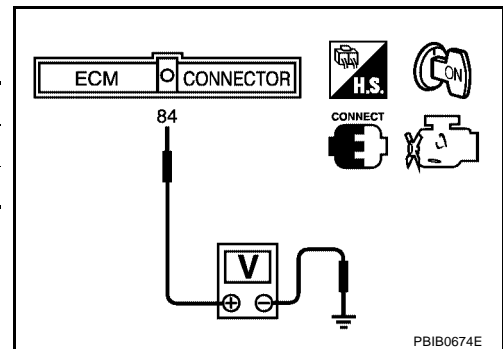
⊗ **Without CONSULT-II**

Check voltage between ECM terminal 84 and ground under the following conditions.

Condition	Voltage
Lighting switch "2ND" and "HIGH" position	BATTERY VOLTAGE
Lighting switch "OFF"	0V

OK or NG

- OK >> GO TO 6.  
 NG >> GO TO 11.



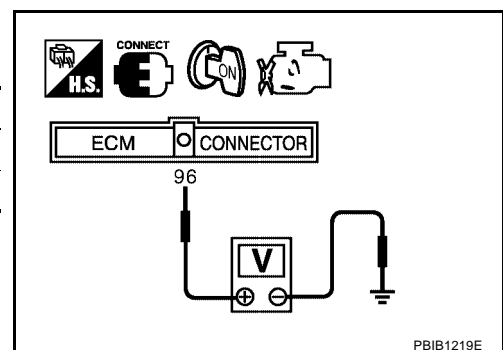
## 6. CHECK FAN CONTROL SWITCH CIRCUIT OVERALL FUNCTION

Check voltage between ECM terminal 96 and ground under the following conditions.

Condition	Voltage
Fan control switch "ON"	BATTERY VOLTAGE
Fan control switch "OFF"	0V

OK or NG

- OK >> **INSPECTION END**  
 NG >> GO TO 15.



## 7. CHECK LIGHTING SWITCH 1ST POSITION CIRCUIT

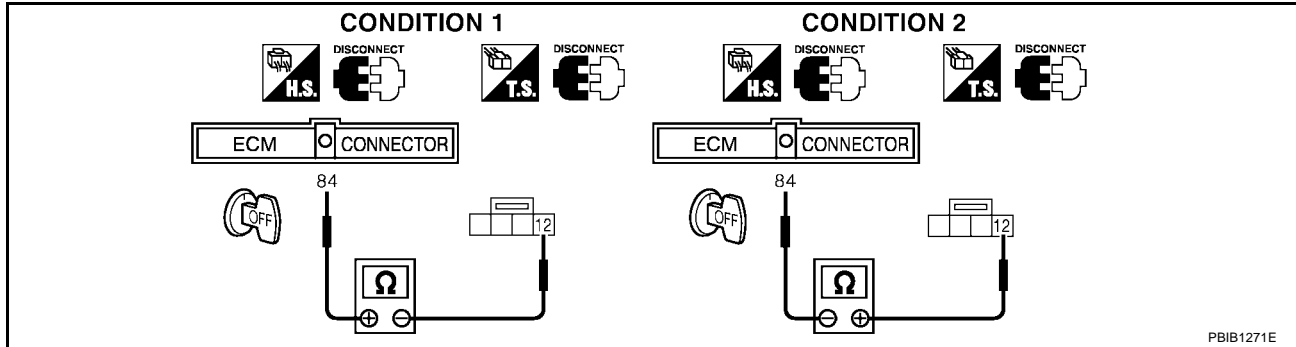
1. Turn the lighting switch "1ST" position.
2. Check that any illumination lamp is illuminated.

OK or NG

- OK >> GO TO 8.  
 NG >> Refer to [LT-32. "ILLUMINATION"](#) .

**8. CHECK LOAD SIGNAL INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Disconnect lighting switch harness connectors.
4. Check harness continuity between ECM terminal 84 and lighting switch terminal 12 under the following conditions.



CONDITION	CONTINUITY
1	Should not exist.
2	Should exist.

5. Also check harness for short to ground and short to power.

**OK or NG**

- OK >> GO TO 10.
- NG >> GO TO 9.

**9. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M59, F27
- Fuse block (J/B) connectors M1, E103
- Diode-3
- Harness for open and short between ECM and lighting switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

**10. CHECK INTERMITTENT INCIDENT**

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**11. CHECK HEADLAMP HIGH BEAM CIRCUIT**

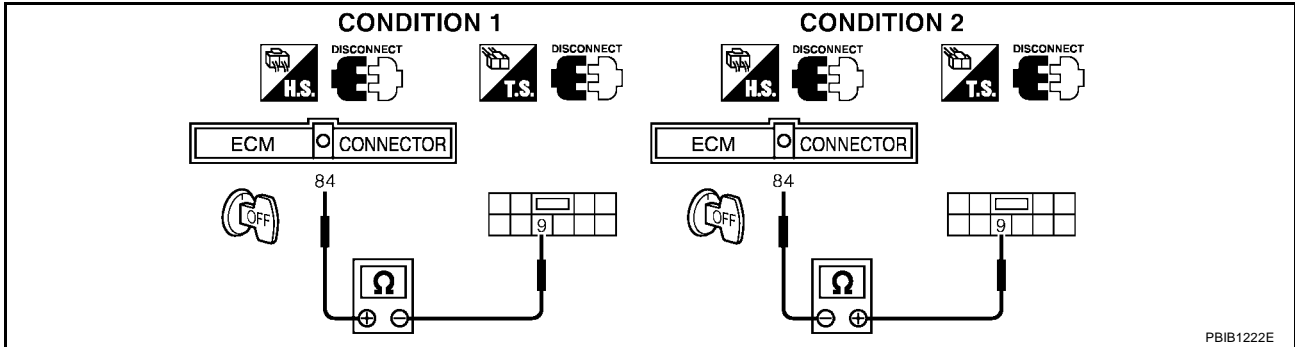
1. Start engine.
2. Turn the lighting switch "2ND" and "HIGH" position.
3. Check that headlamp high beams are illuminated.

**OK or NG**

- OK >> GO TO 12.
- NG >> Refer to [LT-6, "HEADLAMP \(FOR USA\)"](#) .

## 12. CHECK HEADLAMP HIGH BEAM INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Stop engine.
2. Disconnect ECM harness connector.
3. Disconnect lighting switch harness connector.
4. Check harness continuity between ECM terminal 84 and lighting switch terminal 9 under the following conditions.



PBIB1222E

CONDITION	CONTINUITY
1	Should not exist.
2	Should exist.

5. Also check harness for short to ground and short to power.

### OK or NG

- OK >> GO TO 14.
- NG >> GO TO 13.

## 13. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M59, F27
- Harness connectors E109, M20
- Diode-3
- Harness for open and short between ECM and lighting switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 14. CHECK INTERMITTENT INCIDENT

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

## 15. CHECK FAN CONTROL SWITCH CIRCUIT

1. Start engine.
2. Turn the fan control switch "ON".
3. Check the blower fan motor. Is the blower fan motor operating?

### Yes or No

- Yes >> GO TO 16.
- No >> Refer to [MTC-19, "TROUBLE DIAGNOSIS"](#) .

---

**16. CHECK FAN CONTROL SWITCH INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT**

---

1. Stop engine.
2. Disconnect ECM harness connector.
3. Disconnect fan control switch harness connector.
4. Check harness continuity between ECM terminal 96 and fan control switch terminal 6.  
Refer to Wiring Diagram.

**Continuity should exist.**

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 18.
- NG >> GO TO 17.

---

**17. DETECT MALFUNCTIONING PART**

---

Check the following.

- Harness connectors M59, F27
- Harness for open and short between ECM and fan control switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

**18. CHECK INTERMITTENT INCIDENT**

---

Perform [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

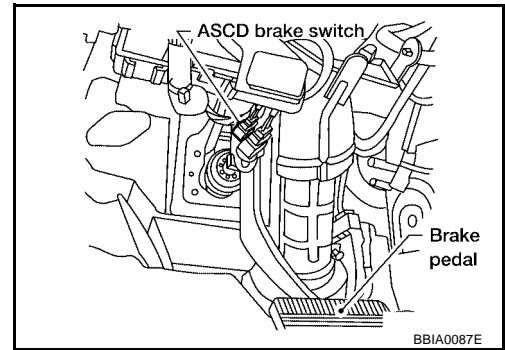
## ASCD BRAKE SWITCH

### Component Description

UBS006JA

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal)

Refer to [EC-1220, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



### CONSULT-II Reference Value in Data Monitor Mode

UBS006JB

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW1	● Ignition switch: ON	Clutch pedal (M/T) and brake pedal: Slightly depressed	ON
		Clutch pedal (M/T) and brake pedal: Slightly depressed	OFF
BRAKE SW2	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON



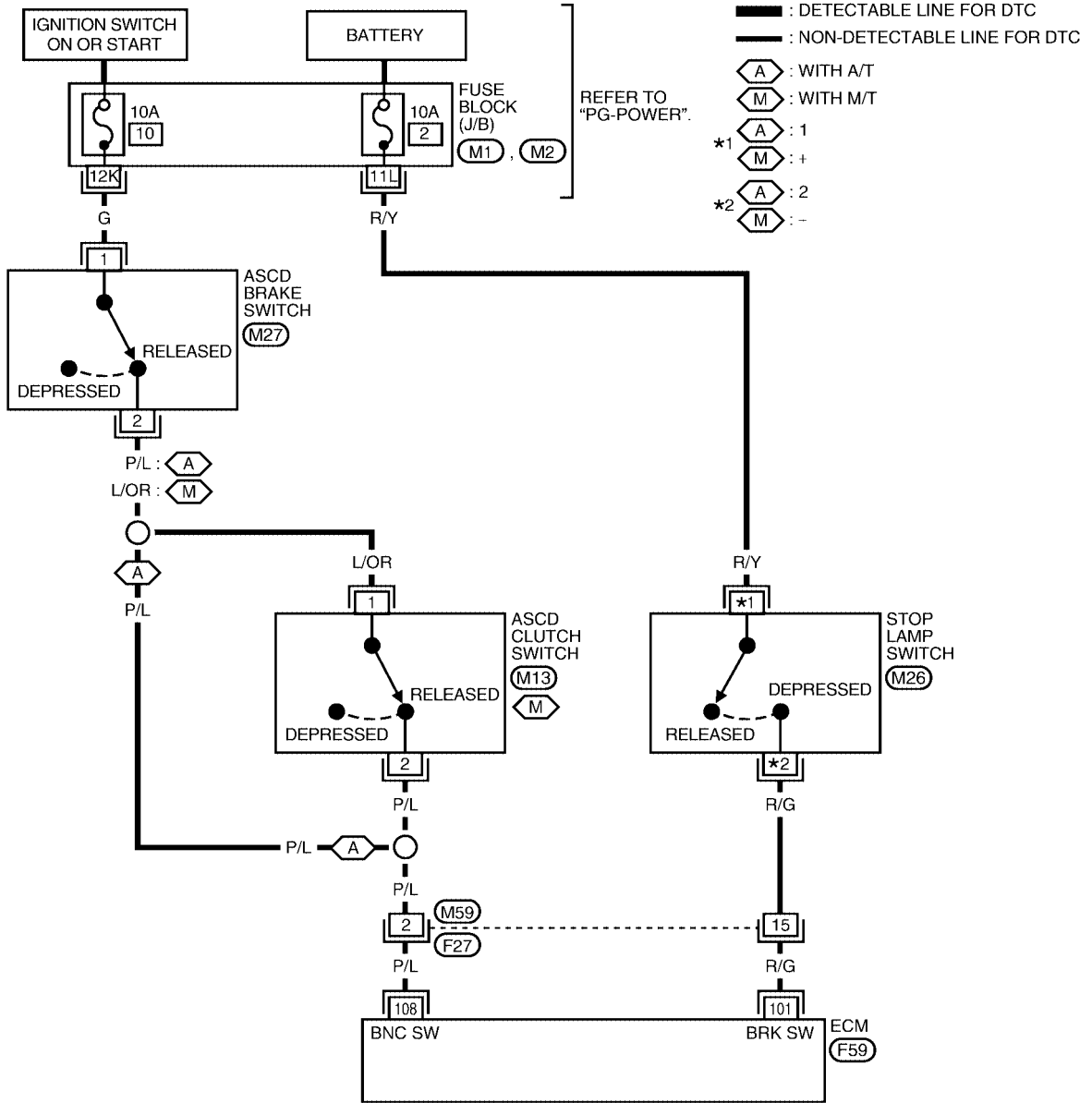
# ASC D BRAKE SWITCH

[QG18DE (SULEV)]

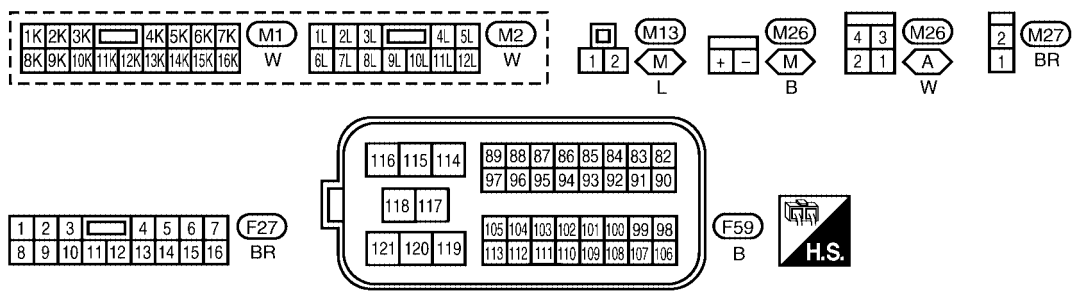
UBS006.JC

## Wiring Diagram

EC-ASCBOF-01



A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



BBWA0316E

# ASCD BRAKE SWITCH

[QG18DE (SULEV)]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	R/G	Stop lamp switch	[Ignition switch "ON"] ● Brake pedal is fully released	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is depressed	BATTERY VOLTAGE (11 - 14V)
108	P/L	ASCD brake switch	[Ignition switch "ON"] ● Brake pedal is depressed ● Clutch pedal is depressed (M/T models)	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is depressed ● Clutch pedal is depressed (M/T models)	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS006JD

### 1. CHECK OVERALL FUNCTION-I

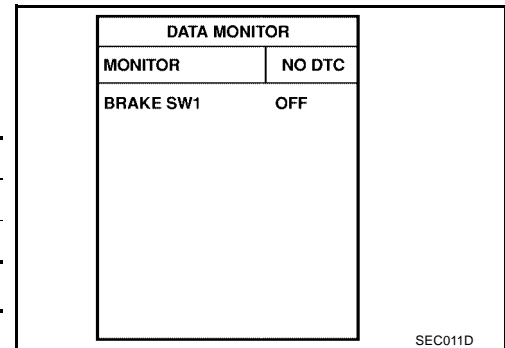
**Ⓟ With CONSULT-II**

- Turn ignition switch "ON".
- Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-II.
- Check "BRAKE SW1" indication under the following conditions.  
**M/T models**

CONDITION	INDICATION
When clutch pedal or brake pedal is depressed	OFF
When clutch pedal and brake pedal are fully released	ON

**A/T models**

CONDITION	INDICATION
When brake pedal is depressed	OFF
When brake pedal is fully released	ON



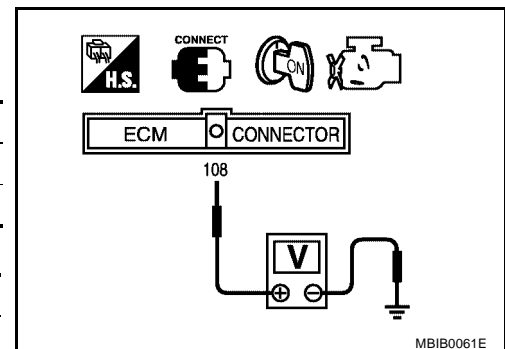
**ⓧ Without CONSULT-II**

- Turn ignition switch "ON".
- Check voltage between ECM terminal 108 and ground under the following conditions.  
**M/T models**

CONDITION	VOLTAGE
When clutch pedal or brake pedal is depressed	Approximately 0V
When clutch pedal and brake pedal are fully released	Battery voltage

**A/T models**

CONDITION	VOLTAGE
When brake pedal is depressed	Approximately 0V
When brake pedal is fully released	Battery voltage



OK or NG

OK >> GO TO 2.

NG (M/T models) >>GO TO 3.

NG (A/T models) >>GO TO 4.

# ASCD BRAKE SWITCH

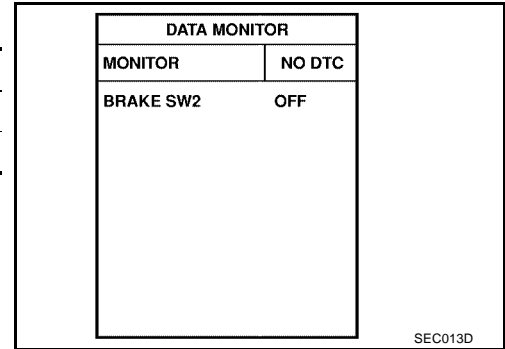
[QG18DE (SULEV)]

## 2. CHECK OVERALL FUNCTION-II

### With CONSULT-II

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

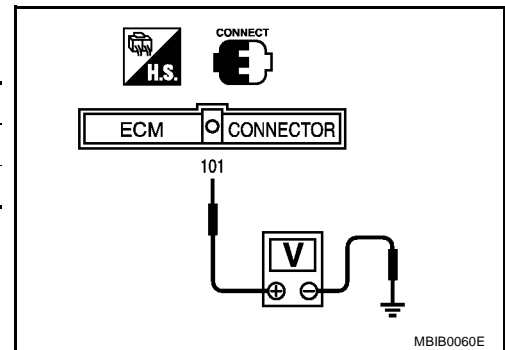
CONDITION	INDICATION
When brake pedal is released	OFF
When brake pedal is depressed	ON



### Without CONSULT-II

Check voltage between ECM terminal 101 and ground under the following conditions.

CONDITION	VOLTAGE
When brake pedal is released	Approximately 0V
When brake pedal is depressed	Battery voltage

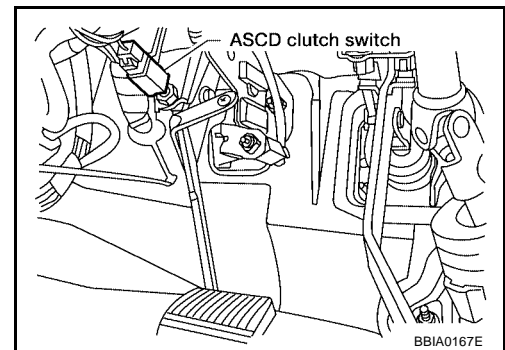


OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 13.

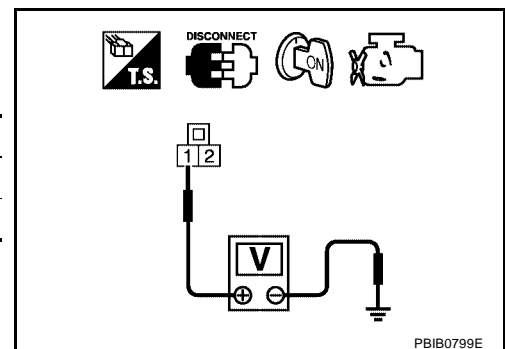
## 3. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch "ON".



4. Check voltage between ASCD clutch switch terminal 1 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
When brake pedal is released	Battery voltage
When brake pedal is depressed	Approx. 0V

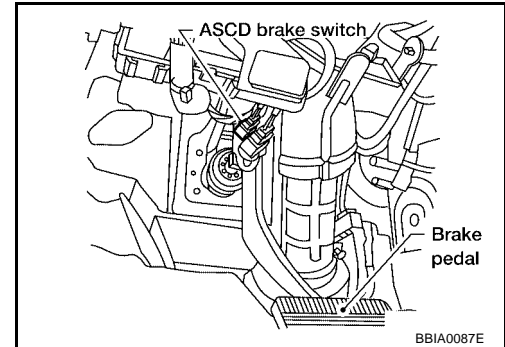


OK or NG

- OK >> GO TO 10.
- NG >> GO TO 4.

## 4. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".

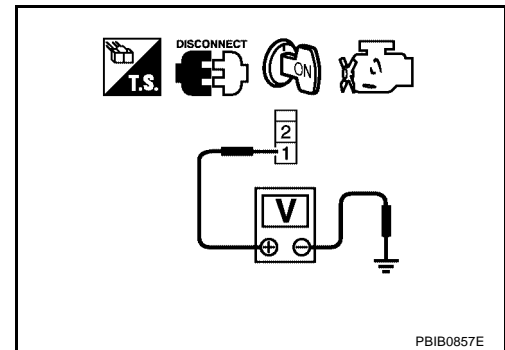


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK (M/T models)>>GO TO 6.
- OK (A/T models)>>GO TO 7.
- NG >> GO TO 5.



## 5. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M1
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 6. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between ASCD brake switch terminal 2 and ASCD clutch switch terminal 1. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 7. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 108 and ASCD brake switch terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 9.  
NG >> GO TO 8.

---

## 8. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and ASCD brake switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 9. CHECK ASCD BRAKE SWITCH

---

Refer to [EC-1738, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.  
NG >> Replace ASCD brake switch.

---

## 10. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 108 and ASCD clutch switch terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 12.  
NG >> GO TO 11.

---

## 11. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and ASCD clutch switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 12. CHECK ASCD CLUTCH SWITCH

---

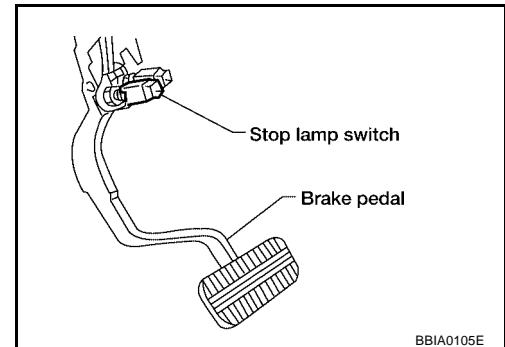
Refer to [EC-1199, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.  
NG >> Replace ASCD clutch switch.

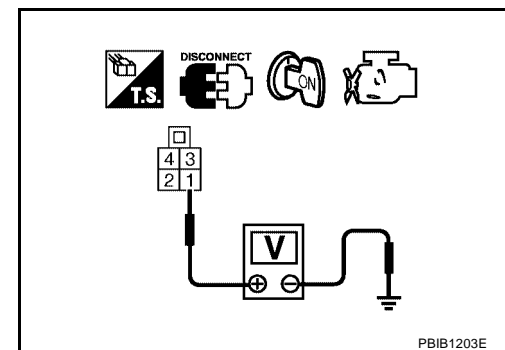
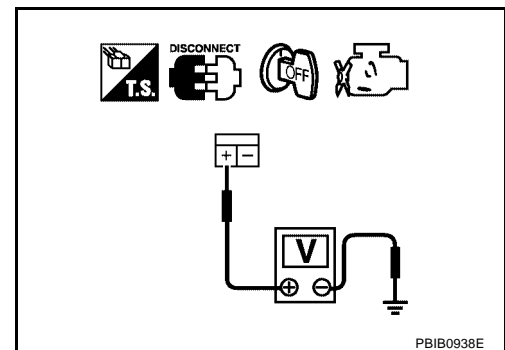
### 13. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect stop lamp switch harness connector.



3. Check voltage between stop lamp switch terminal + (M/T models) or 1 (A/T models) and ground with CONSULT-II or tester.

**Voltage: Battery voltage**



#### OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.

### 14. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M2
- 10A fuse
- Harness for open or short between stop lamp switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 15. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 101 and stop lamp switch terminal – (M/T models) or 2 (A/T models).  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 17.
- NG >> GO TO 16.

## 16. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 17. CHECK STOP LAMP SWITCH

Refer to [EC-1199, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 18.
- NG >> Replace stop lamp switch.

## 18. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

**>> INSPECTION END**

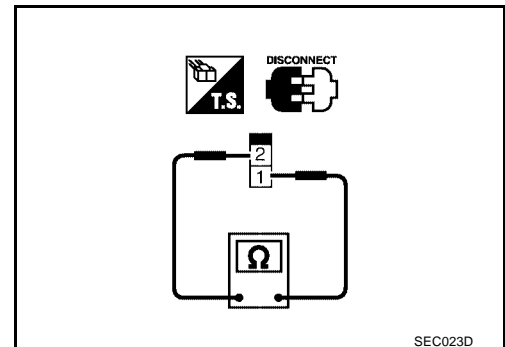
### Component Inspection ASCD BRAKE SWITCH

UBS006JE

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Check harness continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should exist.
When brake pedal is depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to [BR-11, "BRAKE PEDAL AND BRACKET"](#) , and perform step 3 again.



### ASCD CLUTCH SWITCH (FOR M/T MODELS)

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.

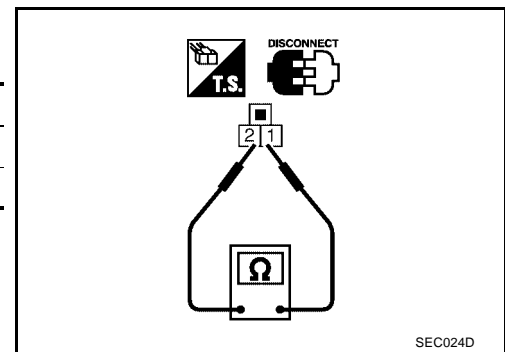
# ASCD BRAKE SWITCH

[QG18DE (SULEV)]

- Check continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When clutch pedal is fully released.	Should exist.
When clutch pedal is depressed.	Should not exist.

If NG, adjust ASCD clutch switch installation, refer to [CL-23](#), "[CLUTCH SYSTEM](#)", and perform step 3 again.



SEC024D

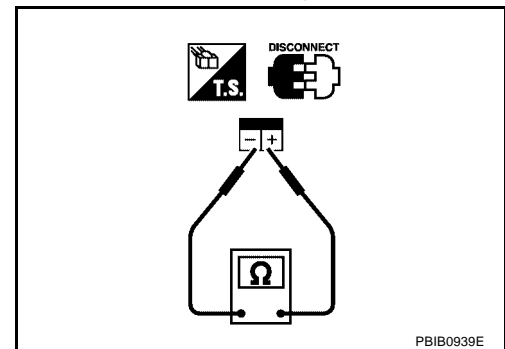
## STOP LAMP SWITCH

### With M/T Models

- Turn ignition switch "OFF".
- Disconnect stop lamp switch harness connector.
- Check harness continuity between stop lamp switch terminals + and - under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should not exist.
When brake pedal is depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-11](#), "[BRAKE PEDAL AND BRACKET](#)", and perform step 3 again.



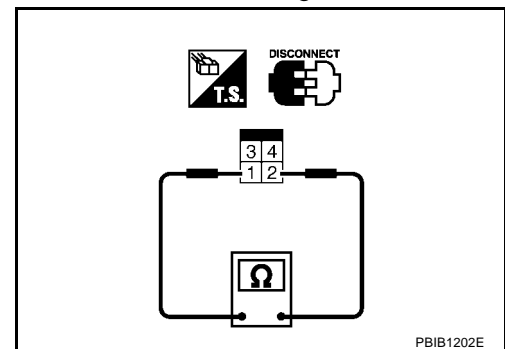
PBIB0939E

### With A/T Models

- Turn ignition switch "OFF".
- Disconnect stop lamp switch harness connector.
- Check harness continuity between stop lamp switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should not exist.
When brake pedal is depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-11](#), "[BRAKE PEDAL AND BRACKET](#)", and perform step 3 again.



PBIB1202E



**ASCD INDICATOR**

PFP:24814

**Component Description**

UBS006BX

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.

CRUISE indicator illuminates when CRUISE switch on ASCD steering switch is turned ON to indicated that ASCD system is ready for operation.

SET indicator illuminates when following conditions are met.

- CRUISE indicator is illuminated.
- SET switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET indicator remains lit during ASCD control.

Refer to [EC-1220, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.

**CONSULT-II Reference Value in Data Monitor Mode**

UBS006BY

Specification data are reference value.

MONITOR ITEM	CONDITION		SPECIFICATION
CRUISE LAMP	● Ignition switch: ON	CRUISE Lamp: Illuminated	ON
		CRUISE Lamp: Not illuminated	OFF
SET LAMP	● Ignition switch: ON	SET Lamp: Illuminated	ON
		SET Lamp: Not illuminated	OFF




# ASC D INDICATOR

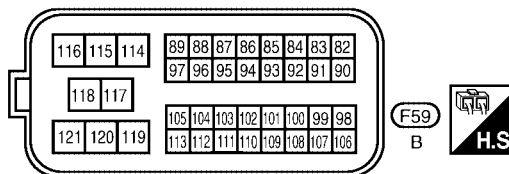
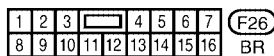
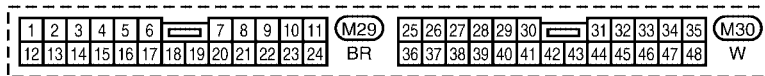
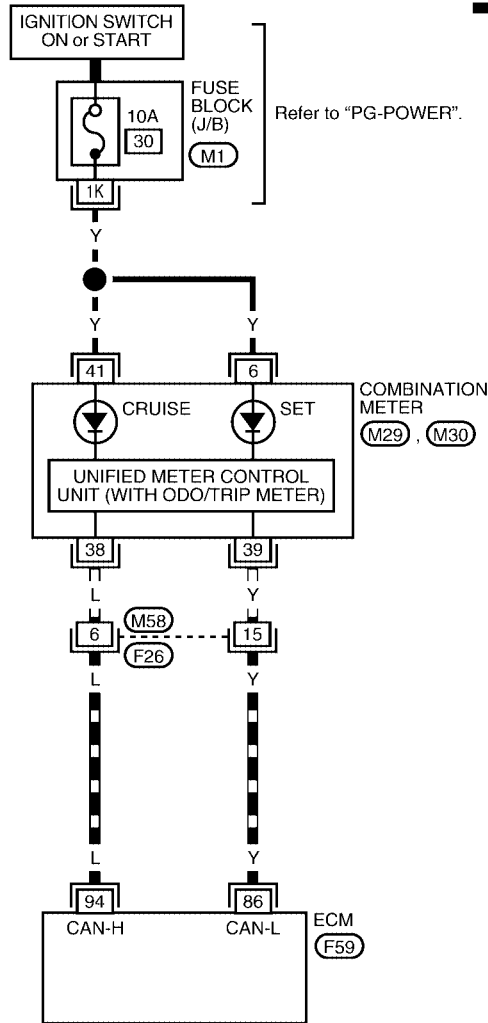
[QG18DE (SULEV)]

UBS006BZ

## Wiring Diagram

### EC-ASCIND-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : DATA LINE



BBWA0433E

## Diagnostic Procedure

### 1. CHECK OVERALL FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	CONDITION	SPECIFICATION	
CRUISE LAMP	● Ignition switch: ON	CRUISE Lamp: Illuminated	ON
		CRUISE Lamp: Not illuminated	OFF
SET LAMP	● Ignition switch: ON	SET Lamp: Illuminated	ON
		SET Lamp: Not illuminated	OFF

OK or NG

OK >> **INSPECTION END**  
 NG >> GO TO 2.

### 2. CHECK DTC

Check that DTC U1000 or U1001 is not displayed.

Yes or No

Yes >> Perform trouble diagnoses for DTC U1000, U1001, refer to [EC-728, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#) .  
 No >> GO TO 3.

### 3. CHECK COMBINATION METER OPERATION

Does combination meter operate normally?

Yes or No

Yes >> GO TO 4.  
 No >> Check combination meter circuit. Refer to [DI-8, "Combination Meter"](#) .

### 4. CHECK INTERMITTENT INCIDENT

Refer to [EC-720, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

# DATA LINK CONNECTOR

[QG18DE (SULEV)]

PF24814

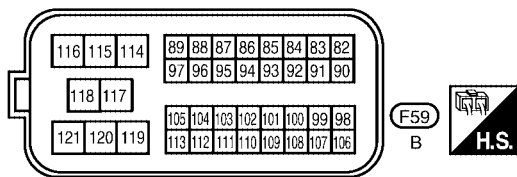
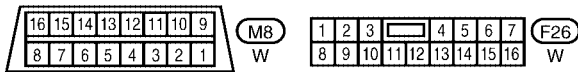
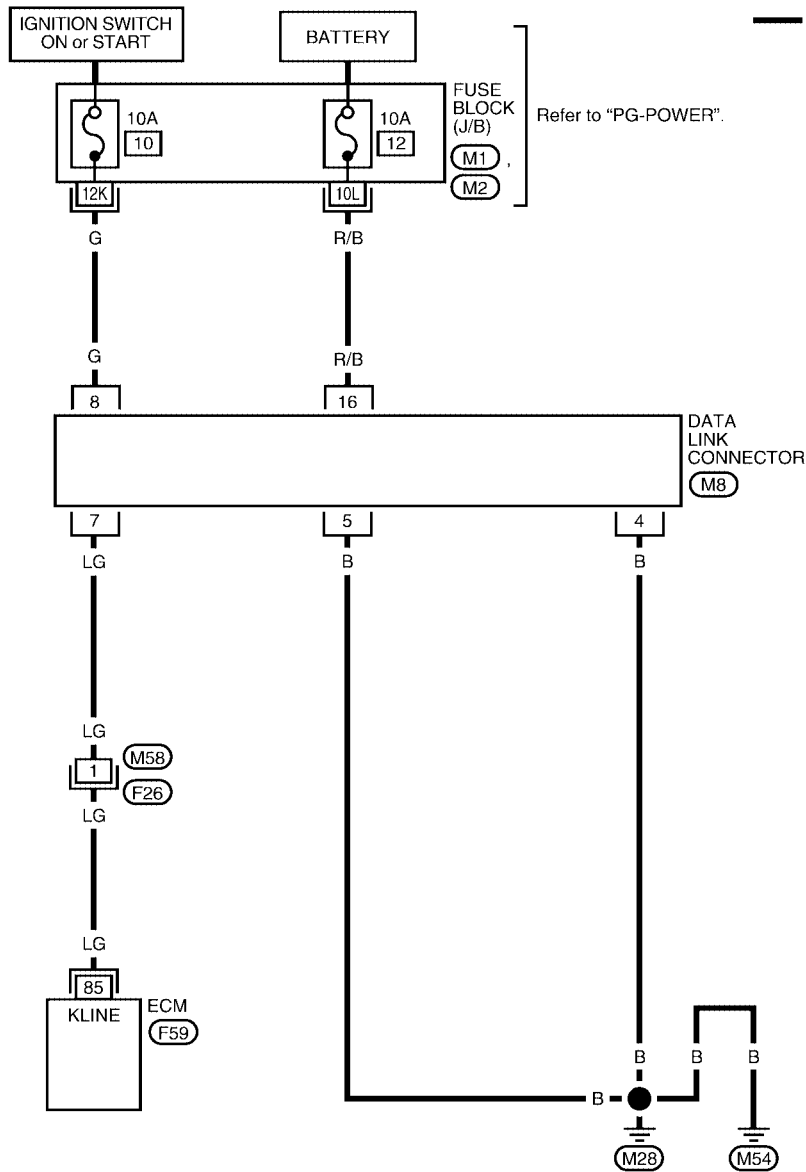
## DATA LINK CONNECTOR

### Wiring Diagram

EBS00KLG

## EC-DLC-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.  
 (M1), (M2) - FUSE  
 BLOCK-JUNCTION BOX (J/B)

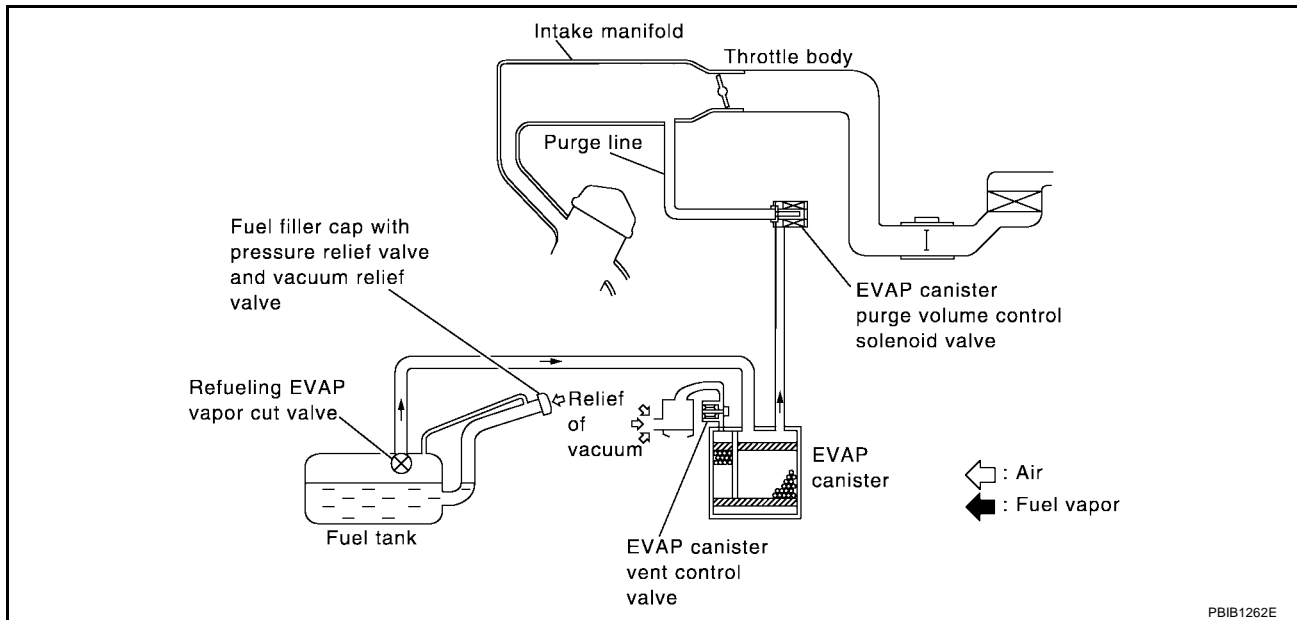
BBWA0318E

## EVAPORATIVE EMISSION SYSTEM

PFP:14950

### Description SYSTEM DESCRIPTION

UBS0025Y



PBIB1262E

The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister.

The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank.

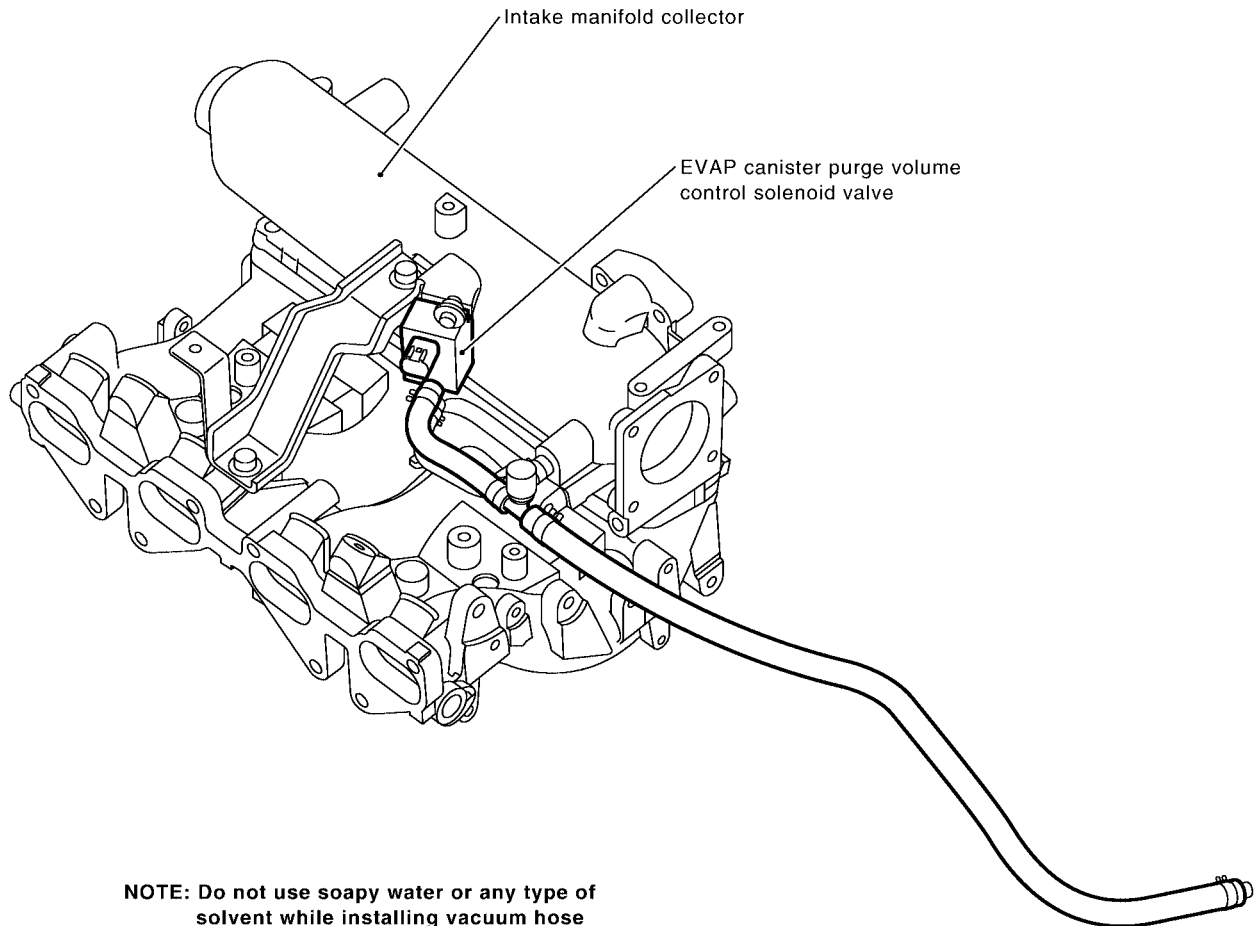
The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.

EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating and idling.

# EVAPORATIVE EMISSION SYSTEM

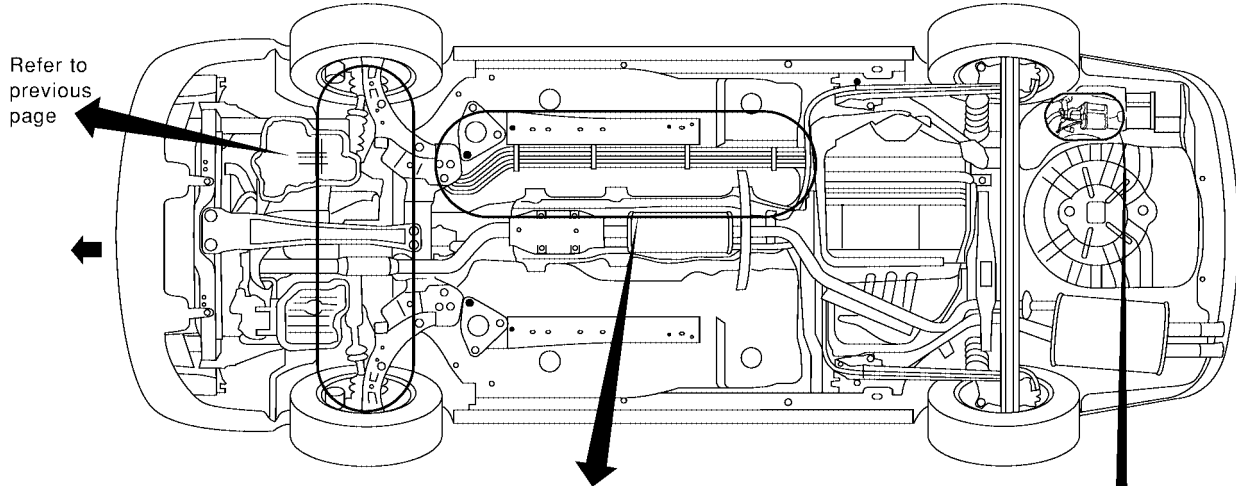
[QG18DE (SULEV)]

## EVAPORATIVE EMISSION LINE DRAWING

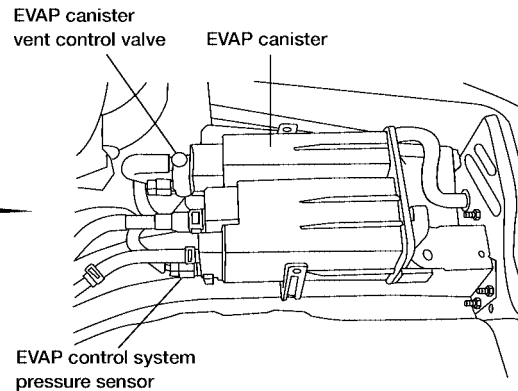
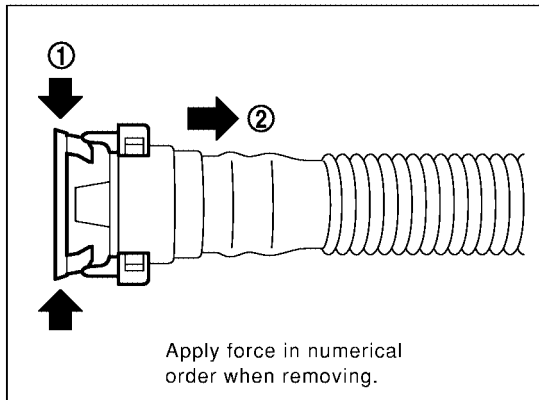
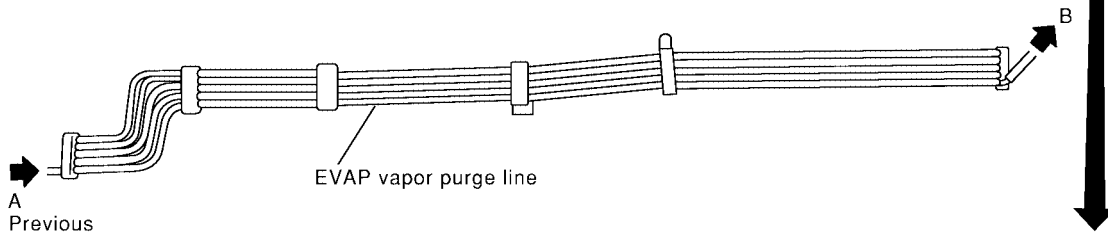


**NOTE:** Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

PBIB1180E



Refer to previous page



### INSTALLATION PRECAUTIONS:

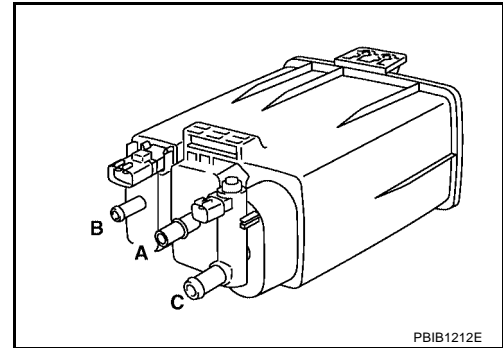
- This hose can be reused, but do not remove it unless necessary.
- Remove any foreign matter (dust, sand, etc.) from the hose connection before installing.
- Apply oil to the O-ring before installing.
- Replace the hose assembly if the O-ring is scratched or cracked.

BBIA0177E

### Component Inspection EVAP CANISTER

Check EVAP canister as follows:

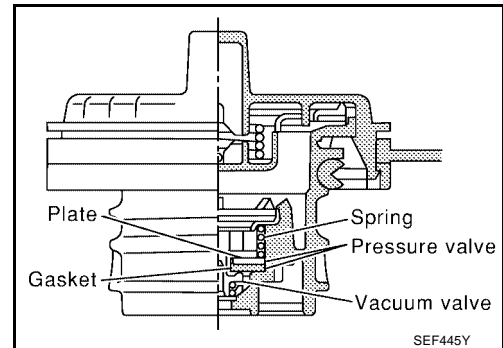
1. Block port **B** .
2. Blow air into port **A** and check that it flows freely out of port **C** .
3. Release blocked port **B** .
4. Apply vacuum pressure to port **B** and check that vacuum pressure exists at the ports **A** and **C** .
5. Block port **A** and **B** .
6. Apply pressure to port **C** and check that there is no leakage.



PBIB1212E

### FUEL TANK VACUUM RELIEF VALVE (BUILT INTO FUEL FILLER CAP)

1. Wipe clean valve housing.



SEF445Y

2. Check valve opening pressure and vacuum.

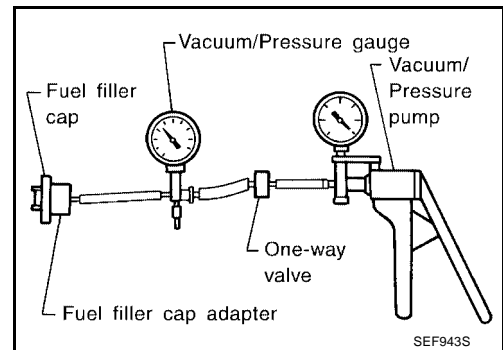
**Pressure:** 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm<sup>2</sup> , 2.22 - 2.90 psi)

**Vacuum:** -6.0 to -3.3 kPa (-0.061 to -0.034 kg/cm<sup>2</sup> , -0.87 to -0.48 psi)

3. If out of specification, replace fuel filler cap as an assembly.

**CAUTION:**

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.



SEF943S

### EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-867, "DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE"](#) .

### FUEL TANK TEMPERATURE SENSOR

Refer to [EC-809, "DTC P0181 FTT SENSOR"](#) , [EC-814, "DTC P0182, P0183 FTT SENSOR"](#) .

### EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-873](#) .

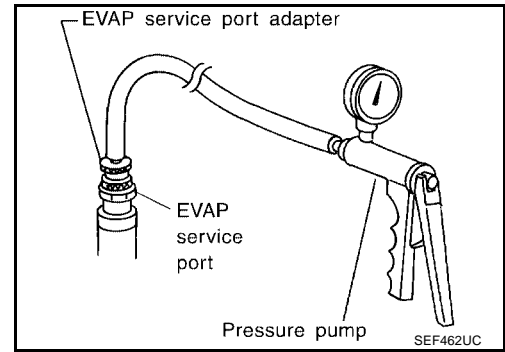
### EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-880](#) .



### EVAP SERVICE PORT

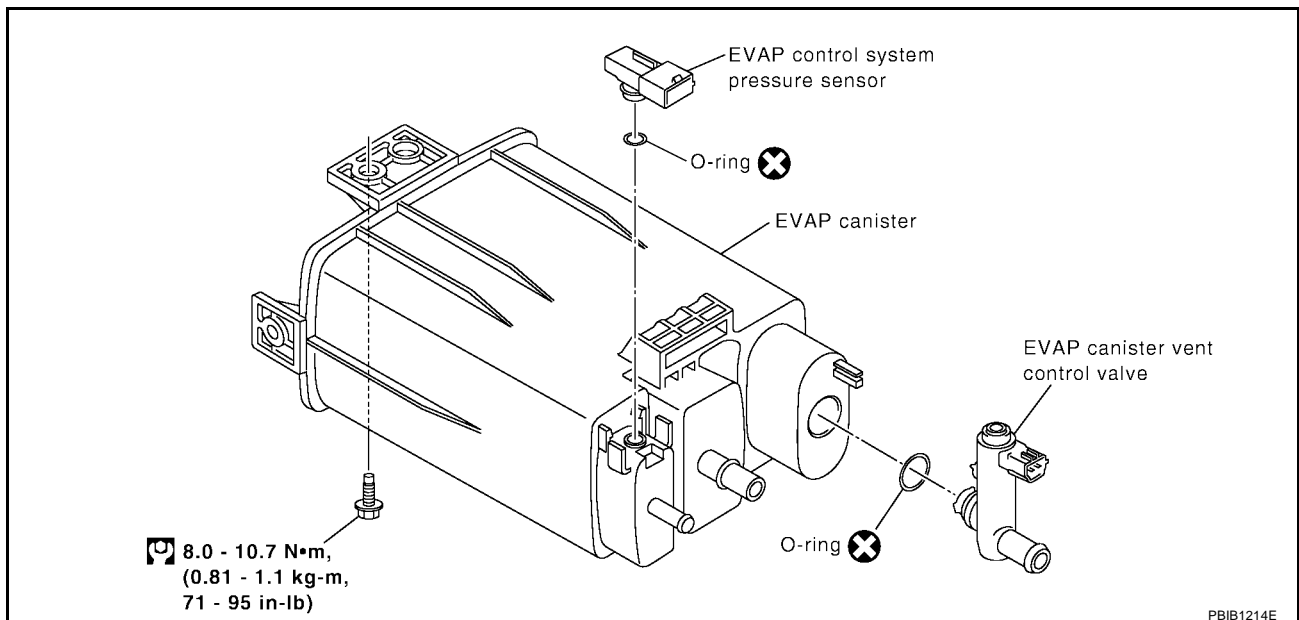
Positive pressure is delivered to the EVAP system through the EVAP service port. If fuel vapor leakage in the EVAP system occurs, use a leak detector to locate the leak.



UBS00617

### Removal and Installation EVAP CANISTER

Tighten EVAP canister as shown in the figure.

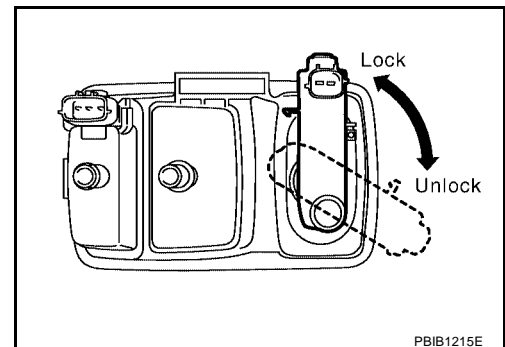


PBIB1214E

### EVAP CANISTER VENT CONTROL VALVE

1. Turn EVAP canister vent control valve counterclockwise.
2. Remove the EVAP canister vent control valve.

**Do not reuse the O-ring, replace it with a new one.**



PBIB1215E

### How to Detect Fuel Vapor Leakage

UBS00260

#### CAUTION:

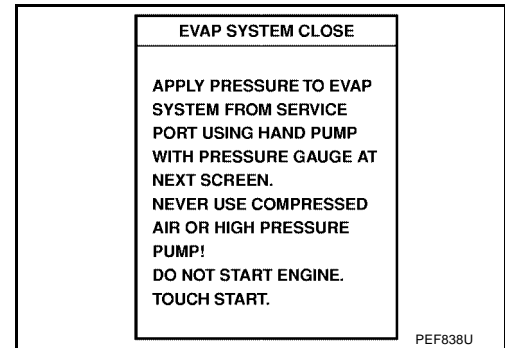
- Never use compressed air or a high pressure pump.
- Do not start engine.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in EVAP system.

#### NOTE:

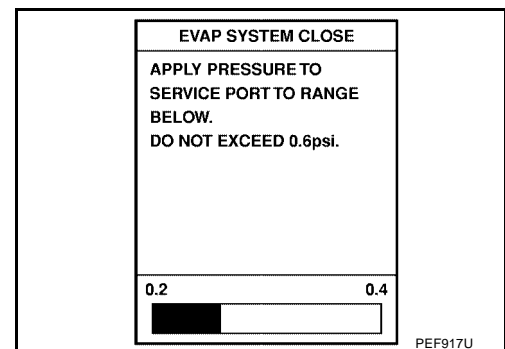
Improper installation of adapter to the service port may cause a leak.

### Ⓜ WITH CONSULT-II

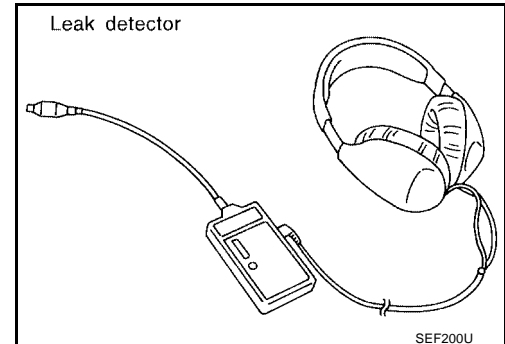
1. Attach the EVAP service port adapter securely to the EVAP service port.
2. Also attach the pressure pump and hose.
3. Turn ignition switch "ON".
4. Select the "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
5. Touch "START". A bar graph (Pressure indicating display) will appear on the screen.



6. Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
7. Remove the EVAP service port adapter and hose with pressure pump.

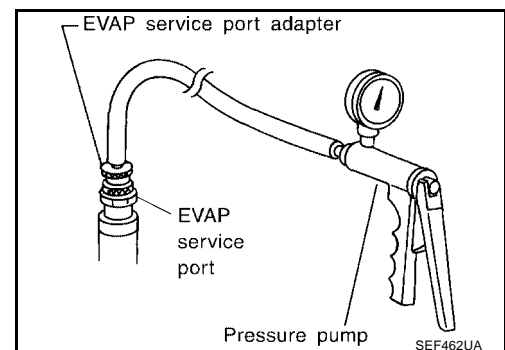


8. Locate the leak using a leak detector. Refer to [EC-1206](#), "[EVAPORATIVE EMISSION LINE DRAWING](#)".



### ⓧ WITHOUT CONSULT-II

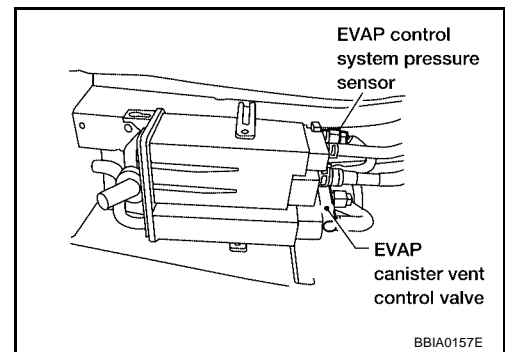
1. Attach the EVAP service port adapter securely to the EVAP service port.
2. Also attach the pressure pump with pressure gauge to the EVAP service port adapter.



# EVAPORATIVE EMISSION SYSTEM

[QG18DE (SULEV)]

3. Apply battery voltage to between the terminals of EVAP canister vent control valve to make a closed EVAP system.
4. To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm<sup>2</sup> , 0.2 to 0.4 psi).
5. Remove EVAP service port adapter and hose with pressure pump.
6. Locate the leak using a leak detector. Refer to [EC-1206, "EVAPORATIVE EMISSION LINE DRAWING"](#) .



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# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

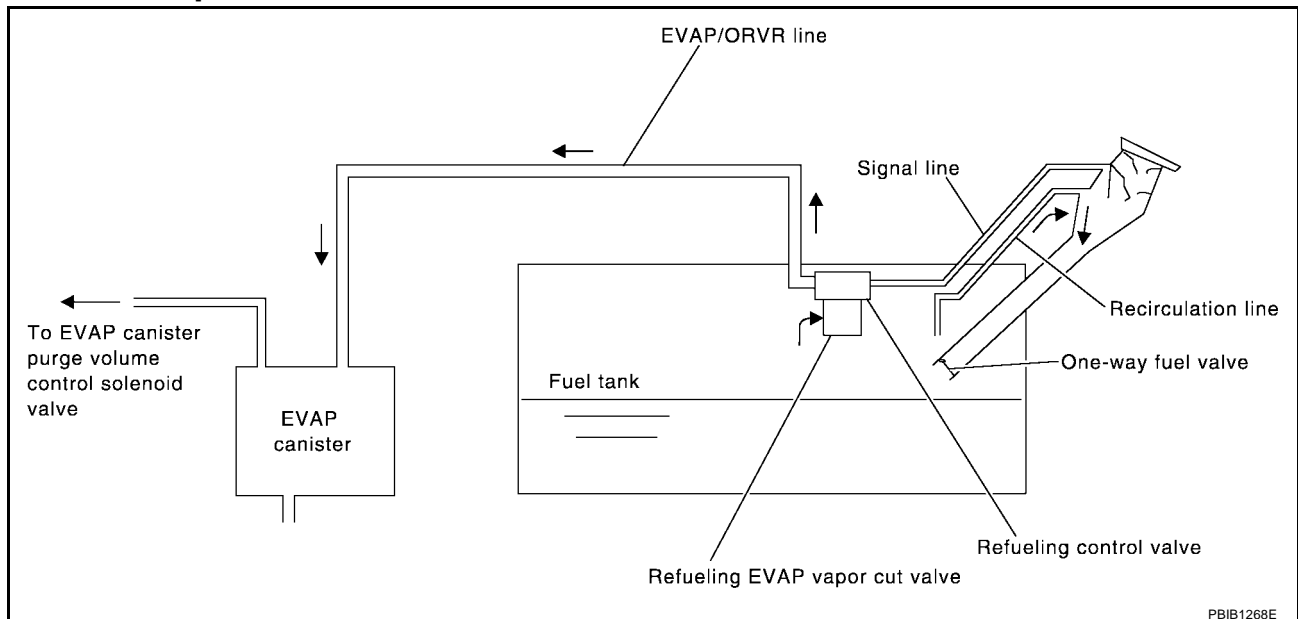
[QG18DE (SULEV)]

## ON BOARD REFUELING VAPOR RECOVERY (ORVR)

PFP:00000

### System Description

UBS00261



PBIB1268E

From the beginning of refueling, the fuel tank pressure goes up. When the pressure reaches the setting value of the refueling control valve (RCV) opening pressure, the RCV is opened. After RCV opens, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve, RCV and EVAP/ORVR line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is released to the atmosphere.

When the refueling has reached the full level of the fuel tank, the refueling EVAP vapor cut valve is closed and refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.

The RCV is always closed during driving and the evaporative emission control system is operated the same as conventional system.

#### **WARNING:**

When conducting inspections below, be sure to observe the following:

- Put a "CAUTION: FLAMMABLE" sign in workshop.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Be sure to furnish the workshop with a CO<sub>2</sub> fire extinguisher.

#### **CAUTION:**

- Before removing fuel line parts, carry out the following procedures:
  - Put drained fuel in an explosion-proof container and put lid on securely.
  - Release fuel pressure from fuel line. Refer to [EC-637, "FUEL PRESSURE RELEASE"](#).
  - Disconnect battery ground cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Do not kink or twist hose and tube when they are installed.
- Do not tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leaks at connection.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QG18DE (SULEV)]

## Diagnostic Procedure

**SYMPTOM: FUEL ODOR FROM EVAP CANISTER IS STRONG.**

UBS00262

### 1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Weigh the EVAP canister with EVAP canister vent control valve attached.  
The weight should be less than 1.9 kg (4.2 lb).

OK or NG

OK >> GO TO 2.

NG >> GO TO 3.

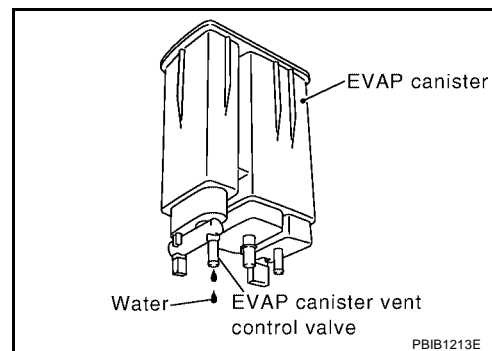
### 2. CHECK IF EVAP CANISTER SATURATED WITH WATER

Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 3.

No >> GO TO 5.



### 3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 4.

### 4. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

### 5. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-1215, "Component Inspection"](#).

OK or NG

OK >> **INSPECTION END**

NG >> Replace refueling EVAP vapor cut valve with fuel tank.

**SYMPTOM: CANNOT REFUEL/FUEL ODOR FROM THE FUEL FILLER OPENING IS STRONG WHILE REFUELING.**

### 1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Weigh the EVAP canister with EVAP canister vent control valve attached.  
The weight should be less than 1.9 kg (4.2 lb).

OK or NG

OK >> GO TO 2.

NG >> GO TO 3.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

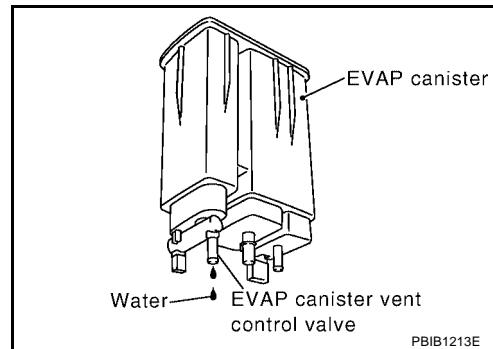
[QG18DE (SULEV)]

## 2. CHECK IF EVAP CANISTER SATURATED WITH WATER

Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 3.
- No >> GO TO 5.



## 3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 4.

## 4. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

## 5. CHECK VENT HOSES AND VENT TUBES

Check hoses and tubes between EVAP canister and refueling control valve for clogging, kink, looseness and improper connection.

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace hoses and tubes.

## 6. CHECK FILLER NECK TUBE

Check signal line and recirculation line for clogging, dents and cracks.

OK or NG

- OK >> GO TO 7.
- NG >> Replace filler neck tube.

## 7. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-1215, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace refueling EVAP vapor cut valve with fuel tank.

## 8. CHECK FUEL FILLER TUBE

Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.

OK or NG

- OK >> GO TO 9.
- NG >> Replace fuel filler tube.

**9. CHECK ONE-WAY FUEL VALVE-I**

Check one-way valve for clogging.

OK or NG

OK >> GO TO 10.

NG >> Repair or replace one-way fuel valve with fuel tank.

**10. CHECK ONE-WAY FUEL VALVE-II**

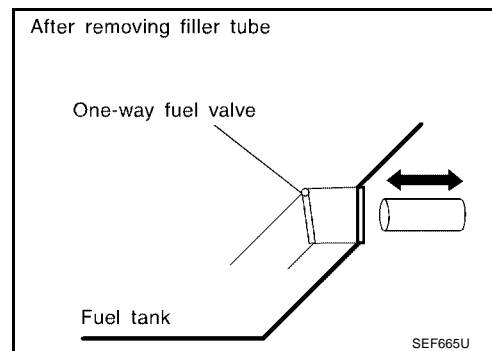
1. Make sure that fuel is drained from the tank.
2. Remove fuel filler tube and hose.
3. Check one-way fuel valve for operation as follows.  
When a stick is inserted, the valve should open, when removing stick it should close.

**Do not drop any material into the tank.**

OK or NG

OK >> **INSPECTION END**

NG >> Replace fuel filler tube or replace one-way fuel valve with fuel tank.



UBS00618

### Component Inspection

#### REFUELING EVAP VAPOR CUT VALVE

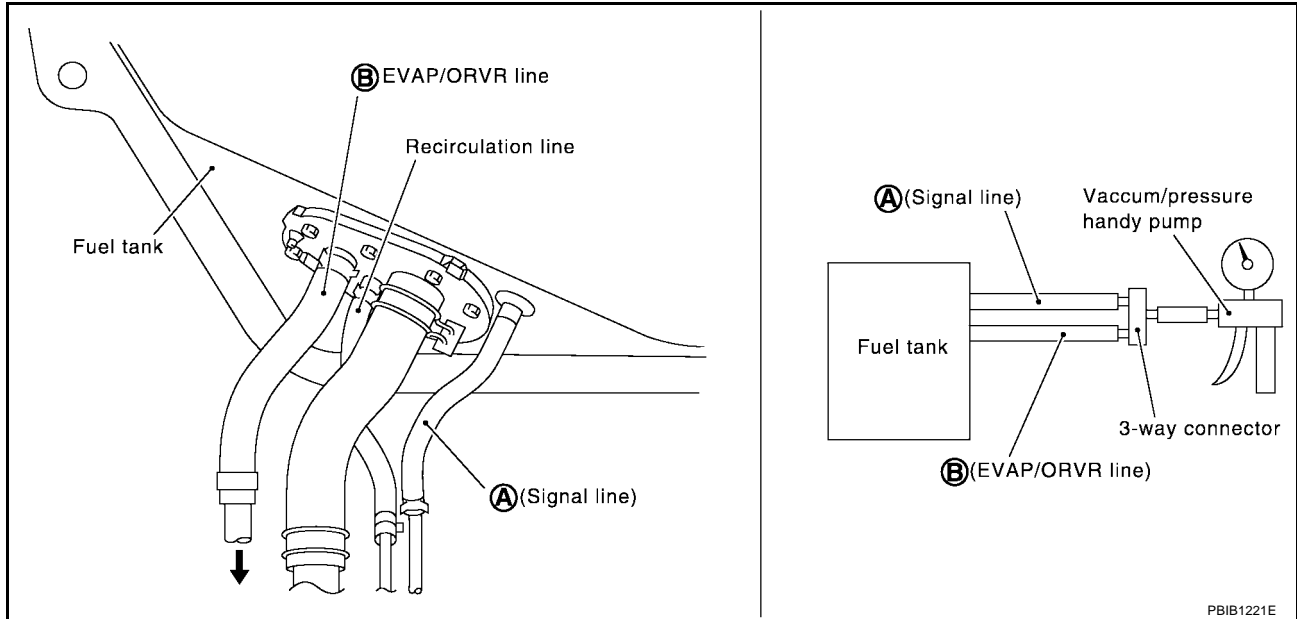
##### Ⓟ With CONSULT-II

1. Remove fuel tank. Refer to [FL-7, "Removal and Installation"](#).
2. Drain fuel from the tank as follows:
  - Remove fuel feed hose located on the fuel level sensor unit retainer.
  - Connect a spare fuel hose, one side to fuel level sensor unit retainer where the hose was removed and the other side to a fuel container.
  - Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-II.
3. Check refueling EVAP vapor cut valve for being stuck closed as follows.  
Blow air into the refueling EVAP vapor cut valve (from hose end **B**), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck open as follows.
  - Connect vacuum pump to hose ends **A** and **B** using a suitable 3-way connector.
  - Remove fuel level sensor unit retainer with fuel level sensor unit.
  - Always replace O-ring with new one.**
  - Put fuel tank upside down.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QG18DE (SULEV)]

- Apply vacuum pressure to both hose ends **A** and **B** [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit retainer remaining open and check that the pressure is applicable.



PBIB1221E

## ⊗ Without CONSULT-II

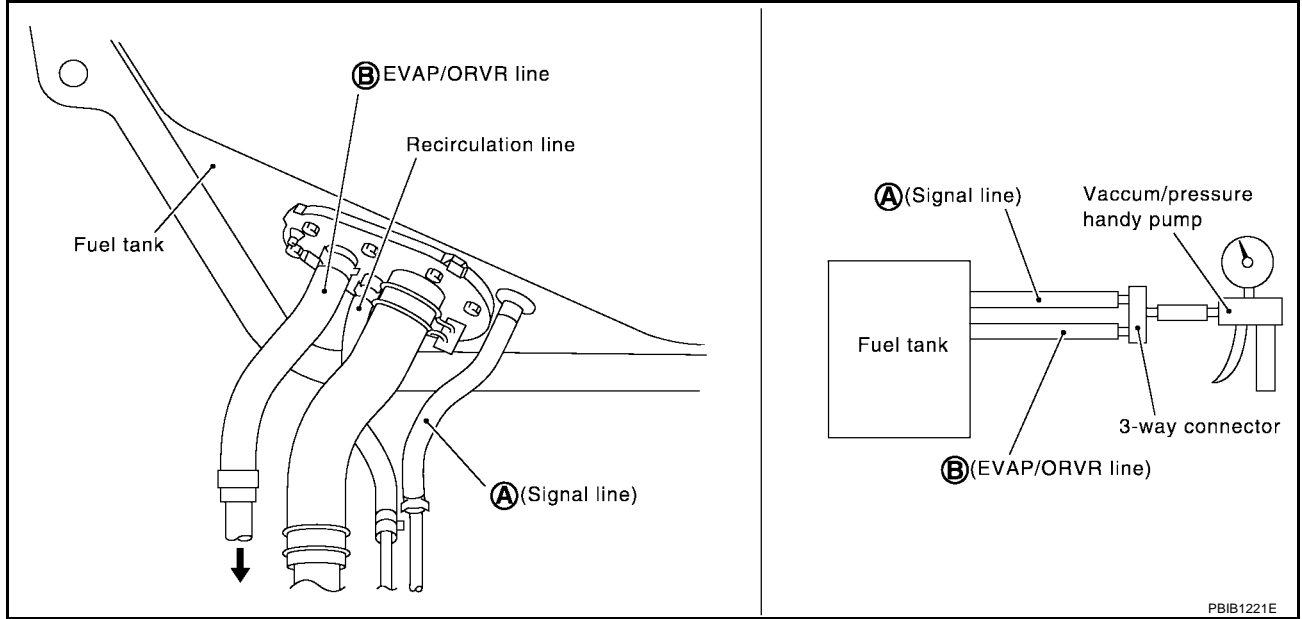
1. Remove fuel tank. Refer to [FL-7, "Removal and Installation"](#).
2. Drain fuel from the tank as follows:
  - Remove fuel level sensor unit retainer.
  - Drain fuel from the tank using a handy pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck closed as follows. Blow air into the refueling EVAP vapor cut valve (from hose end **B**), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck open as follows.
  - Connect vacuum pump to hose ends **A** and **B** using a suitable 3-way connector.
  - Remove fuel level sensor unit retainer with fuel level sensor unit.  
**Always replace O-ring with new one.**
  - Put fuel tank upside down.



# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QG18DE (SULEV)]

- Apply vacuum pressure to both hose ends **A** and **B** [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit retainer remaining open and check that the pressure is applicable.



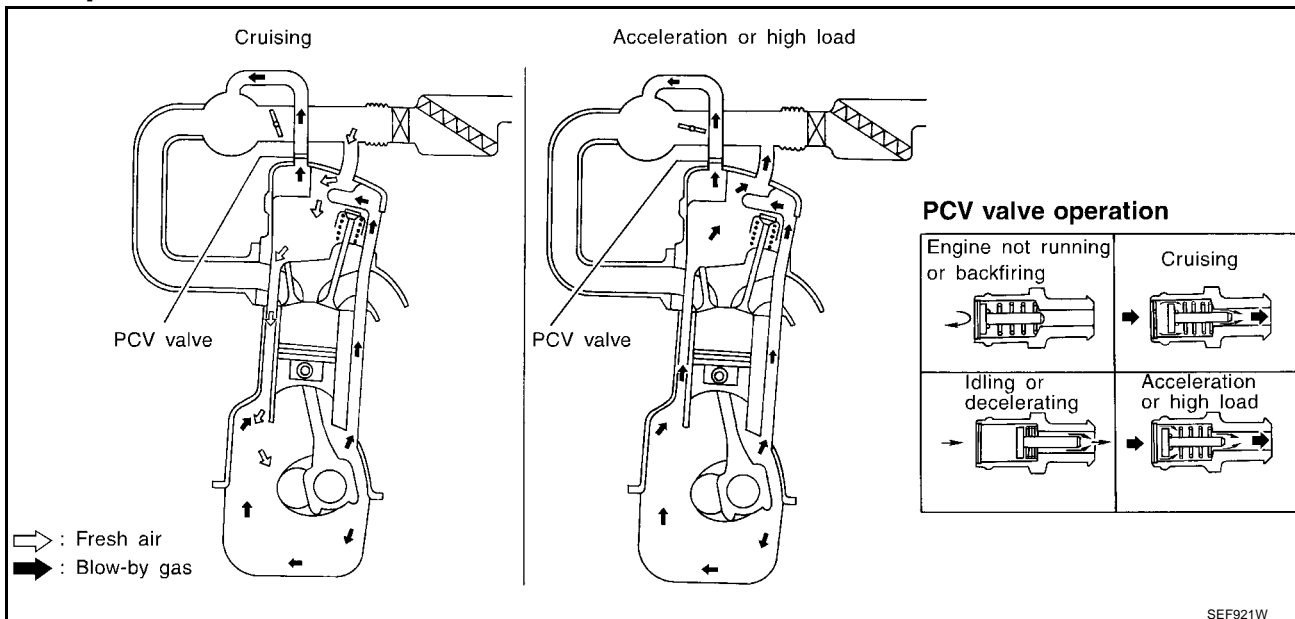
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POSITIVE CRANKCASE VENTILATION

PF1:11810

Description

UBS00263



SEF921W

This system returns blow-by gas to the intake collector.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.

The ventilating air is then drawn from the air duct into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.

Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

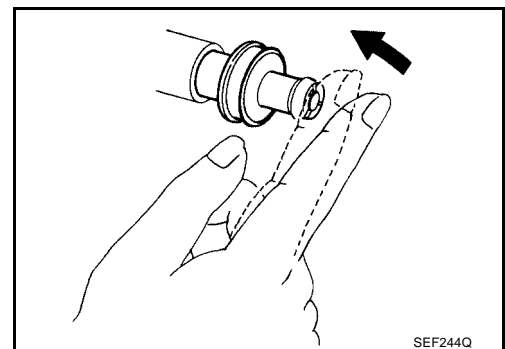
On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the intake collector under all conditions.

Component Inspection

PCV (POSITIVE CRANKCASE VENTILATION) VALVE

UBS00264

With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over the valve inlet.



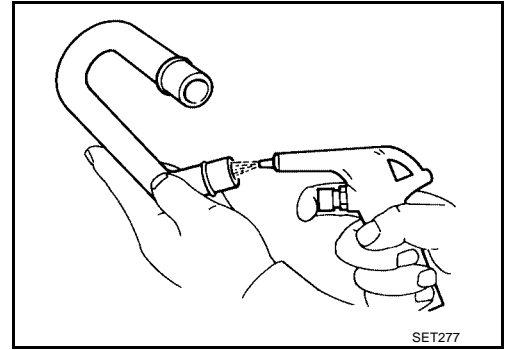
SEF244Q

# POSITIVE CRANKCASE VENTILATION

[QG18DE (SULEV)]

## VENTILATION HOSE

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace.



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# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[QG18DE (SULEV)]

## AUTOMATIC SPEED CONTROL DEVICE (ASCD)

PF1:18930

### System Description INPUT/OUTPUT SIGNAL CHART

UBS006C1

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation	ASCD vehicle speed control	Electric throttle control actuator
Stop lamp switch	Brake pedal operation		
ASCD clutch switch (M/T models)	Clutch pedal operation		
ASCD steering switch	ASCD steering switch operation		
Park/Neutral position (PNP) switch (A/T models)	Gear position		
Combination meter	Vehicle speed		
TCM	Powertrain revolution		

### BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.

Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH).

ECM controls throttle angle of electric throttle control actuator to regulate engine speed.

Operation status of ASCD is indicated by CRUISE indicator and SET indicator in combination meter. If any malfunction occurs in ASCD system, it automatically deactivates control.

### SET OPERATION

Press ASCD CRUISE switch (Main switch). (The CRUISE indicator in combination meter illuminates.)

When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH), press SET switch. (Then SET indicator in combination meter illuminates.)

### ACCEL OPERATION

If the RESUME/ACCEL switch is depressed during cruise control driving, increase the vehicle speed until the switch is released or vehicle speed reaches maximum speed controlled by the system.

And then ASCD will keep the new set speed.

### CANCEL OPERATION

When any of following conditions exist, cruise operation will be canceled.

- CANCEL switch is depressed
- More than 2 switches at ASCD steering switch are depressed at the same time (Set speed will be cleared.).
- Brake pedal is depressed
- Clutch pedal is depressed or gear position is changed to the neutral position (M/T models)
- Selector lever is changed to "N", "P", "R" position (A/T models).
- Vehicle speed decreased to 13 km/h (8 MPH) lower than the set speed

When the ECM detects any of the following conditions, the ECM will cancel the cruise operation and inform the driver by blinking indicator lamp.

- Engine coolant temperature is slightly higher than the normal operating temperature: CRUISE lamp may blink slowly.  
When the engine coolant temperature decreases to the normal operating temperature, CRUISE lamp will stop blinking and the cruise operation will be able to work by depressing SET switch or RESUME switch.
- Malfunction for some self-diagnoses regarding ASCD control: SET lamp will blink quickly.

If MAIN switch is turned to OFF during ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

### COAST OPERATION

When the SET/COAST switch is depressed during cruise control driving, decrease vehicle set speed until the switch is released. And then ASCD will keep the new set speed.

# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[QG18DE (SULEV)]

## RESUME OPERATION

When the RESUME/ACCEL switch is depressed after cancel operation other than depressing MAIN switch is performed, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must meet following conditions.

- Brake pedal is released.
- Clutch pedal is released (M/T models)
- A/T selector lever is in other than P and N position (A/T models)
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 144 km/h (89 MPH)

## Component Description

### ASCD STEERING SWITCH

Refer to [EC-1095](#) .

### ASCD BRAKE SWITCH

Refer to [EC-1119](#) , and [EC-1123](#) .

### ASCD CLUTCH SWITCH

Refer to [EC-1102](#) and [EC-1111](#) .

### STOP LAMP SWITCH

Refer to [EC-1102](#) , [EC-1119](#) and [EC-1192](#) .

### ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EC-952](#) , [EC-954](#) , [EC-961](#) and [EC-966](#) .

### ASCD INDICATOR

Refer to [EC-1201](#) .

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# SERVICE DATA AND SPECIFICATIONS (SDS)

[QG18DE (SULEV)]

## SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

### Fuel Pressure

UBS00265

Fuel pressure at idling kPa (kg/cm <sup>2</sup> , psi)	Approximately 350 (3.57, 51)
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### Idle Speed and Ignition Timing

UBS00266

Target idle speed rpm (Engine is warmed up to normal operating temperature)	No-load*1	A/T: 800 ± 50 rpm (in "P" or "N" position) M/T: 650 ± 50 rpm
Air conditioner: ON rpm		850 or more
Ignition timing		A/T: 18° ± 5° BTDC M/T: 7° ± 5° BTDC
Throttle position sensor idle position V		0.15 - 0.85

\*1: Under the following conditions:

- Air conditioner switch: OFF
- Electrical load: OFF (Lights & rear window defogger)
- Steering wheel: Kept in straight-ahead position

### Mass Air Flow Sensor

UBS00267

Supply voltage V	Battery voltage (11 - 14)
Output voltage V	1.0 - 1.7
Mass air flow (Using CONSULT-II or GST) g-m/sec	1.4 - 4.0 at idle* 5.0 - 10.0 at 2,500 rpm*

\*: Engine is warmed up to normal operating temperature and idling under no-load.

### Engine Coolant Temperature Sensor

UBS00268

Temperature °C (°F)	Resistance kΩ
25 (77)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

### Fuel Pump

UBS0026A

Resistance [at 25°C (77°F)] Ω	0.2 - 5.0
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### Injector

UBS0026C

Resistance [at 20°C (68°F)] Ω	13.5 - 17.5
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### Resistor

UBS006IW

Resistance [at 25°C (77°F)] Ω	4 - 8
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### Throttle Control Motor

UBS006J4

Resistance [at 25°C (77°F)]	Approximately 1 - 15Ω
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### Air Fuel Ratio (A/F) Sensor 1 Heater

UBS0026F

Resistance [at 25°C (77°F)] Ω	2.3 - 4.3
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# SERVICE DATA AND SPECIFICATIONS (SDS)

[QG18DE (SULEV)]

## Calculated Load Value

UBS0026G

	Calculated load value % (Using CONSULT-II or GST)
At idle	20.0 - 35.5
At 2,500 rpm	17.0 - 30.0

## Intake Air Temperature Sensor

UBS0026H

Temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

## Heated Oxygen Sensor 2 Heater

UBS0026J

Resistance [at 25°C (77°F)] Ω	2.3 - 4.3
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## Crankshaft Position Sensor (POS)

UBS0026K

Resistance [at 20°C (68°F)] Ω	166 - 204
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## Fuel Tank Temperature Sensor

UBS0026L

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

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[QR25DE]

PFP:00024

UBS0026N

## INDEX FOR DTC

### Alphabetical Index

**NOTE:**

If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-1350, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

x: Applicable —: Not applicable

Items (CONSULT-II screen terms)	DTC*1		Trip	MIL lighting up	Reference page
	CONSULT-II GST*2	ECM*3			
A/T 1ST GR FNCTN	P0731	0731	2	×	<a href="#">AT-512</a>
A/T 2ND GR FNCTN	P0732	0732	2	×	<a href="#">AT-517</a>
A/T 3RD GR FNCTN	P0733	0733	2	×	<a href="#">AT-522</a>
A/T 4TH GR FNCTN	P0734	0734	2	×	<a href="#">AT-527</a>
A/T TCC S/V FNCTN	P0744	0744	2	×	<a href="#">AT-539</a>
APP SEN 1/CIRC	P2122	2122	1	×	<a href="#">EC-1751</a>
APP SEN 1/CIRC	P2123	2123	1	×	<a href="#">EC-1751</a>
APP SEN 2/CIRC	P2127	2127	1	×	<a href="#">EC-1757</a>
APP SEN 2/CIRC	P2128	2128	1	×	<a href="#">EC-1757</a>
APP SENSOR	P2138	2138	1	×	<a href="#">EC-1770</a>
ASCD BRAKE SW	P1572	1572	1	—	<a href="#">EC-1730</a>
ASCD SW	P1564	1564	1	—	<a href="#">EC-1723</a>
ASCD VHL SPD SEN	P1574	1574	1	—	<a href="#">EC-1740</a>
ATF TEMP SEN/CIRC	P0710	0710	2	×	<a href="#">AT-497</a>
BRAKE SW/CIRCUIT	P1805	1805	2	—	<a href="#">EC-1746</a>
CAN COMM CIRCUIT	U1000	1000*5	1	×	<a href="#">EC-1350</a>
CAN COMM CIRCUIT	U1001	1001*5	2	—	<a href="#">EC-1350</a>
CKP SEN/CIRCUIT	P0335	0335	2	×	<a href="#">EC-1490</a>
CLOSED LOOP-B1	P1148	1148	1	×	<a href="#">EC-1649</a>
CMP SEN/CIRC-B1	P0340	0340	2	×	<a href="#">EC-1496</a>
CTP LEARNING	P1225	1225	2	—	<a href="#">EC-1664</a>
CTP LEARNING	P1226	1226	2	—	<a href="#">EC-1666</a>
CYL 1 MISFIRE	P0301	0301	2	×	<a href="#">EC-1481</a>
CYL 2 MISFIRE	P0302	0302	2	×	<a href="#">EC-1481</a>
CYL 3 MISFIRE	P0303	0303	2	×	<a href="#">EC-1481</a>
CYL 4 MISFIRE	P0304	0304	2	×	<a href="#">EC-1481</a>
ECM	P0605	0605	1 or 2	× or —	<a href="#">EC-1583</a>
ECM BACK UP/CIRC	P1065	1065	2	×	<a href="#">EC-1590</a>
ECT SEN/CIRCUIT	P0117	0117	1	×	<a href="#">EC-1386</a>
ECT SEN/CIRCUIT	P0118	0118	1	×	<a href="#">EC-1386</a>
ECT SENSOR	P0125	0125	1	×	<a href="#">EC-1398</a>
ENG OVER TEMP	P0217	0217	1	×	<a href="#">EC-1461</a>
ENG OVER TEMP	P1217	1217	1	×	<a href="#">EC-1651</a>
ENGINE SPEED SIG	P0725	0725	2	×	<a href="#">AT-508</a>
ETC ACTR	P1121	1121	1 or 2	×	<a href="#">EC-1604</a>
ETC FUNCTION/CIRC	P1122	1122	1	×	<a href="#">EC-1606</a>
ETC MOT	P1128	1128	1	×	<a href="#">EC-1618</a>



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[QR25DE]

Items (CONSULT-II screen terms)	DTC*1		Trip	MIL lighting up	Reference page
	CONSULT-II GST*2	ECM*3			
ETC MOT PWR	P1124	1124	1	×	<a href="#">EC-1613</a>
ETC MOT PWR	P1126	1126	1	×	<a href="#">EC-1613</a>
EVAP GROSS LEAK	P0455	0455	2	×	<a href="#">EC-1547</a>
EVAP PURG FLOW/MON	P0441	0441	2	×	<a href="#">EC-1507</a>
EVAP SMALL LEAK	P0442	0442	2	×	<a href="#">EC-1513</a>
EVAP SYS PRES SEN	P0452	0452	2	×	<a href="#">EC-1534</a>
EVAP SYS PRES SEN	P0453	0453	2	×	<a href="#">EC-1540</a>
EVAP VERY SML LEAK	P0456	0456	2	×	<a href="#">EC-1555</a>
EVAP VERY SML LEAK	P1456	1456	2	×	<a href="#">EC-1695</a>
FTT SEN/CIRCUIT	P0182	0182	2	×	<a href="#">EC-1457</a>
FTT SEN/CIRCUIT	P0183	0183	2	×	<a href="#">EC-1457</a>
FTT SENSOR	P0181	0181	2	×	<a href="#">EC-1455</a>
FUEL LEV SEN SLOSH	P0460	0460	2	×	<a href="#">EC-1564</a>
FUEL LEVEL SEN/CIRC	P1464	1464	2	×	<a href="#">EC-1704</a>
FUEL LEVEL SENSOR	P0461	0461	2	×	<a href="#">EC-1569</a>
FUEL LEVL SEN/CIRC	P0462	0462	2	×	<a href="#">EC-1571</a>
FUEL LEVL SEN/CIRC	P0463	0463	2	×	<a href="#">EC-1571</a>
FUEL SYS-LEAN-B1	P0171	0171	2	×	<a href="#">EC-1442</a>
FUEL SYS-RICH-B1	P0172	0172	2	×	<a href="#">EC-1449</a>
HO2S1 (B1)	P0132	0132	2	×	<a href="#">EC-1406</a>
HO2S1 (B1)	P0133	0133	2	×	<a href="#">EC-1412</a>
HO2S1 (B1)	P0134	0134	2	×	<a href="#">EC-1421</a>
HO2S1 (B1)	P1143	1143	2	×	<a href="#">EC-1623</a>
HO2S1 (B1)	P1144	1144	2	×	<a href="#">EC-1629</a>
HO2S1 HTR (B1)	P0031	0031	2	×	<a href="#">EC-1356</a>
HO2S1 HTR (B1)	P0032	0032	2	×	<a href="#">EC-1356</a>
HO2S2 (B1)	P0138	0138	2	×	<a href="#">EC-1428</a>
HO2S2 (B1)	P0139	0139	2	×	<a href="#">EC-1435</a>
HO2S2 (B1)	P1146	1146	2	×	<a href="#">EC-1635</a>
HO2S2 (B1)	P1147	1147	2	×	<a href="#">EC-1642</a>
HO2S2 HTR (B1)	P0037	0037	2	×	<a href="#">EC-1362</a>
HO2S2 HTR (B1)	P0038	0038	2	×	<a href="#">EC-1362</a>
IAT SEN/CIRCUIT	P0112	0112	2	×	<a href="#">EC-1381</a>
IAT SEN/CIRCUIT	P0113	0113	2	×	<a href="#">EC-1381</a>
IAT SENSOR	P0127	0127	2	×	<a href="#">EC-1401</a>
INT/V TIM CONT-B1	P0011	0011	2	×	<a href="#">EC-1353</a>
INT/V TIM V/CIR-B1	P1111	1111	2	×	<a href="#">EC-1600</a>
ISC SYSTEM	P0506	0506	2	×	<a href="#">EC-1579</a>
ISC SYSTEM	P0507	0507	2	×	<a href="#">EC-1581</a>
KNOCK SEN/CIRC-B1	P0327	0327	2	—	<a href="#">EC-1486</a>
KNOCK SEN/CIRC-B1	P0328	0328	2	—	<a href="#">EC-1486</a>
L/PRESS SOL/CIRC	P0745	0745	2	×	<a href="#">AT-547</a>

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# INDEX FOR DTC

[QR25DE]

Items (CONSULT-II screen terms)	DTC*1		Trip	MIL lighting up	Reference page
	CONSULT-II GST*2	ECM*3			
MAF SEN/CIRCUIT	P0101	0101	1	×	<a href="#">EC-1368</a>
MAF SEN/CIRCUIT	P0102	0102	1	×	<a href="#">EC-1375</a>
MAF SEN/CIRCUIT	P0103	0103	1	×	<a href="#">EC-1375</a>
MAF SENSOR	P1102	1102	1	×	<a href="#">EC-1594</a>
MIL/CIRC	P0650	0650	2	—	<a href="#">EC-1586</a>
MULTI CYL MISFIRE	P0300	0300	2	×	<a href="#">EC-1481</a>
NATS MALFUNCTION	P1610 - P1615	1610 - 1615	2	—	<a href="#">EC-1275</a>
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	No DTC	Flashing*4	—	Flashing*4	<a href="#">EC-1276</a>
<b>NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.</b>	<b>P0000</b>	<b>0000</b>	—	—	—
O/R CLTCH SOL/CIRC	P1760	1760	2	×	<a href="#">AT-568</a>
P-N POS SW/CIRCUIT	P1706	1706	2	×	<a href="#">EC-1742</a>
PNP SW/CIRC	P0705	0705	2	×	<a href="#">AT-491</a>
PURG VOLUME CONT/V	P0444	0444	2	×	<a href="#">EC-1521</a>
PURG VOLUME CONT/V	P0445	0445	2	×	<a href="#">EC-1521</a>
PURG VOLUME CONT/V	P1444	1444	2	×	<a href="#">EC-1672</a>
SENSOR POWER/CIRC	P1229	1229	1	×	<a href="#">EC-1668</a>
SFT SOL A/CIRC	P0750	0750	1	×	<a href="#">AT-553</a>
SFT SOL B/CIRC	P0755	0755	1	×	<a href="#">AT-558</a>
TCC SOLENOID/CIRC	P0740	0740	2	×	<a href="#">AT-534</a>
THERMSTAT FNCTN	P0128	0128	2	×	<a href="#">EC-1404</a>
TP SEN 1/CIRC	P0222	0222	1	×	<a href="#">EC-1475</a>
TP SEN 1/CIRC	P0223	0223	1	×	<a href="#">EC-1475</a>
TP SEN 2/CIRC	P0122	0122	1	×	<a href="#">EC-1391</a>
TP SEN 2/CIRC	P0123	0123	1	×	<a href="#">EC-1391</a>
TP SENSOR	P2135	2135	1	×	<a href="#">EC-1763</a>
TPV SEN/CIRC A/T	P1705	1705	1	×	<a href="#">AT-563</a>
TW CATALYST SYS-B1	P0420	0420	2	×	<a href="#">EC-1502</a>
VC CUT/V BYPASS/V	P1491	1491	2	×	<a href="#">EC-1714</a>
VC/V BYPASS/V	P1490	1490	2	×	<a href="#">EC-1707</a>
VEH SPD SEN/CIR AT*6	P0720	0720	2	×	<a href="#">AT-503</a>
VEH SPEED SEN/CIRC*6	P0500	0500	2	×	<a href="#">EC-1575</a>
VENT CONTROL VALVE	P0447	0447	2	×	<a href="#">EC-1527</a>
VENT CONTROL VALVE	P1446	1446	2	×	<a href="#">EC-1680</a>
VENT CONTROL VALVE	P1448	1448	2	×	<a href="#">EC-1687</a>

\*1: 1st trip DTC No. is the same as DTC No.

\*2: These numbers are prescribed by SAE J2012.

\*3: In Diagnostic Test Mode II (Self-diagnostic results), these numbers are controlled by NISSAN.

\*4: When engine is running.

\*5: The troubleshooting for this DTC needs CONSULT-II.

\*6: When the fail-safe operations for both self-diagnoses occur, the MIL illuminates.

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UBS00260

## DTC No. Index

**NOTE:**

If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-1350, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).

×: Applicable —: Not applicable

DTC*1		Items (CONSULT-II screen terms)	Trip	MIL lighting up	Reference page
CONSULT-II GST*2	ECM*3				
No DTC	Flashing*4	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	—	Flashing*4	<a href="#">EC-1276</a>
U1000	1000*5	CAN COMM CIRCUIT	1	×	<a href="#">EC-1350</a>
U1001	1001*5	CAN COMM CIRCUIT	2	—	<a href="#">EC-1350</a>
<b>P0000</b>	<b>0000</b>	<b>NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.</b>	—	—	—
P0011	0011	INT/V TIM CONT-B1	2	×	<a href="#">EC-1353</a>
P0031	0031	HO2S1 HTR (B1)	2	×	<a href="#">EC-1356</a>
P0032	0032	HO2S1 HTR (B1)	2	×	<a href="#">EC-1356</a>
P0037	0037	HO2S2 HTR (B1)	2	×	<a href="#">EC-1362</a>
P0038	0038	HO2S2 HTR (B1)	2	×	<a href="#">EC-1362</a>
P0101	0101	MAF SEN/CIRCUIT	1	×	<a href="#">EC-1368</a>
P0102	0102	MAF SEN/CIRCUIT	1	×	<a href="#">EC-1375</a>
P0103	0103	MAF SEN/CIRCUIT	1	×	<a href="#">EC-1375</a>
P0112	0112	IAT SEN/CIRCUIT	2	×	<a href="#">EC-1381</a>
P0113	0113	IAT SEN/CIRCUIT	2	×	<a href="#">EC-1381</a>
P0117	0117	ECT SEN/CIRCUIT	1	×	<a href="#">EC-1386</a>
P0118	0118	ECT SEN/CIRCUIT	1	×	<a href="#">EC-1386</a>
P0122	0122	TP SEN 2/CIRC	1	×	<a href="#">EC-1391</a>
P0123	0123	TP SEN 2/CIRC	1	×	<a href="#">EC-1391</a>
P0125	0125	ECT SENSOR	1	×	<a href="#">EC-1398</a>
P0127	0127	IAT SENSOR	2	×	<a href="#">EC-1401</a>
P0128	0128	THERMSTAT FNCTN	2	×	<a href="#">EC-1404</a>
P0132	0132	HO2S1 (B1)	2	×	<a href="#">EC-1406</a>
P0133	0133	HO2S1 (B1)	2	×	<a href="#">EC-1412</a>
P0134	0134	HO2S1 (B1)	2	×	<a href="#">EC-1421</a>
P0138	0138	HO2S2 (B1)	2	×	<a href="#">EC-1428</a>
P0139	0139	HO2S2 (B1)	2	×	<a href="#">EC-1435</a>
P0171	0171	FUEL SYS-LEAN-B1	2	×	<a href="#">EC-1442</a>
P0172	0172	FUEL SYS-RICH-B1	2	×	<a href="#">EC-1449</a>
P0181	0181	FTT SENSOR	2	×	<a href="#">EC-1455</a>
P0182	0182	FTT SEN/CIRCUIT	2	×	<a href="#">EC-1457</a>
P0183	0183	FTT SEN/CIRCUIT	2	×	<a href="#">EC-1457</a>
P0217	0217	ENG OVER TEMP	1	×	<a href="#">EC-1461</a>
P0222	0222	TP SEN 1/CIRC	1	×	<a href="#">EC-1475</a>
P0223	0223	TP SEN 1/CIRC	1	×	<a href="#">EC-1475</a>
P0300	0300	MULTI CYL MISFIRE	2	×	<a href="#">EC-1481</a>

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DTC*1		Items (CONSULT-II screen terms)	Trip	MIL lighting up	Reference page
CONSULT-II GST*2	ECM*3				
P0301	0301	CYL 1 MISFIRE	2	×	<a href="#">EC-1481</a>
P0302	0302	CYL 2 MISFIRE	2	×	<a href="#">EC-1481</a>
P0303	0303	CYL 3 MISFIRE	2	×	<a href="#">EC-1481</a>
P0304	0304	CYL 4 MISFIRE	2	×	<a href="#">EC-1481</a>
P0327	0327	KNOCK SEN/CIRC-B1	2	—	<a href="#">EC-1486</a>
P0328	0328	KNOCK SEN/CIRC-B1	2	—	<a href="#">EC-1486</a>
P0335	0335	CKP SEN/CIRCUIT	2	×	<a href="#">EC-1490</a>
P0340	0340	CMP SEN/CIRC-B1	2	×	<a href="#">EC-1496</a>
P0420	0420	TW CATALYST SYS-B1	2	×	<a href="#">EC-1502</a>
P0441	0441	EVAP PURG FLOW/MON	2	×	<a href="#">EC-1507</a>
P0442	0442	EVAP SMALL LEAK	2	×	<a href="#">EC-1513</a>
P0444	0444	PURG VOLUME CONT/V	2	×	<a href="#">EC-1521</a>
P0445	0445	PURG VOLUME CONT/V	2	×	<a href="#">EC-1521</a>
P0447	0447	VENT CONTROL VALVE	2	×	<a href="#">EC-1527</a>
P0452	0452	EVAP SYS PRES SEN	2	×	<a href="#">EC-1534</a>
P0453	0453	EVAP SYS PRES SEN	2	×	<a href="#">EC-1540</a>
P0455	0455	EVAP GROSS LEAK	2	×	<a href="#">EC-1547</a>
P0456	0456	EVAP VERY SML LEAK	2	×	<a href="#">EC-1555</a>
P0460	0460	FUEL LEV SEN SLOSH	2	×	<a href="#">EC-1564</a>
P0461	0461	FUEL LEVEL SENSOR	2	×	<a href="#">EC-1569</a>
P0462	0462	FUEL LEVL SEN/CIRC	2	×	<a href="#">EC-1571</a>
P0463	0463	FUEL LEVL SEN/CIRC	2	×	<a href="#">EC-1571</a>
P0500	0500	VEH SPEED SEN/CIRC*6	2	×	<a href="#">EC-1575</a>
P0506	0506	ISC SYSTEM	2	×	<a href="#">EC-1579</a>
P0507	0507	ISC SYSTEM	2	×	<a href="#">EC-1581</a>
P0605	0605	ECM	1 or 2	× or —	<a href="#">EC-1583</a>
P0650	0650	MIL/CIRC	2	—	<a href="#">EC-1586</a>
P0705	0705	PNP SW/CIRC	2	×	<a href="#">AT-491</a>
P0710	0710	ATF TEMP SEN/CIRC	2	×	<a href="#">AT-497</a>
P0720	0720	VEH SPD SEN/CIR AT*6	2	×	<a href="#">AT-503</a>
P0725	0725	ENGINE SPEED SIG	2	×	<a href="#">AT-508</a>
P0731	0731	A/T 1ST GR FNCTN	2	×	<a href="#">AT-512</a>
P0732	0732	A/T 2ND GR FNCTN	2	×	<a href="#">AT-517</a>
P0733	0733	A/T 3RD GR FNCTN	2	×	<a href="#">AT-522</a>
P0734	0734	A/T 4TH GR FNCTN	2	×	<a href="#">AT-527</a>
P0740	0740	TCC SOLENOID/CIRC	2	×	<a href="#">AT-534</a>
P0744	0744	A/T TCC S/V FNCTN	2	×	<a href="#">AT-539</a>
P0745	0745	L/PRESS SOL/CIRC	2	×	<a href="#">AT-547</a>
P0750	0750	SFT SOL A/CIRC	1	×	<a href="#">AT-553</a>
P0755	0755	SFT SOL B/CIRC	1	×	<a href="#">AT-558</a>
P1065	1065	ECM BACK UP/CIRC	2	×	<a href="#">EC-1590</a>
P1102	1102	MAF SENSOR	1	×	<a href="#">EC-1594</a>

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DTC*1		Items (CONSULT-II screen terms)	Trip	MIL lighting up	Reference page
CONSULT-II GST*2	ECM*3				
P1111	1111	INT/V TIM V/CIR-B1	2	×	<a href="#">EC-1600</a>
P1121	1121	ETC ACTR	1 or 2	×	<a href="#">EC-1604</a>
P1122	1122	ETC FUNCTION/CIRC	1	×	<a href="#">EC-1606</a>
P1124	1124	ETC MOT PWR	1	×	<a href="#">EC-1613</a>
P1126	1126	ETC MOT PWR	1	×	<a href="#">EC-1613</a>
P1128	1128	ETC MOT	1	×	<a href="#">EC-1618</a>
P1143	1143	HO2S1 (B1)	2	×	<a href="#">EC-1623</a>
P1144	1144	HO2S1 (B1)	2	×	<a href="#">EC-1629</a>
P1146	1146	HO2S2 (B1)	2	×	<a href="#">EC-1635</a>
P1147	1147	HO2S2 (B1)	2	×	<a href="#">EC-1642</a>
P1148	1148	CLOSED LOOP-B1	1	×	<a href="#">EC-1649</a>
P1217	1217	ENG OVER TEMP	1	×	<a href="#">EC-1651</a>
P1225	1225	CTP LEARNING	2	—	<a href="#">EC-1664</a>
P1226	1226	CTP LEARNING	2	—	<a href="#">EC-1666</a>
P1229	1229	SENSOR POWER/CIRC	1	×	<a href="#">EC-1668</a>
P1444	1444	PURG VOLUME CONT/V	2	×	<a href="#">EC-1672</a>
P1446	1446	VENT CONTROL VALVE	2	×	<a href="#">EC-1680</a>
P1448	1448	VENT CONTROL VALVE	2	×	<a href="#">EC-1687</a>
P1456	1456	EVAP VERY SML LEAK	2	×	<a href="#">EC-1695</a>
P1464	1464	FUEL LEVEL SEN/CIRC	2	×	<a href="#">EC-1704</a>
P1490	1490	VC/V BYPASS/V	2	×	<a href="#">EC-1707</a>
P1491	1491	VC CUT/V BYPASS/V	2	×	<a href="#">EC-1714</a>
P1564	1564	ASCD SW	1	—	<a href="#">EC-1723</a>
P1572	1572	ASCD BRAKE SW	1	—	<a href="#">EC-1730</a>
P1574	1574	ASCD VHL SPD SEN	1	—	<a href="#">EC-1740</a>
P1610 - P1615	1610 - 1615	NATS MALFUNCTION	2	—	<a href="#">EC-1275</a>
P1705	1705	TPV SEN/CIRC A/T	1	×	<a href="#">AT-563</a>
P1706	1706	P-N POS SW/CIRCUIT	2	×	<a href="#">EC-1742</a>
P1760	1760	O/R CLTCH SOL/CIRC	2	×	<a href="#">AT-568</a>
P1805	1805	BRAKE SW/CIRCUIT	2	—	<a href="#">EC-1746</a>
P2122	2122	APP SEN 1/CIRC	1	×	<a href="#">EC-1751</a>
P2123	2123	APP SEN 1/CIRC	1	×	<a href="#">EC-1751</a>
P2127	2127	APP SEN 2/CIRC	1	×	<a href="#">EC-1757</a>
P2128	2128	APP SEN 2/CIRC	1	×	<a href="#">EC-1757</a>
P2135	2135	TP SENSOR	1	×	<a href="#">EC-1763</a>
P2138	2138	APP SENSOR	1	×	<a href="#">EC-1770</a>

\*1: 1st trip DTC No. is the same as DTC No.

\*2: These numbers are prescribed by SAE J2012.

\*3: In Diagnostic Test Mode II (Self-diagnostic results), these numbers are controlled by NISSAN.

\*4: When engine is running.

\*5: The troubleshooting for this DTC needs CONSULT-II.

\*6: When the fail-safe operations for both self-diagnoses occur, the MIL illuminates.

## PRECAUTIONS

PFP:00001

### Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

UBS0026P

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

**WARNING:**

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

### On Board Diagnostic (OBD) System of Engine and A/T

UBS0026Q

The ECM has an on board diagnostic system. It will light up the malfunction indicator (MIL) to warn the driver of a malfunction causing emission deterioration.

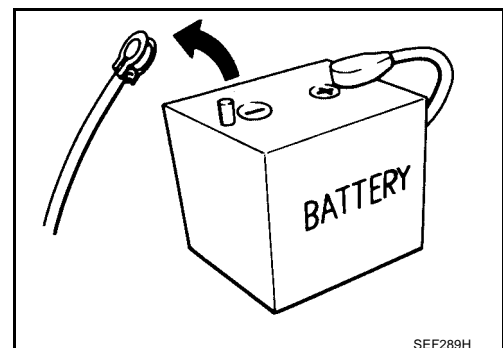
**CAUTION:**

- Be sure to turn the ignition switch OFF and disconnect the battery ground cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to [PG-46, "HARNESS CONNECTOR"](#).
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the fuel injection system, etc.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.

### Precaution

UBS0026R

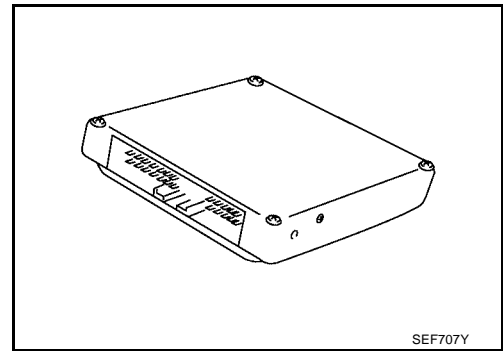
- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect battery ground cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned off.
- Before removing parts, turn ignition switch OFF and then disconnect battery ground cable.



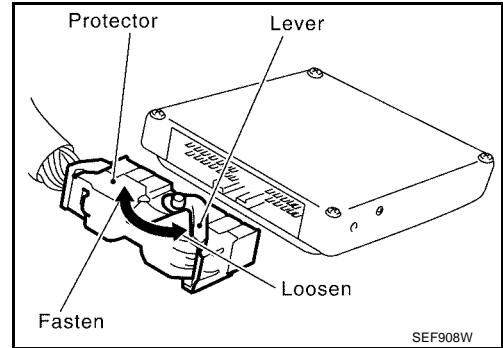
# PRECAUTIONS

[QR25DE]

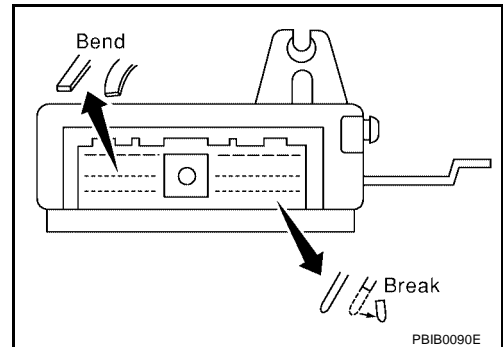
- Do not disassemble ECM.
- If battery cable is disconnected, the memory will return to the initial ECM values.  
The ECM will now start to self-control at its initial values. Engine operation can vary slightly when the cable is disconnected. However, this is not an indication of a malfunction. Do not replace parts because of a slight variation.



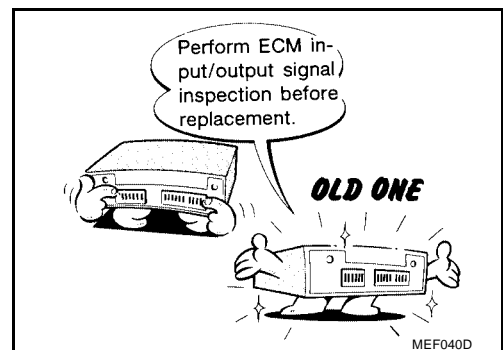
- When connecting ECM harness connector, fasten it securely with a lever as far as it will go as shown at right.



- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).  
Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.



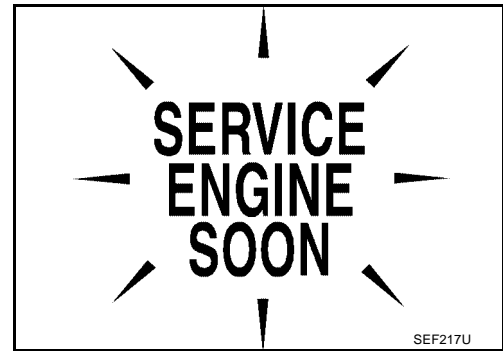
- Securely connect ECM harness connectors.  
A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep engine control system parts and harness dry.
- Before replacing ECM, perform "ECM Terminals and Reference Value" inspection and make sure ECM functions properly. Refer to [EC-1307](#).
- Handle mass air flow sensor carefully to avoid damage.
- Do not disassemble mass air flow sensor.
- Do not clean mass air flow sensor with any type of detergent.
- Do not disassemble electric throttle control actuator.
- Even a slight leak in the air intake system can cause serious incidents.
- Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).



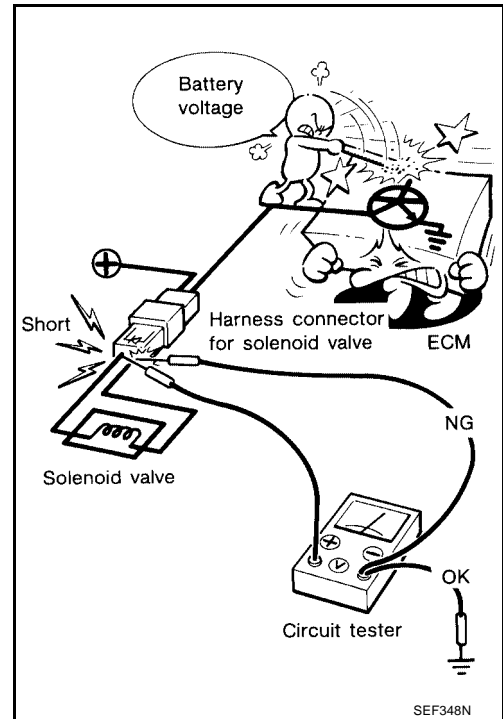
## PRECAUTIONS

[QR25DE]

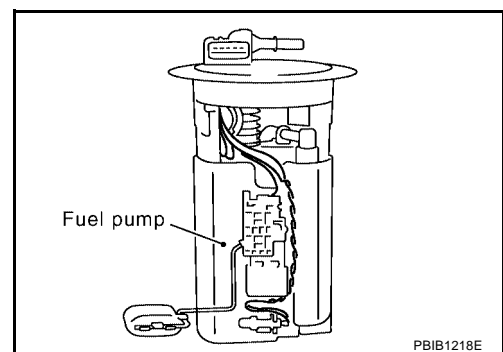
- After performing each TROUBLE DIAGNOSIS, perform “DTC Confirmation Procedure” or “Overall Function Check”.  
The DTC should not be displayed in the “DTC Confirmation Procedure” if the repair is completed. The “Overall Function Check” should be a good result if the repair is completed.



- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.



- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.

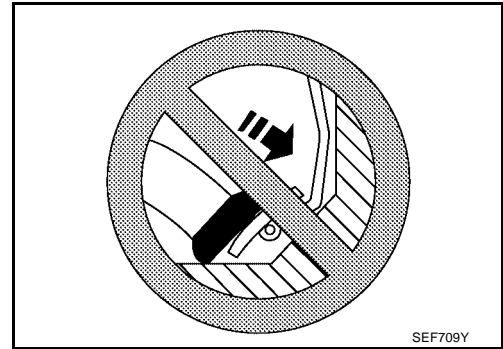




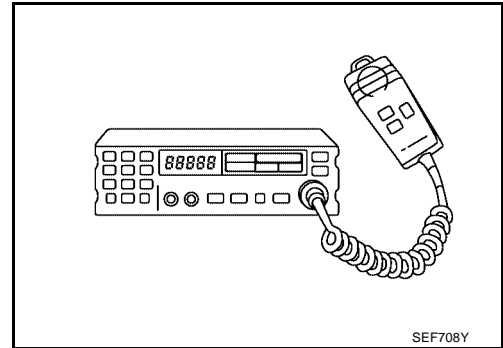
# PRECAUTIONS

[QR25DE]

- Do not depress accelerator pedal when starting.
- Immediately after starting, do not rev up engine unnecessarily.
- Do not rev up engine just prior to shutdown.



- When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.
  - Keep the antenna as far as possible from the electronic control units.
  - Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls. Do not let them run parallel for a long distance.
  - Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
  - Be sure to ground the radio to vehicle body.



UBS0026S

## Wiring Diagrams and Trouble Diagnosis

When you read wiring diagrams, refer to the following:

- [GI-13, "How to Read Wiring Diagrams"](#)
- [PG-2, "POWER SUPPLY ROUTING"](#) for power distribution circuit

When you perform trouble diagnosis, refer to the following:

- [GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"](#)
- [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#)

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# PREPARATION

[QR25DE]

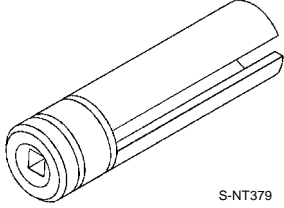
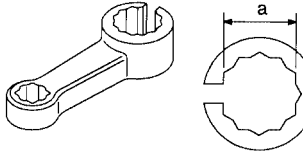
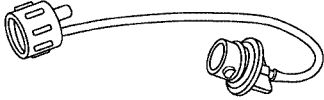
PF0:00002

UBS0026T

## PREPARATION

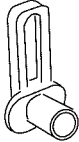
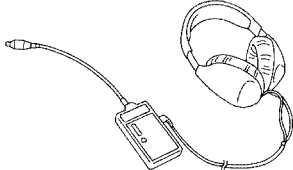
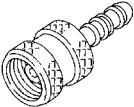
### Special Service Tools

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number Tool name (Kent-Moore No.)	Description
KV10117100 Heated oxygen sensor wrench	 <p>S-NT379</p> <p>Loosening or tightening heated oxygen sensors with 22 mm (0.87 in) hexagon nut</p>
KV10114400 Heated oxygen sensor wrench	 <p>S-NT636</p> <p>Loosening or tightening heated oxygen sensors <b>a: 22 mm (0.87 in)</b></p>
Fuel filler cap adapter (J-45356)	 <p>S-NT815</p> <p>Checking fuel tank vacuum relief valve opening pressure</p>

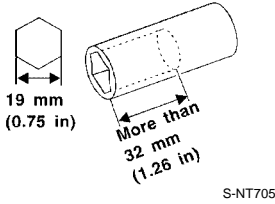
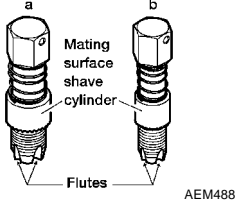
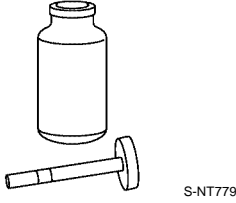
## Commercial Service Tools

UBS0026U

Tool name (Kent-Moore No.)	Description
Quick connector release	 <p>PBIC0198E</p> <p>Removing fuel tube quick connectors in engine room (Available in SEC. 164 of PARTS CATALOG: Part No. 16441 6N210)</p>
Leak detector ie: (J41416)	 <p>S-NT703</p> <p>Locating the EVAP leak</p>
EVAP service port adapter ie: (J41413-OBD)	 <p>S-NT704</p> <p>Applying positive pressure through EVAP service port</p>

# PREPARATION

[QR25DE]

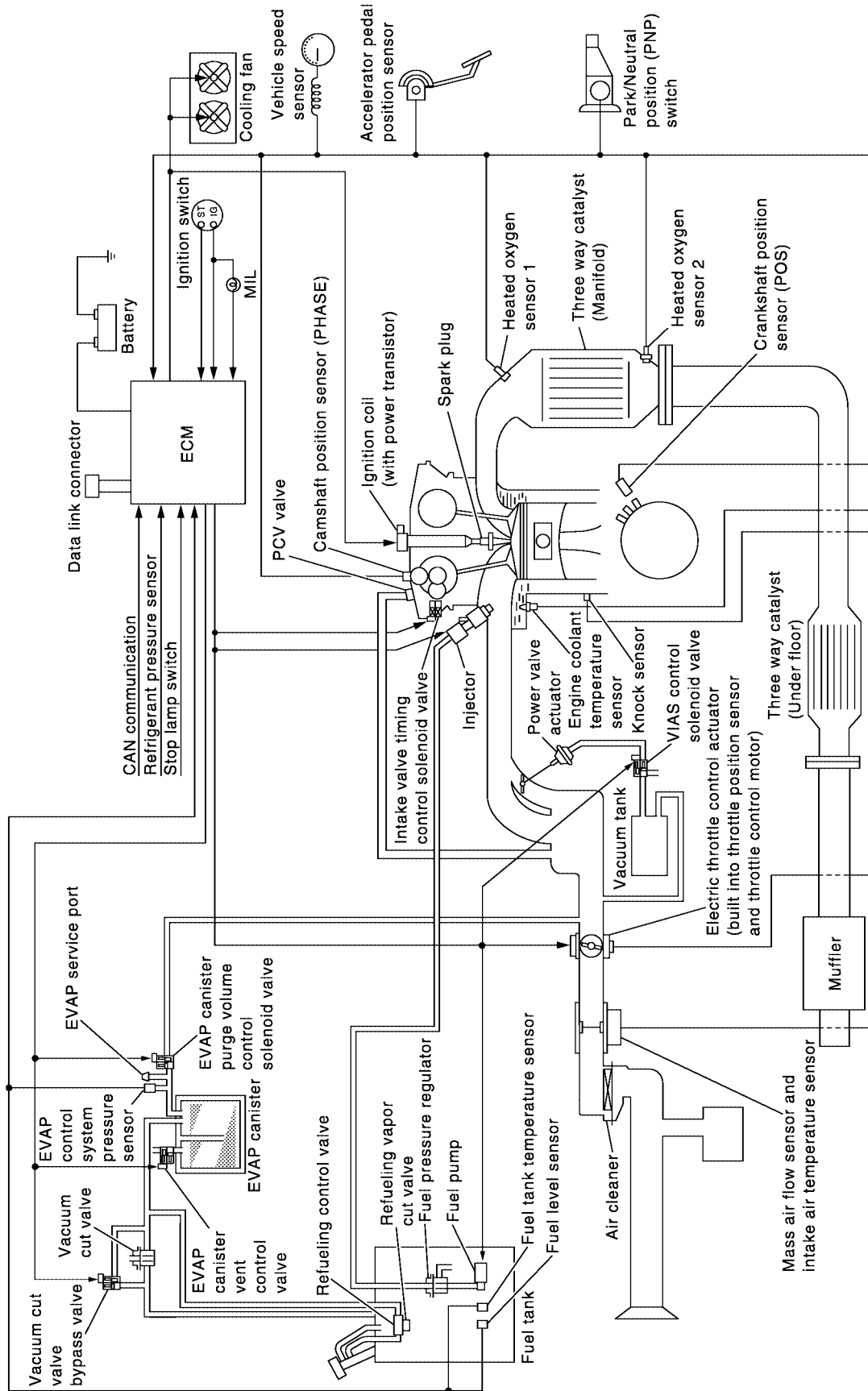
Tool name (Kent-Moore No.)	Description	A
Socket wrench	 <p>Removing and installing engine coolant temperature sensor</p>	EC
Oxygen sensor thread cleaner ie: (J-43897-18) (J-43897-12)	 <p>Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below.</p> <p><b>a: 18 mm diameter with pitch 1.5 mm for Zirconia Oxygen Sensor</b></p> <p><b>b: 12 mm diameter with pitch 1.25 mm for Titania Oxygen Sensor</b></p>	C
Anti-seize lubricant ie: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)	 <p>Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.</p>	D
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## ENGINE CONTROL SYSTEM

PF2:23710

### System Diagram

UBS0026V



PBIB1261E

### Vacuum Hose Drawing

UBS0026W

A

EC

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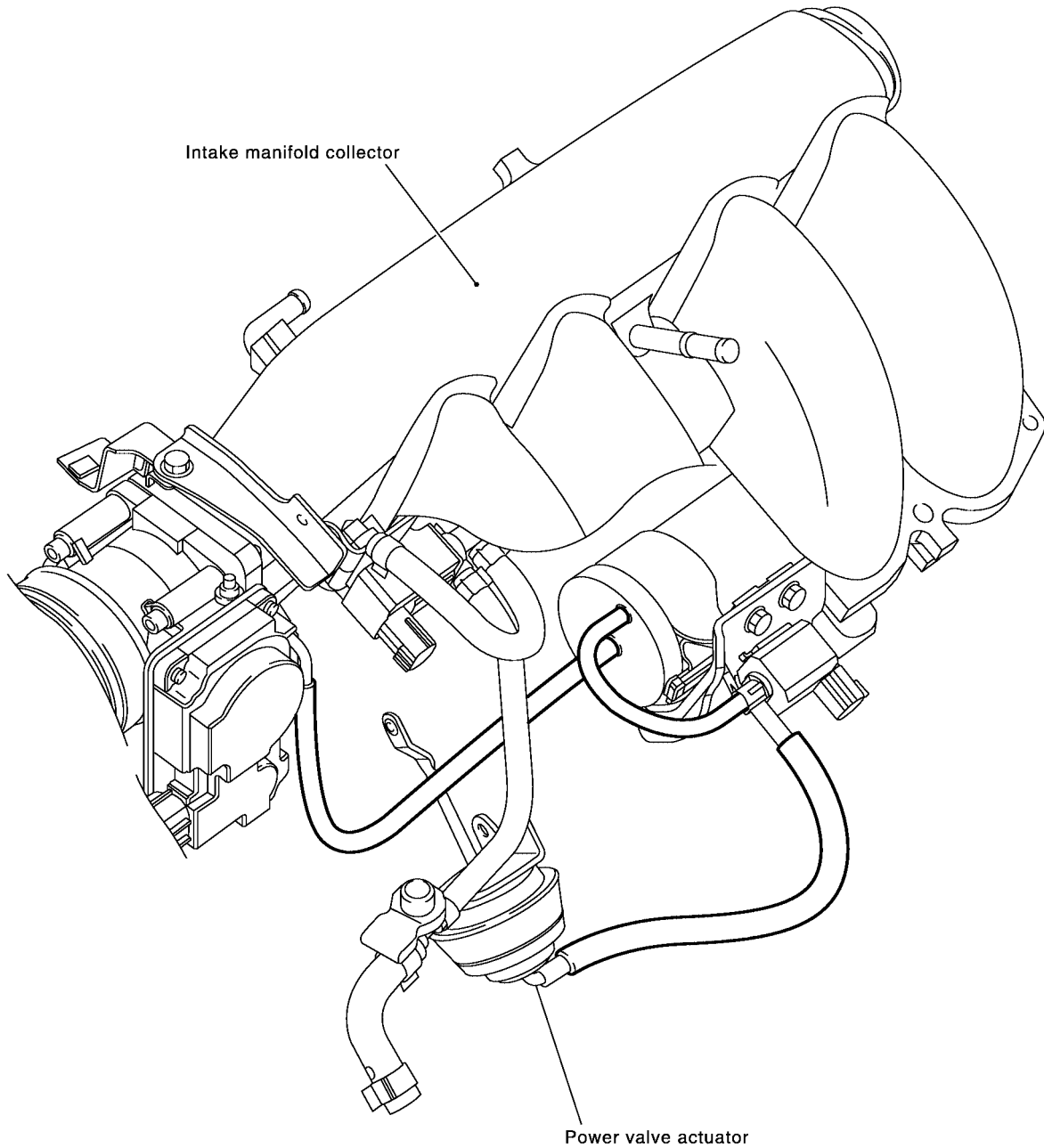
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Refer to [EC-1236, "System Diagram"](#) for Vacuum Control System.

PBIB1265E

# ENGINE CONTROL SYSTEM

[QR25DE]

UBS0026X

## System Chart

Input (Sensor)	ECM Function	Output (Actuator)	
<ul style="list-style-type: none"> <li>● Camshaft position sensor (PHASE)</li> <li>● Crankshaft position sensor (POS)</li> <li>● Mass air flow sensor</li> <li>● Engine coolant temperature sensor</li> <li>● Heated oxygen sensor 1</li> <li>● Throttle position sensor</li> <li>● Accelerator pedal position sensor</li> <li>● Park/neutral position (PNP) switch</li> <li>● Intake air temperature sensor</li> <li>● Power steering oil pressure switch</li> <li>● Ignition switch</li> <li>● Battery voltage</li> <li>● Knock sensor</li> <li>● Refrigerant pressure sensor</li> </ul>	Fuel injection & mixture ratio control	Fuel injectors	
	Electronic ignition system	Power transistor	
	Fuel pump control	Fuel pump relay	
	ASCD vehicle speed control	Electric throttle control actuator	
	On board diagnostic system	MIL (On the instrument panel)	
	Power valve control	VIAS control solenoid valve	
	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater	
	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater	
	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve	
	Air conditioning cut control	Air conditioner relay	
	Cooling fan control	Cooling fan relays	
	<ul style="list-style-type: none"> <li>● Stop lamp switch</li> <li>● ASCD steering switch</li> <li>● ASCD brake switch</li> <li>● ASCD clutch switch</li> <li>● Fuel level sensor*<sup>1</sup></li> <li>● EVAP control system pressure sensor</li> <li>● Fuel tank temperature sensor*<sup>1</sup></li> <li>● Heated oxygen sensor 2 *<sup>2</sup></li> <li>● TCM (Transmission control module) *<sup>3</sup></li> <li>● Air conditioner switch</li> <li>● Vehicle speed sensor</li> <li>● Electrical load signal</li> </ul>	ON BOARD DIAGNOSIS for EVAP system	<ul style="list-style-type: none"> <li>● EVAP canister vent control valve</li> <li>● Vacuum cut valve bypass valve</li> </ul>

\*1: These sensors are not used to control the engine system. They are used only for the on board diagnosis.

\*2: This sensor is not used to control the engine system under normal conditions.

\*3: The signal is sent to the ECM through CAN communication line.

## Multiport Fuel Injection (MFI) System INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	Fuel injection & mixture ratio control	Fuel injectors
Camshaft position sensor (PHASE)	Engine speed and piston position		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Heated oxygen sensor 1	Density of oxygen in exhaust gas		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Park/neutral position (PNP) switch	Gear position		
Ignition switch	Start signal		
Knock sensor	Engine knocking condition		
Battery	Battery voltage		
Power steering oil pressure switch	Power steering operation		
Heated oxygen sensor 2 *	Density of oxygen in exhaust gas		
Vehicle speed sensor	Vehicle speed		
Air conditioner switch	Air conditioner operation		

\*: Under normal conditions, this sensor is not for engine control operation.

### SYSTEM DESCRIPTION

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined by input signals (for engine speed and intake air) from both the crankshaft position sensor and the mass air flow sensor.

### VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

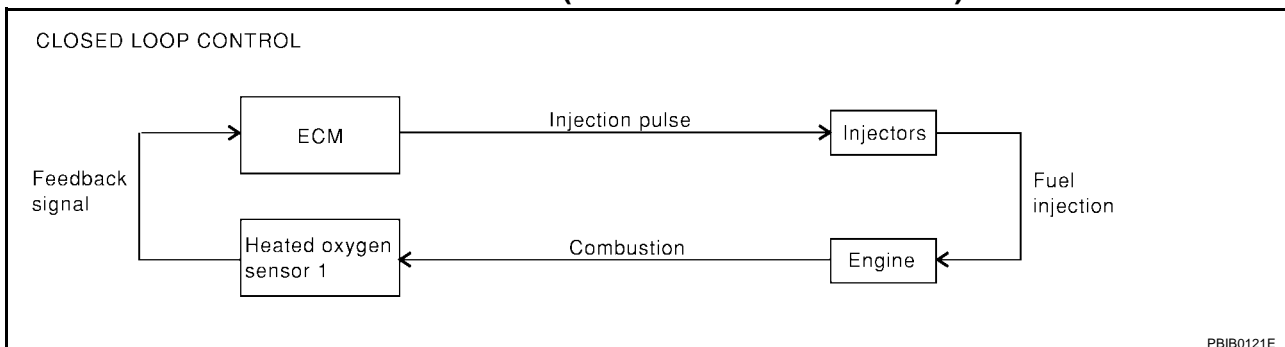
In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from "N" to "D" (A/T models)
- High-load, high-speed operation

<Fuel decrease>

- During deceleration
- During high engine speed operation

**MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)**

The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The three way catalyst (manifold) can then better reduce CO, HC and NOx emissions. This system uses heated oxygen sensor 1 in the exhaust manifold to monitor if the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about heated oxygen sensor 1, refer to [EC-1406](#). This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).

This stage is referred to as the closed loop control condition.

Heated oxygen sensor 2 is located downstream of the three way catalyst (manifold). Even if the switching characteristics of heated oxygen sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from heated oxygen sensor 2.

**Open Loop Control**

The open loop system condition refers to when the ECM detects any of the following conditions. Feedback control stops in order to maintain stabilized fuel combustion.

- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of heated oxygen sensor 1 or its circuit
- Insufficient activation of heated oxygen sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- After shifting from “N” to “D” (A/T models)
- When starting the engine

**MIXTURE RATIO SELF-LEARNING CONTROL**

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from heated oxygen sensor 1. This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. Both manufacturing differences (i.e., mass air flow sensor hot film) and characteristic changes during operation (i.e., injector clogging) directly affect mixture ratio.

Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of “injection pulse duration” to automatically compensate for the difference between the two ratios.

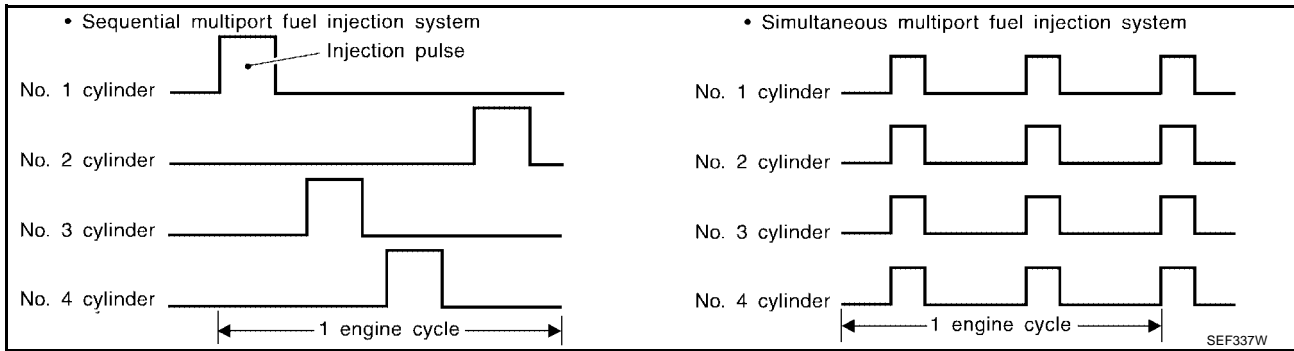
“Fuel trim” refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes short term fuel trim and long term fuel trim.

“Short term fuel trim” is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from heated oxygen sensor 1 indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.

“Long term fuel trim” is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.



## FUEL INJECTION TIMING



Two types of systems are used.

### Sequential Multiport Fuel Injection System

Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.

### Simultaneous Multiport Fuel Injection System

Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.

The four injectors will then receive the signals two times for each engine cycle.

This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

## FUEL SHUT-OFF

Fuel to each cylinder is cut off during deceleration or operation of the engine at excessively high speeds.

## Electronic Ignition (EI) System INPUT/OUTPUT SIGNAL CHART

UBS0026Z

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	Ignition timing control	Power transistor
Camshaft position sensor (PHASE)	Engine speed and piston position		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Ignition switch	Start signal		
Knock sensor	Engine knocking		
Park/neutral position (PNP) switch	Gear position		
Battery	Battery voltage		
Vehicle speed sensor	Vehicle speed		

## SYSTEM DESCRIPTION

The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM. This data forms the map shown.

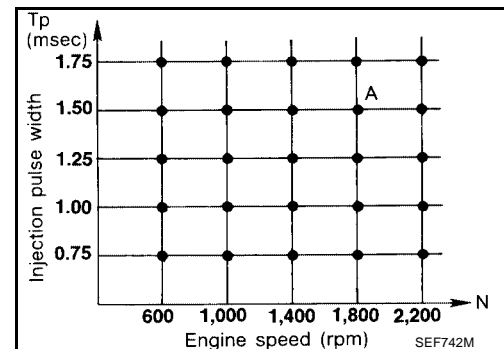
The ECM receives information such as the injection pulse width and camshaft position sensor signal. Computing this information, ignition signals are transmitted to the power transistor.

e.g., N: 1,800 rpm, Tp: 1.50 msec

A °BTDC

During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.

- At starting
- During warm-up
- At idle



- At low battery voltage
- During acceleration

The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not operate under normal driving conditions. If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

## Air Conditioning Cut Control INPUT/OUTPUT SIGNAL CHART

UBS00270

Sensor	Input Signal to ECM	ECM function	Actuator
Air conditioner switch	Air conditioner "ON" signal	Air conditioner cut control	Air conditioner relay
Throttle position sensor	Throttle position		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		
Power steering oil pressure switch	Power steering operation		
Vehicle speed sensor	Vehicle speed		

### SYSTEM DESCRIPTION

This system improves engine operation when the air conditioner is used. Under the following conditions, the air conditioner is turned off.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- When operating power steering during low engine speed or low vehicle speed.
- When engine speed is excessively low.
- When refrigerant pressure is excessively low or high.

## Fuel Cut Control (at No Load and High Engine Speed) INPUT/OUTPUT SIGNAL CHART

UBS00271

Sensor	Input Signal to ECM	ECM function	Actuator
Park/neutral position (PNP) switch	Neutral position	Fuel cut control	Fuel injectors
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Vehicle speed sensor	Vehicle speed		

### SYSTEM DESCRIPTION

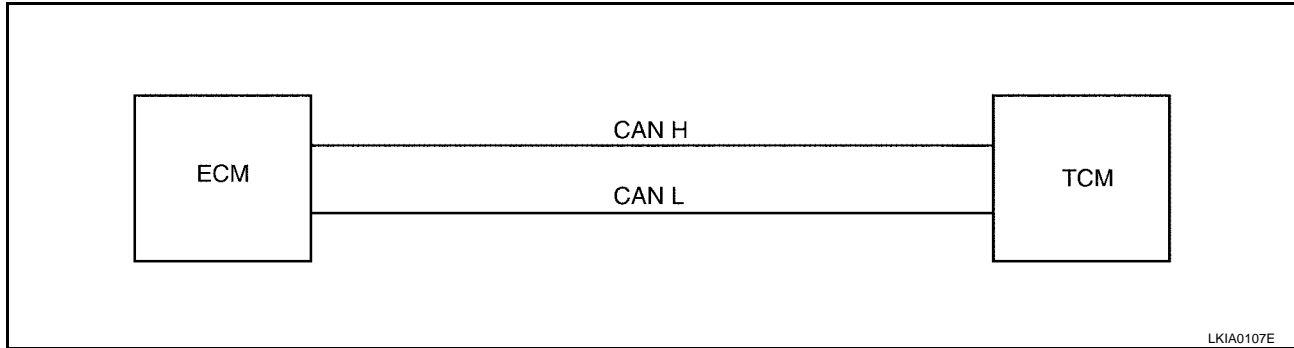
If the engine speed is above 1,800 rpm with no load (for example, in neutral and engine speed over 1,800 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed. Fuel cut will operate until the engine speed reaches 1,500 rpm, then fuel cut is cancelled.

#### NOTE:

This function is different from deceleration control listed under "Multiport Fuel Injection (MFI) System", [EC-1239](#).

## CAN communication SYSTEM DESCRIPTION

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.



## INPUT/OUTPUT SIGNAL CHART

T: Transmit R: Receive

Signals	ECM	TCM
Accelerator pedal position signal	T	R
Output shaft revolution signal	R	T
A/T self-diagnosis signal	R	T
Wide open throttle position signal	T	R
Overdrive cancel signal	T	R

## BASIC SERVICE PROCEDURE

PFP:00018

### Idle Speed and Ignition Timing Check IDLE SPEED

UBS00273

#### With CONSULT-II

Check idle speed in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### With GST

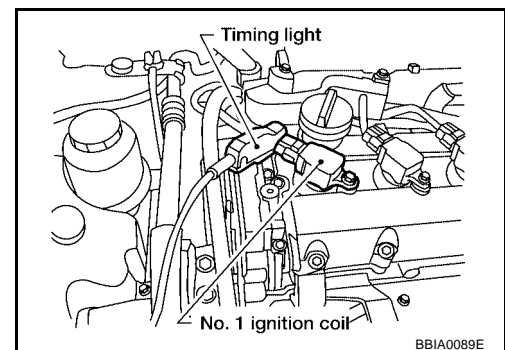
Check idle speed in "MODE 1" with GST.

### IGNITION TIMING

Any of following two methods may be used.

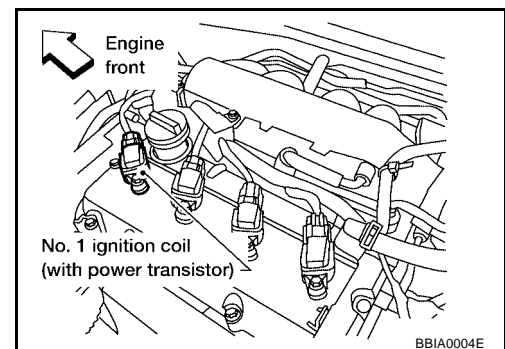
#### Method A

1. Slide the harness protector off ignition coil No. 1 to clear the wires.
2. Attach timing light to the wires as shown in the figure.
3. Check ignition timing.



#### Method B

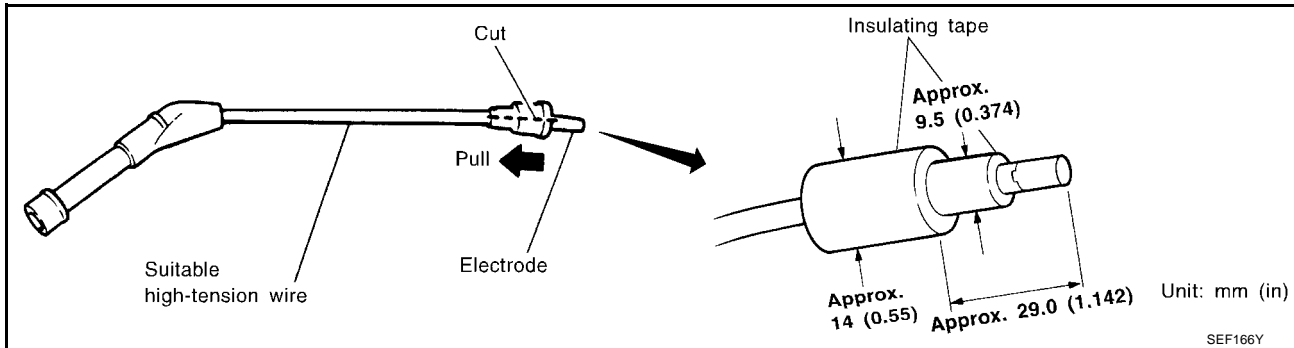
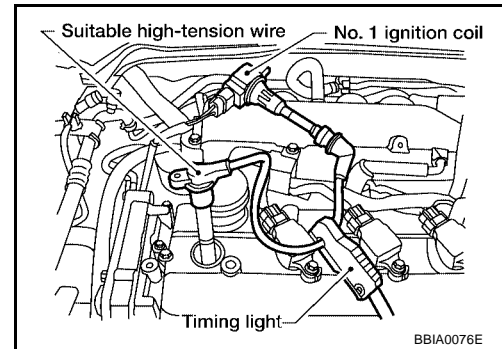
1. Remove No. 1 ignition coil.



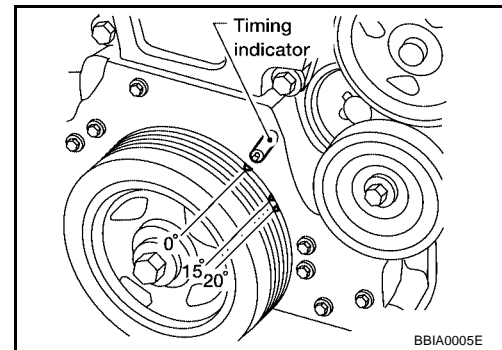
# BASIC SERVICE PROCEDURE

[QR25DE]

2. Connect No. 1 ignition coil and No. 1 spark plug with suitable high-tension wire as shown, and attach timing light clamp to this wire.



3. Check ignition timing.



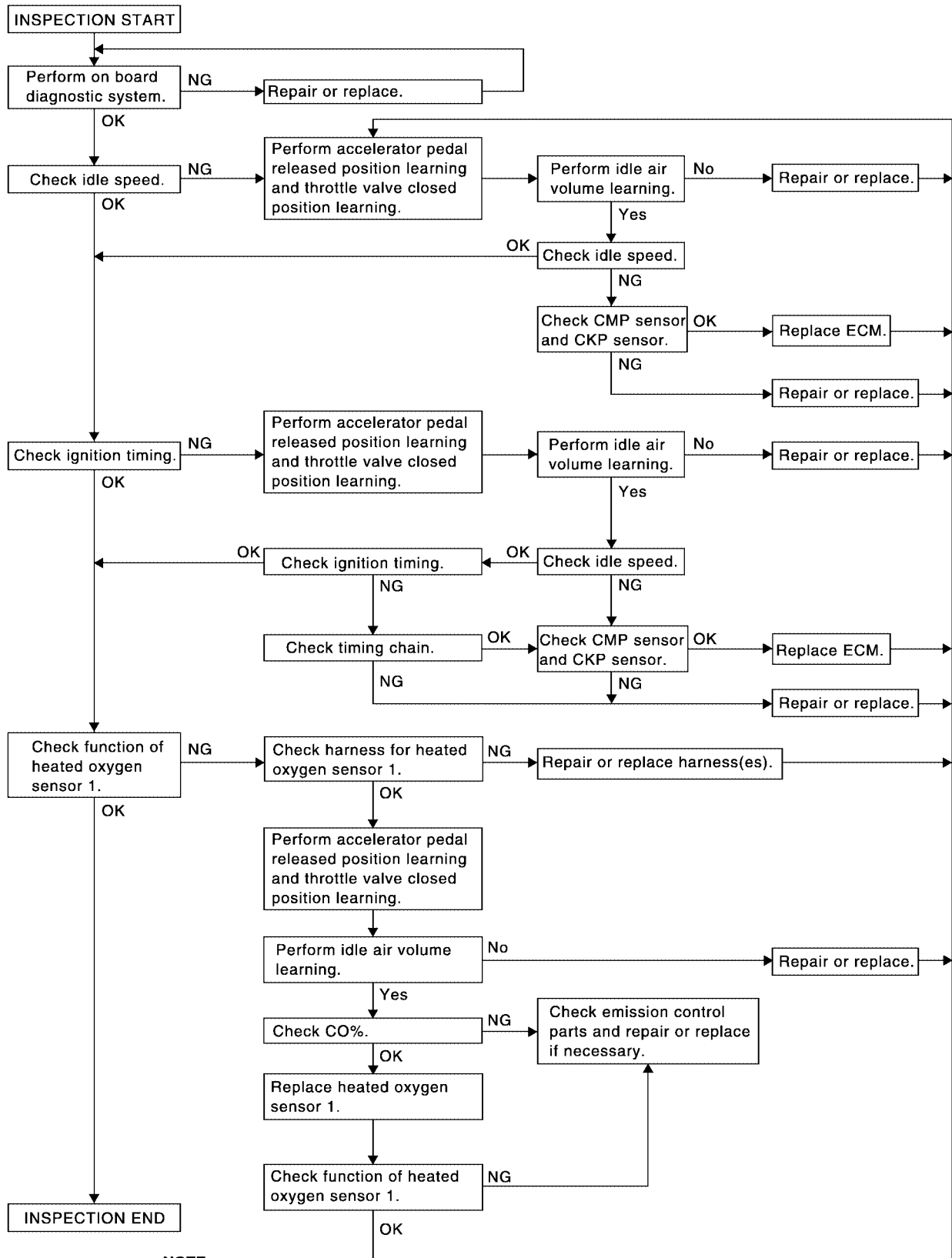
## Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment PREPARATION

UBS00274

1. Make sure that the following parts are in good order.
  - Battery
  - Ignition system
  - Engine oil and coolant levels
  - Fuses
  - ECM harness connector
  - Vacuum hoses
  - Air intake system (Oil filler cap, oil level gauge, etc.)
  - Fuel pressure
  - Engine compression
  - Throttle valve
  - Evaporative emission system
2. On air conditioner equipped models, checks should be carried out while the air conditioner is "OFF".
3. On automatic transmission equipped models, when checking idle rpm, ignition timing and mixture ratio, checks should be carried out while shift lever is in "N" position.
4. When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.
5. Turn off headlamps, heater blower, rear window defogger.

6. Keep front wheels pointed straight ahead.

## OVERALL INSPECTION SEQUENCE



**NOTE:**

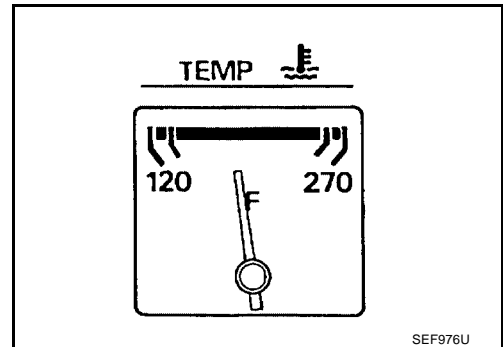
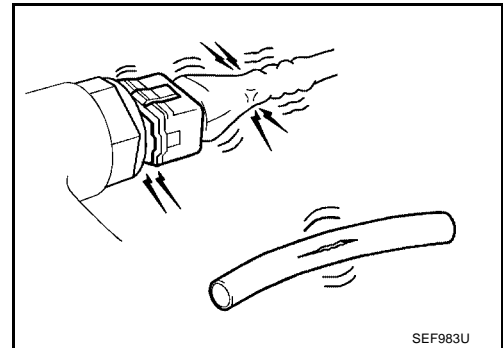
If a vehicle contains a part which is operating outside of design specifications with no MIL illumination, the part shall not be replaced prior to emission testing unless it is determined that the part has been tampered with or abused in such a way that the diagnostic system cannot reasonably be expected to detect the resulting malfunction.

PBIB1054E

## INSPECTION PROCEDURE

### 1. INSPECTION START

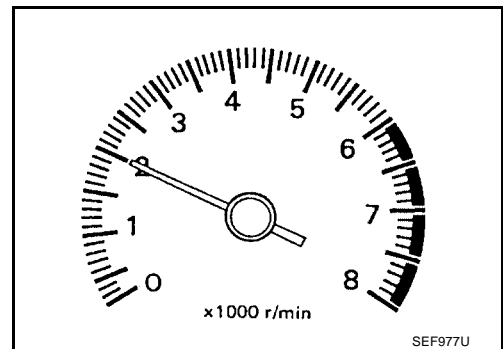
1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
  - Harness connectors for improper connections
  - Wiring harness for improper connections, pinches and cut
  - Vacuum hoses for splits, kinks and improper connections
  - Hoses and ducts for leaks
  - Air cleaner clogging
  - Gasket
3. Confirm that electrical or mechanical loads are not applied.
  - Headlamp switch is OFF.
  - Air conditioner switch is OFF.
  - Rear window defogger switch is OFF.
  - Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge. Ensure engine stays below 1,000 rpm.



5. Run engine at about 2,000 rpm for about 2 minutes under no-load.
6. Make sure that no DTC is displayed with CONSULT-II or GST.

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. REPAIR OR REPLACE

Repair or replace components as necessary according to corresponding "Diagnostic Procedure".

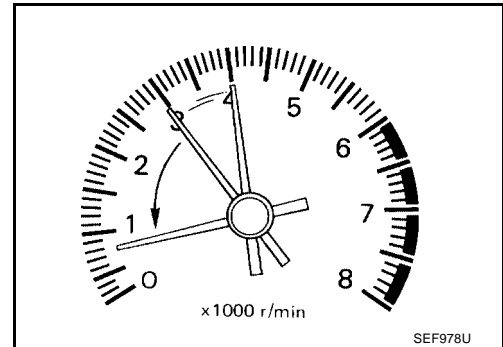
>> GO TO 3.

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

## 3. CHECK TARGET IDLE SPEED

### Ⓟ With CONSULT-II

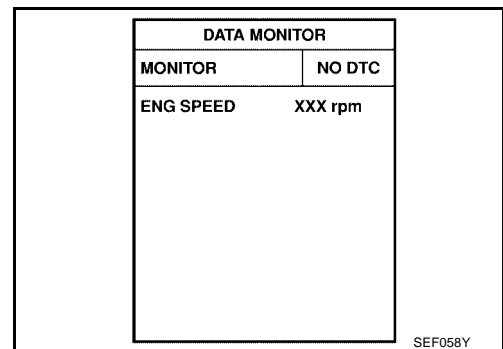
1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.



3. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 700 ± 50 rpm**

**A/T: 700 ± 50 rpm (in "P" or "N" position)**



### ⓧ Without CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.
3. Check idle speed.

**M/T: 700 ± 50 rpm**

**A/T: 700 ± 50 rpm (in "P" or "N" position)**

#### OK or NG

- OK    >> GO TO 10.
- NG    >> GO TO 4.

## 4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-1255, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 5.

## 5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 6.



**6. PERFORM IDLE AIR VOLUME LEARNING**

Perform [EC-1255, "Idle Air Volume Learning"](#) .

Is the "Idle Air Volume Learning" carried out successfully?

Yes or No

Yes >> GO TO 7.

No >> 1. Follow the instruction of "Idle Air Volume Learning".

2. GO TO 4.

**7. CHECK TARGET IDLE SPEED AGAIN****Ⓔ With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 700 ± 50 rpm**

**A/T: 700 ± 50 rpm (in "P" or "N" position)**

**ⓧ Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

**M/T: 700 ± 50 rpm**

**A/T: 700 ± 50 rpm (in "P" or "N" position)**

OK or NG

OK >> GO TO 10.

NG >> GO TO 8.

**8. DETECT MALFUNCTIONING PART**

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-1496](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-1490](#) .

OK or NG

OK >> GO TO 9.

NG >> 1. Repair or replace.

2. GO TO 4.

**9. CHECK ECM FUNCTION**

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a incident, but this is the rarely the case.)
2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to [EC-1275, "NVIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .

>> GO TO 4.

## 10. CHECK IGNITION TIMING

---

1. Run engine at idle.
2. Check ignition timing with a timing light.

**M/T:  $15 \pm 5^\circ$  BTDC**

**A/T:  $15 \pm 5^\circ$  BTDC (in "P" or "N" position)**

OK or NG

OK (With CONSULT-II)>>GO TO 19.

OK (Without CONSULT-II)>>GO TO 20.

NG >> GO TO 11.

## 11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

---

1. Stop engine.
2. Perform [EC-1255, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 12.

## 12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

---

Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 13.

## 13. PERFORM IDLE AIR VOLUME LEARNING

---

Perform [EC-1255, "Idle Air Volume Learning"](#) .

**Is the "Idle Air Volume Learning" carried out successfully?**

Yes or No

Yes >> GO TO 14.

No >> 1. Follow the construction of "Idle Air Volume Learning".

2. GO TO 4.

## 14. CHECK TARGET IDLE SPEED AGAIN

---

 **With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T:  $700 \pm 50$  rpm**

**A/T:  $700 \pm 50$  rpm (in "P" or "N" position)**

 **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

**M/T:  $700 \pm 50$  rpm**

**A/T:  $700 \pm 50$  rpm (in "P" or "N" position)**

OK or NG

OK >> GO TO 15.

NG >> GO TO 17.

## 15. CHECK IGNITION TIMING AGAIN

1. Run engine at idle.
2. Check ignition timing with a timing light.

**M/T: 15 ± 5° BTDC**

**A/T: 15 ± 5° BTDC (in "P" or "N" position)**

OK or NG

OK (With CONSULT-II)>>GO TO 19.

OK (Without CONSULT-II)>>GO TO 20.

NG >> GO TO 16.

## 16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to [EM-134, "TIMING CHAIN"](#) .

OK or NG

OK >> GO TO 17.

NG >> 1. Repair the timing chain installation.

2. GO TO 4.

## 17. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-1496](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-1490](#) .

OK or NG

OK >> GO TO 18.

NG >> 1. Repair or replace.

2. GO TO 4.

## 18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a incident, but this is the rarely the case.)
2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to [EC-1275, "NVIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .

>> GO TO 4.

## 19. CHECK HEATED OXYGEN SENSOR 1 SIGNAL

 **With CONSULT-II**

1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode.
3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

**1 time: RICH → LEAN → RICH**

**2 times: RICH → LEAN → RICH → LEAN → RICH**

OK or NG

OK >> **INSPECTION END**

NG (Monitor does not fluctuate.)>>GO TO 21.

NG (Monitor fluctuates less than 5 times.)>>GO TO 28.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

---

## 20. CHECK HEATED OXYGEN SENSOR 1 SIGNAL

---

### ⊗ Without CONSULT-II

1. Stop engine and set ECM to Self-diagnostic mode II (Heated oxygen sensor 1 monitor). Refer to [EC-1276, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#).
2. Start engine and run it at about 2,000 rpm for about 2 minutes under no-load.
3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds.

#### OK or NG

OK >> **INDPECTION END**

NG (MIL does not come on)>>GO TO 21.

NG (MIL comes on less than 5 times)>>GO TO 28.

---

## 21. CHECK HEATED OXYGEN SENSOR 1 HARNESS

---

1. Turn ignition switch "OFF" and disconnect battery ground cable.
2. Disconnect ECM harness connector.
3. Disconnect heated oxygen sensor 1 harness connector.
4. Check harness continuity between ECM terminal 92 and heated oxygen sensor 1 terminal 1. Refer to [EC-1408, "Wiring Diagram"](#).

**Continuity should exist.**

5. Also check harness for short to ground and short to power.

#### OK or NG

OK >> GO TO 22.

NG >> 1. Repair or replace harness between ECM and heated oxygen sensor 1.

2. GO TO 4.

---

## 22. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

---

1. Reconnect ECM harness connector.
2. Perform [EC-1255, "Accelerator Pedal Released Position Learning"](#).

>> GO TO 23.

---

## 23. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

---

Perform [EC-1255, "Throttle Valve Closed Position Learning"](#).

>> GO TO 24.

---

## 24. PERFORM IDLE AIR VOLUME LEARNING

---

Refer to [EC-1255, "Idle Air Volume Learning"](#).

**Is the "Idle Air Volume Learning" carried out successfully?**

#### Yes or No

Yes (With CONSULT-II)>>GO TO 25.

Yes (Without CONSULT-II)>>GO TO 26.

No >> 1. Follow the construction of "Idle Air Volume Learning".

2. GO TO 4.

**25. CHECK "CO"%**

**With CONSULT-II**

1. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
2. Turn ignition switch "OFF", wait at least 10 seconds and then turn "ON".
3. Select "ENG COOLANT TEMP" in "ACTIVE TEST" mode.
4. Set "ENG COOLANT TEMP" to 5°C (41°F) by touching "DWN" and "Qd".
5. Start engine and rev it (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.
6. Check "CO"%.

**Idle CO: 0.3 – 9.5% and engine runs smoothly.**

OK or NG

- OK >> GO TO 28.
- NG >> GO TO 27.

ACTIVE TEST	
ENG COOLANT TEMP	XXX °C
MONITOR	
ENG SPEED	XXX rpm
INJ PULSE-B1	XXX msec
IGN TIMING	XXX BTDC

SEF172Y

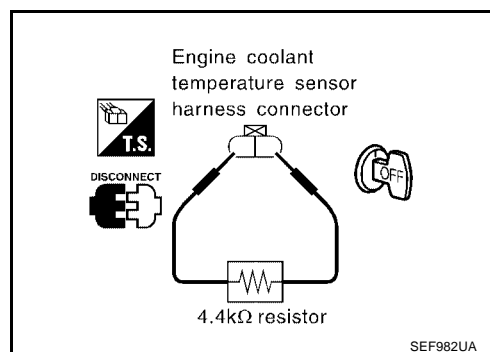
**26. CHECK "CO"%**

**Without CONSULT-II**

1. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge.
2. Turn ignition switch "OFF".
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect a resistor (4.4 kΩ) between terminals of engine coolant temperature sensor harness connector.
5. Start engine and rev it (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.
6. Check "CO"%.

**Idle CO: 0.3 – 9.5% and engine runs smoothly.**

7. After checking "CO"%, turn ignition switch "OFF", disconnect the resistor from the terminals of engine coolant temperature sensor harness connector, and then connect engine coolant temperature sensor harness connector to engine coolant temperature sensor.



OK or NG

- OK >> GO TO 28.
- NG >> GO TO 27.

**27. RECONNECT HEATED OXYGEN SENSOR 1 HARNESS CONNECTOR**

1. Turn ignition switch "OFF".
2. Reconnect heated oxygen sensor 1 harness connector.

>> GO TO 31.

**28. REPLACE HEATED OXYGEN SENSOR 1**

1. Stop engine.
2. Replace heated oxygen sensor 1.

With CONSULT-II>>GO TO 29.  
Without CONSULT-II>>GO TO 30.

## 29. CHECK HEATED OXYGEN SENSOR 1 SIGNAL

### With CONSULT-II

1. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
2. See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode.
3. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

**1 time: RICH → LEAN → RICH**

**2 times: RICH → LEAN → RICH → LEAN → RICH**

#### OK or NG

- OK >> GO TO 4.  
NG >> GO TO 31.

## 30. CHECK HEATED OXYGEN SENSOR 1 SIGNAL

### Without CONSULT-II

1. Set ECM to Self-diagnostic mode II (Heated oxygen sensor 1 monitor). Refer to [EC-1277, "How to Set Diagnostic Test Mode II \(Heated Oxygen Sensor 1 Monitor\)"](#) .
2. Running engine at 2,000 rpm under no-load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds.

#### OK or NG

- OK >> GO TO 4.  
NG >> GO TO 31.

## 31. DETECT MALFUNCTIONING PART

Check the following.

- Check fuel pressure regulator and repair or replace if necessary. Refer to [EC-1257, "Fuel Pressure Check"](#) .
- Check mass air flow sensor and its circuit, and repair or replace if necessary. Refer to [EC-1368](#) , [EC-1375](#) and [EC-1594](#) .
- Check injector and its circuit, and repair or replace if necessary. Refer to [EC-1796](#) .
- Check engine coolant temperature sensor and its circuit, and repair or replace if necessary. Refer to [EC-1386](#) and [EC-1398](#) .

#### OK or NG

- OK >> GO TO 33.  
NG >> 1. Repair or replace.  
2. GO TO 32.

## 32. ERASE UNNECESSARY DTC

After this inspection, unnecessary DTC might be displayed.

Erase the stored memory in ECM and TCM. Refer to [EC-1273, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) .

>> GO TO 4.

**33. CHECK ECM FUNCTION**

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a incident, but this is the rarely the case.)
2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to [EC-1275, "NVIS \(Nissan Vehicle Immobilizer System — NATS\)"](#).

>> GO TO 4.

**Accelerator Pedal Released Position Learning**

UBS00275

**DESCRIPTION**

"Accelerator Pedal Released Position Learning" is an operation to learn the fully released position of the accelerator pedal by monitoring the accelerator pedal position sensor output signal. It must be performed each time harness connector of accelerator pedal position sensor or ECM is disconnected.

**OPERATION PROCEDURE**

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch "ON" and wait at least 2 seconds.
3. Turn ignition switch "OFF" wait at least 10 seconds.
4. Turn ignition switch "ON" and wait at least 2 seconds.
5. Turn ignition switch "OFF" wait at least 10 seconds.

**Throttle Valve Closed Position Learning**

UBS00276

**DESCRIPTION**

"Throttle Valve Closed Position Learning" is an operation to learn the fully closed position of the throttle valve by monitoring the throttle position sensor output signal. It must be performed each time harness connector of electric throttle control actuator or ECM is disconnected.

**OPERATION PROCEDURE**

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch "ON".
3. Turn ignition switch "OFF" wait at least 10 seconds.  
Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

**Idle Air Volume Learning**

UBS00277

**DESCRIPTION**

"Idle Air Volume Learning" is an operation to learn the idle air volume that keeps each engine within the specific range. It must be performed under any of the following conditions:

- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

**PREPARATION**

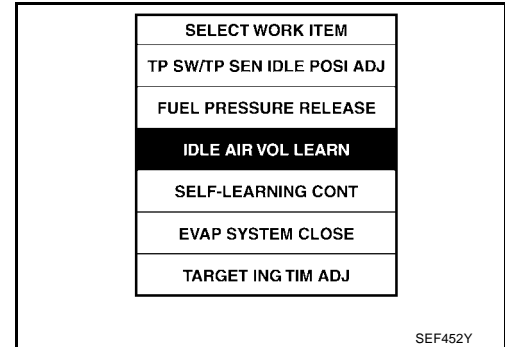
Before performing "Idle Air Volume Learning", make sure that all of the following conditions are satisfied. Learning will be cancelled if any of the following conditions are missed for even a moment.

- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 95°C (158 - 203°F)
- PNP switch: ON
- Electric load switch: OFF  
(Air conditioner, headlamp, rear window defogger)  
**On vehicles equipped with daytime light systems, set lighting switch to the 1st position to light only small lamps.**
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up  
For A/T models with CONSULT-II, drive vehicle until "FLUID TEMP SE" in "DATA MONITOR" mode of "A/T" system indicates less than 0.9V.  
For A/T models without CONSULT-II and M/T models, drive vehicle for 10 minutes.

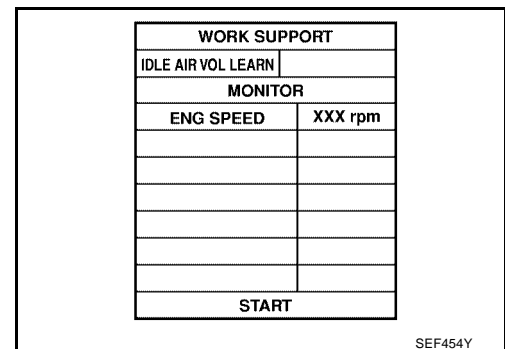
## OPERATION PROCEDURE

### ① With CONSULT-II

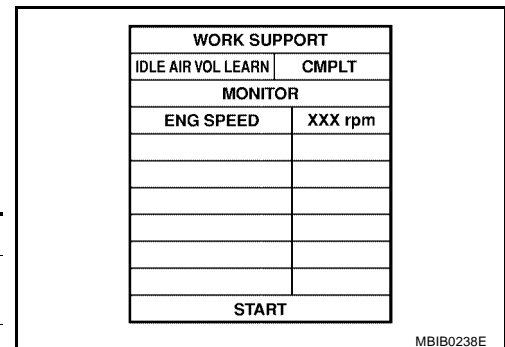
1. Perform [EC-1255, "Accelerator Pedal Released Position Learning"](#) .
2. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic "PREPARATION" (previously mentioned) are in good order.
5. Select "IDLE AIR VOL LEARN" in "WORK SUPPORT" mode.



6. Touch "START" and wait 20 seconds.



7. Make sure that "CMPLT" is displayed on CONSULT-II screen. If "CMPLT" is not displayed, "Idle Air Volume Learning" will not be carried out successfully. In this case, find the cause of the incident by referring to the "Diagnostic Procedure" below.
8. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.



ITEM	SPECIFICATION
Idle speed	M/T: 700±50 rpm A/T: 700±50 rpm (in "P" or "N" position)
Ignition timing	M/T: 15±5° BTDC A/T: 15±5° BTDC (in "P" or "N" position)

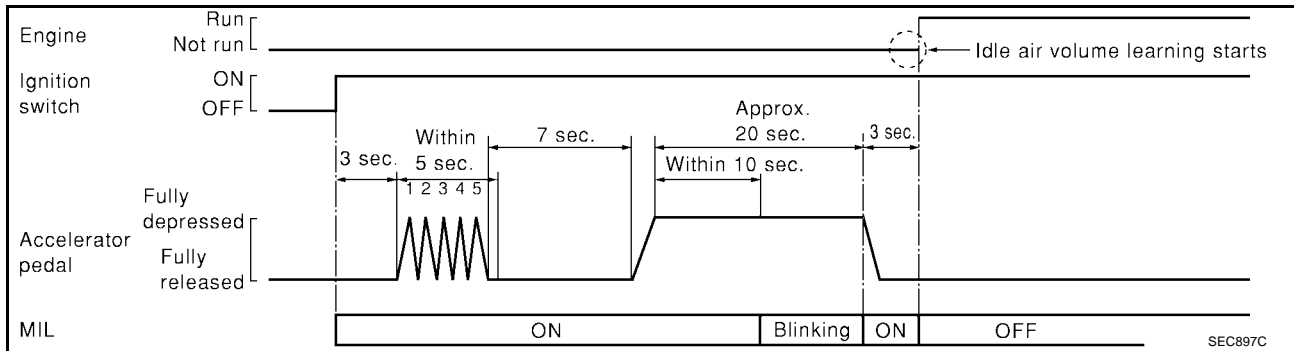
### ⊗ Without CONSULT-II

#### NOTE:

- It is better to count the time accurately with a clock.
  - It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.
1. Perform [EC-1255, "Accelerator Pedal Released Position Learning"](#) .
  2. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
  3. Start engine and warm it up to normal operating temperature.
  4. Check that all items listed under the topic "PREPARATION" (previously mentioned) are in good order.
  5. Turn ignition switch "OFF" and wait at least 10 seconds.
  6. Confirm that accelerator pedal is fully released, turn ignition switch "ON" and wait 3 seconds.
  7. Repeat the following procedure quickly five times within 5 seconds.



- a. Fully depress the accelerator pedal.
- b. Fully release the accelerator pedal.
8. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MIL stops blinking and turned ON.
9. Fully release the accelerator pedal within 3 seconds after the MIL goes off.
10. Start engine and let it idle.
11. Wait 20 seconds.



12. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.

ITEM	SPECIFICATION
Idle speed	M/T: 700±50 rpm A/T: 700±50 rpm (in "P" or "N" position)
Ignition timing	M/T: 15±5° BTDC A/T: 15±5° BTDC (in "P" or "N" position)

13. If idle speed and ignition timing are not within the specification, "Idle Air Volume Learning" will not be carried out successfully. In this case, find the cause of the incident by referring to the "Diagnostic Procedure" below.

## DIAGNOSTIC PROCEDURE

If idle air volume learning cannot be performed successfully, proceed as follows:

1. Check that throttle valve is fully closed.
2. Check PCV valve operation.
3. Check that downstream of throttle valve is free from air leakage.
4. When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.  
It is useful to perform [EC-1337, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE"](#).
5. If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform "Idle air volume learning" all over again:
  - Engine stalls.
  - Erroneous idle.

## Fuel Pressure Check FUEL PRESSURE RELEASE

UBS00278

Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.

### NOTE:

Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because B15 models do not have fuel return system.

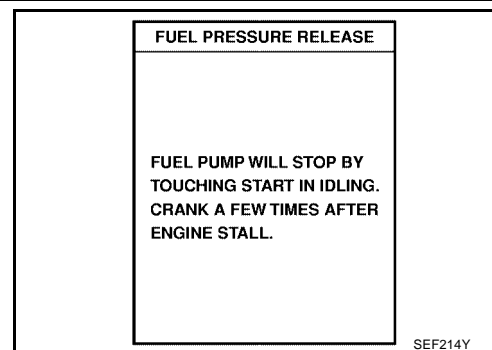
### Ⓟ With CONSULT-II

1. Turn ignition switch "ON".

# BASIC SERVICE PROCEDURE

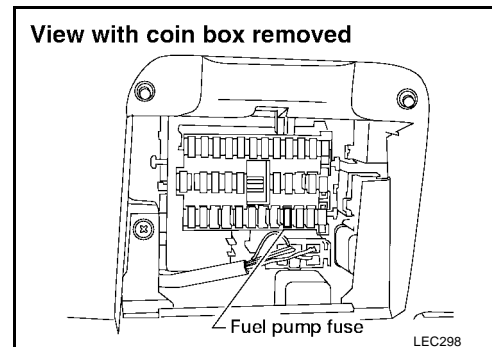
[QR25DE]

2. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT-II.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch "OFF".



## ⊗ Without CONSULT-II

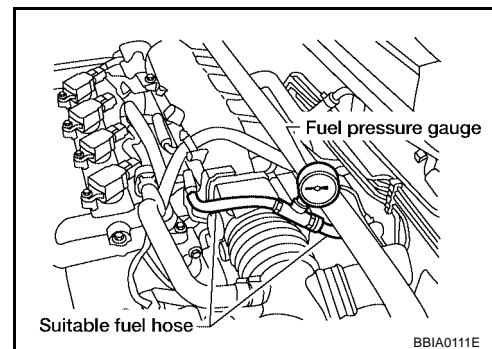
1. Remove fuel pump fuse.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch "OFF".
5. Reinstall fuel pump fuse after servicing fuel system.



## FUEL PRESSURE CHECK

### CAUTION:

- The fuel hose connection method used when taking fuel pressure check must not be used for other purposes.
  - Be careful not to scratch or put debris around connection area when servicing, so that the quick connector maintains sealability with O-rings inside.
  - Do not perform fuel pressure check with electrical systems operating (i.e. lights, rear defogger, A/C switch, etc.). Fuel pressure gauge may indicate false readings due to varying engine loads and changes in manifold vacuum.
1. Release fuel pressure to zero. Refer to [EC-1257, "FUEL PRESSURE RELEASE"](#).
  2. Prepare fuel hose and fuel hose clamp for fuel pressure check, and connect fuel pressure gauge.
    - Use suitable fuel hose for fuel pressure check (genuine NISSAN fuel hose without quick connector).
    - To avoid unnecessary force or tension to hose, use moderately long fuel hose for fuel pressure check.
    - Do not use the fuel hose for checking fuel pressure with damage or cracks on it.
    - Use fuel pressure gauge to check fuel pressure.
  3. Remove fuel hose. Refer to [EM-105, "INTAKE MANIFOLD"](#).
    - Do not twist or kink fuel hose because it is plastic hose.
    - Do not remove fuel hose from quick connector.
    - Keep the original fuel hose to be free from intrusion of dust or foreign substances with a suitable cover.
  4. Install the fuel pressure gauge as shown in the figure.
    - Wipe off oil or dirt from hose insertion part using cloth moistened with gasoline.
    - Apply proper amount of gasoline between top of the fuel tube and No.1 spool.
    - Insert fuel hose for fuel pressure check until it touches the No.1 spool on fuel tube.
    - Use NISSAN genuine hose clamp (part number: 16439 N4710 or 16439 40U00).
    - When reconnecting fuel line, always use new clamps.
    - When reconnecting fuel hose, check the original fuel hose for damage and abnormality.



# BASIC SERVICE PROCEDURE

[QR25DE]

- Use a torque driver to tighten clamps.
- Install hose clamp to the position within 1 - 2 mm (0.04 - 0.08 in).

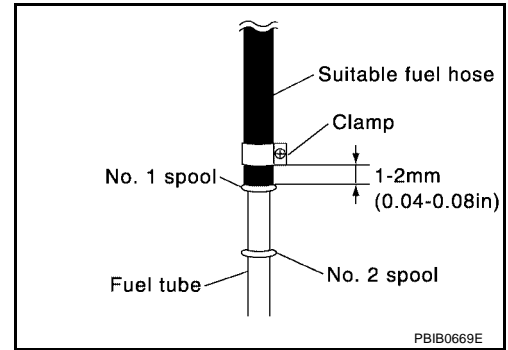
## **Tightening torque:**

**1 - 1.5 N·m (0.1 - 0.15 kg·m, 9 - 13 in·lb.)**

- Make sure that clamp screw does not contact adjacent parts.
5. After connecting fuel hose for fuel pressure check, pull the hose with a force of approximately 98 N (10 kg, 22 lb.) to confirm fuel tube does not come off.
  6. Turn ignition switch "ON", and check for fuel leakage.
  7. Start engine and check for fuel leakage.
  8. Read the indication of fuel pressure gauge.
    - Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.
    - During fuel pressure check, confirm for fuel leakage from fuel connection every 3 minutes.

## **At idling: Approximately 350 CPA (3.57 kg/cm<sup>2</sup> , 51 psi)**

9. If result is unsatisfactory, go to next step.
10. Check the following.
  - Fuel hoses and fuel tubes for clogging
  - Fuel filter for clogging
  - Fuel pump
  - Fuel pressure regulator for cloggingIf OK, replace fuel pressure regulator.  
If NG, repair or replace.



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## ON BOARD DIAGNOSTIC (OBD) SYSTEM

PFP:00028

### Introduction

UBS00279

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information	SAE Mode
Diagnostic Trouble Code (DTC)	Mode 3 of SAE J1979
Freeze Frame data	Mode 2 of SAE J1979
System Readiness Test (SRT) code	Mode 1 of SAE J1979
1st Trip Diagnostic Trouble Code (1st Trip DTC)	Mode 7 of SAE J1979
1st Trip Freeze Frame data	
Test values and Test limits	Mode 6 of SAE J1979
Calibration ID	Mode 9 of SAE J1979

The above information can be checked using procedures listed in the table below.

×: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT code	Test value
CONSULT-II	×	×	×	×	×	—
GST	×	×*1	×	—	×	×
ECM	×	×*2	—	—	—	—

\*1: 1st trip DTCs for self-diagnoses concerning SRT items cannot be shown on the GST display.

\*2: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other.

The malfunction indicator lamp (MIL) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to [EC-1290](#).)

### Two Trip Detection Logic

UBS0027A

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MIL will not light up at this stage. <1st trip>

If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MIL lights up. The MIL lights up at the same time when the DTC is stored. <2nd trip> The "trip" in the "Two Trip Detection Logic" means a driving mode in which self-diagnosis is performed during vehicle operation. Specific on board diagnostic items will cause the ECM to light up or blink the MIL, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

×: Applicable —: Not applicable

Items	MIL				DTC		1st trip DTC	
	1st trip		2nd trip		1st trip displaying	2nd trip displaying	1st trip displaying	2nd trip displaying
	Blinking	Lighting up	Blinking	Lighting up				
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	×	—	—	—	—	—	×	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	—	—	×	—	—	×	—	—
One trip detection diagnosis (refer to <a href="#">EC-1224</a> . "INDEX FOR DTC" )	—	×	—	—	×	—	—	—
Except above	—	—	—	×	—	×	×	—

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR25DE]

UBS0027B

## Emission-related Diagnostic Information EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

Items (CONSULT-II screen terms)	DTC*1 *2		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST	ECM				
CAN COMM CIRCUIT	U1000	1000*5	—	—	—	<a href="#">EC-1350</a>
CAN COMM CIRCUIT	U1001	1001*5	—	—	×	<a href="#">EC-1350</a>
<b>NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.</b>	<b>P0000</b>	<b>0000</b>	—	—	—	—
INT/V TIM CONT-B1	P0011	0011	—	—	×	<a href="#">EC-1353</a>
HO2S1 HTR (B1)	P0031	0031	×	×	×*4	<a href="#">EC-1356</a>
HO2S1 HTR (B1)	P0032	0032	×	×	×*4	<a href="#">EC-1356</a>
HO2S2 HTR (B1)	P0037	0037	×	×	×*4	<a href="#">EC-1362</a>
HO2S2 HTR (B1)	P0038	0038	×	×	×*4	<a href="#">EC-1362</a>
MAF SEN/CIRCUIT	P0101	0101	—	—	×	<a href="#">EC-1368</a>
MAF SEN/CIRCUIT	P0102	0102	—	—	—	<a href="#">EC-1375</a>
MAF SEN/CIRCUIT	P0103	0103	—	—	—	<a href="#">EC-1375</a>
IAT SEN/CIRCUIT	P0112	0112	—	—	×	<a href="#">EC-1381</a>
IAT SEN/CIRCUIT	P0113	0113	—	—	×	<a href="#">EC-1381</a>
ECT SEN/CIRCUIT	P0117	0117	—	—	—	<a href="#">EC-1386</a>
ECT SEN/CIRCUIT	P0118	0118	—	—	—	<a href="#">EC-1386</a>
TP SEN 2/CIRC	P0122	0122	—	—	—	<a href="#">EC-1391</a>
TP SEN 2/CIRC	P0123	0123	—	—	—	<a href="#">EC-1391</a>
ECT SENSOR	P0125	0125	—	—	—	<a href="#">EC-1398</a>
IAT SENSOR	P0127	0127	—	—	×	<a href="#">EC-1401</a>
THERMSTAT FNCTN	P0128	0128	—	—	×	<a href="#">EC-1404</a>
HO2S1 (B1)	P0132	0132	×	×	×*4	<a href="#">EC-1406</a>
HO2S1 (B1)	P0133	0133	×	×	×*4	<a href="#">EC-1412</a>
HO2S1 (B1)	P0134	0134	×	×	×*4	<a href="#">EC-1421</a>
HO2S2 (B1)	P0138	0138	×	×	×*4	<a href="#">EC-1428</a>
HO2S2 (B1)	P0139	0139	×	×	×*4	<a href="#">EC-1435</a>
FUEL SYS-LEAN-B1	P0171	0171	—	—	×	<a href="#">EC-1442</a>
FUEL SYS-RICH-B1	P0172	0172	—	—	×	<a href="#">EC-1449</a>
FTT SENSOR	P0181	0181	—	—	×	<a href="#">EC-1455</a>
FTT SEN/CIRCUIT	P0182	0182	—	—	×	<a href="#">EC-1457</a>
FTT SEN/CIRCUIT	P0183	0183	—	—	×	<a href="#">EC-1457</a>
ENG OVER TEMP	P0217	0217	—	—	—	<a href="#">EC-1461</a>
TP SEN 1/CIRC	P0222	0222	—	—	—	<a href="#">EC-1475</a>
TP SEN 1/CIRC	P0223	0223	—	—	—	<a href="#">EC-1475</a>
MULTI CYL MISFIRE	P0300	0300	—	—	×	<a href="#">EC-1481</a>
CYL 1 MISFIRE	P0301	0301	—	—	×	<a href="#">EC-1481</a>
CYL 2 MISFIRE	P0302	0302	—	—	×	<a href="#">EC-1481</a>
CYL 3 MISFIRE	P0303	0303	—	—	×	<a href="#">EC-1481</a>
CYL 4 MISFIRE	P0304	0304	—	—	×	<a href="#">EC-1481</a>

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR25DE]

Items (CONSULT-II screen terms)	DTC*1 *2		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST	ECM				
KNOCK SEN/CIRC-B1	P0327	0327	—	—	×	<a href="#">EC-1486</a>
KNOCK SEN/CIRC-B1	P0328	0328	—	—	×	<a href="#">EC-1486</a>
CKP SEN/CIRCUIT	P0335	0335	—	—	×	<a href="#">EC-1490</a>
CMP SEN/CIRC-B1	P0340	0340	—	—	×	<a href="#">EC-1496</a>
TW CATALYST SYS-B1	P0420	0420	×	×	×*4	<a href="#">EC-1502</a>
EVAP PURG FLOW/MON	P0441	0441	×	×	×*4	<a href="#">EC-1507</a>
EVAP SMALL LEAK	P0442	0442	×	×	×*4	<a href="#">EC-1513</a>
PURG VOLUME CONT/V	P0444	0444	—	—	×	<a href="#">EC-1521</a>
PURG VOLUME CONT/V	P0445	0445	—	—	×	<a href="#">EC-1521</a>
VENT CONTROL VALVE	P0447	0447	—	—	×	<a href="#">EC-1527</a>
EVAP SYS PRES SEN	P0452	0452	—	—	×	<a href="#">EC-1534</a>
EVAP SYS PRES SEN	P0453	0453	—	—	×	<a href="#">EC-1540</a>
EVAP GROSS LEAK	P0455	0455	—	×	×*4	<a href="#">EC-1547</a>
EVAP VERY SML LEAK	P0456	0456	×*3	×	×*4	<a href="#">EC-1555</a>
FUEL LEV SEN SLOSH	P0460	0460	—	—	×	<a href="#">EC-1564</a>
FUEL LEVEL SENSOR	P0461	0461	—	—	×	<a href="#">EC-1569</a>
FUEL LEVL SEN/CIRC	P0462	0462	—	—	×	<a href="#">EC-1571</a>
FUEL LEVL SEN/CIRC	P0463	0463	—	—	×	<a href="#">EC-1571</a>
VEH SPEED SEN/CIRC*6	P0500	0500	—	—	×	<a href="#">EC-1575</a>
ISC SYSTEM	P0506	0506	—	—	×	<a href="#">EC-1579</a>
ISC SYSTEM	P0507	0507	—	—	×	<a href="#">EC-1581</a>
ECM	P0605	0605	—	—	×	<a href="#">EC-1583</a>
MIL/CIRC	P0650	0650	—	—	×	<a href="#">EC-1586</a>
PNP SW/CIRC	P0705	0705	—	—	×	<a href="#">AT-491</a>
ATF TEMP SEN/CIRC	P0710	0710	—	—	×	<a href="#">AT-497</a>
VEH SPD SEN/CIR AT*6	P0720	0720	—	—	×	<a href="#">AT-503</a>
ENGINE SPEED SIG	P0725	0725	—	—	×	<a href="#">AT-508</a>
A/T 1ST GR FNCTN	P0731	0731	—	—	×	<a href="#">AT-512</a>
A/T 2ND GR FNCTN	P0732	0732	—	—	×	<a href="#">AT-517</a>
A/T 3RD GR FNCTN	P0733	0733	—	—	×	<a href="#">AT-522</a>
A/T 4TH GR FNCTN	P0734	0734	—	—	×	<a href="#">AT-527</a>
TCC SOLENOID/CIRC	P0740	0740	—	—	×	<a href="#">AT-534</a>
A/T TCC S/V FNCTN	P0744	0744	—	—	×	<a href="#">AT-539</a>
L/PRESS SOL/CIRC	P0745	0745	—	—	×	<a href="#">AT-547</a>
SFT SOL A/CIRC	P0750	0750	—	—	—	<a href="#">AT-553</a>
SFT SOL B/CIRC	P0755	0755	—	—	—	<a href="#">AT-558</a>
ECM BACK UP/CIRC	P1065	1065	—	—	×	<a href="#">EC-1590</a>
MAF SENSOR	P1102	1102	—	—	—	<a href="#">EC-1594</a>
INT/V TIM V/CIR-B1	P1111	1111	—	—	×	<a href="#">EC-1600</a>
ETC ACTR	P1121	1121	—	—	— or ×	<a href="#">EC-1604</a>
ETC FUNCTION/CIRC	P1122	1122	—	—	—	<a href="#">EC-1606</a>

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR25DE]

Items (CONSULT-II screen terms)	DTC*1 *2		SRT code	Test value/ Test limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST	ECM				
ETC MOT PWR	P1124	1124	—	—	—	<a href="#">EC-1613</a>
ETC MOT PWR	P1126	1126	—	—	—	<a href="#">EC-1613</a>
ETC MOT	P1128	1128	—	—	—	<a href="#">EC-1618</a>
HO2S1 (B1)	P1143	1143	×	×	×*4	<a href="#">EC-1623</a>
HO2S1 (B1)	P1144	1144	×	×	×*4	<a href="#">EC-1629</a>
HO2S2 (B1)	P1146	1146	×	×	×*4	<a href="#">EC-1635</a>
HO2S2 (B1)	P1147	1147	×	×	×*4	<a href="#">EC-1642</a>
CLOSED LOOP-B1	P1148	1148	—	—	—	<a href="#">EC-1649</a>
ENG OVER TEMP	P1217	1217	—	—	—	<a href="#">EC-1651</a>
CTP LEARNING	P1225	1225	—	—	×	<a href="#">EC-1664</a>
CTP LEARNING	P1226	1226	—	—	×	<a href="#">EC-1666</a>
SENSOR POWER/CIRC	P1229	1229	—	—	—	<a href="#">EC-1668</a>
PURG VOLUME CONT/V	P1444	1444	—	—	×	<a href="#">EC-1672</a>
VENT CONTROL VALVE	P1446	1446	—	—	×	<a href="#">EC-1680</a>
VENT CONTROL VALVE	P1448	1448	—	—	×	<a href="#">EC-1687</a>
EVAP VERY SML LEAK	P1456	1456	×*3	×	×*4	<a href="#">EC-1695</a>
FUEL LEVEL SEN/CIRC	P1464	1464	—	—	×	<a href="#">EC-1704</a>
VC/V BYPASS/V	P1490	1490	—	—	×	<a href="#">EC-1707</a>
VC CUT/V BYPASS/V	P1491	1491	—	—	×	<a href="#">EC-1714</a>
ASCD SW	P1564	1564	—	—	—	<a href="#">EC-1723</a>
ASCD BRAKE SW	P1572	1572	—	—	—	<a href="#">EC-1730</a>
ASCD VHL SPD SEN	P1574	1574	—	—	—	<a href="#">EC-1740</a>
TPV SEN/CIRC A/T	P1705	1705	—	—	—	<a href="#">AT-563</a>
P-N POS SW/CIRCUIT	P1706	1706	—	—	×	<a href="#">EC-1742</a>
O/R CLTCH SOL/CIRC	P1760	1760	—	—	×	<a href="#">AT-568</a>
BRAKE SW/CIRCUIT	P1805	1805	—	—	×	<a href="#">EC-1746</a>
APP SEN 1/CIRC	P2122	2122	—	—	—	<a href="#">EC-1751</a>
APP SEN 1/CIRC	P2123	2123	—	—	—	<a href="#">EC-1751</a>
APP SEN 2/CIRC	P2127	2127	—	—	—	<a href="#">EC-1757</a>
APP SEN 2/CIRC	P2128	2128	—	—	—	<a href="#">EC-1757</a>
TP SENSOR	P2135	2135	—	—	—	<a href="#">EC-1763</a>
APP SENSOR	P2138	2138	—	—	—	<a href="#">EC-1770</a>

\*1: 1st trip DTC No. is the same as DTC No.

\*2: These numbers are prescribed by SAE J2012.

\*3: SRT code will not be set if the self-diagnostic result is NG.

\*4: These are not displayed with GST.

\*5: The troubleshooting for this DTC needs CONSULT-II.

\*6: When the fail-safe operations for both self-diagnoses occur at the same time, the MIL illuminates.

## DTC AND 1ST TRIP DTC

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not reoccur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MIL will not light up (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required

driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MIL lights up. In other words, the DTC is stored in the ECM memory and the MIL lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored. For malfunctions that blink or light up the MIL during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.

Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in [EC-1273, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) .

For malfunctions in which 1st trip DTCs are displayed, refer to [EC-1261, "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS"](#) . These items are required by legal regulations to continuously monitor the system/component. In addition, the items monitored non-continuously are also displayed on CONSULT-II.

1st trip DTC is specified in Mode 7 of SAE J1979. 1st trip DTC detection occurs without lighting up the MIL and therefore does not warn the driver of a malfunction. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in "Work Flow" procedure Step II, refer to [EC-1285, "WORK FLOW"](#) . Then perform "DTC Confirmation Procedure" or "Overall Function Check" to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

## How to Read DTC and 1st Trip DTC

DTC and 1st trip DTC can be read by the following methods.

 **WITH CONSULT-II**

 **WITH GST**

CONSULT-II or GST (Generic Scan Tool) Examples: P0340, P1148, P1706, etc.

These DTCs are prescribed by SAE J2012.

(CONSULT-II also displays the malfunctioning component or system.)

 **NO TOOLS**

The number of blinks of the MIL in the Diagnostic Test Mode II (Self-Diagnostic Results) indicates the DTC. Example: 0340, 1148, 1706, etc.

These DTCs are controlled by NISSAN.

- **1st trip DTC No. is the same as DTC No.**
- **Output of a DTC indicates a malfunction. However, GST or the Diagnostic Test Mode II do not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-II can identify malfunction status as shown below. Therefore, using CONSULT-II (if available) is recommended.**

A sample of CONSULT-II display for DTC and 1st trip DTC is shown below. DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode of CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

If the DTC is being detected currently, the time data will be "0".

If a 1st trip DTC is stored in the ECM, the time data will be "[1t]".

DTC display	<b>SELF DIAG RESULTS</b>		1st trip DTC display	<b>SELF DIAG RESULTS</b>	
	<b>DTC RESULTS</b>			<b>DTC RESULTS</b>	
	<b>CKP SEN/CIRCUIT [P0335]</b>	<b>TIME</b>		<b>CKP SEN/CIRCUIT [P0335]</b>	<b>TIME</b>
	0			1t	

PBIB0911E

## FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed, base fuel schedule and intake air temperature at the moment a malfunction is detected.

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For details, see [EC-1320, "Freeze Frame Data and 1st Trip Freeze Frame Data"](#) .



# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR25DE]

Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0304 Fuel Injection System Function — DTC: P0171, P0172
2		Except the above items (Includes A/T related items)
3	1st trip freeze frame data	

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored in the 2nd trip. After that when the misfire (Priority: 1) is detected in another trip, the freeze frame data will be updated from the EGR malfunction to the misfire. The 1st trip freeze frame data is updated each time a different malfunction is detected. There is no priority for 1st trip freeze frame data. However, once freeze frame data is stored in the ECM memory, 1st trip freeze data is no longer stored (because only one freeze frame data or 1st trip freeze frame data can be stored in the ECM). If freeze frame data is stored in the ECM memory and freeze frame data with the same priority occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in [EC-1261, "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS"](#).

## SYSTEM READINESS TEST (SRT) CODE

System Readiness Test (SRT) code is specified in Mode 1 of SAE J1979.

As part of an enhanced emissions test for Inspection & Maintenance (I/M), certain states require the status of SRT be used to indicate whether the ECM has completed self-diagnosis of major emission systems and components. Completion must be verified in order for the emissions inspection to proceed.

If a vehicle is rejected for a State emissions inspection due to one or more SRT items indicating "INCMP", use the information in this Service Manual to set the SRT to "CMPLT".

In most cases the ECM will automatically complete its self-diagnosis cycle during normal usage, and the SRT status will indicate "CMPLT" for each application system. Once set as "CMPLT", the SRT status remains "CMPLT" until the self-diagnosis memory is erased.

Occasionally, certain portions of the self-diagnostic test may not be completed as a result of the customer's normal driving pattern; the SRT will indicate "INCMP" for these items.

### NOTE:

The SRT will also indicate "INCMP" if the self-diagnosis memory is erased for any reason or if the ECM memory power supply is interrupted for several hours.

If, during the state emissions inspection, the SRT indicates "CMPLT" for all test items, the inspector will continue with the emissions test. However, if the SRT indicates "INCMP" for one or more of the SRT items the vehicle is returned to the customer untested.

### NOTE:

If MIL is "ON" during the state emissions inspection, the vehicle is also returned to the customer untested even though the SRT indicates "CMPLT" for all test items. Therefore, it is important to check SRT ("CMPLT") and DTC (No DTCs) before the inspection.

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR25DE]

## SRT Item

The table below shows required self-diagnostic items to set the SRT to "CMPLT".

SRT item (CONSULT-II indication)	Performance Priority*1	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	2	Three way catalyst function	P0420
EVAP SYSTEM	1	EVAP control system	P0442
	2	EVAP control system	P0456, P1456
	2	EVAP control system purge flow monitoring	P0441
HO2S	2	Heated oxygen sensor 1	P0132
		Heated oxygen sensor 1	P0133
		Heated oxygen sensor 1	P0134
		Heated oxygen sensor 1	P1143
		Heated oxygen sensor 1	P1144
		Heated oxygen sensor 2	P0138
		Heated oxygen sensor 2	P0139
		Heated oxygen sensor 2	P1146
		Heated oxygen sensor 2	P1147
HO2S HTR	2	Heated oxygen sensor 1 heater	P0031, P0032
		Heated oxygen sensor 2 heater	P0037, P0038

\*1: If completion of several SRTs is required, perform driving patterns (DTC confirmation procedure), one by one based on the priority for models with CONSULT-II.

## SRT Set Timing

SRT is set as "CMPLT" after self-diagnosis has been performed one or more times. Completion of SRT is done regardless of whether the result is OK or NG. The set timing is different between OK and NG results and is shown in the table below.

Self-diagnosis result		Example							
		Diagnosis	Ignition cycle						
			← ON →	OFF	← ON →	OFF	← ON →	OFF	← ON →
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)			
		P0402	OK (1)	— (1)	— (1)	OK (2)			
		P1402	OK (1)	OK (2)	— (2)	— (2)			
		SRT of EGR	"CMPLT"	"CMPLT"	"CMPLT"	"CMPLT"			
	Case 2	P0400	OK (1)	— (1)	— (1)	— (1)			
		P0402	— (0)	— (0)	OK (1)	— (1)			
		P1402	OK (1)	OK (2)	— (2)	— (2)			
		SRT of EGR	"INCMP"	"INCMP"	"CMPLT"	"CMPLT"			
NG exists	Case 3	P0400	OK	OK	—	—			
		P0402	—	—	—	—			
		P1402	NG	—	NG	NG	NG (Consecutive NG)		
		(1st trip) DTC	1st trip DTC	—	1st trip DTC	DTC (= MIL "ON")			
		SRT of EGR	"INCMP"	"INCMP"	"INCMP"	"CMPLT"			

OK: Self-diagnosis is carried out and the result is OK.

NG: Self-diagnosis is carried out and the result is NG.

—: Self-diagnosis is not carried out.

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR25DE]

When all SRT related self-diagnoses showed OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate "CMPLT". → Case 1 above

When all SRT related self-diagnoses showed OK results through several different cycles, the SRT will indicate "CMPLT" at the time the respective self-diagnoses have at least one OK result. → Case 2 above

If one or more SRT related self-diagnoses showed NG results in 2 consecutive cycles, the SRT will also indicate "CMPLT". → Case 3 above

The table above shows that the minimum number of cycles for setting SRT as "INCMP" is one (1) for each self-diagnosis (Case 1 & 2) or two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary for each self-diagnosis to be executed twice (Case 3) for the following reasons:

- The SRT will indicate "CMPLT" at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires "CMPLT" of the SRT only with OK self-diagnosis results.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to "CMPLT" of SRT, the self-diagnosis memory must be erased from ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate "INCMP".

**NOTE:**

SRT can be set as "CMPLT" together with the DTC(s). Therefore, DTC check must always be carried out prior to the state emission inspection even though the SRT indicates "CMPLT".

## SRT Service Procedure

If a vehicle has failed the state emissions inspection due to one or more SRT items indicating "INCMP", review the flowchart diagnostic sequence on the next page.

A

EC

C

D

E

F

G

H

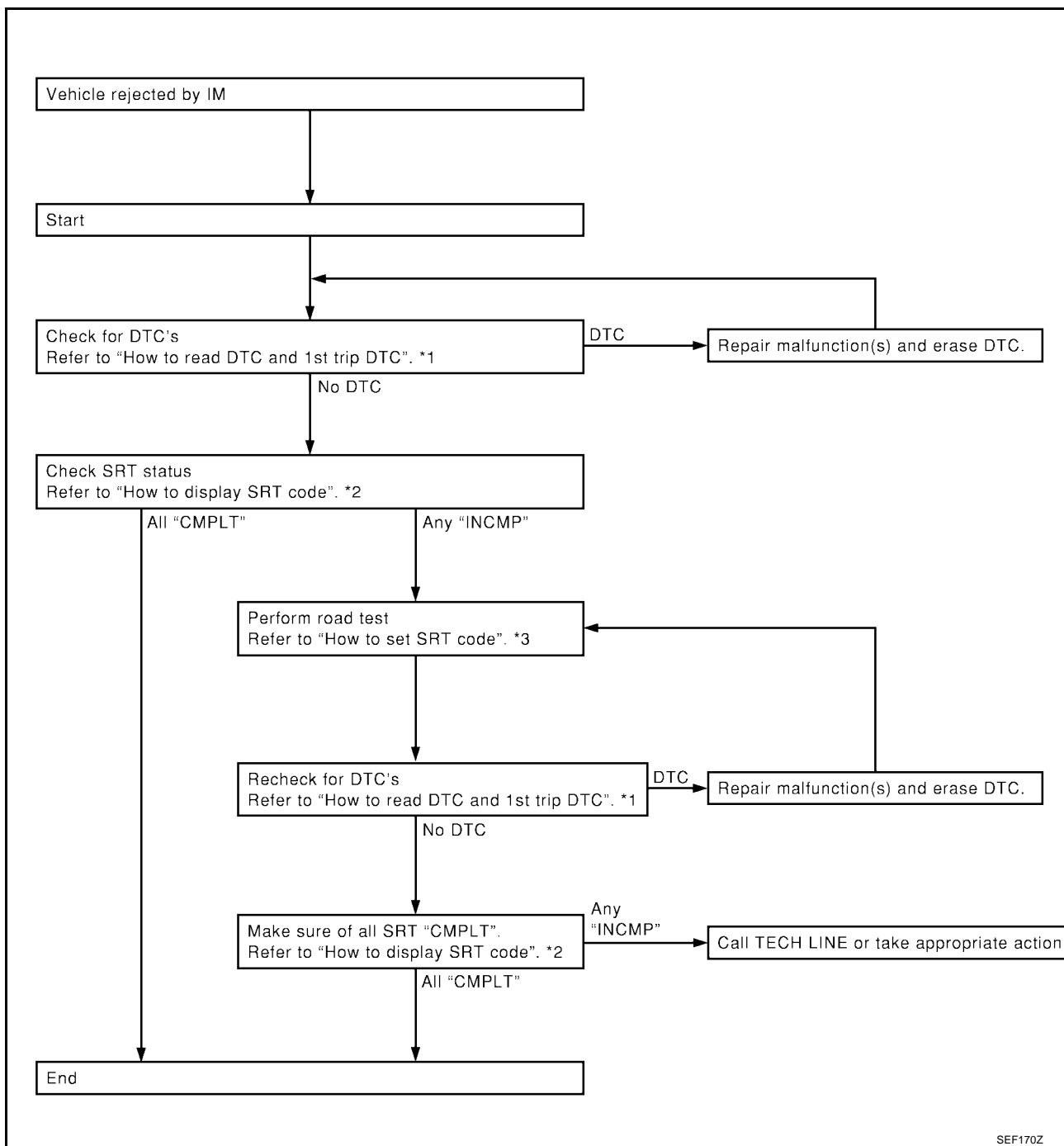
I

J

K

L

M



SEF170Z

\*1 [EC-1264](#)                      \*2 [EC-1268](#)                      \*3 [EC-1269](#)

## How to Display SRT Code

### Ⓜ WITH CONSULT-II

Selecting "SRT STATUS" in "DTC CONFIRMATION" mode with CONSULT-II.

For items whose SRT codes are set, a "CMPLT" is displayed on the CONSULT-II screen; for items whose SRT codes are not set, "INCMP" is displayed.

A sample of CONSULT-II display for SRT code is shown at right. "INCMP" means the self-diagnosis is incomplete and SRT is not set. "CMPLT" means the self-diagnosis is complete and SRT is set.

### Ⓜ WITH GST

Selecting Mode 1 with GST (Generic Scan Tool)

SRT STATUS	
CATALYST	CMPLT
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	CMPLT

SEF949Z

## How to Set SRT Code

To set all SRT codes, self-diagnosis for the items indicated above must be performed one or more times. Each diagnosis may require a long period of actual driving under various conditions.

### WITH CONSULT-II

Perform corresponding DTC Confirmation Procedure one by one based on "Performance Priority" in the table on [EC-1266, "SRT Item"](#).

### WITHOUT CONSULT-II

The most efficient driving pattern in which SRT codes can be properly set is explained on the next page. The driving pattern should be performed one or more times to set all SRT codes.

A

EC

C

D

E

F

G

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I

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K

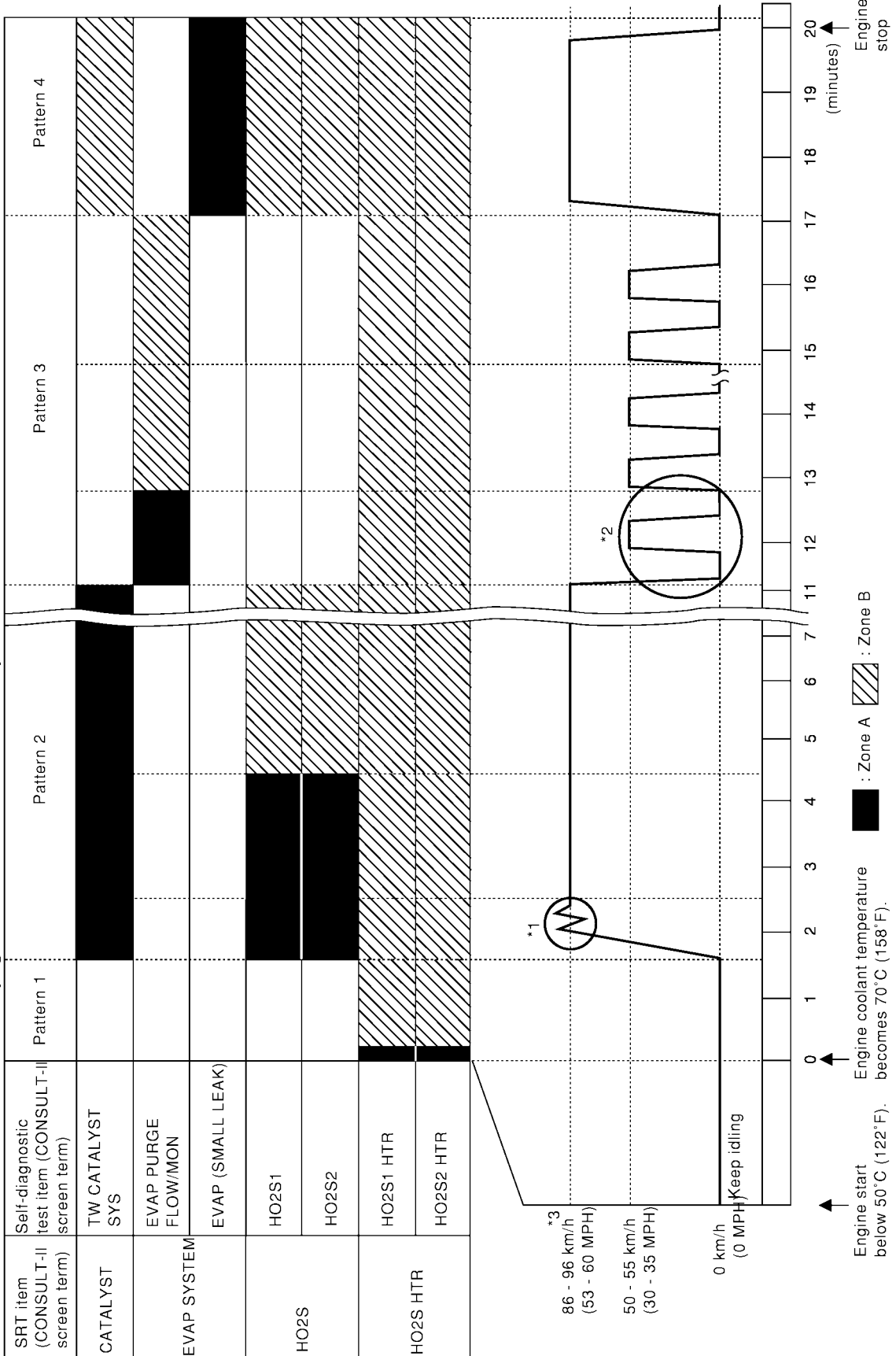
L

M

## Driving Pattern

**Note: Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws. Refer to next page for more information and explanation of chart.**

### Driving pattern



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# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR25DE]

- The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.  
Zone A refers to the range where the time, required for the diagnosis under normal conditions\*, is the shortest.  
Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

\*: Normal conditions refer to the following:

- Sea level
- Flat road
- Ambient air temperature: 20 - 30°C (68 - 86°F)
- Diagnosis is performed as quickly as possible under normal conditions.  
Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

- **The engine is started at the engine coolant temperature of -10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 93 and ground is 3.0 - 4.3V).**
- **The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 93 and ground is lower than 1.4V).**
- **The engine is started at the fuel tank temperature of warmer than 0°C (32°F) (where the voltage between the ECM terminal 70 and ground is less than 4.1V).**

Pattern 2:

- When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

Pattern 3:

- The driving pattern outlined in \*2 must be repeated at least 3 times.

Pattern 4:

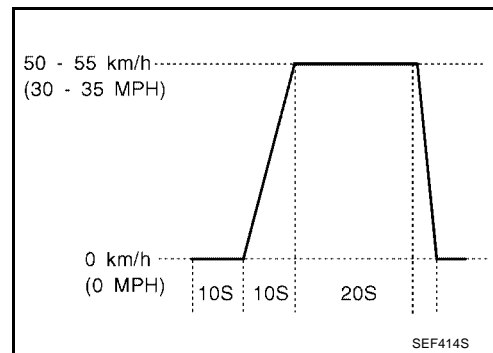
- Tests are performed after the engine has been operated for at least 17 minutes.
- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

\*1: Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH), then release the accelerator pedal and keep it released for more than 10 seconds. Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH) again.

\*2: Operate the vehicle in the following driving pattern.

1. Decelerate vehicle to 0 km/h (0 MPH) and let engine idle.
2. Repeat driving pattern shown at right at least 10 times.  
- **During acceleration, hold the accelerator pedal as steady as possible.**

\*3: Checking the vehicle speed with GST is advised.



## Suggested Transmission Gear Position for A/T Models

Set the selector lever in the "D" position with the overdrive switch turned ON.

## Suggested Upshift Speeds for M/T Models

Shown below are suggested vehicle speeds for shifting into a higher gear. These suggestions relate to fuel economy and vehicle performance. Actual upshift speeds will vary according to road conditions, the weather and individual driving habits.

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR25DE]

## Model with 5-speed

Gear change	For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft)]:		For normal acceleration in high altitude areas [over 1,219 m (4,000 ft)]:
	ACCEL shift point km/h (MPH)	CRUISE shift point km/h (MPH)	km/h (MPH)
1st to 2nd	24 (15)	24 (15)	24 (15)
2nd to 3rd	40 (25)	29 (18)	40 (25)
3rd to 4th	58 (36)	48 (30)	64 (40)
4th to 5th	64 (40)	62 (39)	72 (45)

## Model with 6-speed

Gear change	For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft)]:		For normal acceleration in high altitude areas [over 1,219 m (4,000 ft)]:	
	ACCEL shift point km/h (MPH)	CRUISE shift point km/h (MPH)	ACCEL shift point km/h (MPH)	CRUISE shift point km/h (MPH)
1st to 2nd	26 (16)	16 (10)	26 (16)	24 (15)
2nd to 3rd	42 (26)	23 (14)	42 (26)	40 (25)
3rd to 4th	55 (34)	40 (25)	64 (40)	64 (40)
4th to 5th	66 (41)	60 (37)	72 (45)	72 (45)
5th to 6th	72 (45)	72 (45)	80 (50)	80 (50)

### Suggested Maximum Speed in Each Gear

Downshift to a lower gear if the engine is not running smoothly, or if you need to accelerate.

Do not exceed the maximum suggested speed (shown below) in any gear. For level road driving, use the highest gear suggested for that speed. Always observe posted speed limits and drive according to the road conditions to ensure safe operation. Do not over-rev the engine when shifting to a lower gear as it may cause engine damage or loss of vehicle control.

## Model with 5-speed

Gear	km/h (MPH)
1st	55 (35)
2nd	95 (60)
3rd	135 (85)
4th	—
5th	—

## Model with 6-speed

Gear	km/h (MPH)
1st	45 (25)
2nd	80 (50)
3rd	130 (80)
4th	—
5th	—
6th	—

### TEST VALUE AND TEST LIMIT (GST ONLY — NOT APPLICABLE TO CONSULT-II)

The following is the information specified in Mode 6 of SAE J1979.

The test value is a parameter used to determine whether a system/circuit diagnostic test is "OK" or "NG" while being monitored by the ECM during self-diagnosis. The test limit is a reference value which is specified as the maximum or minimum value and is compared with the test value being monitored.

Items for which these data (test value and test limit) are displayed are the same as SRT code items (18 test items).



# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR25DE]

These data (test value and test limit) are specified by Test ID (TID) and Component ID (CID) and can be displayed on the GST screen.

×: Applicable —: Not applicable

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
CATALYST	Three way catalyst function	01H	01H	Max.	×
		02H	81H	Min.	×
EVAP SYSTEM	EVAP control system (Small leak)	05H	03H	Max.	×
	EVAP control system purge flow monitoring	06H	83H	Min.	×
	EVAP control system (Very small leak)	07H	03H	Max.	×
HO2S	Heated oxygen sensor 1	09H	04H	Max.	×
		0AH	84H	Min.	×
		0BH	04H	Max.	×
		0CH	04H	Max.	×
	Heated oxygen sensor 2	0DH	04H	Max.	×
		19H	86H	Min.	×
		1AH	86H	Min.	×
		1BH	06H	Max.	×
HO2S HTR	Heated oxygen sensor 1 heater	1CH	06H	Max.	×
		29H	08H	Max.	×
	Heated oxygen sensor 2 heater	2AH	88H	Min.	×
		2DH	0AH	Max.	×
		2EH	8AH	Min.	×

## HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

### Ⓟ How to Erase DTC ( With CONSULT-II)

The emission related diagnostic information in the ECM can be erased by selecting “ERASE” in the “SELF-DIAG RESULTS” mode with CONSULT-II.

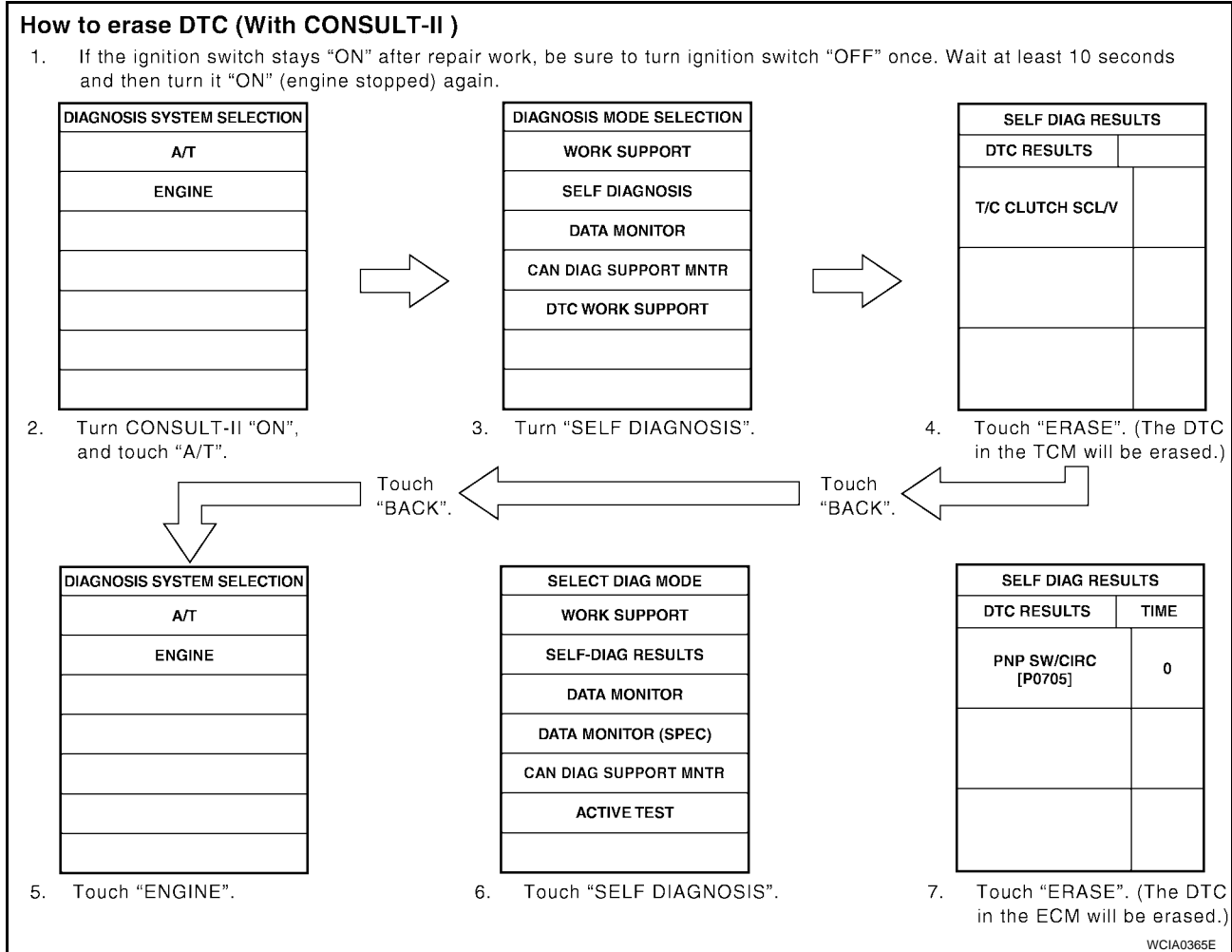
If DTCs are displayed for both ECM and TCM (Transmission control module), they need to be erased individually from the ECM and TCM (Transmission control module).

#### NOTE:

**If the DTC is not for A/T related items (see [EC-1224](#) ), skip steps 2 through 4.**

1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait at least 10 seconds and then turn it “ON” (engine stopped) again.
2. Turn CONSULT-II “ON” and touch “A/T”.
3. Touch “SELF-DIAG RESULTS”.
4. Touch “ERASE”. [The DTC in the TCM (Transmission control module) will be erased.] Then touch “BACK” twice.
5. Touch “ENGINE”.
6. Touch “SELF-DIAG RESULTS”.

7. Touch "ERASE". (The DTC in the ECM will be erased.)



### How to Erase DTC ( With GST)

The emission related diagnostic information in the ECM can be erased by selecting Mode 4 with GST.

**NOTE:**

**If the DTC is not for A/T related items (see [EC-1224](#) ), skip step 2.**

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
2. Perform "SELF-DIAGNOSTIC PROCEDURE (Without CONSULT-II)" in AT section titled "TROUBLE DIAGNOSIS", "Self-diagnosis". (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Select Mode 4 with GST (Generic Scan Tool).

### How to Erase DTC ( No Tools)

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once.
  2. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
  3. Change the diagnostic test mode from Mode II to Mode I by depressing the accelerator pedal. Refer to [EC-1276. "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#) .
- **If the battery is disconnected, the emission-related diagnostic information will be lost after approx. 24 hours.**
  - **The following data are cleared when the ECM memory is erased.**
    - Diagnostic trouble codes
    - 1st trip diagnostic trouble codes
    - Freeze frame data
    - 1st trip freeze frame data

- System readiness test (SRT) codes
- Test values
- Others

Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

## NVIS (Nissan Vehicle Immobilizer System — NATS)

UBS0027C

- If the security indicator lights up with the ignition switch in the “ON” position or “NATS MALFUNCTION” is displayed on “SELF-DIAG RESULTS” screen, perform self-diagnostic results mode with CONSULT-II using NATS program card. Refer to [BL-95, "NVIS \(NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS\)"](#).
- Confirm no self-diagnostic results of NVIS (NATS) is displayed before touching “ERASE” in “SELF-DIAG RESULTS” mode with CONSULT-II.
- When replacing ECM, initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs must be carried out with CONSULT-II using NATS program card.

SELF DIAG RESULTS	
DTC RESULTS	TIME
NATS MALFUNCTION [P1610]	0

SEF543X

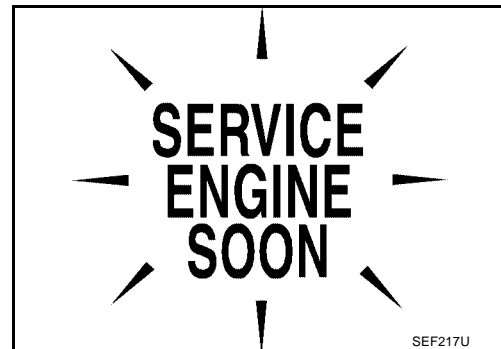
Therefore, be sure to receive all keys from vehicle owner. Regarding the procedures of NVIS (NATS) initialization and NVIS (NATS) ignition key ID registration, refer to CONSULT-II operation manual, IVIS/NVIS.

## Malfunction Indicator Lamp (MIL) DESCRIPTION

UBS0027D







The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check. If the MIL does not light up, refer to [DI-27, "WARNING LAMPS"](#), or see [EC-1586](#).
2. When the engine is started, the MIL should go off. If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.



## ON BOARD DIAGNOSTIC SYSTEM FUNCTION

The on board diagnostic system has the following four functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in "ON" position  Engine stopped 	BULB CHECK	This function checks the MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL circuit.
	Engine running 	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MIL in the 1st trip. <ul style="list-style-type: none"> <li>● "Misfire (Possible three way catalyst damage)"</li> <li>● One trip detection diagnosis</li> </ul>
Mode II	Ignition switch in "ON" position  Engine stopped 	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.
	Engine running 	HEATED OXYGEN SENSOR 1 MONITOR	This function allows the fuel mixture condition (lean or rich), monitored by heated oxygen sensor 1, to be read.

### MIL Flashing Without DTC

If the ECM is in Diagnostic Test Mode II, MIL may flash when engine is running. In this case, check ECM diagnostic test mode. [EC-1276, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#) .

How to switch the diagnostic test (function) modes, and details of the above functions are described later. [EC-1276, "HOW TO SWITCH DIAGNOSTIC TEST MODE"](#) .

The following emission-related diagnostic information is cleared when the ECM memory is erased.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values
- Others

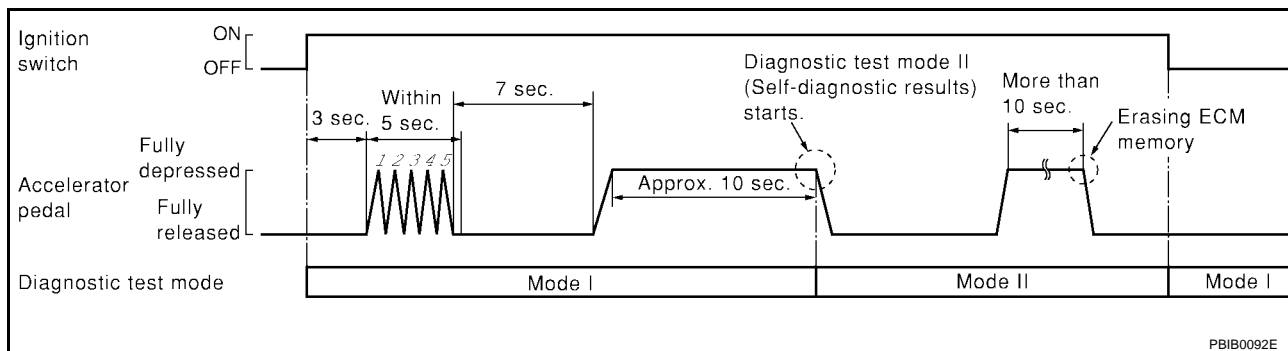
### HOW TO SWITCH DIAGNOSTIC TEST MODE

#### NOTE:

- It is better to count the time accurately with a clock.
- It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.
- Always ECM returns to Diagnostic Test Mode I after ignition switch is turned "OFF".

## How to Set Diagnostic Test Mode II (Self-diagnostic Results)

1. Confirm that accelerator pedal is fully released, turn ignition switch "ON" and wait 3 seconds.
2. Repeat the following procedure quickly five times within 5 seconds.
  - a. Fully depress the accelerator pedal.
  - b. Fully release the accelerator pedal.
3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MIL starts blinking.
4. Fully release the accelerator pedal.  
ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).



## How to Set Diagnostic Test Mode II (Heated Oxygen Sensor 1 Monitor)

1. Set the ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to [EC-1277, "How to Set Diagnostic Test Mode II \(Self-diagnostic Results\)"](#).
2. Start Engine.  
ECM has entered to Diagnostic Test Mode II (Heated oxygen sensor 1 monitor).

## How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to [EC-1277, "How to Set Diagnostic Test Mode II \(Self-diagnostic Results\)"](#).
2. Fully depress the accelerator pedal and keep it for more than 10 seconds.  
The emission-related diagnostic information has been erased from the backup memory in the ECM.
3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

## DIAGNOSTIC TEST MODE I — BULB CHECK

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to [DI-27, "WARNING LAMPS"](#) or see [EC-1586](#).

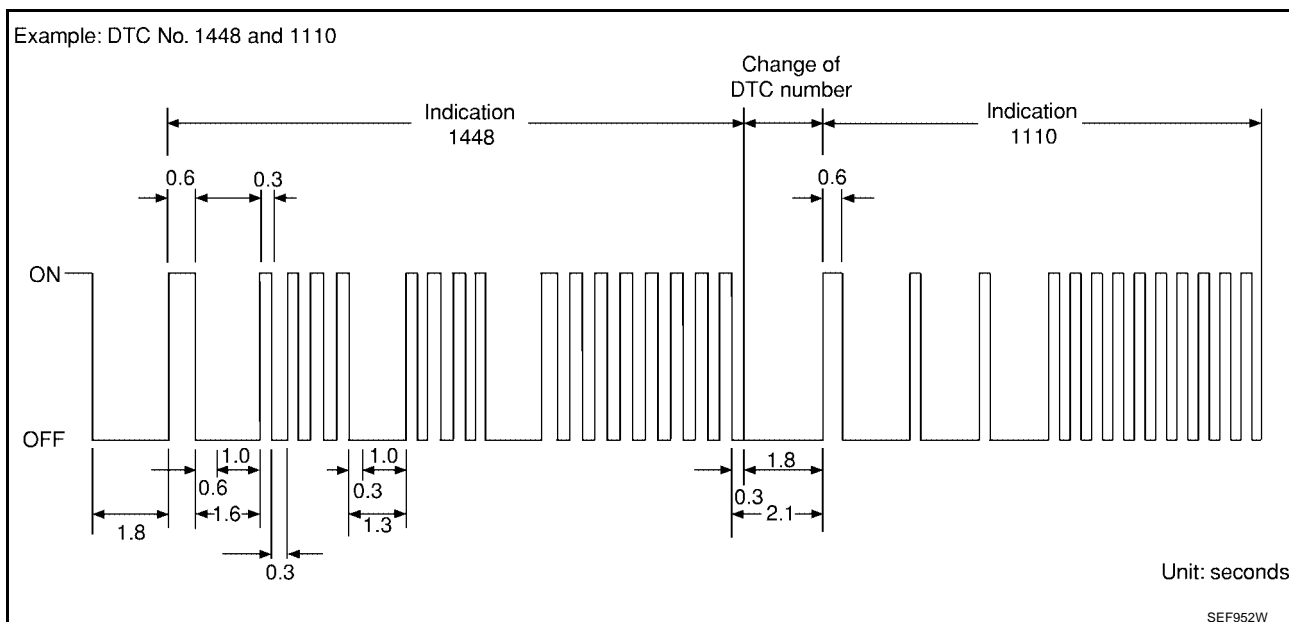
## DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

MIL	Condition
ON	When the malfunction is detected or the ECM's CPU is malfunctioning.
OFF	No malfunction.

These DTC numbers are clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS)

## DIAGNOSTIC TEST MODE II — SELF-DIAGNOSTIC RESULTS

In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MIL as shown below. The DTC and 1st trip DTC are displayed at the same time. If the MIL does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MIL illuminates in diagnostic test mode II (SELF-DIAGNOSTIC RESULTS), it is a DTC; if two or more codes are displayed, they may be either DTCs or 1st trip DTCs. DTC No. is same as that of 1st trip DTC. These unidentified codes can be identified by using the CONSULT-II or GST. A DTC will be used as an example for how to read a code.



A particular trouble code can be identified by the number of four-digit numeral flashes. The “zero” is indicated by the number of ten flashes. The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-second) - OFF (0.6-second) cycle.

The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second OFF cycle.

A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared.

A change from one trouble code to another occurs at an interval of 1.8-second OFF.

In this way, all the detected malfunctions are classified by their DTC numbers. The DTC “0000” refers to no malfunction. (See [EC-1224, "INDEX FOR DTC"](#) )

### How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to [EC-1277, "How to Erase Diagnostic Test Mode II \(Self-diagnostic Results\)"](#) .

- If the battery is disconnected, the DTC will be lost from the backup memory after approx 24 hours.
- Be careful not to erase the stored memory before starting trouble diagnoses.

### DIAGNOSTIC TEST MODE II — HEATED OXYGEN SENSOR 1 MONITOR

In this mode, the MIL displays the condition of the fuel mixture (lean or rich) which is monitored by the heated oxygen sensor 1.

MIL	Fuel mixture condition in the exhaust gas	Air fuel ratio feedback control condition
ON	Lean	Closed loop system
OFF	Rich	
*Remains ON or OFF	Any condition	Open loop system

\*: Maintains conditions just before switching to open loop.

To check the heated oxygen sensor 1 function, start engine in the Diagnostic Test Mode II and warm it up until engine coolant temperature indicator points to the middle of the gauge.

Next run engine at about 2,000 rpm for about 2 minutes under no-load conditions. Then make sure that the MIL comes ON more than 5 times within 10 seconds with engine running at 2,000 rpm under no-load.

### OBD System Operation Chart

#### RELATIONSHIP BETWEEN MIL, 1ST TRIP DTC, DTC, AND DETECTABLE ITEMS

UBS0027E

- When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data are stored in the ECM memory.
- When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data are stored in the ECM memory, and the MIL will come on. For details, refer to [EC-1260, "Two Trip Detection Logic"](#) .

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR25DE]

- The MIL will go off after the vehicle is driven 3 times with no malfunction. The drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset. A
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (driving pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (driving pattern C) without the same malfunction recurring. The "TIME" in "SELF-DIAGNOSTIC RESULTS" mode of CONSULT-II will count the number of times the vehicle is driven. EC
- The 1st trip DTC is not displayed when the self-diagnosis results in "OK" for the 2nd trip. C

## SUMMARY CHART

Items	Fuel Injection System	Misfire	Other
MIL (goes off)	3 (pattern B)	3 (pattern B)	3 (pattern B)
DTC, Freeze Frame Data (no display)	80 (pattern C)	80 (pattern C)	40 (pattern A)
1st Trip DTC (clear)	1 (pattern C), *1	1 (pattern C), *1	1 (pattern B)
1st Trip Freeze Frame Data (clear)	*1, *2	*1, *2	1 (pattern B)

For details about patterns "B" and "C" under "Fuel Injection System" and "Misfire", see [EC-1281](#).

For details about patterns "A" and "B" under "Other", see [EC-1283](#).

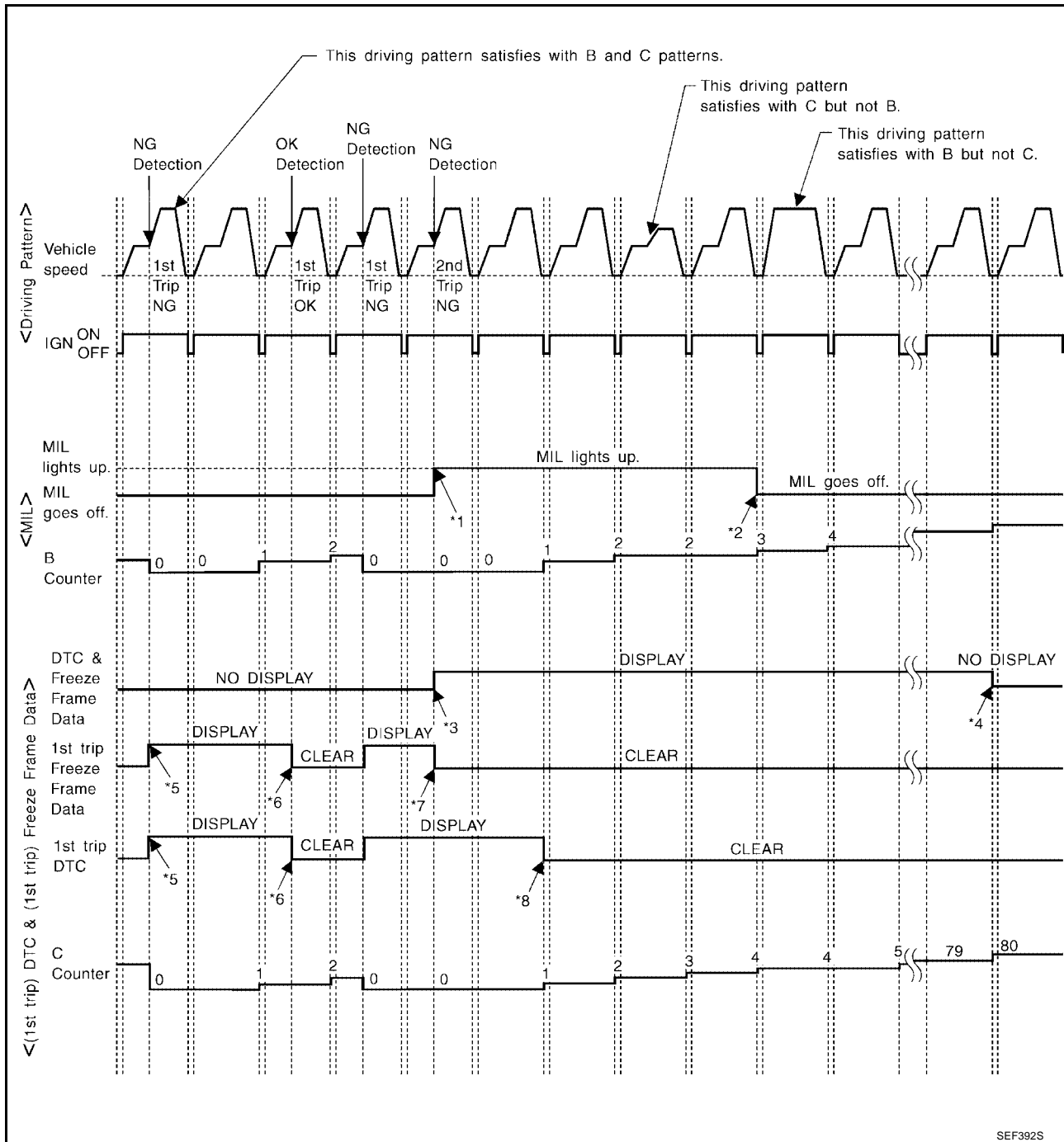
\*1: Clear timing is at the moment OK is detected.

\*2: Clear timing is when the same malfunction is detected in the 2nd trip.

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR25DE]

## RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"



SEF392S

\*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

\*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

\*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

\*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

\*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

\*6: The 1st trip DTC and the 1st trip freeze frame data will be cleared at the moment OK is detected.

\*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

\*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.



## EXPLANATION FOR DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”

### <Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunction.
- The MIL will go off when the B counter reaches 3. (\*2 in “OBD SYSTEM OPERATION CHART”)

### <Driving Pattern C>

Driving pattern C means the vehicle operation as follows:

The following conditions should be satisfied at the same time:

Engine speed: (Engine speed in the freeze frame data)  $\pm 375$  rpm

Calculated load value: (Calculated load value in the freeze frame data)  $\times (1 \pm 0.1)$  [%]

Engine coolant temperature (T) condition:

- When the freeze frame data shows lower than 70°C (158°F), “T” should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), “T” should be higher than or equal to 70°C (158°F).

Example:

If the stored freeze frame data is as follows:

Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F)

To be satisfied with driving pattern C, the vehicle should run under the following conditions:

Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

- The C counter will be cleared when the malfunction is detected regardless of the vehicle conditions described above.
- The C counter will be counted up when the vehicle conditions described above is satisfied without the same malfunction.
- The DTC will not be displayed after C counter reaches 80.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

A

EC

C

D

E

F

G

H

I

J

K

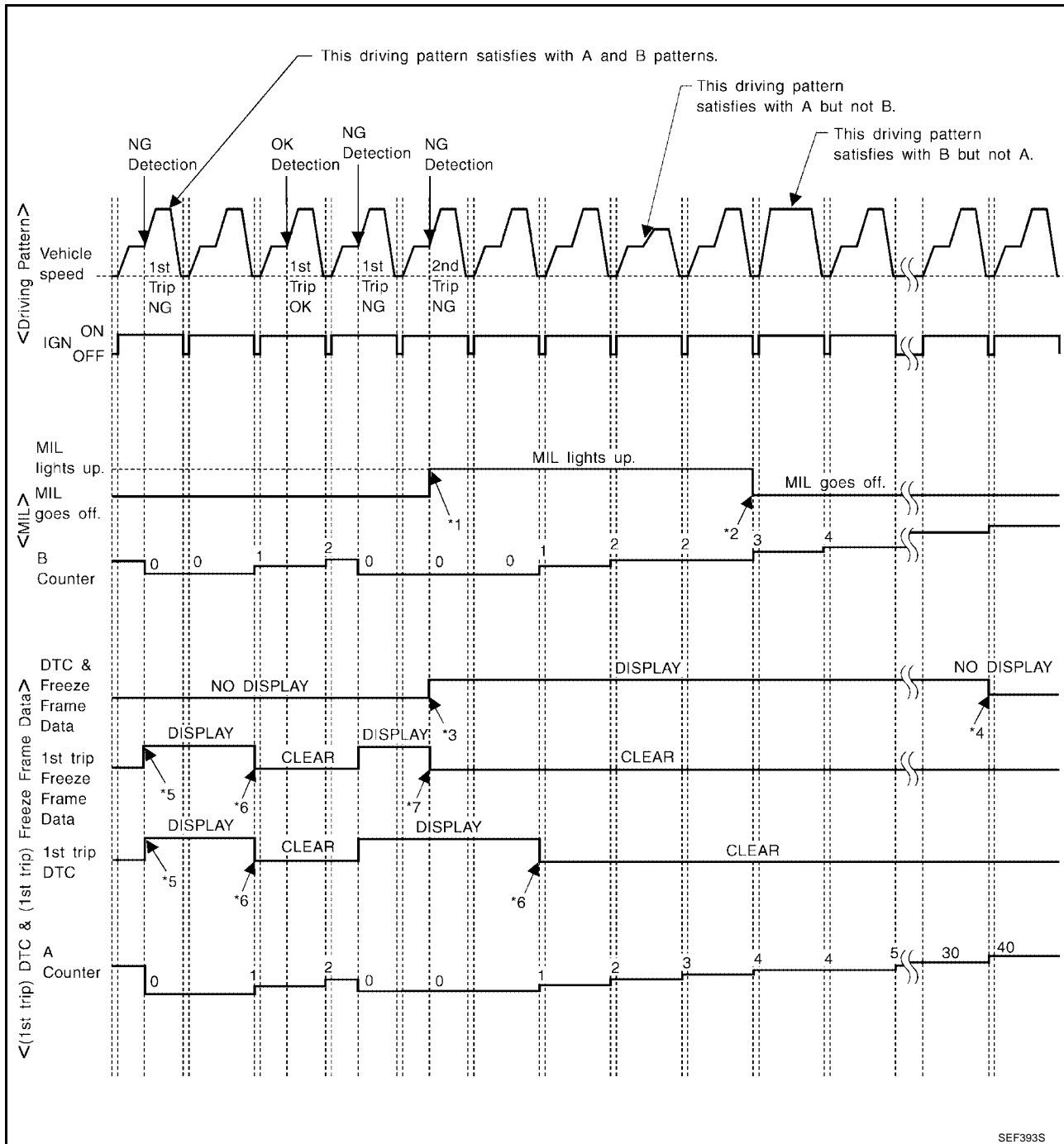
L

M

# ON BOARD DIAGNOSTIC (OBD) SYSTEM

[QR25DE]

## RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"



SEF393S

\*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

\*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

\*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

\*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

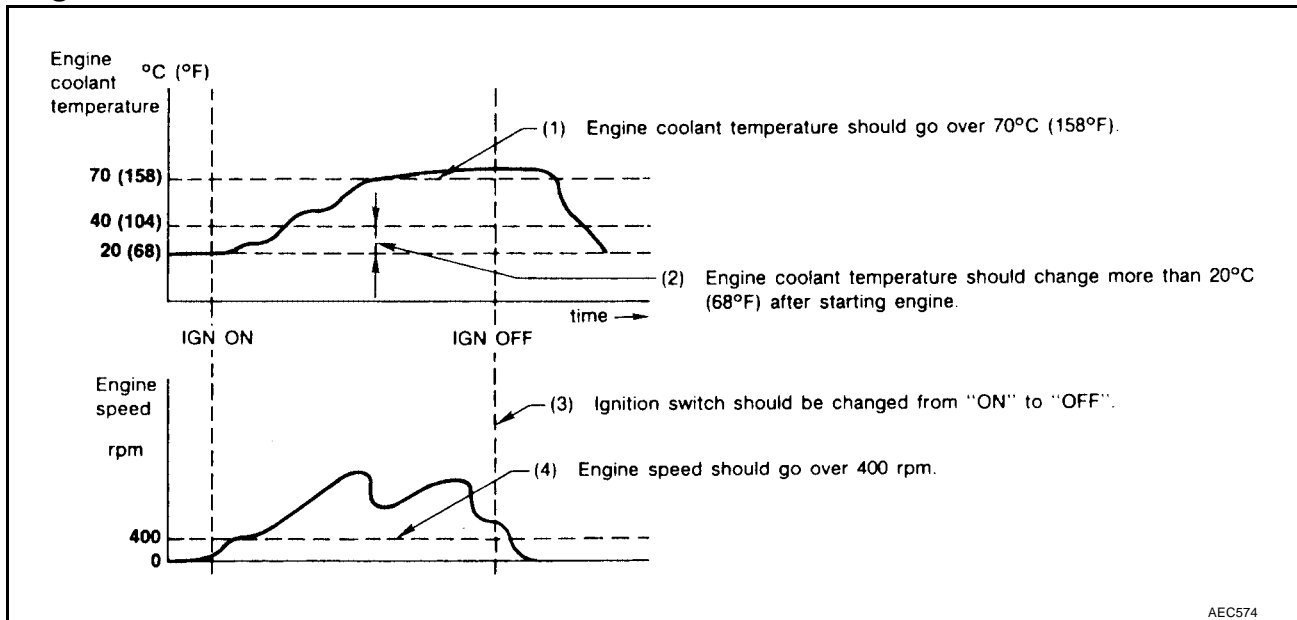
\*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

\*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.

\*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

## EXPLANATION FOR DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

### <Driving Pattern A>



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

### <Driving Pattern B>

Driving pattern B means the vehicle operation as follows:

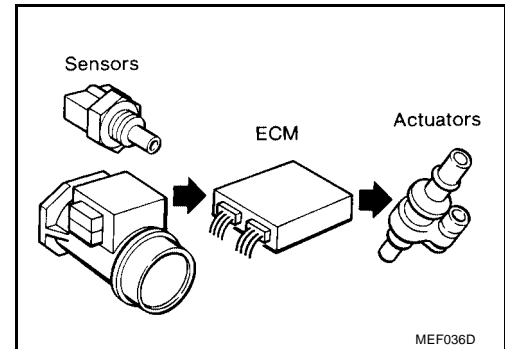
All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunctions.
- The MIL will go off when the B counter reaches 3 (\*2 in "OBD SYSTEM OPERATION CHART").

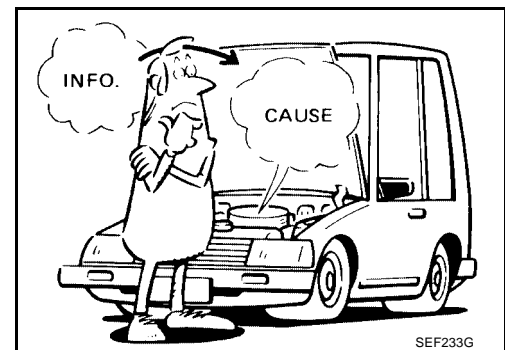
## TROUBLE DIAGNOSIS

### Trouble Diagnosis Introduction INTRODUCTION

The engine has an ECM to control major systems such as fuel control, ignition control, idle air control system, etc. The ECM accepts input signals from sensors and instantly drives actuators. It is essential that both input and output signals are proper and stable. At the same time, it is important that there are no malfunctions such as vacuum leaks, fouled spark plugs, or other malfunctions with the engine.



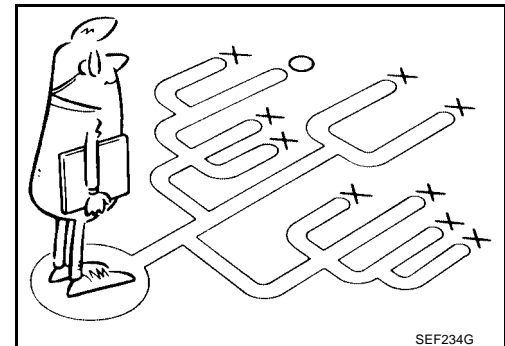
It is much more difficult to diagnose an incident that occurs intermittently rather than continuously. Most intermittent incidents are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.



A visual check only may not find the cause of the incidents. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the "Work Flow" on [EC-1285](#).

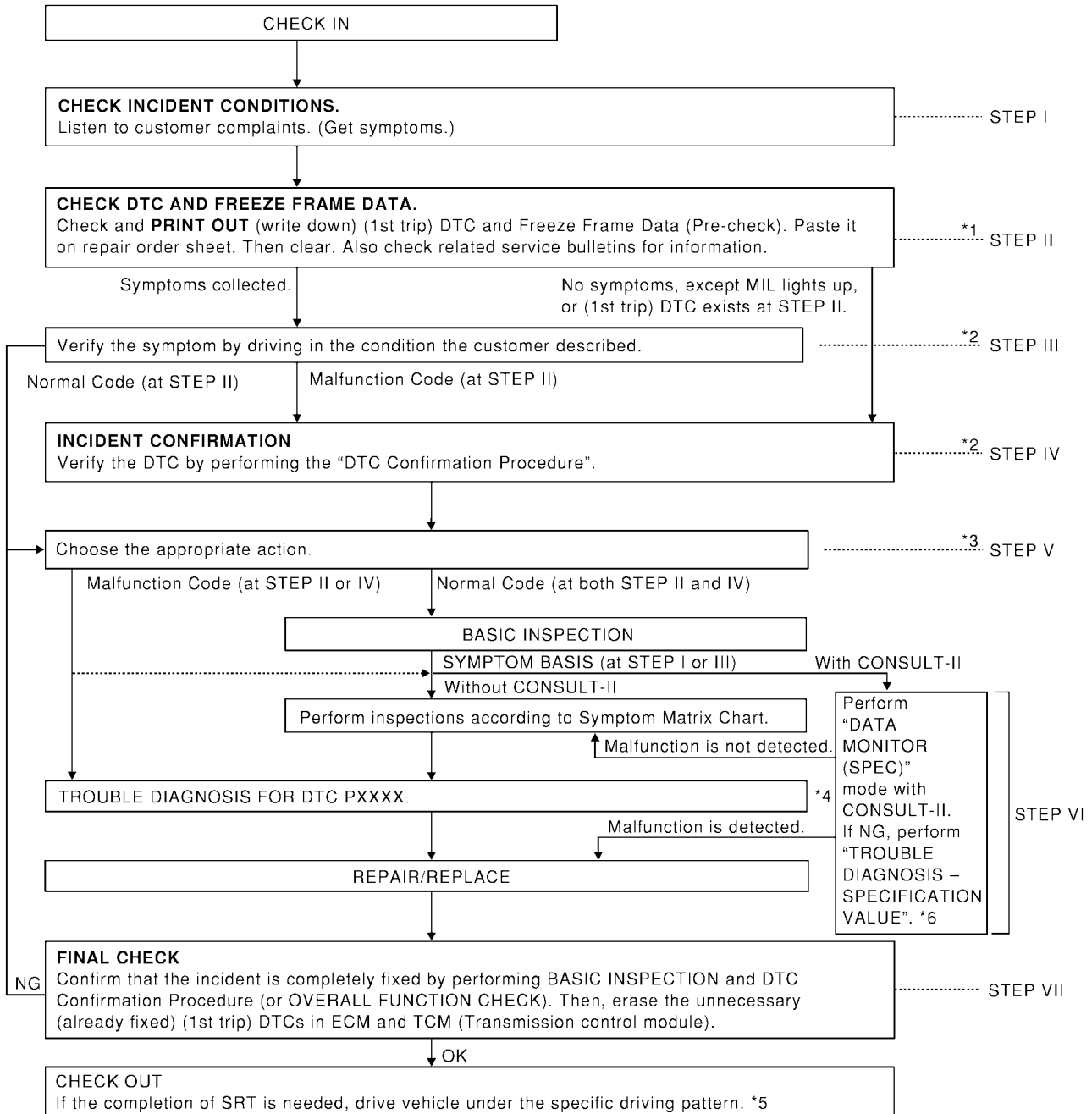
Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such incidents, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "Diagnostic Worksheet" like the example on [EC-1288](#) should be used.

Start your diagnosis by looking for "conventional" incidents first. This will help troubleshoot driveability incidents on an electronically controlled engine vehicle.



## WORK FLOW

### Flow Chart



\*1 If time data of "SELF-DIAG RESULTS" is other than "0" or "[1t]", perform [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

\*4 If malfunctioning part cannot be detected, perform [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

\*2 If the incident cannot be verified, perform [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

\*5 [EC-1270](#)

\*3 If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to [EC-1342, "POWER SUPPLY CIRCUIT FOR ECM"](#) .

\*6 [EC-1337](#)

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# TROUBLE DIAGNOSIS

[QR25DE]

## Description for Work Flow

STEP	DESCRIPTION
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the "DIAGNOSTIC WORK SHEET", <a href="#">EC-1287</a> .
STEP II	Before confirming the concern, check and write down (print out using CONSULT-II or GST) the (1st trip) DTC and the (1st trip) freeze frame data, then erase the DTC and the data. (Refer to <a href="#">EC-1273</a> .) The (1st trip) DTC and the (1st trip) freeze frame data can be used when duplicating the incident at STEP III & IV. If the incident cannot be verified, perform <a href="#">EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"</a> . Study the relationship between the cause, specified by (1st trip) DTC, and the symptom described by the customer. (The "Symptom Matrix Chart" will be useful. See <a href="#">EC-1295</a> .) Also check related service bulletins for information.
STEP III	Try to confirm the symptom and under what conditions the incident occurs. The "DIAGNOSTIC WORK SHEET" and the freeze frame data are useful to verify the incident. Connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot be verified, perform <a href="#">EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"</a> . If the malfunction code is detected, skip STEP IV and perform STEP V.
STEP IV	Try to detect the (1st trip) DTC by driving in (or performing) the "DTC Confirmation Procedure". Check and read the (1st trip) DTC and (1st trip) freeze frame data by using CONSULT-II or GST. During the (1st trip) DTC verification, be sure to connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot be verified, perform <a href="#">EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"</a> . In case the "DTC Confirmation Procedure" is not available, perform the "Overall Function Check" instead. The (1st trip) DTC cannot be displayed by this check, however, this simplified "check" is an effective alternative. The "NG" result of the "Overall Function Check" is the same as the (1st trip) DTC detection.
STEP V	Take the appropriate action based on the results of STEP I through IV. If the malfunction code is indicated, proceed to TROUBLE DIAGNOSIS FOR DTC PXXXX. If the normal code is indicated, proceed to the BASIC INSPECTION. (Refer to <a href="#">EC-1291</a> .) If CONSULT-II is available, perform "DATA MONITOR (SPEC)" mode with CONSULT-II and proceed to the "TROUBLE DIAGNOSIS – SPECIFICATION VALUE". (Refer to <a href="#">EC-1337</a> .) (If malfunction is detected, proceed to "REPAIR/REPLACE".) Then perform inspections according to the Symptom Matrix Chart. (Refer to <a href="#">EC-1295</a> .)
STEP VI	Identify where to begin diagnosis based on the relationship study between symptom and possible causes. Inspect the system for mechanical binding, loose connectors or wiring damage using (tracing) "Harness Layouts". Gently shake the related connectors, components or wiring harness with CONSULT-II set in "DATA MONITOR (AUTO TRIG)" mode. Check the voltage of the related ECM terminals or monitor the output data from the related sensors with CONSULT-II. Refer to <a href="#">EC-1307</a> , <a href="#">EC-1331</a> . The "Diagnostic Procedure" in EC section contains a description based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure. For details, refer to "Circuit Inspection" in <a href="#">GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"</a> . Repair or replace the malfunction parts. If malfunctioning part cannot be detected, perform <a href="#">EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"</a> .
STEP VII	Once you have repaired the circuit or replaced a component, you need to run the engine in the same conditions and circumstances which resulted in the customer's initial complaint. Perform the "DTC Confirmation Procedure" and confirm the normal code [DTC No. P0000] is detected. If the incident is still detected in the final check, perform STEP VI by using a method different from the previous one. Before returning the vehicle to the customer, be sure to erase the unnecessary (already fixed) (1st trip) DTC in ECM and TCM (Transmission control module). (Refer to <a href="#">EC-1273, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"</a> and <a href="#">AT-430, "HOW TO ERASE DTC"</a> .)

## DIAGNOSTIC WORKSHEET

### Description

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate.

In general, each customer feels differently about an incident. It is important to fully understand the symptoms or conditions for a customer complaint.

Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.

Some conditions may cause the MIL to come on steady or blink and DTC to be detected. Examples:

- Vehicle ran out of fuel, which caused the engine to misfire.
- Fuel filler cap was left off or incorrectly screwed on, allowing fuel to evaporate into the atmosphere.

### KEY POINTS

**WHAT** ..... Vehicle & engine model  
**WHEN** ..... Date, Frequencies  
**WHERE**..... Road conditions  
**HOW** ..... Operating conditions,  
Weather conditions,  
Symptoms

SEF907L

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M





# TROUBLE DIAGNOSIS

[QR25DE]

Priority	Detected items (DTC)	
1	<ul style="list-style-type: none"> <li>● U1000 U1001 CAN communication line</li> <li>● P0101 P0102 P0103 P1102 Mass air flow sensor</li> <li>● P0112 P0113 P0127 Intake air temperature sensor</li> <li>● P0117 P0118 P0125 Engine coolant temperature sensor</li> <li>● P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor</li> <li>● P0128 Thermostat function</li> <li>● P0181 P0182 P0183 Fuel tank temperature sensor</li> <li>● P0327 P0328 Knock sensor</li> <li>● P0335 Crankshaft position sensor (POS)</li> <li>● P0340 Camshaft position sensor (PHASE)</li> <li>● P0460 P0461 P0462 P0463 P1464 Fuel level sensor</li> <li>● P0500 Vehicle speed sensor</li> <li>● P0605 ECM</li> <li>● P1229 Sensor power supply</li> <li>● P1610-P1615 NATS</li> <li>● P1706 Park/Neutral position (PNP) switch</li> <li>● P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor</li> </ul>	<p>A</p> <p><b>EC</b></p> <p>C</p> <p>D</p> <p>E</p> <p>F</p>
2	<ul style="list-style-type: none"> <li>● P0031 P0032 Heated oxygen sensor 1 heater</li> <li>● P0037 P0038 Heated oxygen sensor 2 heater</li> <li>● P0132 P0133 P0134 P1143 P1144 Heated oxygen sensor 1</li> <li>● P0138 P0139 P1146 P1147 Heated oxygen sensor 2</li> <li>● P0217 Coolant overtemperature enrichment protection</li> <li>● P0441 EVAP control system purge flow monitoring</li> <li>● P0444 P0445 P1444 EVAP canister purge volume control solenoid valve</li> <li>● P0447 P1446 P1448 EVAP canister vent control valve</li> <li>● P0452 P0453 EVAP control system pressure sensor</li> <li>● P0506 P0507 Idle speed control system</li> <li>● P0650 MIL</li> <li>● P0705-P0725, P0740-P0755, P1705 P1760 A/T related sensors and solenoid valves</li> <li>● P1065 ECM power supply</li> <li>● P1111 Intake valve timing control solenoid valve</li> <li>● P1122 Electric throttle control function</li> <li>● P1124 P1126 Throttle control motor relay</li> <li>● P1128 Electric throttle control actuator</li> <li>● P1490 P1491 Vacuum cut valve bypass valve</li> <li>● P1805 Brake switch</li> </ul>	<p>G</p> <p>H</p> <p>I</p> <p>J</p> <p>K</p> <p>L</p> <p>M</p>
3	<ul style="list-style-type: none"> <li>● P0011 Intake valve timing control</li> <li>● P0171 P0172 Fuel injection system function</li> <li>● P0300 - P0304 Misfire</li> <li>● P0420 Three way catalyst function</li> <li>● P0442 P0456 P1456 EVAP control system (SMALL LEAK, VERY SMALL LEAK)</li> <li>● P0455 EVAP control system (GROSS LEAK)</li> <li>● P0731 - P0734 A/T function</li> <li>● P1121 Electric throttle control actuator</li> <li>● P1148 Closed loop control</li> <li>● P1217 Engine over temperature (OVERHEAT)</li> <li>● P1564 ASCD steering switch</li> <li>● P1572 ASCD brake switch</li> <li>● P1574 ASCD vehicle speed sensor</li> </ul>	

# TROUBLE DIAGNOSIS

[QR25DE]

UBS0027H

## Fail-safe Chart

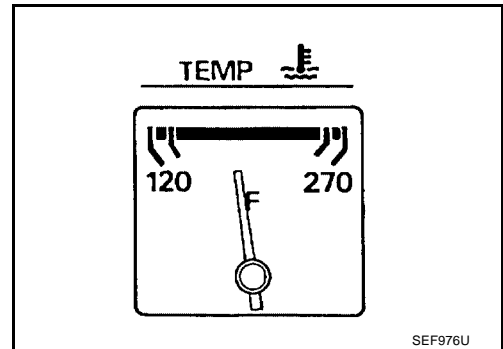
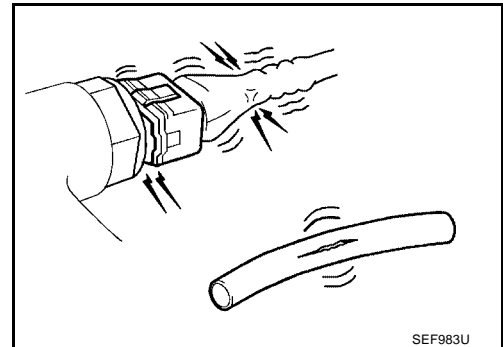
The ECM enters fail-safe mode, if any of the following malfunctions is detected. When the ECM enters the fail-safe mode, the MIL illuminates.

DTC No.	Detected items	Engine operating condition in fail-safe mode								
P0102 P0103 P1102	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.								
P0117 P0118	Engine coolant temperature sensor circuit	<p>Engine coolant temperature will be determined by ECM based on the time after turning ignition switch "ON" or "START". CONSULT-II displays the engine coolant temperature decided by ECM.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Engine coolant temperature decided (CONSULT-II display)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Just as ignition switch is turned ON or Start</td> <td style="text-align: center;">40°C (104°F)</td> </tr> <tr> <td style="text-align: center;">More than approx. 4 minutes after ignition ON or Start</td> <td style="text-align: center;">80°C (176°F)</td> </tr> <tr> <td style="text-align: center;">Except as shown above</td> <td style="text-align: center;">40 - 80°C (104 - 176°F) (Depends on the time)</td> </tr> </tbody> </table> <p>When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.</p>	Condition	Engine coolant temperature decided (CONSULT-II display)	Just as ignition switch is turned ON or Start	40°C (104°F)	More than approx. 4 minutes after ignition ON or Start	80°C (176°F)	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
Condition	Engine coolant temperature decided (CONSULT-II display)									
Just as ignition switch is turned ON or Start	40°C (104°F)									
More than approx. 4 minutes after ignition ON or Start	80°C (176°F)									
Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)									
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal operation. So, the acceleration will be poor.								
P1121	Electric throttle control actuator (ECM detects the throttle valve is stuck open.)	While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in "N" or "P" position, and engine speed will not exceed 1,000 rpm or more.								
P1122	Electric throttle control function	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
P1124 P1126	Throttle control motor relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
P1128	Throttle control motor	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
P1229	Sensor power supply	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.								
P2122 P2123 P2127 P2128 P2138	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal operation. So, the acceleration will be poor.								

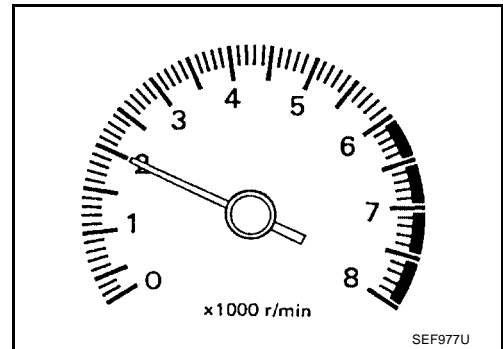
## Basic Inspection

### 1. INSPECTION START

1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
  - Harness connectors for improper connections
  - Wiring harness for improper connections, pinches and cut
  - Vacuum hoses for splits, kinks and improper connections
  - Hoses and ducts for leaks
  - Air cleaner clogging
  - Gasket
3. Confirm that electrical or mechanical loads are not applied.
  - Headlamp switch is OFF.
  - Air conditioner switch is OFF.
  - Rear window defogger switch is OFF.
  - Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge. Ensure engine stays below 1,000 rpm.



5. Run engine at about 2,000 rpm for about 2 minutes under no-load.
  6. Make sure that no DTC is displayed with CONSULT-II or GST.
- OK or NG**
- OK    >> GO TO 3.  
 NG    >> GO TO 2.



### 2. REPAIR OR REPLACE

Repair or replace components as necessary according to corresponding "Diagnostic Procedure".

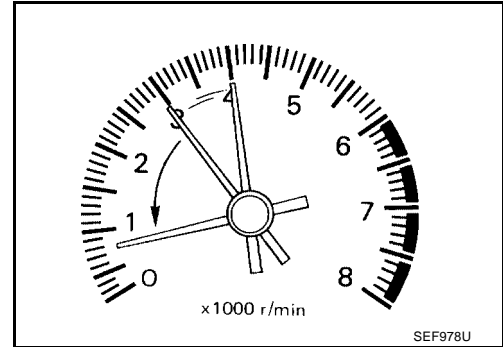
>> GO TO 3.

A  
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### 3. CHECK TARGET IDLE SPEED

#### ④ With CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.



3. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 700 ± 50 rpm**

**A/T: 700 ± 50 rpm (in "P" or "N" position)**

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### ⊗ Without CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.
3. Check idle speed.

**M/T: 700 ± 50 rpm**

**A/T: 700 ± 50 rpm (in "P" or "N" position)**

#### OK or NG

- OK >> GO TO 10.  
 NG >> GO TO 4.

### 4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform [EC-1255, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 5.

### 5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 6.

**6. PERFORM IDLE AIR VOLUME LEARNING**

Refer to [EC-1255, "Idle Air Volume Learning"](#) .

Is the Air Volume Learning carried out successfully?

Yes or No

Yes >> GO TO 7.

No >> 1. Follow the instruction of "Idle Air Volume Learning".

2. GO TO 4.

**7. CHECK TARGET IDLE SPEED AGAIN**

**Ⓜ With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 700 ± 50 rpm**

**A/T: 700 ± 50 rpm (in "P" or "N" position)**

**ⓧ Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

**M/T: 700 ± 50 rpm**

**A/T: 700 ± 50 rpm (in "P" or "N" position)**

OK or NG

OK >> GO TO 10.

NG >> GO TO 8.

**8. DETECT MALFUNCTIONING PART**

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-1496](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-1490](#) .

OK or NG

OK >> GO TO 9.

NG >> 1. Repair or replace.

2. GO TO 4.

**9. CHECK ECM FUNCTION**

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a incident, but this is the rarely the case.)
2. Perform initialization of NATS system and registration of NATS ignition key IDs. Refer to [EC-1275, "NVIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .

>> GO TO 4.

**10. CHECK IGNITION TIMING**

1. Run engine at idle.
2. Check ignition timing with a timing light.

**M/T: 15 ± 5° BTDC**

**A/T: 15 ± 5° BTDC (in "P" or "N" position)**

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 11.

**11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING**

---

1. Stop engine.
2. Perform [EC-1255, "Accelerator Pedal Released Position Learning"](#) .

>> GO TO 12.

**12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING**

---

Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .

>> GO TO 13.

**13. PERFORM IDLE AIR VOLUME LEARNING**

---

Refer to [EC-1255, "Idle Air Volume Learning"](#) .

**Is the "Idle Air Volume Learning" carried out successfully?**

Yes or No

- Yes >> GO TO 14.  
 No >> 1. Follow the instruction of "Idle Air Volume Learning".  
 2. GO TO 4.

**14. CHECK TARGET IDLE SPEED AGAIN**

---

**Ⓟ With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in "DATA MONITOR" mode with CONSULT-II.

**M/T: 700 ± 50 rpm**

**A/T: 700 ± 50 rpm (in "P" or "N" position)**

**ⓧ Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

**M/T: 700 ± 50 rpm**

**A/T: 700 ± 50 rpm (in "P" or "N" position)**

OK or NG

- OK >> GO TO 15.  
 NG >> GO TO 17.

**15. CHECK IGNITION TIMING AGAIN**

---

1. Run engine at idle.
2. Check ignition timing with a timing light.

**M/T: 15 ± 5° BTDC**

**A/T: 15 ± 5° BTDC (in "P" or "N" position)**

OK or NG

- OK >> **INSPECTION END**  
 NG >> GO TO 16.

**16. CHECK TIMING CHAIN INSTALLATION**

Check timing chain installation. Refer to [EM-134, "TIMING CHAIN"](#) .

OK or NG

- OK >> GO TO 17.
- NG >> 1. Repair the timing chain installation.  
2. GO TO 4.

**17. DETECT MALFUNCTIONING PART**

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to [EC-1496](#) .
- Check crankshaft position sensor (POS) and circuit. Refer to [EC-1490](#) .

OK or NG

- OK >> GO TO 18.
- NG >> 1. Repair or replace.  
2. GO TO 4.

**18. CHECK ECM FUNCTION**

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a incident, but this is the rarely the case.)
2. Perform initialization of NATS system and registration of NATS ignition key IDs. Refer to [EC-1275, "NVIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .

>> GO TO 4.

**Symptom Matrix Chart  
SYSTEM — BASIC ENGINE CONTROL SYSTEM**

UBS0027J

		SYMPTOM											Reference page		
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION		EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	<a href="#">EC-1806</a>
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			<a href="#">EC-1257</a>
	Injector circuit	1	1	2	3	2		2	2			2			<a href="#">EC-1796</a>
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			<a href="#">EC-1846</a>

# TROUBLE DIAGNOSIS

[QR25DE]

		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		<a href="#">EC-1858</a>
	Incorrect idle speed adjustment	3	3				1	1	1	1		1			<a href="#">EC-1291</a>
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	<a href="#">EC-1604</a> , <a href="#">EC-1606</a> , <a href="#">EC-1613</a> , <a href="#">EC-1618</a>
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			<a href="#">EC-1291</a>
	Ignition circuit	1	1	2	2	2		2	2			2			<a href="#">EC-1777</a>
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3			<a href="#">EC-1342</a>
Mass air flow sensor circuit		1	1	2	2	2		2	2			2			<a href="#">EC-1368</a> , <a href="#">EC-1375</a> , <a href="#">EC-1594</a>
Engine coolant temperature sensor circuit		1	1	2	2	2	3	2	2	3	1	2			<a href="#">EC-1386</a> , <a href="#">EC-1398</a>
Throttle position sensor circuit			1	2		2	2	2	2	2		2			<a href="#">EC-1391</a> , <a href="#">EC-1475</a> , <a href="#">EC-1664</a> , <a href="#">EC-1666</a> , <a href="#">EC-1668</a> , <a href="#">EC-1763</a>
Accelerator pedal position sensor circuit				3	2	1	2			2					<a href="#">EC-1751</a> , <a href="#">EC-1757</a> , <a href="#">EC-1770</a>
Heated oxygen sensor 1 circuit			1	2	3	2		2	2			2			<a href="#">EC-1406</a> , <a href="#">EC-1412</a> , <a href="#">EC-1421</a> , <a href="#">EC-1623</a> , <a href="#">EC-1629</a>
Knock sensor circuit				2	2							3			<a href="#">EC-1486</a>
Crankshaft position sensor (POS) circuit		2	2												<a href="#">EC-1490</a>
Camshaft position sensor (PHASE) circuit		2	2												<a href="#">EC-1496</a>
Vehicle speed signal circuit			2	3		3						3			<a href="#">EC-1575</a>
Power steering oil pressure switch circuit			2				3	3	3	3					<a href="#">EC-1811</a>
ECM		2	2	3	3	3	3	3	3	3	3	3			<a href="#">EC-1583</a> , <a href="#">EC-1590</a>
Intake valve timing control solenoid valve circuit		3	3	2		1	3	2	2	3		3			<a href="#">EC-1600</a>



# TROUBLE DIAGNOSIS

[QR25DE]

	SYMPTOM													Reference page
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
VIAS control solenoid valve circuit					1									<a href="#">EC-1788</a>
PNP switch circuit			3		3	3	3	3	3		3			<a href="#">EC-1742</a>
Start signal circuit	2													<a href="#">EC-1802</a>
Refrigerant pressure sensor circuit		2				3	3	3	3		4			<a href="#">EC-1816</a>
Electrical load signal circuit						3	3	3	3					<a href="#">EC-1821</a>
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	<a href="#">MTC-19</a>

1 - 6: The numbers refer to the order of inspection.  
(continued on next page)

## SYSTEM — ENGINE MECHANICAL & OTHER

	SYMPTOM													Reference page	
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)		
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		
Fuel	Fuel tank	5												<a href="#">FL-7</a>	
	Fuel piping		5	5	5		5	5			5			<a href="#">EM-118</a> , <a href="#">FL-2</a>	
	Vapor lock		5												—
	Valve deposit														—
	Poor fuel (Heavy weight gasoline, Low octane)		5	5	5	5		5	5			5			—

# TROUBLE DIAGNOSIS

[QR25DE]

		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Air	Air duct														<a href="#">EM-103</a>
	Air cleaner														<a href="#">EM-103</a>
	Air leakage from air duct (Mass air flow sensor —electric throttle control actuator)		5	5		5		5	5			5			<a href="#">EM-103</a>
	Electric throttle control actuator	5			5		5			5					<a href="#">EM-105</a>
	Air leakage from intake manifold/ Collector/Gasket														<a href="#">EM-105</a>
Cranking	Battery	1	1	1		1		1	1			1		1	<a href="#">SC-4</a>
	Alternator circuit														<a href="#">SC-22</a>
	Starter circuit	3													<a href="#">SC-9</a>
	Signal plate/Flywheel/Drive plate	6													<a href="#">EM-160</a>
	PNP switch	4													<a href="#">MT-78, MT-139</a> or <a href="#">AT-491</a>
Engine	Cylinder head	5	5	5	5	5		5	5			5			<a href="#">EM-145</a>
	Cylinder head gasket										4		3		
	Cylinder block														
	Piston												4		
	Piston ring	6	6	6	6	6		6	6			6			<a href="#">EM-160</a>
	Connecting rod														
	Bearing														
	Crankshaft														
Valve mechanism	Timing chain														<a href="#">EM-134</a>
	Camshaft														<a href="#">EM-123</a>
	Intake valve timing control	5	5	5	5	5		5	5			5		<a href="#">EM-134</a>	
	Intake valve												3		<a href="#">EM-145</a>
	Exhaust valve														
Exhaust	Exhaust manifold/Tube/Muffler/ Gasket	5	5	5	5	5		5	5			5			<a href="#">EM-110, EX-3</a>
	Three way catalyst														

# TROUBLE DIAGNOSIS

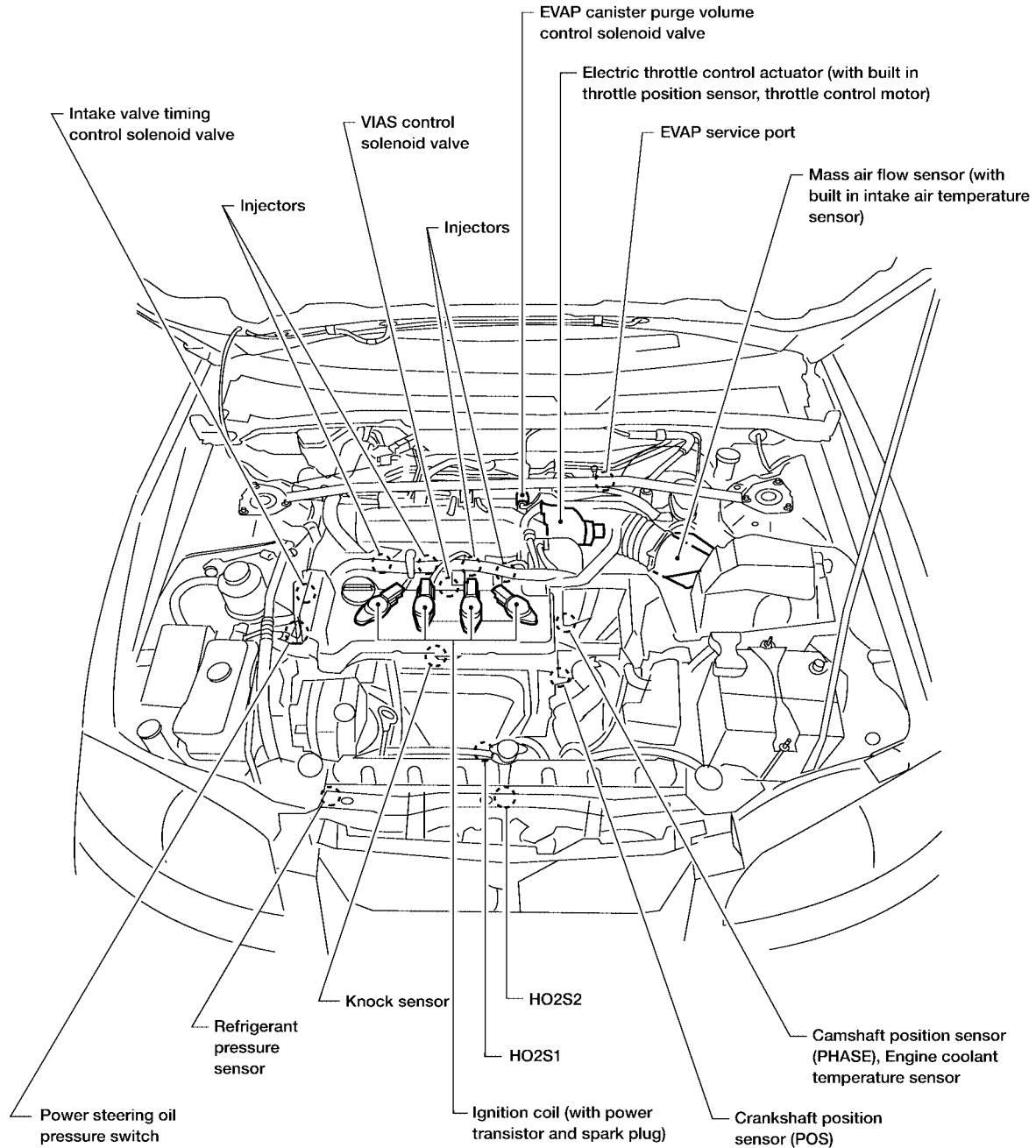
[QR25DE]

		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Lubrica- tion	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5		5	5			5	2		<a href="#">EM-112</a> , <a href="#">LU-19</a> , <a href="#">LU-18</a>
	Oil level (Low)/Filthy oil														<a href="#">LU-16</a>
Cooling	Radiator/Hose/Radiator filler cap														<a href="#">CO-30</a>
	Thermostat									5					<a href="#">CO-28</a>
	Water pump														<a href="#">CO-26</a>
	Water gallery	5	5	5	5	5		5	5		2	5			<a href="#">CO-23</a>
	Cooling fan									5					<a href="#">CO-36</a>
	Coolant level (low)/Contaminated coolant														<a href="#">CO-24</a>
NVIS (NISSAN Vehicle Immobilizer System — NATS)		1	1												<a href="#">EC-1275</a> or <a href="#">BL-95</a>

1 - 6: The numbers refer to the order of inspection.

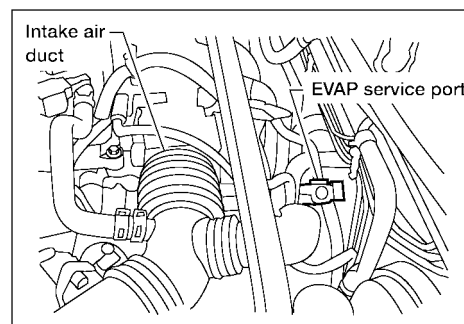
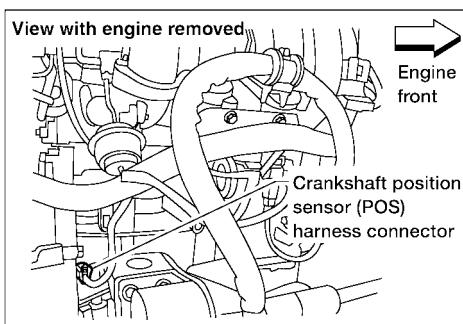
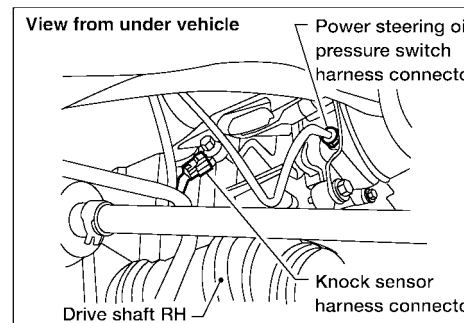
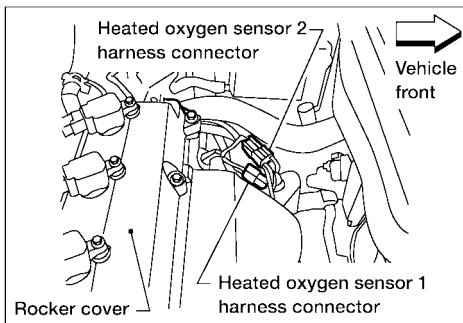
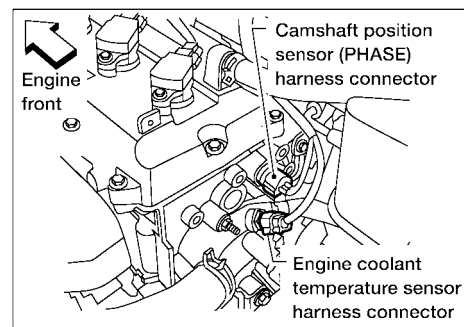
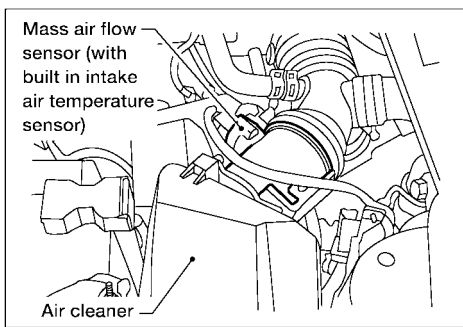
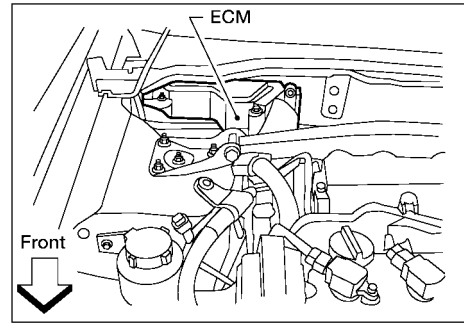
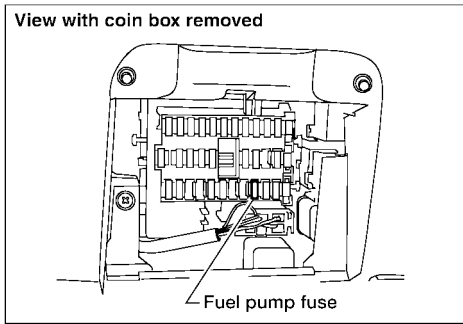
### Engine Control Component Parts Location

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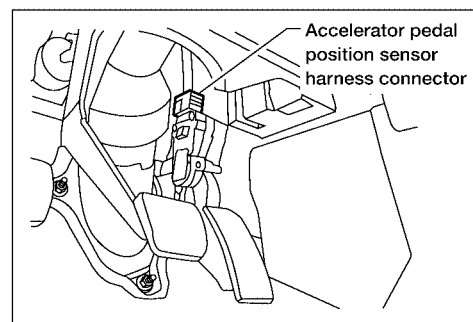
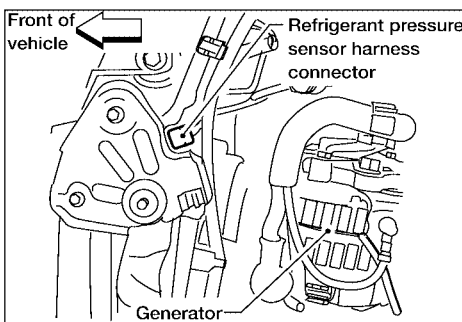
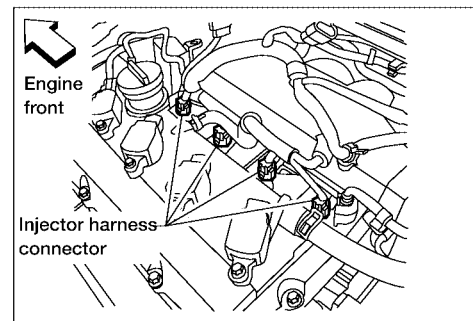
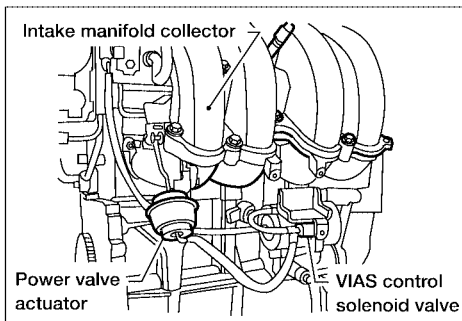
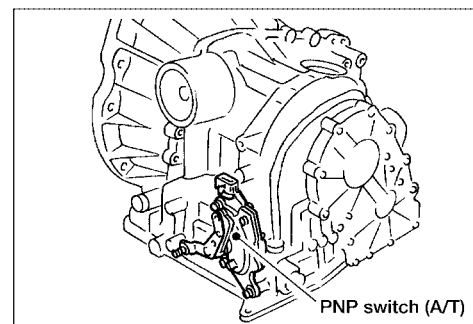
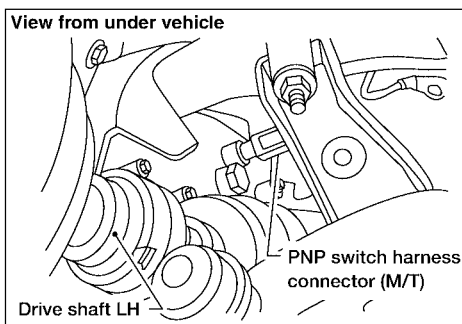
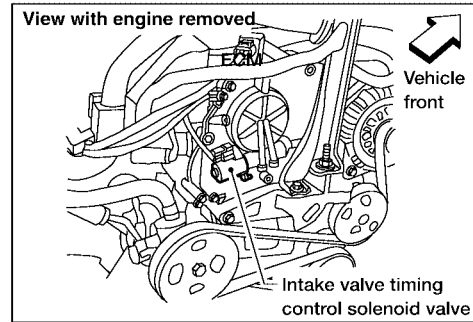
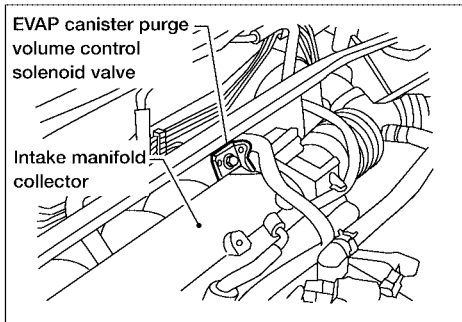
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# TROUBLE DIAGNOSIS

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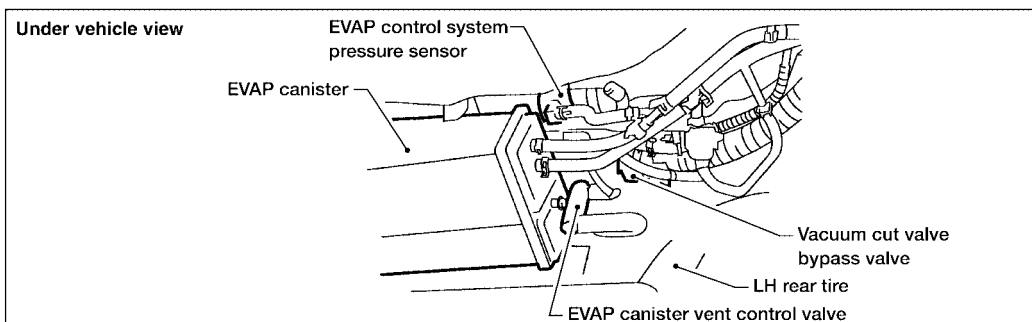
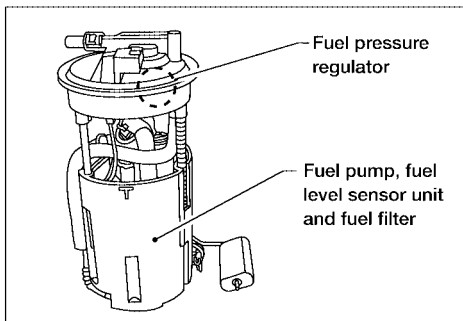
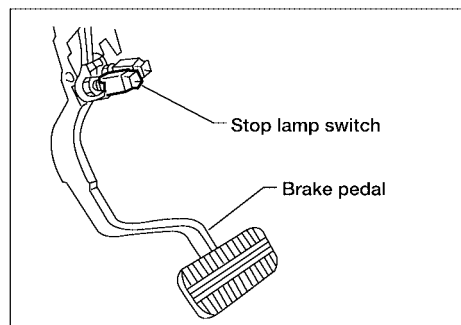
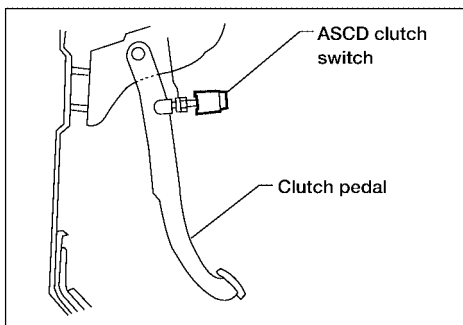
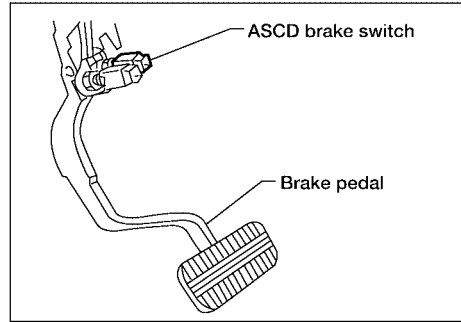
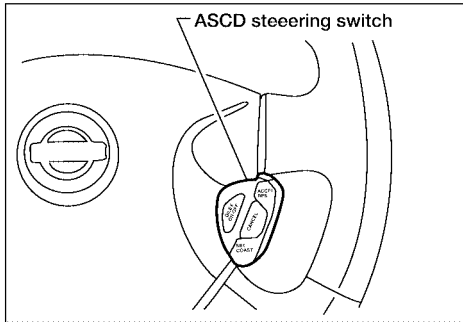
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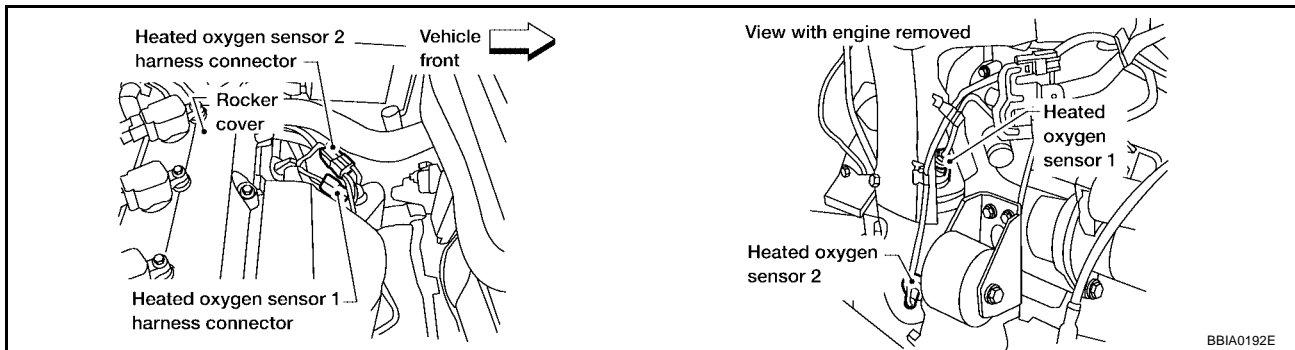
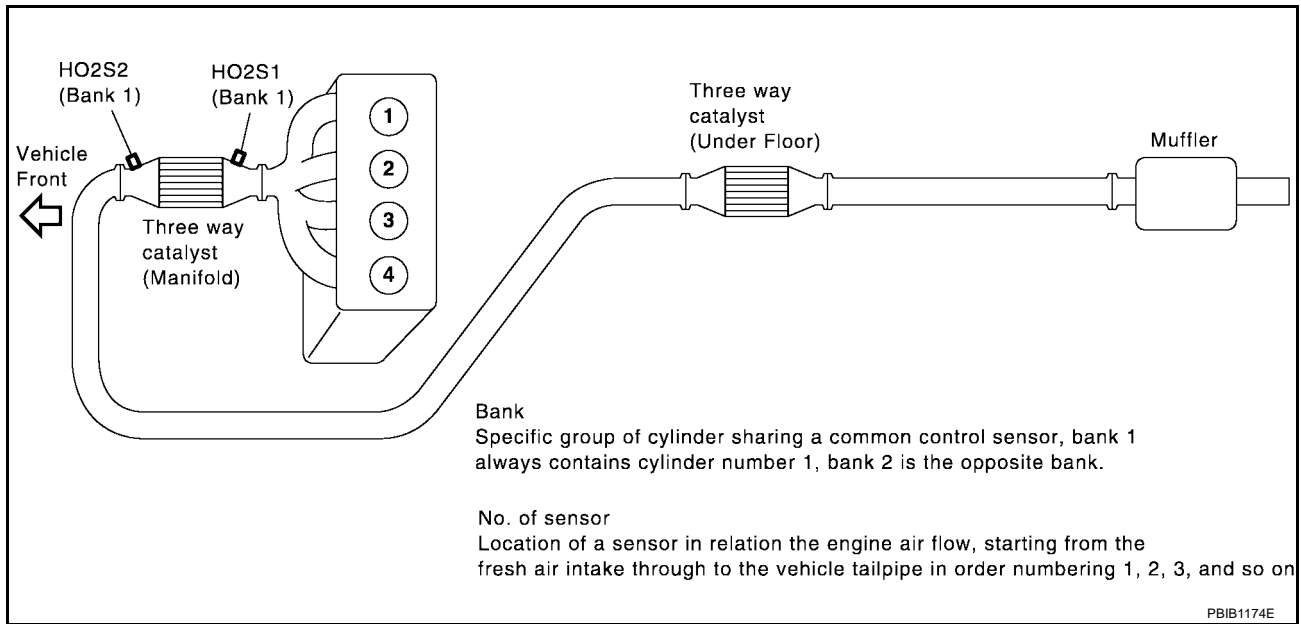
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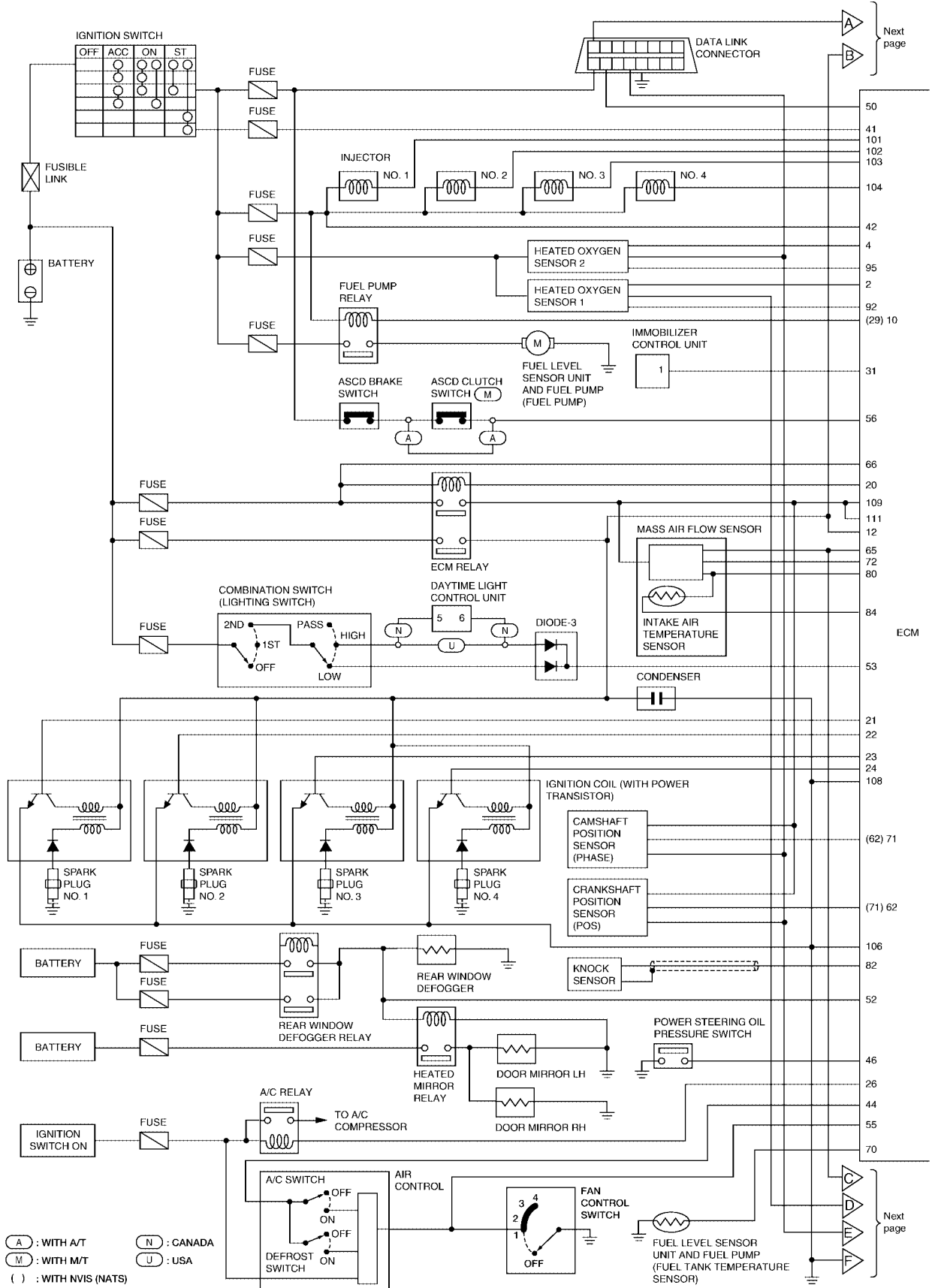


# TROUBLE DIAGNOSIS

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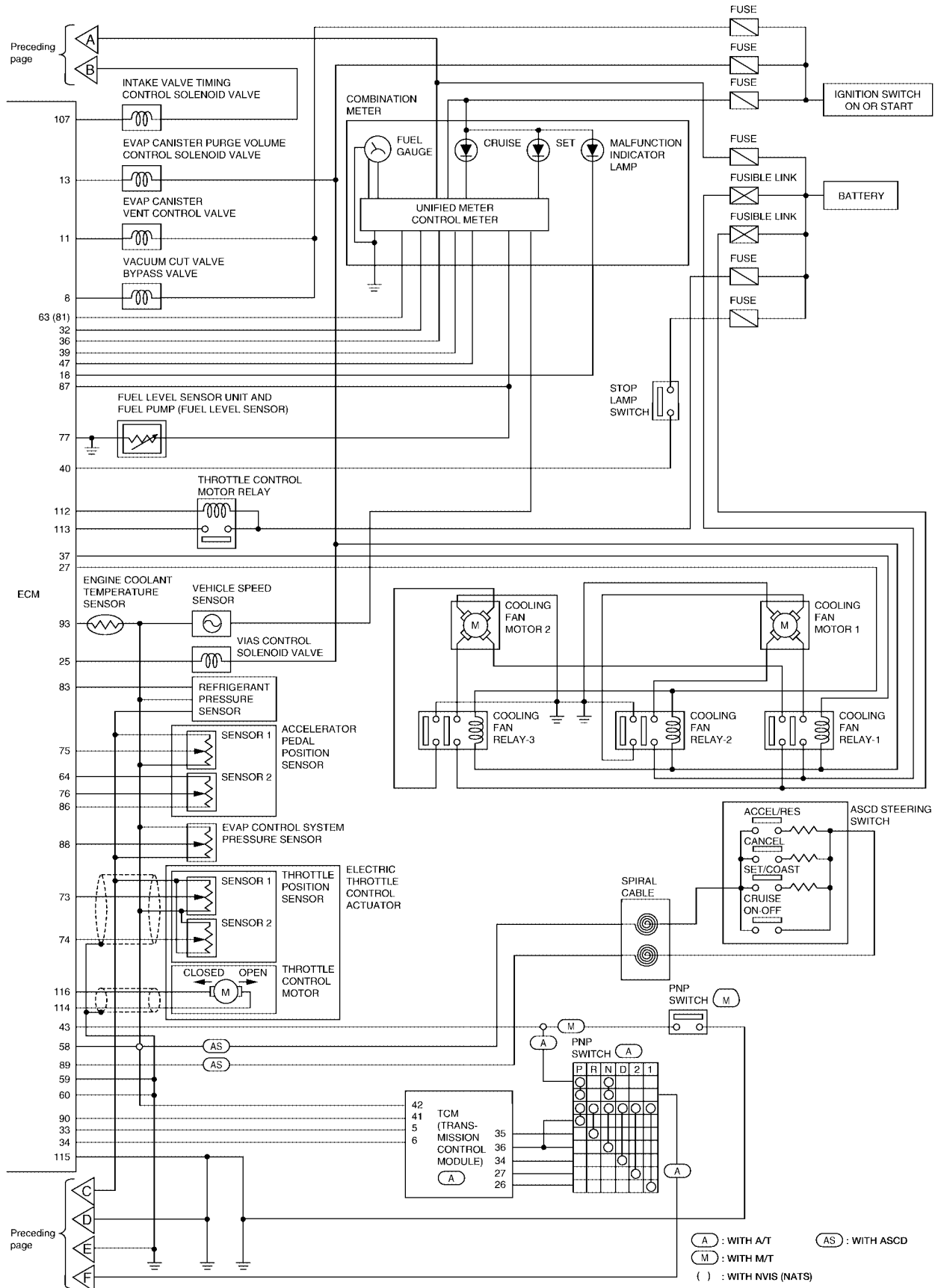
## Circuit Diagram



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# TROUBLE DIAGNOSIS

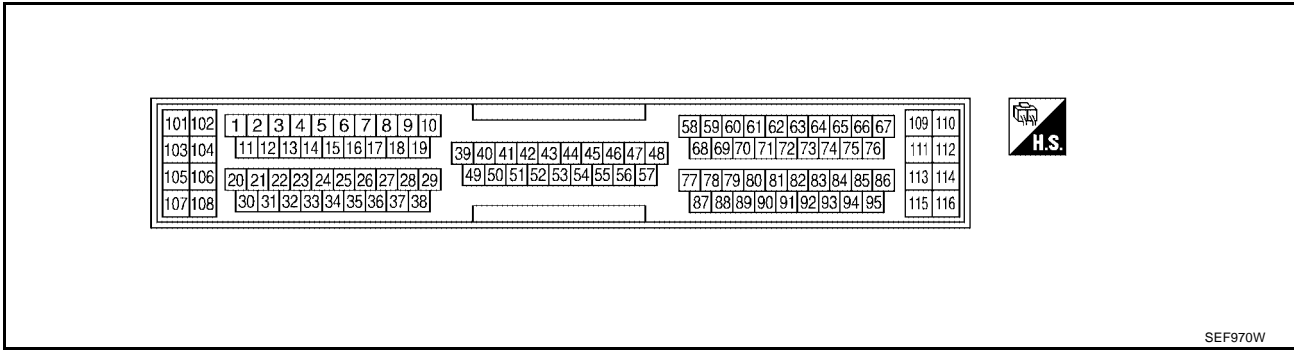
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ECM Harness Connector Terminal Layout

UBS0027M



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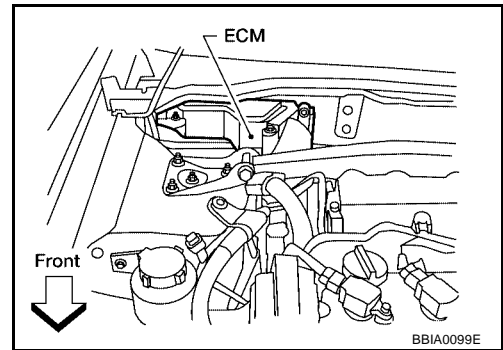
ECM Terminals and Reference Value  
PREPARATION

UBS0027N

1. ECM is located in the right side of the cowl top (behind the strut tower).

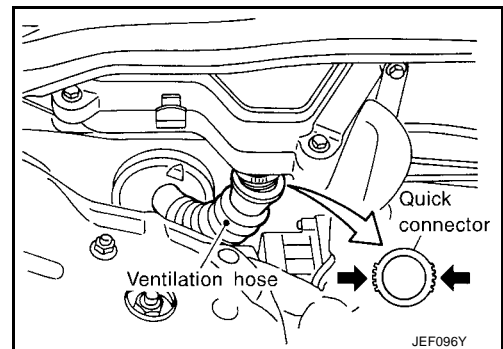
For this inspection:

- Remove front strut tower bar. Refer to [FSU-5, "FRONT SUSPENSION ASSEMBLY"](#).
- Remove engine control harness bracket on the strut tower.



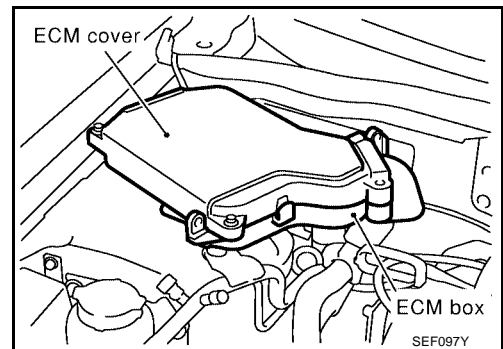
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- Remove quick connector on the ventilation hose.



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- Remove ECM fixing bolts and pull it out all the way.



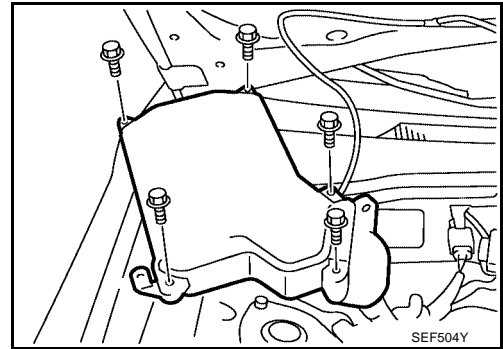
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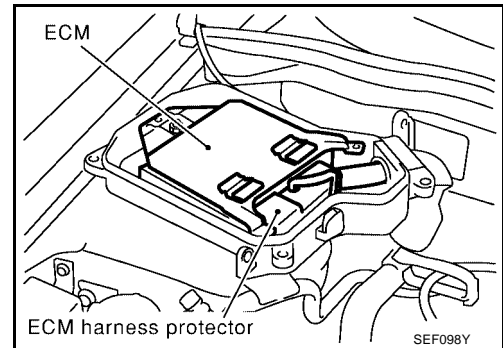
# TROUBLE DIAGNOSIS

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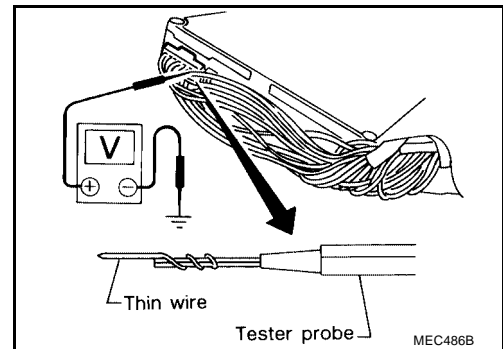
- Remove ECM cover fixing bolts.



- Remove ECM fixing bolts.
- Remove ECM with the harness from the cover.



- Remove ECM harness protector.
- Perform all voltage measurements with the connector connected. Extend tester probe as shown to perform tests easily.
  - Open harness securing clip to make testing easier.
  - Use extreme care not to touch 2 pins at one time.
  - Data is for comparison and may not be exact.



## ECM INSPECTION TABLE

Specification data are reference values and are measured between each terminal and ground. Pulse signal is measured by CONSULT-II.

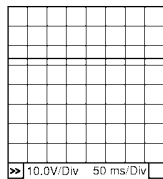

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
2	R/L	Heated oxygen sensor 1 heater	[Engine is running] ● Warm-up condition. ● Engine speed is below 3,600 rpm.	Approximately 7.0V★  PBIB0519E
			[Engine is running] ● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)

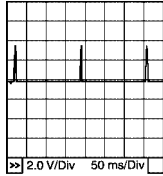
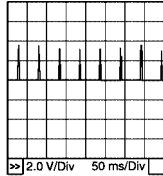
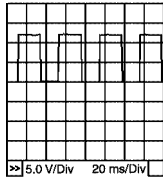
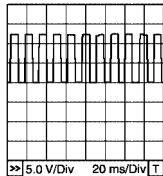
# TROUBLE DIAGNOSIS

[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
4	P/B	Heated oxygen sensor 2 heater	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is below 3,600 rpm after the following conditions are met.</li> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	0 - 1.0V	A
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> </ul> <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is above 3,600 rpm.</li> </ul>	BATTERY VOLTAGE (11 - 14V)	EC
8	L/B	Vacuum cut valve bypass valve	<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)	C
10 (With- out NVIS)	B/P	Fuel pump relay	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● For 1 seconds after turning ignition switch "ON"</li> </ul>	0 - 1.0V	D
29 (With NVIS)			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● More than 1 seconds after turning ignition switch "ON".</li> </ul>	BATTERY VOLTAGE (11 - 14V)	E
11	L/Y	EVAP canister vent control valve	<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)	F
12	R	Counter current return	<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)	G
13	PU/W	EVAP canister purge volume control solenoid valve	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	BATTERY VOLTAGE (11 - 14V)★ 	H
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine)</li> </ul>	Approximately 10V★ 	I
18	OR/L	MIL	<b>[Ignition switch "ON"]</b>	0 - 1.0V	J
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	BATTERY VOLTAGE (11 - 14V)	K
20	W/G	ECM relay (Self shut-off)	<b>[Engine is running]</b> <b>[Ignition switch "OFF"]</b> <ul style="list-style-type: none"> <li>● For 5 seconds after turning ignition switch "OFF"</li> </ul>	0 - 1.0V	L
			<b>[Ignition switch "OFF"]</b> <ul style="list-style-type: none"> <li>● 5 seconds passed after turning ignition switch "OFF"</li> </ul>	BATTERY VOLTAGE (11 - 14V)	M

# TROUBLE DIAGNOSIS

[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
21 22 23 24	BR PU L/R GY/R	Ignition signal No. 1 Ignition signal No. 2 Ignition signal No. 3 Ignition signal No. 4	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	0 - 0.1V★  <small>PBIB0521E</small>
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm.</li> </ul>	0 - 0.2V★  <small>PBIB0522E</small>
25	Y/G	VIAS control solenoid valve	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	BATTERY VOLTAGE (11 - 14V)
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is above 5,000 rpm</li> </ul>	0 - 1.0V
26	L/W	Air conditioner relay	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Both A/C switch and blower switch are "ON" (Compressor operates)</li> </ul>	0 - 0.6V
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● A/C switch is "OFF"</li> </ul>	BATTERY VOLTAGE (11 - 14V)
27	LG/B	Cooling fan relay (High)	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Cooling fan is not operating</li> </ul>	BATTERY VOLTAGE (11 - 14V)
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Cooling fan is high speed operating</li> </ul>	0 - 1.0V
33	L	CAN communication line	<b>[Ignition switch "ON"]</b>	Approximately 2.6 - 3.2V Output voltage varies with the communication status.
34	Y	CAN communication line	<b>[Ignition switch "ON"]</b>	Approximately 1.7 - 2.3V Output voltage varies with the communication status.
36	L/OR	Tachometer	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	6 - 7V★  <small>PBIB0523E</small>
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is 2,500 rpm</li> </ul>	6 - 7V★  <small>PBIB0524E</small>

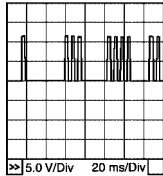
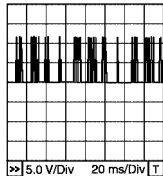
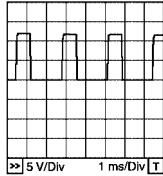
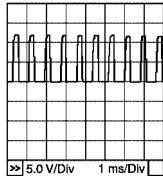
# TROUBLE DIAGNOSIS

[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	A
37	LG/R	Cooling fan relay (Low)	<b>[Engine is running]</b> ● Cooling fan is not operating.	BATTERY VOLTAGE (11 - 14V)	EC
			<b>[Engine is running]</b> ● Cooling fan is operating.	0 - 1.0V	
39	P/B	ASCD CRUISE lamp	<b>[Ignition switch "ON"]</b> ● CRUISE switch is depressed at first time → second time	Approximately 0V ↓ BATTERY VOLTAGE (11 - 14V)	C
40	R/G	Stop lamp switch	<b>[Engine is running]</b> ● Brake pedal fully released	Approximately 0V	D
			<b>[Engine is running]</b> ● Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)	E
41	B/Y	Start signal	<b>[Ignition switch "ON"]</b>	Approximately 0V	F
			<b>[Ignition switch "START"]</b>	9 - 14V	
42	B/R	Ignition switch	<b>[Ignition switch "OFF"]</b>	0V	G
			<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)	
43	G/OR	PNP switch	<b>[Ignition switch "ON"]</b> ● Shift lever position is "P" or "N" (A/T models), "Neutral" (M/T models).	Approximately 0V	H
			<b>[Ignition switch "ON"]</b> ● Except the above gear position	<b>A/T models</b> BATTERY VOLTAGE (11 - 14V) <b>M/T models</b> Approximately 5V	I
44	L/R	Air conditioner switch	<b>[Engine is running]</b> ● Both A/C switch and blower switch are "ON"	Approximately 0V	J
			<b>[Engine is running]</b> ● A/C switch is "OFF"	BATTERY VOLTAGE (11 - 14V)	K
46	G	Power steering oil pressure switch	<b>[Engine is running]</b> ● Steering wheel is being turned	Approximately 0V	L
			<b>[Engine is running]</b> ● Steering wheel is not being turned	Approximately 5V	
47	Y/B	ASCD SET lamp	<b>[Engine is running]</b> ● SET switch is "ON". ● ASCD control is operating.	Approximately 0V	M
			<b>[Engine is running]</b> ● ASCD control is not operating.	BATTERY VOLTAGE (11 - 14V)	
50	L/G	Data link connector	<b>[Ignition switch "ON"]</b> ● CONSULT-II or GST is disconnected.	Approximately 5V	
52	L/W	Electrical load signal (Rear window defogger signal)	<b>[Ignition switch "ON"]</b> ● Rear window defogger switch is "ON"	BATTERY VOLTAGE (11 - 14V)	
			<b>[Ignition switch "ON"]</b> ● Rear window defogger switch is "OFF"	Approximately 0V	
53	R/W	Electrical load signal (Headlamp signal)	<b>[Ignition switch "ON"]</b> ● Lighting switch is "2ND" position	BATTERY VOLTAGE (11 - 14V)	
			<b>[Ignition switch "ON"]</b> ● Lighting switch is "OFF"	Approximately 0V	

# TROUBLE DIAGNOSIS

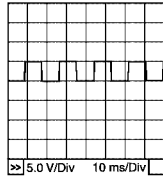
[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
55	LG/B	Heater fan switch	<b>[Engine is running]</b> ● Heater fan switch "ON"	Approximately 0V
			<b>[Engine is running]</b> ● Heater fan switch "OFF"	Approximately 5V
56	P/L	ASCD brake switch	<b>[Ignition switch "ON"]</b> ● Brake pedal is depressed ● Clutch pedal is depressed (M/T models)	Approximately 0V
			<b>[Ignition switch "ON"]</b> ● Brake pedal is fully released ● Clutch pedal is fully released (M/T models)	BATTERY VOLTAGE (11 - 14V)
58	B	Sensors' ground	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 0V
59 60 106 108	B/R B B B	ECM ground	<b>[Engine is running]</b> ● Idle speed	Engine ground
62 (With NVIS) 71 (With- out NVIS)	R	Camshaft position sensor (PHASE)	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	1.0 - 4.0V★  <small>PBIB0525E</small>
			<b>[Engine is running]</b> ● Engine speed is 2,000 rpm.	1.0 - 4.0V★  <small>PBIB0526E</small>
62 (With- out NVIS) 71 (With NVIS)	R	Crankshaft position sensor (POS)	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 3V★  <small>PBIB0527E</small>
			<b>[Engine is running]</b> ● Engine speed is 2,000 rpm	Approximately 3V★  <small>PBIB0528E</small>



# TROUBLE DIAGNOSIS

[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
63 (With- out NVIS) 81 (With NVIS)	R/W	Vehicle speed sensor	[Engine is running] ● Lift up the vehicle ● Vehicle speed is 40 km/h (25MPH)	Approximately 2.3V★  <small>PBIB0531E</small>	EC
					C
64	R/G	Accelerator pedal posi- tion sensor 2 power supply	[Ignition switch "ON"]	Approximately 2.5V	D
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V	E
66	W/L	Power supply for ECM (Buck-up)	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)	F
70	G/OR	Fuel tank temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with fuel tank temperature.	G
72	OR/L	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.1 - 1.5V	H
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.6 - 2.0V	I
73	W	Throttle position sensor 1	[Ignition switch "ON"] ● Engine stopped ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released	More than 0.36V	J
			[Ignition switch "ON"] ● Engine stopped ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed	Less than 4.75V	K
74	G	Throttle position sensor 2	[Ignition switch "ON"] ● Engine stopped ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully released	Less than 4.75V	L
			[Ignition switch "ON"] ● Engine stopped ● Shift lever position is "D" (A/T model) ● Shift lever position is "1st" (M/T model) ● Accelerator pedal fully depressed	More than 0.36V	M
75	W	Accelerator pedal posi- tion sensor 1	[Ignition switch "ON"] ● Engine stopped ● Accelerator pedal fully released	0.41 - 0.71V	
			[Ignition switch "ON"] ● Engine stopped ● Accelerator pedal fully depressed	More than 4.2V	

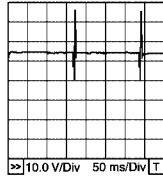
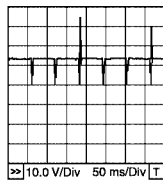
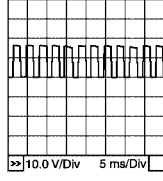
# TROUBLE DIAGNOSIS

[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
76	R/B	Accelerator pedal position sensor 2	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Accelerator pedal fully released</li> </ul>	0.21 - 0.36V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Accelerator pedal fully depressed</li> </ul>	More than 2.1V
77	B/W	Fuel level sensor ground	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	Approximately 0V
80	W/L	Mass air flow sensor ground	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 0V
82	W	Knock sensor	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	Approximately 2.5V
83	L	Refrigerant pressure sensor	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Both A/C switch and blower switch are "ON". (Compressor operates.)</li> </ul>	1.0 - 4.0V
84	Y/G	Intake air temperature sensor	<b>[Engine is running]</b>	Approximately 0 - 4.8V Output voltage varies with intake air temperature.
86	G	Accelerator pedal position sensor 2 ground	<b>[Ignition switch "ON"]</b>	Approximately 0V
87	G/R	Fuel level sensor	<b>[Ignition switch "ON"]</b>	Approximately 0 - 4.8V Output voltage varies with fuel level.
88	B/R	EVAP control system pressure sensor	<b>[Ignition switch "ON"]</b>	1.8 -4.8V
89	G	ASCD steering switch	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● ASCD steering switch is "OFF".</li> </ul>	Approximately 4.0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● CRUISE switch is "ON".</li> </ul>	Approximately 0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● CANCEL switch is "ON".</li> </ul>	Approximately 1.0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● SET/COAST switch is "ON".</li> </ul>	Approximately 2.0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● ACCEL/RES switch is "ON".</li> </ul>	Approximately 3.0V
90	W	Accelerator pedal position sensor signal output	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Accelerator pedal fully released</li> </ul>	0.41 - 0.71V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Accelerator pedal fully depressed</li> </ul>	More than 4.2V
92	W/G	Heated oxygen sensor 1	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm.</li> </ul>	0 - Approximately 1.0V (Periodically change)

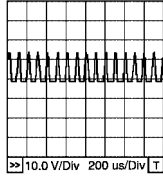
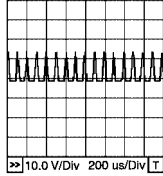
# TROUBLE DIAGNOSIS

[QR25DE]

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
93	Y	Engine coolant temperature sensor	<b>[Engine is running]</b>	Approximately 0 - 4.8V Output voltage varies with engine coolant temperature.	EC
95	W	Heated oxygen sensor 2	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Engine speed is below 3,600 rpm after the following conditions are met.                             <ul style="list-style-type: none"> <li>- Engine: after warming up</li> <li>- Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul> </li> <li>● Revving engine from idle to 3,000 rpm quickly.</li> </ul>	0 - Approximately 1.0V	C
101 102 103 104	R/B R/W R/Y R/L	Injector No. 1 Injector No. 2 Injector No. 3 Injector No. 4	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	BATTERY VOLTAGE (11 - 14V)★ 	F
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm</li> </ul>	BATTERY VOLTAGE (11 - 14V)★ 	G
107	G	Intake valve timing control solenoid valve	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	BATTERY VOLTAGE (11 - 14V)	H
			<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm</li> </ul>	Approximately 9V★ 	I
109 111	R/G R/G	Power supply for ECM	<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)	J
112	OR	Throttle control motor relay	<b>[Ignition switch "OFF"]</b>	BATTERY VOLTAGE (11 - 14V)	K
			<b>[Ignition switch "ON"]</b>	0 - 1.0V	L
113	R	Throttle control motor relay power supply	<b>[Ignition switch "ON"]</b>	BATTERY VOLTAGE (11 - 14V)	M

# TROUBLE DIAGNOSIS

[QR25DE]

TERMI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
114	L	Throttle control motor (Open)	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal is depressing</li> </ul>	0 - 14V★  <small>PBIB0533E</small>
115	B	Throttle control motor ground	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	Approximately 0V
116	P	Throttle control motor (Close)	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal is releasing</li> </ul>	0 - 14V★  <small>PBIB0534E</small>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## CONSULT-II Function FUNCTION

UBS00270

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-II unit.
Self-diagnostic results	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*
Data monitor	Input/Output data in the ECM can be read.
Data monitor (SPEC)	Input/Output of the specification for Basic fuel schedule, AFM, A/F feedback control value and the other data monitor items can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.
Active test	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
Function test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
DTC & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
ECM part number	ECM part number can be read.

\*: The following emission-related diagnostic information is cleared when the ECM memory is erased.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values
- Others

# TROUBLE DIAGNOSIS

[QR25DE]

## ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

Item		DIAGNOSTIC TEST MODE							
		WORK SUP-PORT	SELF-DIAGNOSTIC RESULTS		DATA MONI-TOR	DATA MONI-TOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION	
			DTC*1	FREEZE FRAME DATA*2				SRT STATUS	DTC WORK SUP-PORT
ENGINE CONTROL COMPONENT PARTS	INPUT								
		Crankshaft position sensor (POS)	×	×	×	×			
		Camshaft position sensor (PHASE)	×		×	×			
		Mass air flow sensor	×		×	×			
		Engine coolant temperature sensor	×	×	×	×	×		
		Heated oxygen sensor 1	×		×	×		×	×
		Heated oxygen sensor 2	×		×	×		×	×
		Vehicle speed sensor	×	×	×	×			
		Accelerator pedal position sensor	×		×	×			
		Throttle position sensor	×		×	×			
		Fuel tank temperature sensor	×		×	×	×		
		EVAP control system pressure sensor	×		×	×			
		Intake air temperature sensor	×		×	×			
		Knock sensor	×						
		Refrigerant pressure sensor			×	×			
		Ignition switch (start signal)			×	×			
		Closed throttle position switch (accelerator pedal position sensor signal)			×	×			
		Air conditioner switch			×	×			
		Park/neutral position (PNP) switch	×		×	×			
		Stop lamp switch	×		×	×			
	Power steering oil pressure switch			×	×				
	Battery voltage			×	×				
	Load signal			×	×				
	Fuel level sensor	×		×	×				
	ASCD steering switch	×		×	×				
	ASCD brake switch	×		×	×				

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# TROUBLE DIAGNOSIS

[QR25DE]

Item		DIAGNOSTIC TEST MODE							
		WORK SUP-PORT	SELF-DIAGNOSTIC RESULTS		DATA MONI-TOR	DATA MONI-TOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION	
			DTC*1	FREEZE FRAME DATA*2				SRT STATUS	DTC WORK SUP-PORT
ENGINE CONTROL COMPONENT PARTS OUTPUT	Injectors				×	×	×		
	Power transistor (Ignition timing)				×	×	×		
	Throttle control motor relay		×		×	×			
	Throttle control motor		×						
	EVAP canister purge volume control solenoid valve		×		×	×	×		×
	Air conditioner relay				×	×			
	Fuel pump relay	×			×	×	×		
	Cooling fan relay		×		×	×	×		
	Heated oxygen sensor 1 heater		×		×	×		×	
	Heated oxygen sensor 2 heater		×		×	×		×	
	EVAP canister vent control valve		×		×	×	×		
	Vacuum cut valve bypass valve		×		×	×	×		×
	Intake valve timing control solenoid valve		×		×	×	×		
	VIAS control solenoid valve				×	×	×		
Calculated load value			×	×	×				

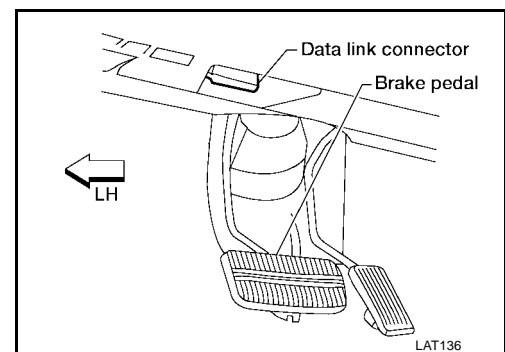
X: Applicable

\*1: This item includes 1st trip DTCs.

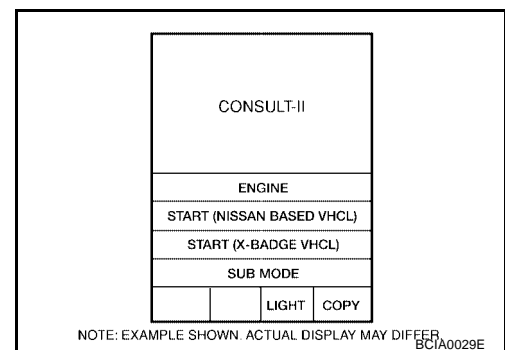
\*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-II screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to [EC-1264](#).

## CONSULT-II INSPECTION PROCEDURE

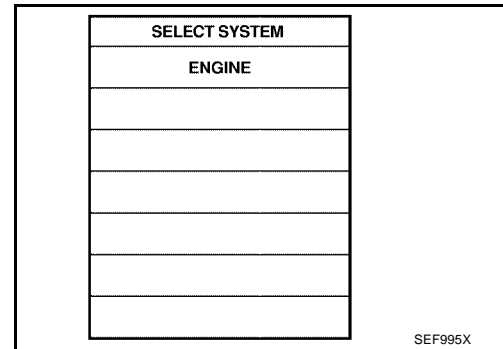
1. Turn ignition switch OFF.
2. Connect "CONSULT-II" and "CONSULT-II CONVERTER" to data link connector, which is located under LH dash panel.
3. Turn ignition switch ON.



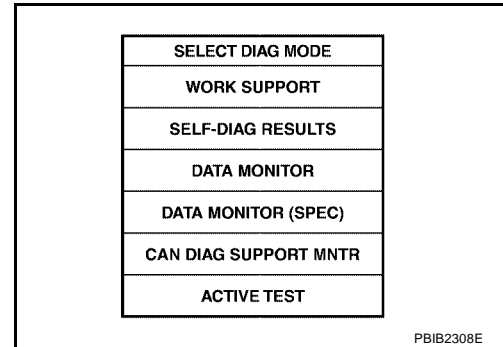
4. Touch "START (NISSAN BASED VHCL)".



5. Touch "ENGINE".  
If "ENGINE" is not indicated, go to [EC-582, "DATA LINK CONNECTOR"](#) .



6. Perform each diagnostic test mode according to each service procedure.  
**For further information, see the CONSULT-II Operation Manual.**



## WORK SUPPORT MODE

### Work Item

WORK ITEM	CONDITION	USAGE
FUEL PRESSURE RELEASE	<ul style="list-style-type: none"> <li>FUEL PUMP WILL STOP BY TOUCHING "START" DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS.</li> </ul>	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	<ul style="list-style-type: none"> <li>THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM.</li> </ul>	When learning the idle air volume
SELF-LEARNING CONT	<ul style="list-style-type: none"> <li>THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT.</li> </ul>	When clearing the coefficient of self-learning control value
EVAP SYSTEM CLOSE	<p>OPEN THE VACUUM CUT VALVE BYPASS VALVE AND CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS.</p> <ul style="list-style-type: none"> <li>IGN SW "ON"</li> <li>ENGINE NOT RUNNING</li> <li>AMBIENT TEMPERATURE IS ABOVE 0°C (32°F).</li> <li>NO VACUUM AND NO HIGH PRESSURE IN EVAP SYSTEM</li> <li>FUEL TANK TEMP. IS MORE THAN 0°C (32°F).</li> <li>WITHIN 10 MINUTES AFTER STARTING "EVAP SYSTEM CLOSE"</li> <li>WHEN TRYING TO EXECUTE "EVAP SYSTEM CLOSE" UNDER THE CONDITION EXCEPT ABOVE, CONSULT-II WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTION.</li> </ul> <p><b>NOTE:</b> <b>WHEN STARTING ENGINE, CONSULT-II MAY DISPLAY "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", EVEN IN USING CHARGED BATTERY.</b></p>	When detecting EVAP vapor leak point of EVAP system

# TROUBLE DIAGNOSIS

[QR25DE]

WORK ITEM	CONDITION	USAGE
TARGET IDLE RPM ADJ*	● IDLE CONDITION	When setting target idle speed
TARGET IGN TIM ADJ*	● IDLE CONDITION	When adjusting target ignition timing After adjustment, confirm target ignition timing with a timing light.

\*: This function is not necessary in the usual service procedure.

## SELF-DIAG RESULTS MODE

### Self Diagnostic Item

Regarding items of "DTC and 1st trip DTC", refer to [EC-1224, "INDEX FOR DTC"](#) .)

### Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*	Description
DIAG TROUBLE CODE [PXXXX]	● The engine control component part/control system has a trouble code, it is displayed as "PXXXX". (Refer to <a href="#">EC-1224, "INDEX FOR DTC"</a> .)
FUEL SYS-B1	● "Fuel injection system status" at the moment a malfunction is detected is displayed. ● One mode in the following is displayed. "MODE 2": Open loop due to detected system malfunction "MODE 3": Open loop due to driving conditions (power enrichment, deceleration enrichment) "MODE 4": Closed loop - using oxygen sensor(s) as feedback for fuel control "MODE 5": Open loop - has not yet satisfied condition to go to closed loop
CAL/LD VALUE [%]	● The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	● The engine coolant temperature at the moment a malfunction is detected is displayed.
L-FUEL TRIM-B1 [%]	● "Long-term fuel trim" at the moment a malfunction is detected is displayed. ● The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
S-FUEL TRIM-B1 [%]	● "Short-term fuel trim" at the moment a malfunction is detected is displayed. ● The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
ENGINE SPEED [rpm]	● The engine speed at the moment a malfunction is detected is displayed.
VHCL SPEED [km/h] or [mph]	● The vehicle speed at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	● The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	● The intake air temperature at the moment a malfunction is detected is displayed.

\*: The items are the same as those of 1st trip freeze frame data.



# TROUBLE DIAGNOSIS

[QR25DE]

## DATA MONITOR MODE

### Monitored Item

x: Applicable

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	Description	Remarks
ENG SPEED [rpm]	x	x	<ul style="list-style-type: none"> <li>Indicates the engine speed computed from the signals of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).</li> </ul>	<ul style="list-style-type: none"> <li>Accuracy becomes poor if engine speed drops below the idle rpm.</li> <li>If the signal is interrupted while the engine is running, an abnormal value may be indicated.</li> </ul>
MAS A/F SE-B1 [V]	x	x	<ul style="list-style-type: none"> <li>The signal voltage of the mass air flow sensor is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> </ul>
B/FUEL SCHDL [msec]		x	<ul style="list-style-type: none"> <li>"Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.</li> </ul>	
A/F ALPHA-B1 [%]		x	<ul style="list-style-type: none"> <li>The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> <li>This data also includes the data for the air-fuel ratio learning control.</li> </ul>
COOLAN TEMP/S [°C] or [°F]	x	x	<ul style="list-style-type: none"> <li>The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.</li> </ul>
HO2S1 (B1) [V]	x	x	<ul style="list-style-type: none"> <li>The signal voltage of the heated oxygen sensor 1 is displayed.</li> </ul>	
HO2S2 (B1) [V]	x	x	<ul style="list-style-type: none"> <li>The signal voltage of the heated oxygen sensor 2 is displayed.</li> </ul>	
HO2S1 MNTR (B1) [RICH/LEAN]	x	x	<ul style="list-style-type: none"> <li>Display of heated oxygen sensor 1 signal during air-fuel ratio feedback control: RICH ... means the mixture became "rich", and control is being affected toward a leaner mixture. LEAN ... means the mixture became "lean", and control is being affected toward a rich mixture.</li> </ul>	<ul style="list-style-type: none"> <li>After turning ON the ignition switch, "RICH" is displayed until air-fuel mixture ratio feedback control begins.</li> <li>When the air-fuel ratio feedback is clamped, the value just before the clamping is displayed continuously.</li> </ul>
HO2S2 MNTR (B1) [RICH/LEAN]	x		<ul style="list-style-type: none"> <li>Display of heated oxygen sensor 2 signal: RICH ... means the amount of oxygen after three way catalyst is relatively small. LEAN ... means the amount of oxygen after three way catalyst is relatively large.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> </ul>
VHCL SPEED SE [km/h] or [mph]	x	x	<ul style="list-style-type: none"> <li>The vehicle speed computed from the vehicle speed signal is displayed.</li> </ul>	
BATTERY VOLT [V]	x	x	<ul style="list-style-type: none"> <li>The power supply voltage of ECM is displayed.</li> </ul>	
ACCEL SEN 1 [V]	x	x	<ul style="list-style-type: none"> <li>The accelerator pedal position sensor signal voltage is displayed.</li> </ul>	
ACCEL SEN 2 [V]	x			
THRTL SEN 1 [V]	x	x	<ul style="list-style-type: none"> <li>The throttle position sensor signal voltage is displayed.</li> </ul>	
THRTL SEN 2 [V]	x			

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# TROUBLE DIAGNOSIS

[QR25DE]

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	Description	Remarks
FUEL T/TEMP SE [°C] or [°F]	×		<ul style="list-style-type: none"> <li>The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed.</li> </ul>	
INT/A TEMP SE [°C] or [°F]	×	×	<ul style="list-style-type: none"> <li>The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated.</li> </ul>	
EVAP SYS PRES [V]	×		<ul style="list-style-type: none"> <li>The signal voltage of EVAP control system pressure sensor is displayed.</li> </ul>	
ABSOL PRES/SE [V]	×		<ul style="list-style-type: none"> <li>The signal voltage of EVAP control system pressure sensor is displayed.</li> </ul>	
FUEL LEVEL SE [V]	×		<ul style="list-style-type: none"> <li>The signal voltage of the fuel level sensor is displayed.</li> </ul>	
START SIGNAL [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the starter signal.</li> </ul>	<ul style="list-style-type: none"> <li>After starting the engine, [OFF] is displayed regardless of the starter signal.</li> </ul>
CLSD THL POS [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal.</li> </ul>	
AIR COND SIG [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal.</li> </ul>	
P/N POSI SW [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal.</li> </ul>	
PW/ST SIGNAL [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>[ON/OFF] condition of the power steering oil pressure switch as determined by the power steering oil pressure signal is indicated.</li> </ul>	
LOAD SIGNAL [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the electrical load signal.</li> <li>ON ... Rear window defogger switch is ON and/or lighting switch is in 2nd position.</li> <li>OFF ... Both rear window defogger switch and lighting switch are OFF.</li> </ul>	
IGNITION SW [ON/OFF]	×	×	<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from ignition switch.</li> </ul>	
HEATER FAN SW [ON/OFF]	×		<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the heater fan switch signal.</li> </ul>	
BRAKE SW [ON/OFF]	×		<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition from the stop lamp switch signal.</li> </ul>	
INJ PULSE-B1 [msec]		×	<ul style="list-style-type: none"> <li>Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain computed value is indicated.</li> </ul>
IGN TIMING [BTDC]		×	<ul style="list-style-type: none"> <li>Indicates the ignition timing computed by ECM according to the input signals.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine is stopped, a certain value is indicated.</li> </ul>
CAL/LD VALUE [%]			<ul style="list-style-type: none"> <li>"Calculated load value" indicates the value of the current airflow divided by peak airflow.</li> </ul>	
MASS AIRFLOW [g·m/s]			<ul style="list-style-type: none"> <li>Indicates the mass airflow computed by ECM according to the signal voltage of the mass air flow sensor.</li> </ul>	

# TROUBLE DIAGNOSIS

[QR25DE]

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	Description	Remarks
PURG VOL C/V [%]			<ul style="list-style-type: none"> <li>Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals.</li> <li>The opening becomes larger as the value increases.</li> </ul>	
INT/V TIM (B1) [°CA]			<ul style="list-style-type: none"> <li>Indicates [°CA] of intake camshaft advanced angle.</li> </ul>	
INT/V SOL (B1) [%]			<ul style="list-style-type: none"> <li>The control condition of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated. ON ... intake valve timing control is operating. OFF ... Intake valve timing control is not operating.</li> </ul>	
VIAS S/V [ON/OFF]			<ul style="list-style-type: none"> <li>The control condition of the VIAS control solenoid valve (determined by ECM according to the input signals) is indicated. ON ... VIAS control solenoid valve is operating. OFF ... VIAS control solenoid valve is not operating.</li> </ul>	
AIR COND RLY [ON/OFF]		×	<ul style="list-style-type: none"> <li>The air conditioner relay control condition (determined by ECM according to the input signals) is indicated.</li> </ul>	
FUEL PUMP RLY [ON/OFF]		×	<ul style="list-style-type: none"> <li>Indicates the fuel pump relay control condition determined by ECM according to the input signals.</li> </ul>	
VC/V BYPASS/V [ON/OFF]			<ul style="list-style-type: none"> <li>The control condition of the vacuum cut valve bypass valve (determined by ECM according to the input signals) is indicated. ON ... Open OFF ... Closed</li> </ul>	
VENT CONT/V [ON/OFF]			<ul style="list-style-type: none"> <li>The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated. ON ... Closed OFF ... Open</li> </ul>	
THRTL RELAY [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.</li> </ul>	
COOLING FAN [HI/LOW/OFF]			<ul style="list-style-type: none"> <li>Indicates the condition of the cooling fan (determined by ECM according to the input signals). HI ... High speed operation LOW ... Low speed operation OFF ... Stop</li> </ul>	
HO2S1 HTR (B1) [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of heated oxygen sensor 1 heater determined by ECM according to the input signals.</li> </ul>	
HO2S2 HTR (B1) [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals.</li> </ul>	

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# TROUBLE DIAGNOSIS

[QR25DE]

Monitored item [Unit]	ECM INPUT SIG- NALS	MAIN SIG- NALS	Description	Remarks
IDL A/V LEARN [YET/CMPLT]			<ul style="list-style-type: none"> <li>● Display the condition of idle air volume learning YET ... Idle air volume learning has not been performed yet. CMPLT ... Idle air volume learning has already been performed successfully.</li> </ul>	
TRVL AFTER MIL [km] or [mile]			<ul style="list-style-type: none"> <li>● Distance traveled while MIL is activated.</li> </ul>	
O2SEN HTR DTY [%]			<ul style="list-style-type: none"> <li>● Indicates the heated oxygen sensor 1 heater control value computed by the ECM according to the input signals.</li> </ul>	
AC PRESS SEN [V]			<ul style="list-style-type: none"> <li>● The signal voltage from the refrigerant pressure sensor is displayed.</li> </ul>	
VHCL SPEED SE [km/h] or [mph]			<ul style="list-style-type: none"> <li>● The vehicle speed computed from the vehicle speed signal sent from TCM is displayed.</li> </ul>	
SET VHCL SPD [km/h] or [mph]			<ul style="list-style-type: none"> <li>● The preset vehicle speed is displayed.</li> </ul>	
MAIN SW [ON/OFF]			<ul style="list-style-type: none"> <li>● Indicates [ON/OFF] condition from CRUISE switch signal.</li> </ul>	
CANCEL SW [ON/OFF]			<ul style="list-style-type: none"> <li>● Indicates [ON/OFF] condition from CANCEL switch signal.</li> </ul>	
RESUME/ACC SW [ON/OFF]			<ul style="list-style-type: none"> <li>● Indicates [ON/OFF] condition from ACCEL/RES switch signal.</li> </ul>	
SET SW [ON/OFF]			<ul style="list-style-type: none"> <li>● Indicates [ON/OFF] condition from COAST/SET switch signal.</li> </ul>	
BRAKE SW1 SW [ON/OFF]			<ul style="list-style-type: none"> <li>● Indicates [ON/OFF] condition from ASCD brake switch signal, and ASCD clutch switch signal (M/T models).</li> </ul>	
BRAKE SW2 SW [ON/OFF]			<ul style="list-style-type: none"> <li>● Indicates [ON/OFF] condition of stop lamp switch signal.</li> </ul>	
VHCL SPD CUT [NON/CUT]			<ul style="list-style-type: none"> <li>● Indicates the vehicle cruise condition. NON ... Vehicle speed is maintained at the ASCD set speed. CUT ... Vehicle speed increased to excessively high compared with the ASCD set speed, and ASCD operation is cut off.</li> </ul>	
LO SPEED CUT [NON/CUT]			<ul style="list-style-type: none"> <li>● Indicates the vehicle cruise condition. NON ... Vehicle speed is maintained at the ASCD set speed. CUT ... Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off.</li> </ul>	
AT OD MONITOR [ON/OFF]			<ul style="list-style-type: none"> <li>● Indicates [ON/OFF] condition of A/T O/D according to the input signal from the TCM.</li> </ul>	
AT OD CANCEL [ON/OFF]			<ul style="list-style-type: none"> <li>● Indicates [ON/OFF] condition of A/T O/D cancel signal sent from the TCM.</li> </ul>	
CRUISE LAMP [ON/OFF]			<ul style="list-style-type: none"> <li>● Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals.</li> </ul>	

# TROUBLE DIAGNOSIS

[QR25DE]

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	Description	Remarks
SET LAMP [ON/OFF]			<ul style="list-style-type: none"> <li>Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals.</li> </ul>	
Voltage [V]			<ul style="list-style-type: none"> <li>Voltage, frequency, duty cycle or pulse width measured by the probe.</li> </ul>	<ul style="list-style-type: none"> <li>Only “#” is displayed if item is unable to be measured.</li> <li>Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.</li> </ul>
Frequency [msec], [Hz] or [%]				
DUTY-HI				
DUTY-LOW				
PLS WIDTH-HI				
PLS WIDTH-LOW				

**NOTE:**

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

## DATA MONITOR (SPEC) MODE

### Monitored Item

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
ENG SPEED [rpm]	×		<ul style="list-style-type: none"> <li>Indicates the engine speed computed from the signal of the crankshaft position sensor (POS).</li> </ul>	
MAS A/F SE-B1 [V]	×	×	<ul style="list-style-type: none"> <li>The signal voltage of the mass air flow sensor specification is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>When engine is running specification range is indicated.</li> </ul>
B/FUEL SCHDL [msec]			<ul style="list-style-type: none"> <li>“Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.</li> </ul>	<ul style="list-style-type: none"> <li>When engine is running specification range is indicated.</li> </ul>
A/F ALPHA-B1 [%]		×	<ul style="list-style-type: none"> <li>The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.</li> </ul>	<ul style="list-style-type: none"> <li>When engine is running specification range is indicated.</li> <li>This data also includes the data for the air-fuel ratio learning control.</li> </ul>

**NOTE:**

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

## ACTIVE TEST MODE

### Test Item

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	<ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Change the amount of fuel injection using CONSULT-II.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>Harness and connectors</li> <li>Fuel injectors</li> <li>Heated oxygen sensor 1</li> </ul>
IGNITION TIMING	<ul style="list-style-type: none"> <li>Engine: Return to the original trouble condition</li> <li>Timing light: Set</li> <li>Retard the ignition timing using CONSULT-II.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>Perform “Idle Air Volume Learning”.</li> </ul>

# TROUBLE DIAGNOSIS

[QR25DE]

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
POWER BAL- ANCE	<ul style="list-style-type: none"> <li>● Engine: After warming up, idle the engine.</li> <li>● A/C switch "OFF"</li> <li>● Shift lever "N"</li> <li>● Cut off each injector signal one at a time using CONSULT-II.</li> </ul>	Engine runs rough or dies.	<ul style="list-style-type: none"> <li>● Harness and connectors</li> <li>● Compression</li> <li>● Fuel injectors</li> <li>● Power transistor</li> <li>● Spark plugs</li> <li>● Ignition coils</li> </ul>
COOLING FAN	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> <li>● Turn the cooling fan "ON" and "OFF" with CONSULT-II.</li> </ul>	Cooling fan moves and stops.	<ul style="list-style-type: none"> <li>● Harness and connectors</li> <li>● Cooling fan relay</li> <li>● Cooling fan motor</li> </ul>
ENG COOLANT TEMP	<ul style="list-style-type: none"> <li>● Engine: Return to the original trouble condition</li> <li>● Change the engine coolant temperature using CONSULT-II.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>● Harness and connectors</li> <li>● Engine coolant temperature sensor</li> <li>● Fuel injectors</li> </ul>
FUEL PUMP RELAY	<ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> <li>● Turn the fuel pump relay "ON" and "OFF" using CONSULT-II and listen to operating sound.</li> </ul>	Fuel pump relay makes the operating sound.	<ul style="list-style-type: none"> <li>● Harness and connectors</li> <li>● Fuel pump relay</li> </ul>
VIAS SOL VALVE	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> <li>● Turn solenoid valve "ON" and "OFF" with CONSULT-II and listen to operating sound.</li> </ul>	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> <li>● Harness and connectors</li> <li>● Solenoid valve</li> </ul>
PURG VOL CONT/V	<ul style="list-style-type: none"> <li>● Engine: After warming up, run engine at 1,500 rpm.</li> <li>● Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-II.</li> </ul>	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> <li>● Harness and connectors</li> <li>● Solenoid valve</li> </ul>
FUEL/T TEMP SEN	<ul style="list-style-type: none"> <li>● Change the fuel tank temperature using CONSULT-II.</li> </ul>		
VENT CON- TROL/V	<ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> <li>● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound.</li> </ul>	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> <li>● Harness and connectors</li> <li>● Solenoid valve</li> </ul>
VC/V BYPASS/V	<ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> <li>● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound.</li> </ul>	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> <li>● Harness and connectors</li> <li>● Solenoid valve</li> </ul>
V/T ASSIGN ANGLE	<ul style="list-style-type: none"> <li>● Engine: Return to the original trouble condition</li> <li>● Change intake valve timing using CONSULT-II.</li> </ul>	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> <li>● Harness and connectors</li> <li>● Intake valve timing control solenoid valve</li> </ul>

## DTC & SRT CONFIRMATION MODE

### SRT STATUS Mode

For details, refer to [EC-1265, "SYSTEM READINESS TEST \(SRT\) CODE"](#) .

### SRT Work Support Mode

This mode enables a technician to drive a vehicle to set the SRT while monitoring the SRT status.

# TROUBLE DIAGNOSIS

[QR25DE]

## DTC Work Support Mode

Test mode	Test item	Condition	Reference page
EVAP SYSTEM	PURGE FLOW P0441	Refer to corresponding trouble diagnosis for DTC.	<a href="#">EC-1507</a>
	EVAP SML LEAK P0442/P1442		<a href="#">EC-1513</a>
	EVAP V/S SML LEAK P0456/P1456		<a href="#">EC-1555</a> , <a href="#">EC-1695</a>
	PURG VOL CN/V P1444		<a href="#">EC-1672</a>
	VC CUT/V BP/V P1491		<a href="#">EC-1714</a>
HO2S1	HO2S1 (B1) P0133		<a href="#">EC-1412</a>
	HO2S1 (B1) P0134		<a href="#">EC-1421</a>
	HO2S1 (B1) P1143		<a href="#">EC-1623</a>
	HO2S1 (B1) P1144		<a href="#">EC-1629</a>
HO2S2	HO2S2 (B1) P0139		<a href="#">EC-1435</a>
	HO2S2 (B1) P1146	<a href="#">EC-1635</a>	
	HO2S2 (B1) P1147	<a href="#">EC-1642</a>	

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## REAL TIME DIAGNOSIS IN DATA MONITOR MODE (RECORDING VEHICLE DATA)

### Description

CONSULT-II has two kinds of triggers and they can be selected by touching "SETTING" in "DATA MONITOR" mode.

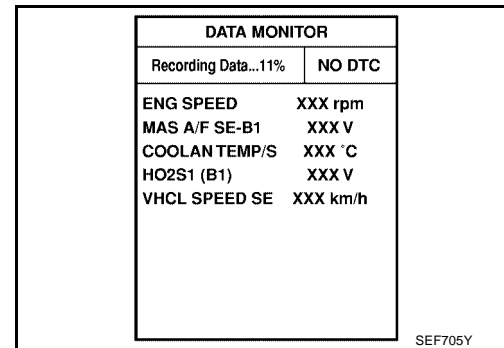
1. "AUTO TRIG" (Automatic trigger):

- The malfunction will be identified on the CONSULT-II screen in real time.

In other words, DTC/1st trip DTC and malfunction item will be displayed if the malfunction is detected by ECM.

At the moment a malfunction is detected by ECM, "MONITOR" in "DATA MONITOR" screen is changed to "Recording Data ... xx%" as shown at right, and the data after the malfunction detection is recorded. Then when the percentage reached 100%, "REAL-TIME DIAG" screen is displayed. If "STOP" is touched on the screen during "Recording Data ... xx%", "REAL-TIME DIAG" screen is also displayed.

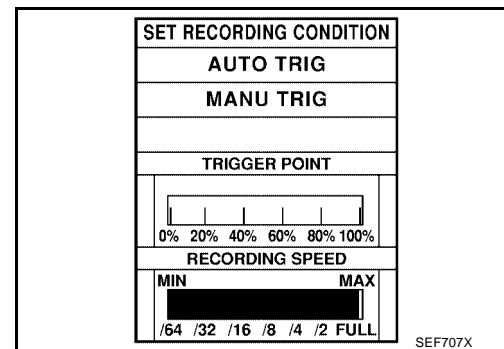
The recording time after the malfunction detection and the recording speed can be changed by "TRIGGER POINT" and "Recording Speed". Refer to CONSULT-II OPERATION MANUAL.



2. "MANU TRIG" (Manual trigger):

- DTC/1st trip DTC and malfunction item will not be displayed automatically on CONSULT-II screen even though a malfunction is detected by ECM.

DATA MONITOR can be performed continuously even though a malfunction is detected.



### Operation

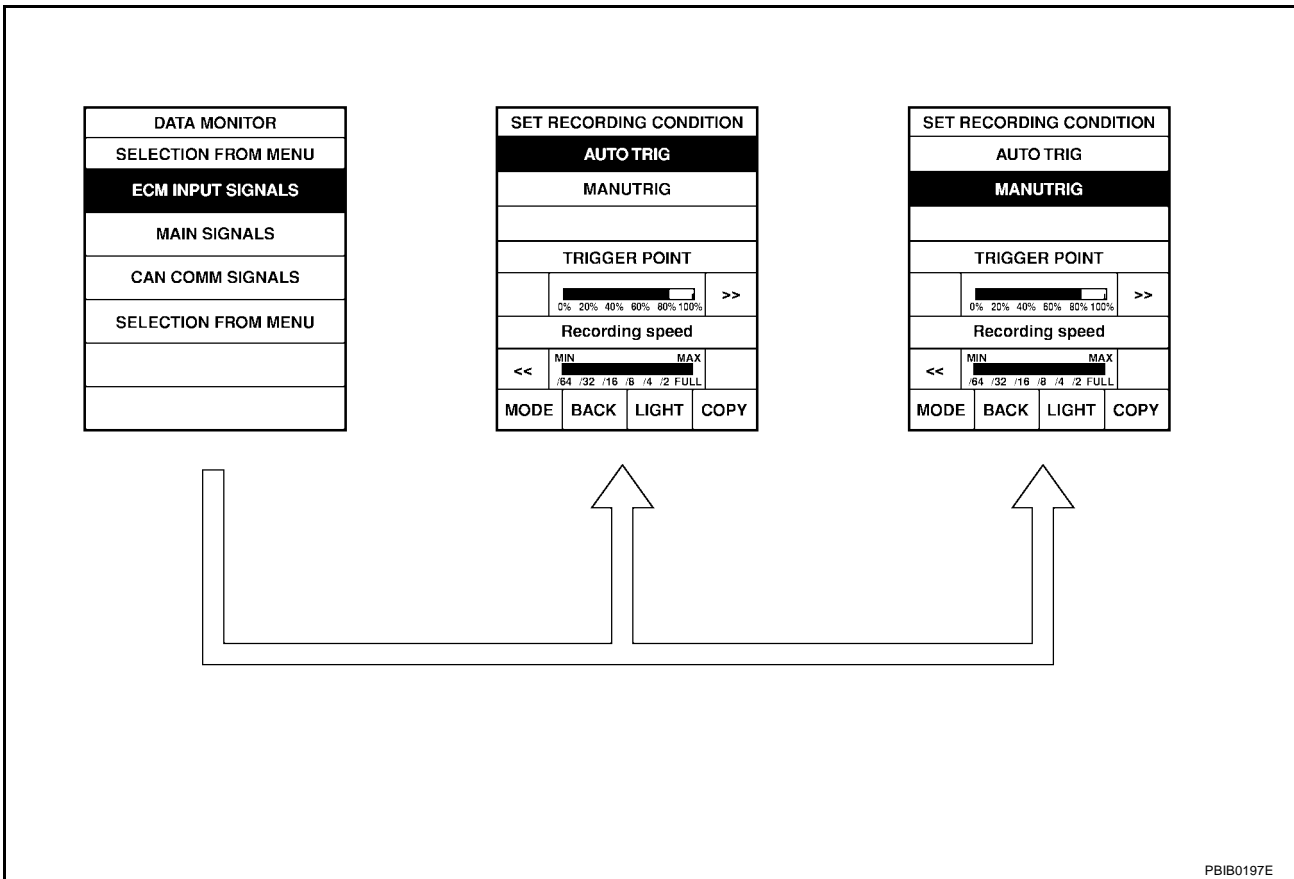
1. "AUTO TRIG"

- While trying to detect the DTC/1st trip DTC by performing the "DTC Confirmation Procedure", be sure to select to "DATA MONITOR (AUTO TRIG)" mode. You can confirm the malfunction at the moment it is detected.
- While narrowing down the possible causes, CONSULT-II should be set in "DATA MONITOR (AUTO TRIG)" mode, especially in case the incident is intermittent.  
When you are inspecting the circuit by gently shaking (or twisting) the suspicious connectors, components and harness in the "DTC Confirmation Procedure", the moment a malfunction is found the DTC/1st trip DTC will be displayed. (Refer to "Incident Simulation Tests" in [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#) .)

2. "MANU TRIG"

- If the malfunction is displayed as soon as "DATA MONITOR" is selected, reset CONSULT-II to "MANU TRIG". By selecting "MANU TRIG" you can monitor and store the data. The data can be utilized for further diagnosis, such as a comparison with the value for the normal operating condition.



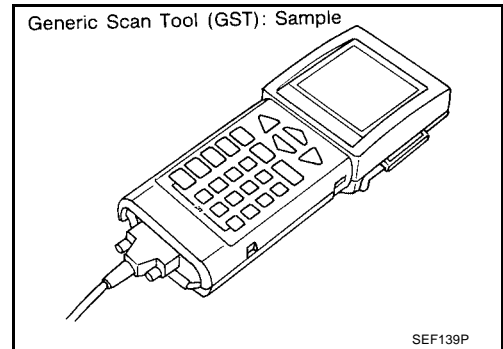


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## Generic Scan Tool (GST) Function DESCRIPTION

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Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 8 different functions explained below. ISO9141 is used as the protocol. The name "GST" or "Generic Scan Tool" is used in this service manual.



## FUNCTION

Diagnostic test mode		Function
MODE 1	READINESS TESTS	This mode gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
MODE 2	(FREEZE DATA)	This mode gains access to emission-related data value which were stored by ECM during the freeze frame. For details, refer to <a href="#">EC-1264, "FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA"</a> .
MODE 3	DTCs	This mode gains access to emission-related power train trouble codes which were stored by ECM.

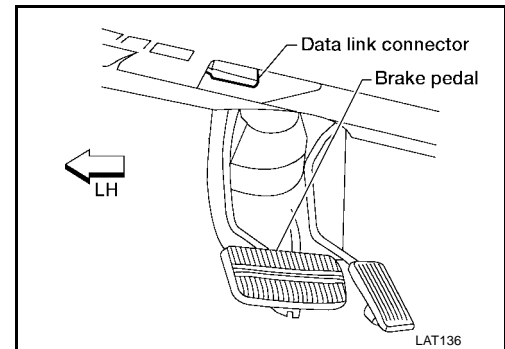
# TROUBLE DIAGNOSIS

[QR25DE]

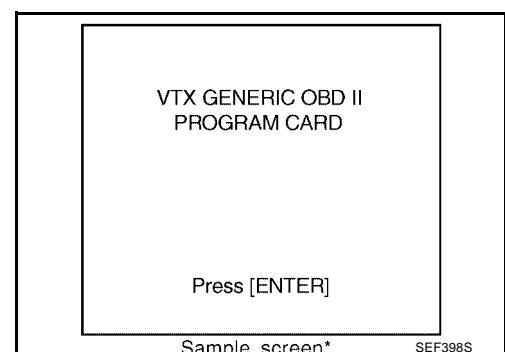
Diagnostic test mode		Function
MODE 4	CLEAR DIAG INFO	This mode can clear all emission-related diagnostic information. This includes: <ul style="list-style-type: none"> <li>● Clear number of diagnostic trouble codes (MODE 1)</li> <li>● Clear diagnostic trouble codes (MODE 3)</li> <li>● Clear trouble code for freeze frame data (MODE 1)</li> <li>● Clear freeze frame data (MODE 2)</li> <li>● Reset status of system monitoring test (MODE 1)</li> <li>● Clear on board monitoring test results (MODE 6 and 7)</li> </ul>
MODE 6	(ON BOARD TESTS)	This mode accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
MODE 7	(ON BOARD TESTS)	This mode enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
MODE 8	—	This mode can close EVAP system in ignition switch "ON" position (Engine stopped). When this mode is performed, the following parts can be opened or closed. <ul style="list-style-type: none"> <li>● EVAP canister vent control valve open</li> <li>● Vacuum cut valve bypass valve closed</li> </ul> In the following conditions, this mode cannot function. <ul style="list-style-type: none"> <li>● Low ambient temperature</li> <li>● Low battery voltage</li> <li>● Engine running</li> <li>● Ignition switch "OFF"</li> <li>● Low fuel temperature</li> <li>● Too much pressure is applied to EVAP system</li> </ul>
MODE 9	(CALIBRATION ID)	This mode enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.

## GST INSPECTION PROCEDURE

1. Turn ignition switch OFF.
2. Connect "GST" to data link connector, which is located under LH dash panel near the fuse box cover.
3. Turn ignition switch ON.

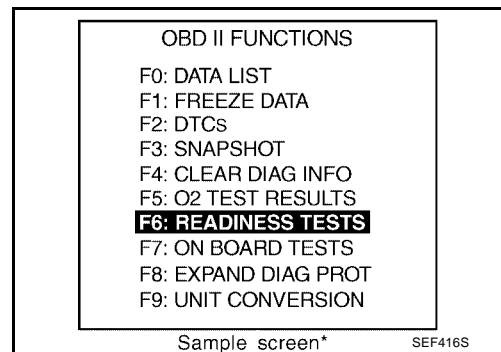


4. Enter the program according to instruction on the screen or in the operation manual.  
(\*: Regarding GST screens in this section, sample screens are shown.)



5. Perform each diagnostic mode according to each service procedure.

**For further information, see the GST Operation Manual of the tool maker.**



## CONSULT-II Reference Value in Data Monitor Mode

UBS0027Q

Remarks:

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.
- \* Specification data may not be directly related to their components signals/values/operations.

i.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. This IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

MONITOR ITEM	CONDITION	SPECIFICATION
ENG SPEED	<ul style="list-style-type: none"> <li>● Tachometer: Connect</li> <li>● Run engine and compare tachometer indication with the CONSULT-II value.</li> </ul>	Almost the same speed as the CONSULT-II value.
MAS A/F SE-B1	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: N</li> <li>● No-load</li> </ul>	Idle Approx. 1.1 - 1.5V
		2,500 rpm Approx. 1.6 - 2.0V
B/FUEL SCHDL	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N</li> <li>● Air conditioner switch: OFF</li> <li>● No-load</li> </ul>	Idle 2.5 - 3.5 msec
		2,000 rpm 2.5 - 3.5 msec
A/F ALPHA-B1	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> </ul>	Maintaining engine speed at 2,000 rpm 54% - 155%
COOLAN TEMP/S	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> </ul>	More than 70°C (158°F)
HO2S1 (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> </ul>	Maintaining engine speed at 2,000 rpm 0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 (B1)	<ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● After keeping engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	Revs engine from idle to 3,000 rpm quickly. 0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> </ul>	Maintaining engine speed at 2,000 rpm LEAN ↔ RICH Changes more than 5 times during 10 seconds.
HO2S2 MNTR (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● After keeping engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	Revs engine from idle to 3,000 rpm quickly. LEAN ↔ RICH
VEH SPEED SE	<ul style="list-style-type: none"> <li>● Turn drive wheels and compare speedometer indication with the CONSULT-II value.</li> </ul>	Almost the same speed as the CONSULT-II value
BATTERY VOLT	<ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> </ul>	11 - 14V
ACCEL SEN1	<ul style="list-style-type: none"> <li>● Ignition switch: ON (engine stopped)</li> </ul>	Accelerator pedal: Fully released 0.41 - 0.71V
ACCEL SEN2★		Accelerator pedal: Fully depressed More than 4.2V

# TROUBLE DIAGNOSIS

[QR25DE]

MONITOR ITEM	CONDITION	SPECIFICATION	
THRTL SEN1 THRTL SEN2★	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	More than 0.36V
	● Shift lever: D (A/T model) 1st (M/T model)	Accelerator pedal: Fully depressed	Less than 4.75V
EVAP SYS PRES	● Ignition switch: ON		1.8 - 4.8V
ABSOL PRES/SE	● Ignition switch: ON		1.8 - 4.8V
START SIGNAL	● Ignition switch: ON → START → ON		OFF → ON → OFF
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
P/N POSI SW	● Ignition switch: ON	Shift lever: P or N (A/T model) Neutral (M/T model)	ON
		Shift lever: Except above	OFF
PW/ST SIGNAL	● Engine: After warming up, idle the engine	Steering wheel is in neutral position. (Forward direction)	OFF
		Steering wheel is turned.	ON
LOAD SIGNAL	● Ignition switch: ON	Rear window defogger switch is ON and/or lighting switch is in 2nd.	ON
		Rear window defogger switch is OFF and lighting switch is OFF.	OFF
IGNITION SW	● Ignition switch: ON → OFF → ON		ON → OFF → ON
HEATER FAN SW	● Engine: After warming up, idle the engine	Heater fan is operating.	ON
		Heater fan is not operating	OFF
BRAKE SW	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
INJ PULSE-B1	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
IGN TIMING	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle	10° - 20° BTDC
		2,000 rpm	25° - 45° BTDC
CAL/LD VALUE	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle	10% - 35%
		2,500 rpm	10% - 35%
MASS AIRFLOW	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle	1.0 - 4.0 g-m/s
		2,500 rpm	4.0 - 10.0 g-m/s
PURG VOL C/V	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle	0%
		2,000 rpm	20 - 30%

# TROUBLE DIAGNOSIS

[QR25DE]

MONITOR ITEM	CONDITION		SPECIFICATION
INT/V TIM (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N</li> <li>● Air conditioner switch: OFF</li> <li>● No-load</li> </ul>	Idle	-5° - 5°C
		2,000 rpm	Approx. 0° - 20°C
INT/V SOL (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N</li> <li>● Air conditioner switch: OFF</li> <li>● No-load</li> </ul>	Idle	0% - 2%
		2,000 rpm	Approx. 25% - 60%
AIR COND RLY	<ul style="list-style-type: none"> <li>● Engine: After warming up, idle the engine</li> </ul>	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates)	ON
VIAS S/V	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> </ul>	Idle	OFF
		More than 5,000 rpm	ON
FUEL PUMP RLY	<ul style="list-style-type: none"> <li>● For 1 seconds after turning ignition switch ON</li> <li>● Engine running or cranking</li> </ul>		ON
	<ul style="list-style-type: none"> <li>● Except above conditions</li> </ul>		OFF
VC/V BYPAS S/V	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>		OFF
VENT CONT/V	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>		OFF
THRTL RELAY	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>		ON
COOLING FAN	<ul style="list-style-type: none"> <li>● Engine: After warming up, idle the engine</li> <li>● Air conditioner switch: OFF</li> </ul>	Engine coolant temperature is 94°C (201°F) or less	OFF
		Engine coolant temperature is between 95°C (203°F) and 104°C (219°F)	LOW
		Engine coolant temperature is 105°C (221°F) or more	HIGH
HO2S1 HTR (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Engine speed: Below 3,600 rpm</li> </ul>		ON
	<ul style="list-style-type: none"> <li>● Engine speed: Above 3,600 rpm</li> </ul>		OFF
HO2S2 HTR (B1)	<ul style="list-style-type: none"> <li>● Engine speed: Below 3,600 rpm after the following conditions are met</li> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>		ON
	<ul style="list-style-type: none"> <li>● Engine speed: Above 3,600 rpm</li> </ul>		OFF
TRVL AFTER MIL	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	Vehicle has traveled after MIL has turned ON.	0 - 65,535 km (0 - 40,723 mile)
O2SEN HTR DTY	<ul style="list-style-type: none"> <li>● Engine coolant temperature when engine started: More than 80°C (176°F)</li> <li>● Engine speed: Below 3,600 rpm</li> </ul>		Approx. 50%
AC PRESS SEN	<ul style="list-style-type: none"> <li>● Ignition switch: ON (Engine stopped)</li> </ul>		Approx. 0V
	<ul style="list-style-type: none"> <li>● Engine: Idle</li> <li>● Air conditioner switch: OFF</li> </ul>		1.0 - 4.0V
VEH SPEED SE	<ul style="list-style-type: none"> <li>● Turn drive wheels and compare speedometer indication with the CONSULT-II value.</li> </ul>		Almost the same speed as the CONSULT-II value
SET VHCL SPD	<ul style="list-style-type: none"> <li>● Engine: Running</li> </ul>	ASCD: Operating	The preset vehicle speed is displayed.
MAIN SW	<ul style="list-style-type: none"> <li>● Ignition switch: ON</li> </ul>	CRUISE switch: Depressed	ON
		CRUISE switch: Released	OFF

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# TROUBLE DIAGNOSIS

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MONITOR ITEM	CONDITION	SPECIFICATION	
CANCEL SW	● Ignition switch: ON	CANCEL switch: Depressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	● Ignition switch: ON	ACCEL/RES switch: Depressed	ON
		ACCEL/RES switch: Released	OFF
SET SW	● Ignition switch: ON	COAST/SET switch: Depressed	ON
		COAST/SET switch: Released	OFF
BRAKE SW1 (ASCD brake switch)	● Ignition switch: ON	Brake pedal: Fully released	ON
		Brake pedal: Slightly depressed	OFF
BRAKE SW2 (STOP lamp switch)	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
CRUISE LAMP	● Ignition switch: ON	CRUISE switch is depressed at first time → second time	ON → OFF
SET LAMP	● CRUISE switch: ON ● When vehicle is between 40 km/h (25 MPH) and 144 km/h (89 MPH)	SET switch pressed	ON
		ASCD control is canceled.	OFF

★: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

## Major Sensor Reference Graph in Data Monitor Mode

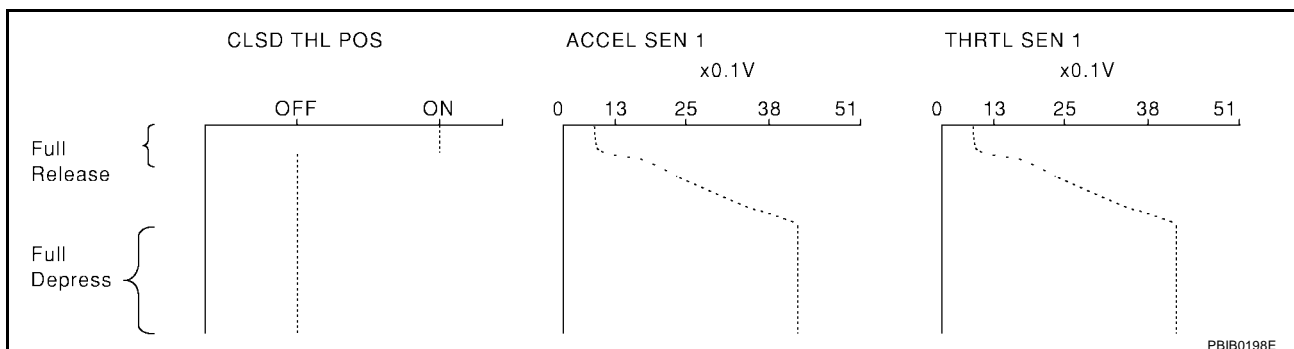
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The following are the major sensor reference graphs in “DATA MONITOR” mode.

### CLSD THL POS, ACCEL SEN 1, THRTL SEN 1

Below is the data for “CLSD THL POS”, “ACCEL SEN 1” and “THRTL SEN 1” when depressing the accelerator pedal with the ignition switch “ON” and with selector lever in “D” position (A/T models) or with shift lever in “1st” position (M/T models).

The signal of “ACCEL SEN 1” and “THRTL SEN 1” should rise gradually without any intermittent drop or rise after “CLSD THL POS” is changed from “ON” to “OFF”.



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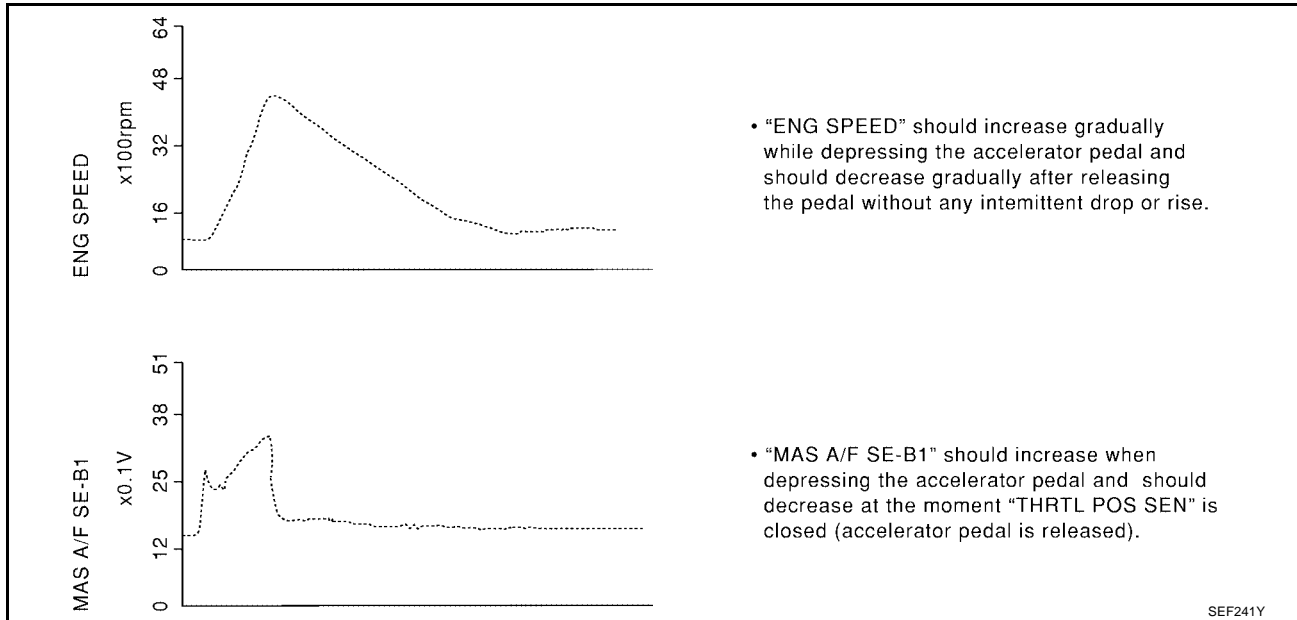
# TROUBLE DIAGNOSIS

[QR25DE]

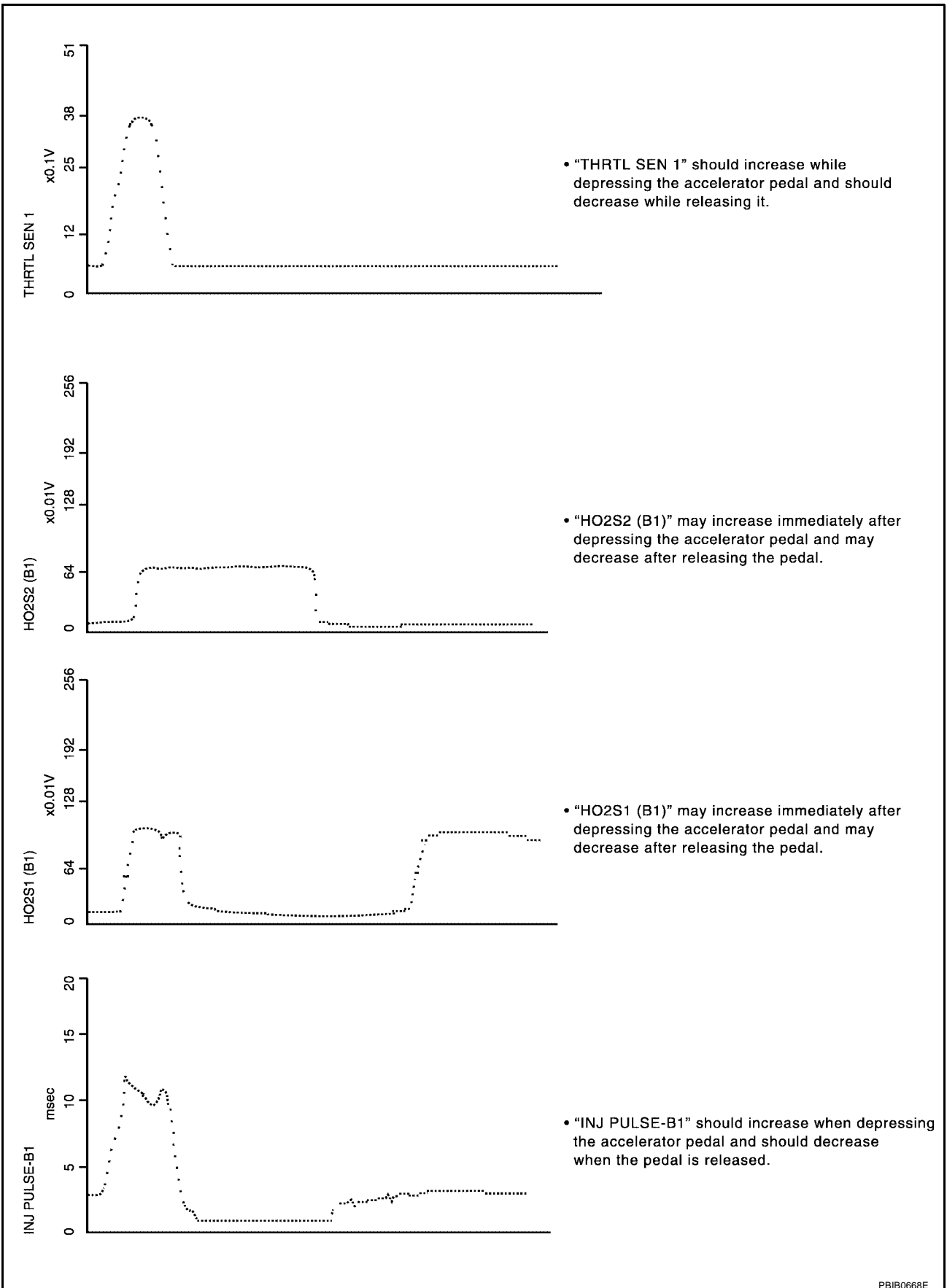
## ENG SPEED, MAS A/F SE-B1, THRTL SEN 1, HO2S2 (B1), HO2S1 (B1), INJ PULSE-B1

Below is the data for "ENG SPEED", "MAS A/F SE-B1", "THRTL SEN 1", "HO2S2 (B1)", "HO2S1 (B1)" and "INJ PULSE-B1" when revving engine quickly up to 4,800 rpm under no load after warming up engine sufficiently.

Each value is for reference, the exact value may vary.



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**TROUBLE DIAGNOSIS - SPECIFICATION VALUE**

**Description**

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The specification (SP) value indicates the tolerance of the value that is displayed in "DATA MONITOR (SPEC)" mode of CONSULT-II during normal operation of the Engine Control System. When the value in "DATA MONITOR (SPEC)" mode is within the SP value, the Engine Control System is confirmed OK. When the value in "DATA MONITOR (SPEC)" mode is NOT within the SP value, the Engine Control System may have one or more malfunctions.

The SP value is used to detect malfunctions that may affect the Engine Control System, but will not light the MIL.

The SP value will be displayed for the following three items:

- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction)
- A/F ALPHA-B1 (The mean value of air-fuel ratio feedback correction factor per cycle)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor)

**Testing Condition**

UBS0027T

- Vehicle driven distance: More than 5,000 km (3,017 miles)
- Barometric pressure: 98.3 - 104.3 kPa (1.003 - 1.064 kg/cm<sup>2</sup> , 14.25 - 15.12 psi)
- Atmospheric temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up\*1
- Electrical load: Not applied\*2
- Engine speed: Idle

\*1: For A/T models, after the engine is warmed up to normal operating temperature, drive vehicle until "FLUID TEMP SE" (A/T fluid temperature sensor signal) indicates more than 60°C (140°F).

For M/T models, after the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.

\*2: Rear window defogger switch, air conditioner switch, lighting switch are "OFF". Steering wheel is straight ahead.

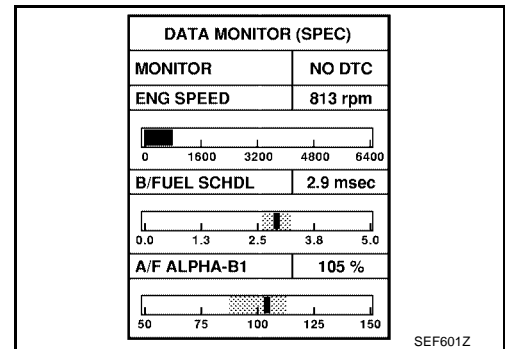
**Inspection Procedure**

UBS0027U

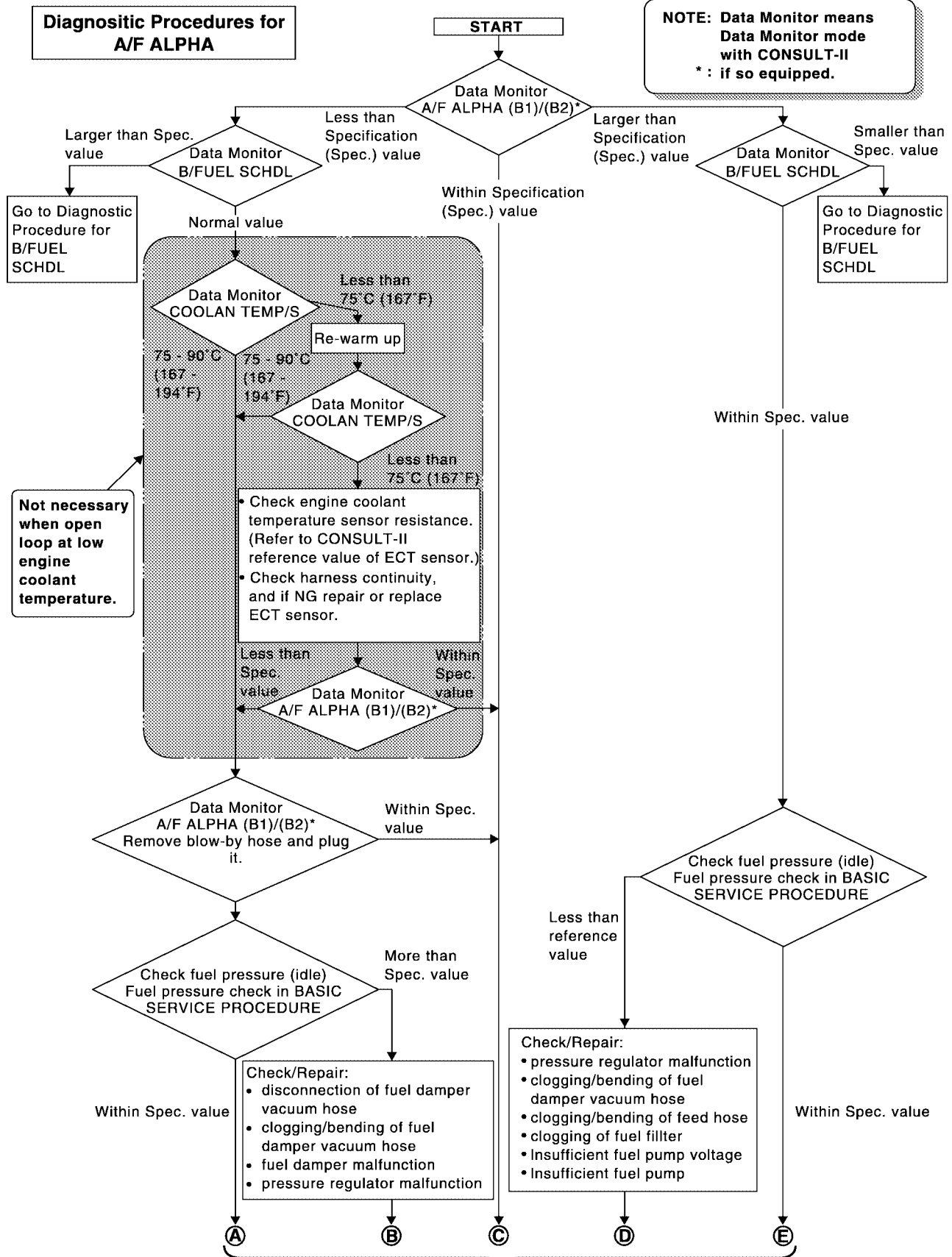
**NOTE:**

Perform "DATA MONITOR (SPEC)" mode in maximum scale display.

1. Perform [EC-1291, "Basic Inspection"](#) .
2. Confirm that the testing conditions indicated above are met.
3. Select "B/FUEL SCHDL", "A/F ALPHA-B1" and "MAS A/F SE-B1" in "DATA MONITOR (SPEC)" mode with CONSULT-II.
4. Make sure that monitor items are within the SP value.
5. If NG, go to [EC-1338, "Diagnostic Procedure"](#) .



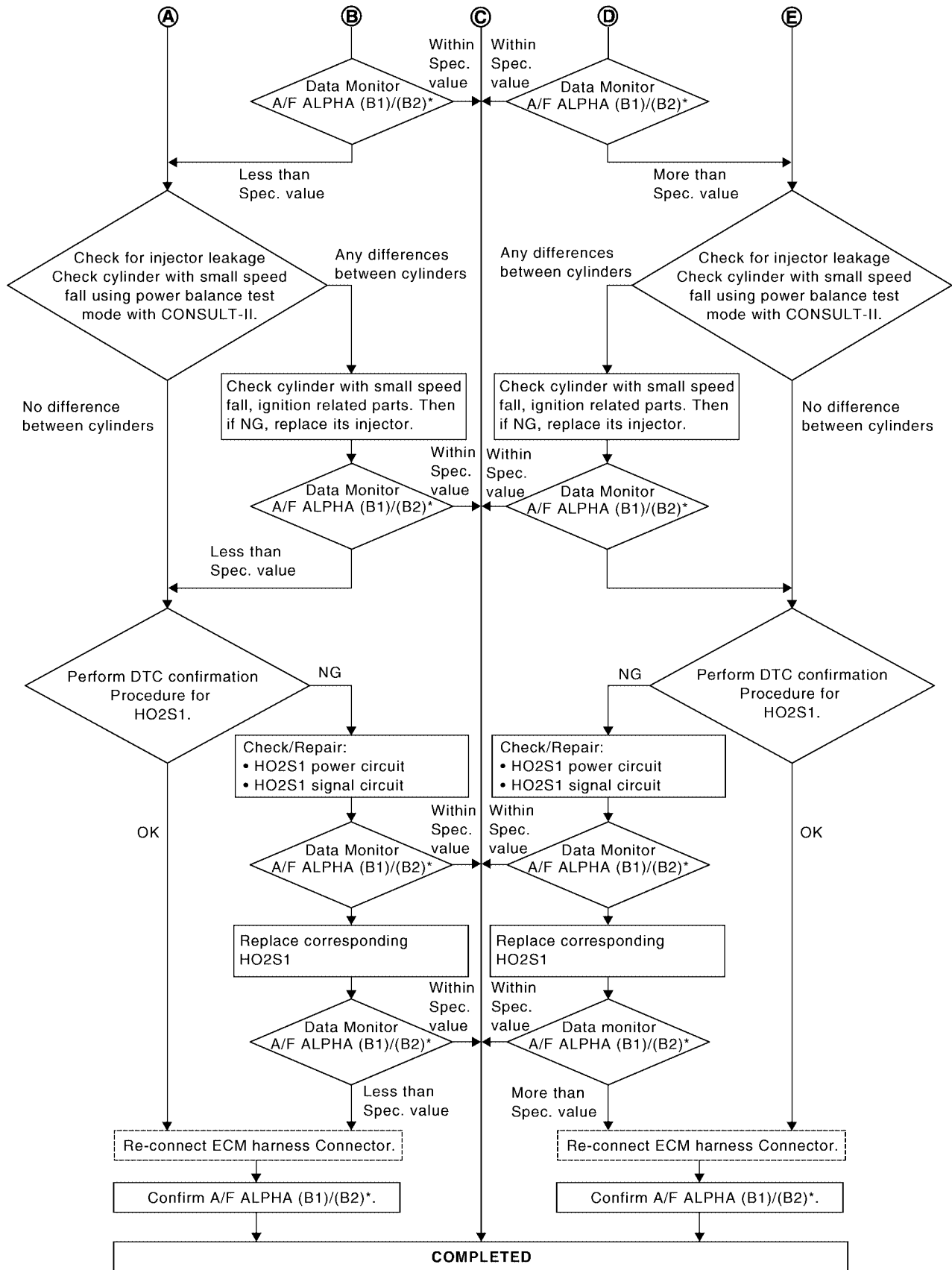
Diagnostic Procedure



(Go to next page.)

# TROUBLE DIAGNOSIS - SPECIFICATION VALUE

[QR25DE]



A  
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C  
D  
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F  
G  
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I  
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K  
L  
M

SEF768Z



**TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT****Description**

Intermittent incidents (I/I) may occur. In many cases, the malfunction resolves itself (the part or circuit function returns to normal without intervention). It is important to realize that the symptoms described in the customer's complaint often do not recur on (1st trip) DTC visits. Realize also that the most frequent cause of I/I occurrences is poor electrical connections. Because of this, the conditions under which the incident occurred may not be clear. Therefore, circuit checks made as part of the standard diagnostic procedure may not indicate the specific malfunctioning area.

**Common I/I Report Situations**

STEP in Work Flow	Situation
II	The CONSULT-II is used. The SELF-DIAG RESULTS screen shows time data other than "0" or "[1t]".
III	The symptom described by the customer does not recur.
IV	(1st trip) DTC does not appear during the DTC Confirmation Procedure.
VI	The Diagnostic Procedure for PXXXX does not indicate the malfunctioning area.

**Diagnostic Procedure****1. INSPECTION START**

Erase (1st trip) DTCs. Refer to [EC-1273, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).

>> GO TO 2.

**2. CHECK GROUND TERMINALS**

Check ground terminals for corroding or loose connection.

Refer to [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#), "Incident Simulation Tests".

OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

**3. SEARCH FOR ELECTRICAL INCIDENT**

Perform [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#), "Incident Simulation Tests".

OK or NG

OK >> GO TO 4.

NG >> Repair or replace.

**4. CHECK CONNECTOR TERMINALS**

Refer to [GI-23, "How to Check Terminal"](#), "HOW TO PROBE CONNECTORS", "How to Check Enlarged Contact Spring of Terminal".

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace connector.

# POWER SUPPLY CIRCUIT FOR ECM

[QR25DE]

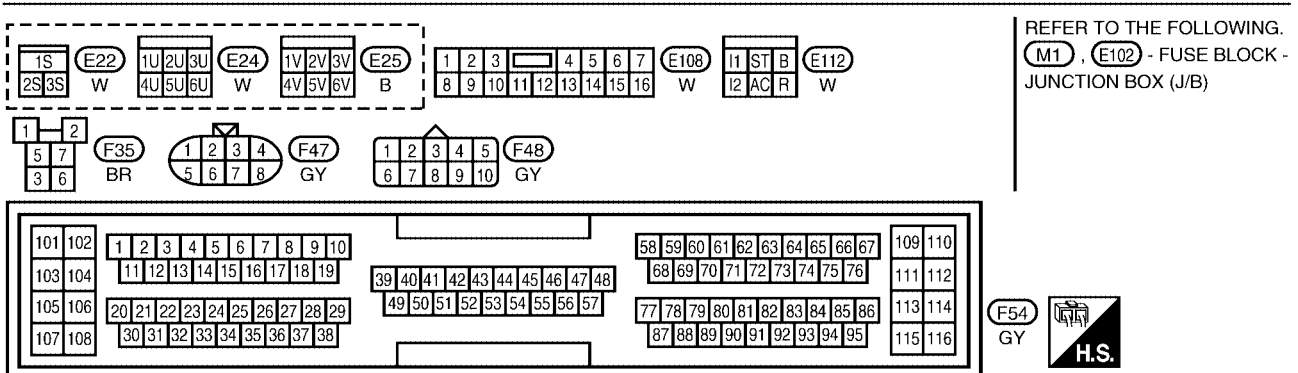
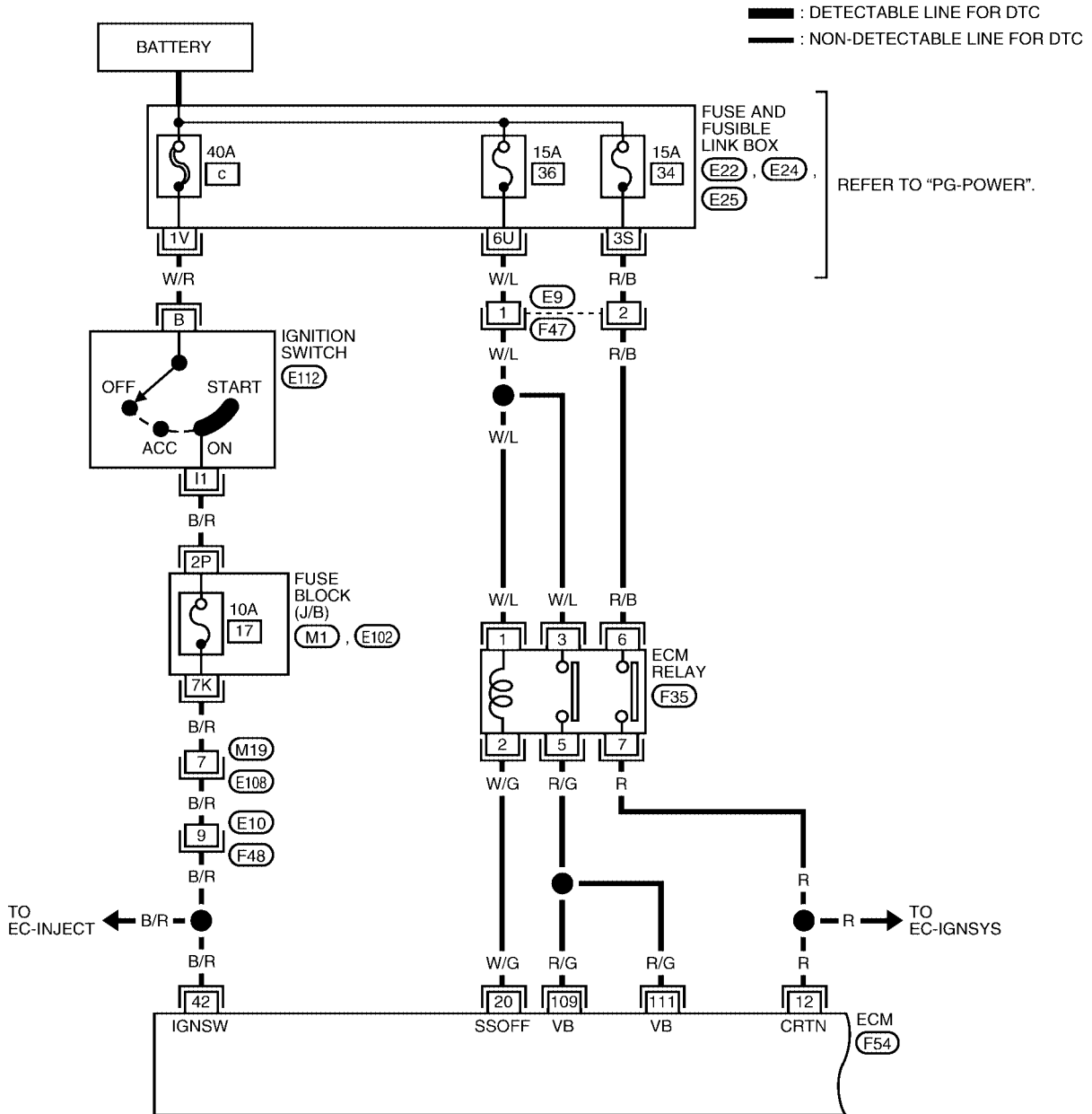
## POWER SUPPLY CIRCUIT FOR ECM

FFP:24110

### Wiring Diagram

UBS0027Y

### EC-MAIN-01



BBWA0410E

# POWER SUPPLY CIRCUIT FOR ECM

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
12	R	Counter current return	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
20	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For 5 seconds after turning ignition switch "OFF"	0 - 1.0V
			[Ignition switch "OFF"] ● More than 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
42	B/R	Ignition switch	[Ignition switch "OFF"]	0V
			[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
109 111	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

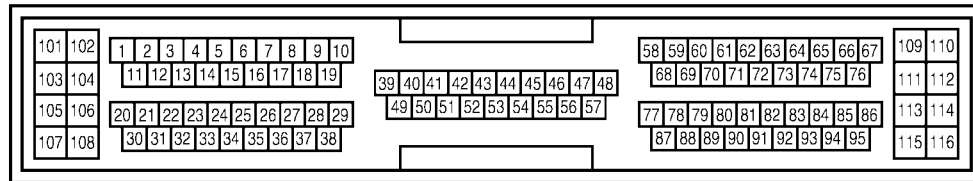
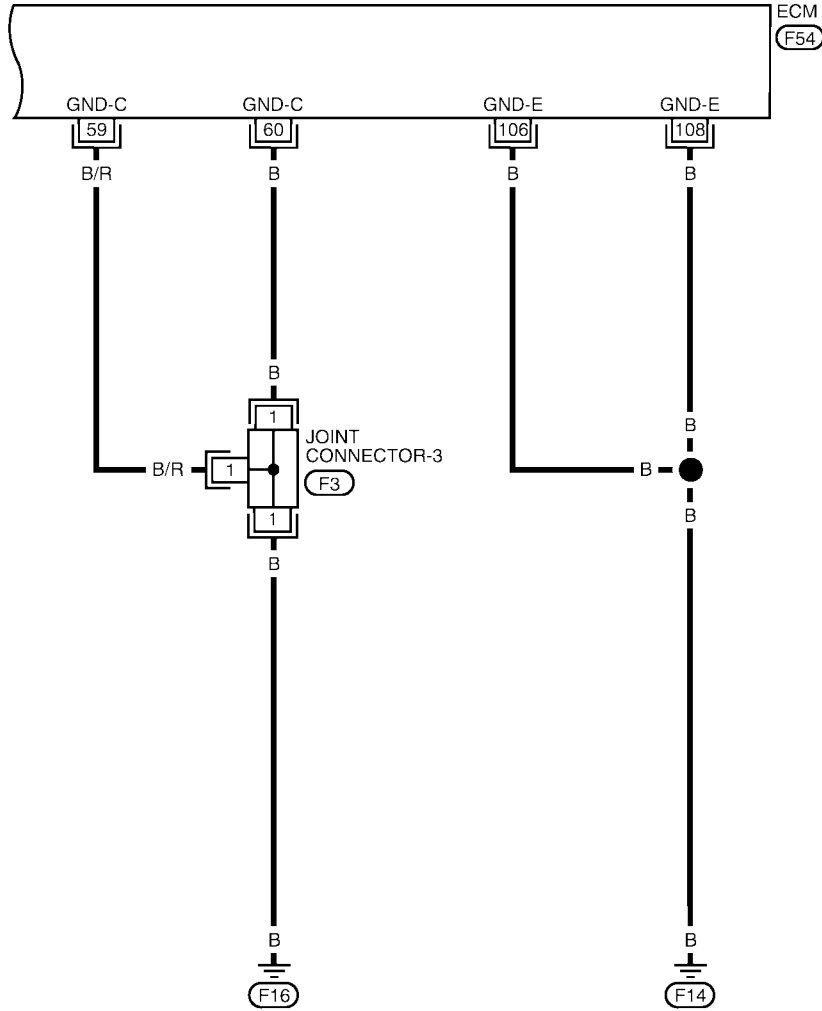
A  
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# POWER SUPPLY CIRCUIT FOR ECM

[QR25DE]

EC-MAIN-02

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.  
 (F3) -JOINT CONNECTOR



BBWA0211E



# POWER SUPPLY CIRCUIT FOR ECM

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
59	B/R	ECM ground	[Engine is running] ● Idle speed	Engine ground
60	B			
106	B			
108	B			

## Diagnostic Procedure

UBS0027Z

### 1. INSPECTION START

Start engine.

**Is engine running?**

Yes or No

- Yes >> GO TO 9.
- No >> GO TO 2.

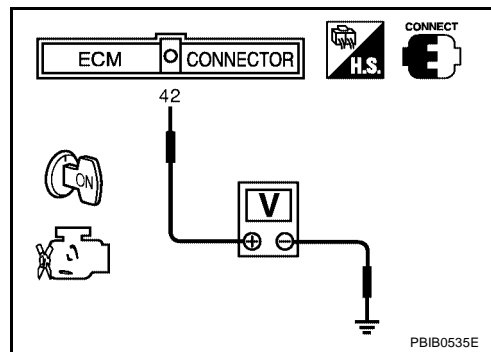
### 2. CHECK ECM POWER SUPPLY CIRCUIT-I

1. Turn ignition switch "OFF" and then "ON".
2. Check voltage between ECM terminal 42 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



### 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M19, E108
- Harness connectors E10, F48
- Fuse block (J/B) connectors E102, M1
- 10A fuse
- Harness for open or short between ECM and fuse

>> Repair harness or connectors.

**4. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 59, 60, 106, 108 and engine ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

**5. DETECT MALFUNCTIONING PART**

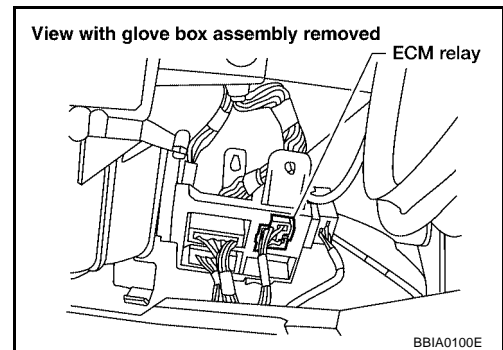
Check the following.

- Joint connector-3
- Harness for open or short between ECM and ground

>> Repair open circuit or short to power in harness or connectors.

**6. CHECK ECM POWER SUPPLY CIRCUIT-II**

1. Disconnect ECM relay.

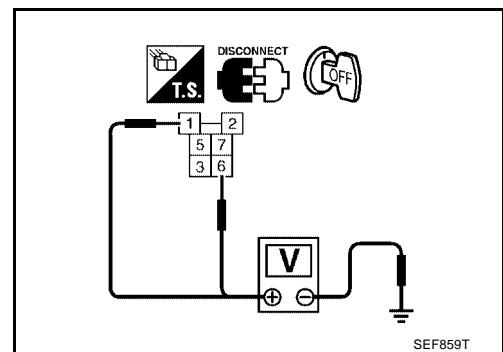


2. Check voltage between ECM relay terminals 1, 6 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.



**7. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors E9, F47
- 15A fuses
- Fuse and fusible link box connectors E22, E24
- Harness for open or short between ECM relay and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Check harness continuity between ECM terminal 20 and ECM relay terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

OK >> Go to [EC-1777, "IGNITION SIGNAL"](#) .

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**9. CHECK ECM POWER SUPPLY CIRCUIT-II**

1. Stop engine.
2. Turn ignition switch "ON" and then "OFF".
3. Check voltage between ECM terminals 12, 109, 111 and ground with CONSULT-II or tester.

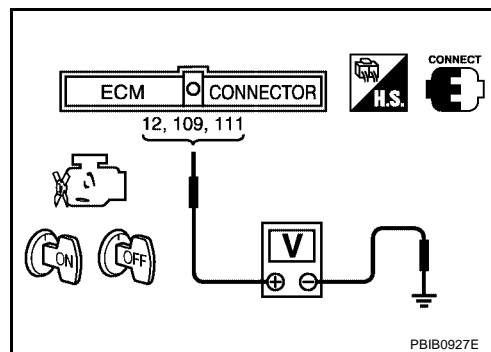
**Voltage:** After turning ignition switch "OFF", battery voltage will exist for a few seconds, then drop approximately 0V.

OK or NG

OK >> GO TO 14.

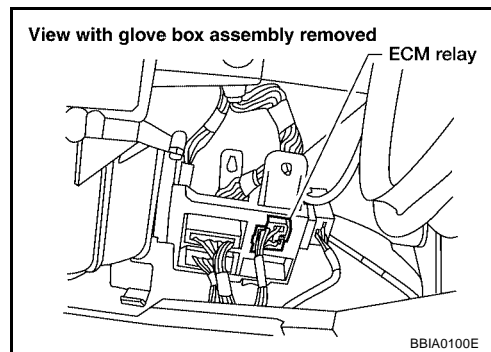
NG (Battery voltage does not exist.)>>GO TO 10.

NG (Battery voltage exists for more than a few seconds.)>>GO TO 13.



**10. CHECK ECM POWER SUPPLY CIRCUIT-III**

1. Disconnect ECM relay.



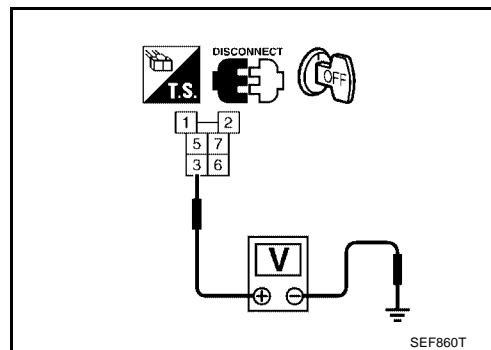
2. Check voltage between ECM relay terminal 3 and ground with CONSULT-II or tester.

**Voltage:** Battery voltage

OK or NG

OK >> GO TO 12.

NG >> GO TO 11.



## 11. DETECT MALFUNCTIONING PART

Check the following.

- Harness or connectors E9, F47
- Harness for open or short between ECM relay and 15A fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 12. CHECK HARNESS CONTINUITY BETWEEN ECM RELAY AND ECM FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals and ECM relay terminals as follows.  
Refer to Wiring Diagram.

ECM terminal	ECM relay terminal
12	7
109, 111	5

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 13.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 13. CHECK ECM RELAY

Refer to [EC-1349, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 14.
- NG >> Replace ECM relay.

## 14. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 59, 60, 106, 108 and engine ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 15.

## 15. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-3
- Harness for open or short between ECM and ground

>> Repair open circuit or short to power in harness or connectors.

16. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

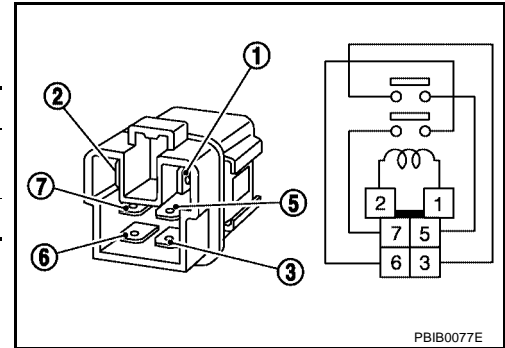
**Component Inspection**  
**ECM RELAY**

UBS00280

1. Apply 12V direct current between ECM relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5, 6 and 7.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No

3. If NG, replace ECM relay.



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## DTC U1000, U1001 CAN COMMUNICATION LINE

PFP:23710

### Description

UBS00281

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

### On Board Diagnosis Logic

UBS00282

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1000*1 1000	CAN communication line	<ul style="list-style-type: none"> <li>● ECM cannot communicate to other control units.</li> <li>● ECM cannot communicate for more than the specified time.</li> </ul>	<ul style="list-style-type: none"> <li>● Harness or connectors (CAN communication line is open or shorted)</li> </ul>
U1001*2 1001			

\*1: This self-diagnosis has the one trip detection.

\*2: The MIL will not light up for this diagnosis.

### DTC Confirmation Procedure

UBS00283

1. Turn ignition switch "ON" and wait at least 3 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If 1st trip DTC is detected, go to [EC-1352, "Diagnostic Procedure"](#) .




# DTC U1000, U1001 CAN COMMUNICATION LINE

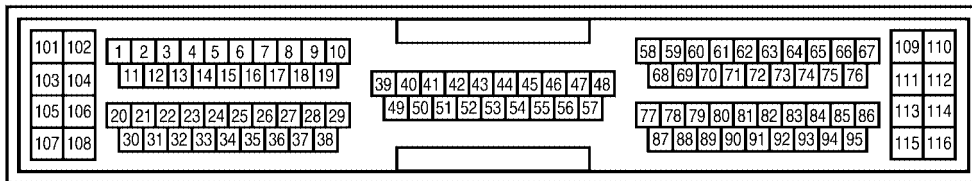
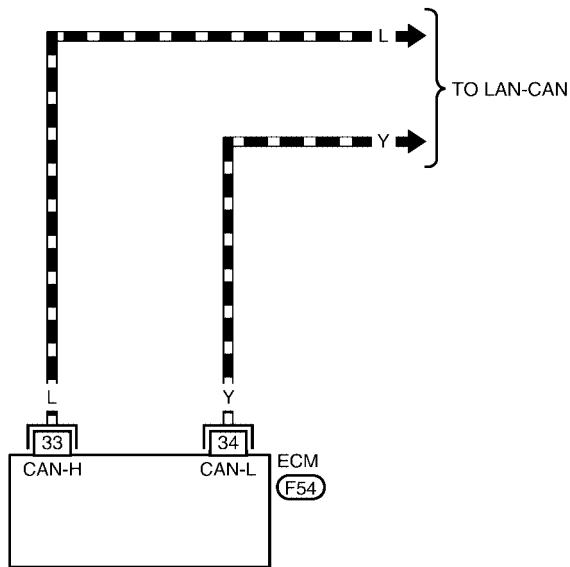
[QR25DE]

UBS00284

## Wiring Diagram

EC-CAN-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : DATA LINE



BBWA0212E

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**Diagnostic Procedure**

UBS00285

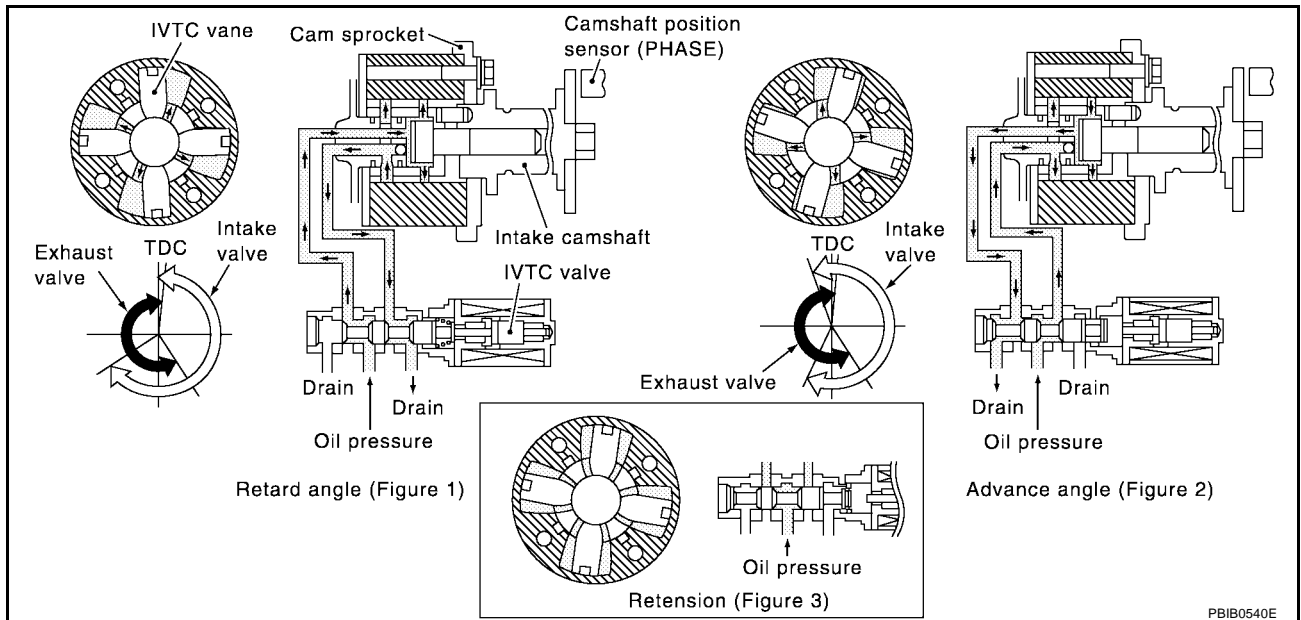
Go to [LAN-23, "CAN SYSTEM \(TYPE 3\)"](#)



DTC P0011 IVT CONTROL

Description  
SYSTEM DESCRIPTION

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	Intake valve timing control	Intake valve timing control solenoid valve
Camshaft position sensor (PHASE)			
Engine coolant temperature sensor	Engine coolant temperature		
Vehicle speed sensor	Vehicle speed		



This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
INT/V TIM (B1)	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load Idle	-5° - 5°CA
	2,000 rpm	Approx. 0° - 20°CA
INT/V SOL (B1)	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load Idle	0% - 2%
	2,000 rpm	Approx. 25% - 60%

## On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	Detecting condition	Possible cause
P0011 0011	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	<ul style="list-style-type: none"> <li>● Crankshaft position sensor (POS)</li> <li>● Camshaft position sensor (PHASE)</li> <li>● Accumulation of debris to the signal pick-up portion of the camshaft</li> </ul>

### FAIL-SAFE MODE

ECM enters in fail-safe mode when the malfunction is detected.

Detected items	Engine operating condition in fail-safe mode
Intake valve timing control	The signal is not energized to the solenoid valve and the valve control does not function

### DTC Confirmation Procedure

#### CAUTION:

Always drive at a safe speed.

#### NOTE:

- If DTC P0011 is displayed with DTC P1111, first perform trouble diagnosis for “DTC P1111”. See [EC-1600](#).
- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 10V and 16V at idle.

#### WITH CONSULT-II

1. Turn ignition switch “ON”.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Maintain the following conditions for at least 20 consecutive seconds.

ENG SPEED	1,700 - 3,175 rpm (A constant rotation is maintained.)
COOLANT TEMPS	70 - 105°C (158 - 221°F)
Selector lever	1st or 2nd position
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions required for this test.)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLANT TEMP/S	XXX °C

SEF174Y

4. If 1st trip DTC is detected, go to [EC-1354, "Diagnostic Procedure"](#).

#### WITH GST

Follow the procedure “WITH CONSULT-II” above.

### Diagnostic Procedure

#### 1. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to [EC-1494, "Component Inspection"](#).

#### OK or NG

- OK >> GO TO 2.
- NG >> Replace crankshaft position sensor (POS).

## 2. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-1500, "Component Inspection"](#) .

OK or NG

OK >> GO TO 3.

NG >> Replace camshaft position sensor (PHASE).

## 3. CHECK CAMSHAFT (INTAKE)

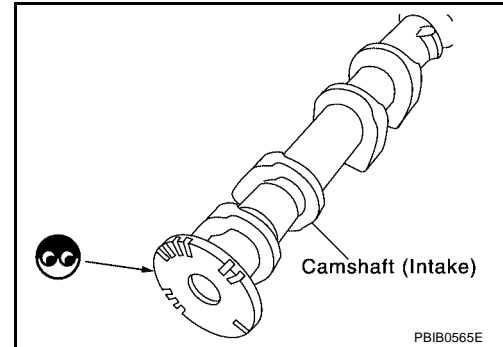
Check the following.

- Accumulation of debris to the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end

OK or NG

OK >> GO TO 4.

NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



## 4. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

For wiring diagram refer to CKP sensor (POS) [EC-1491](#) and CMP sensor (PHASE) [EC-1497](#) .

>> INSPECTION END

# DTC P0031, P0032 HO2S1 HEATER

[QR25DE]

## DTC P0031, P0032 HO2S1 HEATER

PFP:22690

### Description SYSTEM DESCRIPTION

UBS0028B

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater
Engine coolant temperature sensor	Engine coolant temperature		

The ECM performs ON/OFF duty control of the heated oxygen sensor 1 heater corresponding to the engine speed and engine coolant temperature. The duty percent varies with engine coolant temperature when engine is started.

### OPERATION

Engine speed rpm	Heated oxygen sensor 1 heater
Above 3,600	OFF
Below 3,600	ON

### CONSULT-II Reference Value in Data Monitor Mode

UBS0028C

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S1 HTR (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Engine speed: Below 3,600 rpm</li> </ul>	ON
	<ul style="list-style-type: none"> <li>● Engine speed: Above 3,600 rpm</li> </ul>	OFF
O2SEN HTR DTY	<ul style="list-style-type: none"> <li>● Engine coolant temperature when engine started: More than 80°C (176°F)</li> <li>● Engine speed: Below 3,600 rpm</li> </ul>	Approx. 50%

### On Board Diagnosis Logic

UBS0028D

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0031 0031	Heated oxygen sensor 1 heater control circuit low	The current amperage in the heated oxygen sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 1 heater.)	<ul style="list-style-type: none"> <li>● Harness or connectors (The heated oxygen sensor 1 heater circuit is open or shorted.)</li> <li>● Heater oxygen sensor 1 heater</li> </ul>
P0032 0032	Heated oxygen sensor 1 heater control circuit high	The current amperage in the heated oxygen sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 1 heater.)	<ul style="list-style-type: none"> <li>● Harness or connectors (The heated oxygen sensor 1 heater circuit is shorted.)</li> <li>● Heater oxygen sensor 1 heater</li> </ul>

### DTC Confirmation Procedure

UBS0028E

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

**Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V at idle.**

#### Ⓟ WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.

# DTC P0031, P0032 HO2S1 HEATER

[QR25DE]

3. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
4. Start engine and run it for at least 6 seconds at idle speed.
5. If 1st trip DTC is detected, go to [EC-1359, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

## WITH GST

1. Start engine and warm it up to normal operating temperature.
  2. Turn ignition switch "OFF" and wait at least 10 seconds.
  3. Start engine and run it for at least 6 seconds at idle speed.
  4. Turn ignition switch "OFF" and wait at least 10 seconds.
  5. Start engine and run it for at least 6 seconds at idle speed.
  6. Select "MODE 3" with GST.
  7. If DTC is detected, go to [EC-1359, "Diagnostic Procedure"](#).
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

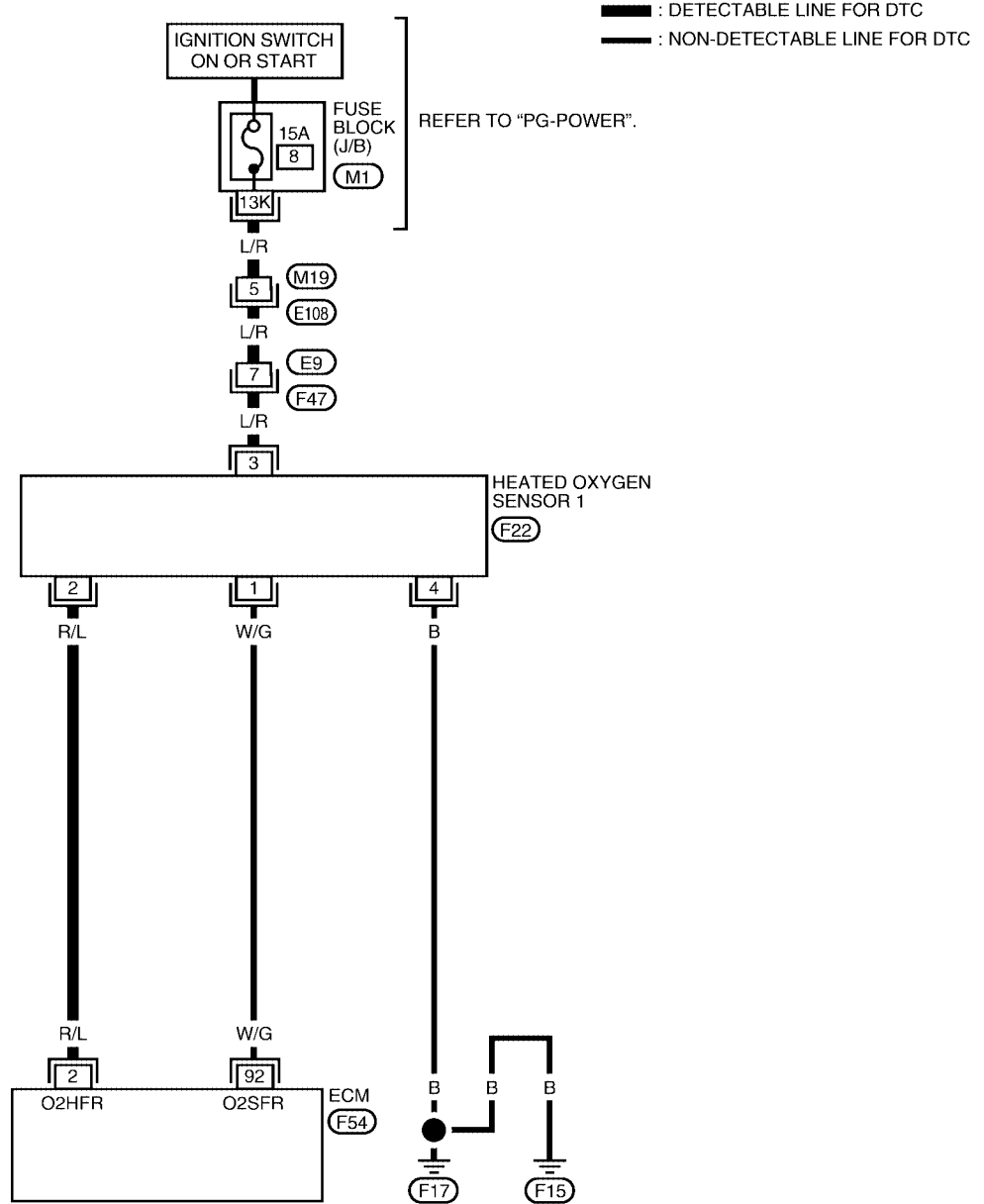
# DTC P0031, P0032 HO2S1 HEATER

[QR25DE]

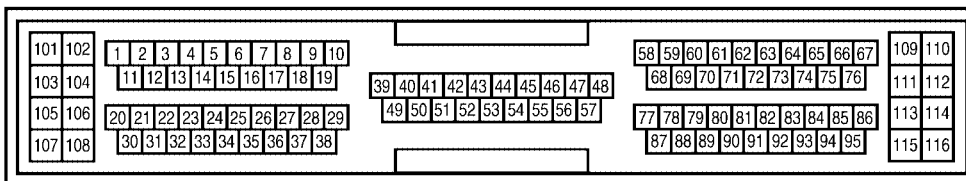
UBS0028F

## Wiring Diagram

EC-HO2S1H-01



REFER TO THE FOLLOWING.  
 (M1) - FUSE BLOCK - JUNCTION BOX (J/B)



BBWA0411E

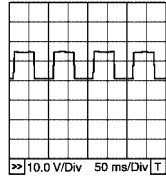
# DTC P0031, P0032 HO2S1 HEATER

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
2	R/L	Heated oxygen sensor 1 heater	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition.</li> <li>● Engine speed is below 3,600 rpm.</li> </ul>	<p>Approximately 7.0V★</p>  <p>PBIB0519E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Engine speed is above 3,600 rpm.</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)</p>

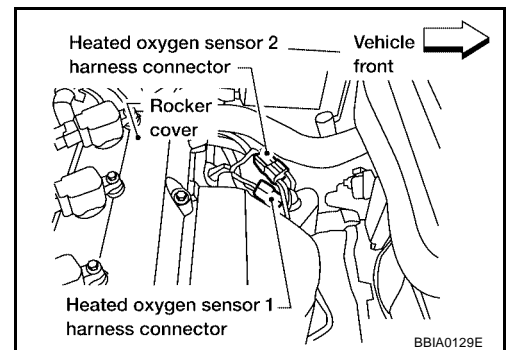
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS0028G

### 1. CHECK HO2S1 POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 1 harness connector.
3. Turn ignition switch "ON".

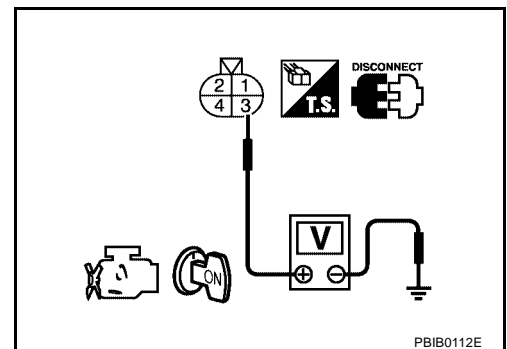


4. Check voltage between HO2S1 terminal 3 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.  
 NG >> GO TO 2.



---

## 2. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M19, E108
- Harness connectors E9, F47
- Fuse block (J/B) connector M1
- 15A fuse
- Harness for open or short between heated oxygen sensor 1 and fuse

>> Repair harness or connectors.

---

## 3. CHECK HO2S1 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 2 and HO2S1 terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 4. CHECK HEATED OXYGEN SENSOR 1 HEATER

---

Refer to [EC-1361, "Component Inspection"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace heated oxygen sensor 1.

---

## 5. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**



**Component Inspection**  
**HEATED OXYGEN SENSOR 1 HEATER**

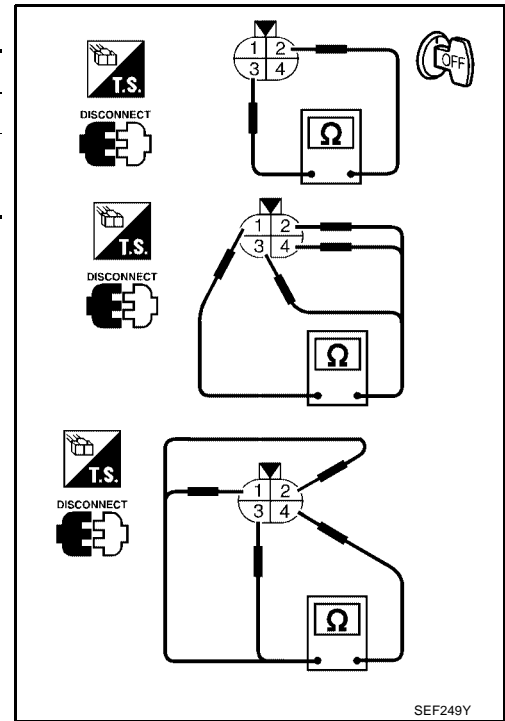
1. Check resistance between HO2S1 terminals as follows.

Terminal No.	Resistance
2 and 3	3.3 - 4.0 Ω at 25°C (77°F)
1 and 2, 3, 4	∞ Ω (Continuity should not exist)
4 and 1, 2, 3	

2. If NG, replace heated oxygen sensor 1.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



SEF249Y

**Removal and Installation**  
**HEATED OXYGEN SENSOR 1**

Refer to [EM-110, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

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**DTC P0037, P0038 HO2S2 HEATER**

PF0:226A0

**Description  
SYSTEM DESCRIPTION**

UBS0028J

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE)	Engine speed	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
Crankshaft position sensor (POS)			
Engine coolant temperature sensor	Engine coolant temperature		
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater corresponding to the engine speed, amount of intake air and engine coolant temperature.

**OPERATION**

Engine speed rpm	Heated oxygen sensor 2 heater
Above 3,600	OFF
Below 3,600 rpm after the following conditions are met. <ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	ON

**CONSULT-II Reference Value in Data Monitor Mode**

UBS0028K

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 HTR (B1)	<ul style="list-style-type: none"> <li>● Engine speed: Below 3,600 rpm after the following conditions are met.</li> <li>● Engine: After warming up</li> <li>● Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	ON
	<ul style="list-style-type: none"> <li>● Engine speed: Above 3,600 rpm</li> </ul>	OFF

**On Board Diagnosis Logic**

UBS0028L

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0037 0037	Heated oxygen sensor 2 heater control circuit low	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	<ul style="list-style-type: none"> <li>● Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.)</li> <li>● Heated oxygen sensor 2 heater</li> </ul>
P0038 0038	Heated oxygen sensor 2 heater control circuit high	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	<ul style="list-style-type: none"> <li>● Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.)</li> <li>● Heated oxygen sensor 2 heater</li> </ul>

**DTC Confirmation Procedure**

UBS0028M

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

**Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V at idle.**

**WITH CONSULT-II**

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.

# DTC P0037, P0038 HO2S2 HEATER

[QR25DE]

4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
5. Let engine idle for one minute.
6. If 1st trip DTC is detected, go to [EC-1365, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

## WITH GST

1. Start engine and warm it up to the normal operating temperature.
  2. Turn ignition switch "OFF" and wait at least 10 seconds.
  3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
  4. Let engine idle for one minute.
  5. Turn ignition switch "OFF" and wait at least 10 seconds.
  6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
  7. Let engine idle for one minute.
  8. Select "MODE 3" with GST.
  9. If DTC is detected, go to [EC-1365, "Diagnostic Procedure"](#).
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

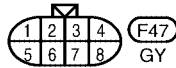
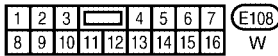
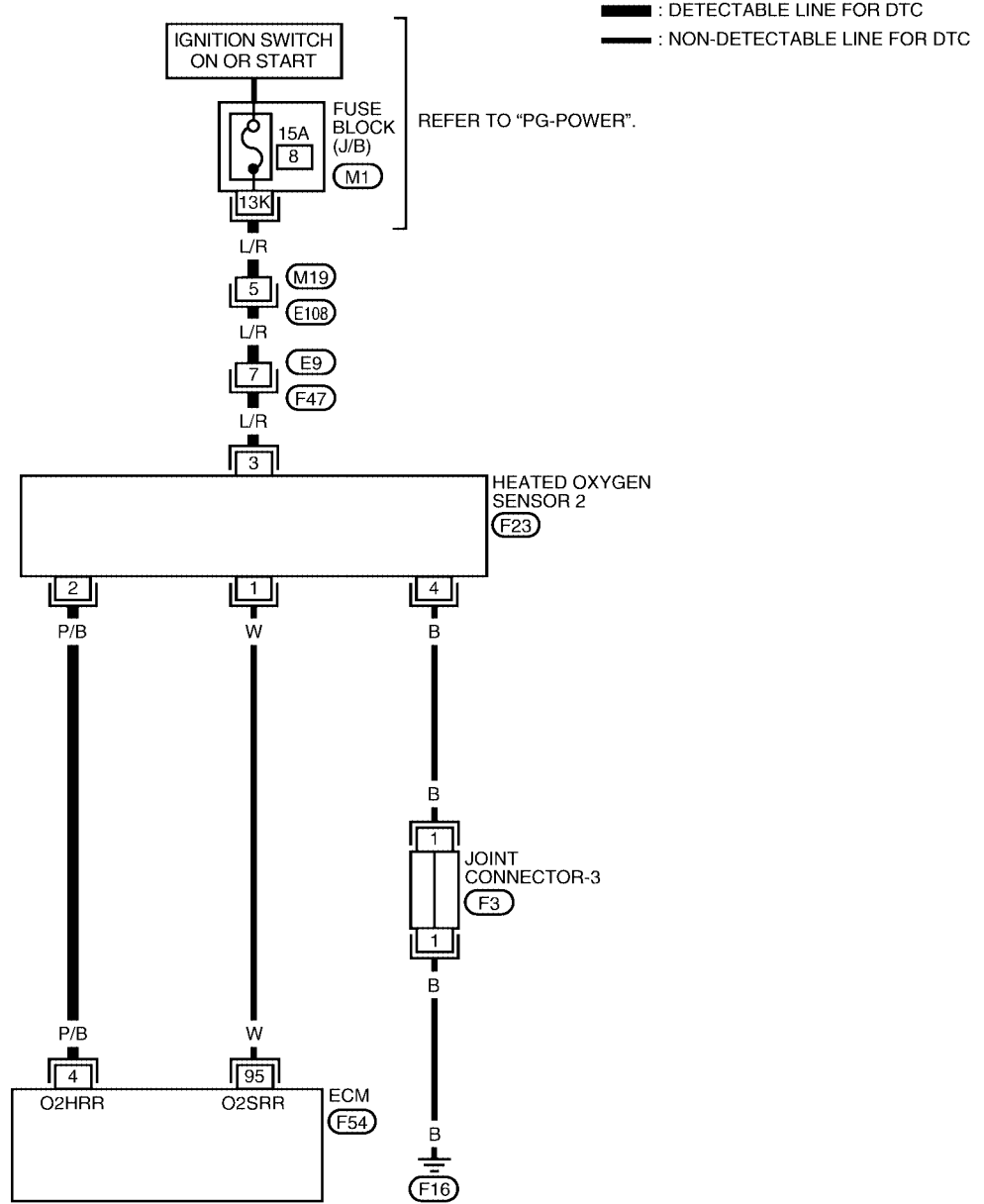
# DTC P0037, P0038 HO2S2 HEATER

[QR25DE]

UBS0028N

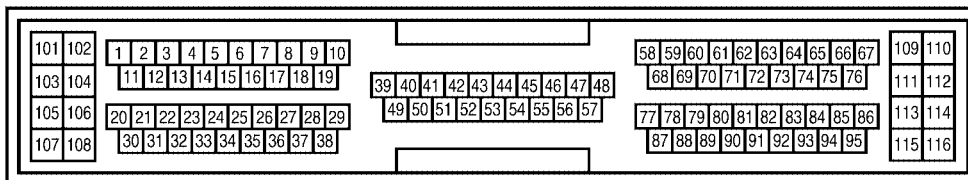
## Wiring Diagram

EC-HO2S2H-01



REFER TO THE FOLLOWING.

(M1) - FUSE BLOCK -  
 JUNCTION BOX (J/B)  
 (F3) - JOINT CONNECTOR



BBWA0412E

# DTC P0037, P0038 HO2S2 HEATER

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

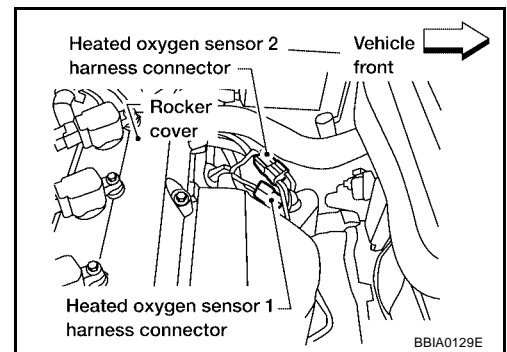
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	P/B	Heated oxygen sensor 2 heater	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>Engine speed is below 3,600 rpm after the following conditions are met.</li> <li>Engine: After warming up</li> <li>Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	0 - 1.0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>Engine stopped</li> </ul> <b>[Engine is running]</b> <ul style="list-style-type: none"> <li>Engine speed is above 3,600 rpm.</li> </ul>	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS00280

### 1. CHECK HO2S2 POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Turn ignition switch "ON".

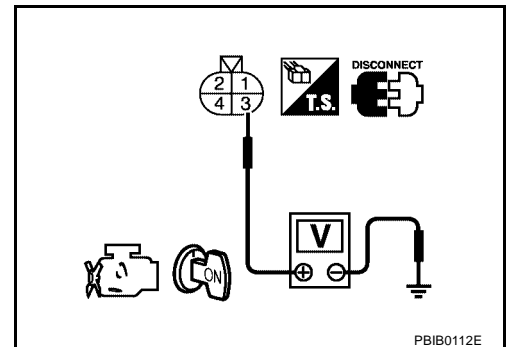


4. Check voltage between HO2S2 terminal 3 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.  
 NG >> GO TO 2.



---

## 2. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M19, E108
- Harness connectors E9, F47
- Fuse block (J/B) connector M1
- 15A fuse
- Harness for open or short between heated oxygen sensor 2 and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 3. CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 4 and HO2S2 terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 4. CHECK HEATED OXYGEN SENSOR 2 HEATER

---

Refer to [EC-1367, "Component Inspection"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace heated oxygen sensor 2.

---

## 5. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Component Inspection**  
**HEATED OXYGEN SENSOR 2 HEATER**

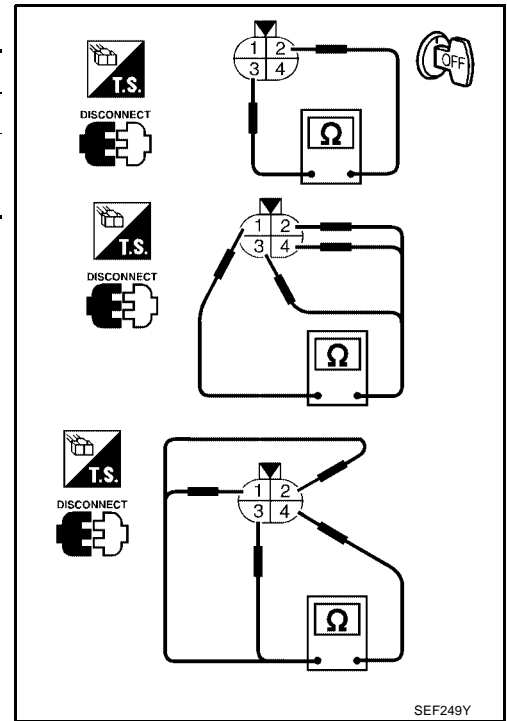
1. Check resistance between HO2S2 terminals as follows.

Terminal No.	Resistance
2 and 3	3.3 - 4.0 Ω at 25°C (77°F)
1 and 2, 3, 4	∞ Ω (Continuity should not exist)
4 and 1, 2, 3	

2. If NG, replace heated oxygen sensor 2.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



SEF249Y

**Removal and Installation**  
**HEATED OXYGEN SENSOR 2**

Refer to [EX-3, "EXHAUST SYSTEM"](#) .

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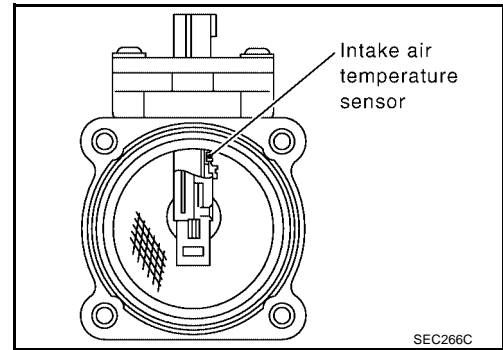
**DTC P0101 MAF SENSOR**

PF2:22680

**Component Description**

UBS0028R

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss. Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS0028S

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS A/F SE-B1	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N ● No-load Idle	Approx. 1.1 - 1.5V
	2,500 rpm	Approx. 1.6 - 2.0V
CAL/LD VALUE	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load Idle	10% - 35%
	2,500 rpm	10% - 35%
MASS AIRFLOW	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load Idle	1.0 - 4.0 g-m/s
	2,500 rpm	4.0 - 10.0 g-m/s

**On Board Diagnosis Logic**

UBS0028T

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0101 0101	Mass air flow sensor circuit range/performance problem	A) A high voltage from the sensor is sent to ECM under light load driving condition.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Mass air flow sensor</li> </ul>
		B) A low voltage from the sensor is sent to ECM under heavy load driving condition.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Intake air leaks</li> <li>● Mass air flow sensor</li> </ul>

**DTC Confirmation Procedure**

UBS0028U

Perform "PROCEDURE FOR MALFUNCTION A" first.

If the DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B".

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**PROCEDURE FOR MALFUNCTION A**

**NOTE:**

If engine will not start or stops soon, wait at least 10 seconds with engine stopped (Ignition switch "ON") instead of running engine at idle speed.



**With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and warm it up to normal operating temperature.
4. Run engine for at least 10 seconds at idle speed.
5. If DTC is detected, go to [EC-1372, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

**With GST**

Follow the procedure "With CONSULT-II" above.

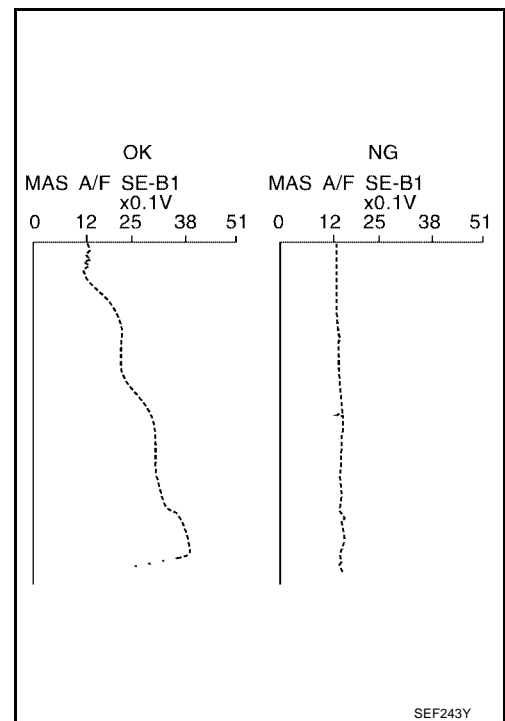
**PROCEDURE FOR MALFUNCTION B**

**CAUTION:**

**Always drive vehicle at a safe speed.**

**With CONSULT-II**

1. Turn ignition switch "ON".
2. Start engine and warm it up to normal operating temperature.  
**If engine cannot be started, go to [EC-1372, "Diagnostic Procedure"](#) .**
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Check the voltage of "MAS A/F SE-B1" with "DATA MONITOR".
5. Increases engine speed to about 4,000 rpm.
6. Monitor the linear voltage rise in response to engine speed increases.  
If NG, go to [EC-1372, "Diagnostic Procedure"](#) .  
If OK, go to following step.



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# DTC P0101 MAF SENSOR

[QR25DE]

7. Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	More than 2,000 rpm
THRTL SEN 1	More than 3V
THRTL SEN 2	More than 3V
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

8. If DTC is detected, go to [EC-1372, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
VHCL SPEED SE	XXX km/h
THRTL SEN 1	XXX V
THRTL SEN 2	XXX V

PBIB0199E

UBS0028V

## Overall Function Check PROCEDURE FOR MALFUNCTION B

Use this procedure to check the overall function of the mass air flow sensor circuit. During this check, a DTC might not be confirmed.

### With GST

1. Start engine and warm it up to normal operating temperature.
2. Select "MODE 1" with GST.
3. Check the mass air flow sensor signal with "MODE 1".
4. Check for linear mass air flow sensor signal value rise in response to increases to about 4,000 rpm in engine speed.
5. If NG, go to [EC-1372, "Diagnostic Procedure"](#).

CALC LOAD	20%
COOLANT TEMP	95°C
SHORT FT #1	2%
LONG FT #1	0%
SHORT FT #2	4%
LONG FT #2	0%
ENGINE SPD	2637RPM
VEHICLE SPD	0MPH
IGN ADVANCE	41.0°
INTAKE AIR	41°C
<b>MAF</b>	<b>14.1gm/sec</b>
THROTTLE POS	3%

SEF534P



# DTC P0101 MAF SENSOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
72	OR/L	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.1 - 1.5V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.6 - 2.0V
80	W/L	Mass air flow sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V

## Diagnostic Procedure

UBS0028X

### 1. INSPECTION START

Which malfunction (A or B) is duplicated?

A or B

- A >> GO TO 3.
- B >> GO TO 2.

### 2. CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses
- Intake air passage between air duct to intake manifold

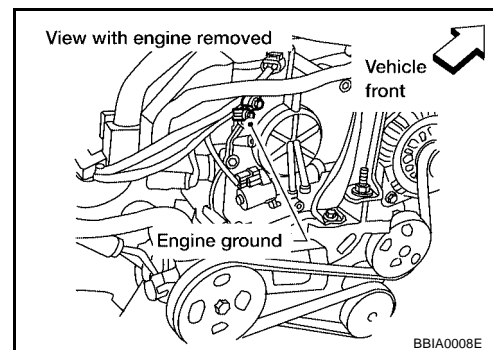
OK or NG

- OK >> GO TO 3.
- NG >> Reconnect the parts.

### 3. RETIGHTEN GROUND SCREWS

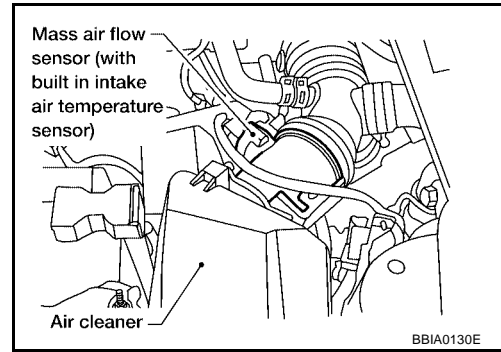
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 4.



## 4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect MAF sensor harness connector.
2. Turn ignition switch "ON".

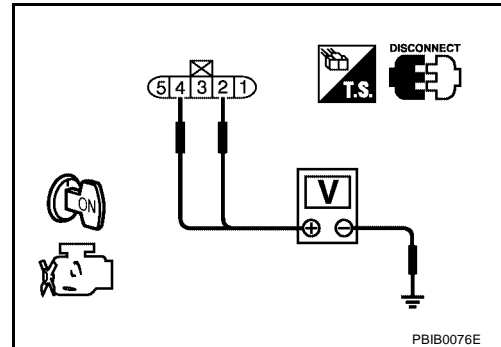


3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.

Terminal	Voltage
2	Approximately 5V
4	Battery voltage

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.



## 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between mass air flow sensor and ECM
- Harness for open or short between mass air flow sensor and ECM relay

>> Repair harness or connectors.

## 6. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 80. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 1 and ECM terminal 72. Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 8. CHECK MASS AIR FLOW SENSOR

Refer to [EC-1374, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace mass air flow sensor.

## 9. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection MASS AIR FLOW SENSOR

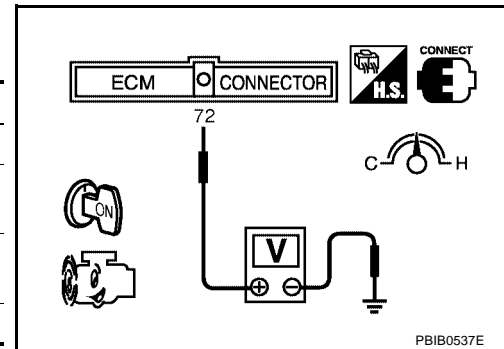
UBS0028Y

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 72 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 2.0
Idle to about 4,000 rpm*	1.5 - 2.0 to Approx. 4.0

\*: Check for liner voltage rise in response to engine being increased to about 4,000 rpm.

4. If the voltage is out of specification, proceed the following.
  - a. Turn ignition switch "OFF".
  - b. Disconnect mass air flow sensor harness connector and reconnect it again.
  - c. Perform steps 2 and 3 again.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.
6. If NG, clean or replace mass air flow sensor.



UBS0028Z

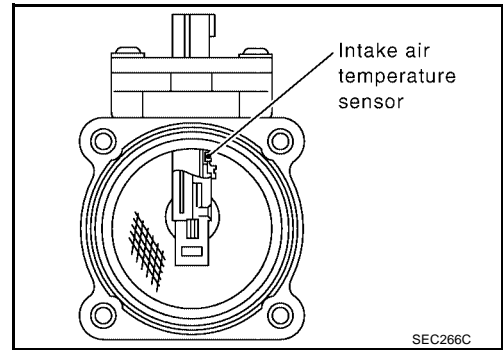
### Removal and Installation MASS AIR FLOW SENSOR

Refer to [EM-103, "AIR CLEANER AND AIR DUCT"](#) .

**DTC P0102, P0103 MAF SENSOR**

**Component Description**

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss. Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.



**CONSULT-II Reference Value in Data Monitor Mode**

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS A/F SE-B1	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N ● No-load	Idle Approx. 1.1 - 1.5V
		2,500 rpm Approx. 1.6 - 2.0V
CAL/LD VALUE	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle 10% - 35%
		2,500 rpm 10% - 35%
MASS AIRFLOW	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle 1.0 - 4.0 g-m/s
		2,500 rpm 4.0 - 10.0 g-m/s

**On Board Diagnosis Logic**

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0102 0102	Mass air flow sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Intake air leaks</li> <li>● Mass air flow sensor</li> </ul>
P0103 0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Mass air flow sensor</li> </ul>

**FAIL-SAFE MODE**

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

**DTC Confirmation Procedure**

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

## PROCEDURE FOR DTC P0102

### With CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait at least 5 seconds.
4. If DTC is detected, go to [EC-1378, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

### With GST

Follow the procedure "With CONSULT-II" above.

## PROCEDURE FOR DTC P0103

### With CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-1378, "Diagnostic Procedure"](#) .  
If DTC is not detected, go to next step.
5. Start engine and wait at least 5 seconds.
6. If DTC is detected, go to [EC-1378, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

### With GST

Follow the procedure "With CONSULT-II" above.



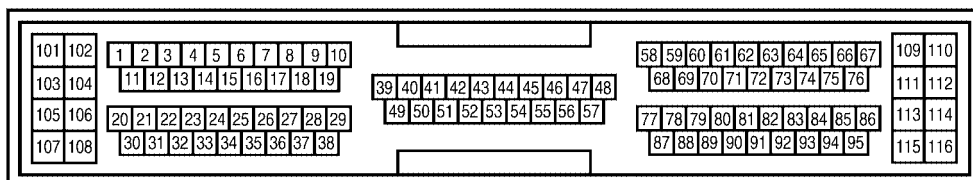
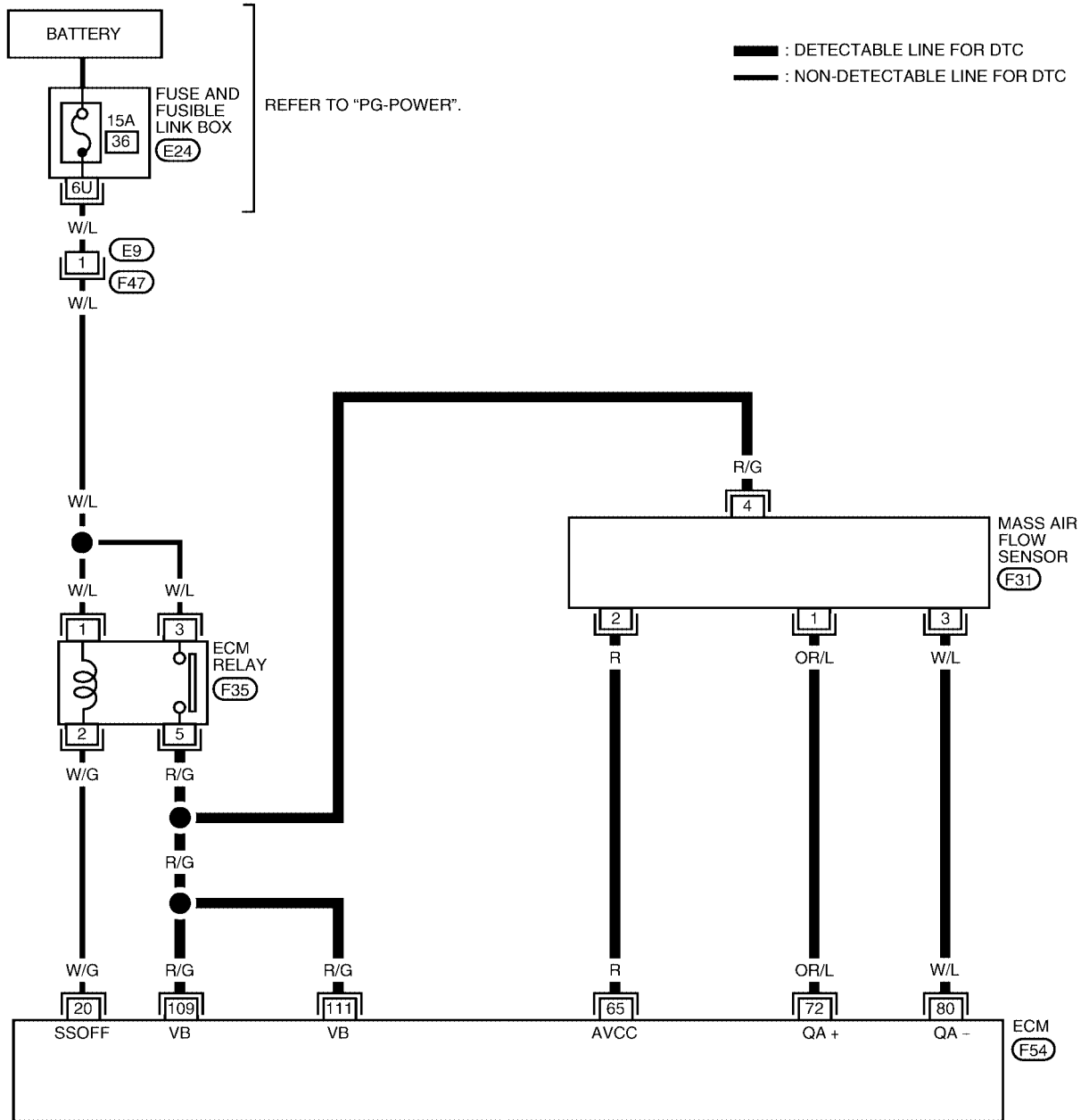
# DTC P0102, P0103 MAF SENSOR

[QR25DE]

UBS00294

## Wiring Diagram

EC-MAFS-01



BBWA0213E

# DTC P0102, P0103 MAF SENSOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
72	OR/L	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.1 - 1.5V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.6 - 2.0V
80	W/L	Mass air flow sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V

## Diagnostic Procedure

UBS00295

### 1. INSPECTION START

Which malfunction (P0102 or P0103) is duplicated?

P0102 or P0103

P0102 >> GO TO 2.

P0103 >> GO TO 3.

### 2. CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses
- Intake air passage between air duct to intake manifold

OK or NG

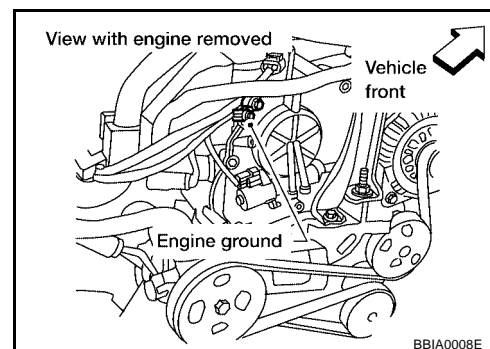
OK >> GO TO 3.

NG >> Reconnect the parts.

### 3. RETIGHTEN GROUND SCREWS

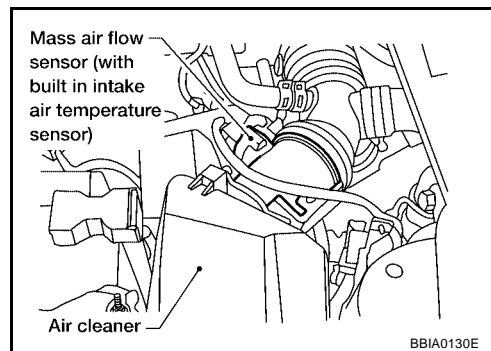
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 4.



#### 4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect MAF sensor harness connector.
2. Turn ignition switch "ON".

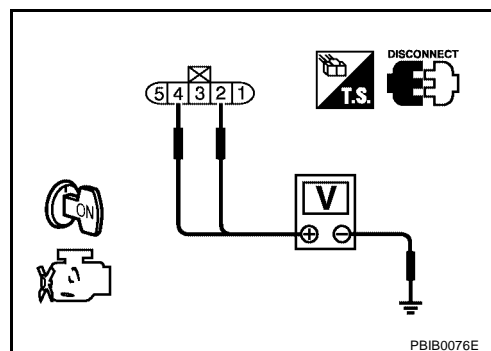


3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.

Terminal	Voltage
2	Approximately 5V
4	Battery voltage

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.



#### 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between ECM relay and mass air flow sensor
- Harness for open or short between mass air flow sensor and ECM

>> Repair harness or connectors.

#### 6. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 80. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

#### 7. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 1 and ECM terminal 72. Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 8. CHECK MASS AIR FLOW SENSOR

Refer to [EC-1380, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace mass air flow sensor.

## 9. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection MASS AIR FLOW SENSOR

UBS00296

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 72 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 2.0
Idle to about 4,000 rpm*	1.5 - 2.0 to Approx. 4.0

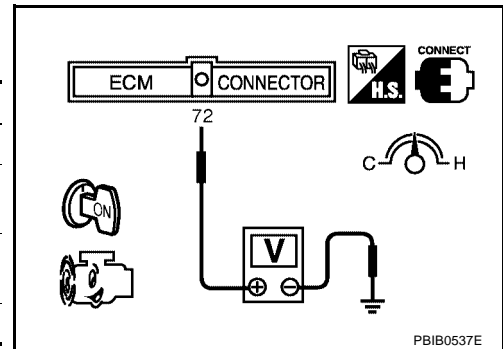
\*: Check for liner voltage rise in response to engine being increased to about 4,000 rpm.

4. If the voltage is out of specification, proceed the following.
  - a. Turn ignition switch "OFF".
  - b. Disconnect mass air flow sensor harness connector and reconnect it again.
  - c. Perform steps 2 and 3 again.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.
6. If NG, clean or replace mass air flow sensor.

### Removal and Installation MASS AIR FLOW SENSOR

UBS00297

Refer to [EM-103, "AIR CLEANER AND AIR DUCT"](#) .



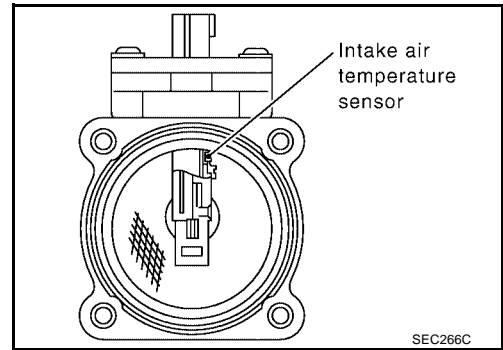
PBIB0537E

DTC P0112, P0113 IAT SENSOR

Component Description

The intake air temperature sensor is built into mass air flow sensor. The sensor detects intake air temperature and transmits a signal to the ECM.

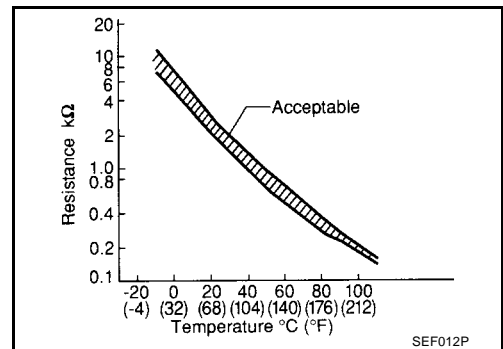
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.43	7.9 - 9.3
25 (77)	3.32	1.9 - 2.1
80 (176)	1.23	0.31 - 0.37

\*: These data are reference values and are measured between ECM terminal 84 (Intake air temperature sensor) and ground.



**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0112 0112	Intake air temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Intake air temperature sensor</li> </ul>
P0113 0113	Intake air temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

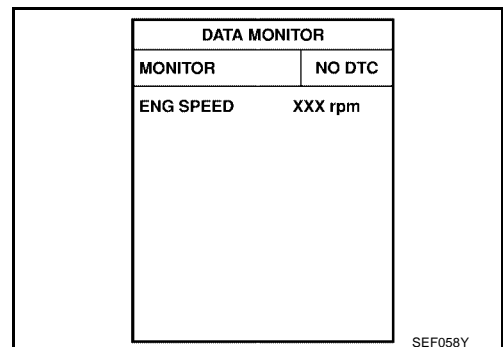
DTC Confirmation Procedure

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-1384, "Diagnostic Procedure"](#).





**WITH GST**

Follow the procedure "With CONSULT-II" above.



# DTC P0112, P0113 IAT SENSOR

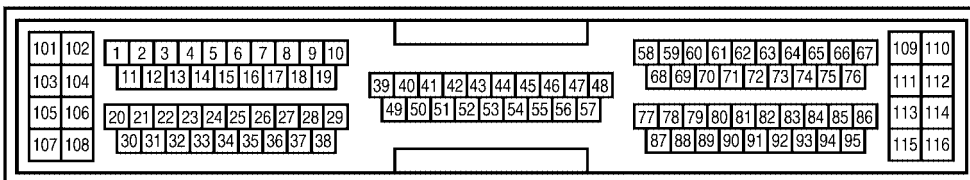
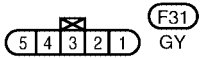
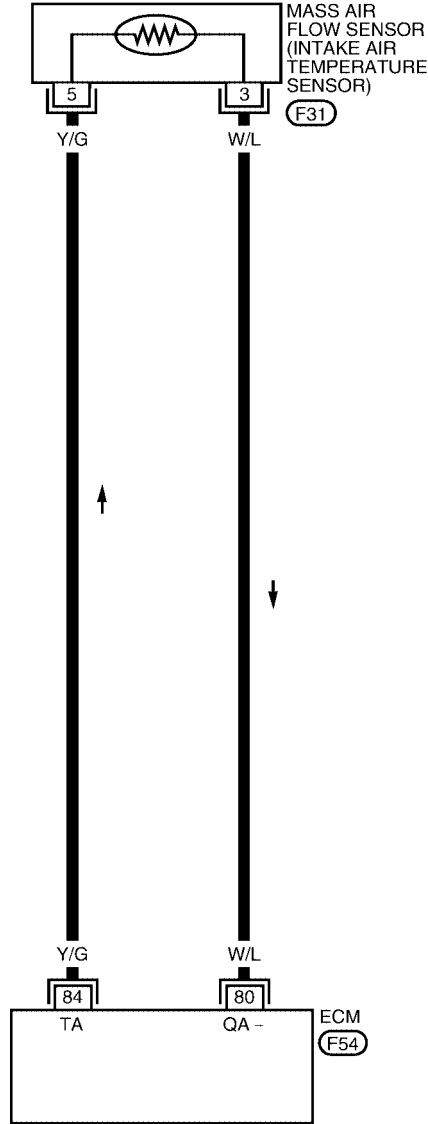
[QR25DE]

UBS0029B

## Wiring Diagram

EC-IATS-01

 : DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC

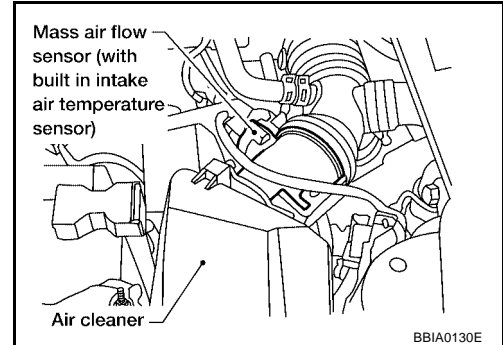


BBWA0214E

## Diagnostic Procedure

### 1. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect mass air flow sensor (intake air temperature sensor is built-into) harness connector.
3. Turn ignition switch "ON".

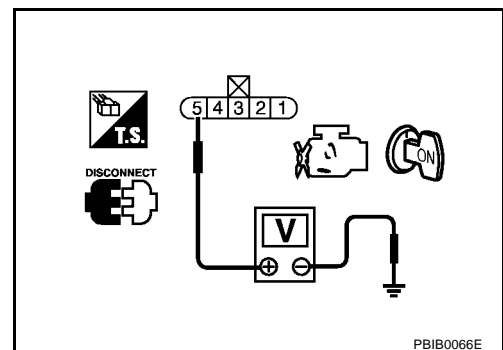


4. Check voltage between MAF sensor terminal 5 and ground.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 2.  
 NG >> Repair harness or connectors.



### 2. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between MAF sensor terminal 3 and ECM terminal 80. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 3.  
 NG >> Repair harness or connectors.

### 3. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-1385, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 4.  
 NG >> Replace mass air flow sensor (with intake air temperature sensor).

### 4. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**



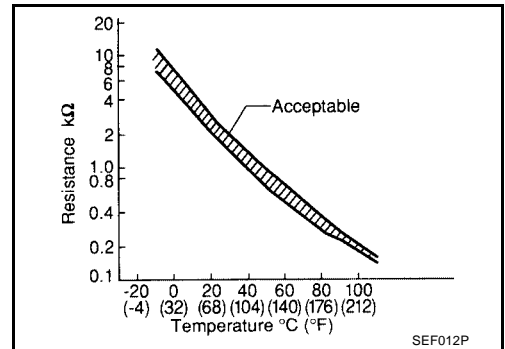
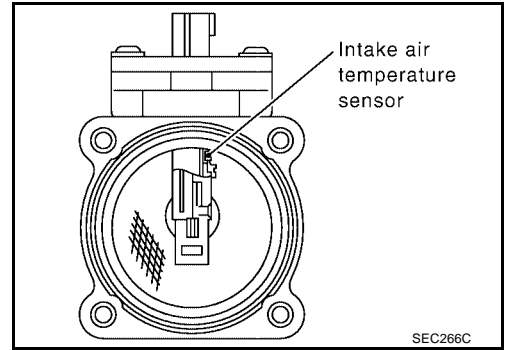
UBS0029D

**Component Inspection**  
**INTAKE AIR TEMPERATURE SENSOR**

1. Check resistance between intake air temperature sensor terminals 3 and 5 under the following conditions.

Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

2. If NG, replace mass air flow sensor (with intake air temperature sensor).



**Removal and Installation**  
**MASS AIR FLOW SENSOR**

Refer to [EM-103, "AIR CLEANER AND AIR DUCT"](#) .

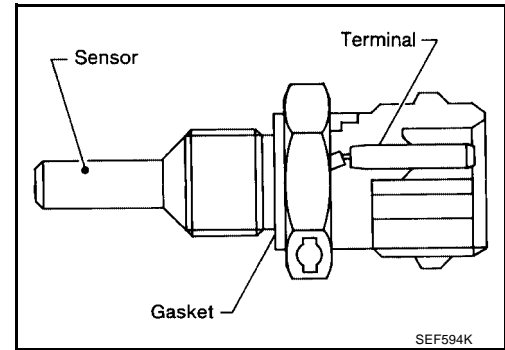
UBS0029E

A  
 EC  
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## DTC P0117, P0118 ECT SENSOR

### Component Description

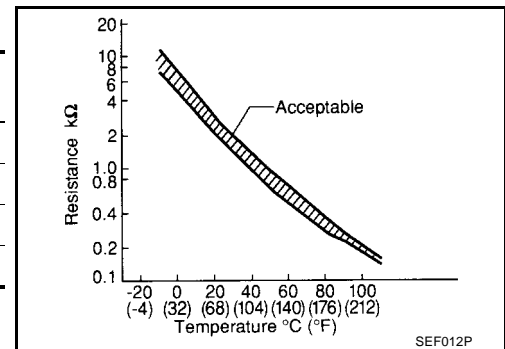
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



### <Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

\*: These data are reference values and are measured between ECM terminal 93 (Engine coolant temperature sensor) and ground.



### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

### On Board Diagnosis Logic

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0117 0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Engine coolant temperature sensor</li> </ul>
P0118 0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

### FAIL-SAFE MODE

When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

# DTC P0117, P0118 ECT SENSOR

[QR25DE]

Detected items	Engine operating condition in fail-safe mode	
Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch "ON" or "START". CONSULT-II displays the engine coolant temperature decided by ECM.	
	Condition	Engine coolant temperature decided (CONSULT-II display)
	Just as ignition switch is turned ON or Start	40°C (104°F)
	More than approx. 4 minutes after ignition ON or Start	80°C (176°F)
	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.		

## DTC Confirmation Procedure

UBS0029H

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to [EC-1389, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

### WITH GST

Follow the procedure "WITH CONSULT-II" above.

# DTC P0117, P0118 ECT SENSOR

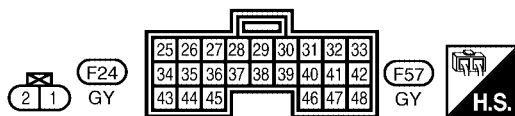
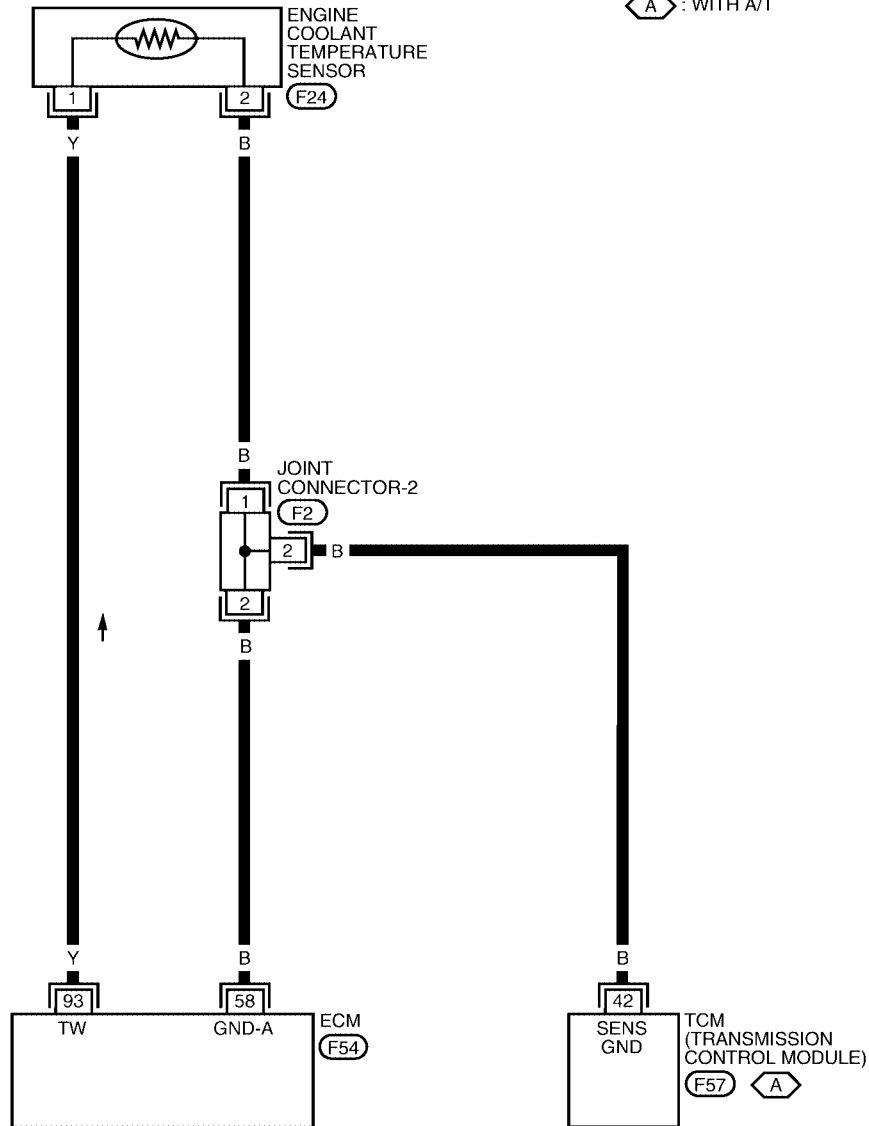
[QR25DE]

UBS0029I

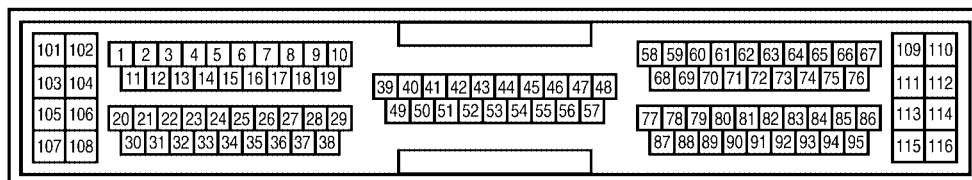
## Wiring Diagram

EC-ECTS-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- ⬡** : WITH A/T



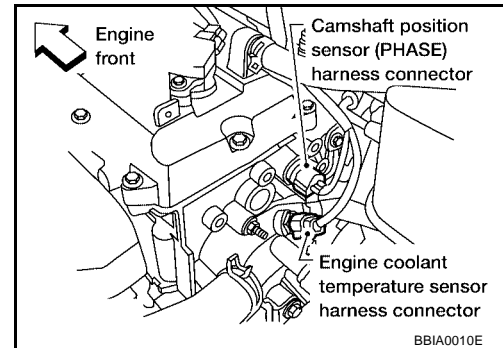
REFER TO THE FOLLOWING.  
**F2** -JOINT CONNECTOR



BBWA0413E

**Diagnostic Procedure****1. CHECK ECT SENSOR POWER SUPPLY CIRCUIT**

1. Turn ignition switch "OFF".
2. Disconnect engine coolant temperature (ECT) sensor harness connector.
3. Turn ignition switch "ON".

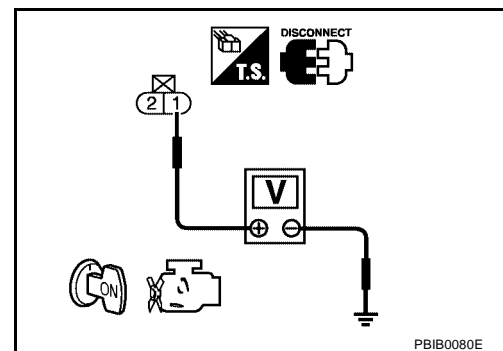


4. Check voltage between ECT sensor terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 2.  
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**2. CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Check harness continuity between ECT sensor terminal 2 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.  
 NG >> GO TO 3.

**3. DETECT MALFUNCTIONING PART**

Check the following.

- Joint connector-2
- Harness for open or short between engine coolant temperature sensor and ECM
- Harness for open or short between engine coolant temperature sensor and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

**4. CHECK ENGINE COOLANT TEMPERATURE SENSOR**

Refer to [EC-1390, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.  
 NG >> Replace engine coolant temperature sensor.

**5. CHECK INTERMITTENT INCIDENT**

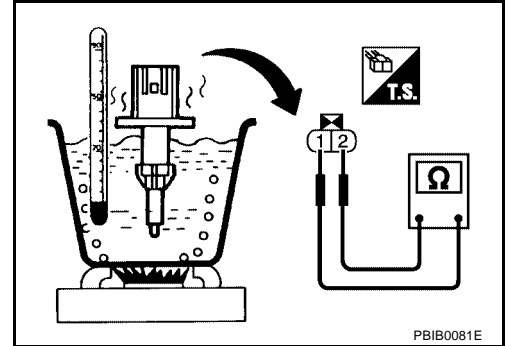
Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection  
ENGINE COOLANT TEMPERATURE SENSOR**

UBS0029K

1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



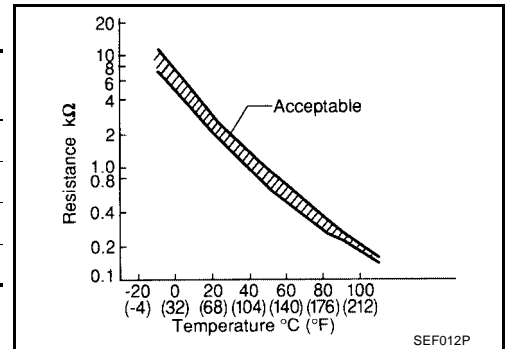
PBIB0081E

**<Reference data>**

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

\*: These data are reference values and are measured between ECM terminal 93 (Engine coolant temperature sensor) and ground.

2. If NG, replace engine coolant temperature sensor.



SEF012P

**Removal and Installation  
ENGINE COOLANT TEMPERATURE SENSOR**

UBS0029L

Refer to [CO-28, "THERMOSTAT AND THERMOSTAT HOUSING"](#) .

DTC P0122, P0123 TP SENSOR

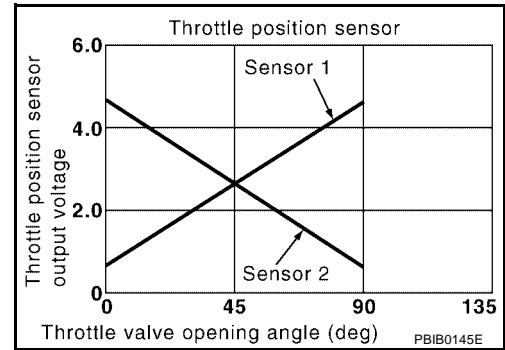
PF1:16119

Component Description

UBS00571

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

UBS00572

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1	<ul style="list-style-type: none"> <li>Ignition switch: ON (Engine stopped)</li> <li>Shift lever: D (A/T model) 1st(M/T model)</li> </ul>	Accelerator pedal: Fully released	More than 0.36V
THRTL SEN2★		Accelerator pedal: Fully depressed	Less than 4.75V

★: Throttle position sensor2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

UBS00573

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122 0122	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	<ul style="list-style-type: none"> <li>Harness or connectors (The TP sensor 2 circuit is open or shorted.)</li> <li>Electric throttle control actuator (TP sensor 2)</li> </ul>
P0123 0123	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.  
The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.  
So, the acceleration will be poor.

DTC Confirmation Procedure

UBS00574

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

# DTC P0122, P0123 TP SENSOR

[QR25DE]

## WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-1394, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

## WITH GST

Follow the procedure "WITH CONSULT-II" above.



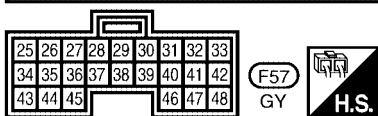
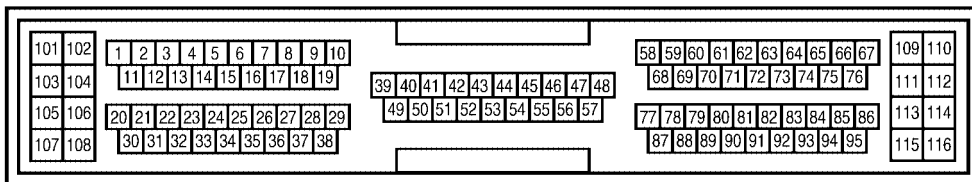
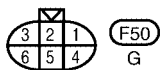
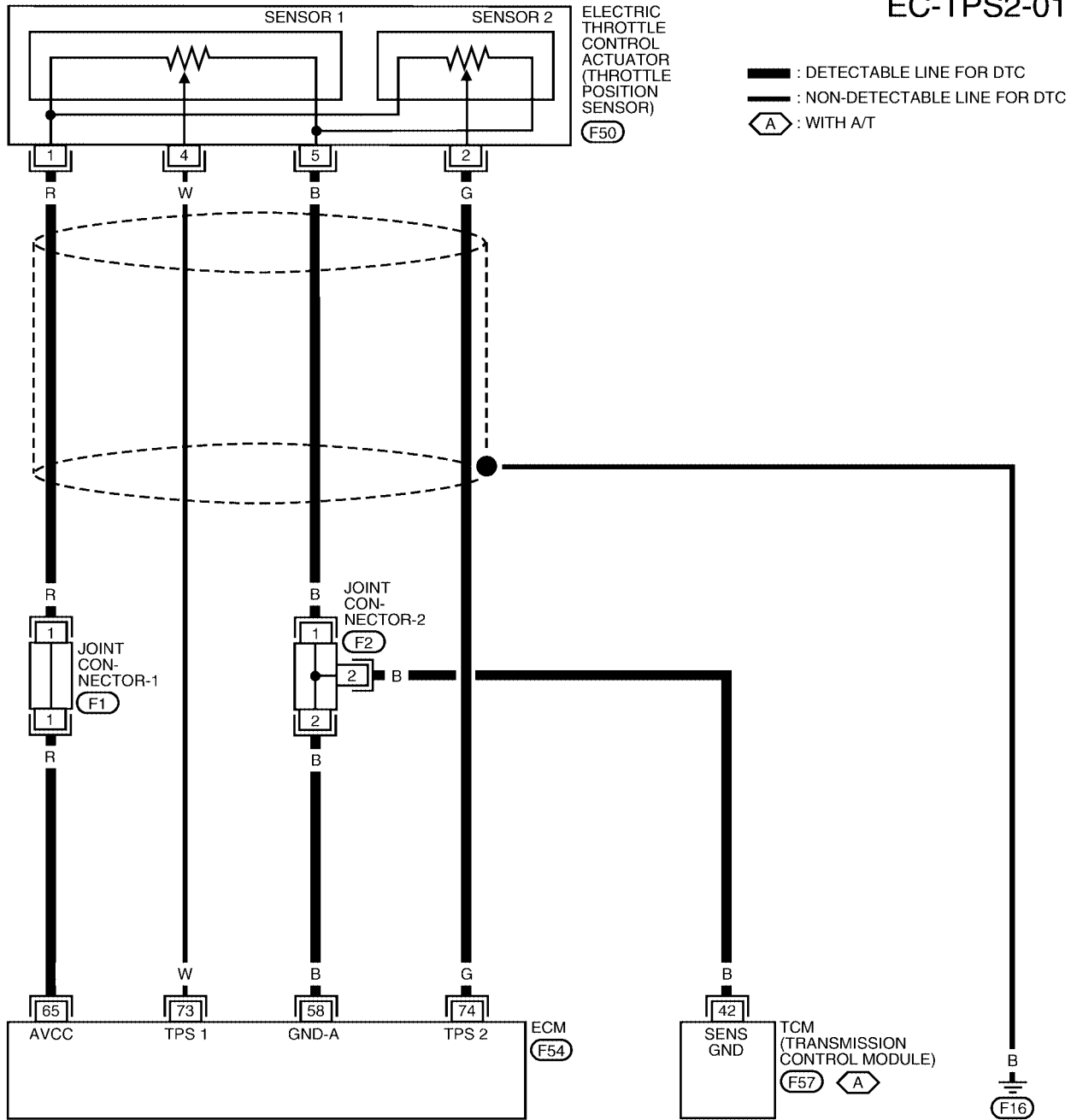
# DTC P0122, P0123 TP SENSOR

[QR25DE]

UBS00575

## Wiring Diagram

EC-TPS2-01



REFER TO THE FOLLOWING.  
 (F1), (F2) - JOINT CONNECTOR



BBWA0237E

# DTC P0122, P0123 TP SENSOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 0V
65	R	Sensors' power supply	<b>[Ignition switch "ON"]</b>	Approximately 5V
73	W	Throttle position sensor 1	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully released</li> </ul>	More than 0.36V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully depressed</li> </ul>	Less than 4.75V
74	G	Throttle position sensor 2	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully released</li> </ul>	Less than 4.75V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully depressed</li> </ul>	More than 0.36V

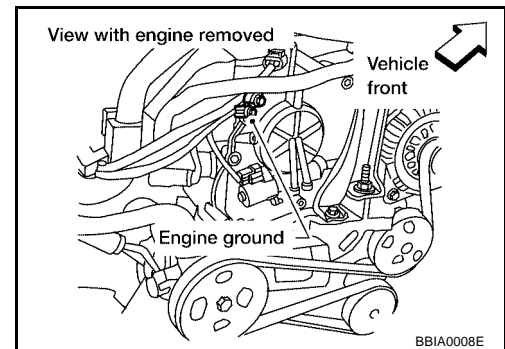
## Diagnostic Procedure

UBS00576

### 1. RETIGHTEN GROUND SCREWS

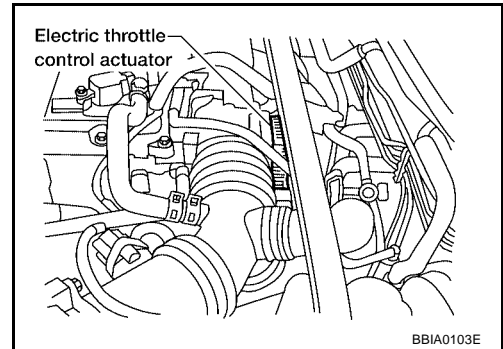
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

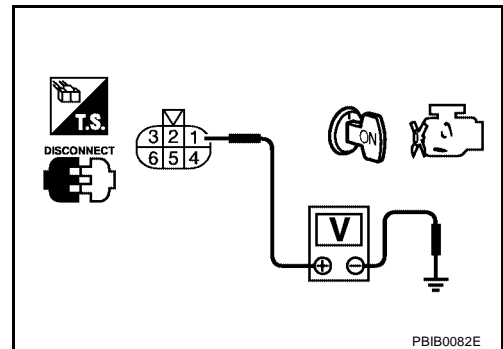


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-1
- Harness for open or short between electric throttle control actuator and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between electric throttle control actuator terminal 5 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-2
- Harness for open or short between electric throttle control actuator and ECM
- Harness for open or short between electric throttle control actuator and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 74 and electric throttle control actuator terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**7. CHECK THROTTLE POSITION SENSOR**

Refer to [EC-1396, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> GO TO 8.

**8. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-1255, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**9. CHECK INTERMITTENT INCIDENT**

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

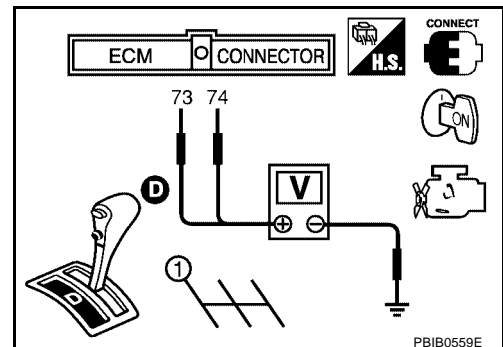
**Component Inspection  
THROTTLE POSITION SENSOR**

UBS00577

1. Reconnect all harness connectors disconnected.
2. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 73 (TP sensor 1signal), 74 (TP sensor 2signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
73 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
74 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-1255, "Idle Air Volume Learning"](#) .



**Removal and Installation**  
**ELECTRIC THROTTLE CONTROL ACTUATOR**

Refer to [EM-105, "INTAKE MANIFOLD"](#) .

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## DTC P0125 ECT SENSOR

PFP:22630

### Description

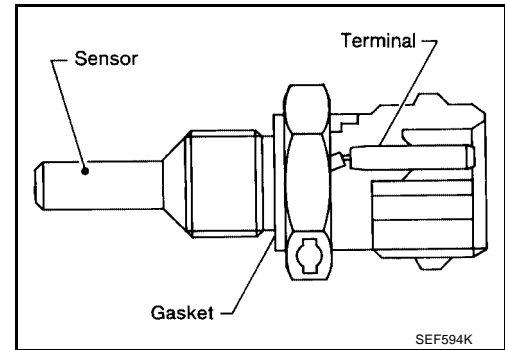
UBS0029M

**NOTE:**

If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117 or P0118. Refer to [EC-1386](#).

### COMPONENT DESCRIPTION

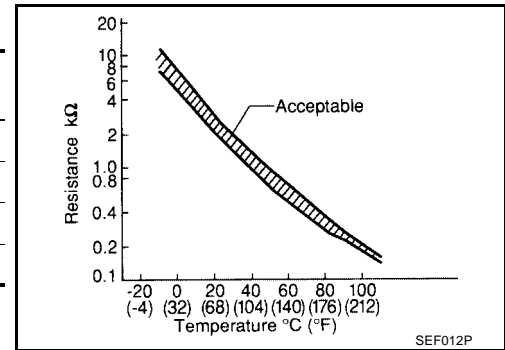
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



### <Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

\*: These data are reference values and are measured between ECM terminal 93 (Engine coolant temperature sensor) and ground.



**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

### On Board Diagnosis Logic

UBS0029N

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0125 0125	Insufficient engine coolant temperature for closed loop fuel control	<ul style="list-style-type: none"> <li>● Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine.</li> <li>● Engine coolant temperature is insufficient for closed loop fuel control.</li> </ul>	<ul style="list-style-type: none"> <li>● Harness or connectors (High resistance in the circuit)</li> <li>● Engine coolant temperature sensor</li> <li>● Thermostat</li> </ul>

### DTC Confirmation Procedure

UBS0029O

**CAUTION:**

Be careful not to overheat engine.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**Ⓜ WITH CONSULT-II**

1. Turn ignition switch "ON".

# DTC P0125 ECT SENSOR

[QR25DE]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Check that "COOLAN TEMP/S" is above 10°C (50°F).  
**If it is above 10°C (50°F), the test result will be OK.**  
**If it is below 10°C (50°F), go to following step.**
4. Start engine and run it for 65 minutes at idle speed.  
**If "COOLAN TEMP/S" increases to more than 10°C (50°F) within 65 minutes, stop engine because the test result will be OK.**
5. If DTC is detected, go to [EC-1399, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

## WITH GST

Follow the procedure "WITH CONSULT-II" above.

## Diagnostic Procedure

UBS0029P

### 1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-1399, "Component Inspection"](#).

OK or NG

OK >> GO TO 2.

NG >> Replace engine coolant temperature sensor.

### 2. CHECK THERMOSTAT OPERATION

When the engine is cold [lower than 70°C (158°F)] condition, grasp lower radiator hose and confirm the engine coolant does not flow.

OK or NG

OK >> GO TO 3.

NG >> Repair or replace thermostat. Refer to [CO-28, "THERMOSTAT AND THERMOSTAT HOUSING"](#).

### 3. CHECK INTERMITTENT INCIDENT

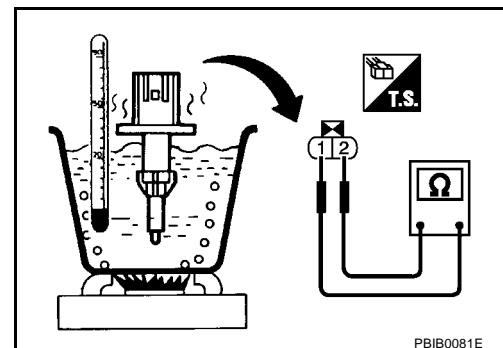
Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> INSPECTION END

## Component Inspection ENGINE COOLANT TEMPERATURE SENSOR

UBS0029Q

1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



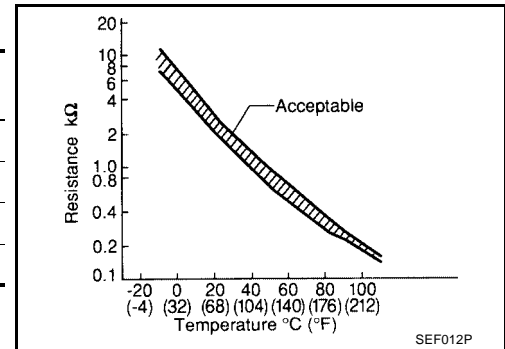
# DTC P0125 ECT SENSOR

[QR25DE]

## <Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

\*: These data are reference values and are measured between ECM terminal 93 (Engine coolant temperature sensor) and ground.



2. If NG, replace engine coolant temperature sensor.

## Removal and Installation ENGINE COOLANT TEMPERATURE SENSOR

Refer to [CO-28, "THERMOSTAT AND THERMOSTAT HOUSING"](#).

UBS0029R

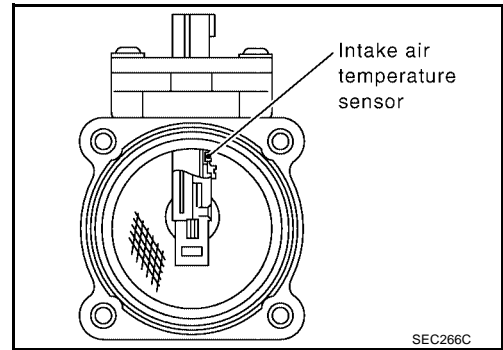


**DTC P0127 IAT SENSOR**

**Component Description**

The intake air temperature sensor is built into mass air flow sensor. The sensor detects intake air temperature and transmits a signal to the ECM.

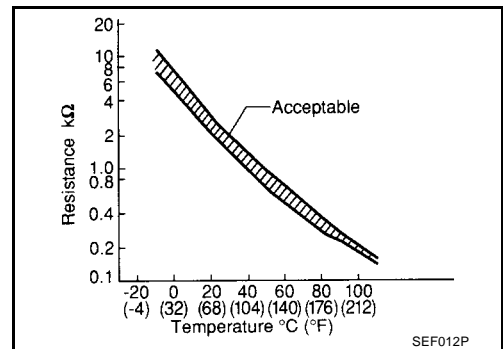
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



**<Reference data>**

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.43	7.9 - 9.3
25 (77)	3.32	1.9 - 2.1
80 (176)	1.23	0.31 - 0.37

\*: These data are reference values and are measured between ECM terminal 84 (Intake air temperature sensor) and ground.



**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

**On Board Diagnosis Logic**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0127 0127	Intake air temperature too high	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Intake air temperature sensor</li> </ul>

**DTC Confirmation Procedure**

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

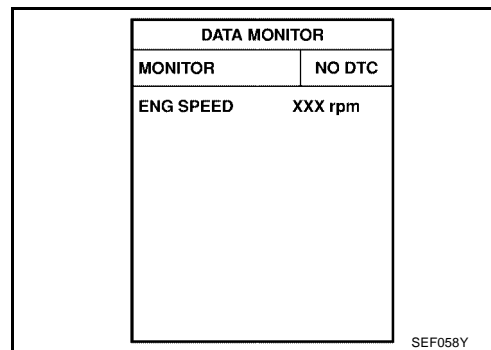
**TESTING CONDITION:**

This test may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

**Ⓟ WITH CONSULT-II**

1. Wait until engine coolant temperature is less than 90°C (194°F)
  - a. Turn ignition switch "ON".

- b. Select "DATA MONITOR" mode with CONSULT-II.
- c. Check the engine coolant temperature.
- d. If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch "OFF" and cool down engine.
  - Perform the following steps before engine coolant temperature is above 90°C (194°F).
2. Turn ignition switch "ON".
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Start engine.
5. Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.
6. If 1st trip DTC is detected, go to [EC-1402, "Diagnostic Procedure"](#).



**WITH GST**

Follow the procedure "With CONSULT-II" above.

## Diagnostic Procedure

UBS0029V

### 1. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-1402, "Component Inspection"](#).

OK or NG

- OK >> GO TO 2.
- NG >> Replace mass air flow sensor (with intake air temperature sensor).

### 2. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

Refer to [EC-1383, "Wiring Diagram"](#).

>> INSPECTION END

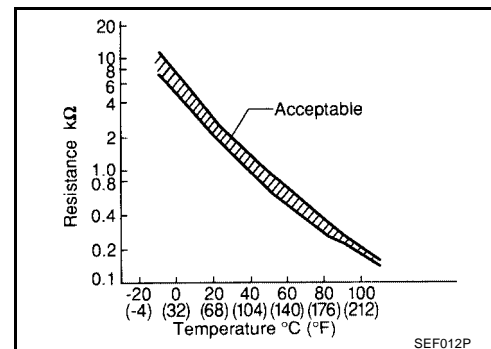
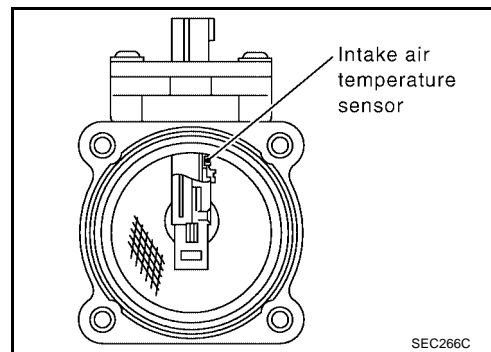
## Component Inspection INTAKE AIR TEMPERATURE SENSOR

UBS0029W

1. Check resistance between intake air temperature sensor terminals 3 and 5 under the following conditions.

Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

2. If NG, replace mass air flow sensor (with intake air temperature sensor).



**Removal and Installation**  
**MASS AIR FLOW SENSOR**

Refer to [EM-103, "AIR CLEANER AND AIR DUCT"](#) .

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## DTC P0128 THERMOSTAT FUNCTION

PFP:21200

### On Board Diagnosis Logic

UBS0029Y

Engine coolant temperature has not risen enough to open the thermostat even though the engine has run long enough.

This is due to a leak in the seal or the thermostat stuck open.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0128 0128	Thermostat function	The engine coolant temperature does not reach to specified temperature even though the engine has run long enough.	<ul style="list-style-type: none"> <li>● Thermostat</li> <li>● Leakage from sealing portion of thermostat</li> <li>● Engine coolant temperature sensor</li> </ul>

### DTC Confirmation Procedure

UBS0029Z

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- For best results, perform at ambient temperature of **-10°C (14°F) or higher.**
- For best results, perform at engine coolant temperature of **-10°C (14°F) to 68°C (154°F).**

**WITH CONSULT-II**

1. Replace thermostat with new one. Refer to [CO-28, "THERMOSTAT AND THERMOSTAT HOUSING"](#) . Use only a genuine NISSAN thermostat as a replacement. If an incorrect thermostat is used, the MIL may come on.
2. Turn ignition switch "ON".
3. Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-II.
4. Check that the "COOLAN TEMP/S" is above 68°C (154°F).  
If it is below 68°C (154°F), go to following step.  
If it is above 68°C (154°F), stop engine and cool down the engine to less than 68°C (154°F), then retry from step 2.
5. Drive vehicle for 10 consecutive minutes under the following conditions.

VHCL SPEED SE	80 - 120 km/h (50 - 75 MPH)
---------------	-----------------------------

DATA MONITOR	
MONITOR	NO DTC
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h

SEF176Y

If 1st trip DTC is detected, go to [EC-1404, "Diagnostic Procedure"](#) .

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

### Diagnostic Procedure

UBS002A0

#### 1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

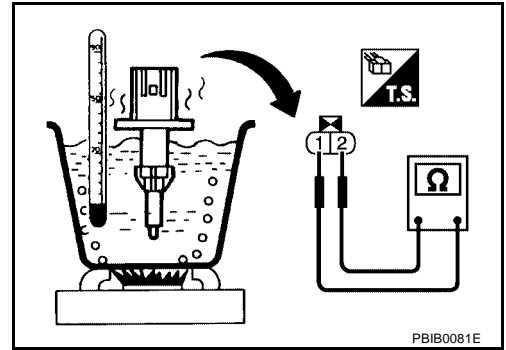
Refer to [EC-1405, "Component Inspection"](#) .

OK or NG

- OK    >> **INSPECTION END**
- NG    >> Replace engine coolant temperature sensor.

**Component Inspection**  
**ENGINE COOLANT TEMPERATURE SENSOR**

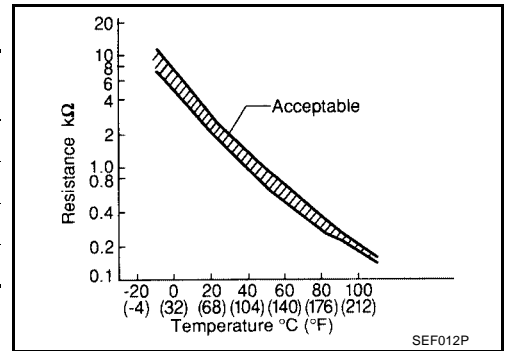
1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



**<Reference data>**

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

\*: These data are reference values and are measured between ECM terminal 93 (Engine coolant temperature sensor) and ground.



2. If NG, replace engine coolant temperature sensor.

**Removal and Installation**  
**ENGINE COOLANT TEMPERATURE SENSOR**

Refer to [CO-28, "THERMOSTAT AND THERMOSTAT HOUSING"](#).

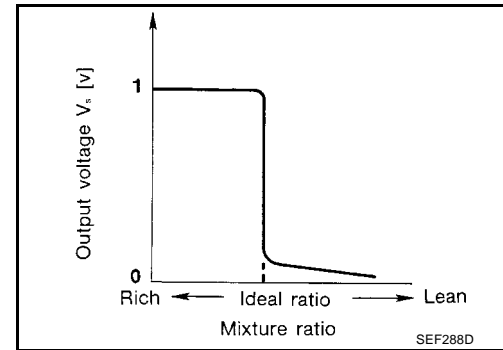
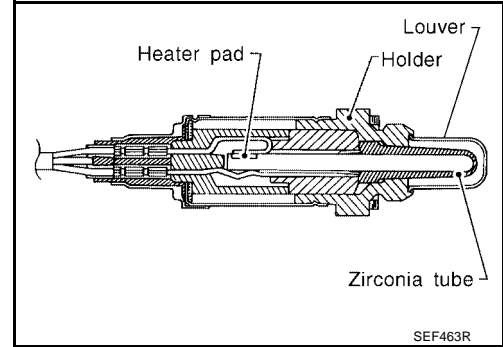
**DTC P0132 HO2S1**

PFP:22690

**Component Description**

UBS002A3

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS002A4

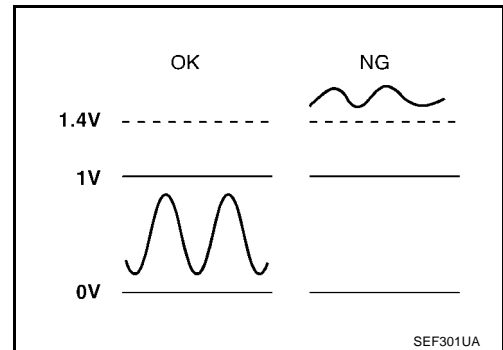
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

**On Board Diagnosis Logic**

UBS002A5

To judge the malfunction, the diagnosis checks that the heated oxygen sensor 1 output is not inordinately high.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0132 0132	Heated oxygen sensor 1 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Heated oxygen sensor 1</li> </ul>

## DTC Confirmation Procedure

### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Restart engine and let it idle for 2 minutes.
6. If 1st trip DTC is detected, go to [EC-1409, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

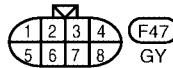
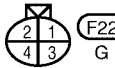
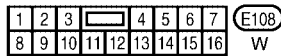
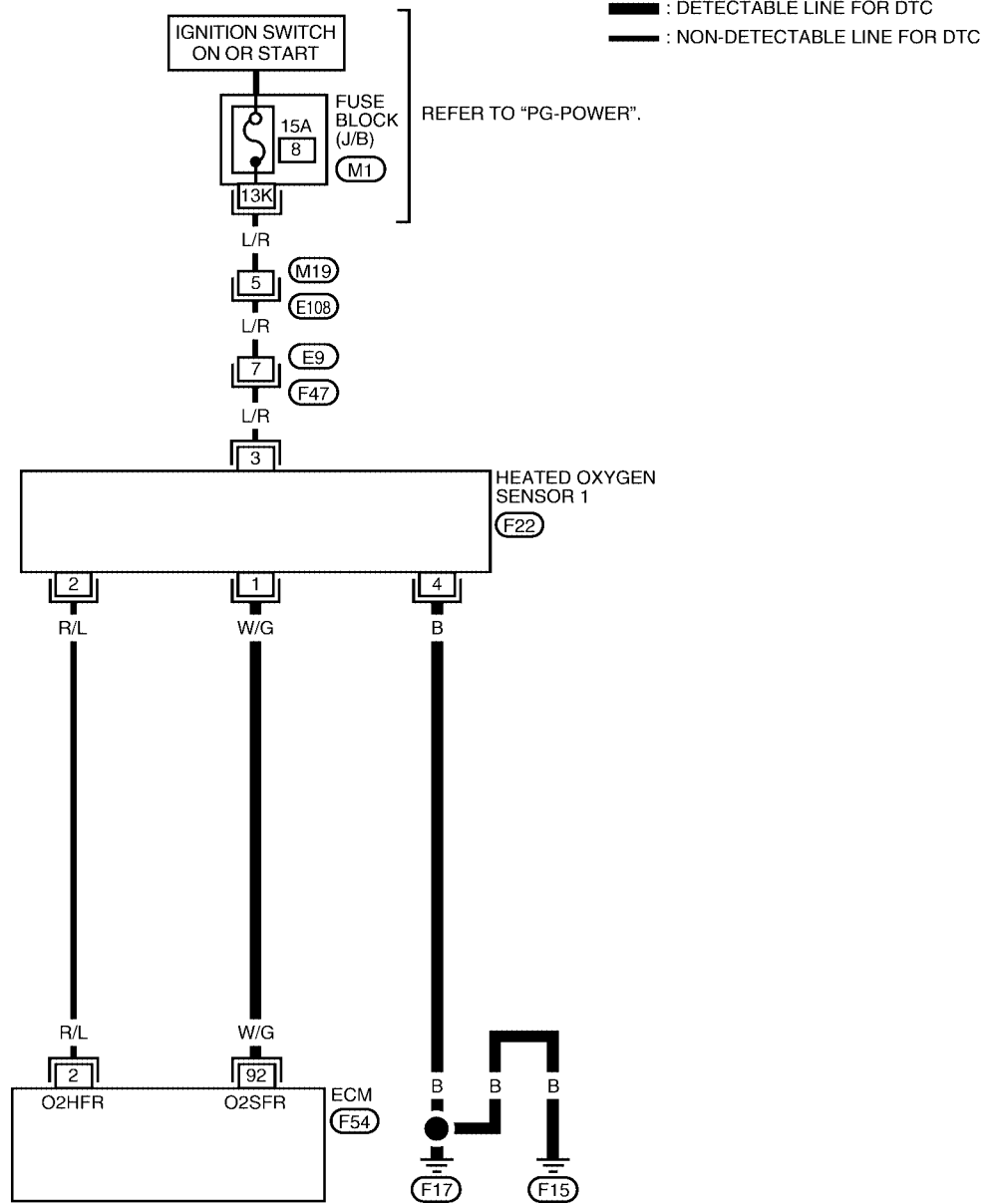
SEF174Y

### WITH GST

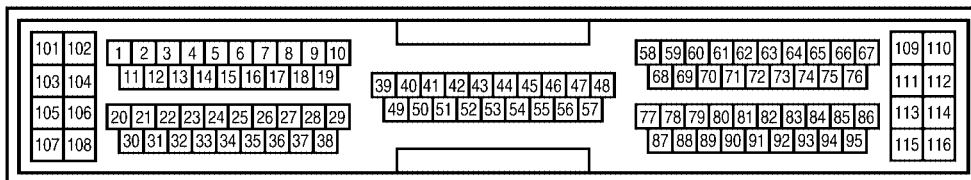
1. Start engine and warm it up to normal operating temperature.
  2. Turn ignition switch "OFF" and wait at least 10 seconds.
  3. Restart engine and let it idle for 2 minutes.
  4. Turn ignition switch "OFF" and wait at least 10 seconds.
  5. Restart engine and let it idle for 2 minutes.
  6. Select "MODE 3" with GST.
  7. If DTC is detected, go to [EC-1409, "Diagnostic Procedure"](#) .
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

Wiring Diagram

EC-HO2S1-01



REFER TO THE FOLLOWING.  
 (M1) - FUSE BLOCK - JUNCTION BOX (J/B)





Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
92	W/G	Heated oxygen sensor 1	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm.</li> </ul>	0 - Approximately 1.0V (Periodically change)

**Diagnostic Procedure**

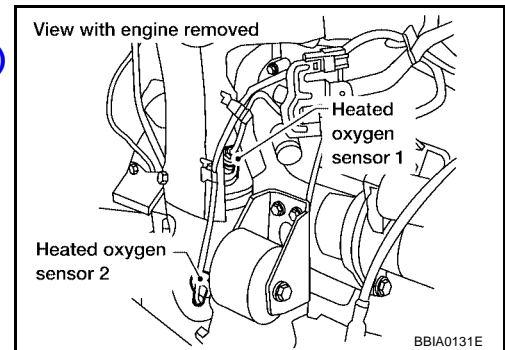
UBS002A8

**1. RETIGHTEN HEATED OXYGEN SENSOR 1**

Loosen and retighten heated oxygen sensor 1.

**Tightening torque: 40 - 50 N·m (4.1 - 5.1 kg·m, 30 - 37 ft·lb)**

>> GO TO 2.



**2. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 1 harness connector.
3. Check harness continuity between HO2S1 terminal 4 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to power in harness or connectors.

**3. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 92 and HO2S1 terminal 1. Refer to Wiring Diagram.

**Continuity should exist.**

3. Check harness continuity between ECM terminal 92 or HO2S1 terminal 1 and ground. Refer to Wiring Diagram.

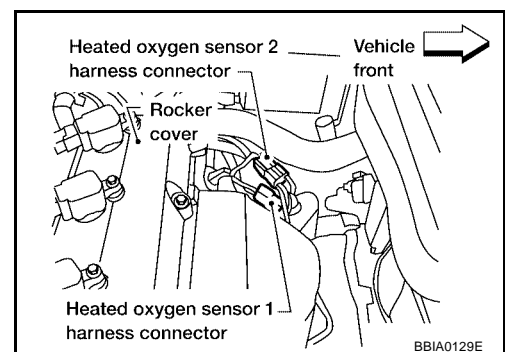
**Continuity should not exist.**

4. Also check harness for short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



#### 4. CHECK HO2S1 CONNECTOR FOR WATER

1. Disconnect heated oxygen sensor 1 harness connector.
2. Check connectors for water.

**Water should not exist.**

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace harness or connectors.

#### 5. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-1410, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Replace heated oxygen sensor 1.

#### 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection HEATED OXYGEN SENSOR 1

UBS002A9

#### With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

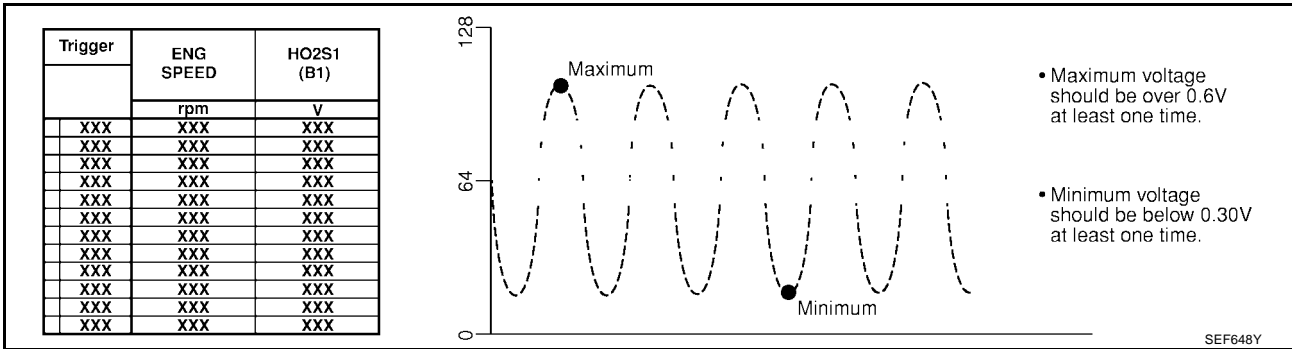
DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

6. Check the following.
  - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown at right.
  - "HO2S1 (B1)" voltage goes above 0.6V at least once.
  - "HO2S1 (B1)" voltage goes below 0.3V at least once.
  - "HO2S1 (B1)" voltage never exceeds 1.0V.

cycle	1   2   3   4   5
HO2S1 MNTR (B1)	R-L-R-L-R-L-R-L-R-L-R
R means HO2S1 MNTR (B1) indicates RICH	
L means HO2S1 MNTR (B1) indicates LEAN	

SEF217YA



**CAUTION:**

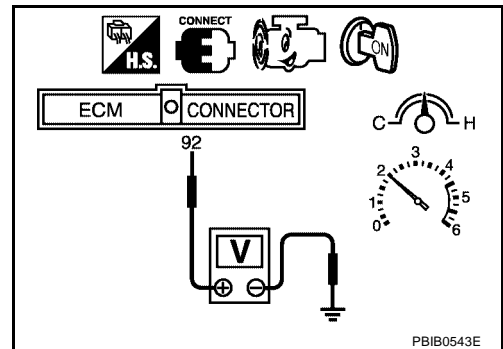
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 92 [HO2S1 (B1) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.

- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V  
 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V



**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation  
 HEATED OXYGEN SENSOR 1**

UBS002AA

Refer to [EM-110, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

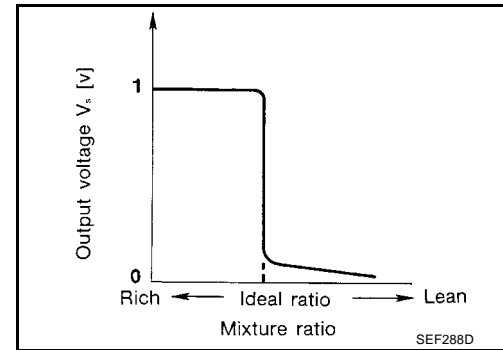
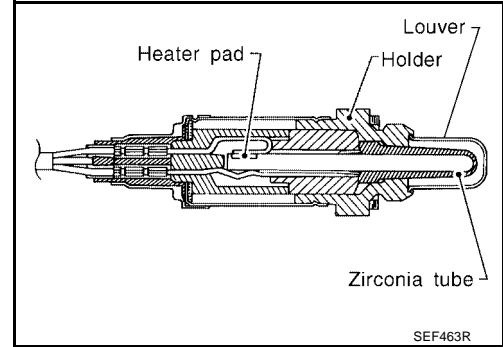
DTC P0133 HO2S1

PFP:22690

Component Description

UBS002AB

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



CONSULT-II Reference Value in Data Monitor Mode

UBS002AC

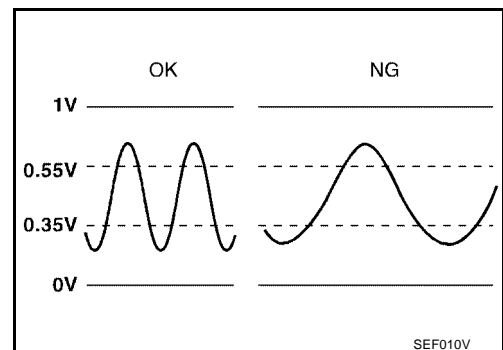
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

UBS002AD

To judge the malfunction of heated oxygen sensor 1, this diagnosis measures response time of heated oxygen sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and heated oxygen sensor 1 temperature index. Judgment is based on whether the compensated time (heated oxygen sensor 1 cycling time index) is inordinately long or not.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0133 0133	Heated oxygen sensor 1 circuit slow response	The response of the voltage signal from the sensor takes more than the specified time.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Heated oxygen sensor 1</li> <li>● Heated oxygen sensor 1 heater</li> <li>● Fuel pressure</li> <li>● Injectors</li> <li>● Intake air leaks</li> <li>● Exhaust gas leaks</li> <li>● PCV valve</li> <li>● Mass air flow sensor</li> </ul>

**DTC Confirmation Procedure**

UBS002AE

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- Always perform at a temperature above -10°C (14°F).
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch “ON” and select “HO2S1 (B1) P0133” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

**NOTE:**

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.

HO2S1 (B1) P0133	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

SEF338Z

6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 20 to 50 seconds.)

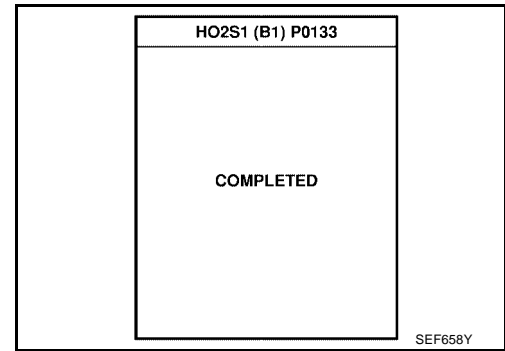
ENG SPEED	1,200 - 3,200 rpm
Vehicle speed	More than 80 km/h (50 MPH)
B/FUEL SCHDL	1.9 - 13.0 msec
Selector lever	Suitable position

HO2S1 (B1) P0133	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

SEF339Z

If “TESTING” is not displayed after 5 minutes, retry from step 2.

7. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to [EC-1416, "Diagnostic Procedure"](#).



## Overall Function Check

UBS002AF

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a DTC might not be confirmed.

### WITH GST

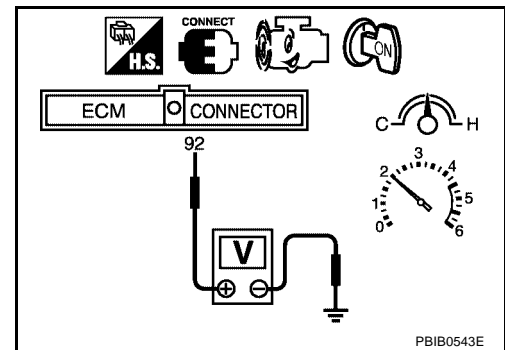
1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 92 [HO2S1(B1) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
  - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.

**1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V**

**2 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V**

**times: → 0 - 0.3V**

4. If NG, go to [EC-1416, "Diagnostic Procedure"](#).



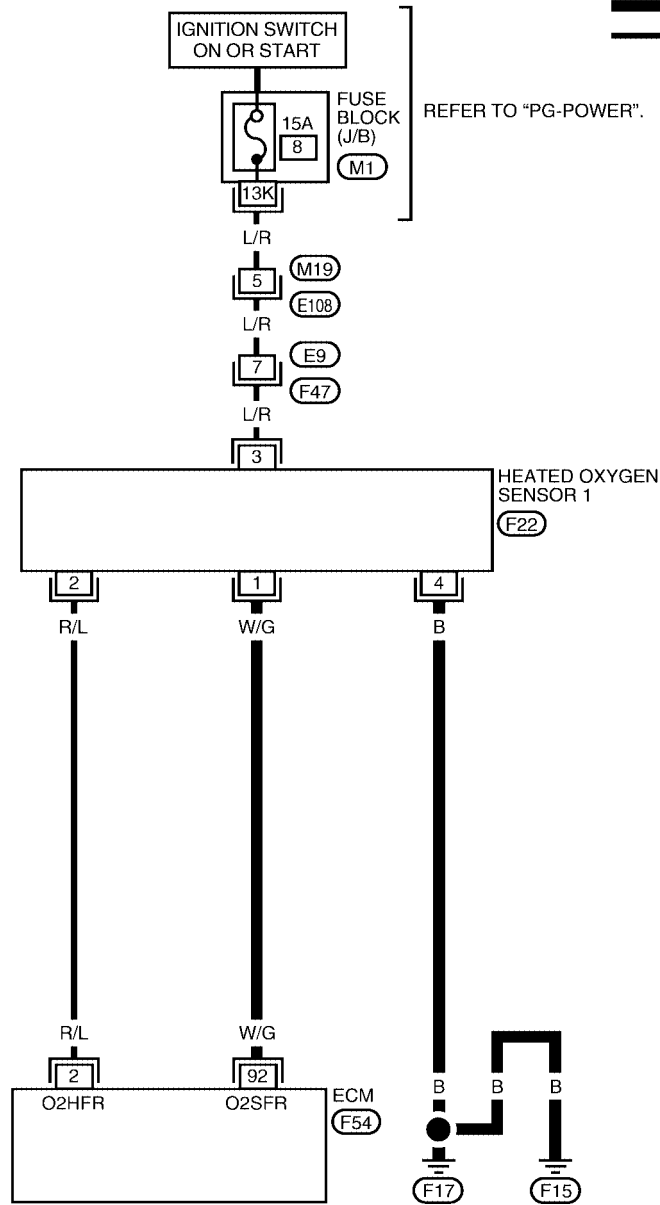
PBIB0543E

Wiring Diagram

UBS002AG

EC-HO2S1-01

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

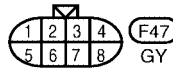
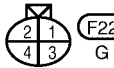
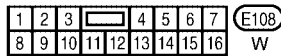


— : DETECTABLE LINE FOR DTC  
— : NON-DETECTABLE LINE FOR DTC

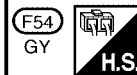
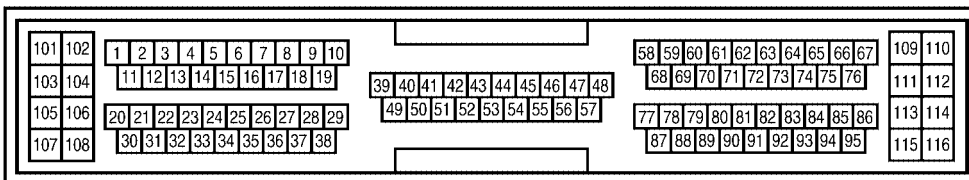
REFER TO "PG-POWER".

HEATED OXYGEN SENSOR 1 (F22)

O2HFR O2SFR ECM (F54)



REFER TO THE FOLLOWING.  
(M1) - FUSE BLOCK - JUNCTION BOX (J/B)



BBWA0414E

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
92	W/G	Heated oxygen sensor 1	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm.</li> </ul>	0 - Approximately 1.0V (Periodically change)

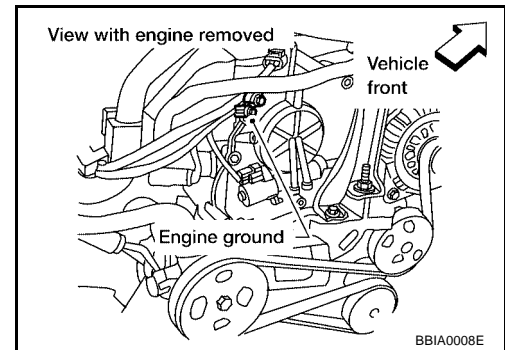
**Diagnostic Procedure**

UBS002AH

**1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.

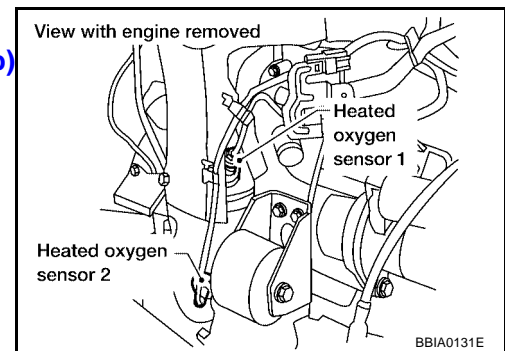


**2. RETIGHTEN HEATED OXYGEN SENSOR 1**

Loosen and retighten heated oxygen sensor 1.

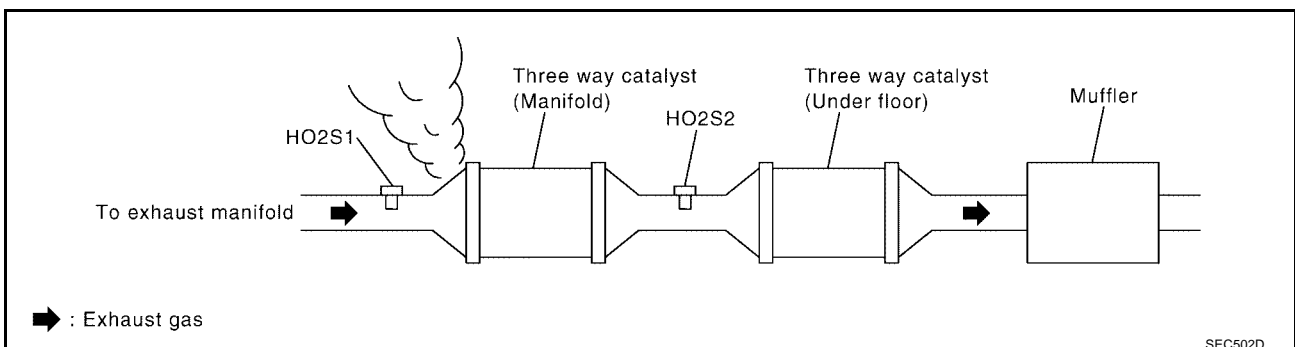
**Tightening torque: 40 - 50 N·m (4.1 - 5.1 kg·m, 30 - 37 ft·lb)**

>> GO TO 3.



**3. CHECK FOR EXHAUST AIR LEAK**

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before three way catalyst (Manifold).



OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace.



## 4. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

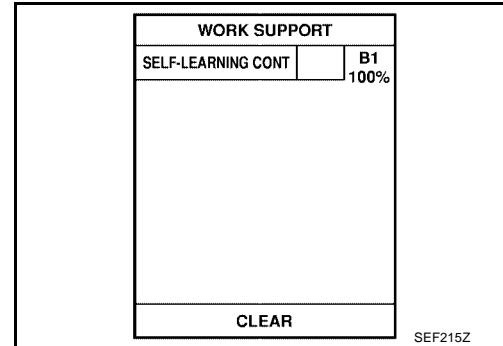
OK or NG

- OK >> GO TO 5.  
 NG >> Repair or replace.

## 5. CLEAR THE SELF-LEARNING DATA

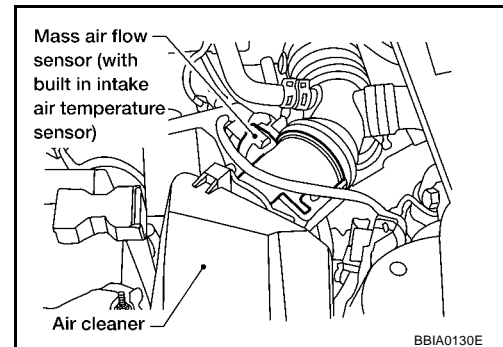
### With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 or P0172 detected?**  
**Is it difficult to start engine?**



### Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-1273, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 or P0172 detected?**  
**Is it difficult to start engine?**



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171 or DTC P0172 (Refer to [EC-1442](#) or [EC-1449](#)).  
 No >> GO TO 6.

## 6. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor1 harness connector.
3. Check harness continuity between HO2S1 terminal 4 and engine ground.  
 Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 7.  
 NG >> Repair open circuit or short to power in harness or connectors.

## 7. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 92 and HO2S1 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Check harness continuity between ECM terminal 92 or HO2S1 terminal 1 and engine ground.  
Refer to Wiring Diagram.

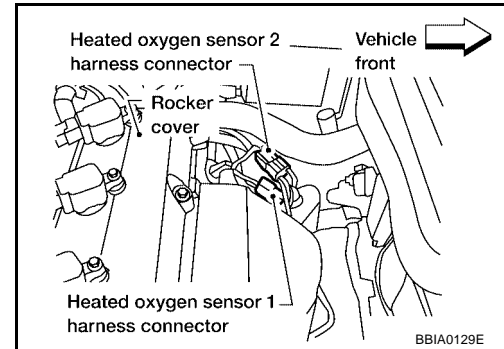
**Continuity should not exist.**

4. Also check harness for short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



## 8. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to [EC-1361, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace malfunctioning heated oxygen sensor 1.

## 9. CHECK MASS AIR FLOW SENSOR

Refer to [EC-1374, "Component Inspection"](#) .

OK or NG

OK >> GO TO 10.

NG >> Replace mass air flow sensor.

## 10. CHECK PCV VALVE

Refer to [EC-1858, "Component Inspection"](#) .

OK or NG

OK >> GO TO 11.

NG >> Replace PCV valve.

## 11. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-1418, "Component Inspection"](#) .

OK or NG

OK >> GO TO 12.

NG >> Replace heated oxygen sensor 1.

## 12. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection HEATED OXYGEN SENSOR 1

UBS002AI

Ⓟ With CONSULT-II

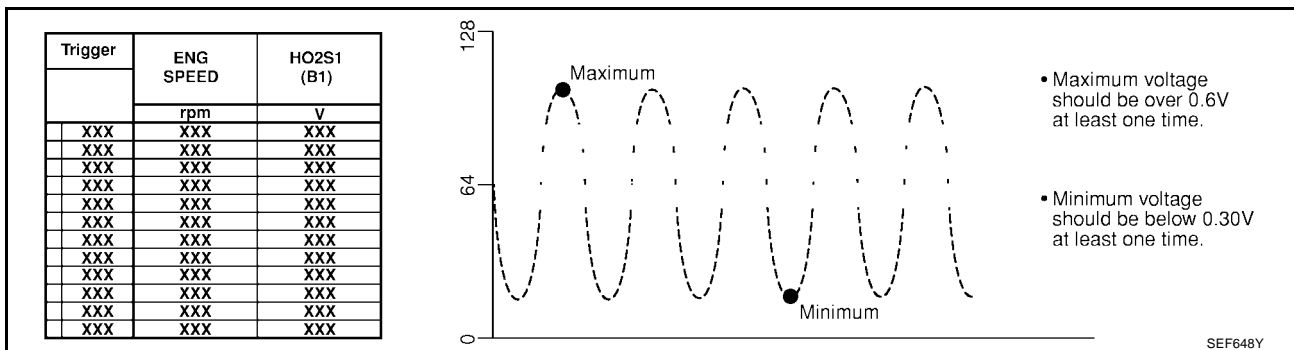
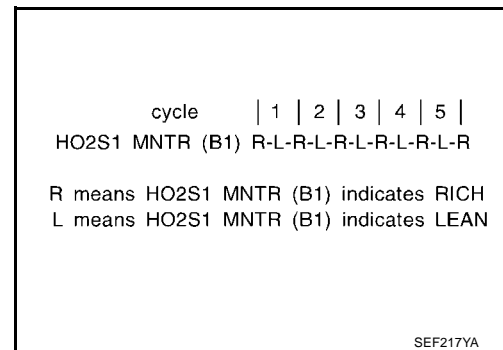
1. Start engine and warm it up to normal operating temperature.

2. Select "MANU TRIG" and adjust "TRIGGER POINT" to 100% in "DATA MONITOR" mode with CONSULT-II.
3. Select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch "RECORD" on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

6. Check the following.
  - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown at right.
  - "HO2S1 (B1)" voltage goes above 0.6V at least once.
  - "HO2S1 (B1)" voltage goes below 0.3V at least once.
  - "HO2S1 (B1)" voltage never exceeds 1.0V.

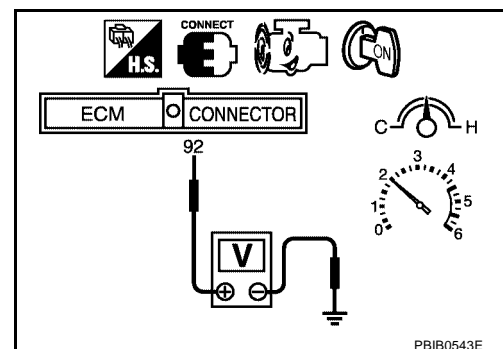


**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
  2. Set voltmeter probes between ECM terminal 92 [HO2S1 (B1) signal] and engine ground.
  3. Check the following with engine speed held at 2,000 rpm constant under no load.
    - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
    - The maximum voltage is over 0.6V at least one time.
    - The minimum voltage is below 0.3V at least one time.
    - The voltage never exceeds 1.0V.
- 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V  
 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V



---

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation**  
**HEATED OXYGEN SENSOR 1**

UBS002AJ

Refer to [EM-110, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

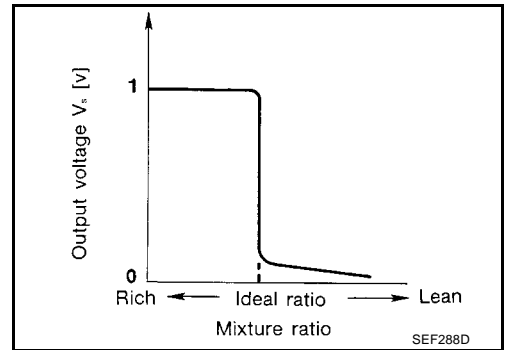
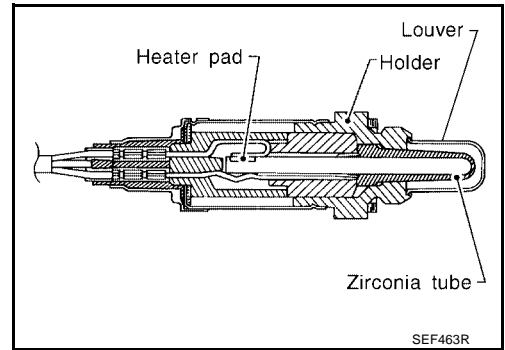
**DTC P0134 HO2S1**

PFP:22690

**Component Description**

UBS002AK

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS002AL

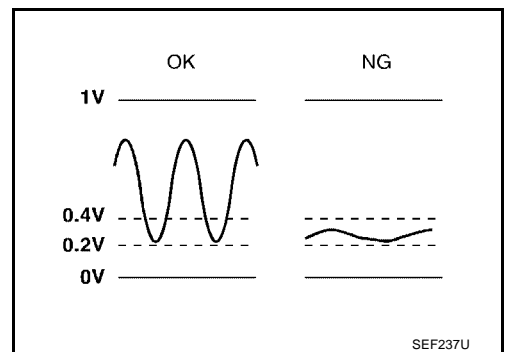
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

**On Board Diagnosis Logic**

UBS002AM

Under the condition in which the heated oxygen sensor 1 signal is not input, the ECM circuits will read a continuous approximately 0.3V. Therefore, for this diagnosis, the time that output voltage is within 200 to 400 mV range is monitored, and the diagnosis checks that this time is not inordinately long.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0134 0134	Heated oxygen sensor 1 circuit no activity detected	The voltage from the sensor is constantly approx. 0.3V.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Heated oxygen sensor 1</li> </ul>

**DTC Confirmation Procedure**

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Select “HO2S1 (B1) P0134” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
3. Touch “START”.
4. Let it idle for at least 3 minutes.

**NOTE:**

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 4.

HO2S1 (B1) P0134	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0544E

5. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 10 to 60 seconds.)

ENG SPEED	1,200 - 3,200 rpm
Vehicle speed	More than 64 km/h (40 MPH)
B/FUEL SCHDL	1.9 - 13.0 msec
Selector lever	Suitable position

HO2S1 (B1) P0134	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0545E

If “TESTING” is not displayed after 5 minutes, retry from step 2.

6. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to [EC-1425, "Diagnostic Procedure"](#).

HO2S1 (B1) P0134	
COMPLETED	

SEC750C

**Overall Function Check**

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a DTC might not be confirmed.

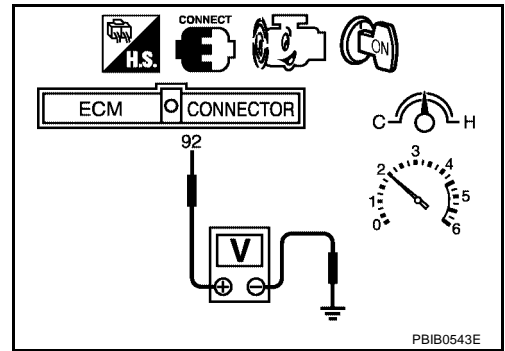
**WITH GST**

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 92 [HO2S1 (B1) signal] and engine ground.

# DTC P0134 HO2S1

[QR25DE]

3. Check the following with engine speed held at 2,000 rpm constant under no load.
  - The voltage does not remain in the range of 0.2 to 0.4V.
4. If NG, go to [EC-1425, "Diagnostic Procedure"](#) .



A

EC

C

D

E

F

G

H

I

J

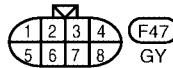
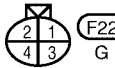
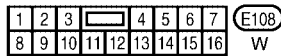
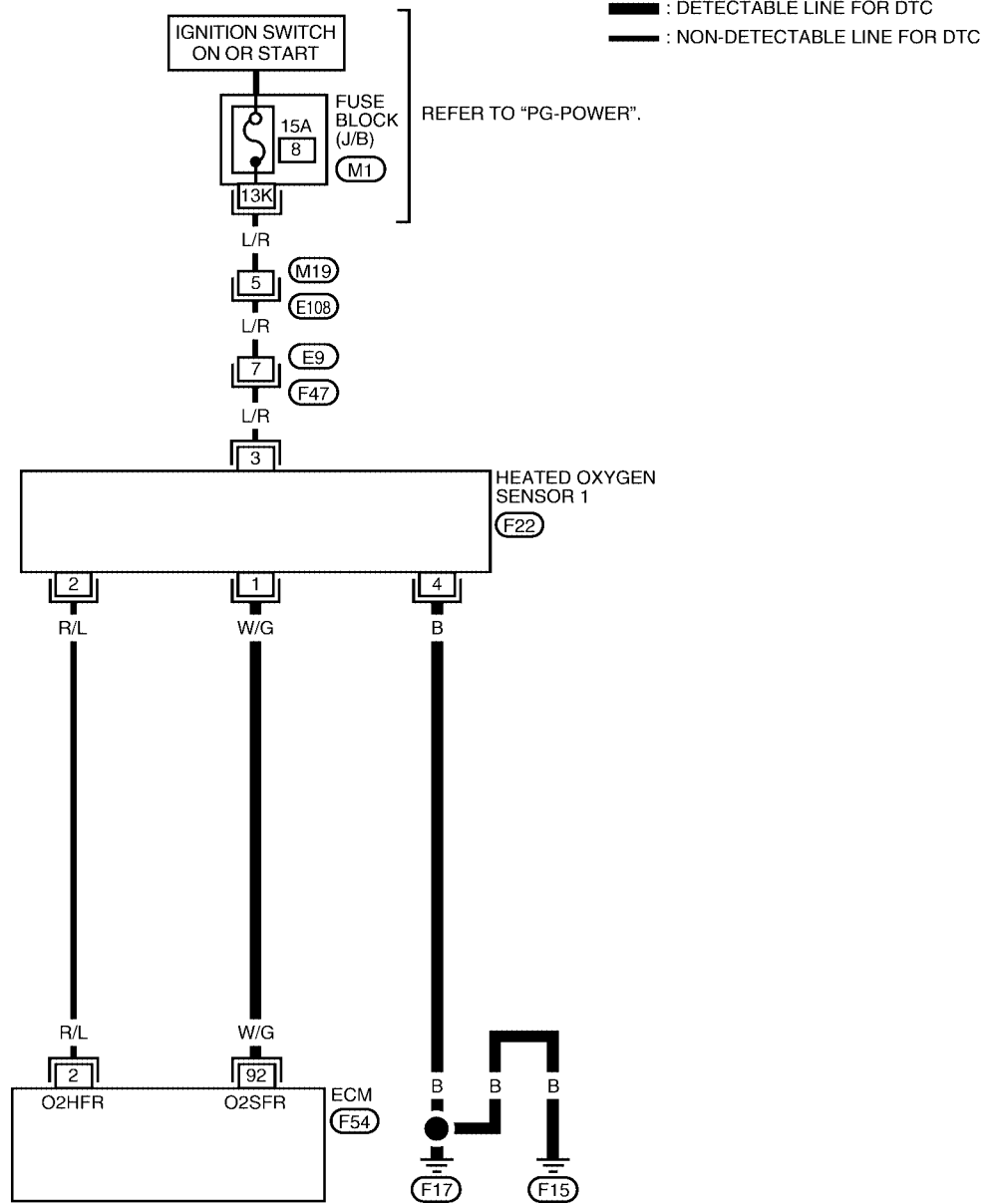
K

L

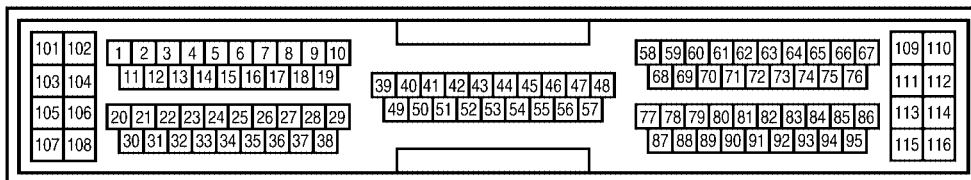
M

Wiring Diagram

EC-HO2S1-01



REFER TO THE FOLLOWING.  
 (M1) - FUSE BLOCK - JUNCTION BOX (J/B)





Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
92	W/G	Heated oxygen sensor 1	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm.</li> </ul>	0 - Approximately 1.0V (Periodically change)

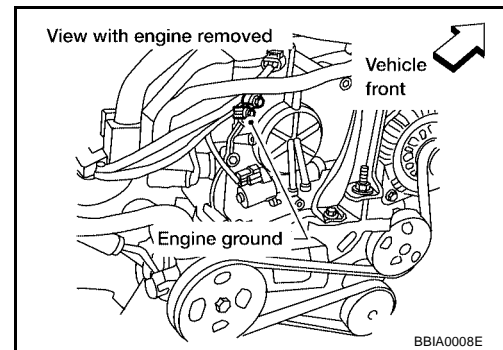
**Diagnostic Procedure**

UBS002A0

**1. INSPECTION START**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.

**2. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor1 harness connector.
3. Check harness continuity between HO2S1 terminal 4 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to power in harness or connectors.

**3. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 92 and HO2S1 terminal 1. Refer to Wiring Diagram.

**Continuity should exist.**

3. Check harness continuity between ECM terminal 92 or HO2S1 terminal 1 and ground. Refer to Wiring Diagram.

**Continuity should not exist.**

4. Also check harness for short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 92 [HO2S1 (B1) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.

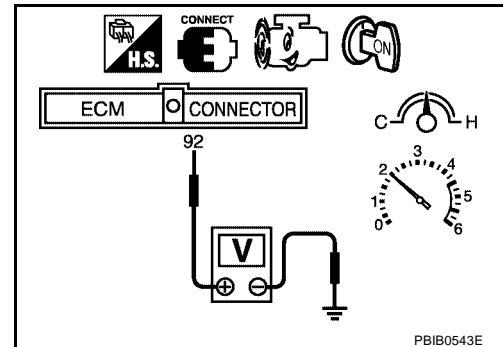
- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



## Removal and Installation HEATED OXYGEN SENSOR 1

UBS002AS

Refer to [EM-110, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

**DTC P0138 HO2S2**

PF:226A0

**Component Description**

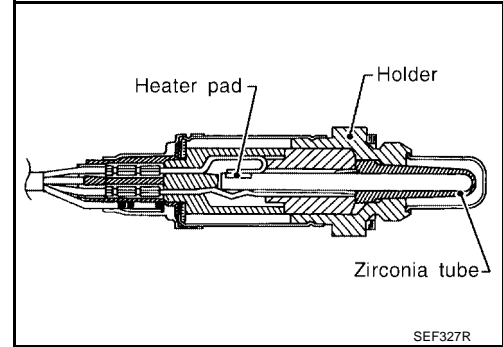
UBS002AT

The heated oxygen sensor 2, after three way catalyst (Manifold), monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS002AU

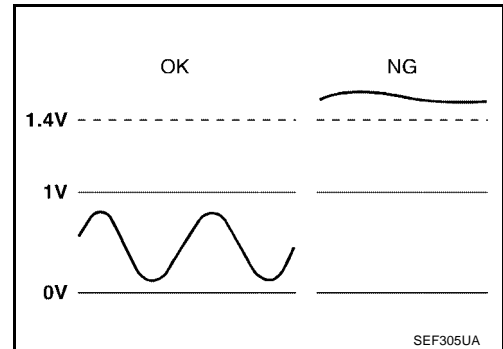
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> <li>Warm-up condition</li> <li>After keeping engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ↔ RICH

**On Board Diagnosis Logic**

UBS002AV

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0138 0138	Heated oxygen sensor 2 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> </ul>

**DTC Confirmation Procedure**

UBS002AW

**CAUTION:**

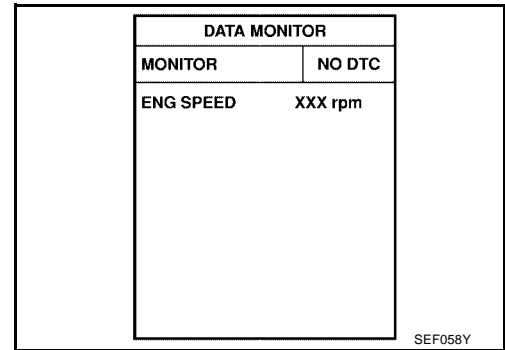
Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### ④ WITH CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
5. Let engine idle for two minutes.
6. If 1st trip DTC is detected, go to [EC-1431, "Diagnostic Procedure"](#) .



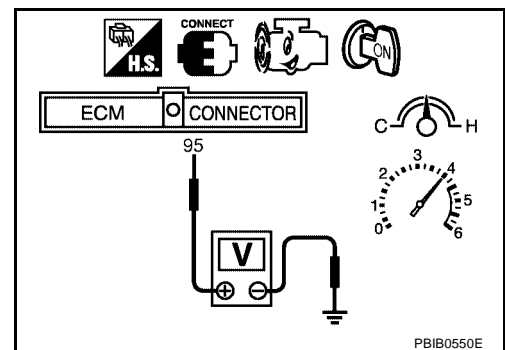
### Overall Function Check

UBS002AX

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a DTC might not be confirmed.

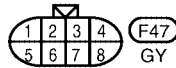
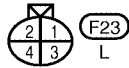
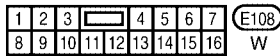
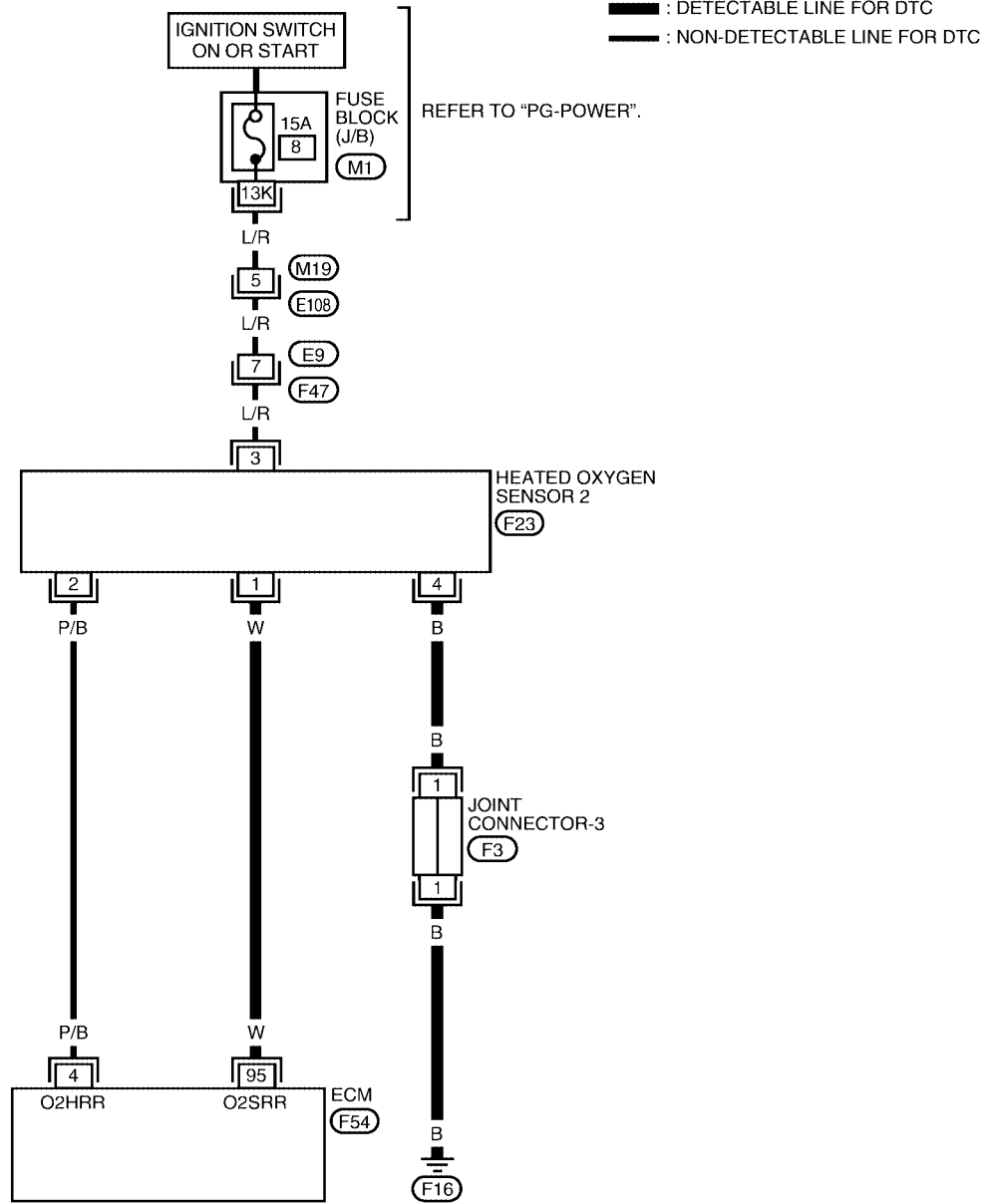
### ④ WITH GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for two minutes.
5. Turn ignition switch "OFF" and wait at least 10 seconds.
6. Start engine and keep the engine speed at between 3,500 to 4,000 rpm for at least one minute under no load.
7. Let engine idle for two minutes.
8. Select "Mode 3" with GST.
9. If DTC is detected, go to [EC-1431, "Diagnostic Procedure"](#) .



Wiring Diagram

EC-HO2S2-01

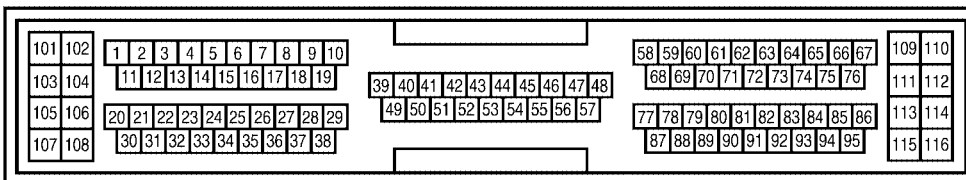


REFER TO THE FOLLOWING.

(M1) - FUSE BLOCK -

JUNCTION BOX (J/B)

(F3) - JOINT CONNECTOR



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
95	W	Heated oxygen sensor 2	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Engine speed is below 3,600rpm after the following conditions are met.                             <ul style="list-style-type: none"> <li>- Engine after warming up</li> <li>- Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul> </li> <li>● Revving engine from idle to 3,000 rpm quickly.</li> </ul>	0 - Approximately 1.0V

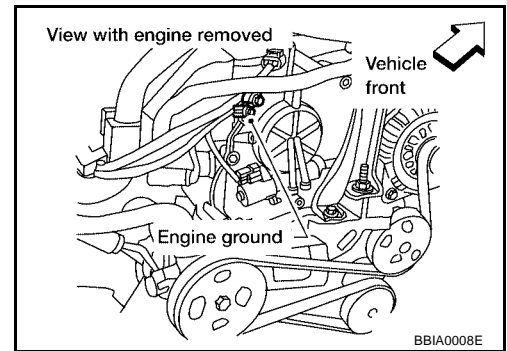
**Diagnostic Procedure**

UBS002AZ

**1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



**2. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT**

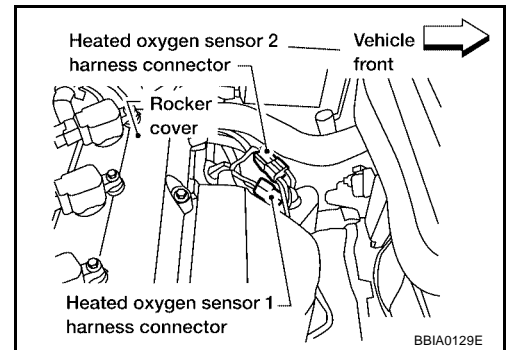
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Check harness continuity between HO2S2 terminal 4 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



**3. DETECT MALFUNCTIONING PART**

Check the following.

- Joint connector-3
- Harness for open and short between HO2S2 and engine ground

>> Repair open circuit or short to power in harness connectors.

#### 4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 95 and HO2S2 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Check harness continuity between ECM terminal 95 or HO2S2 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

4. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

#### 5. CHECK HARNESS CONNECTOR

Check HO2S2 harness connector for water.

**Water should not exist.**

OK or NG

OK >> GO TO 6.

NG >> Repair or replace harness connector.

#### 6. CHECK HEATED OXYGEN SENSOR 2

Refer to [EC-1432, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace heated oxygen sensor 2.

#### 7. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection HEATED OXYGEN SENSOR 2

UBS002B0

#### Ⓟ With CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
5. Let engine idle for two minutes.

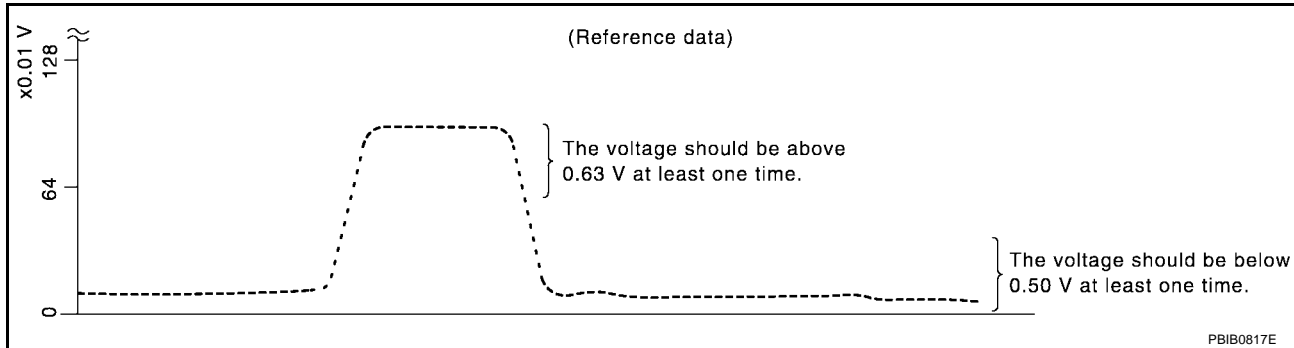


- Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

- Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .



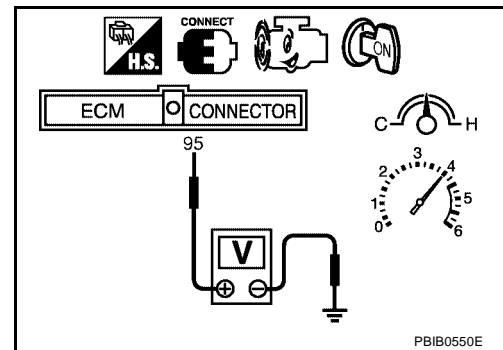
"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.  
 "HO2S2 (B1)" should be below 0.50V at least once when the "FUEL INJECTION" is -25%.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**⊗ Without CONSULT-II**

- Start engine warm it up to the normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
- Let engine idle for one minutes.
- Set voltmeter probes between ECM terminal 95 [HO2S2 (B1) signal] and engine ground.
- Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
 (Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.63V at least once during this procedure.**  
**If the voltage is above 0.63V at step 6, step 7 is not necessary.**



- Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).  
**The voltage should be below 0.50V at least once during this procedure.**

- If NG, replace heated oxygen sensor 2.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

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**Removal and Installation**  
**HEATED OXYGEN SENSOR 2**

Refer to [EX-3, "EXHAUST SYSTEM"](#) .

**DTC P0139 HO2S2**

PF2:226A0

UBS002B2

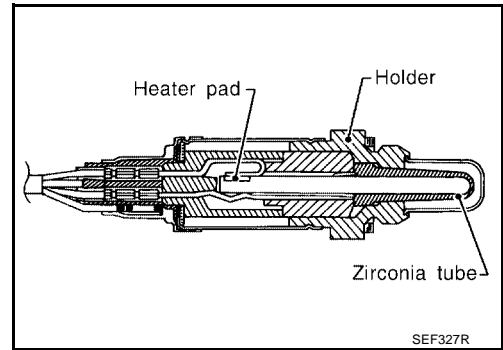
**Component Description**

The heated oxygen sensor 2, after three way catalyst (Manifold), monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS002B3

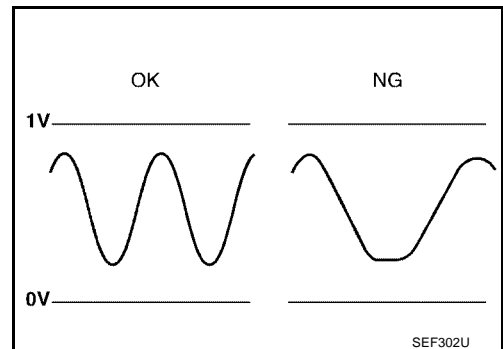
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> <li>Warm-up condition</li> <li>After keeping engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ↔ RICH

**On Board Diagnosis Logic**

UBS002B4

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the switching response of the sensor's voltage is faster than specified during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0139 0139	Heated oxygen sensor 2 circuit slow response	It takes more time for the sensor to respond between rich and lean than the specified time.	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> <li>Fuel pressure</li> <li>Injectors</li> <li>Intake air leaks</li> </ul>

**DTC Confirmation Procedure**

UBS002B5

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

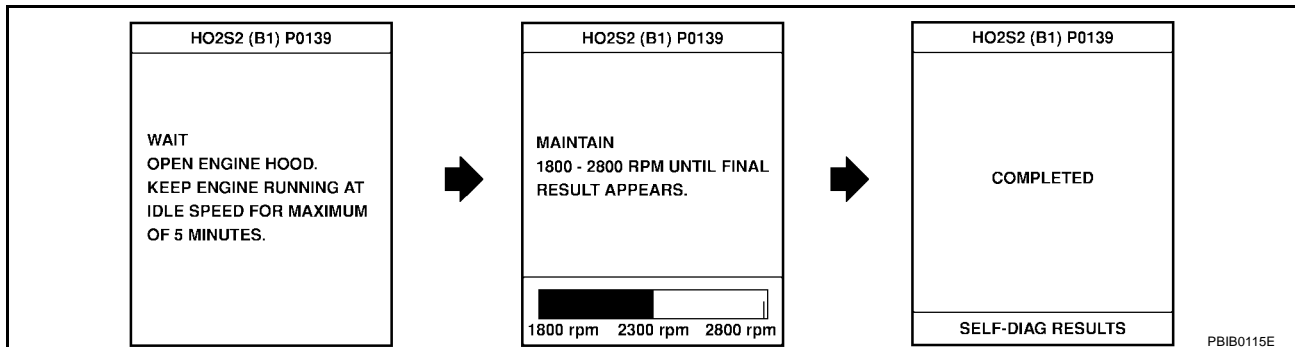
**TESTING CONDITION:**

For the best results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).

**WITH CONSULT-II**

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.

3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minutes.
5. Select "HO2S2 (B1) P0139" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II and follow the instruction of CONSULT-II.



6. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".  
 If "NG" is displayed, refer to [EC-1438, "Diagnostic Procedure"](#) .  
 If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
  - a. Turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle).
  - b. Turn ignition switch "ON" and select "COOLANTEMP/S" in "DATA MONITOR" mode with CONSULT-II.
  - c. Start engine and warm it up while monitoring "COOLANTEMP/S" indication on CONSULT-II.
  - d. When "COOLANTEMP/S" indication reaches to 70°C (158°F), go to step 3.

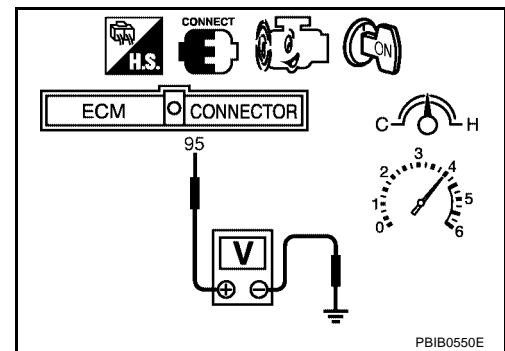
## Overall Function Check

UBS002B6

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a DTC might not be confirmed.

### WITH GST

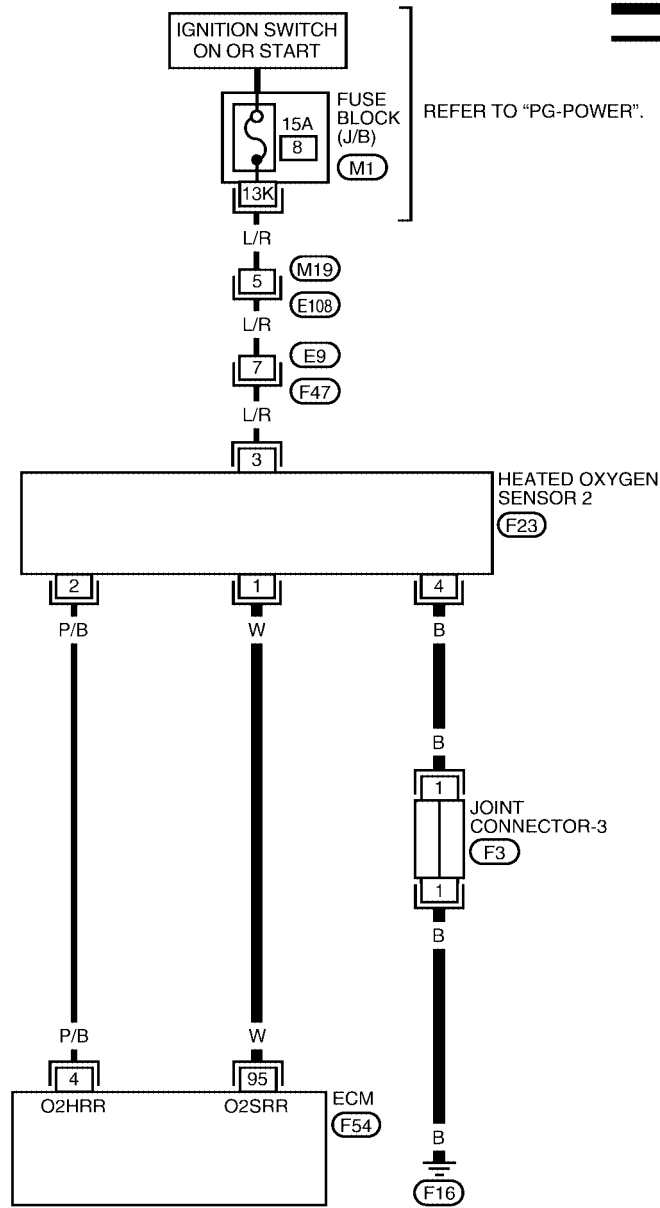
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Set voltmeter probes between ECM terminal 95 [HO2S2 (B1) signal] and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
 (Depress and release accelerator pedal as soon as possible.)  
**A change of voltage should be more than 0.06V for 1 second during this procedure.**  
**If the voltage can be confirmed in step 6, step 7 is not necessary.**
7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).  
**The voltage should change at more than 0.06V for 1 second during this procedure.**
8. If NG, go to [EC-1438, "Diagnostic Procedure"](#) .



Wiring Diagram

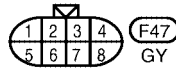
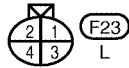
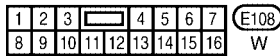
EC-HO2S2-01

A  
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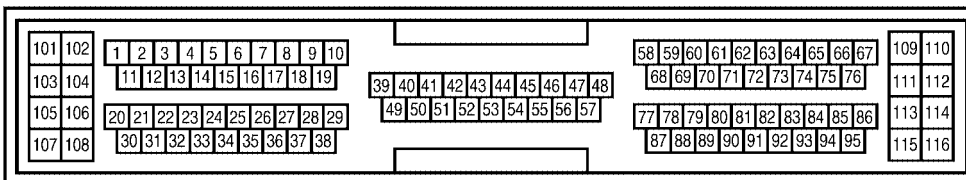


— : DETECTABLE LINE FOR DTC  
— : NON-DETECTABLE LINE FOR DTC

REFER TO "PG-POWER".



REFER TO THE FOLLOWING.  
 (M1) - FUSE BLOCK - JUNCTION BOX (J/B)  
 (F3) - JOINT CONNECTOR



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
95	W	Heated oxygen sensor 2	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Engine speed is below 3,600rpm after the following conditions are met.                             <ul style="list-style-type: none"> <li>- Engine after warming up</li> <li>- Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul> </li> <li>● Revving engine from idle to 3,000 rpm quickly.</li> </ul>	0 - Approximately 1.0V

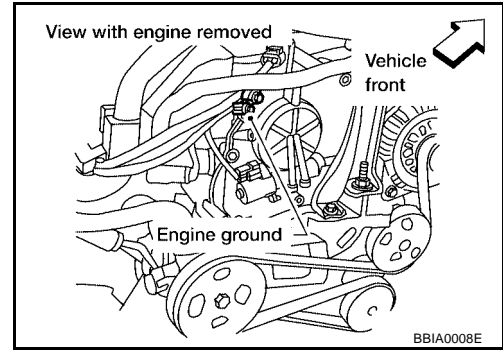
**Diagnostic Procedure**

UBS002B8

**1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

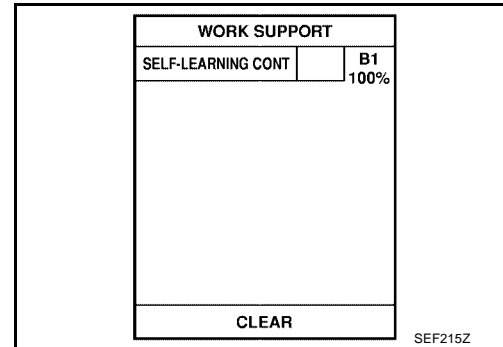
>> GO TO 2.



## 2. CLEAR THE SELF-LEARNING DATA

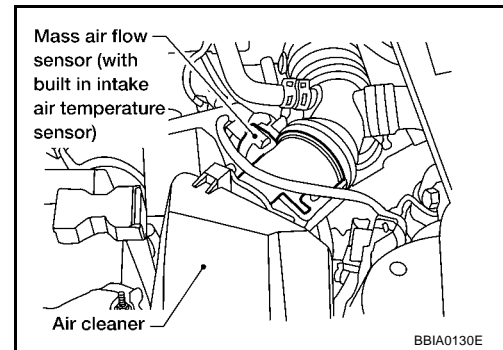
### ④ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 or P0172 detected?  
Is it difficult to start engine?**



### ⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-1273, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 or P0172 detected?  
Is it difficult to start engine?**



#### Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to [EC-1442](#) or [EC-1449](#).
- No >> GO TO 3.

## 3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

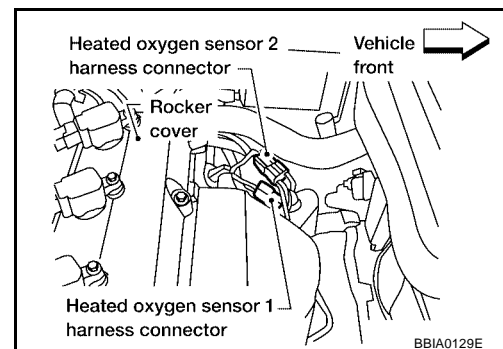
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Check harness continuity between HO2S2 terminal 4 and engine ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

#### OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



## 4. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-3
- Harness for open and short between HO2S2 and engine ground

>> Repair open circuit or short to power in harness or connectors.

**5. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 95 and HO2S2 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Check harness continuity between ECM terminal 95 or HO2S2 terminal 1 and engine ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

4. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 6.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK HEATED OXYGEN SENSOR 2**

Refer to [EC-1440, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace heated oxygen sensor 2.

**7. CHECK INTERMITTENT INCIDENT**

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

**>> INSPECTION END**

**Component Inspection  
HEATED OXYGEN SENSOR 2**

UBS002B9

**With CONSULT-II**

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
5. Let engine idle for one minutes.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

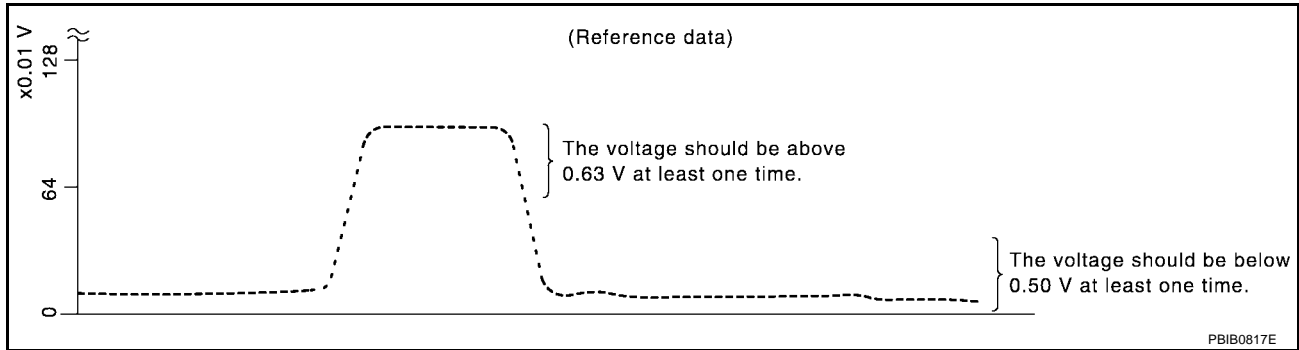
6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y



7. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .



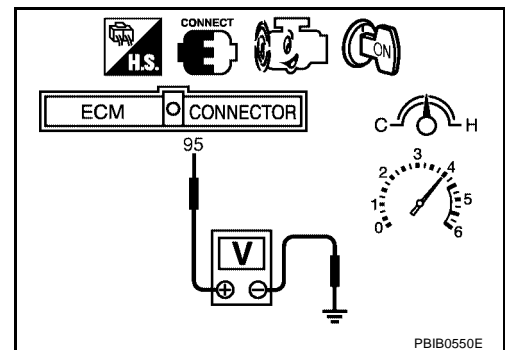
"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.  
 "HO2S2 (B1)" should be below 0.50V at least once when the "FUEL INJECTION" is -25%.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ **Without CONSULT-II**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minutes.
5. Set voltmeter probes between ECM terminal 95 [HO2S2 (B1) signal] and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
 (Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.63V at least once during this procedure.**  
**If the voltage is above 0.63V at step 6, step 7 is not necessary.**
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).  
**The voltage should be below 0.50V at least once during this procedure.**
8. If NG, replace heated oxygen sensor 2.



**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation**  
**HEATED OXYGEN SENSOR 2**

Refer to [EX-3. "EXHAUST SYSTEM"](#) .

UBS002BA

## DTC P0171 FUEL INJECTION SYSTEM FUNCTION

PFP:16600

### On Board Diagnosis Logic

UBS002BB

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.

In case the amount of the compensation value is extremely large (The actual mixture ratio is too lean.), the ECM judges the condition as the fuel injection system malfunction and light up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injectors

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0171 0171	Fuel injection system too lean	<ul style="list-style-type: none"> <li>● Fuel injection system does not operate properly.</li> <li>● The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)</li> </ul>	<ul style="list-style-type: none"> <li>● Intake air leaks</li> <li>● Heated oxygen sensor 1</li> <li>● Injectors</li> <li>● Exhaust gas leaks</li> <li>● Incorrect fuel pressure</li> <li>● Lack of fuel</li> <li>● Mass air flow sensor</li> <li>● Incorrect PCV hose connection</li> </ul>

### DTC Confirmation Procedure

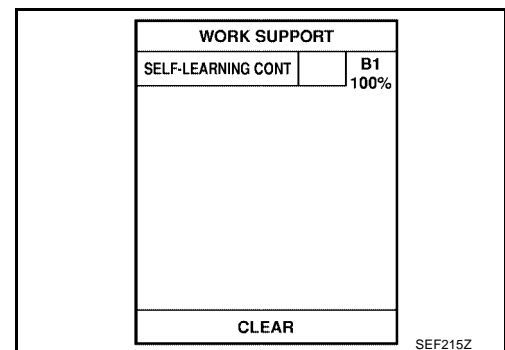
UBS002BC

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON" and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
4. Clear the self-learning control coefficient by touching "CLEAR".
5. Select "DATA MONITOR" mode with CONSULT-II.
6. Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to [EC-1445. "Diagnostic Procedure"](#).
7. If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.
8. Crank engine while depressing accelerator pedal. If engine starts, go to [EC-1445. "Diagnostic Procedure"](#). If engine does not start, check exhaust and intake air leak visually.



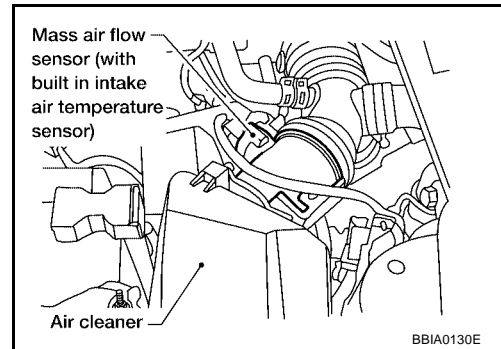
**WITH GST**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.

## DTC P0171 FUEL INJECTION SYSTEM FUNCTION

[QR25DE]

3. Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Select "MODE 3" with GST. Make sure DTC P0102 is detected.
6. Select "MODE 4" with GST and erase the DTC P0102.
7. Start engine again and let it idle for at least 10 minutes.
8. Select "MODE 7" with GST. The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to [EC-1445, "Diagnostic Procedure"](#).
9. If it is difficult to start engine at step 7, the fuel injection system has a malfunction.
10. Crank engine while depressing accelerator pedal. If engine starts, go to [EC-1445, "Diagnostic Procedure"](#).  
If engine does not start, check exhaust and intake air leak visually.



A

EC

C

D

E

F

G

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I

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M

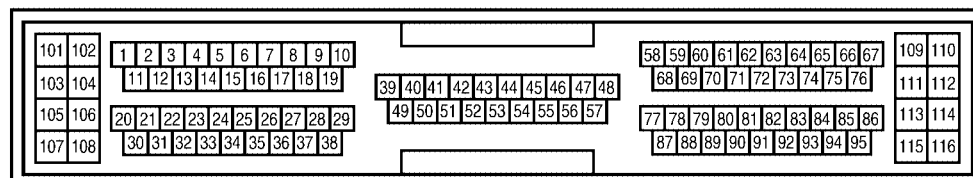
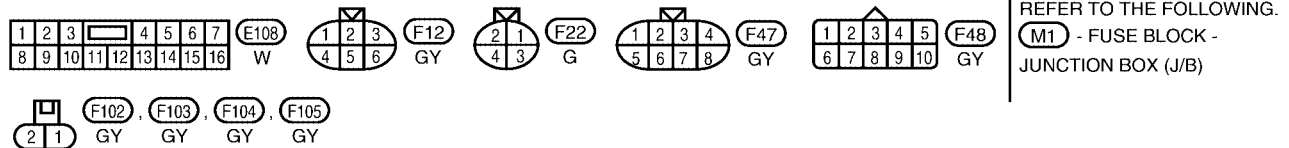
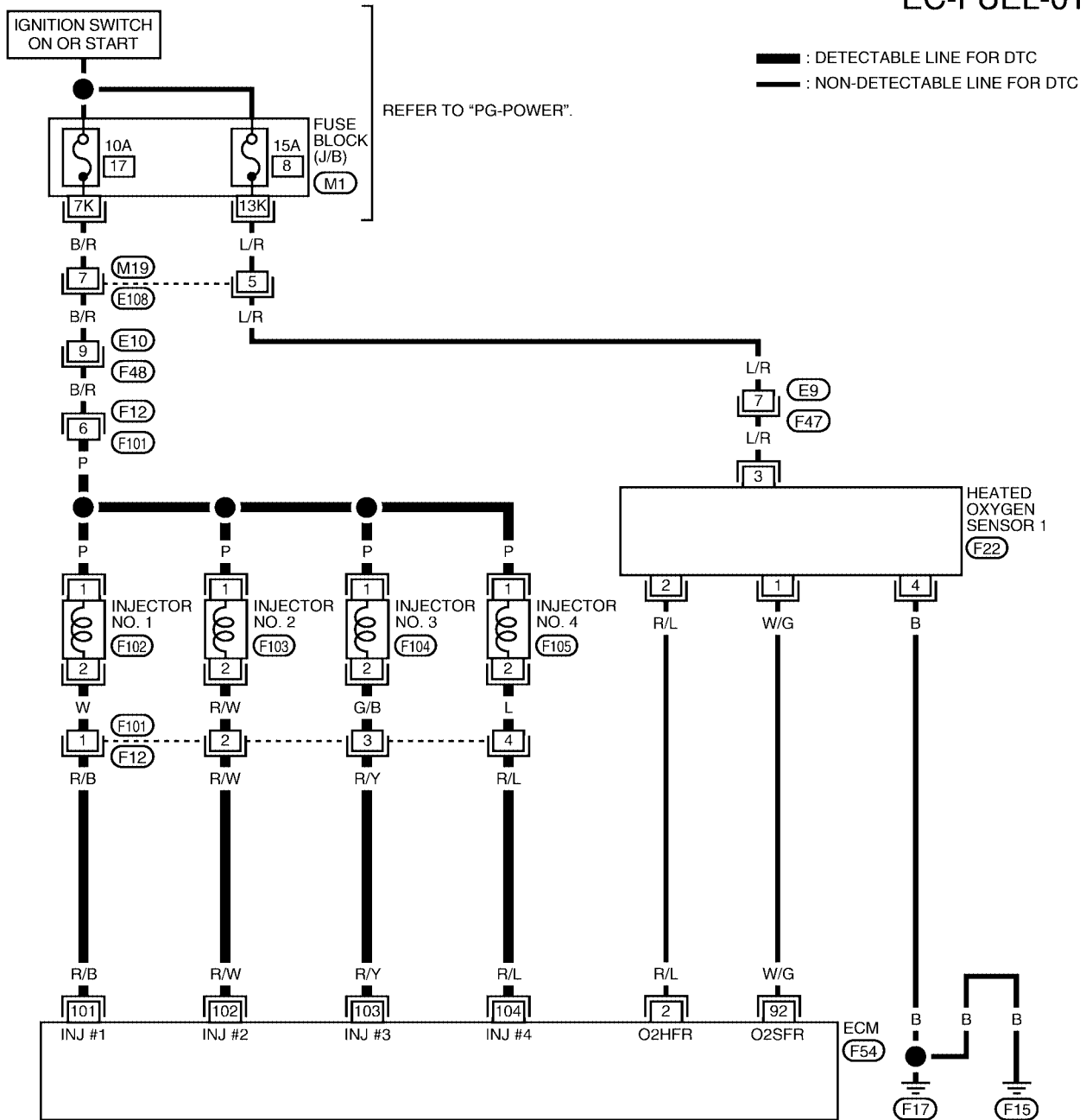
# DTC P0171 FUEL INJECTION SYSTEM FUNCTION

[QR25DE]

UBS002BD

## Wiring Diagram

EC-FUEL-01

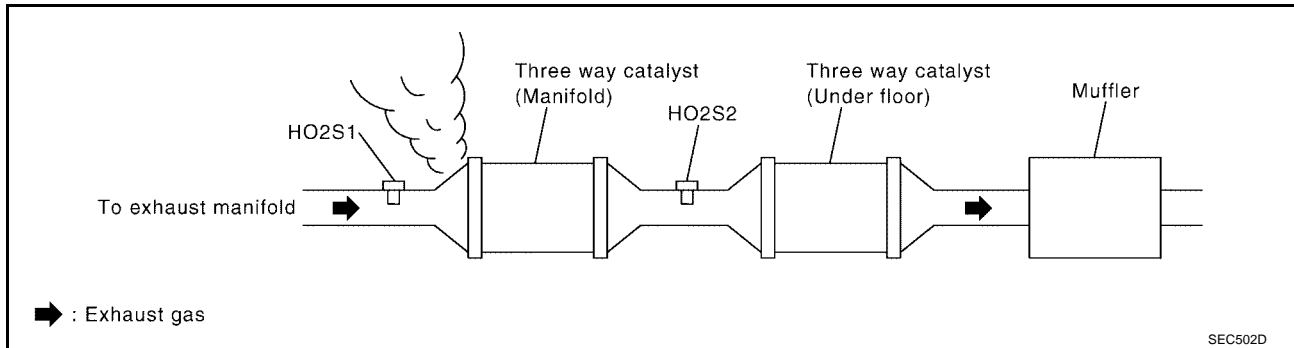


BBWA0416E

## Diagnostic Procedure

### 1. CHECK EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before three way catalyst (manifold).



OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace.

### 2. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Listen for an intake air leak after the mass air flow sensor.
2. Check PCV hose connection.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace.

### 3. CHECK HEATED OXYGEN SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 1 (HO2S1) harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 92 and HO2S1 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

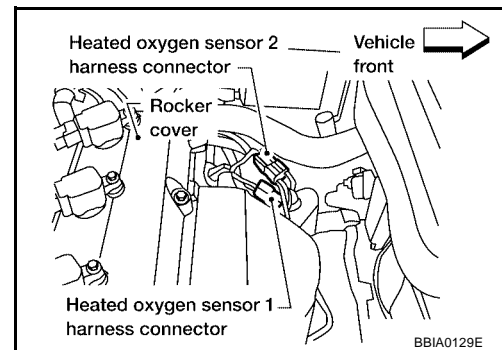
5. Check harness continuity between ECM terminal 92 or HO2S1 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

6. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



---

## 4. CHECK FUEL PRESSURE

---

1. Release fuel pressure to zero. Refer to [EC-1257, "FUEL PRESSURE RELEASE"](#) .
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-1257, "Fuel Pressure Check"](#) .

**At idling: Approximately 350 kPa (3.57 kg/cm<sup>2</sup> , 51 psi)**

OK or NG

- OK >> GO TO 5.  
NG >> Follow the construction of "FUEL PRESSURE CHECK".

---

## 5. CHECK MASS AIR FLOW SENSOR

---

 **With CONSULT-II**

1. Install all removed parts.
2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.

**1.0 - 4.0 g-m/sec: at idling**

**4.0 - 10 g-m/sec: at 2,500 rpm**

 **With GST**

1. Install all removed parts.
2. Check mass air flow sensor signal in MODE 1 with GST.

**1.0 - 4.0 g-m/sec: at idling**

**4.0 - 10 g-m/sec: at 2,500 rpm**

OK or NG

- OK >> GO TO 6.  
NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-1375, "DTC P0102, P0103 MAF SENSOR"](#) .

**6. CHECK FUNCTION OF INJECTORS**

**Ⓟ With CONSULT-II**

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

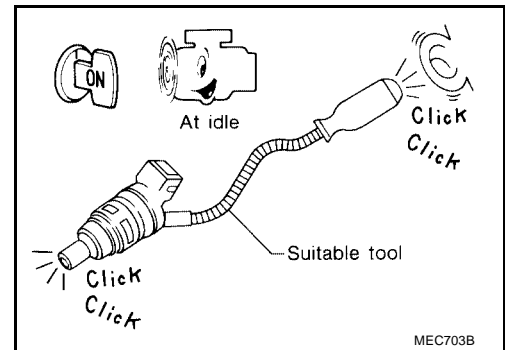
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

**ⓧ Without CONSULT-II**

1. Start engine.
2. Listen to each injector operating sound.

**Clicking noise should be heard.**



**OK or NG**

OK >> GO TO 7.

NG >> Perform trouble diagnosis for [EC-1796, "INJECTOR CIRCUIT"](#) .

**7. CHECK INJECTOR**

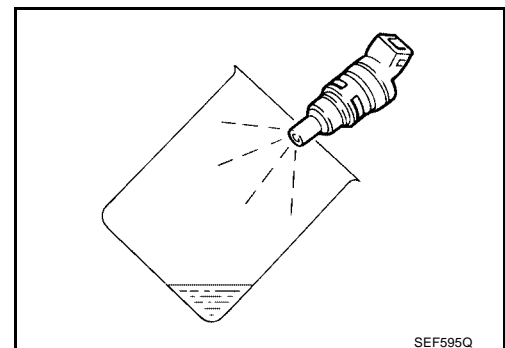
1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch "OFF".
3. Disconnect injector harness connectors.
4. Remove injector gallery assembly. Refer to [EM-118, "FUEL INJECTOR AND FUEL TUBE"](#) .  
Keep fuel hose and all injectors connected to injector gallery.  
The injector harness connectors should remain connected.
5. Disconnect all ignition coil harness connectors.
6. Prepare pans or saucers under each injector.
7. Crank engine for about 3 seconds. Make sure that fuel sprays out from injectors.

**Fuel should be sprayed evenly for each injector.**

**OK or NG**

OK >> GO TO 8.

NG >> Replace injectors from which fuel does not spray out.  
Always replace O-ring with new ones.



---

8. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END



## DTC P0172 FUEL INJECTION SYSTEM FUNCTION

PFP:16600

### On Board Diagnosis Logic

UBS002BF

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.

In case the amount of the compensation value is extremely large (The actual mixture ratio is too rich.), the ECM judges the condition as the fuel injection system malfunction and light up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injectors

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0172 0172	Fuel injection system too rich	<ul style="list-style-type: none"> <li>● Fuel injection system does not operate properly.</li> <li>● The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)</li> </ul>	<ul style="list-style-type: none"> <li>● Heated oxygen sensor 1</li> <li>● Injectors</li> <li>● Exhaust gas leaks</li> <li>● Incorrect fuel pressure</li> <li>● Mass air flow sensor</li> </ul>

### DTC Confirmation Procedure

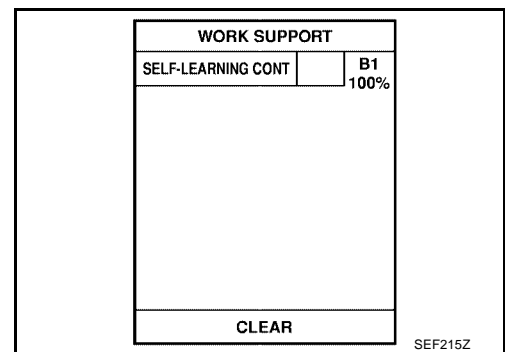
UBS002BG

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON" and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
4. Clear the self-learning control coefficient by touching "CLEAR".
5. Select "DATA MONITOR" mode with CONSULT-II.
6. Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to [EC-1452, "Diagnostic Procedure"](#).
7. If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.
8. Crank engine while depressing accelerator pedal. If engine starts, go to [EC-1452, "Diagnostic Procedure"](#). If engine does not start, remove ignition plugs and check for fouling, etc.



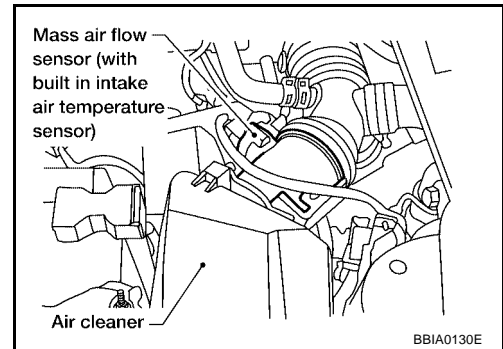
**WITH GST**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.

## DTC P0172 FUEL INJECTION SYSTEM FUNCTION

[QR25DE]

3. Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Select "MODE 3" with GST. Make sure DTC P0102 is detected.
6. Select "MODE 4" with GST and erase the DTC P0102.
7. Start engine again and let it idle for at least 10 minutes.
8. Select "MODE 7" with GST. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to [EC-1452, "Diagnostic Procedure"](#).
9. If it is difficult to start engine at step 7, the fuel injection system has a malfunction.
10. Crank engine while depressing accelerator pedal.  
If engine starts, go to [EC-1452, "Diagnostic Procedure"](#). If engine does not start, check exhaust and intake air leak visually.



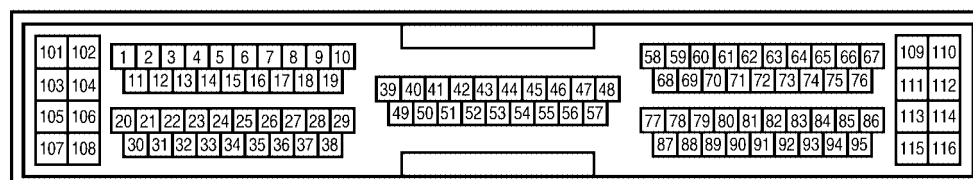
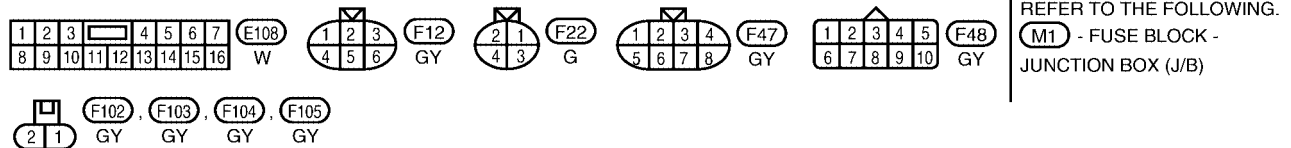
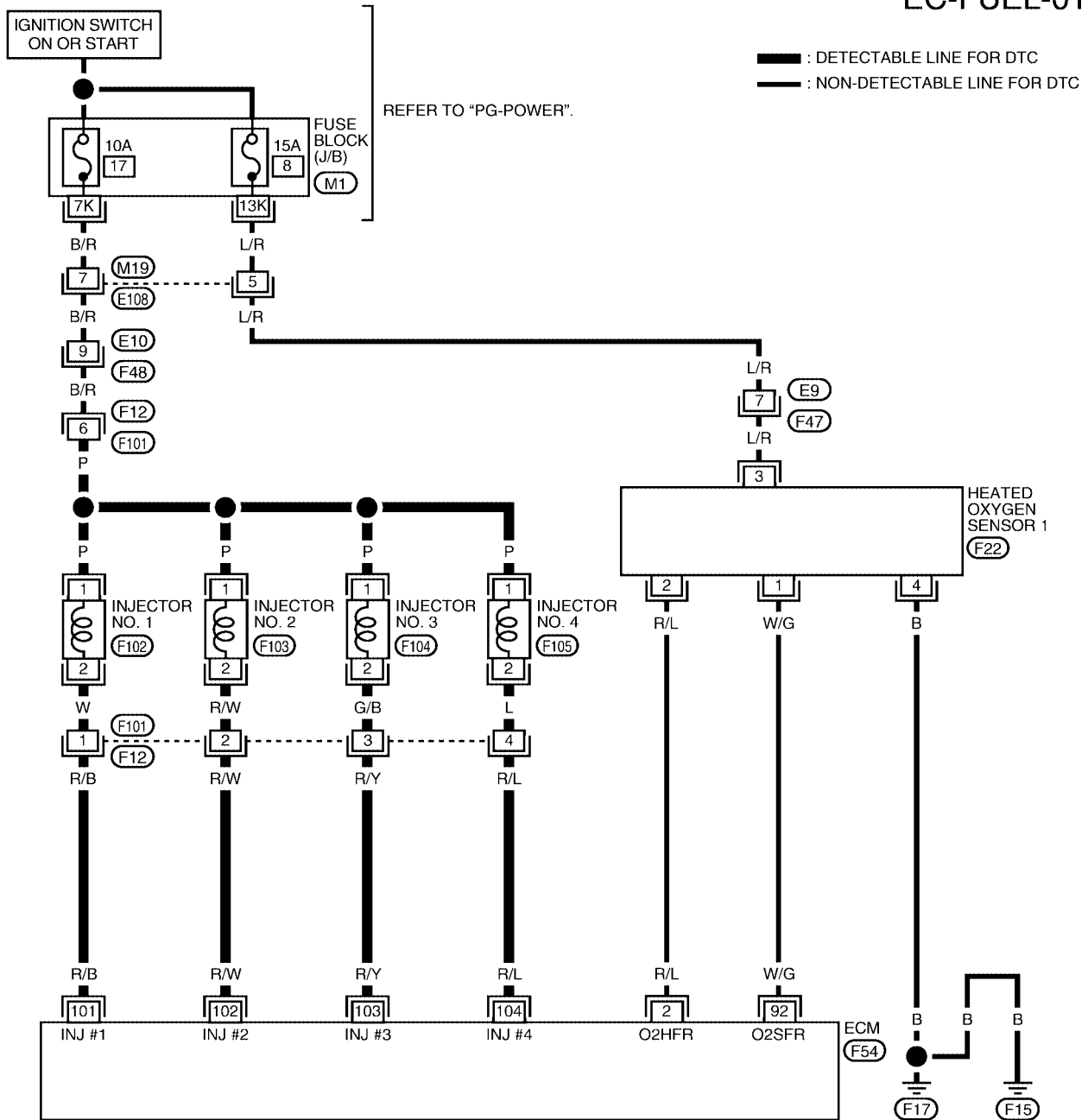
# DTC P0172 FUEL INJECTION SYSTEM FUNCTION

[QR25DE]

UBS002BH

## Wiring Diagram

EC-FUEL-01

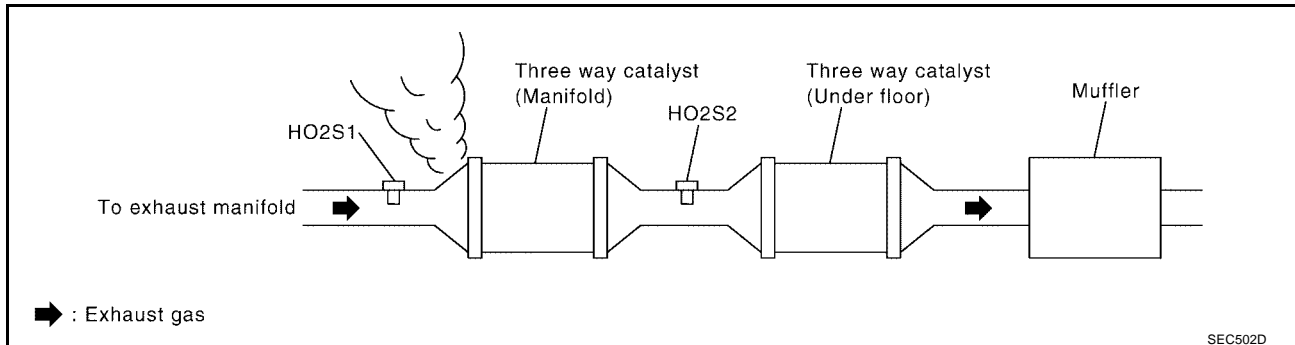


BBWA0416E

## Diagnostic Procedure

### 1. CHECK EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before three way catalyst (manifold).



OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace.

### 2. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace.

### 3. CHECK HEATED OXYGEN SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 1 (HO2S1) harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 92 and HO2S1 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

5. Check harness continuity between ECM terminal 92 or HO2S1 terminal 1 and engine ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

6. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

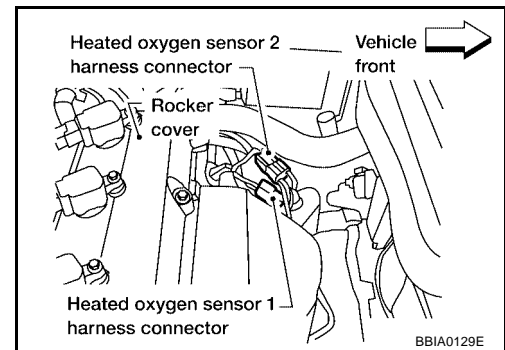
### 4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to [EC-1257, "FUEL PRESSURE RELEASE"](#).
2. Install fuel pressure gauge and check fuel pressure. Refer to [EC-1257, "Fuel Pressure Check"](#).

**At idling: 350 kPa (3.57 kg/cm<sup>2</sup>, 51 psi)**

OK or NG

- OK >> GO TO 5.
- NG >> Follow the construction of "FUEL PRESSURE CHECK".



**5. CHECK MASS AIR FLOW SENSOR**

**With CONSULT-II**

1. Install all removed parts.
2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.

**1.0 - 4.0 g-m/sec: at idling**  
**4.0 - 10 g-m/sec: at 2,500 rpm**

**With GST**

1. Install all removed parts.
2. Check mass air flow sensor signal in MODE 1 with GST.

**1.0 - 4.0 g-m/sec: at idling**  
**4.0 - 10 g-m/sec: at 2,500 rpm**

OK or NG

- OK >> GO TO 6.  
 NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-1375, "DTC P0102, P0103 MAF SENSOR"](#) .

**6. CHECK FUNCTION OF INJECTORS**

**With CONSULT-II**

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

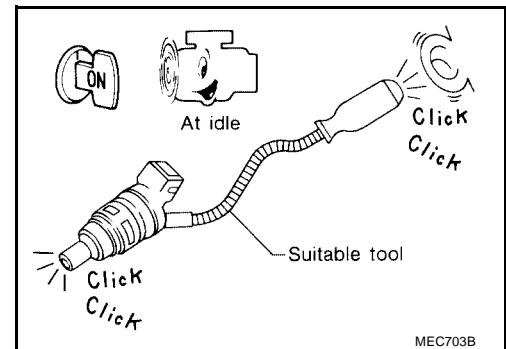
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

**Without CONSULT-II**

1. Start engine.
2. Listen to each injector operating sound.

**Clicking noise should be heard.**



OK or NG

- OK >> GO TO 7.  
 NG >> Perform trouble diagnosis for [EC-1796, "INJECTOR CIRCUIT"](#) .

---

## 7. CHECK INJECTOR

---

1. Remove injector assembly. Refer to [EM-118, "FUEL INJECTOR AND FUEL TUBE"](#) .  
Keep fuel hose and all injectors connected to injector gallery.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
3. Disconnect injector harness connectors.  
The injector harness connectors should remain connected.
4. Disconnect all ignition coil harness connectors.
5. Prepare pans or saucers under each injectors.
6. Crank engine for about 3 seconds.  
Make sure fuel does not drip from injector.

### OK or NG

OK (Does not drip.)>>GO TO 8.

NG (Drips.)>>Replace the injectors from which fuel is dripping. Always replace O-ring with new one.

---

## 8. CHECK INTERMITTENT INCIDENT

---

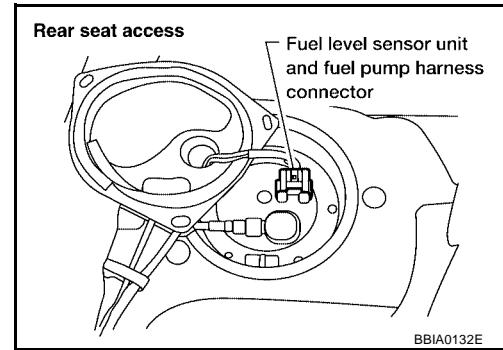
Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

## DTC P0181 FTT SENSOR

### Component Description

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



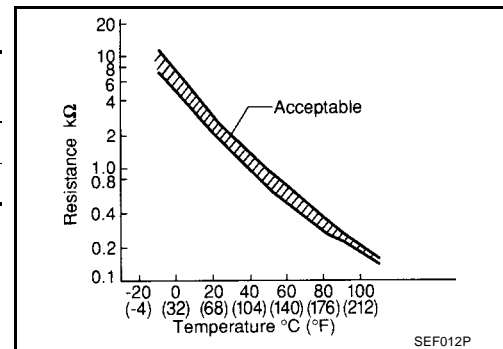
### <Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

\*: These data are reference values and are measured between ECM terminal 70 (Fuel tank temperature sensor) and ground.

### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may lead to ECM's transistor damage. Use ground other than ECM, such as engine ground.**



### On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0181 0181	Fuel tank temperature sensor circuit range/performance	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Fuel tank temperature sensor</li> </ul>

### DTC Confirmation Procedure

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Check "COOLAN TEMP/S" value.  
If "COOLAN TEMP/S" is less than 60°C (140°F), the result will be OK.  
If "COOLAN TEMP/S" is above 60°C (140°F), go to the following step.
4. Cool engine down until "COOLAN TEMP/S" signal is less than 60°C (140°F).
5. Wait at least 10 seconds.
6. If 1st trip DTC is detected, go to [EC-1456, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

#### WITH GST

Follow the procedure "WITH CONSULT-II" above.

**Diagnostic Procedure**

**1. CHECK FUEL TANK TEMPERATURE SENSOR**

Refer to [EC-1456, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 2.
- NG >> Replace fuel tank temperature sensor.

**2. CHECK INTERMITTENT INCIDENT**

Perform [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

Refer to [EC-1458, "Wiring Diagram"](#) .

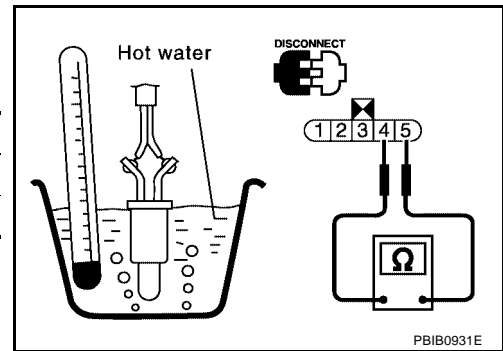
>> INSPECTION END

**Component Inspection**  
**FUEL TANK TEMPERATURE SENSOR**

1. Remove fuel level sensor unit.
2. Check resistance between fuel level sensor unit and fuel pump terminals 4 and 5 by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

If NG, replace fuel level sensor unit.



**Removal and Installation**  
**FUEL TANK TEMPERATURE SENSOR**

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .



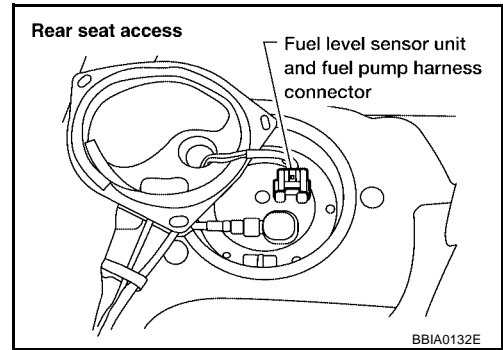
DTC P0182, P0183 FTT SENSOR

PF2:22630

UBS002BP

Component Description

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



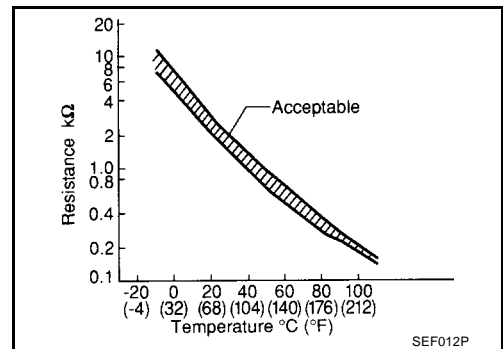
<Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

\*: These data are reference values and are measured between ECM terminal 70 (Fuel tank temperature sensor) and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may lead to ECM's transistor damage. Use ground other than ECM, such as engine ground.



On Board Diagnosis Logic

UBS002BQ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0182 0182	Fuel tank temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Fuel tank temperature sensor</li> </ul>
P0183 0183	Fuel tank temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

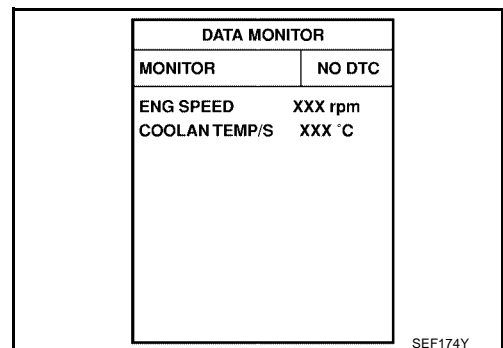
UBS002BR

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-1459, "Diagnostic Procedure"](#).



**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

# DTC P0182, P0183 FTT SENSOR

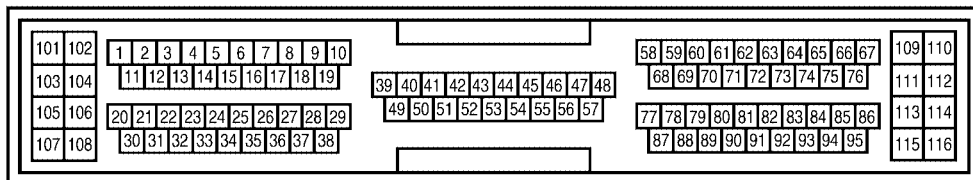
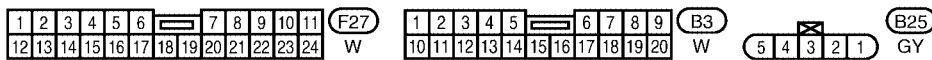
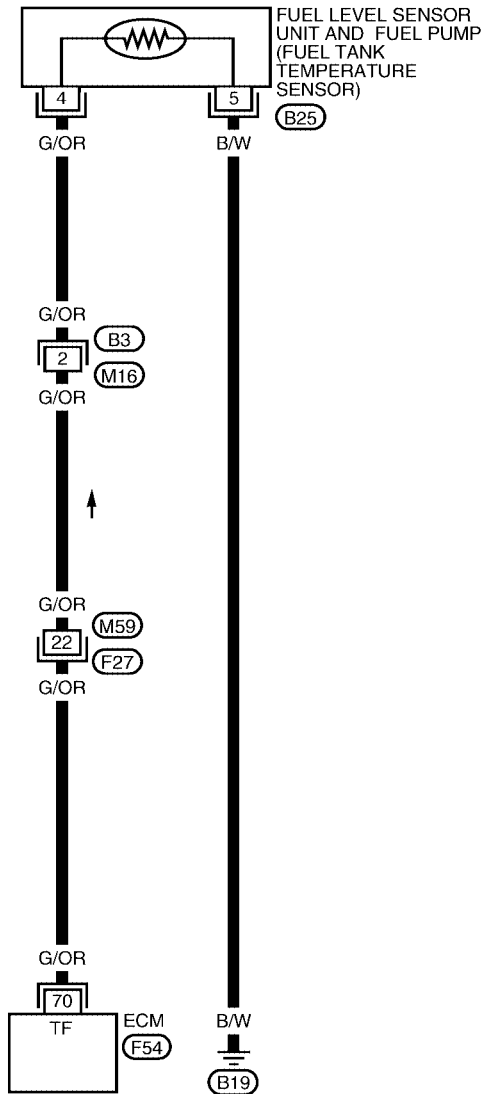
[QR25DE]

UBS002BS

## Wiring Diagram

EC-FTTS-01

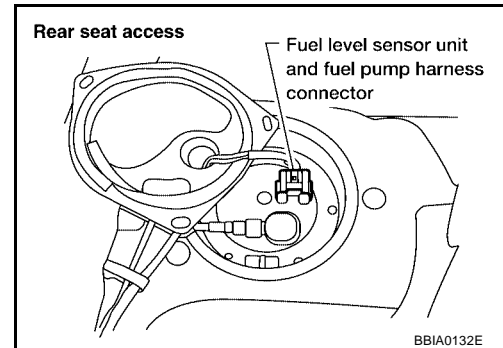
— : DETECTABLE LINE FOR DTC  
 — : NON-DETECTABLE LINE FOR DTC



BBWA0221E

**Diagnostic Procedure****1. CHECK POWER SUPPLY**

1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Turn ignition switch "ON".

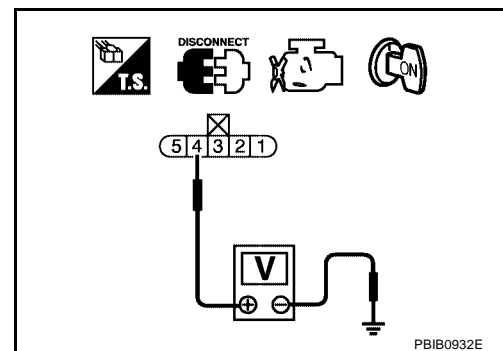


4. Check voltage between fuel level sensor unit and fuel pump terminal 4 and body ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 3.  
 NG >> GO TO 2.

**2. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors B3, M16
- Harness connectors M59, F27
- Harness for open or short between ECM and fuel level sensor unit and fuel pump

>> Repair harness or connector.

**3. CHECK GROUND CIRCUIT**

1. Turn ignition switch "OFF".
2. Check harness continuity between fuel level sensor unit and fuel pump terminal 5 and body ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.  
 NG >> Repair open circuit or short to power in harness or connectors.

**4. CHECK FUEL TANK TEMPERATURE SENSOR**

Refer to [EC-1460, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 5.  
 NG >> Replace fuel tank temperature sensor.

**5. CHECK INTERMITTENT INCIDENT**

Perform [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

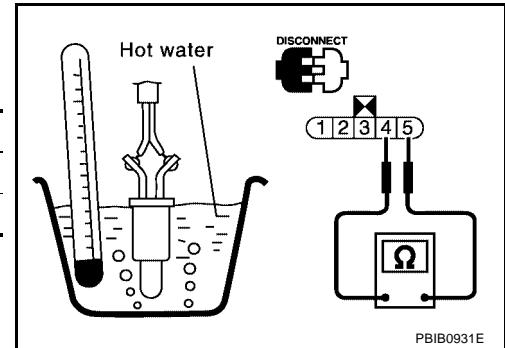
### Component Inspection FUEL TANK TEMPERATURE SENSOR

UBS002BU

1. Remove fuel level sensor unit.
2. Check resistance between fuel level sensor unit and fuel pump terminals 4 and 5 by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

If NG, replace fuel level sensor unit.



PBIB0931E

### Removal and Installation FUEL TANK TEMPERATURE SENSOR

UBS002BV

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

[QR25DE]

## DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

PFP:00019

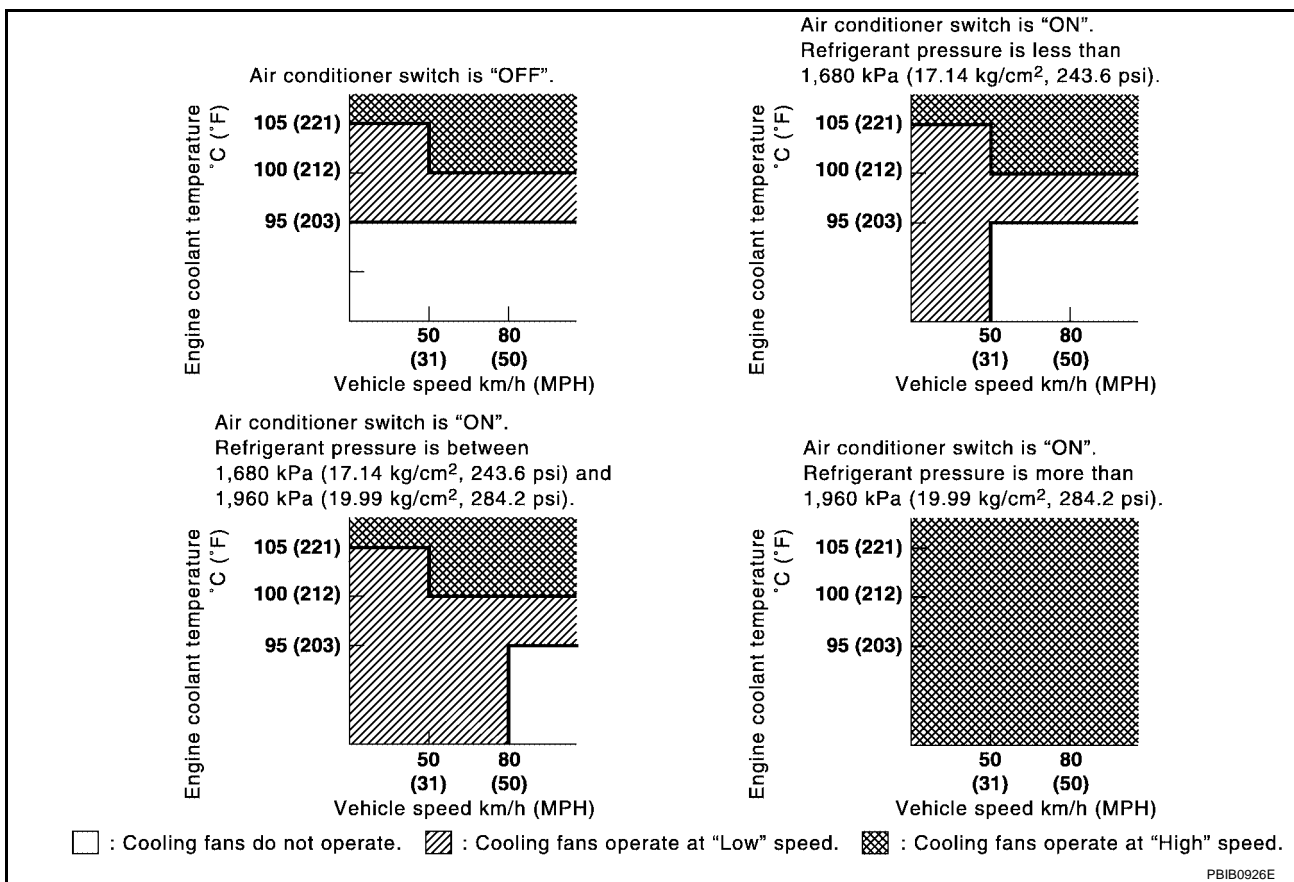
### System Description COOLING FAN CONTROL

UBS002BW

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed sensor	Vehicle speed	Cooling fan control	Cooling fan relay(s)
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner "ON" signal		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

### OPERATION



### CONSULT-II Reference Value in Data Monitor Mode

UBS002BX

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF
		Air conditioner switch: ON (Compressor operates.)
		OFF
		ON

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

[QR25DE]

MONITOR ITEM	CONDITION		SPECIFICATION
COOLING FAN	<ul style="list-style-type: none"> <li>● Engine: After warming up, idle the engine</li> <li>● Air conditioner switch: OFF</li> </ul>	Engine coolant temperature is 94°C (201°F) or less	OFF
		Engine coolant temperature is between 95°C (203°F) and 104°C (219°F)	LOW
		Engine coolant temperature is 105°C (221°F) or more	HIGH

## On Board Diagnosis Logic

UBS002BY

This diagnosis checks whether the engine coolant temperature is extraordinary high, even when the load is not heavy.

When malfunction is detected, the malfunction indicator lamp (MIL) will light up even in the first trip.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0217 0217	Engine coolant over temperature condition	Engine coolant temperature is excessively high under normal engine speed.	<ul style="list-style-type: none"> <li>● Harness or connectors (The cooling fan circuit is open or shorted)</li> <li>● Cooling fan</li> <li>● Thermostat</li> <li>● Improper ignition timing</li> <li>● Engine coolant temperature sensor</li> <li>● Blocked radiator</li> <li>● Blocked front end (Improper fitting of nose mask)</li> <li>● Crushed vehicle frontal area (Vehicle frontal is collided but not repaired)</li> <li>● Blocked air passage by improper installation of front fog lamp or fog lamps</li> <li>● Improper mixture ratio of coolant</li> <li>● Damaged bumper</li> </ul> <p>For more information, refer to <a href="#">EC-1473</a>, "<a href="#">Main 12 Causes of Overheating</a>".</p>

### CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to [MA-23](#), "[Changing Engine Coolant](#)". Also, replace the engine oil. Refer to [LU-17](#), "[Changing Engine Oil](#)".

1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to [MA-14](#), "[Anti-freeze Coolant Mixture Ratio](#)".
2. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

## Overall Function Check

UBS002BZ

Use this procedure to check the overall function of the coolant overtemperature enrichment protection check, a DTC might not be confirmed.

### WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high-pressure fluid escaping from the radiator.

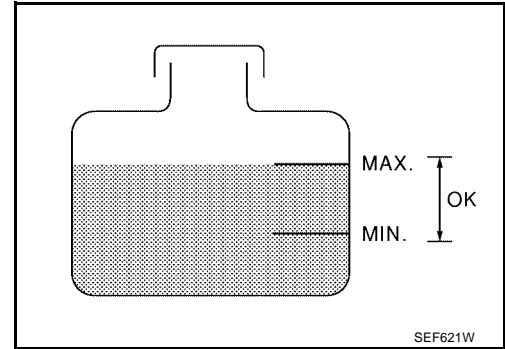
Wrap a thick cloth around the cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

## WITH CONSULT-II

1. Check the coolant level and mixture ratio (using coolant tester) in the reservoir tank and radiator.

**Allow engine to cool before checking coolant level and mixture ratio.**

- If the coolant level in the reservoir and/or radiator is below the proper range, go to [EC-1466, "Diagnostic Procedure"](#).
- If the coolant mixture ratio is out of the range of 45 to 55%, replace the coolant in the following procedure [MA-23, "Changing Engine Coolant"](#).



- a. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute like pouring coolant from a kettle. Be sure to use coolant with the proper mixture ratio. Refer to [MA-14, "Anti-freeze Coolant Mixture Ratio"](#).
- b. After refilling coolant, run engine to ensure that no water-flow noise is emitted.
- c. After checking or replacing coolant, go to step 3 below.
2. Ask the customer if engine coolant has been added. If it has been added, go to [EC-1466, "Diagnostic Procedure"](#). After repair, go to the next step.
3. Start engine and let it idle.
4. Make sure that A/C switch is "OFF" and air conditioner is not operating. If NG, check air conditioner circuit. Refer to [MTC-19, "TROUBLE DIAGNOSIS"](#). After repair, go to the next step.
5. Perform "ENG COOLANT TEMP" in "ACTIVE TEST" mode with CONSULT-II at idle.
  - a. Set "ENG COOLANT TEMP" to 95°C (203°F) and make sure that cooling fan operates at low speed. If NG, go to [EC-1466, "Diagnostic Procedure"](#).
  - b. Set "ENG COOLANT TEMP" to 105°C (221°F) and make sure that cooling fan operates at high speed. If NG, go to [EC-1466, "Diagnostic Procedure"](#). After repair, go to the next step.
6. Check for blocked coolant passage.
  - a. Warm up engine to normal operating temperature, then grasp radiator upper hose and lower hose and make sure that coolant flows. If NG, go to [EC-1466, "Diagnostic Procedure"](#). After repair, go to the next step. **Be extremely careful not to touch any moving or adjacent parts.**
7. Check for blocked radiator air passage.
  - a. When market fog lamps have been installed, check for damaged fans and clogging in the condenser and radiator.
  - b. Check the front end for clogging caused by insects or debris.
  - c. Check for improper fitting of front-end cover, damaged radiator grille or bumper, damaged vehicle front. If NG, take appropriate action and then go to the next step.
8. Check function of ECT sensor. Refer to [EC-1390, "Component Inspection"](#). If NG, replace ECT sensor and go to the next step.
9. Check ignition timing. Refer to [EC-1291, "Basic Inspection"](#). Make sure that ignition timing is 15°±5° at idle. If NG, refer to [EC-1291, "Basic Inspection"](#), and then recheck.

## WITH GST

1. Check the coolant level and mixture ratio (using coolant tester) in the reservoir tank and radiator. **Allow engine to cool before checking coolant level and mixture ratio.**
  - If the coolant level in the reservoir and/or radiator is below the proper range, and go to [EC-1466, "Diagnostic Procedure"](#).
  - If the coolant mixture ratio is out of the range of 45 to 55%, replace the coolant in the following procedure [MA-23, "Changing Engine Coolant"](#).
- a. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute like pouring coolant from a kettle. Be sure to use coolant with the proper mixture ratio. Refer to [MA-14, "Anti-freeze Coolant Mixture Ratio"](#).
- b. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

## DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

[QR25DE]

- c. After checking or replacing coolant, go to step 3 below.
2. Ask the customer if engine coolant has been added. If it has been added, go to [EC-1466, "Diagnostic Procedure"](#) . After repair, go to the next step.
3. Start engine and let it idle.
4. Make sure that A/C switch is "OFF" and air conditioner is not operating. If NG, check air conditioner circuit. Refer to [MTC-19, "TROUBLE DIAGNOSIS"](#) . After repair, go to the next step.
5. Turn ignition switch "OFF".
6. Disconnect engine coolant temperature sensor harness connector.
7. Connect 150Ω resistor to engine coolant temperature sensor.
8. Start engine and make sure that cooling fan operates.  
**Be careful not to overheat engine.**  
If NG, go to [EC-1466, "Diagnostic Procedure"](#) . After repair, go to the next step.
9. Check for blocked coolant passage.
  - a. Warm up engine to normal operating temperature, then grasp radiator upper hose and lower hose and make sure that coolant flows.  
If NG, go to [EC-1466, "Diagnostic Procedure"](#) . After repair, go to the next step.  
**Be extremely careful not to touch any moving or adjacent parts.**
10. Check for blocked radiator air passage.
  - a. When market fog lamps have been installed, check for damaged fans and clogging in the condenser and radiator.
  - b. Check the front end for clogging caused by insects or debris.
  - c. Check for improper fitting of front-end cover, damaged radiator grille or bumper, damaged vehicle front.  
If NG, take appropriate action and then go to the next step.
11. Check function of ECT sensor.  
Refer to [EC-1390, "Component Inspection"](#) .  
If NG, replace ECT sensor and go to the next step.
12. Check ignition timing. Refer to [EC-1291, "Basic Inspection"](#) .  
Make sure that ignition timing is  $15^{\circ} \pm 5^{\circ}$  at idle.  
If NG, refer to [EC-1291, "Basic Inspection"](#) , and then recheck.

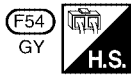
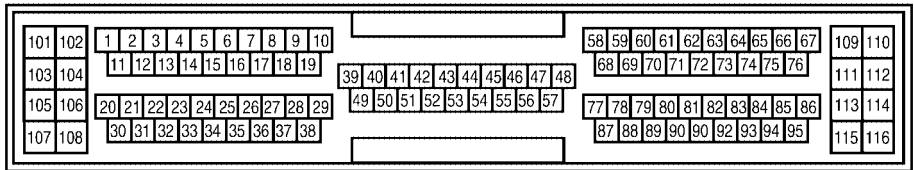
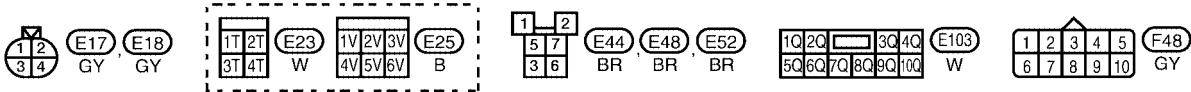
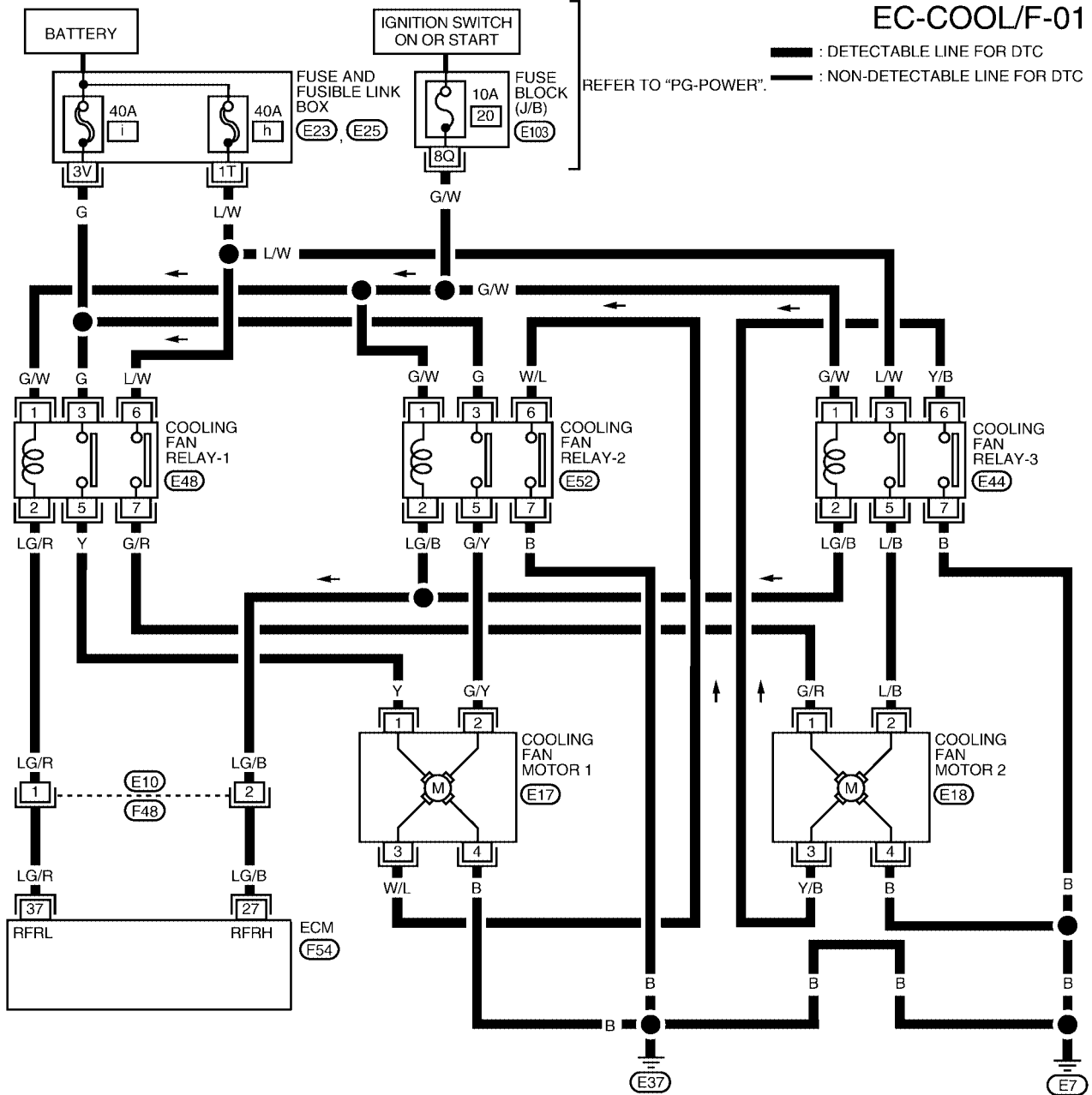


# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

[QR25DE]

UBS002C0

## Wiring Diagram



BBWA0431E

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

[QR25DE]

UBS002C1

## Diagnostic Procedure

### 1. INSPECTION START

Do you have CONSULT-II?

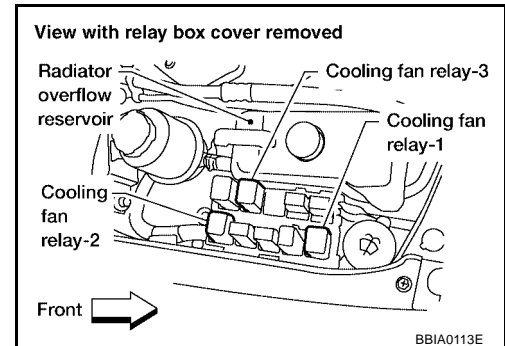
Yes or No

- Yes >> GO TO 2.
- No >> GO TO 4.

### 2. CHECK COOLING FAN LOW SPEED OPERATION

Ⓜ With CONSULT-II

1. Disconnect cooling fan relays-2 and -3.
2. Start engine and let it idle.



3. Select "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II and touch "LOW" on the CONSULT-II screen.
4. Make sure that cooling fans-1 and -2 operate at low speed.

OK or NG

- OK >> GO TO 3.
- NG >> Check cooling fan low speed control circuit. (Go to [EC-1470, "PROCEDURE A"](#).)

ACTIVE TEST	
COOLING FAN	LOW
MONITOR	
COOLAN TEMP/S	XXX °C

SEF784Z

### 3. CHECK COOLING FAN HIGH SPEED OPERATION

Ⓜ With CONSULT-II

1. Turn ignition switch "OFF".
2. Reconnect cooling fan relays-2 and -3.
3. Start engine and let it idle.
4. Select "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II and touch "HIGH" on the CONSULT-II screen.
5. Make sure that cooling fans-1 and -2 operate at high speed.

OK or NG

- OK >> GO TO 6.
- NG >> Check cooling fan high speed control circuit. (Go to [EC-1472, "PROCEDURE B"](#).)

ACTIVE TEST	
COOLING FAN	HIGH
MONITOR	
COOLAN TEMP/S	XXX °C

SEF785Z

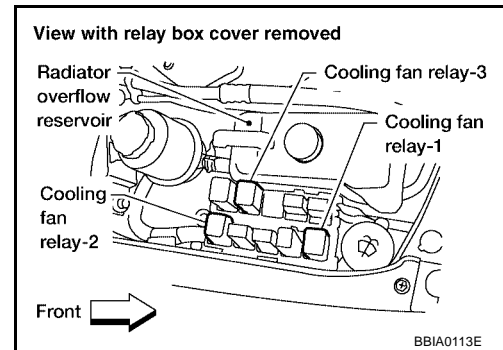
# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

[QR25DE]

## 4. CHECK COOLING FAN LOW SPEED OPERATION

### ⊗ Without CONSULT-II

1. Disconnect cooling fan relays-2 and -3.
2. Start engine and let it idle.
3. Turn air conditioner switch "ON".
4. Turn blower fan switch "ON".

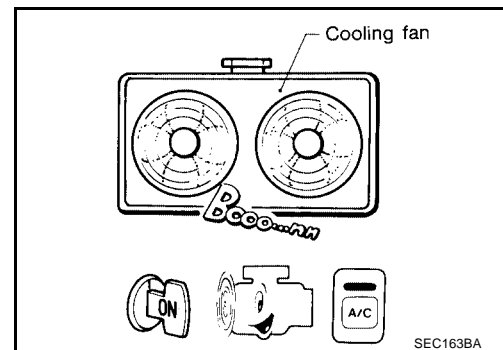


5. Make sure that cooling fans-1 and -2 operate at low speed.

### OK or NG

OK >> GO TO 5.

NG >> Check cooling fan low speed control circuit. (Go to [EC-1470, "PROCEDURE A"](#).)



## 5. CHECK COOLING FAN HIGH SPEED OPERATION

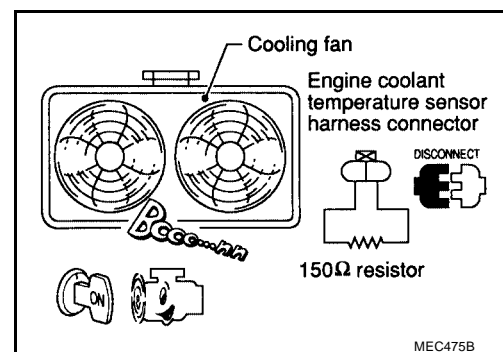
### ⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Reconnect cooling fan relays-2 and -3.
3. Turn air conditioner switch and blower fan switch "OFF".
4. Disconnect engine coolant temperature sensor harness connector.
5. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
6. Restart engine and make sure that cooling fans-1 and -2 operate at high speed.

### OK or NG

OK >> GO TO 6.

NG >> Check cooling fan high speed control circuit. (Go to [EC-1472, "PROCEDURE B"](#).)



## 6. CHECK COOLING SYSTEM FOR LEAK

Apply pressure to the cooling system with a tester, and check if the pressure drops.

**Testing pressure: 157 kPa (1.6 kg/cm<sup>2</sup> , 23 psi)**

**CAUTION:**

Higher than the specified pressure may cause radiator damage.

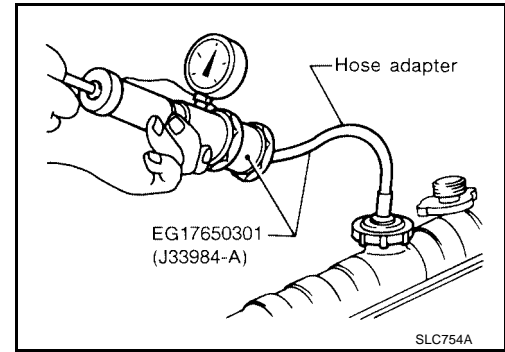
**Pressure should not drop.**

OK or NG

OK >> GO TO 7.

NG >> Check the following for leak.

- Hose
  - Radiator
  - Water pump
- Refer to [CO-26, "WATER PUMP"](#) .



## 7. CHECK RADIATOR CAP

Apply pressure to cap with a tester.

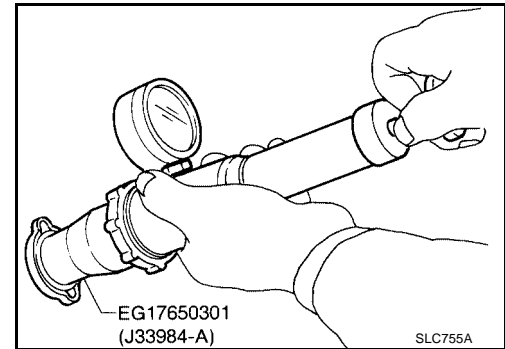
**Radiator cap relief pressure:**

**59 - 98 kPa (0.6 - 1.0 kg/cm<sup>2</sup> , 9 - 14 psi)**

OK or NG

OK >> GO TO 8.

NG >> Replace radiator cap.



## 8. CHECK THERMOSTAT

1. Check valve seating condition at normal room temperatures.  
**It should seat tightly.**
2. Check valve opening temperature and valve lift.

**Valve opening temperature: 82°C (180°F) [standard]**

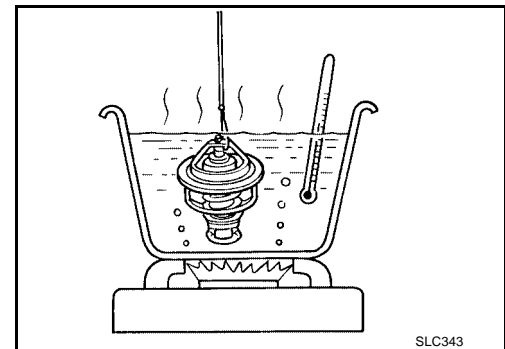
**Valve lift: More than 8 mm/95°C (0.31 in/203°F)**

3. Check if valve is closed at 5°C (9°F) below valve opening temperature.  
For details, refer to [CO-28, "THERMOSTAT AND THERMOSTAT HOUSING"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace thermostat.



## 9. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EC-1390, "Component Inspection"](#) .

OK or NG

OK >> GO TO 10.

NG >> Replace engine coolant temperature sensor.

---

**10. CHECK MAIN 12 CAUSES**

---

If the cause cannot be isolated, go to [EC-1473, "Main 12 Causes of Overheating"](#) .

>> INSPECTION END

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# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

[QR25DE]

## PROCEDURE A

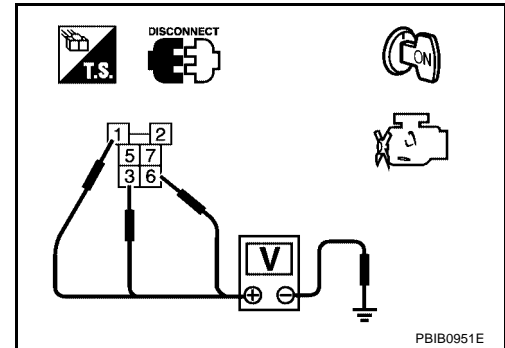
### 1. CHECK POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect cooling fan relay-1.
3. Turn ignition switch "ON".
4. Check voltage between cooling fan relay-1 terminals 1, 3, 6 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.  
NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- Fuse block (J/B) connector E103
- 40A fusible links
- Fuse and fusible link box connectors E23, E25
- Harness for open or short between cooling fan relay-1 and fuse
- Harness for open or short between cooling fan relay-1 and fusible links

>> Repair open circuit or short to ground or short to power in harness or connectors.

### 3. CHECK COOLING FAN MOTORS CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
3. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-1 terminal 1, cooling fan motor-1 terminal 4 and body ground. Refer to Wiring Diagram.

**Continuity should exist.**

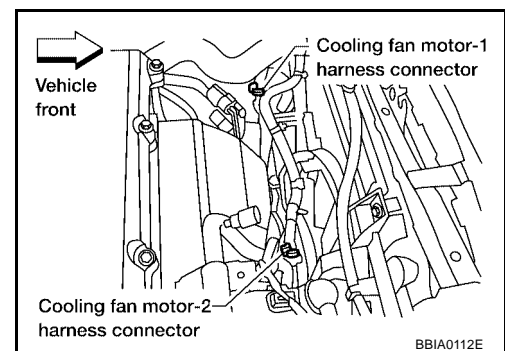
4. Also check harness for short to ground and short to power.
5. Check harness continuity between cooling fan relay-1 terminal 7 and cooling fan motor-2 terminal 1, cooling fan motor-2 terminal 4 and body ground. Refer to Wiring Diagram.

**Continuity should exist.**

6. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.  
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



---

#### 4. CHECK OUTPUT SIGNAL CIRCUIT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 37 and cooling fan relay-1 terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
NG >> GO TO 5.

---

#### 5. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors E10, F48
- Harness for open or short between cooling fan relay-1 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

#### 6. CHECK COOLING FAN RELAY-1

---

Refer to [EC-1474, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.  
NG >> Replace cooling fan relay.

---

#### 7. CHECK COOLING FAN MOTORS-1 AND -2

---

Refer to [EC-1474, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.  
NG >> Replace cooling fan motors.

---

#### 8. CHECK INTERMITTENT INCIDENT

---

Perform [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

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# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

[QR25DE]

## PROCEDURE B

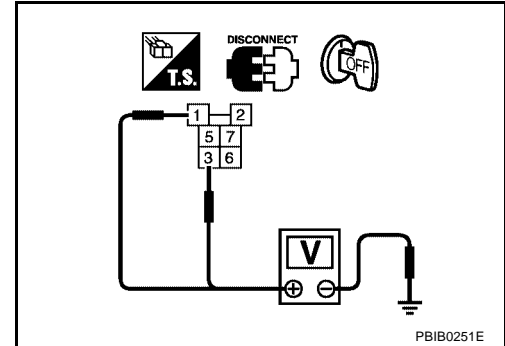
### 1. CHECK POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect cooling fan relays-2 and -3.
3. Turn ignition switch "ON".
4. Check voltage between cooling fan relays-2 and -3 terminals 1, 3 and body ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.  
NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between cooling fan relays-2 and -3 and fuse
- Harness for open or short between cooling fan relays-2 and -3 and fusible links

>> Repair harness or connectors.

### 3. CHECK COOLING FAN MOTORS CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
3. Check harness continuity between the following;  
cooling fan relay-2 terminal 5 and cooling fan motor-1 terminal 2,  
cooling fan relay-2 terminal 6 and cooling fan motor-1 terminal 3,  
cooling fan relay-2 terminal 7 and body ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

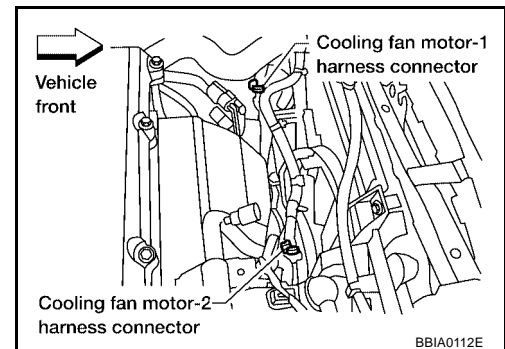
4. Also check harness for short to ground and short to power.
5. Check harness continuity between the following;  
cooling fan relay-3 terminal 5 and cooling fan motor-2 terminal 2,  
cooling fan relay-3 terminal 6 and cooling fan motor-2 terminal 3,  
cooling fan relay-3 terminal 7 and body ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

6. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.  
NG >> Repair open circuit or short to ground or short to power in harness or connectors.





## 4. CHECK OUTPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 27 and cooling fan relay-2 terminal 2, cooling fan relay-3 terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
NG >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E10, F48
- Harness for open or short between cooling fan relays-2, -3 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 6. CHECK COOLING FAN RELAYS-2 AND -3

Refer to [EC-1474, "COOLING FAN RELAYS-1, -2 AND -3"](#) .

OK or NG

- OK >> GO TO 7.  
NG >> Replace cooling fan relays.

## 7. CHECK COOLING FAN MOTORS

Refer to [EC-1474, "COOLING FAN MOTORS-1 AND -2"](#) .

OK or NG

- OK >> GO TO 8.  
NG >> Replace cooling fan motors.

## 8. CHECK INTERMITTENT INCIDENT

Perform [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

## Main 12 Causes of Overheating

UBS002C2

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> <li>● Blocked radiator</li> <li>● Blocked condenser</li> <li>● Blocked radiator grille</li> <li>● Blocked bumper</li> </ul>	<ul style="list-style-type: none"> <li>● Visual</li> </ul>	No blocking	—
	2	<ul style="list-style-type: none"> <li>● Coolant mixture</li> </ul>	<ul style="list-style-type: none"> <li>● Coolant tester</li> </ul>	50 - 50% coolant mixture	See <a href="#">MA-14, "Anti-freeze Coolant Mixture Ratio"</a> .
	3	<ul style="list-style-type: none"> <li>● Coolant level</li> </ul>	<ul style="list-style-type: none"> <li>● Visual</li> </ul>	Coolant up to MAX level in reservoir tank and radiator filler neck	See <a href="#">MA-23, "Changing Engine Coolant"</a> .
	4	<ul style="list-style-type: none"> <li>● Radiator cap</li> </ul>	<ul style="list-style-type: none"> <li>● Pressure tester</li> </ul>	59 - 98 kPa (0.6 - 1.0 kg/cm <sup>2</sup> , 9 - 14 psi) (Limit)	See <a href="#">CO-34, "CHECKING RADIATOR CAP"</a> .

# DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

[QR25DE]

Engine	Step	Inspection item	Equipment	Standard	Reference page
ON*2	5	● Coolant leaks	● Visual	No leaks	See <a href="#">CO-24, "CHECKING COOLING SYSTEM FOR LEAKS"</a> .
ON*2	6	● Thermostat	● Touch the upper and lower radiator hoses	Both hoses should be hot	See <a href="#">CO-28, "THERMOSTAT AND THERMOSTAT HOUSING"</a> , and <a href="#">CO-30, "RADIATOR"</a> .
ON*1	7	● Cooling fan	● CONSULT-II	Operating	See trouble diagnosis for DTC P0217 ( <a href="#">EC-1461</a> ) .
OFF	8	● Combustion gas leak	● Color checker chemical tester 4 Gas analyzer	Negative	—
ON*3	9	● Coolant temperature gauge	● Visual	Gauge less than 3/4 when driving	—
		● Coolant overflow to reservoir tank	● Visual	No overflow during driving and idling	See <a href="#">MA-23, "Changing Engine Coolant"</a> .
OFF*4	10	● Coolant return from reservoir tank to radiator	● Visual	Should be initial level in reservoir tank	See <a href="#">CO-24, "CHECKING RESERVOIR LEVEL"</a> .
OFF	11	● Cylinder head	● Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See <a href="#">EM-145, "CYLINDER HEAD"</a> .
	12	● Cylinder block and pistons	● Visual	No scuffing on cylinder walls or piston	See <a href="#">EM-145, "CYLINDER HEAD"</a> .

\*1: Turn the ignition switch ON.

\*2: Engine running at 3,000 rpm for 10 minutes.

\*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

\*4: After 60 minutes of cool down time.

For more information, refer to [CO-22, "OVERHEATING CAUSE ANALYSIS"](#) .

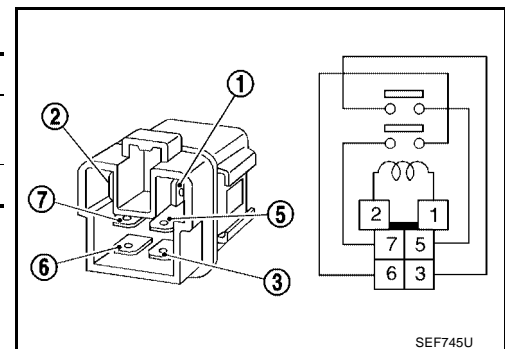
## Component Inspection COOLING FAN RELAYS-1, -2 AND -3

UBS002C3

Check continuity between terminals 3 and 5, 6 and 7.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

If NG, replace relay.



SEF745U

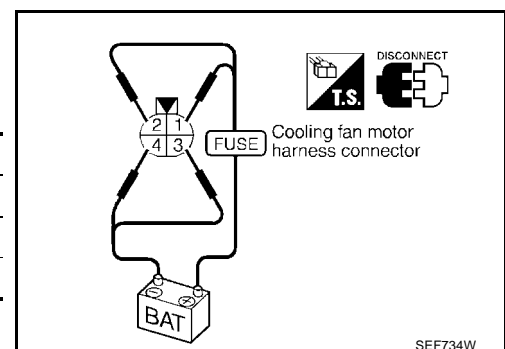
## COOLING FAN MOTORS-1 AND -2

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

	Speed	Terminals	
		(+)	(-)
Cooling fan motor	Low	1	4
	High	1, 2	3, 4

**Cooling fan motor should operate.**

If NG, replace cooling fan motor.



SEF734W

DTC P0222, P0223 TP SENSOR

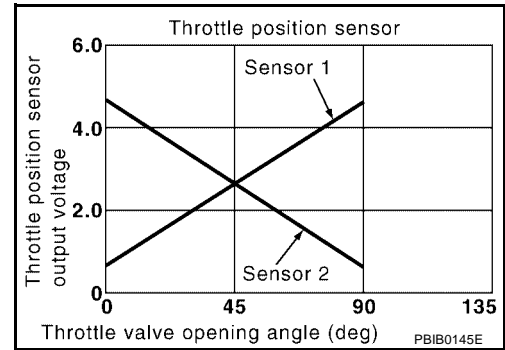
PF1:16119

Component Description

UBS0055P

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

UBS0055Q

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1	<ul style="list-style-type: none"> <li>Ignition switch: ON (Engine stopped)</li> <li>Shift lever: D (A/T model) 1st (M/T model)</li> </ul>	Accelerator pedal: Fully released	More than 0.36V
THRTL SEN2★		Accelerator pedal: Fully depressed	Less than 4.75V

★: Throttle position sensor2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

UBS0055R

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222 0222	Throttle position sensor 1 circuit low input	An excessively low voltage from the TP sensor 1 is sent to ECM.	<ul style="list-style-type: none"> <li>Harness or connectors (The TP sensor 1 circuit is open or shorted.)</li> <li>Electric throttle control actuator (TP sensor 1)</li> </ul>
P0223 0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

DTC Confirmation Procedure

UBS0055S

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

# DTC P0222, P0223 TP SENSOR

[QR25DE]

## WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-1478, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

## WITH GST

Follow the procedure "WITH CONSULT-II" above.

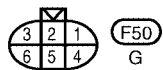
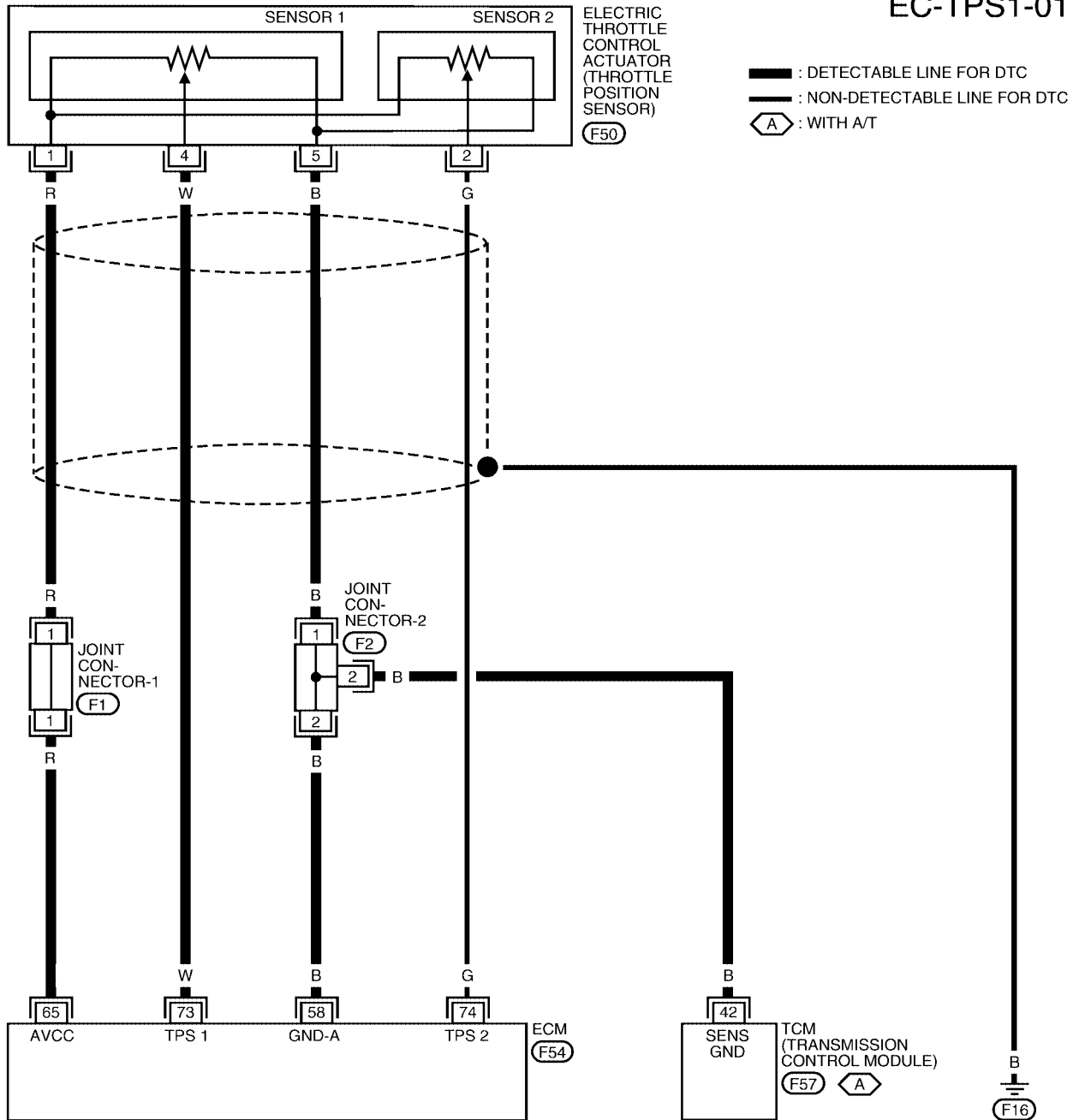
# DTC P0222, P0223 TP SENSOR

[QR25DE]

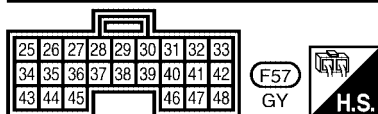
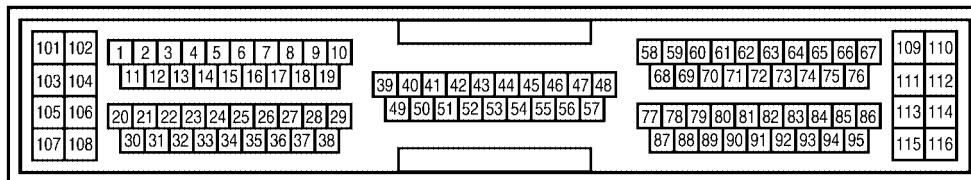
UBS0055T

## Wiring Diagram

EC-TPS1-01



REFER TO THE FOLLOWING.  
 (F1), (F2) - JOINT CONNECTOR



BBWA0236E

# DTC P0222, P0223 TP SENSOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 0V
65	R	Sensors' power supply	<b>[Ignition switch "ON"]</b>	Approximately 5V
73	W	Throttle position sensor 1	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position: "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully released</li> </ul>	More than 0.36V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position: "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully depressed</li> </ul>	Less than 4.75V
74	G	Throttle position sensor 2	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position: "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully released</li> </ul>	Less than 4.75V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position: "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully depressed</li> </ul>	More than 0.36V

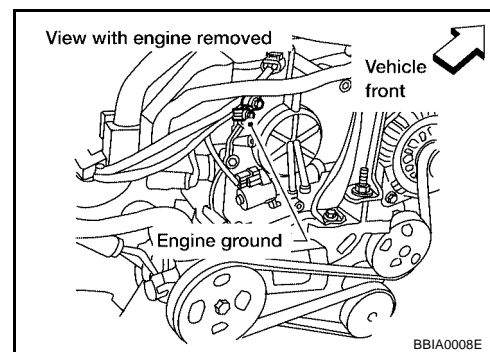
## Diagnostic Procedure

UBS0055U

### 1. RETIGHTEN GROUND SCREWS

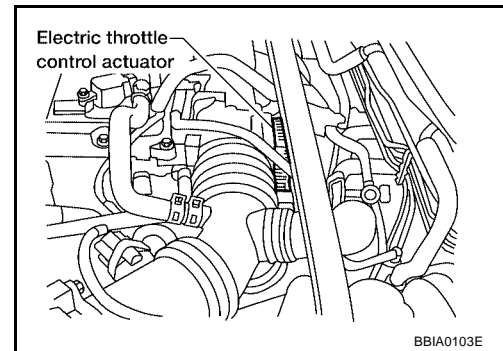
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

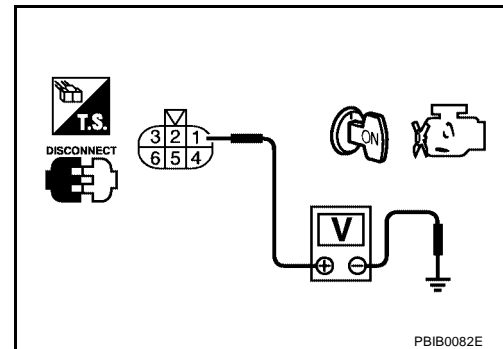


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 4.  
NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-1
- Harness for open or short between electric throttle control actuator and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between electric throttle control actuator terminal 5 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
NG >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-2
- Harness for open or short between electric throttle control actuator and ECM
- Harness for open or short between electric throttle control actuator and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 73 and electric throttle control actuator terminal 4. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**7. CHECK THROTTLE POSITION SENSOR**

Refer to [EC-1480, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 8.

**8. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-1255, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**9. CHECK INTERMITTENT INCIDENT**

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

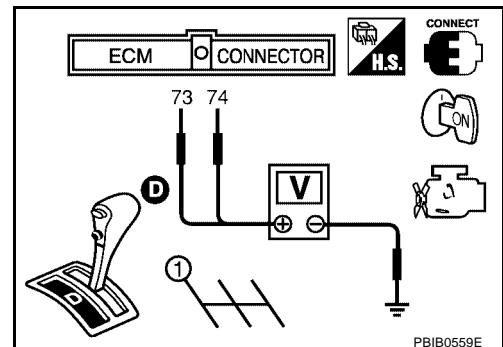
**Component Inspection  
THROTTLE POSITION SENSOR**

UBS0055V

1. Reconnect all harness connectors disconnected.
2. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 73 (TP sensor 1), 74 (TP sensor 2) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
73 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
74 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-1255, "Idle Air Volume Learning"](#) .



**Removal and Installation  
ELECTRIC THROTTLE CONTROL ACTUATOR**

UBS0055W

Refer to [EM-105, "INTAKE MANIFOLD"](#) .



# DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

[QR25DE]

## DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

PFP:00000

### On Board Diagnosis Logic

UBS002D0

When a misfire occurs, engine speed will fluctuate. If the engine speed fluctuates enough to cause the crankshaft position (CKP) sensor (POS) signal to vary, ECM can determine that a misfire is occurring.

Sensor	Input Signal to ECM	ECM function
Crankshaft position sensor (POS)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

- One Trip Detection Logic (Three Way Catalyst Damage)**  
 On the first trip that a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.  
 When a misfire condition occurs, the ECM monitors the CKP sensor (POS) signal every 200 engine revolutions for a change.  
 When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off.  
 If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink.  
 When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on.  
 If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.
- Two Trip Detection Logic (Exhaust quality deterioration)**  
 For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MIL will only light when the misfire is detected on a second trip. During this condition, the ECM monitors the CKP sensor signal every 1,000 engine revolutions.  
 A misfire malfunction can be detected on any one cylinder or on multiple cylinders.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0300 0300	Multiple cylinder misfire detected	Multiple cylinder misfire.	<ul style="list-style-type: none"> <li>● Improper spark plug</li> <li>● Insufficient compression</li> </ul>
P0301 0301	No.1 cylinder misfire detected	No. 1 cylinder misfires.	<ul style="list-style-type: none"> <li>● Incorrect fuel pressure</li> <li>● The injector circuit is open or shorted</li> </ul>
P0302 0302	No. 2 cylinder misfire detected	No. 2 cylinder misfires.	<ul style="list-style-type: none"> <li>● Fuel injectors</li> <li>● Intake air leak</li> </ul>
P0303 0303	No. 3 cylinder misfire detected	No. 3 cylinder misfires.	<ul style="list-style-type: none"> <li>● The ignition signal circuit is open or shorted</li> </ul>
P0304 0304	No. 4 cylinder misfire detected	No. 4 cylinder misfires.	<ul style="list-style-type: none"> <li>● Lack of fuel</li> <li>● Drive plate or flywheel</li> <li>● Heated oxygen sensor 1</li> <li>● Incorrect PCV hose connection</li> </ul>

### DTC Confirmation Procedure

UBS002D1

#### CAUTION:

Always drive vehicle at a safe speed.

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### WITH CONSULT-II

- Turn ignition switch "ON", and select "DATA MONITOR" mode with CONSULT-II.
- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.

# DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

[QR25DE]

4. Start engine again and drive at 1,500 to 3,000 rpm for at least 3 minutes.  
**Hold the accelerator pedal as steady as possible.**  
**NOTE:**  
**Refer to the freeze frame data for the test driving conditions.**
5. If 1st trip DTC is detected, go to [EC-1482, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

PBIB0164E

## WITH GST

Follow the procedure "WITH CONSULT-II" above.

## Diagnostic Procedure

UBS002D2

### 1. CHECK FOR INTAKE AIR LEAK

1. Start engine and run it at idle speed.
2. Listen for the sound of the intake air leak.
3. Check PCV hose connection.

OK or NG

- OK >> GO TO 2.
- NG >> Discover air leak location and repair.

### 2. CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace it.

## 3. PERFORM POWER BALANCE TEST

### With CONSULT-II

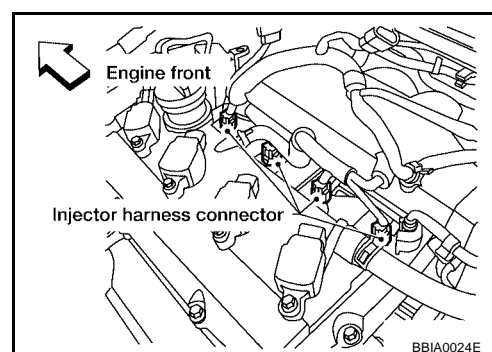
1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

### Without CONSULT-II

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?



#### Yes or No

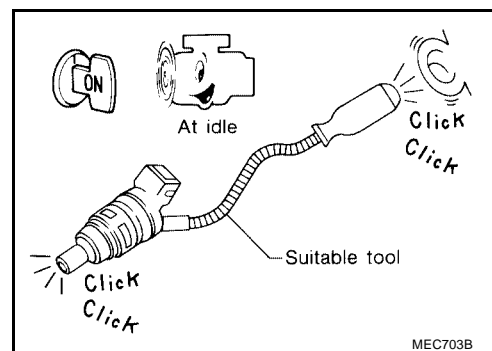
- Yes >> GO TO 4.  
 No >> GO TO 7.

## 4. CHECK INJECTOR

Does each injector make an operating sound at idle?

#### Yes or No

- Yes >> GO TO 5.  
 No >> Check injector(s) and circuit(s). Refer to [EC-1796](#), "[INJECTOR CIRCUIT](#)".

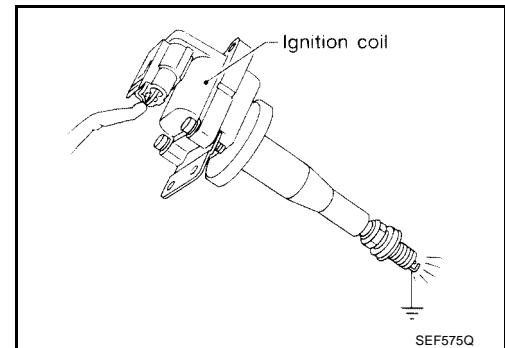


## 5. CHECK IGNITION SPARK

1. Disconnect ignition coil assembly from rocker cover.
2. Connect a known good spark plug to the ignition coil assembly.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

### OK or NG

- OK >> GO TO 6.  
NG >> Check ignition coil, power transistor and their circuits.  
Refer to [EC-1777, "IGNITION SIGNAL"](#) .

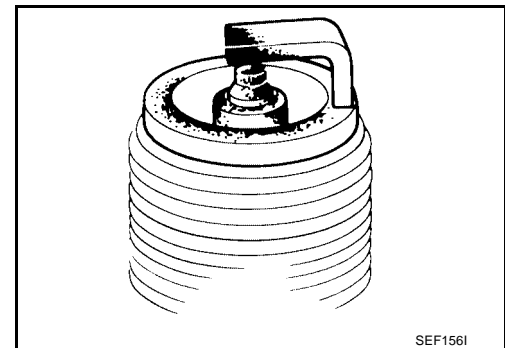


## 6. CHECK SPARK PLUGS

Remove the spark plugs and check for fouling, etc.

### OK or NG

- OK >> GO TO 7.  
NG >> Repair or replace spark plug(s) with standard type one(s). For spark plug type, refer to [MA-27, "Changing Spark Plugs \(Double Platinum - Tipped Type\)"](#) .



## 7. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to [EM-145, "CHECKING COMPRESSION PRESSURE"](#) .

<b>Standard:</b>	<b>1,190 kPa (12.1 kg/cm<sup>2</sup> , 172 psi)/250 rpm</b>
<b>Minimum:</b>	<b>990 kPa (10.1 kg/cm<sup>2</sup> , 144 psi)/250 rpm</b>
<b>Difference between each cylinder:</b>	<b>98 kPa (1.0 kg/cm<sup>2</sup> , 14 psi)/250 rpm</b>

### OK or NG

- OK >> GO TO 8.  
NG >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

## 8. CHECK FUEL PRESSURE

1. Install all removed parts.
2. Release fuel pressure to zero. Refer to [EC-1257, "FUEL PRESSURE RELEASE"](#) .
3. Install fuel pressure gauge and check fuel pressure. Refer to [EC-1257, "Fuel Pressure Check"](#) .

**At idle: Approx. 350 kPa (3.57 kg/cm<sup>2</sup> , 51 psi)**

### OK or NG

- OK >> GO TO 9.  
NG >> Follow the construction of "FUEL PRESSURE CHECK".

## 9. CHECK IGNITION TIMING

Check the following items. Refer to [EC-1291, "Basic Inspection"](#) .

Items	Specifications	
Target idle speed	A/T	700 ± 50 rpm (in "P" or "N" position)
	M/T	700 ± 50 rpm
Ignition timing	A/T	15 ± 5° BTDC (in "P" or "N" position)
	M/T	15 ± 5° BTDC

OK or NG

- OK >> GO TO 10.
- NG >> Follow the "Basic Inspection".

## 10. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-1410, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 12.
- NG >> GO TO 11.

## 11. CHECK MASS AIR FLOW SENSOR

 **With CONSULT-II**

Check mass air flow sensor signal in "DATA MONITOR" mode with CONSULT-II.

- 1.4 - 4.0 g-m/sec: at idling**
- 4.0 - 10.0 g-m/sec: at 2,500 rpm**

 **With GST**

Check mass air flow sensor signal in MODE 1 with GST.

- 1.4 - 4.0 g-m/sec: at idling**
- 4.0 - 10.0 g-m/sec: at 2,500 rpm**

OK or NG

- OK >> GO TO 12.
- NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to [EC-1375, "DTC P0102, P0103 MAF SENSOR"](#) .

## 12. CHECK SYMPTOM MATRIX CHART

Check items on the rough idle symptom in [EC-1295, "Symptom Matrix Chart"](#) .

OK or NG

- OK >> GO TO 13.
- NG >> Repair or replace.

## 13. ERASE THE 1ST TRIP DTC

Some tests may cause a 1st trip DTC to be set.

Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to [EC-1273, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) .

>> GO TO 14.

## 14. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

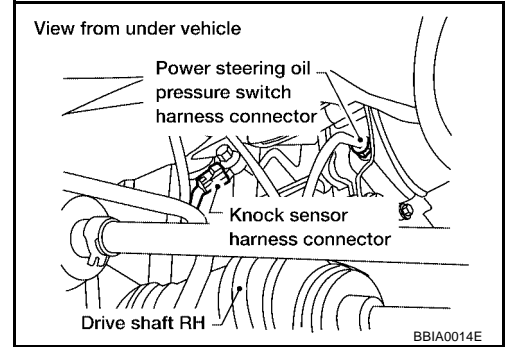
>> **INSPECTION END**

**DTC P0327, P0328 KS**

**Component Description**

UBS002D3

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.



**On Board Diagnosis Logic**

UBS002D4

The MIL will not light for knock sensor malfunction.

DTC No.	Trouble Diagnosis Name	DTC Detected Condition	Possible Cause
P0327 0327	Knock sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Knock sensor</li> </ul>
P0328 0328	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

**DTC Confirmation Procedure**

UBS002D5

**NOTE:**

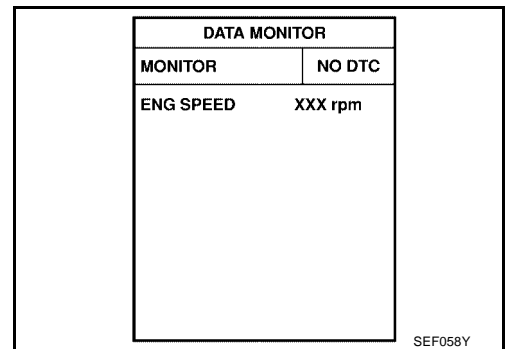
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and run it for at least 5 seconds at idle speed.
3. If 1st trip DTC is detected, go to [EC-1488, "Diagnostic Procedure"](#).



**WITH GST**

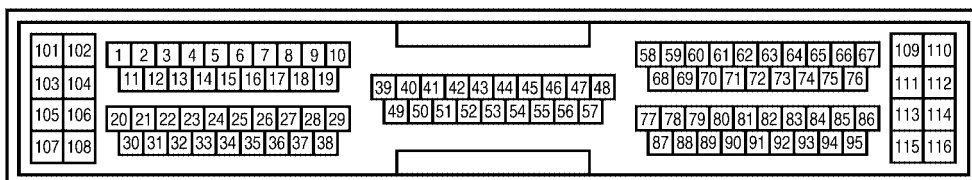
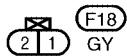
Follow the procedure "WITH CONSULT-II" above.

Wiring Diagram

EC-KS-01

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

— : DETECTABLE LINE FOR DTC  
— : NON-DETECTABLE LINE FOR DTC



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	W	Knock sensor	<b>[Engine is running]</b> ● Idle speed	Approximately 2.5V

**Diagnostic Procedure**

UBS002D7

**1. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-I**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check resistance between ECM terminal 82 and engine ground. Refer to Wiring Diagram.

**NOTE:**

**It is necessary to use an ohmmeter which can measure more than 10 MΩ.**

**Resistance: Approximately 530 - 590kΩ [at 20°C (68°F)]**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.  
NG >> GO TO 2.

**2. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-II**

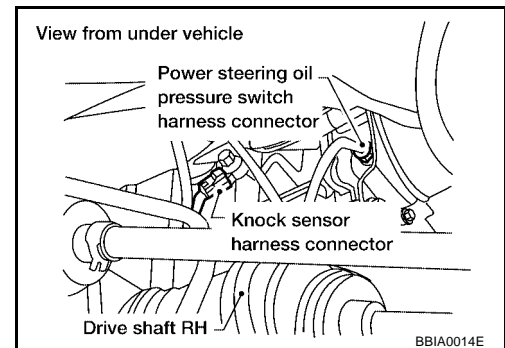
1. Disconnect knock sensor harness connector.
2. Check harness continuity between ECM terminal 82 and knock sensor terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 3.  
NG >> Repair open circuit or short to ground or short to power  
in harness or connectors.

**3. CHECK KNOCK SENSOR**

Refer to [EC-1489, "Component Inspection"](#).

OK or NG

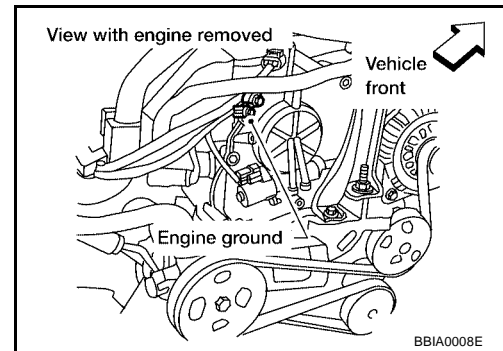
- OK >> GO TO 5.  
NG >> Replace knock sensor.



## 4. RETIGHTEN GROUND SCREWS

Loosen and retighten engine ground screws.

>> GO TO 5.



## 5. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection KNOCK SENSOR

Check resistance between knock sensor terminal 1 and ground.

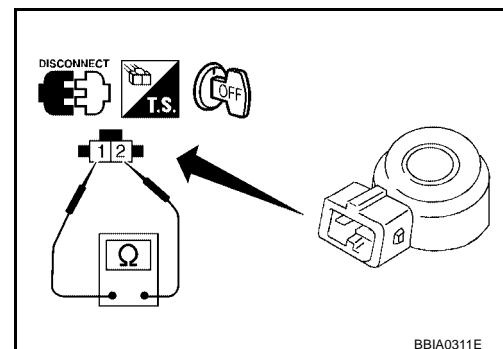
#### NOTE:

It is necessary to use an ohmmeter which can measure more than 10 M $\Omega$ .

**Resistance: Approximately 530 - 590k $\Omega$  [at 20°C (68°F)]**

#### CAUTION:

Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.



### Removal and Installation KNOCK SENSOR

Refer to [EM-160, "CYLINDER BLOCK"](#) .

## DTC P0335 CKP SENSOR (POS)

PFP:23731

### Component Description

UBS002DA

The crankshaft position sensor (POS) is located on the oil pan facing the gear teeth (cogs) of the signal plate. It detects the fluctuation of the engine revolution.

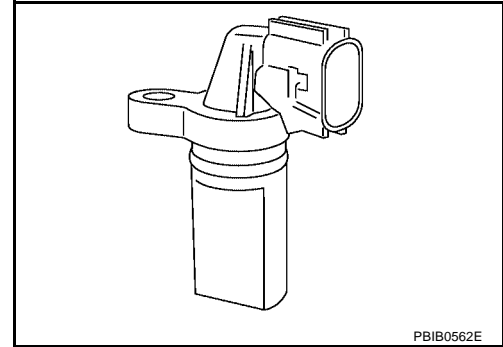
The sensor consists of a permanent magnet and Hall IC.

When the engine is running, the high and low parts of the teeth cause the gap with the sensor change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.



### CONSULT-II Reference Value in Data Monitor Mode

UBS002DB

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
ENG SPEED	<ul style="list-style-type: none"> <li>● Tachometer: Connect</li> <li>● Run engine and compare tachometer indication with the CONSULT-II value.</li> </ul>	Almost the same speed as the CONSULT-II value.

### On Board Diagnosis Logic

UBS002DC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335 0335	Crankshaft position sensor (POS) circuit	<ul style="list-style-type: none"> <li>● The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking.</li> <li>● The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running.</li> <li>● The crankshaft position sensor (POS) signal is not in the normal pattern during engine running.</li> </ul>	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Crankshaft position sensor (POS)</li> <li>● Signal plate</li> </ul>

### DTC Confirmation Procedure

UBS002DD

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

**Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch "ON".**

#### WITH CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
3. If 1st trip DTC is detected, go to [EC-1492, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### WITH GST

Follow the procedure "WITH CONSULT-II" above.

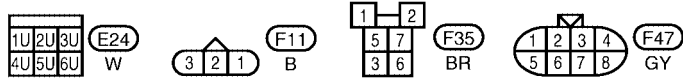
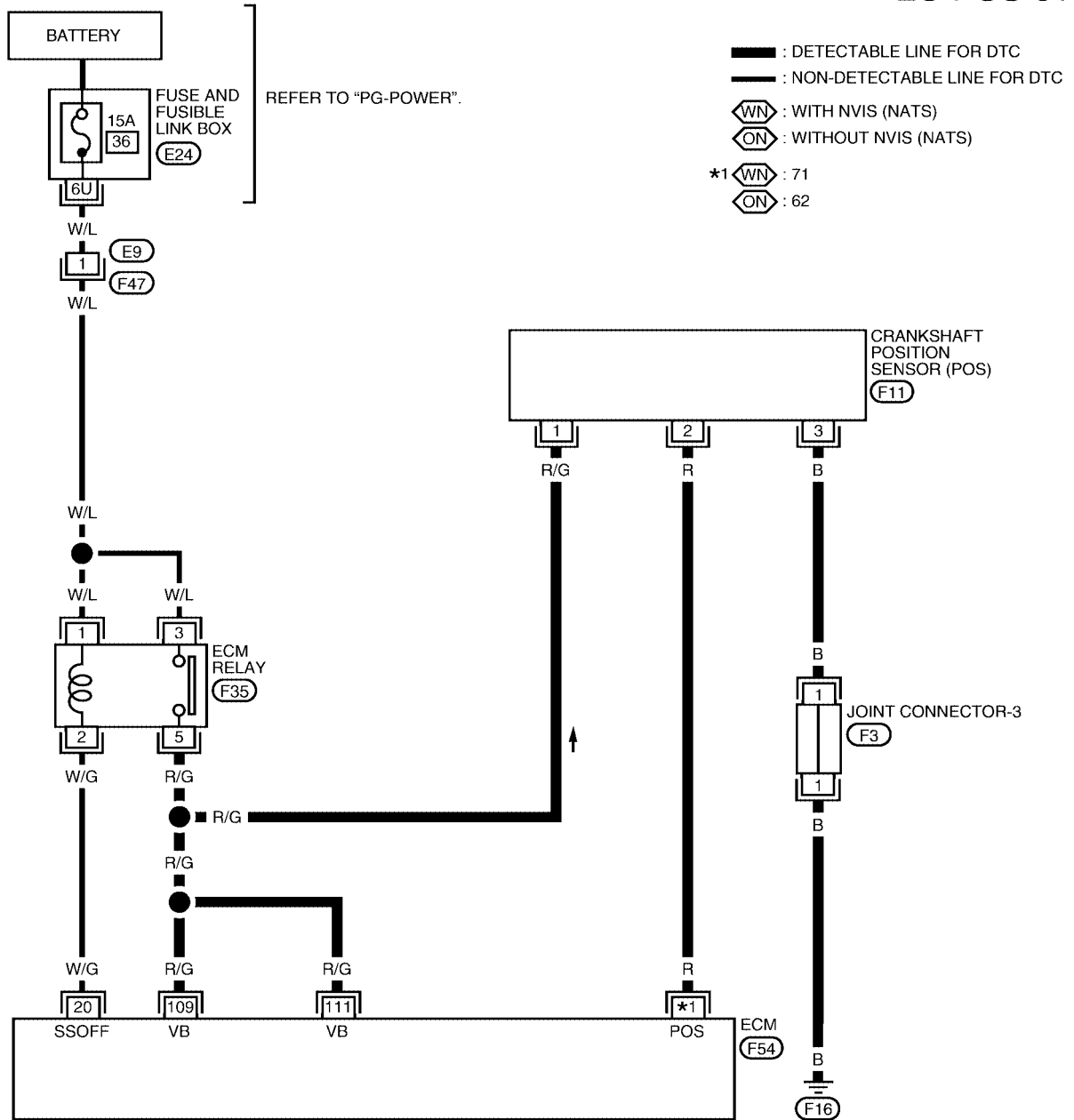
# DTC P0335 CKP SENSOR (POS)

[QR25DE]

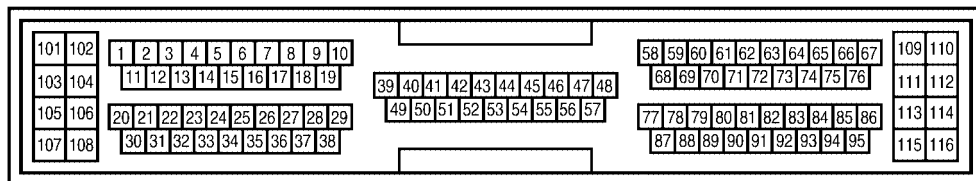
UBS002DE

## Wiring Diagram

EC-POS-01



REFER TO THE FOLLOWING.  
F3 - JOINT CONNECTOR



BBWA0222E

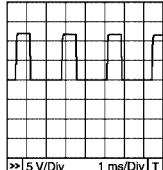
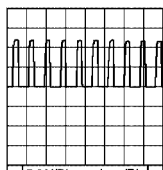
# DTC P0335 CKP SENSOR (POS)

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
62 (With- out NVIS) 71 (With NVIS)	R	Crankshaft position sensor (POS)	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>Approximately 3V★</p>  <p>PBIB0527E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Engine speed is 2,000 rpm</li> </ul>	<p>Approximately 3V★</p>  <p>PBIB0528E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

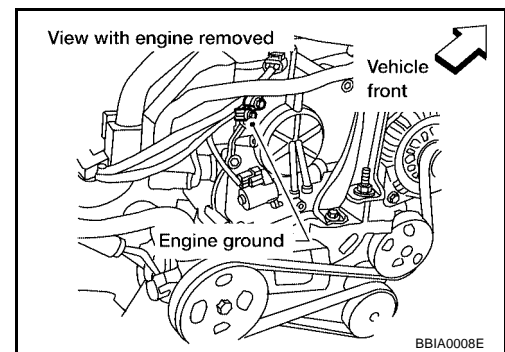
## Diagnostic Procedure

UBS002DF

### 1. RETIGHTEN GROUND SCREWS

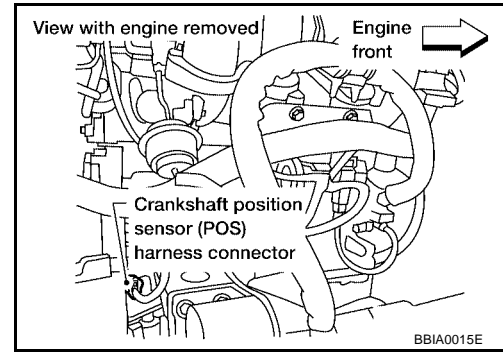
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT

1. Disconnect crankshaft position (CKP) sensor (POS) harness connector.
2. Turn ignition switch "ON".



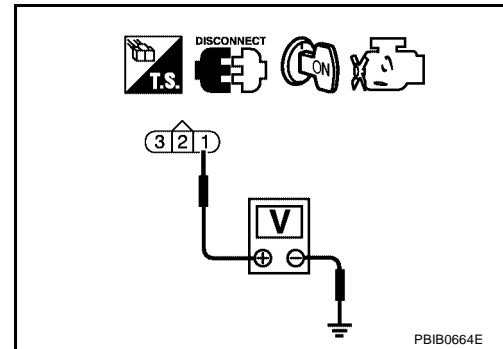
3. Check voltage between CKP sensor (POS) terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between crankshaft position sensor (POS) and ECM
- Harness for open or short between crankshaft position sensor (POS) and ECM relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK CKP (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between CKP sensor (POS) terminal 3 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-3
- Harness for open or short between crankshaft position sensor (POS) and engine ground

>> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 62 or 71 and CKP sensor (POS) terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**7. CHECK CRANKSHAFT POSITION SENSOR (POS)**

Refer to [EC-1494, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace crankshaft position sensor (POS).

**8. CHECK GEAR TOOTH**

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 9.

NG >> Replace the signal plate.

**9. CHECK INTERMITTENT INCIDENT**

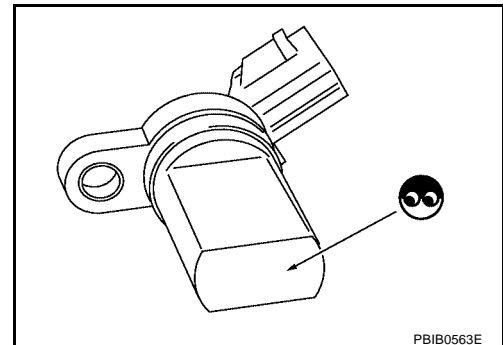
Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

### Component Inspection CRANKSHAFT POSITION SENSOR (POS)

UBS002DG

1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor (POS) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



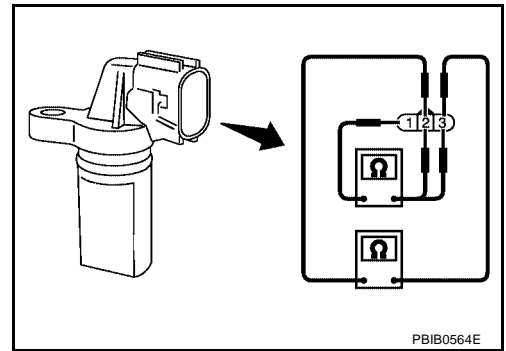
# DTC P0335 CKP SENSOR (POS)

[QR25DE]

5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance $\Omega$ [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or $\infty$
1 (+) - 3 (-)	
2 (+) - 3 (-)	

6. If NG, replace crankshaft position sensor (POS).



## Removal and Installation CRANKSHAFT POSITION SENSOR (POS)

Refer to [EM-160, "CYLINDER BLOCK"](#) .

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

## DTC P0340 CMP SENSOR (PHASE)

PFP:23731

### Component Description

UBS002DI

The camshaft position sensor (PHASE) senses the retraction with intake valve camshaft to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.

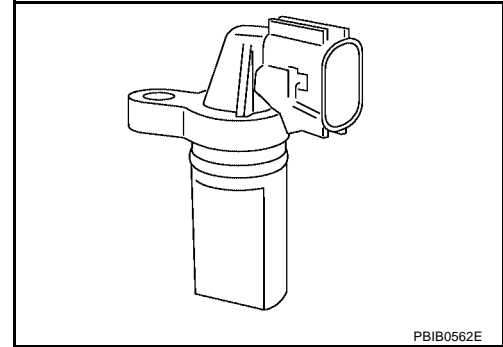
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet and Hall IC.

When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.



PBIB0562E

### On Board Diagnosis Logic

UBS002DJ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340 0340	Camshaft position sensor (PHASE) circuit	<ul style="list-style-type: none"> <li>● The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking.</li> <li>● The cylinder No. signal is not set to ECM during engine running.</li> <li>● The cylinder No. signal is not in the normal pattern during engine running.</li> </ul>	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Camshaft position sensor (PHASE)</li> <li>● Camshaft (Intake)</li> <li>● Starter motor (Refer to <a href="#">SC-9</a> .)</li> <li>● Starting system circuit (Refer to <a href="#">SC-9</a> .)</li> <li>● Dead (Weak) battery</li> </ul>

### DTC Confirmation Procedure

UBS002DK

**NOTE:**

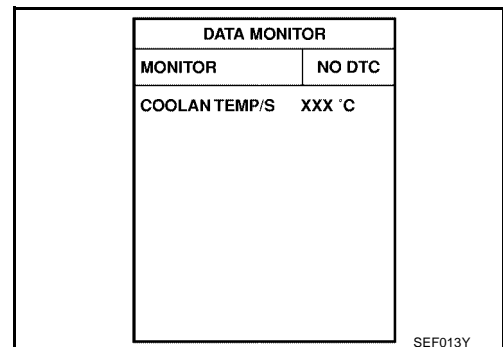
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

**Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch “ON”.**

**Ⓟ WITH CONSULT-II**

1. Turn ignition switch “ON”.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
4. If 1st trip DTC is detected, go to [EC-1498, "Diagnostic Procedure"](#) .  
If 1st trip DTC is not detected, go to next step.
5. Maintaining engine speed at more than 800 rpm for at least 5 seconds.
6. If 1st trip DTC is detected, go to [EC-1498, "Diagnostic Procedure"](#) .



SEF013Y

**Ⓢ WITH GST**

Follow the procedure “WITH CONSULT-II” above.



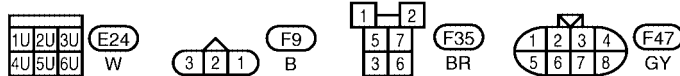
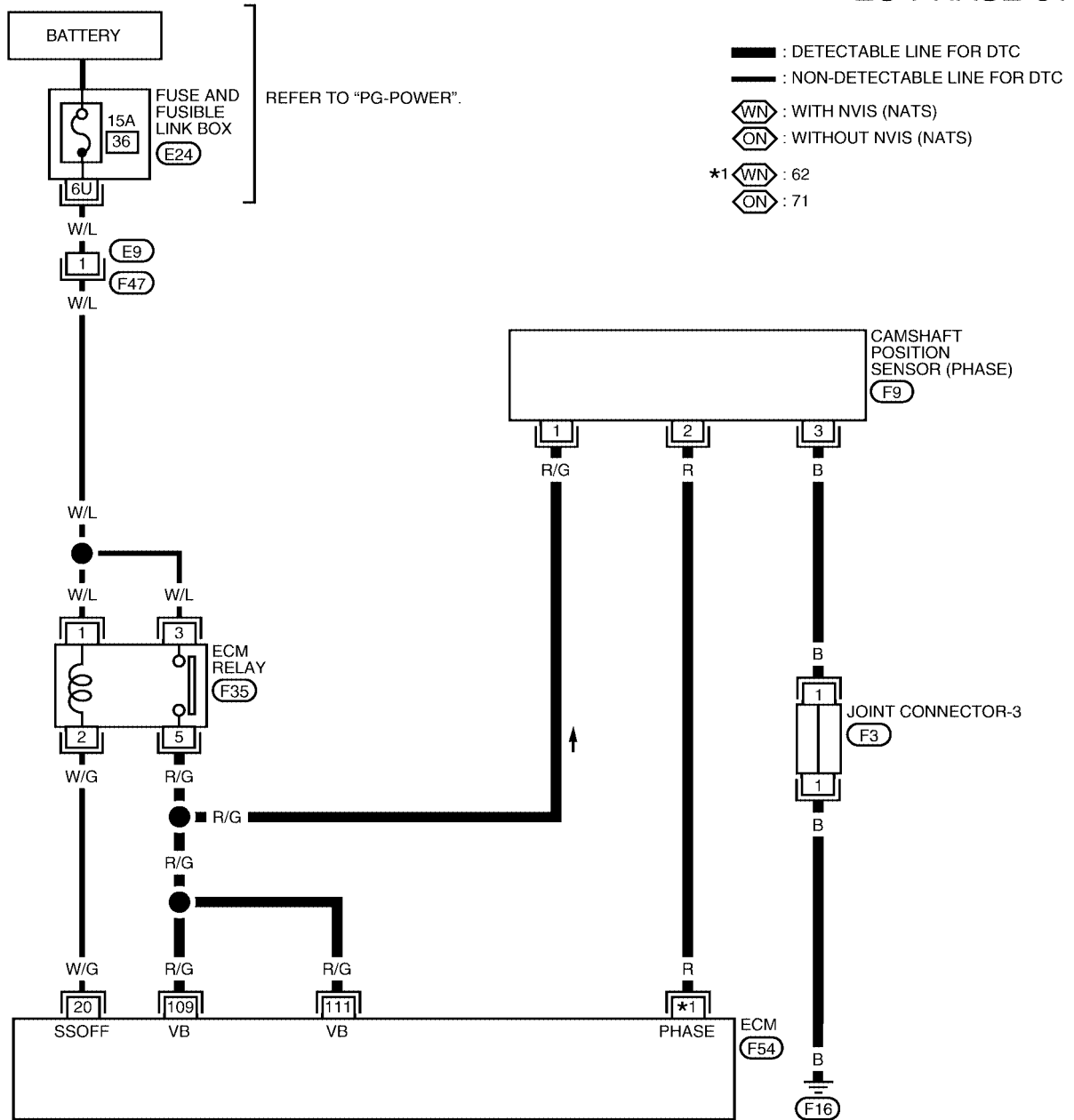
# DTC P0340 CMP SENSOR (PHASE)

[QR25DE]

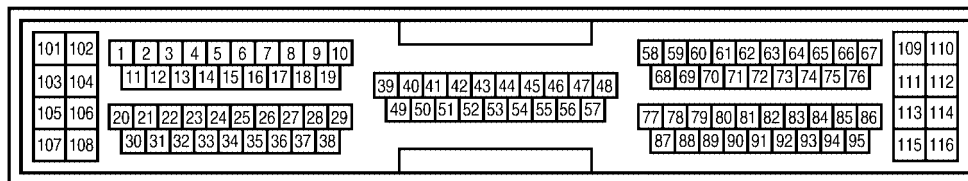
UBS002DL

## Wiring Diagram

### EC-PHASE-01



REFER TO THE FOLLOWING.  
F3 - JOINT CONNECTOR



BBWA0223E

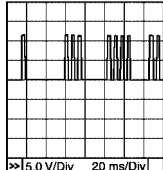
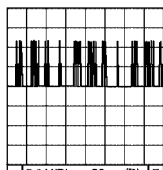
# DTC P0340 CMP SENSOR (PHASE)

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
62 (With NVIS) 71 (With- out NVIS)	R	Camshaft position sensor (PHASE)	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>1.0 - 4.0V★</p>  <p>5.0 V/Div 20 ms/Div</p> <p>PBIB0525E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Engine speed is 2,000 rpm.</li> </ul>	<p>1.0 - 4.0V★</p>  <p>5.0 V/Div 20 ms/Div T</p> <p>PBIB0526E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS002DM

### 1. CHECK STARTING SYSTEM

Turn ignition switch to "START" position.

**Does the engine turn over?**

**Does the starter motor operate?**

Yes or No

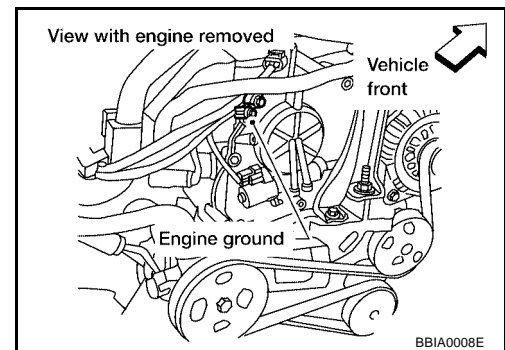
Yes >> GO TO 2.

No >> Check starting system. (Refer to [SC-9, "STARTING SYSTEM"](#) .)

### 2. RETIGHTEN GROUND SCREWS

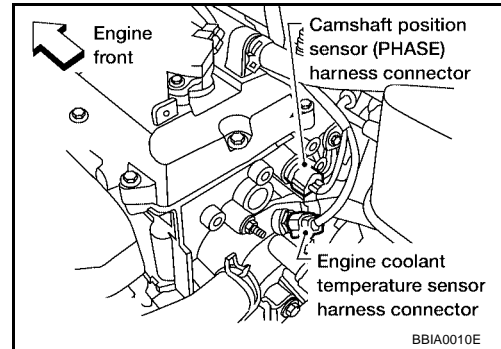
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 3.



### 3. CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor (PHASE) harness connector.
2. Turn ignition switch "ON".



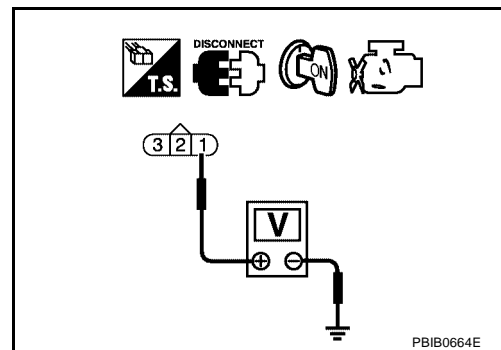
3. Check voltage between CMP sensor (PHASE) terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



### 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between camshaft position sensor (PHASE) and ECM
- Harness for open or short between camshaft position sensor (PHASE) and ECM relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

### 5. CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between CMP sensor (PHASE) terminal 3 and engine ground.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

### 6. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-3
- Harness for open or short between camshaft position sensor (PHASE) and engine ground

>> Repair open circuit or short to power in harness or connectors.

## 7. CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 62 or 71 and CMP sensor (PHASE) terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 8. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EC-1500, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace camshaft position sensor (PHASE).

## 9. CHECK CAMSHAFT (INTAKE)

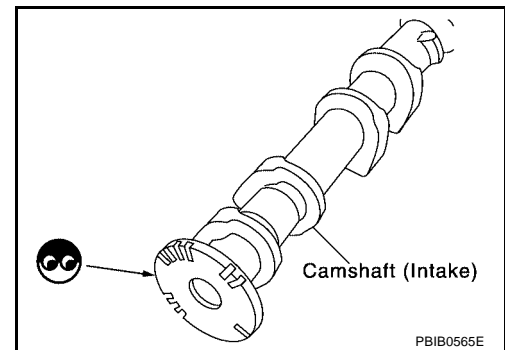
Check the following.

- Accumulation of debris to the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end

OK or NG

OK >> GO TO 10.

NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



## 10. CHECK INTERMITTENT INCIDENT

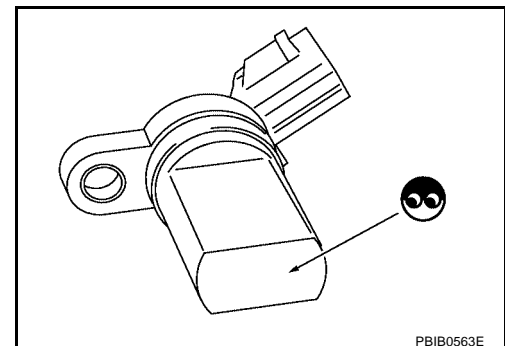
Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection CAMSHAFT POSITION SENSOR (PHASE)

UBS002DN

1. Loosen the fixing bolt of the sensor.
2. Disconnect camshaft position sensor (PHASE) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.

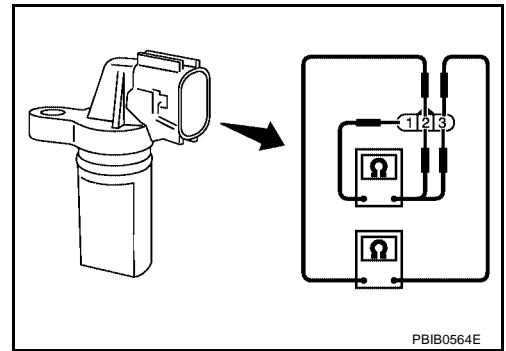


# DTC P0340 CMP SENSOR (PHASE)

[QR25DE]

5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance $\Omega$ [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or $\infty$
1 (+) - 3 (-)	
2 (+) - 3 (-)	



## Removal and Installation CAMSHAFT POSITION SENSOR (PHASE)

Refer to [EM-123, "CAMSHAFT"](#) .

A  
EC  
C  
D  
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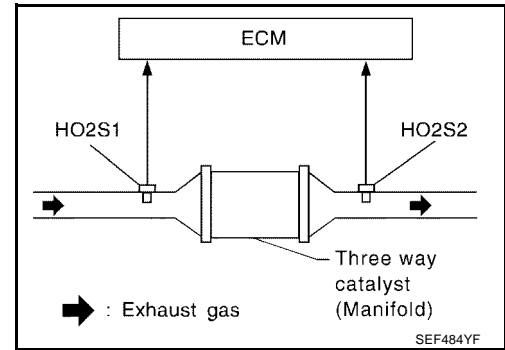
## DTC P0420 THREE WAY CATALYST FUNCTION

### On Board Diagnosis Logic

The ECM monitors the switching frequency ratio of heated oxygen sensors 1 and 2.

A three way catalyst (Manifold) with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2. As oxygen storage capacity decreases, the heated oxygen sensor 2 switching frequency will increase.

When the frequency ratio of heated oxygen sensors 1 and 2 approaches a specified limit value, the three way catalyst (Manifold) malfunction is diagnosed.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0420 0420	Catalyst system efficiency below threshold	<ul style="list-style-type: none"> <li>● Three way catalyst (Manifold) does not operate properly.</li> <li>● Three way catalyst (Manifold) does not have enough oxygen storage capacity.</li> </ul>	<ul style="list-style-type: none"> <li>● Three way catalyst (Manifold)</li> <li>● Exhaust tube</li> <li>● Intake air leaks</li> <li>● Fuel injectors</li> <li>● Fuel injector leaks</li> <li>● Spark plug</li> <li>● Improper ignition timing</li> </ul>

### DTC Confirmation Procedure

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

**TESTING CONDITION:**

- **Do not hold engine speed for more than the specified minutes below.**
1. Start engine and warm it up to the normal operating temperature.
  2. Turn ignition switch "OFF" and wait at least 10 seconds.
  3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
  4. Let engine idle for one minute.
  5. Open engine hood.
  6. Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-II.
  7. Rev engine up to 2,000 to 3,000 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.  
If "INCMP" of "CATALYST" changed to "COMPLT", go to step 10.
  8. Wait 5 seconds at idle.

SRT WORK SUPPORT	
CATALYST	INCMP
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	INCMP
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0822E

# DTC P0420 THREE WAY CATALYST FUNCTION

[QR25DE]

9. Rev engine up to 2,000 to 3,000 rpm and maintain it until "INCMP" of "CATALYST" changes to "CMPLT" (It will take approximately 5 minutes).  
If not "CMPLT", perform the following.
  - a. Turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle).
  - b. Turn ignition switch "ON" and select "COOLANTEMP/S" in "DATA MONITOR" mode with CONSULT-II.
  - c. Start engine and warm it up while monitoring "COOLANTEMP/S" indication on CONSULT-II.
  - d. When "COOLANTEMP/S" indication reaches to 70°C (158°F), go to step 6.
10. Select "SELF-DIAG RESULTS" mode with CONSULT-II.
11. Confirm that the 1st trip DTC is not detected.  
If the 1st trip DTC is detected, go to [EC-1504, "Diagnostic Procedure"](#).

SRT WORK SUPPORT	
CATALYST	CMPLT
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	INCMP
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0823E

SELF DIAG RESULTS	
DTC RESULTS	TIME
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	

SEF535Z

## Overall Function Check

UBS002DR

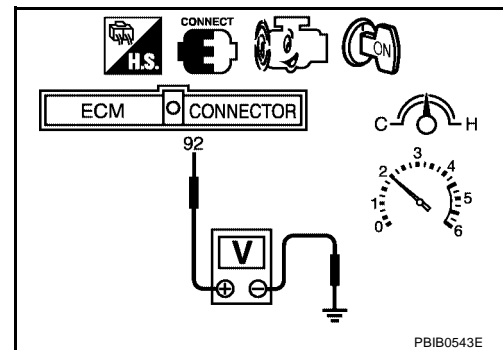
Use this procedure to check the overall function of the three way catalyst (Manifold). During this check, a DTC might not be confirmed.

### CAUTION:

**Always drive vehicle at a safe speed.**

### WITH GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Set voltmeter probes between ECM terminal 92 [HO2S1 signal] and engine ground, and ECM terminal 95 [HO2S2 signal] and engine ground.
6. Keep engine speed at 2,000 rpm constant under no load.



# DTC P0420 THREE WAY CATALYST FUNCTION

[QR25DE]

7. Make sure that the voltage switching frequency (high & low) between ECM terminal 95 and engine ground is very less than that of ECM terminal 92 and engine ground.

**Switching frequency ratio = A/B**

**A: Heated oxygen sensor 2 voltage switching frequency**

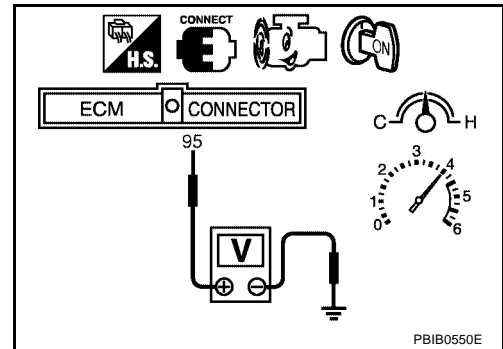
**B: Heated oxygen sensor 1 voltage switching frequency**

**This ratio should be less than 0.75.**

If the ratio is greater than above, it means three way catalyst (manifold) does not operate properly. Go to [EC-1504, "Diagnostic Procedure"](#).

**NOTE:**

If the voltage at terminal 92 does not switch periodically more than 5 times within 10 seconds at step 5, perform trouble diagnosis for "DTC P0133" first. (See [EC-1412](#).)



## Diagnostic Procedure

UBS002DS

### 1. CHECK EXHAUST SYSTEM

Visually check exhaust tubes and muffler for dent.

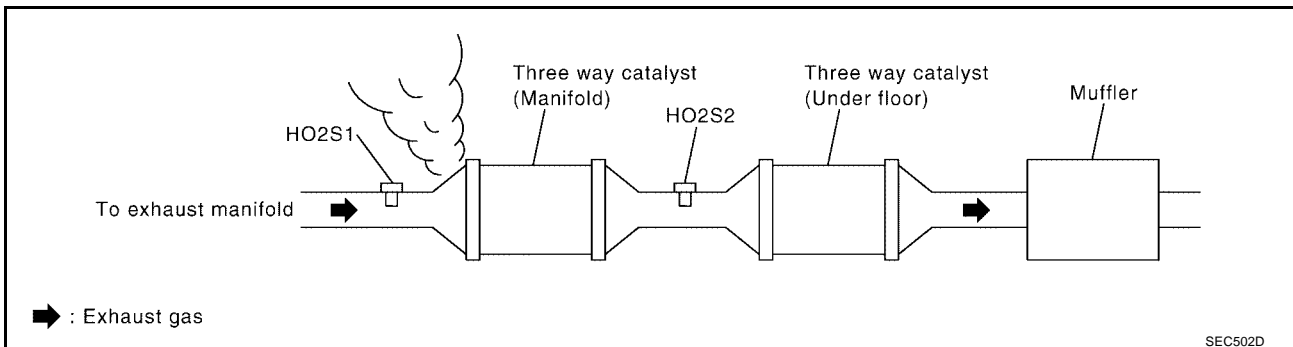
OK or NG

OK >> GO TO 2.

NG >> Repair or replace.

### 2. CHECK EXHAUST AIR LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust air leak before the three way catalyst (Manifold).



OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

### 3. CHECK INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

OK >> GO TO 4.

NG >> Repair or replace.



## 4. CHECK IGNITION TIMING

Check the following items. Refer to [EC-1291, "Basic Inspection"](#) .

Items	Specifications	
Ignition timing	A/T	15° ± 5° BTDC (in "P" or "N" position)
	M/T	15° ± 5° BTDC
Target idle speed	A/T	700 ± 50 rpm (in "P" or "N" position)
	M/T	700 ± 50 rpm

OK or NG

- OK >> GO TO 5.
- NG >> Follow the "Basic Inspection".

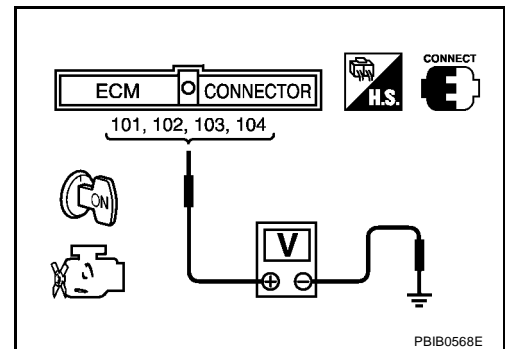
## 5. CHECK INJECTORS

1. Stop engine and then turn ignition switch "ON".
2. Check voltage between ECM terminals 101, 102, 103, 104 and ground with CONSULT-II or tester.  
Refer to Wiring Diagram for Injectors, [EC-1797](#) .

**Battery voltage should exist.**

OK or NG

- OK >> GO TO 6.
- NG >> Perform [EC-1798, "Diagnostic Procedure"](#) .

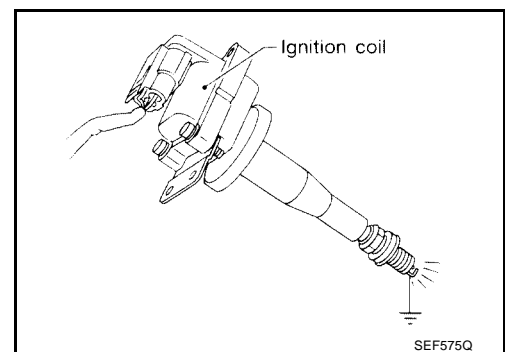


## 6. CHECK IGNITION SPARK

1. Turn ignition switch "OFF".
2. Disconnect ignition coil assembly from rocker cover.
3. Connect a known good spark plug to the ignition coil assembly.
4. Place end of spark plug against a suitable ground and crank engine.
5. Check for spark.

OK or NG

- OK >> GO TO 7.
- NG >> Check ignition coil with power transistor and their circuit.  
Refer to [EC-1777, "IGNITION SIGNAL"](#) .



---

## 7. CHECK INJECTOR

---

1. Turn ignition switch "OFF".
2. Remove injector assembly.  
Refer to [EM-118, "FUEL INJECTOR AND FUEL TUBE"](#) .  
Keep fuel hose and all injectors connected to injector gallery.
3. Disconnect all ignition coil harness connectors.
4. Turn ignition switch "ON".  
Make sure fuel does not drip from injector.

### OK or NG

OK (Does not drip.)>>GO TO 8.

NG (Drips.)>>Replace the injector(s) from which fuel is dripping.

---

## 8. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

Trouble is fixed.>>**INSPECTION END**

Trouble is not fixed.>>Replace three way catalyst (Manifold).

DTC P0441 EVAP CONTROL SYSTEM

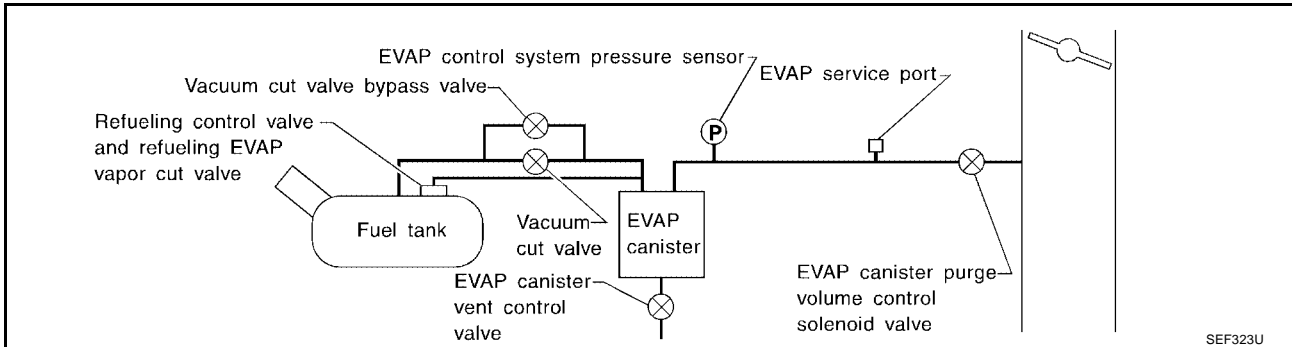
PF:14950

System Description

UBS002DT

NOTE:

If DTC P0441 is displayed with P2122, P2123, P2127, P2128 or P2138, perform trouble diagnosis for displayed other DTC.



In this evaporative emission (EVAP) control system, purge flow occurs during non-closed throttle conditions. Purge volume is related to air intake volume. Under normal purge conditions (non-closed throttle), the EVAP canister purge volume control solenoid valve is open to admit purge flow. Purge flow exposes the EVAP control system pressure sensor to intake manifold vacuum.

On Board Diagnosis Logic

UBS002DU

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a fault is determined.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0441 0441	EVAP control system incorrect purge flow	EVAP control system does not operate properly, EVAP control system has a leak between intake manifold and EVAP control system pressure sensor.	<ul style="list-style-type: none"> <li>● EVAP canister purge volume control solenoid valve stuck closed</li> <li>● EVAP control system pressure sensor and the circuit</li> <li>● Loose, disconnected or improper connection of rubber tube</li> <li>● Blocked rubber tube</li> <li>● Cracked EVAP canister</li> <li>● EVAP canister purge volume control solenoid valve circuit</li> <li>● Accelerator pedal position sensor</li> <li>● Blocked purge port</li> <li>● EVAP canister vent control valve</li> </ul>

DTC Confirmation Procedure

UBS002DV

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- Always perform test at a temperature of 0°C (32°F) or more.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

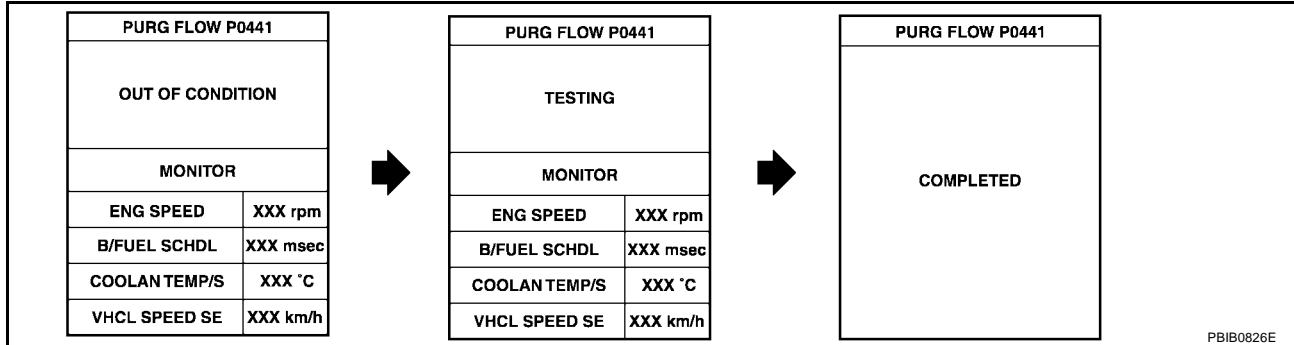
**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and let it idle for at least 70 seconds.
4. Select "PURG FLOW P0441" of "EVAPORATIVE SYSTEM" in "DTC CONFIRMATION" mode with CONSULT-II.

5. Touch "START".  
If "COMPLETED" is displayed, go to step 7.
6. When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 35 seconds.)

Selector lever	Suitable position
Vehicle speed	32 - 120 km/h (20 - 75 MPH)
ENG SPEED	500 - 3,800 rpm
B/FUEL SCHDL	1.0 - 10.0 msec
Engine coolant temperature	70 - 100°C (158 - 212°F)

**If "TESTING" is not changed for a long time, retry from step 2.**



7. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to [EC-1509, "Diagnostic Procedure"](#).

## Overall Function Check

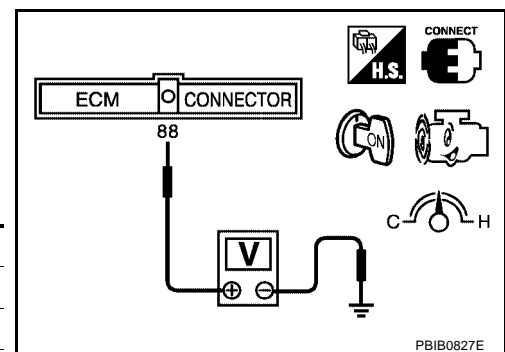
*UBS002DW*

Use this procedure to check the overall monitoring function of the EVAP control system purge flow monitoring. During this check, a DTC might not be confirmed.

### WITH GST

1. Lift up drive wheels.
2. Start engine (TCS switch "OFF") and warm it up to normal operating temperature.
3. Turn ignition switch "OFF", wait at least 10 seconds.
4. Start engine and wait at least 70 seconds.
5. Set voltmeter probes to ECM terminals 88 (EVAP control system pressure sensor signal) and ground.
6. Check EVAP control system pressure sensor value at idle speed and note it.
7. Establish and maintain the following conditions for at least 1 minute.

Air conditioner switch	ON
Headlamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Gear position	Any position other than "P", "N" or "R"



8. Verify that EVAP control system pressure sensor value stays 0.1V less than the value at idle speed (measured at step 6) for at least 1 second.
9. If NG, go to [EC-1509, "Diagnostic Procedure"](#).

**Diagnostic Procedure**

**1. CHECK EVAP CANISTER**

1. Turn ignition switch "OFF".
2. Check EVAP canister for cracks.

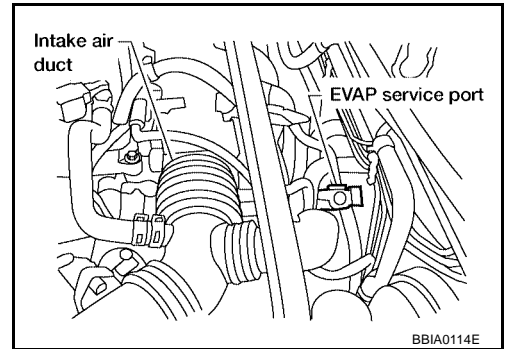
**OK or NG**

- OK (With CONSULT-II)>>GO TO 2.
- OK (Without CONSULT-II)>>GO TO 3.
- NG >> Replace EVAP canister.

**2. CHECK PURGE FLOW**

**Ⓜ With CONSULT-II**

1. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.
2. Start engine and let it idle.



3. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.
4. Rev engine up to 2,000 rpm.
5. Touch "Qd" and "Qu" on CONSULT-II screen to adjust "PURG VOL CONT/V" opening and check vacuum existence.

PURG VOL CONT/V	Vacuum
100.0%	Should exist.
0.0%	Should not exist.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

**OK or NG**

- OK >> GO TO 7.
- NG >> GO TO 4.

A  
EC  
C  
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M

### 3. CHECK PURGE FLOW

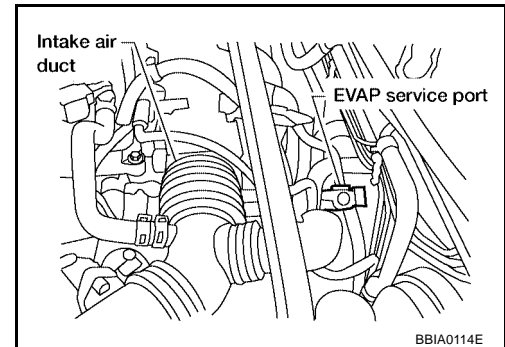
**Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum gauge indication when revving engine up to 2,000 rpm.

**Vacuum should exist.**

6. Release the accelerator pedal fully and let idle.

**Vacuum should not exist.**



OK or NG

- OK >> GO TO 7.
- NG >> GO TO 4.

### 4. CHECK EVAP PURGE LINE

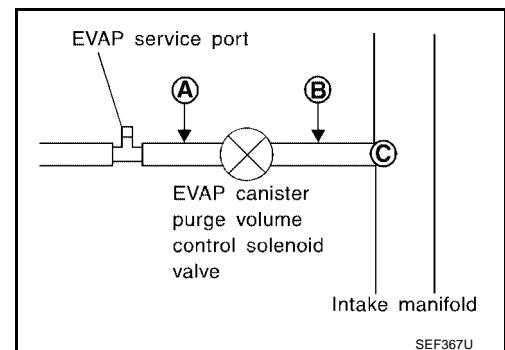
1. Turn ignition switch "OFF".
2. Check EVAP purge line for improper connection or disconnection. Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#).

OK or NG

- OK (With CONSULT-II)>>GO TO 5.
- OK (Without CONSULT-II)>>GO TO 6.
- NG >> Repair it.

### 5. CHECK EVAP PURGE HOSE AND PURGE PORT

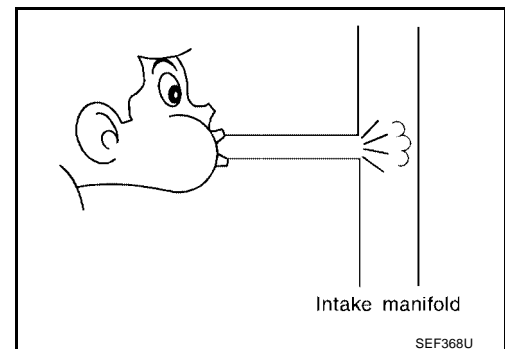
1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B**.
2. Blow air into each hose and EVAP purge port **C**.



3. Check that air flows freely.

OK or NG

- OK >> GO TO 6.
- NG >> Repair or clean hoses and/or purge port.



**6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE****Ⓟ With CONSULT-II**

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 8.  
NG >> GO TO 7.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

**7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

Refer to [EC-1526, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.  
NG >> Replace EVAP canister purge volume control solenoid valve.

**8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE**

1. Turn ignition switch "OFF".
2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

OK or NG

- OK >> GO TO 9.  
NG >> Repair it.

**9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR**

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

**Water should not exist.**

OK or NG

- OK >> GO TO 10.  
NG >> Replace EVAP control system pressure sensor.

**10. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION**

Refer to "DTC Confirmation Procedure" for DTC P0452 ([EC-1534](#) ) and P0453 ([EC-1540](#) ).

OK or NG

- OK >> GO TO 11.  
NG >> Replace EVAP control system pressure sensor.

**11. CHECK RUBBER TUBE FOR CLOGGING**

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 12.  
NG >> Clean the rubber tube using an air blower.

---

## 12. CHECK EVAP CANISTER VENT CONTROL VALVE

---

Refer to [EC-1532, "Component Inspection"](#) .

OK or NG

OK >> GO TO 13.

NG >> Replace EVAP canister vent control valve.

---

## 13. CHECK EVAP PURGE LINE

---

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.

Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

OK >> GO TO 14.

NG >> Replace it.

---

## 14. CLEAN EVAP PURGE LINE

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Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 15.

---

## 15. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END



DTC P0442 EVAP CONTROL SYSTEM

On Board Diagnosis Logic

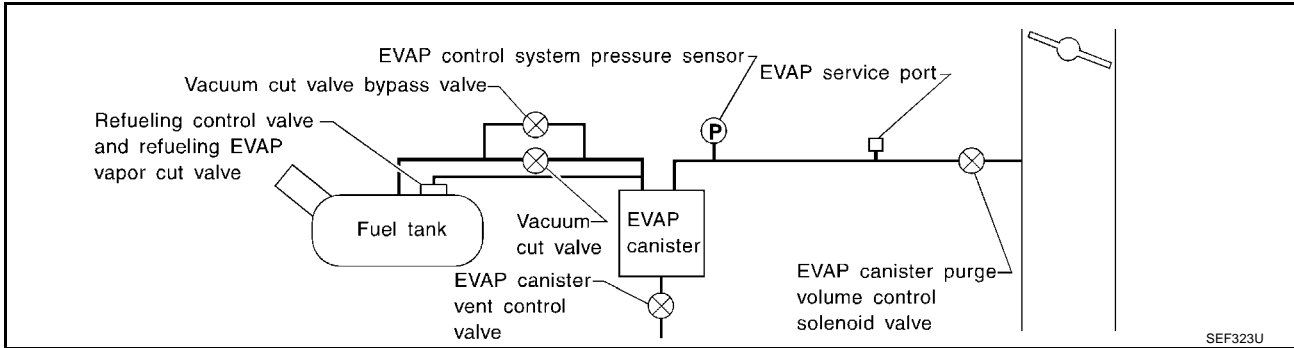
NOTE:

If DTC P0442 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-1687.)

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum.

If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following "Vacuum test" conditions.

The vacuum cut valve bypass valve is opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP canister vent control valve will then be closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve is opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0442 0442	EVAP control system small leak detected (negative pressure)	EVAP control system has a leak, EVAP control system does not operate properly.	<ul style="list-style-type: none"> <li>● Incorrect fuel tank vacuum relief valve</li> <li>● Incorrect fuel filler cap used</li> <li>● Fuel filler cap remains open or fails to close.</li> <li>● Foreign matter caught in fuel filler cap.</li> <li>● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>● Foreign matter caught in EVAP canister vent control valve.</li> <li>● EVAP canister or fuel tank leaks</li> <li>● EVAP purge line (pipe and rubber tube) leaks</li> <li>● EVAP purge line rubber tube bent</li> <li>● Blocked or bent rubber tube to EVAP control system pressure sensor</li> <li>● Loose or disconnected rubber tube</li> <li>● EVAP canister vent control valve and the circuit</li> <li>● EVAP canister purge volume control solenoid valve and the circuit</li> <li>● Fuel tank temperature sensor</li> <li>● O-ring of EVAP canister vent control valve is missing or damaged</li> <li>● EVAP canister is saturated with water</li> <li>● EVAP control system pressure sensor</li> <li>● Fuel level sensor and the circuit</li> <li>● Refueling control valve</li> <li>● ORVR system leaks</li> </ul>

**CAUTION:**

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

## DTC Confirmation Procedure

UBS002DZ

**NOTE:**

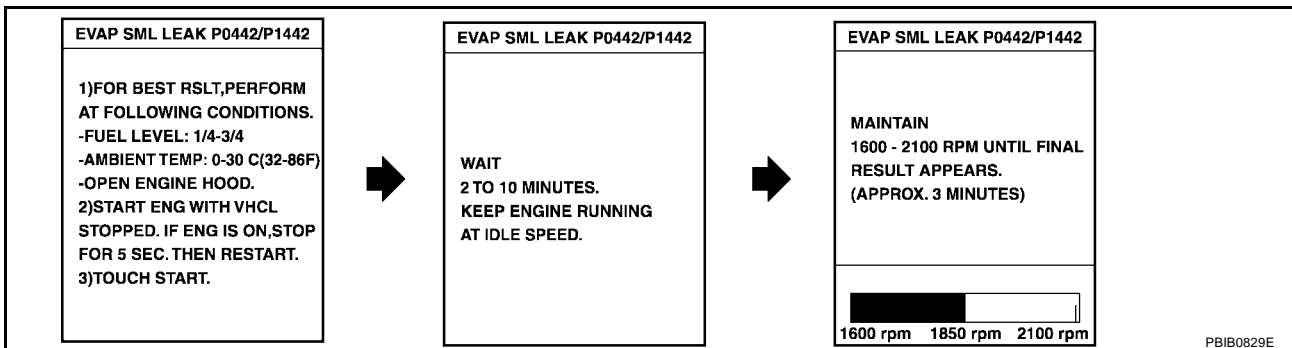
- If DTC P0442 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See [EC-1687](#).)
- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Always perform test at a temperature of 0 to 30°C (32 to 86°F).

**WITH CONSULT-II**

1. Turn ignition switch “ON”.
2. Turn ignition switch “OFF” and wait at least 10 seconds.
3. Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
4. Make sure that the following conditions are met.  
**COOLAN TEMP/S: 0 - 70°C (32 - 158°F)**  
**INT/A TEMP SE: 0 - 30°C (32 - 86°F)**
5. Select “EVAP SML LEAK P0442/P1442” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.  
 Follow the instruction displayed.



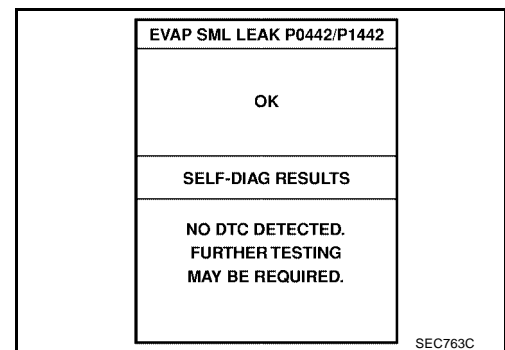
**NOTE:**

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to [EC-1291, "Basic Inspection"](#).

6. Make sure that “OK” is displayed.  
 If “NG” is displayed, refer to [EC-1515, "Diagnostic Procedure"](#).

**NOTE:**

**Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.**



**WITH GST**

**NOTE:**

Be sure to read the explanation of “Driving Pattern” on [EC-1270](#) before driving vehicle.

1. Start engine.

2. Drive vehicle according to "Driving Pattern", [EC-1270](#) .
3. Stop vehicle.
4. Select "MODE 1" with GST.  
If SRT of EVAP system is not set yet, go to the following step.  
If SRT of EVAP system is set, the result will be OK.
5. Turn ignition switch "OFF" and wait at least 10 seconds.
6. Start engine.  
**It is not necessary to cool engine down before driving.**
7. Drive vehicle again according to the "Driving Pattern", [EC-1270](#) .
8. Stop vehicle.
9. Select "MODE 3" with GST.  
If P0442 is displayed on the screen, go to [EC-1515, "Diagnostic Procedure"](#) .  
If P0441 is displayed on the screen, go to "Diagnostic Procedure" for DTC P0441, [EC-1509](#) .  
If P0441 and P0442 are not displayed on the screen, go to the following step.
10. Select "MODE 1" with GST.  
If SRT of EVAP system is set, the result will be OK.  
If SRT of EVAP system is not set, go to step 6.

## Diagnostic Procedure

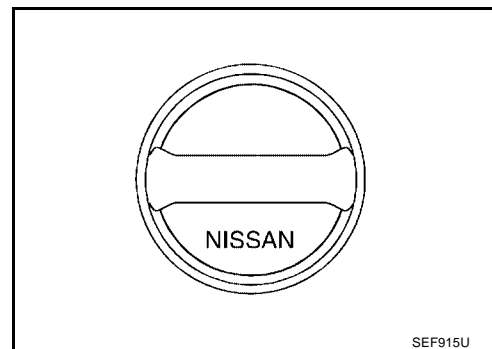
UBS002E0

### 1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch "OFF".
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK >> GO TO 2.  
NG >> Replace with genuine NISSAN fuel filler cap.



### 2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

- OK >> GO TO 3.  
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.  
2. Retighten until ratcheting sound is heard.

### 3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

- OK >> GO TO 5.  
NG >> GO TO 4.

### 4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to [EC-1849, "FUEL TANK VACUUM RELIEF VALVE \(BUILT INTO FUEL FULLER CAP\)"](#) .

OK or NG

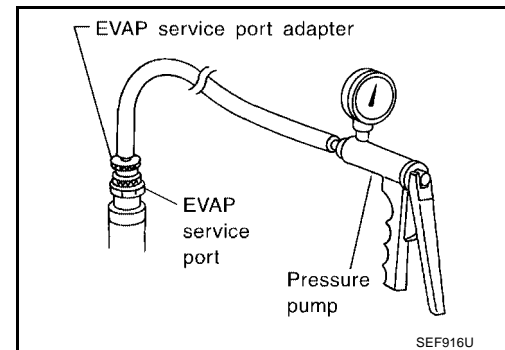
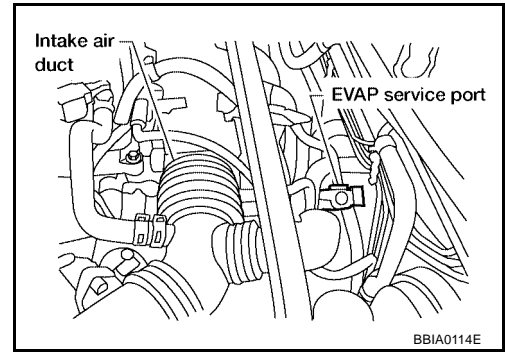
- OK >> GO TO 5.  
NG >> Replace fuel filler cap with a genuine one.

**5. INSTALL THE PRESSURE PUMP**

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.

**NOTE:**

**Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.**



Models with CONSULT-II >> GO TO 6.  
 Models without CONSULT-II >> GO TO 7.

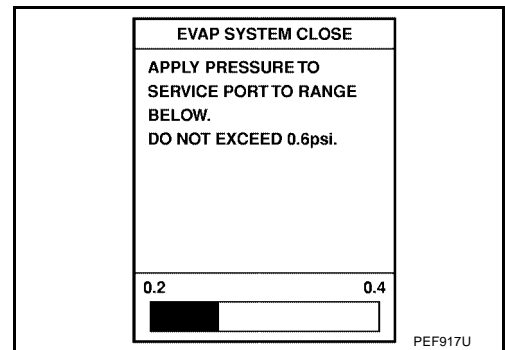
**6. CHECK FOR EVAP LEAK**

**Ⓟ With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

**NOTE:**

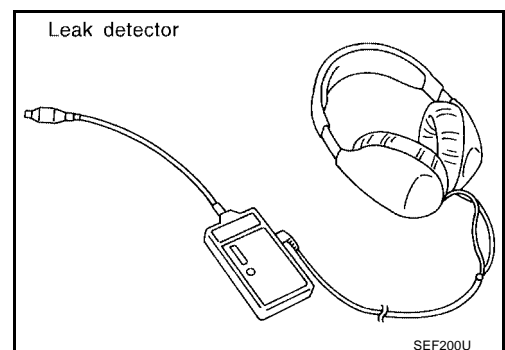
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#).

**OK or NG**

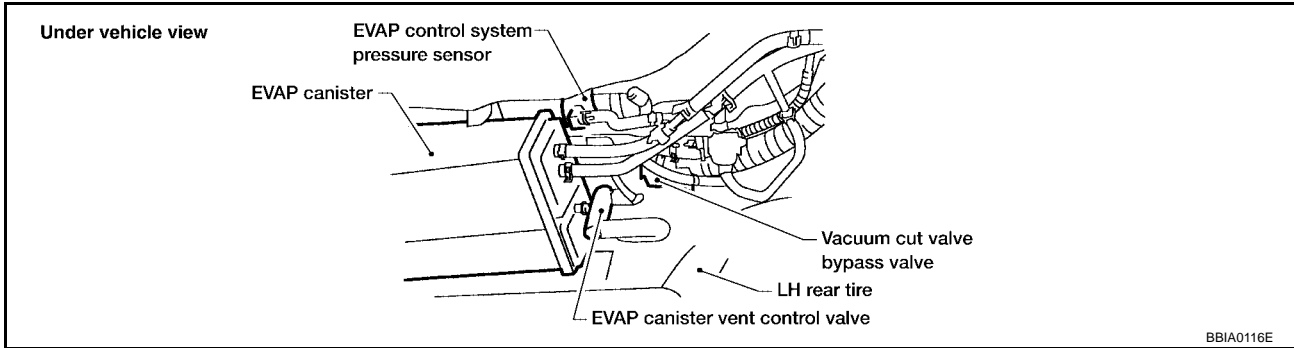
- OK >> GO TO 8.
- NG >> Repair or replace.



**7. CHECK FOR EVAP LEAK**

**⊗ Without CONSULT-II**

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)

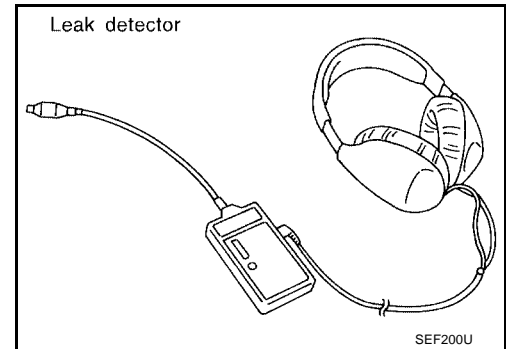


4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

**NOTE:**

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#).



**OK or NG**

- OK >> GO TO 8.
- NG >> Repair or replace.

**8. CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT**

Refer to [EC-1687, "DTC Confirmation Procedure"](#).

**OK or NG**

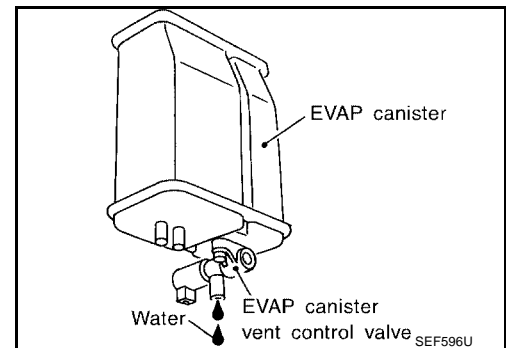
- OK >> GO TO 9.
- NG >> Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

**9. CHECK IF EVAP CANISTER SATURATED WITH WATER**

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Does water drain from the EVAP canister?

**Yes or No**

- Yes >> GO TO 10.
- No (With CONSULT-II)>>GO TO 12.
- No (Without CONSULT-II)>>GO TO 13.



## 10. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.  
**The weight should be less than 1.8 kg (4.0 lb).**

OK or NG

- OK (With CONSULT-II)>>GO TO 12.
- OK (Without CONSULT-II)>>GO TO 13.
- NG >> GO TO 11.

## 11. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

## 12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

 **With CONSULT-II**

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.

## 13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

 **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

**Vacuum should exist.**

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 14.

## 14. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to [EC-1237, "Vacuum Hose Drawing"](#) .

OK or NG

- OK >> GO TO 15.
- NG >> Repair or reconnect the hose.

**15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

Refer to [EC-1526, "Component Inspection"](#) .

OK or NG

OK >> GO TO 16.

NG >> Replace EVAP canister purge volume control solenoid valve.

**16. CHECK FUEL TANK TEMPERATURE SENSOR**

Refer to [EC-1456, "Component Inspection"](#) .

OK or NG

OK >> GO TO 17.

NG >> Replace fuel level sensor unit.

**17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR**

Refer to [EC-1539, "Component Inspection"](#) .

OK or NG

OK >> GO TO 18.

NG >> Replace EVAP control system pressure sensor.

**18. CHECK EVAP PURGE LINE**

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection.

Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

OK >> GO TO 19.

NG >> Repair or reconnect the hose.

**19. CLEAN EVAP PURGE LINE**

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 20.

**20. CHECK REFUELING EVAP VAPOR LINE**

Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-1852, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#) .

OK or NG

OK >> GO TO 21.

NG >> Repair or replace hoses and tubes.

**21. CHECK SIGNAL LINE AND RECIRCULATION LINE**

Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 22.

NG >> Repair or replace hoses, tubes or filler neck tube.

**22. CHECK REFUELING CONTROL VALVE**

Refer to [EC-1855, "Component Inspection"](#) .

OK or NG

OK >> GO TO 23.

NG >> Replace refueling control valve with fuel tank.

---

**23. CHECK FUEL LEVEL SENSOR**

---

Refer to [DI-26, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

OK >> GO TO 24.

NG >> Replace fuel level sensor unit.

---

**24. CHECK INTERMITTENT INCIDENT**

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Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**



# DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR25DE]

## DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

PF1:14920

### Description SYSTEM DESCRIPTION

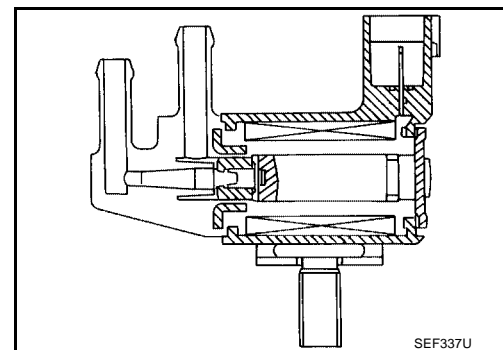
UBS002E2

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Closed throttle position		
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Vehicle speed sensor	Vehicle speed		

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

### COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



### CONSULT-II Reference Value in Data Monitor Mode

UBS002E3

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PURG VOL C/V	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N</li> <li>● Air conditioner switch: OFF</li> <li>● No-load</li> </ul>	Idle	0%
		2,000 rpm	20 - 30%

# DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR25DE]

UBS002E4

## On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0444 0444	EVAP canister purge volume control solenoid valve circuit open	An excessively low voltage signal is sent to ECM through the valve	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● EVAP canister purge volume control solenoid valve</li> </ul>
P0445 0445	EVAP canister purge volume control solenoid valve circuit shorted	An excessively high voltage signal is sent to ECM through the valve	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is shorted.)</li> <li>● EVAP canister purge volume control solenoid valve</li> </ul>

## DTC Confirmation Procedure

UBS002E5

### NOTE:

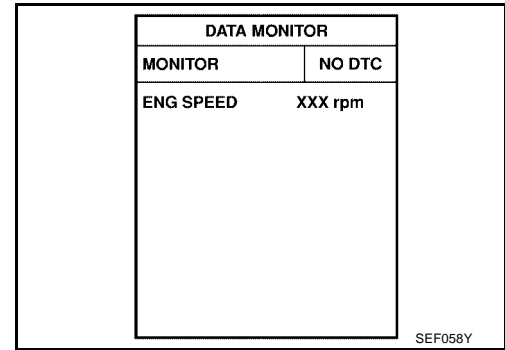
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

**Before performing the following procedure, confirm battery voltage is more than 11V at idle.**

### Ⓟ WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for at least 13 seconds.
4. If 1st trip DTC is detected, go to [EC-1524, "Diagnostic Procedure"](#).



### Ⓟ WITH GST

Follow the procedure "WITH CONSULT-II" above.

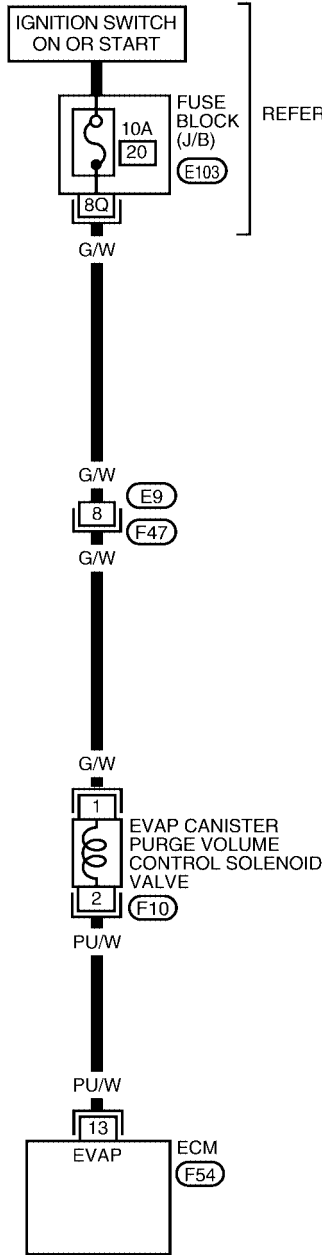
# DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR25DE]

UBS002E6

## Wiring Diagram

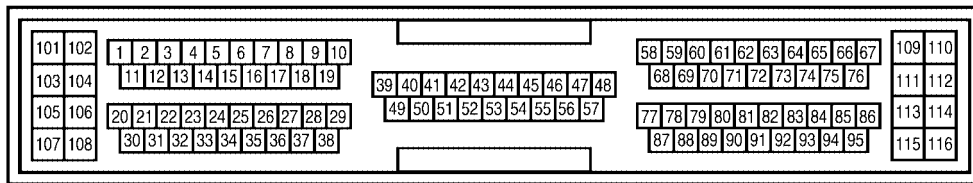
EC-PGC/V-01



: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC

REFER TO "PG-POWER".

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



BBWA0224E

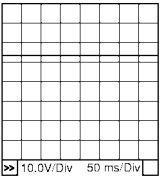
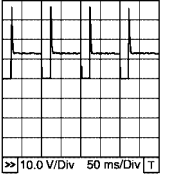
# DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
13	PU/W	EVAP canister purge volume control solenoid valve	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>10.0V/Div 50 ms/Div</p> <p>PBIB0050E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine)</li> </ul>	<p>Approximately 10V★</p>  <p>10.0 V/Div 50 ms/Div</p> <p>PBIB0520E</p>

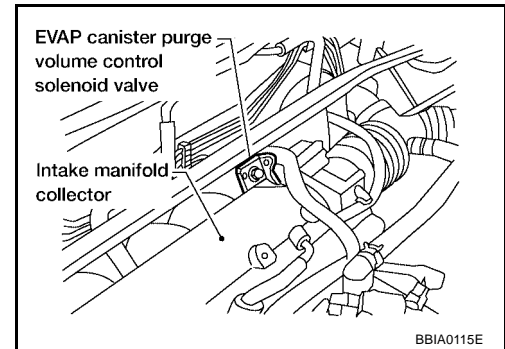
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS002E7

### 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Turn ignition switch "ON".

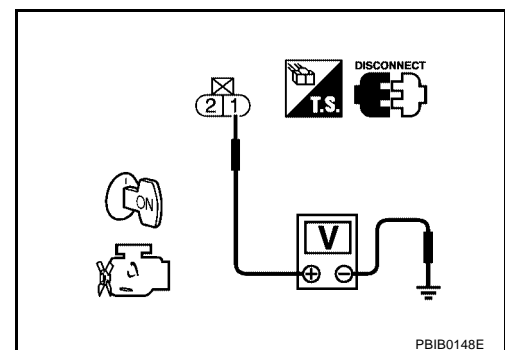


4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and engine ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



# DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR25DE]

## 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E9, F47
- Fuse block (J/B) connector E103
- 10A fuse
- Harness for open or short between EVAP canister purge volume control solenoid valve and fuse

>> Repair harness or connectors.

## 3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 13 and EVAP canister purge volume control solenoid valve terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK (With CONSULT-II)>>GO TO 4.

OK (Without CONSULT-II)>>GO TO 5.

NG >> Repair open circuit or short to ground and short to power in harness or connectors.

## 4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

**Ⓜ With CONSULT-II**

1. Reconnect all harness connectors disconnected.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

OK >> GO TO 6.

NG >> GO TO 5.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 MNTR (B1)	LEAN

PBIB0569E

## 5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-1526, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace EVAP canister purge volume control solenoid valve.

## 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

# DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR25DE]

UBS002E8

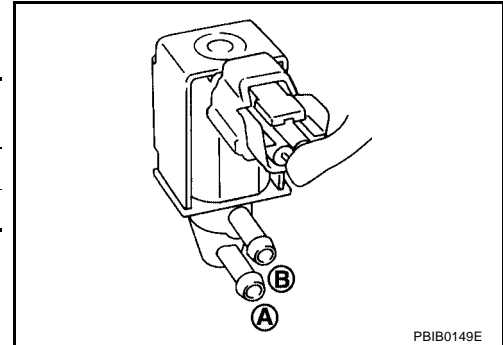
## Component Inspection

### EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

#### ④ With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

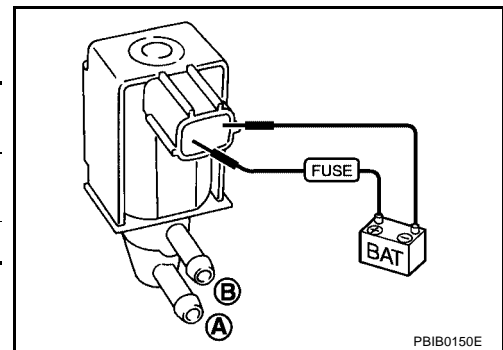
Condition (PURG VOL CONT/V value)	Air passage continuity between <b>A</b> and <b>B</b>
100.0%	Yes
0.0%	No



#### ⊗ Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between <b>A</b> and <b>B</b>
12V direct current supply between terminals 1 and 2	Yes
No supply	No



UBS002E9

## Removal and Installation

### EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EM-105, "INTAKE MANIFOLD"](#) .

## DTC P0447 EVAP CANISTER VENT CONTROL VALVE

PFP:14935

### Component Description

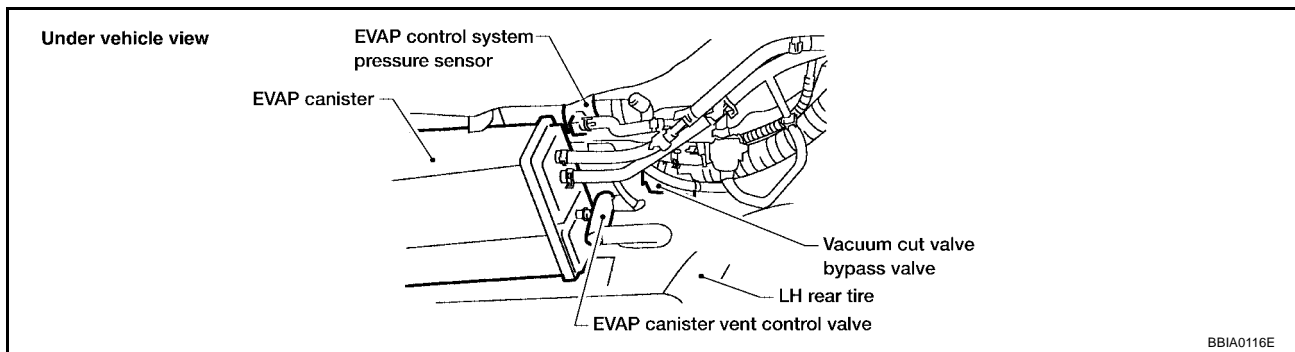
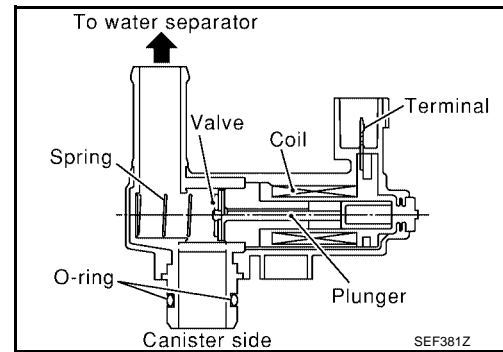
UBS002EA

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.



### CONSULT-II Reference Value in Data Monitor Mode

UBS002EB

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

### On Board Diagnosis Logic

UBS002EC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0447 0447	EVAP canister vent control valve circuit open	An improper voltage signal is sent to ECM through EVAP canister vent control valve.	<ul style="list-style-type: none"> <li>● Harness or connectors (The valve circuit is open or shorted.)</li> <li>● EVAP canister vent control valve</li> </ul>

### DTC Confirmation Procedure

UBS002ED

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

#### WITH CONSULT-II

1. Turn ignition switch "ON".

# DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QR25DE]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait at least 8 seconds.
4. If 1st trip DTC is detected, go to [EC-1530, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



## WITH GST

Follow the procedure "WITH CONSULT-II" above.



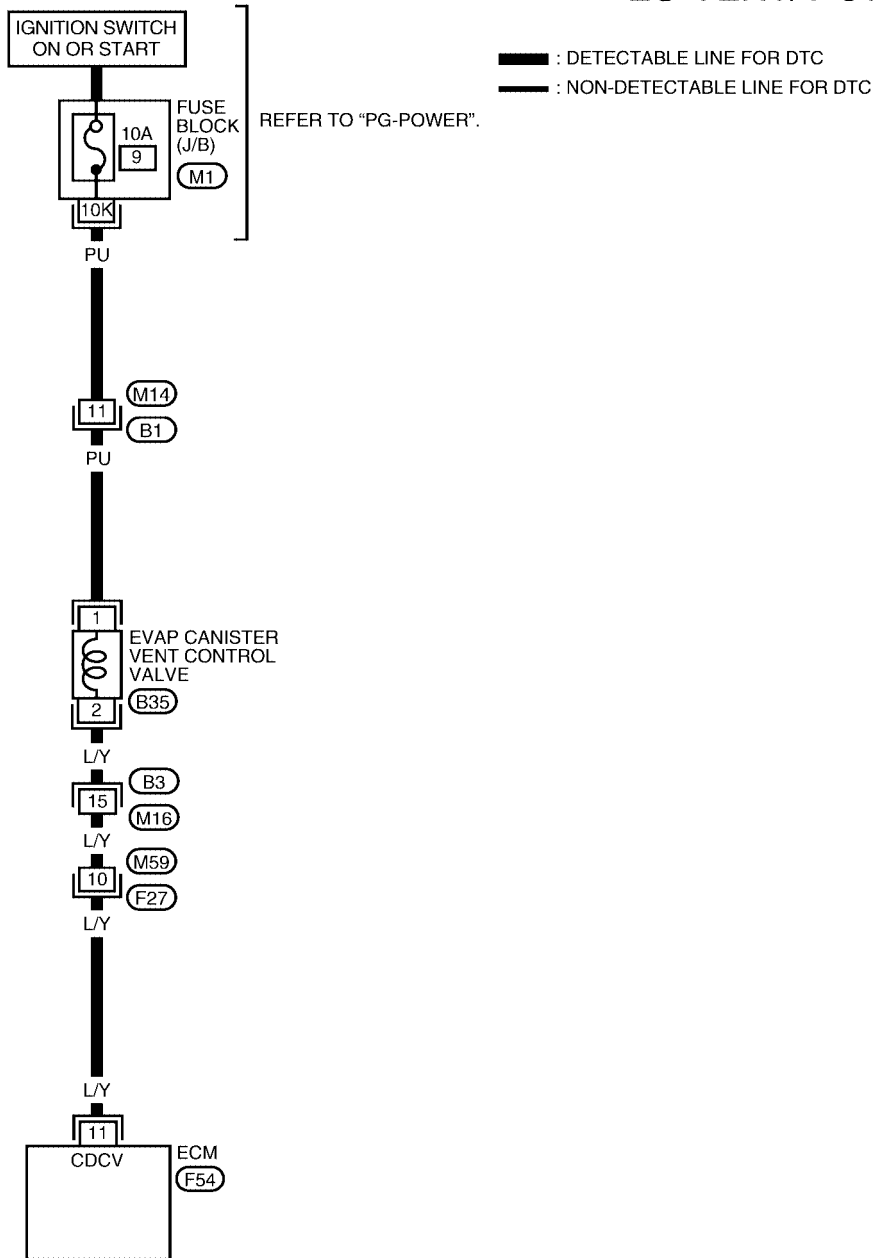
# DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QR25DE]

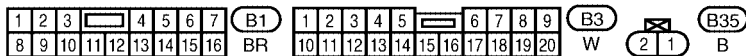
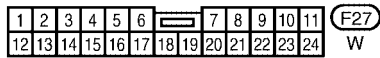
## Wiring Diagram

UBS002EE

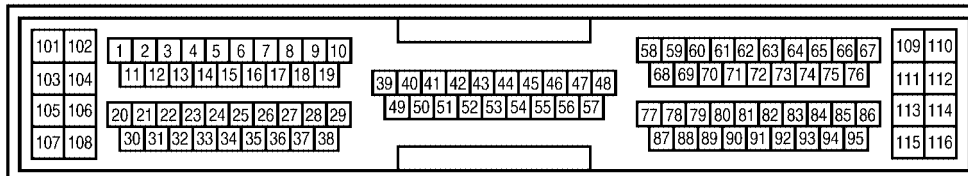
### EC-VENT/V-01



A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



REFER TO THE FOLLOWING.  
 (M1) - JUNCTION BLOCK - JUNCTION BOX (J/B)



BBWA0225E

# DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
11	L/Y	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS002EF

### 1. INSPECTION START

Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

### 2. CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

 **With CONSULT-II**

1. Turn ignition switch "OFF" and then turn "ON".
2. Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-II.
3. Touch "ON/OFF" on CONSULT-II screen.
4. Check for operating sound of the valve.  
**Clicking noise should be heard.**

OK or NG

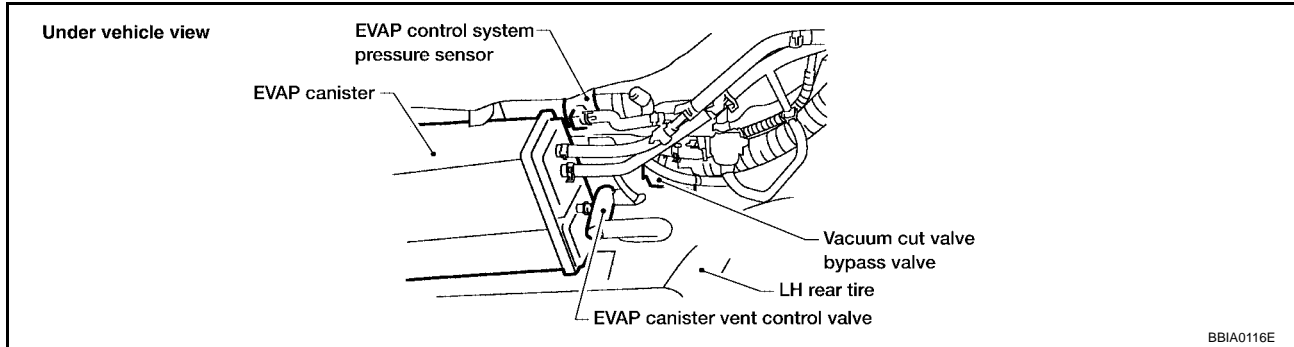
- OK >> GO TO 7.
- NG >> GO TO 3.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 (B1)	XXX V

PBIB0834E

## 3. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect EVAP canister vent control valve harness connector.

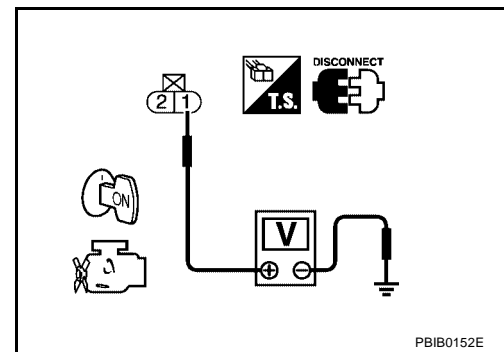


3. Turn ignition switch "ON".
4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



## 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M14, B1
- Fuse block (J/B) connector M1
- 10A fuse
- Harness for open or short between EVAP canister vent control valve and fuse

>> Repair harness or connectors.

## 5. CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 11 and EVAP canister vent control valve terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

## 6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B3, M16
- Harness connectors M59, F27
- Harness for open or short between EVAP canister vent control valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 8.  
 NG >> Clean the rubber tube using an air blower.

## 8. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-1532, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.  
 NG >> Replace EVAP canister vent control valve.

## 9. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

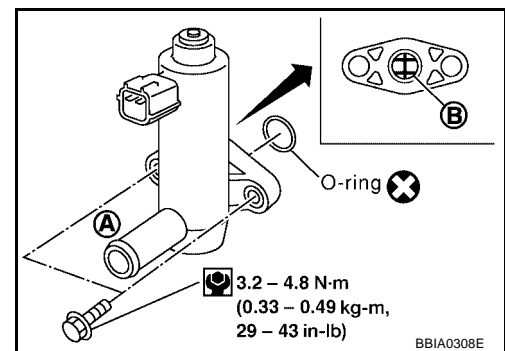
>> INSPECTION END

### Component Inspection EVAP CANISTER VENT CONTROL VALVE

UBS002EG

Ⓟ With CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.
3. Reconnect harness connectors disconnected.
4. Turn ignition switch "ON".



5. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
6. Check air passage continuity and operation delay time.

Condition	Air passage continuity between <b>A</b> and <b>B</b>
ON	No
OFF	Yes

**Operation takes less than 1 second.**  
**Make sure new O-ring is installed properly.**  
 If NG, go to next step.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
H02S1 (B1)	XXX V

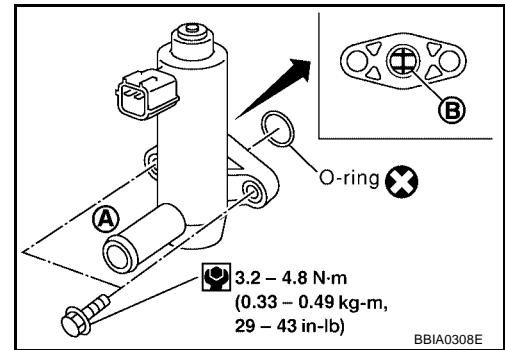
# DTC P0447 EVAP CANISTER VENT CONTROL VALVE

[QR25DE]

7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform inspection again.

⊗ **Without CONSULT-II**

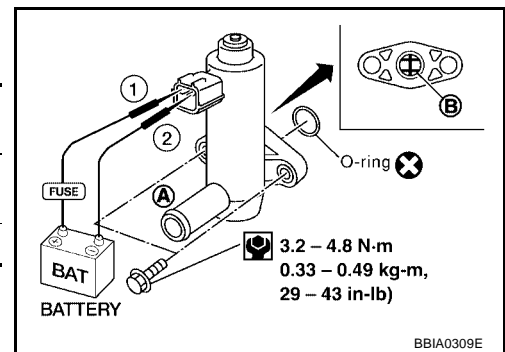
1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.



3. Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between <b>A</b> and <b>B</b>
12V direct current supply between terminals 1 and 2	No
OFF	Yes

**Operation takes less than 1 second.**  
**Make sure new O-ring is installed properly.**  
 If NG, go to next step.



4. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
5. Perform inspection again.

# DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE]

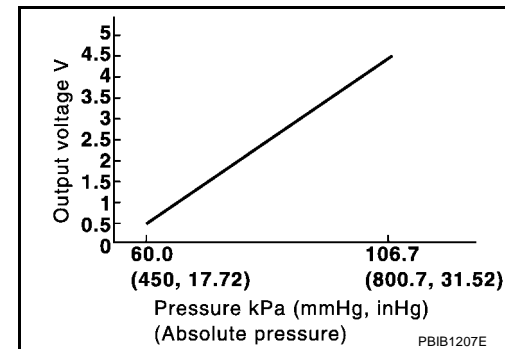
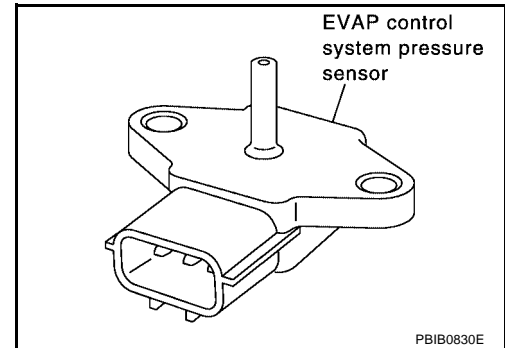
## DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

PF2:25085

### Component Description

UBS002EH

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases. The EVAP control system pressure sensor is not used to control the engine system. It is used only for on board diagnosis.



### CONSULT-II Reference Value in Data Monitor Mode

UBS002EI

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	1.8 - 4.8V

### On Board Diagnosis Logic

UBS002EJ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0452 0452	EVAP control system pressure sensor low input	An excessively low voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● EVAP control system pressure sensor</li> </ul>

### DTC Confirmation Procedure

UBS002EK

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

#### WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".

# DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE]

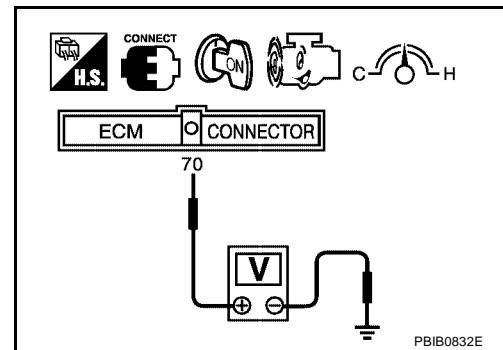
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.  
If 1st trip DTC is detected, go to [EC-1537, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y

## WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 70 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and wait at least 20 seconds.
5. Select "MODE 7" with GST.  
If 1st trip DTC is detected, go to [EC-1537, "Diagnostic Procedure"](#).



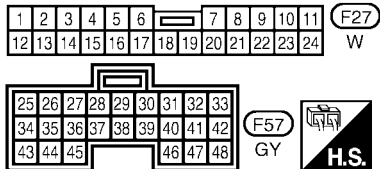
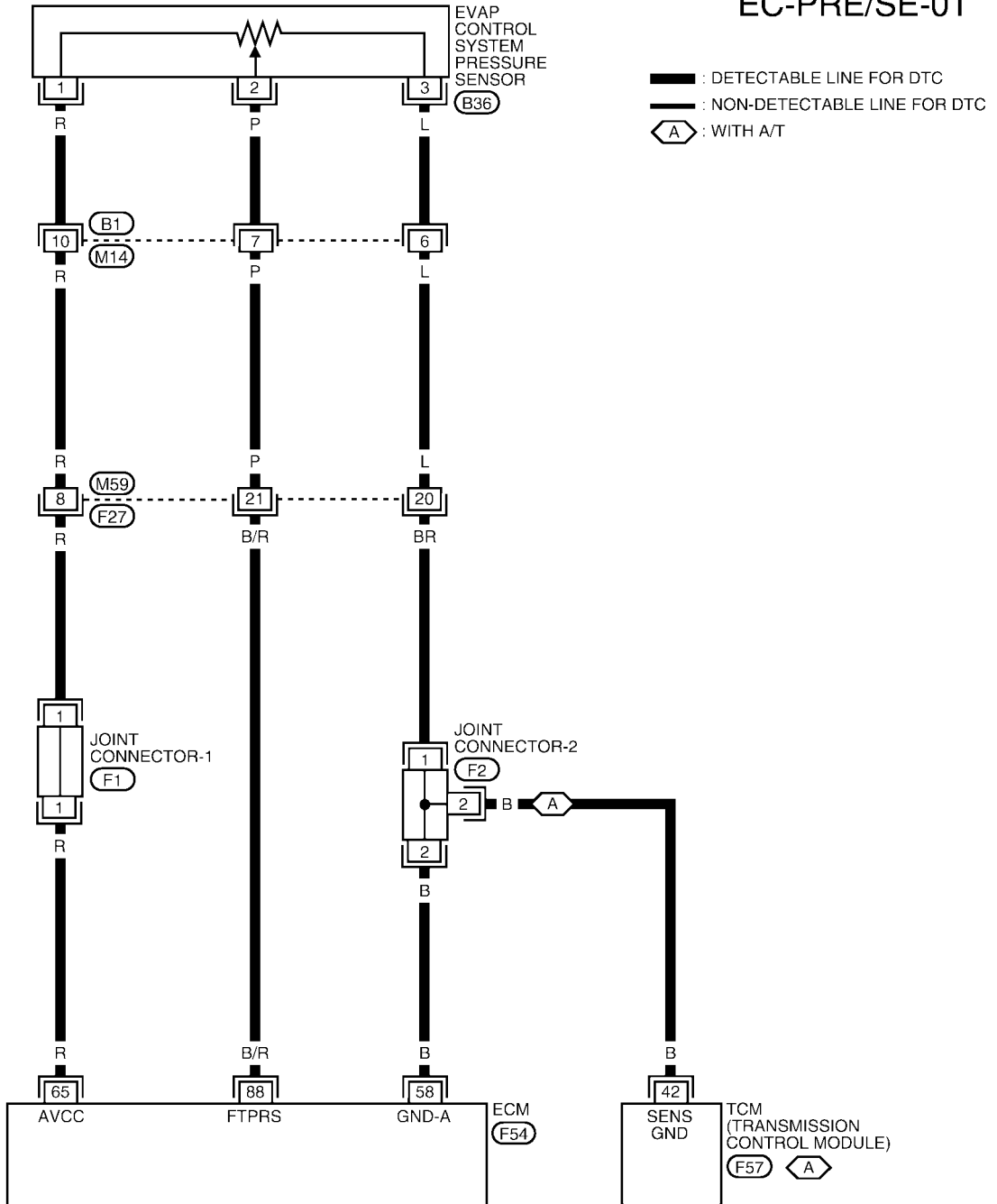
# DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE]

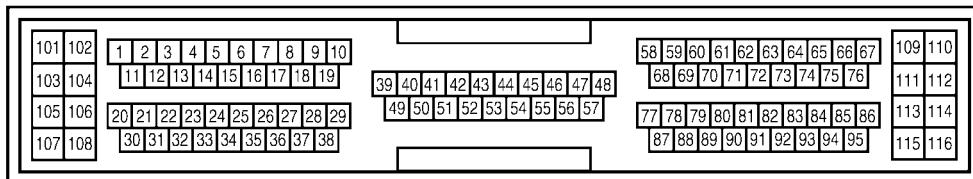
UBS002EL

## Wiring Diagram

EC-PRE/SE-01



REFER TO THE FOLLOWING.  
 (F1), (F2) - JOINT CONNECTOR





# DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
88	B/R	EVAP control system pressure sensor	[Ignition switch "ON"]	1.8 - 4.8V

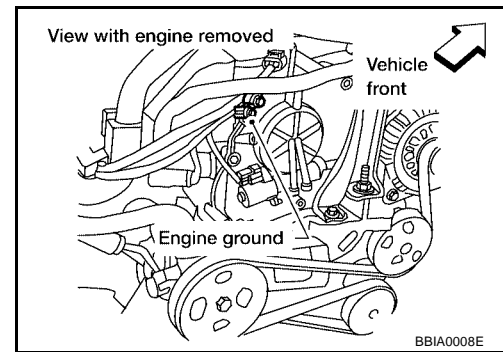
## Diagnostic Procedure

UBS002EM

### 1. RETIGHTEN GROUND SCREWS

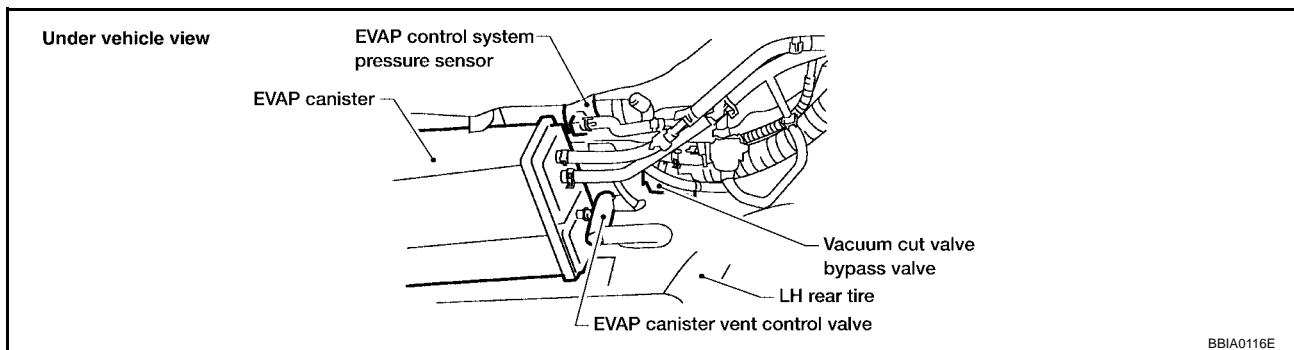
Loosen and retighten engine ground screws.

>> GO TO 2.



### 2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



2. Check sensor harness connector for water.

**Water should not exist.**

OK or NG

OK >> GO TO 3.

NG >> Repair or replace harness connector.

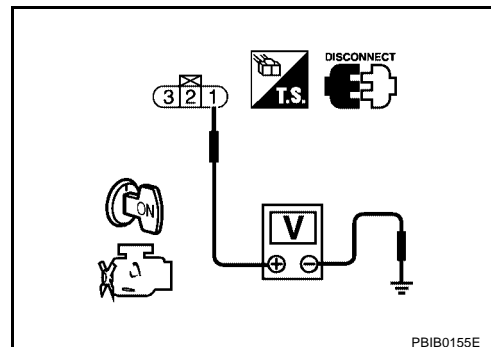
### 3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "ON".
2. Check voltage between EVAP control system pressure sensor terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 5.  
NG >> GO TO 4.



### 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Joint connector-1
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair harness or connectors.

### 5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between EVAP control system pressure sensor terminal 3 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.  
NG >> GO TO 6.

### 6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Joint connector-2
- Harness for open or short between EVAP control system pressure sensor and ECM
- Harness for open or short between EVAP control system pressure sensor and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 88 and EVAP control system pressure sensor terminal 2.  
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 8.

## 8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Harness for open or short between ECM and EVAP control system pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1539, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace EVAP control system pressure sensor.

## 10. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection EVAP CONTROL SYSTEM PRESSURE SENSOR

UBS002EN

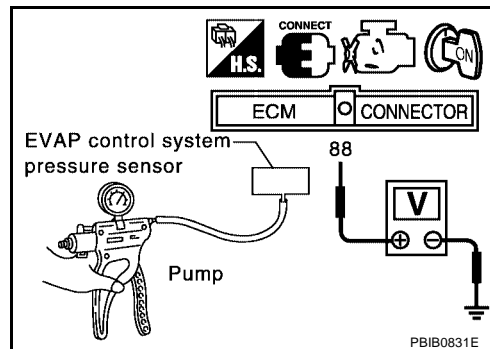
1. Remove EVAP control system pressure sensor with its harness connector connected.
2. Remove hose from EVAP control system pressure sensor.
3. Install a vacuum pump to EVAP control system pressure sensor.
4. Turn ignition switch "ON" and check output voltage between ECM terminal 88 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 to 2.5V lower than above value

**CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or over pressure 101.3 kPa (760 mmHg, 29.92 inHg) of pressure.

5. If NG, replace EVAP control system pressure sensor.



# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE]

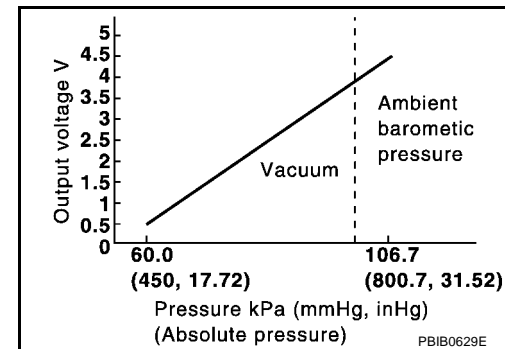
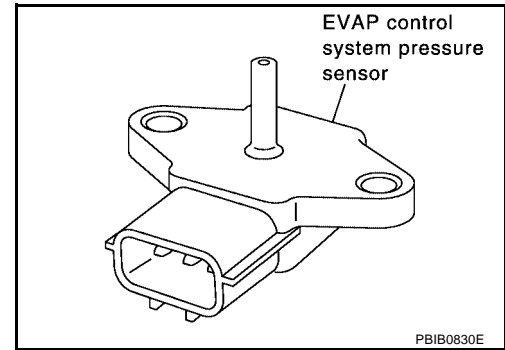
## DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

PFIP:25085

### Component Description

UBS002EO

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases. The EVAP control system pressure sensor is not used to control the engine system. It is used only for on board diagnosis.



### CONSULT-II Reference Value in Data Monitor Mode

UBS002EP

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	1.8 - 4.8V

### On Board Diagnosis Logic

UBS002EQ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0453 0453	EVAP control system pressure sensor high input	An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● EVAP control system pressure sensor</li> <li>● EVAP canister vent control valve</li> <li>● EVAP canister</li> <li>● Rubber hose from EVAP canister vent control valve to vehicle frame</li> </ul>

### DTC Confirmation Procedure

UBS002ER

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

#### Ⓟ WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".

# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE]

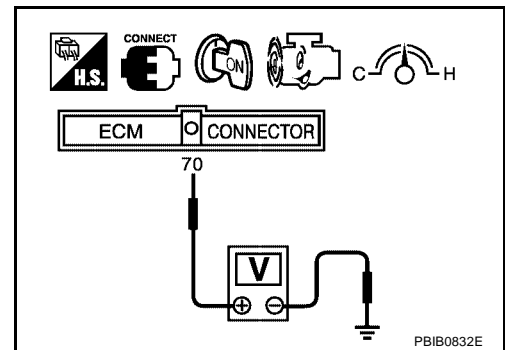
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
6. Wait at least 10 seconds.
7. If 1st trip DTC is detected, go to [EC-1543, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y

## WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Wait at least 10 seconds.
5. Select "MODE 7" with GST.
6. If 1st trip DTC is detected, go to [EC-1543, "Diagnostic Procedure"](#).



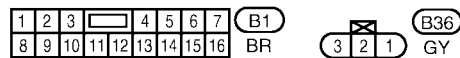
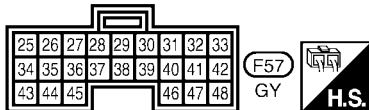
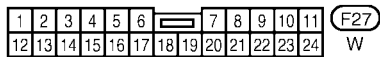
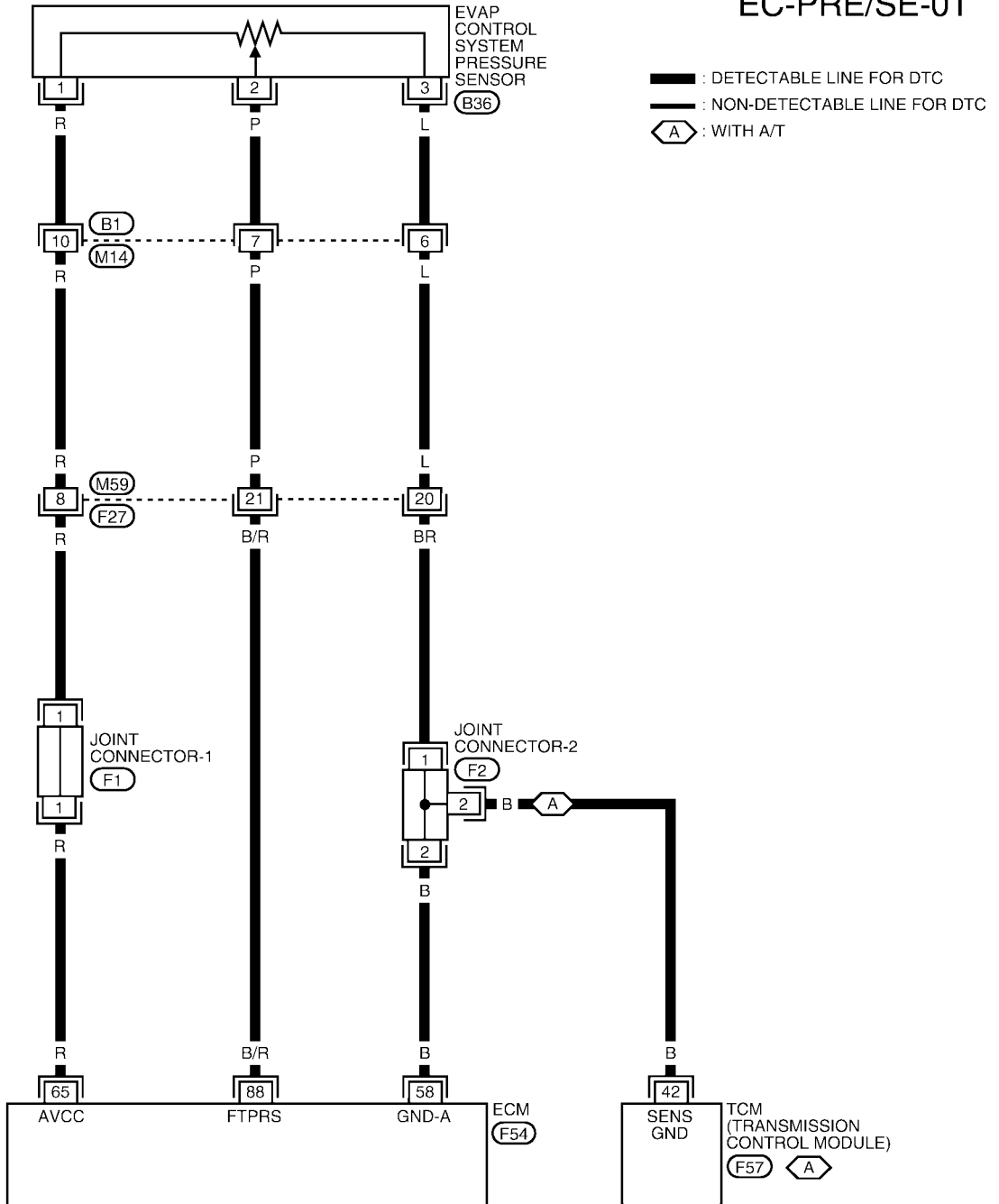
# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE]

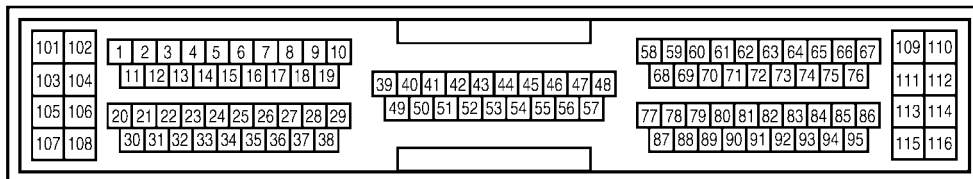
UBS002ES

## Wiring Diagram

EC-PRE/SE-01



REFER TO THE FOLLOWING.  
 (F1), (F2) - JOINT CONNECTOR



BBWA0417E

# DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
88	B/R	EVAP control system pressure sensor	[Ignition switch "ON"]	1.8 - 4.8V

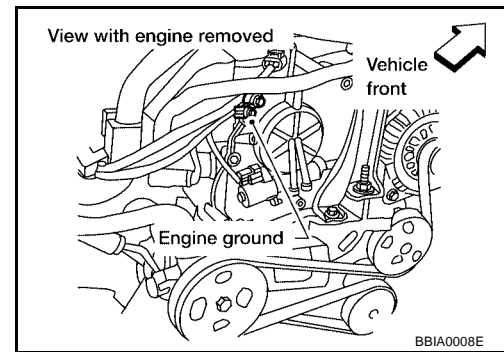
## Diagnostic Procedure

UBS002ET

### 1. RETIGHTEN GROUND SCREWS

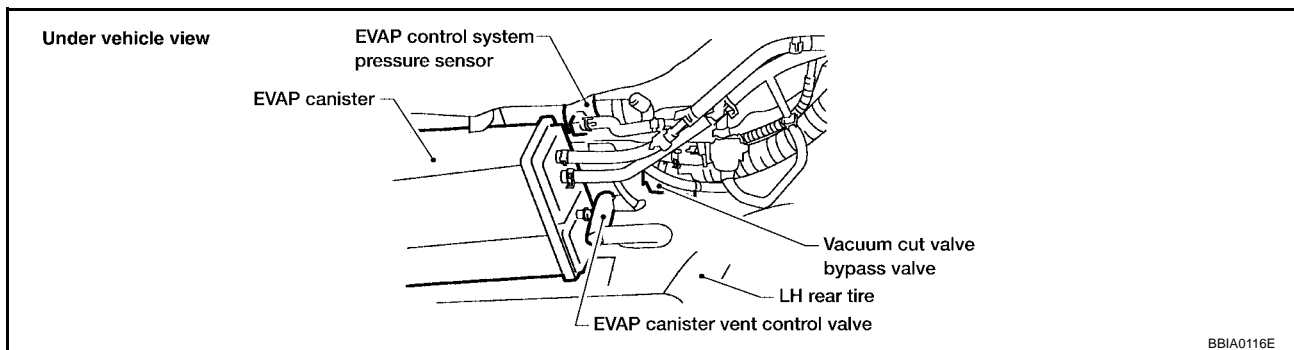
Loosen and retighten engine ground screws.

>> GO TO 2.



### 2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



2. Check sensor harness connector for water.

**Water should not exist.**

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace harness connector.

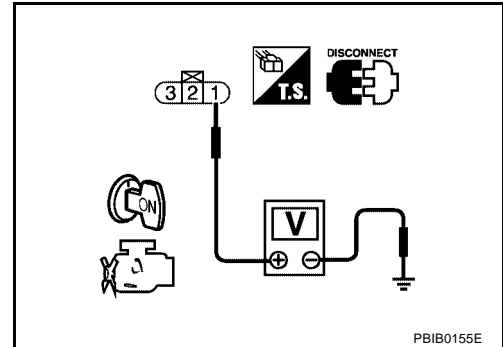
## 3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "ON".
2. Check voltage between EVAP control system pressure sensor terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



## 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Joint connector-1
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair harness or connectors.

## 5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between EVAP control system pressure sensor terminal 3 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

## 6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Joint connector-2
- Harness for open or short between EVAP control system pressure sensor and ECM
- Harness for open or short between EVAP control system pressure sensor and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.



---

## 7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 88 and EVAP control system pressure sensor terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.  
NG >> GO TO 8.

---

## 8. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Harness for open or short between ECM and EVAP control system pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 9. CHECK RUBBER TUBE FOR CLOGGING

---

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 10.  
NG >> Clean the rubber tube using an air blower.

---

## 10. CHECK EVAP CANISTER VENT CONTROL VALVE

---

Refer to [EC-1532. "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.  
NG >> Replace EVAP canister vent control valve.

---

## 11. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

---

Refer to [EC-1546. "Component Inspection"](#) .

OK or NG

- OK >> GO TO 12.  
NG >> Replace EVAP control system pressure sensor.

---

## 12. CHECK RUBBER TUBE

---

Check obstructed rubber tube connected to EVAP canister vent control valve.

OK or NG

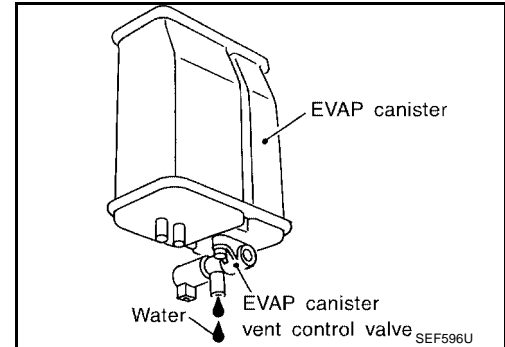
- OK >> GO TO 13.  
NG >> Clean rubber tube using an air blower, repair or replace rubber tube.

**13. CHECK IF EVAP CANISTER SATURATED WITH WATER**

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will drain from the EVAP canister.

Yes or No

- Yes >> GO TO 14.
- No >> GO TO 16.



**14. CHECK EVAP CANISTER**

Weigh the EVAP canister with the EVAP canister vent control valve attached.

**The weight should be less than 1.8 kg (4.0 lb).**

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 15.

**15. DETECT MALFUNCTIONING PART**

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

**16. CHECK INTERMITTENT INCIDENT**

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection  
EVAP CONTROL SYSTEM PRESSURE SENSOR**

UBS002EU

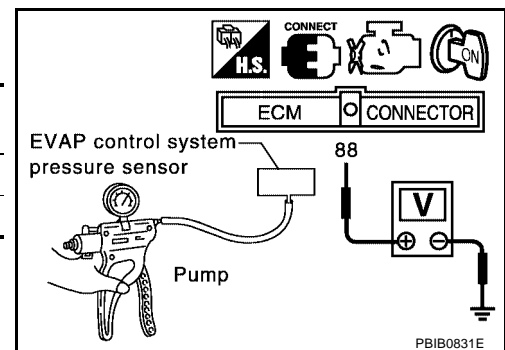
1. Remove EVAP control system pressure sensor with its harness connector connected.
2. Remove hose from EVAP control system pressure sensor.
3. Install a vacuum pump to EVAP control system pressure sensor.
4. Turn ignition switch "ON" and check output voltage between ECM terminal 88 and ground under the following conditions.

Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200 mmHg, -7.87)	2.1 to 2.5V lower than above value

**CAUTION:**

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg) of pressure.

5. If NG, replace EVAP control system pressure sensor.



## DTC P0455 EVAP CONTROL SYSTEM

PFP:14950

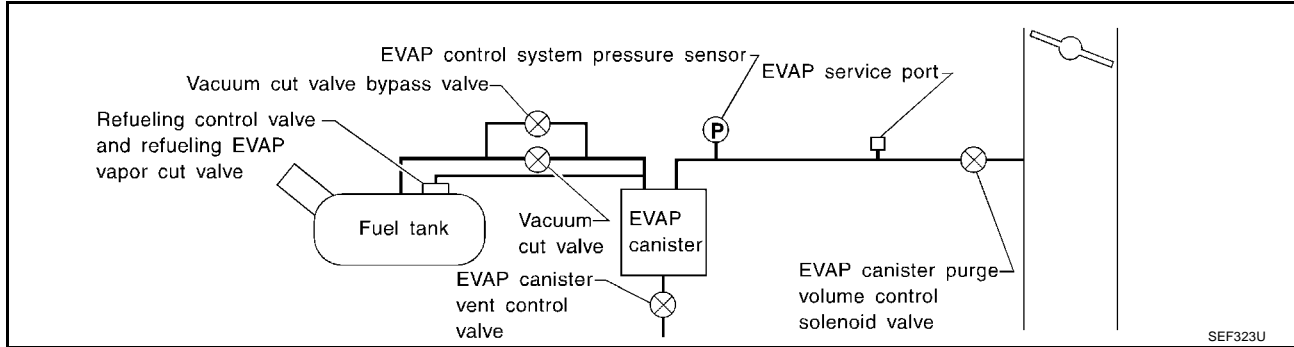
### On Board Diagnosis Logic

UBS002EV

**NOTE:**

**If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (EC-1687.)**

This diagnosis detects a very large leak (fuel filler cap fell off etc.) in EVAP system between the fuel tank and EVAP canister purge volume control solenoid valve.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0455 0455	EVAP control system gross leak detected	EVAP control system has a very large leak such as fuel filler cap fell off, EVAP control system does not operate properly.	<ul style="list-style-type: none"> <li>● Fuel filler cap remains open or fails to close.</li> <li>● Incorrect fuel tank vacuum relief valve</li> <li>● Incorrect fuel filler cap used</li> <li>● Foreign matter caught in fuel filler cap.</li> <li>● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>● Foreign matter caught in EVAP canister vent control valve.</li> <li>● EVAP canister or fuel tank leaks</li> <li>● EVAP purge line (pipe and rubber tube) leaks</li> <li>● EVAP purge line rubber tube bent.</li> <li>● Blocked or bent rubber tube to EVAP control system pressure sensor</li> <li>● Loose or disconnected rubber tube</li> <li>● EVAP canister vent control valve and the circuit</li> <li>● EVAP canister purge volume control solenoid valve and the circuit</li> <li>● Fuel tank temperature sensor</li> <li>● O-ring of EVAP canister vent control valve is missing or damaged.</li> <li>● EVAP control system pressure sensor</li> <li>● Refueling control valve</li> <li>● ORVR system leaks</li> </ul>

**CAUTION:**

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

### DTC Confirmation Procedure

UBS002EW

**CAUTION:**

**Never remove fuel filler cap during the DTC Confirmation Procedure.**

**NOTE:**

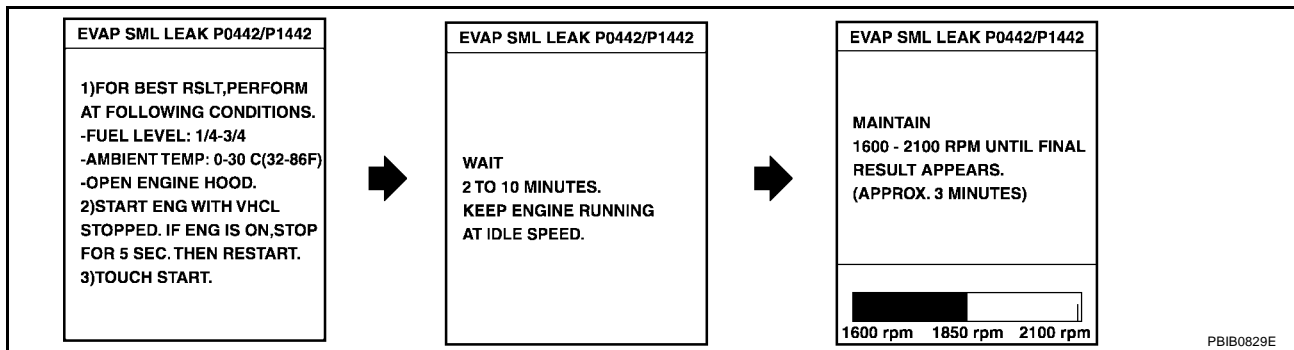
- If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. ([EC-1687](#) .)
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.
- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Open engine hood before conducting the following procedures.

**WITH CONSULT-II**

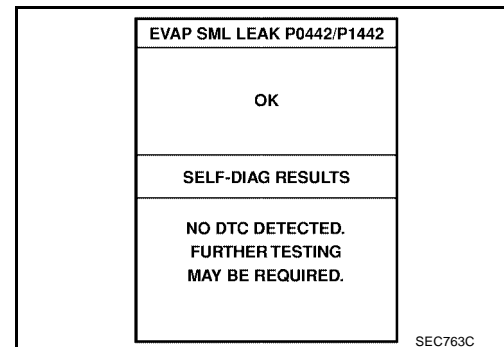
1. Tighten fuel filler cap securely until ratcheting sound is heard.
2. Turn ignition switch “ON”.
3. Turn ignition switch “OFF” and wait at least 10 seconds.
4. Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
5. Make sure that the following conditions are met.  
**COOLAN TEMP/S: 0 - 70°C (32 - 158°F)**  
**INT/A TEMP SE: 0 - 60°C (32 - 140°F)**
6. Select “EVAP SML LEAK P0442/P1442” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.  
 Follow the instruction displayed.



**NOTE:**

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to [EC-1291, "Basic Inspection"](#) .

7. Make sure that “OK” is displayed.  
 If “NG” is displayed, select “SELF-DIAG RESULTS” mode and make sure that “EVAP GROSS LEAK [P0455]” is displayed. If it is displayed, refer to [EC-1549, "Diagnostic Procedure"](#) .  
 If P0442 is displayed, perform “Diagnostic Procedure” for DTC P0442, [EC-1515](#) .



**WITH GST**

**NOTE:**

Be sure to read the explanation of “Driving Pattern” on [EC-1270](#) before driving vehicle.

1. Start engine.
2. Drive vehicle according to “Driving Pattern”, [EC-1270](#) .
3. Stop vehicle.
4. Select “MODE 1” with GST.
  - If SRT of EVAP system is not set yet, go to the following step.

- If SRT of EVAP system is set, the result will be OK.
- 5. Turn ignition switch "OFF" and wait at least 10 seconds.
- 6. Start engine.  
**It is not necessary to cool engine down before driving.**
- 7. Drive vehicle again according to the "Driving Pattern", [EC-1270](#) .
- 8. Stop vehicle.
- 9. Select "MODE 3" with GST.
  - If P0455 is displayed on the screen, go to [EC-1549, "Diagnostic Procedure"](#) .
  - If P0442 is displayed on the screen, go to "Diagnostic Procedure", for DTC P0442, [EC-1515](#) .
  - If P0441 is displayed on the screen, go to "Diagnostic Procedure" for DTC P0441, [EC-1509](#) .
  - If P0455, P0441 and P0442 are not displayed on the screen, go to the following step.
- 10. Select "MODE 1" with GST.
  - If SRT of EVAP system is set, the result will be OK.
  - If SRT of EVAP system is not set, go to step 6.

## Diagnostic Procedure

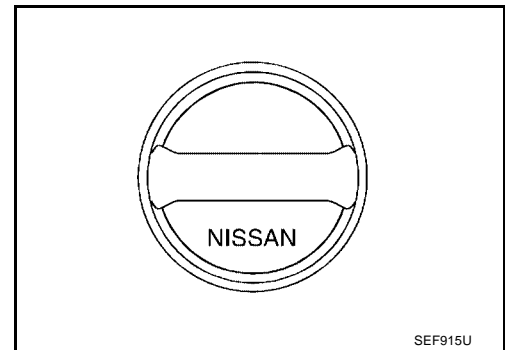
UBS002EX

### 1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch "OFF".
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK >> GO TO 2.
- NG >> Replace with genuine NISSAN fuel filler cap.



### 2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

- OK >> GO TO 3.
- NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.  
2. Retighten until ratcheting sound is heard.

### 3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.

### 4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to [EC-1849, "FUEL TANK VACUUM RELIEF VALVE \(BUILT INTO FUEL FULLER CAP\)"](#) .

OK or NG

- OK >> GO TO 5.
- NG >> Replace fuel filler cap with a genuine one.

## 5. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks, improper connection or disconnection.

Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#).

OK or NG

OK >> GO TO 6.

NG >> Repair or reconnect the hose.

## 6. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 7.

## 7. CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT

Refer to [EC-1687, "DTC Confirmation Procedure"](#).

OK or NG

OK >> GO TO 8.

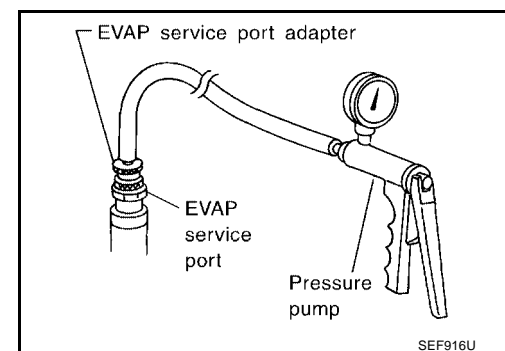
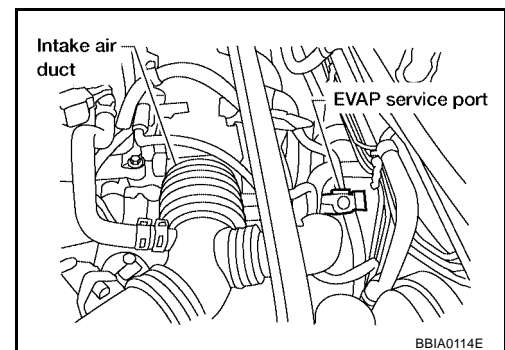
NG >> Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

## 8. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.

**NOTE:**

**Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.**



Models with CONSULT-II >> GO TO 9.

Models without CONSULT-II >> GO TO 10.

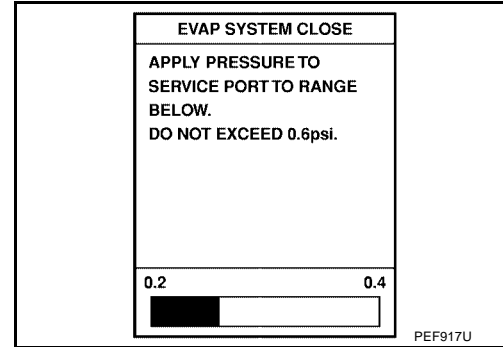
## 9. CHECK FOR EVAP LEAK

### With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

#### NOTE:

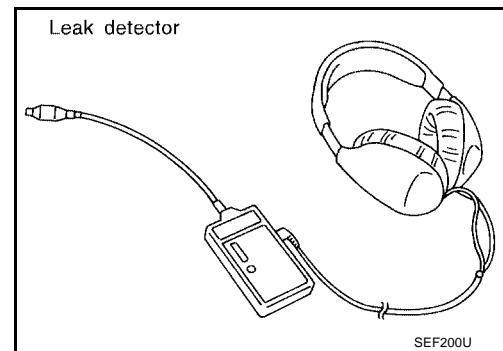
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#).

#### OK or NG

- OK >> GO TO 11.  
 NG >> Repair or replace.



A

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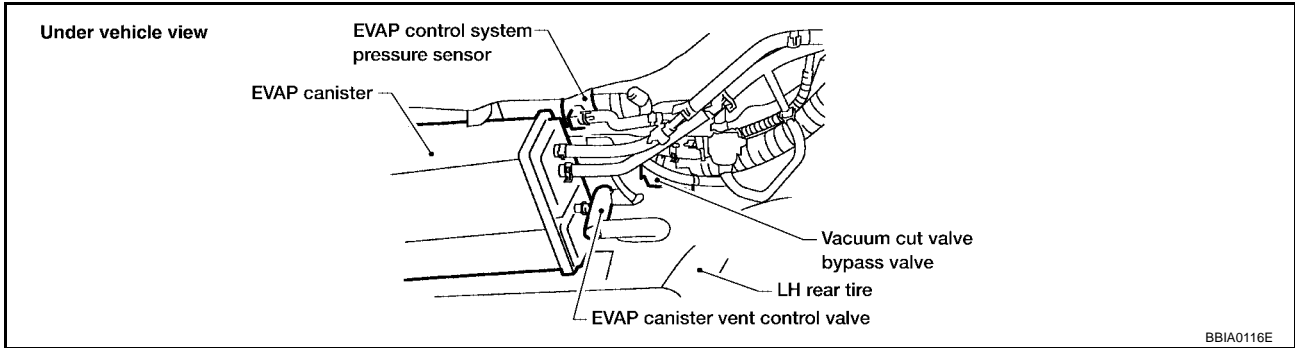
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M

10. CHECK FOR EVAP LEAK

⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

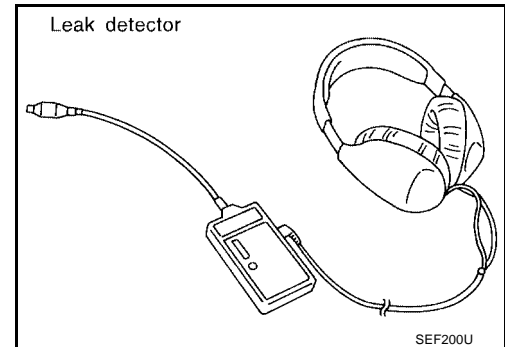
**NOTE:**

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#).

OK or NG

- OK >> GO TO 12.  
 NG >> Repair or replace.



11. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Ⓟ With CONSULT-II

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

OK or NG

- OK >> GO TO 14.  
 NG >> GO TO 13.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E



**12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION**

**⊗ Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

**Vacuum should exist.**

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 13.

**13. CHECK VACUUM HOSE**

Check vacuum hoses for clogging or disconnection. Refer to [EC-1237, "Vacuum Hose Drawing"](#) .

OK or NG

- OK (With CONSULT-II)>>GO TO 14.
- OK (Without CONSULT-II)>>GO TO 15.
- NG >> Repair or reconnect the hose.

**14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

**Ⓜ With CONSULT-II**

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 15.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

**15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

Refer to [EC-1526, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 16.
- NG >> Replace EVAP canister purge volume control solenoid valve.

**16. CHECK FUEL TANK TEMPERATURE SENSOR**

Refer to [EC-1456, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 17.
- NG >> Replace fuel level sensor unit.

---

## 17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

---

Refer to [EC-1539, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 18.
- NG >> Replace EVAP control system pressure sensor.

---

## 18. CHECK REFUELING EVAP VAPOR LINE

---

Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-1852, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#) .

OK or NG

- OK >> GO TO 19.
- NG >> Repair or replace hoses and tubes.

---

## 19. CHECK SIGNAL LINE AND RECIRCULATION LINE

---

Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

- OK >> GO TO 20.
- NG >> Repair or replace hoses, tubes or filler neck tube.

---

## 20. CHECK REFUELING CONTROL VALVE

---

Refer to [EC-1855, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 21.
- NG >> Replace refueling control valve with fuel tank.

---

## 21. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

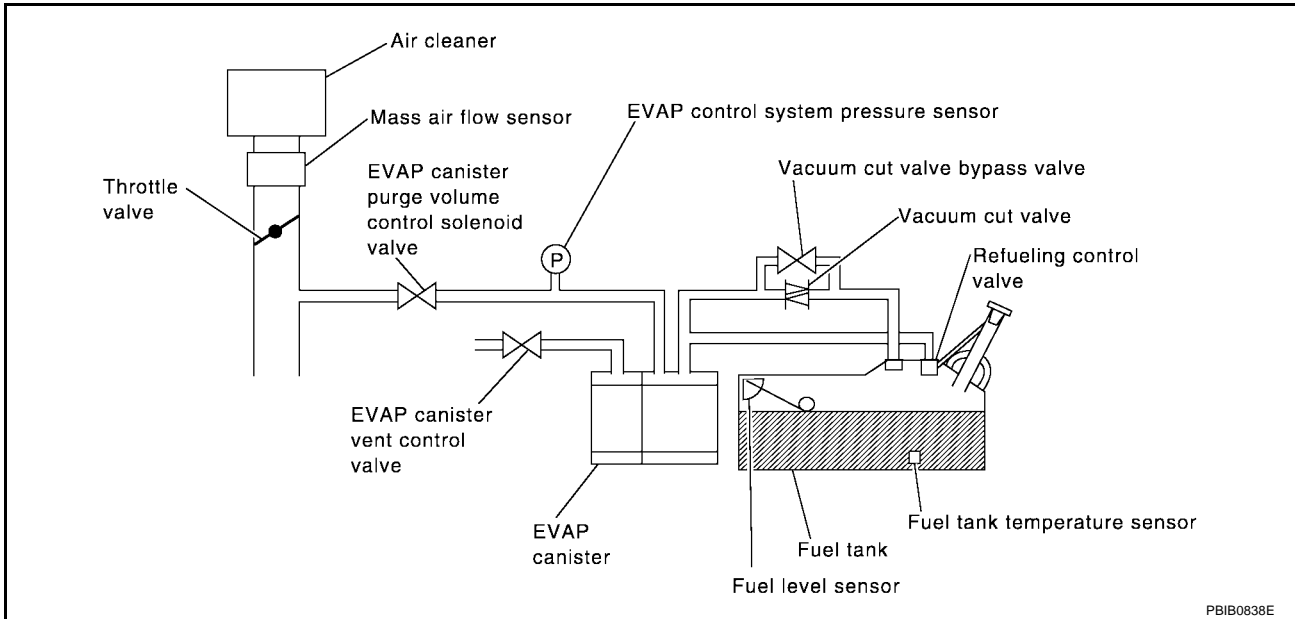
**DTC P0456 EVAP CONTROL SYSTEM**

PF0:14950

**On Board Diagnosis Logic**

UBS002EY

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum. If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following "Vacuum test" conditions. The vacuum cut valve bypass valve is opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP canister vent control valve will then be closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve is opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed. If ECM judges a leak which corresponds to a very small leak, the very small leak P0456 will be detected. If ECM judges a leak equivalent to a small leak, EVAP small leak P0442 will be detected. If ECM judges there are no leaks, the diagnosis will be OK.



PBIB0838E

# DTC P0456 EVAP CONTROL SYSTEM

[QR25DE]

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0456 0456	Evaporative emission control system very small leak (negative pressure check)	<ul style="list-style-type: none"> <li>● EVAP system has a very small leak.</li> <li>● EVAP system does not operate properly.</li> </ul>	<ul style="list-style-type: none"> <li>● Incorrect fuel tank vacuum relief valve</li> <li>● Incorrect fuel filler cap used</li> <li>● Fuel filler cap remains open or fails to close.</li> <li>● Foreign matter caught in fuel filler cap.</li> <li>● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>● Foreign matter caught in EVAP canister vent control valve.</li> <li>● EVAP canister or fuel tank leaks</li> <li>● EVAP purge line (pipe and rubber tube) leaks</li> <li>● EVAP purge line rubber tube bent</li> <li>● Blocked or bent rubber tube to EVAP control system pressure sensor</li> <li>● Loose or disconnected rubber tube</li> <li>● EVAP canister vent control valve and the circuit</li> <li>● EVAP canister purge volume control solenoid valve and the circuit</li> <li>● Fuel tank temperature sensor</li> <li>● O-ring of EVAP canister vent control valve is missing or damaged</li> <li>● EVAP canister is saturated with water</li> <li>● EVAP control system pressure sensor</li> <li>● Refueling control valve</li> <li>● ORVR system leaks</li> <li>● Fuel level sensor and the circuit</li> <li>● Foreign matter caught in EVAP canister purge volume control solenoid valve</li> </ul>

## CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

## DTC Confirmation Procedure

UBS002EZ

### NOTE:

- If DTC P0456 is displayed with P0442, first perform TROUBLE DIAGNOSIS FOR DTC P0456.
- After repair, make sure that the hoses and clips are installed properly.
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

- Open engine hood before conducting following procedure.
- If any of following conditions are met just before the DTC confirmation procedure, leave the vehicle for more than 1 hour.
  - Fuel filler cap is removed.
  - Refilled or drained the fuel.
  - EVAP component parts is/are removed.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

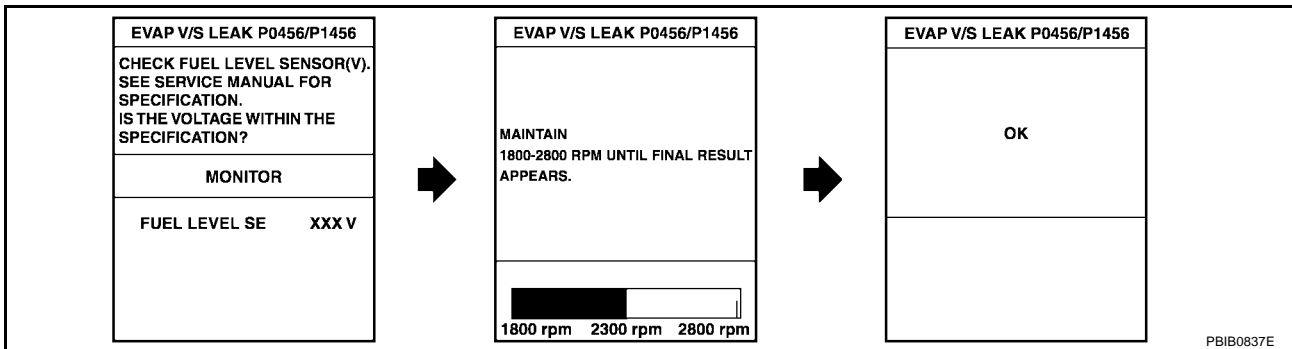
### Ⓟ WITH CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Make sure the following conditions are met.  
**FUEL LEVEL SE: 0.25 - 1.15V**

**COOLAN TEMP/S: 0 - 32°C (32 - 90°F)**  
**FUEL T/TMP SE: 0 - 35°C (32 - 95°F)**  
**INT A/TEMP SE: More than 0°C (32°F)**

If NG, turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle) or refilling/draining fuel until the output voltage condition of the "FUEL LEVEL SE" meets within the range above and leave the vehicle for more than 1 hour. Then start from step 1).

3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Turn ignition switch "ON".
5. Select "EVAP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.  
Follow the instruction displayed.



6. Make sure that "OK" is displayed.  
If "NG" is displayed, refer to [EC-1558, "Diagnostic Procedure"](#).

**NOTE:**

- If the engine speed cannot be maintained within the range displayed on CONSULT-II screen, go to [EC-1291, "Basic Inspection"](#).
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

## Overall Function Check

UBS002F0

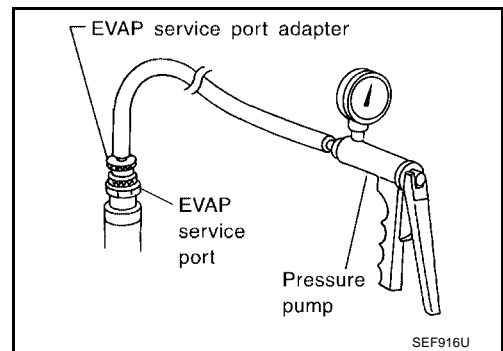
### WITH GST

Use this procedure to check the overall function of the EVAP very small leak function. During this check, a DTC might not be confirmed.

**CAUTION:**

- Never use compressed air, doing so may damage the EVAP system.
- Do not start engine.
- Do not exceeded 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi).

1. Attach the EVAP service port adapter securely to the EVAP service port.
2. Set the pressure pump and a hose.
3. Also set a vacuum gauge via 3-way connector and a hose.
4. Turn ignition switch "ON".
5. Connect GST and select MODE 8.
6. Using MODE 8 control the EVAP canister vent control valve (close) and vacuum cut valve bypass valve (open).
7. Apply pressure and make sure the following conditions are satisfied.



**Pressure to be applied: 2.7 kPa (20 mmHg, 0.79 inHg)**

**Time to be waited after the pressure drawn in to the EVAP system and the pressure to be dropped: 60 seconds and the pressure should not be dropped more than 0.4 kPa (3 mmHg, 0.12 inHg).**

If NG, go to [EC-1558, "Diagnostic Procedure"](#).

If OK, go to next step.

8. Disconnect GST.
9. Start engine and warm it up to normal operating temperature.

10. Turn ignition switch "OFF" and wait at least 10 seconds.
11. Restart engine and let it idle for 90 seconds.
12. Keep engine speed at 2,000 rpm for 30 seconds.
13. Turn ignition switch "OFF".

**NOTE:**

For more information, refer to GST instruction manual.

## Diagnostic Procedure

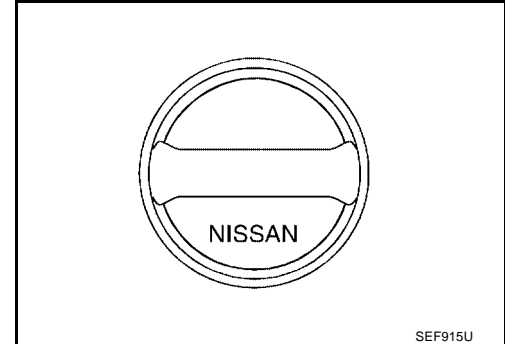
UBS002F1

### 1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch "OFF".
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK >> GO TO 2.  
NG >> Replace with genuine NISSAN fuel filler cap.



### 2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

- OK >> GO TO 3.  
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.  
2. Retighten until ratcheting sound is heard.

### 3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

- OK >> GO TO 5.  
NG >> GO TO 4.

### 4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to [EC-1849, "Component Inspection"](#) .

OK or NG

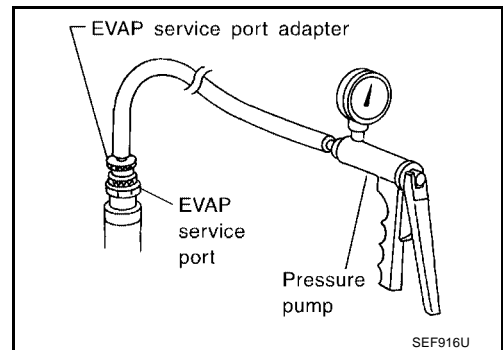
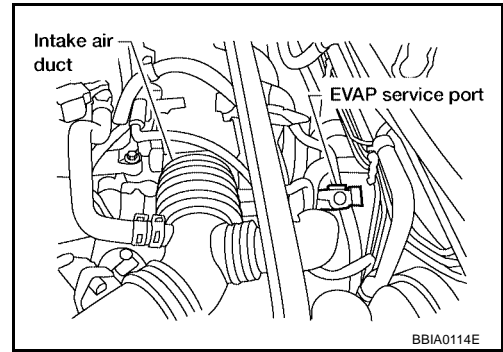
- OK >> GO TO 5.  
NG >> Replace fuel filler cap with a genuine one.

**5. INSTALL THE PRESSURE PUMP**

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.

**NOTE:**

**Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.**



Models with CONSULT-II>>GO TO 6.  
Models without CONSULT-II>>GO TO 7.

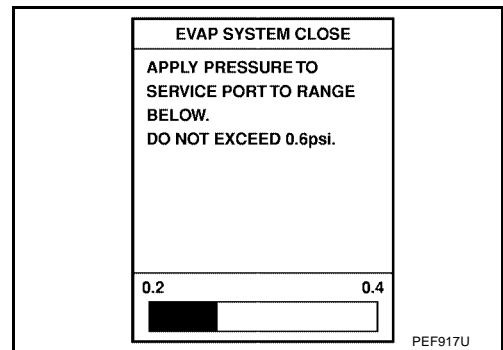
**6. CHECK FOR EVAP LEAK**

**Ⓜ With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

**NOTE:**

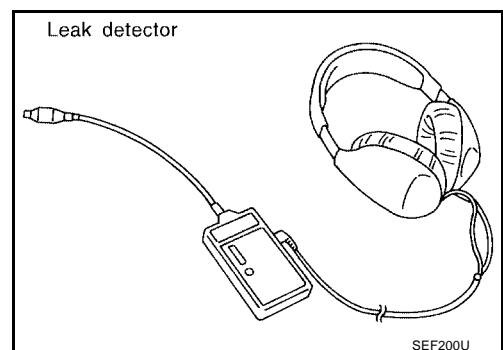
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#).

**OK or NG**

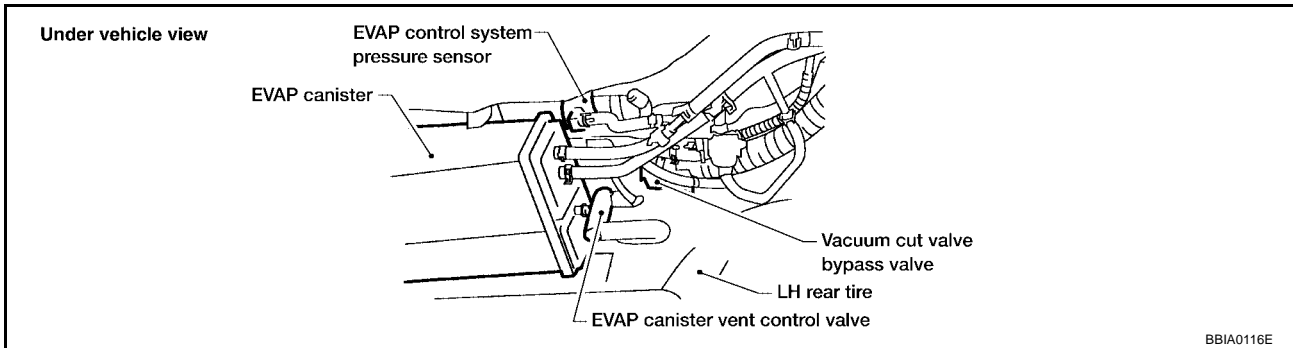
- OK >> GO TO 8.
- NG >> Repair or replace.



## 7. CHECK FOR EVAP LEAK

⊗ **Without CONSULT-II**

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)

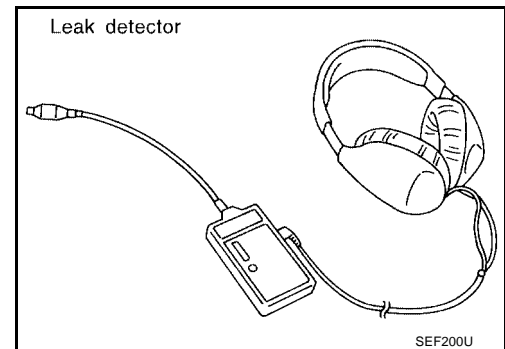


4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

**NOTE:**

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#).



**OK or NG**

- OK >> GO TO 8.  
 NG >> Repair or replace.

## 8. CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT

Refer to [EC-1693, "Component Inspection"](#).

**OK or NG**

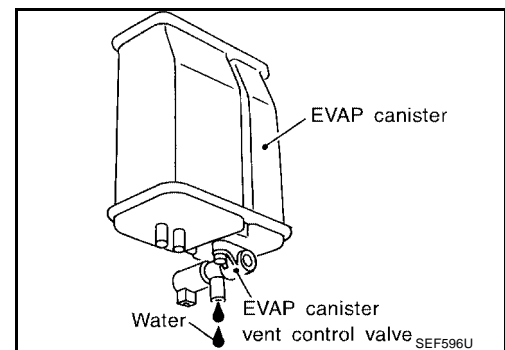
- OK >> GO TO 9.  
 NG >> Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

## 9. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Does water drain from the EVAP canister?

**Yes or No**

- Yes >> GO TO 10.  
 No (With CONSULT-II)>>GO TO 12.  
 No (Without CONSULT-II)>>GO TO 13.





**10. CHECK EVAP CANISTER**

Weigh the EVAP canister with the EVAP canister vent control valve attached.  
**The weight should be less than 1.8 kg (4.0 lb).**

OK or NG

- OK (With CONSULT-II)>>GO TO 12.
- OK (Without CONSULT-II)>>GO TO 13.
- NG >> GO TO 11.

**11. DETECT MALFUNCTIONING PART**

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

**12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION**

**Ⓜ With CONSULT-II**

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.

**13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION**

**Ⓧ Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

**Vacuum should exist.**

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 14.

**14. CHECK VACUUM HOSE**

Check vacuum hoses for clogging or disconnection. Refer to [EC-1237, "Vacuum Hose Drawing"](#) .

OK or NG

- OK >> GO TO 15.
- NG >> Repair or reconnect the hose.

---

**15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

---

Refer to [EC-1526, "Component Inspection"](#) .

OK or NG

OK >> GO TO 16.

NG >> Replace EVAP canister purge volume control solenoid valve.

---

**16. CHECK FUEL TANK TEMPERATURE SENSOR**

---

Refer to [EC-1456, "FUEL TANK TEMPERATURE SENSOR"](#) .

OK or NG

OK >> GO TO 17.

NG >> Replace fuel level sensor unit.

---

**17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR**

---

Refer to [EC-1539, "Component Inspection"](#) .

OK or NG

OK >> GO TO 18.

NG >> Replace EVAP control system pressure sensor.

---

**18. CHECK EVAP PURGE LINE**

---

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection.

Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

OK >> GO TO 19.

NG >> Repair or reconnect the hose.

---

**19. CLEAN EVAP PURGE LINE**

---

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 20.

---

**20. CHECK REFUELING EVAP VAPOR LINE**

---

Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-1852, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#) .

OK or NG

OK >> GO TO 21.

NG >> Repair or replace hoses and tubes.

---

**21. CHECK SIGNAL LINE AND RECIRCULATION LINE**

---

Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 22.

NG >> Repair or replace hoses, tubes or filler neck tube.

---

**22. CHECK REFUELING CONTROL VALVE**

---

Refer to [EC-1855, "Component Inspection"](#) .

OK or NG

OK >> GO TO 23.

NG >> Replace refueling control valve with fuel tank.

---

**23. CHECK FUEL LEVEL SENSOR**

---

Refer to [DI-26, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

OK >> GO TO 24.

NG >> Replace fuel level sensor unit.

---

**24. CHECK INTERMITTENT INCIDENT**

---

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

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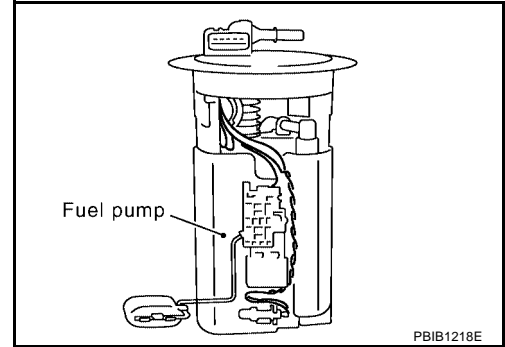
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## DTC P0460 FUEL LEVEL SENSOR

### Component Description

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



### On Board Diagnosis Logic

When the vehicle is parked, naturally the fuel level in the fuel tank is stable. It means that output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0460 0460	Fuel level sensor circuit noise	Even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Fuel level sensor</li> </ul>

### DTC Confirmation Procedure

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait maximum of 2 consecutive minutes.
4. If 1st trip DTC is detected, go to [EC-1566, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

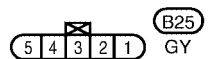
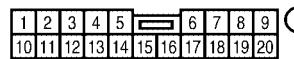
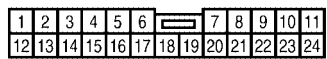
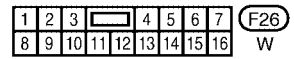
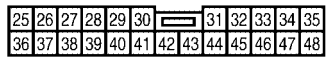
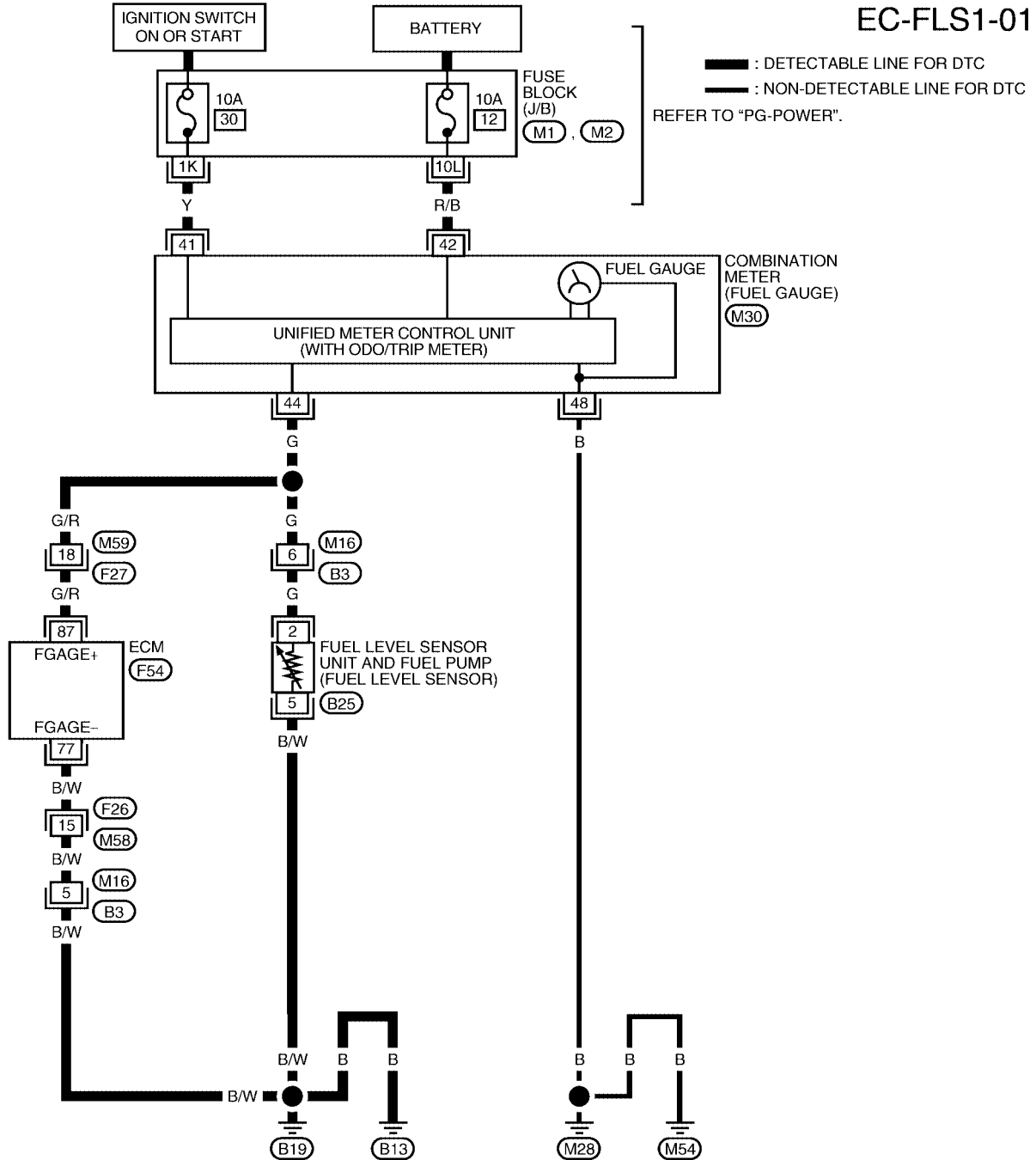
# DTC P0460 FUEL LEVEL SENSOR

[QR25DE]

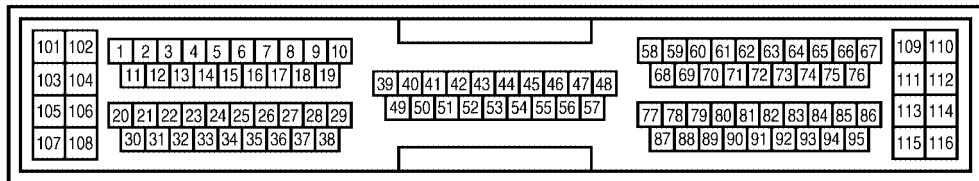
UBS002F6

## Wiring Diagram

EC-FLS1-01



REFER TO THE FOLLOWING.  
 (M1), (M2) - FUSE BLOCK - JUNCTION BOX (J/B)



BBWA0227E

# DTC P0460 FUEL LEVEL SENSOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

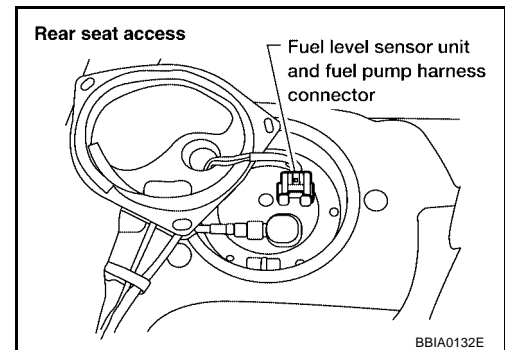
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
77	B/W	Fuel level sensor ground	[Engine is running] ● Idle speed	Approximately 0V
87	G/R	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.

## Diagnostic Procedure

UBS002F7

### 1. CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Turn ignition switch "ON".

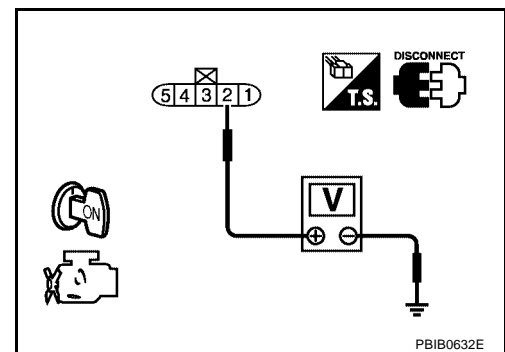


4. Check voltage between fuel level sensor unit and fuel pump terminal 2 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M16, B3
- Harness for open or short between combination meter and fuel level sensor until and fuel pump

>> Repair open circuit or short to ground or short to power in harness or connectors.

**3. CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Check harness continuity between fuel level sensor unit and fuel pump terminal 5 and body ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 5.  
NG >> GO TO 4.

**4. DETECT MALFUNCTIONING PART**

Check the following.

- Harness for open or short between fuel level sensor unit and fuel pump and body ground

>> Repair open circuit or short to power in harness or connectors.

**5. CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 87 and fuel level sensor unit and fuel pump terminal 2, ECM terminal 77 and fuel level sensor unit and fuel pump terminal 5.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 7.  
NG >> GO TO 6.

**6. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M16, B3
- Harness connectors M58, F26
- Harness connectors M59, F27
- Harness for open or short between ECM and fuel level sensor unit and fuel pump

>> Repair open circuit or short to ground or short to power in harness or connectors.

**7. CHECK FUEL LEVEL SENSOR**

Refer to [DI-26, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

- OK >> GO TO 8.  
NG >> Replace fuel level sensor unit.

**8. CHECK INTERMITTENT INCIDENT**

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

## DTC P0460 FUEL LEVEL SENSOR

[QR25DE]

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### Remove and Installation FUEL LEVEL SENSOR

UBS002F8

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

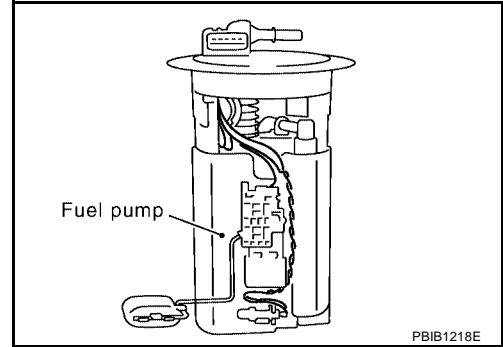


**DTC P0461 FUEL LEVEL SENSOR**

**Component Description**

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



**On Board Diagnosis Logic**

Driving long distances naturally affect fuel gauge level.

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0461 0461	Fuel level sensor circuit range/performance	The output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Fuel level sensor</li> </ul>

**Overall Function Check**

Use this procedure to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed.

**WARNING:**

When performing following procedure, be sure to observe the handling of the fuel. Refer to [FL-7, "FUEL TANK"](#).

**TESTING CONDITION:**

Before starting overall function check, preparation of draining fuel and refilling fuel is required.

**WITH CONSULT-II**

**NOTE:**

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line, refer to [EC-1257, "FUEL PRESSURE RELEASE"](#).
3. Remove the fuel feed hose on the fuel level sensor unit.
4. Connect a spare fuel hose where the fuel feed hose was removed.
5. Turn ignition switch "OFF" and wait at least 10 seconds then turn "ON".
6. Select "FUEL LEVEL SE" in "DATA MONITOR" mode with CONSULT-II.
7. Check "FUEL LEVEL SE" output voltage and note it.
8. Select "FUEL PUMP" in "ACTIVE TEST" mode with CONSULT-II.
9. Touch "ON" and drain fuel approximately 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it.
10. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
11. Check "FUEL LEVEL SE" output voltage and note it.
12. Check "FUEL LEVEL SE" output voltage and confirm whether the voltage changes more than 0.03V during step 7 to 11.  
If NG, check the fuel level sensor, refer to [DI-26, "FUEL LEVEL SENSOR UNIT CHECK"](#).

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

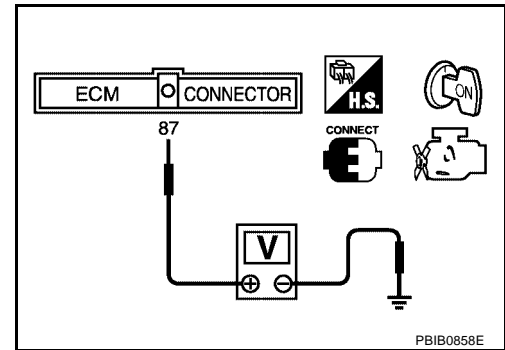
SEF195Y

 WITH GST
**NOTE:**

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line, refer to [EC-1257, "FUEL PRESSURE RELEASE"](#) .
3. Remove the fuel feed hose on the fuel level sensor unit.
4. Connect a spare fuel hose where the fuel feed hose was removed.
5. Turn ignition switch "OFF".
6. Set voltmeters probe between ECM terminal 87 (fuel level sensor signal) and ground.
7. Turn ignition switch "ON".
8. Check voltage between ECM terminal 87 and ground and note it.
9. Drain fuel by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.
10. Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
11. Confirm that the voltage between ECM terminal 87 and ground changes more than 0.03V during step 8 - 10.

If NG, check component of fuel level sensor, refer to [DI-26, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

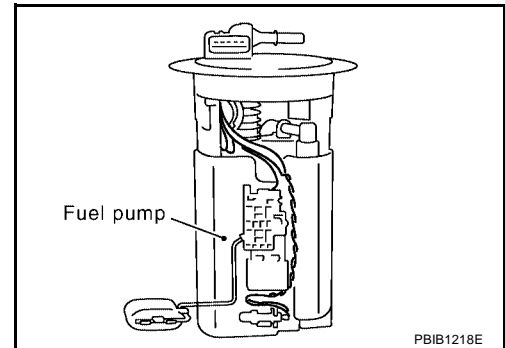


## DTC P0462, P0463 FUEL LEVEL SENSOR

### Component Description

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



### On Board Diagnosis Logic

ECM receives two signals from the fuel level sensor circuit.

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the former, to detect open or short circuit malfunction.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0462 0462	Fuel level sensor circuit low input	An excessively low voltage is sent from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> <li>● Fuel level sensor</li> </ul>
P0463 0463	Fuel level sensor circuit high input	An excessively high voltage is sent from the sensor is sent to ECM.	

### DTC Confirmation Procedure

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at ignition switch "ON".

#### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-1573, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

#### WITH GST

Follow the procedure "WITH CONSULT-II" above.

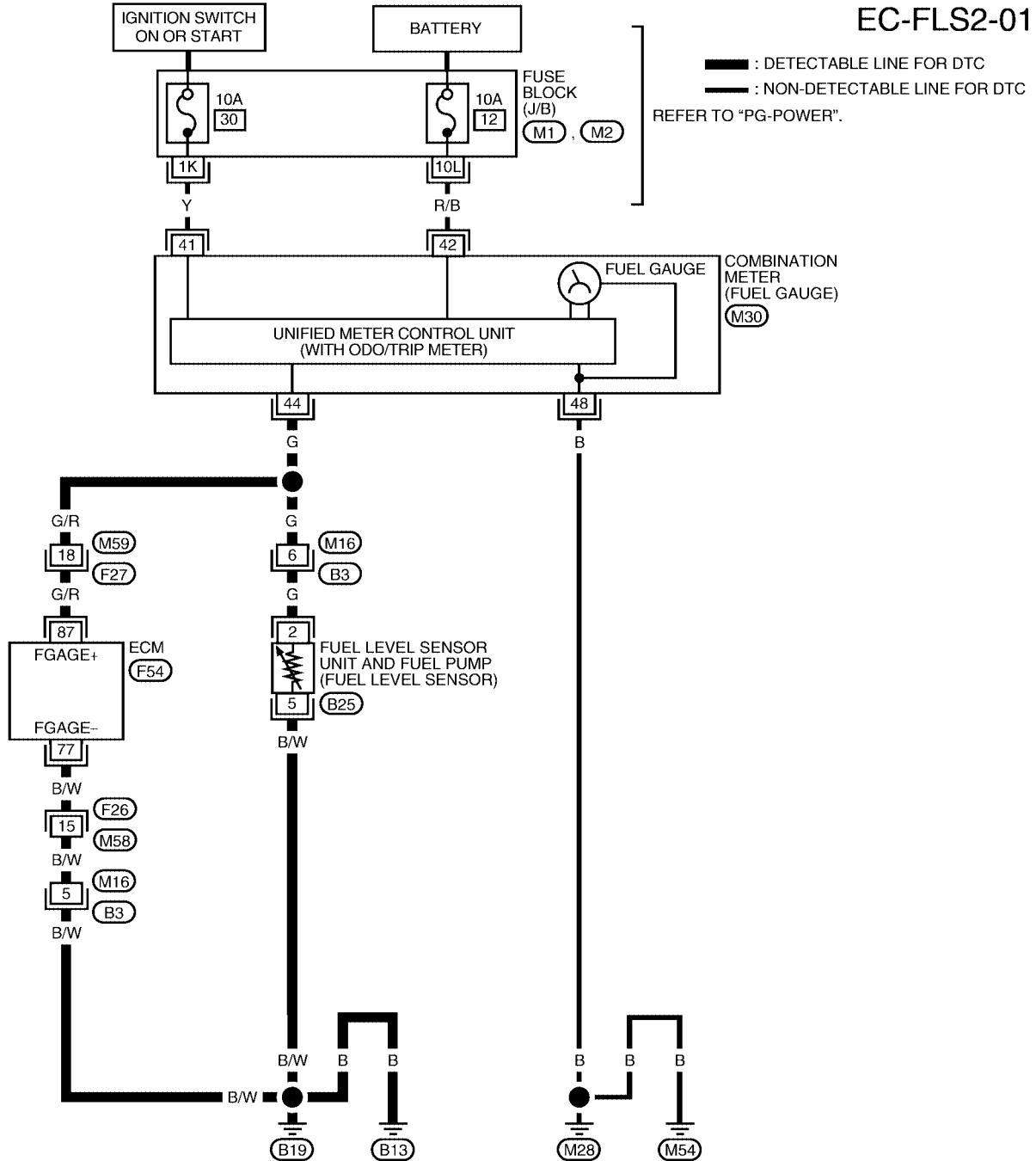
# DTC P0462, P0463 FUEL LEVEL SENSOR

[QR25DE]

UBS002FF

## Wiring Diagram

EC-FLS2-01



25	26	27	28	29	30	31	32	33	34	35	(M30)		
36	37	38	39	40	41	42	43	44	45	46	47	48	W

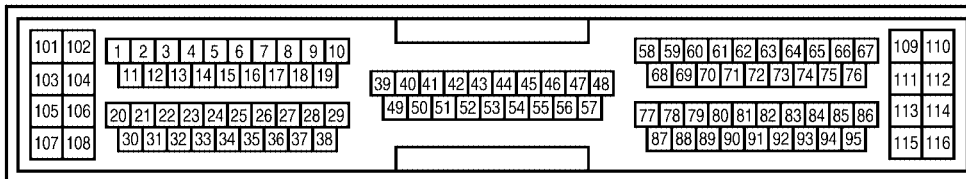
1	2	3	4	5	6	7	(F26)		
8	9	10	11	12	13	14	15	16	W

REFER TO THE FOLLOWING.  
 (M1), (M2) - FUSE BLOCK - JUNCTION BOX (J/B)

1	2	3	4	5	6	7	8	9	10	11	(F27)		
12	13	14	15	16	17	18	19	20	21	22	23	24	W

1	2	3	4	5	6	7	8	9	(B3)		
10	11	12	13	14	15	16	17	18	19	20	W

5	4	3	2	1	(B25)
					GY



BBWA0228E

# DTC P0462, P0463 FUEL LEVEL SENSOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

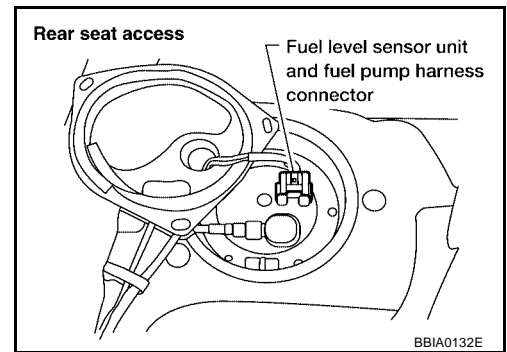
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
77	B/W	Fuel level sensor ground	[Engine is running] ● Idle speed	Approximately 0V
87	G/R	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.

## Diagnostic Procedure

UBS002FG

### 1. CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Turn ignition switch "ON".

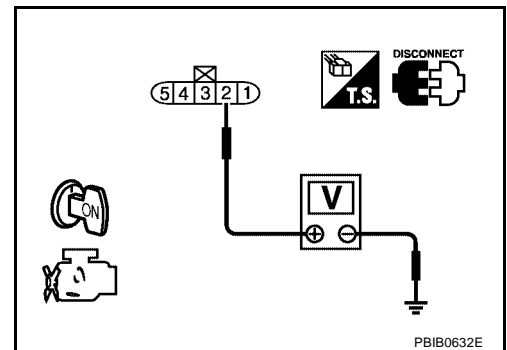


4. Check voltage between fuel level sensor unit and fuel pump terminal 2 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M16, B3
- Harness for open or short between combination meter and fuel level sensor unit and fuel pump

>> Repair open circuit or short to ground or short to power in harness or connectors.

**3. CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT**

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1. Turn ignition switch "OFF".
2. Check harness continuity between fuel level sensor unit and fuel pump terminal 5 and body ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK >> GO TO 4.  
NG >> Repair open circuit or short to power in harness or connectors.

**4. CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 87 and fuel level sensor unit and fuel pump terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 6.  
NG >> GO TO 5.

**5. DETECT MALFUNCTIONING PART**

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Check the following.

- Harness connectors M16, B3
- Harness connectors M59, F27
- Harness for open or short between ECM and fuel level sensor unit and fuel pump

>> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK FUEL LEVEL SENSOR**

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Refer to [DI-26, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

- OK >> GO TO 7.  
NG >> Replace fuel level sensor.

**7. CHECK INTERMITTENT INCIDENT**

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Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Removal and Installation  
FUEL LEVEL SENSOR**

UBS002FH

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

**DTC P0500 VSS**

**Description**

UBS002FI

The vehicle speed sensor is installed in the transaxle. It contains a pulse generator which provides a vehicle speed signal to the combination meter. The combination meter then sends a signal to the ECM.

**On Board Diagnosis Logic**

UBS002FJ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0500 0500	Vehicle speed sensor	The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven.	<ul style="list-style-type: none"> <li>● Harness or connectors (The vehicle speed sensor circuit is open or shorted)</li> <li>● Vehicle speed sensor</li> <li>● Combination meter</li> </ul>

**DTC Confirmation Procedure**

UBS002FK

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Steps 1 and 2 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

**WITH CONSULT-II**

1. Start engine.
2. Read "VHCL SPEED SE" in "DATA MONITOR" mode with CONSULT-II. The vehicle speed on CONSULT-II should exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.  
If NG, go to [EC-1577, "Diagnostic Procedure"](#).  
If OK, go to following step.
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Warm engine up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	1,200 - 6,000 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	6.0 - 31.8 msec
Selector lever	Suitable position
PW/ST SIGNAL	OFF

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
B/FUEL SCHDL	XXX msec
PW/ST SIGNAL	OFF
VHCL SPEED SE	XXX km/h

SEF196Y

6. If 1st trip DTC is detected, go to [EC-1577, "Diagnostic Procedure"](#).

**Overall Function Check**

UBS002FL

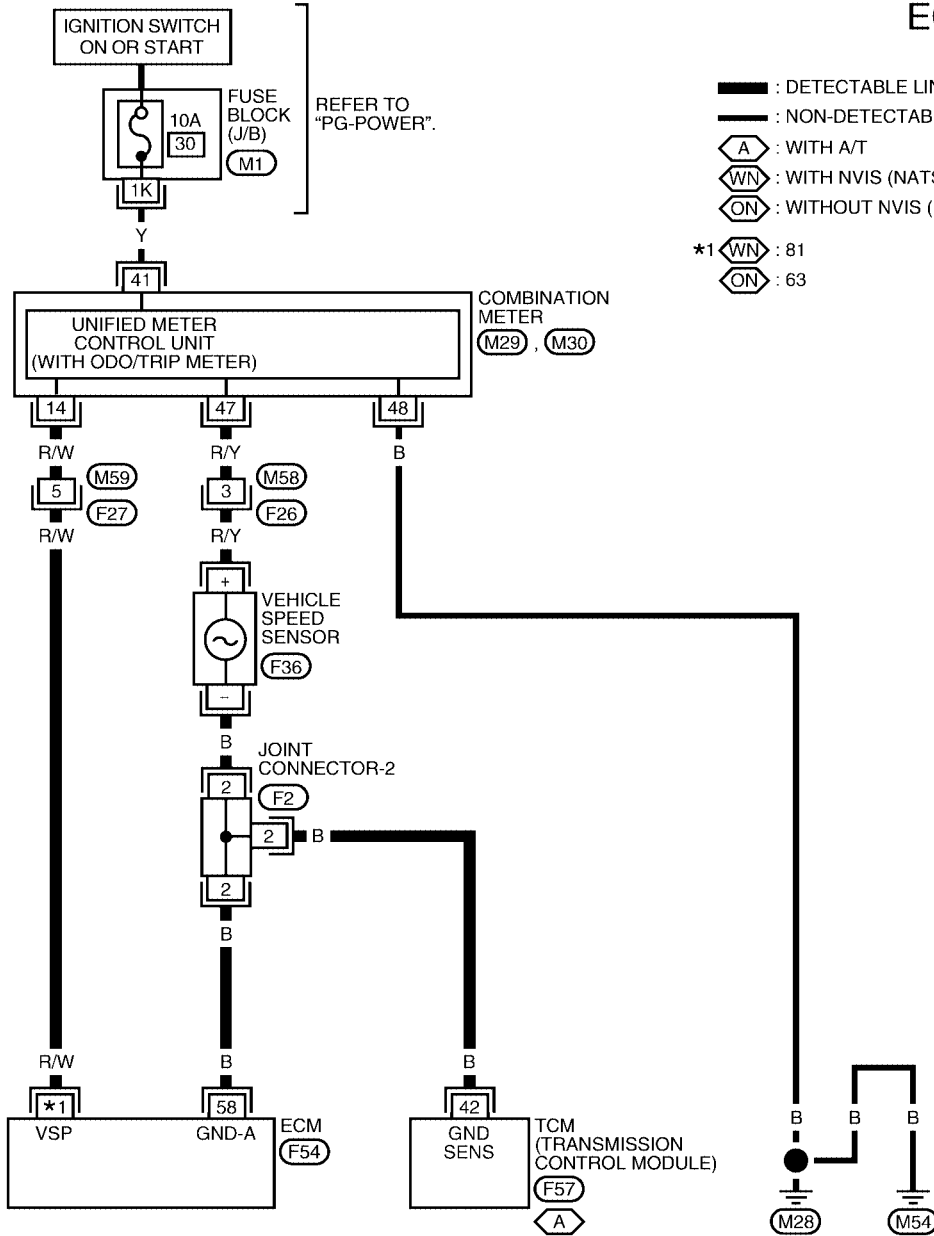
Use this procedure to check the overall function of the vehicle speed sensor circuit. During this check, a 1st trip DTC might not be confirmed.

**WITH GST**

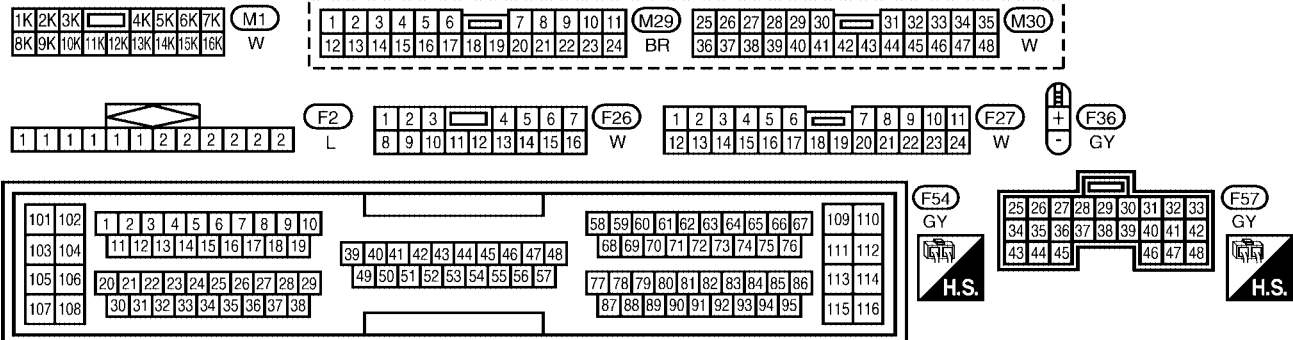
1. Lift up drive wheels.
2. Start engine.
3. Read vehicle speed sensor signal in "MODE 1" with GST.  
The vehicle speed sensor on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
4. If NG, go to [EC-1577, "Diagnostic Procedure"](#).

Wiring Diagram

EC-VSS-01



- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- ⬡ : WITH A/T
- ⬡ : WITH NVIS (NATS)
- ⬡ : WITHOUT NVIS (NATS)
- \*1 ⬡ : 81
- ⬡ : 63

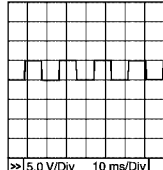




Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
63 (With- out NVIS)	R/W	Vehicle speed sensor	<b>[Engine is running]</b> ● Lift up the vehicle ● Vehicle speed is 40 km/h (25MPH)	Approximately 2.3V★ 
81 With (NVIS)				PBIB0531E

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

**Diagnostic Procedure**

UBS002FN

**1. CHECK INPUT SIGNAL CIRCUIT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector and combination meter harness connector.
3. Check harness continuity between ECM terminal 81 (Models with NVIS) or 63 (Models without NVIS) and combination meter terminal 14.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.

**2. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and combination meter

>> Repair open circuit or short to ground or short to power in harness or connectors.

**3. CHECK SPEEDOMETER FUNCTION**

Make sure that speedometer functions properly.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.

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**4. CHECK SPEEDOMETER CIRCUIT FOR OPEN AND SHORT**

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Check the following.

- Harness connectors M58, F26
- Joint connector-2
- Harness for open or short between combination meter and vehicle speed sensor
- Harness for open or short between vehicle speed sensor and ECM
- Harness for open or short between vehicle speed sensor and TCM

**OK or NG**

- OK >> Check combination meter and vehicle speed sensor. Refer to [DI-3, "METERS AND GAUGES"](#) .  
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

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**5. CHECK INTERMITTENT INCIDENT**

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Perform [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**DTC P0506 ISC SYSTEM**

**Description**

**NOTE:**

If DTC P0506 is displayed with other DTC, first perform the trouble diagnosis for the other DTC displayed.

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

**On Board Diagnosis Logic**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0506 0506	Idle speed control system RPM lower than expected	The idle speed is less than the target idle speed by 100 rpm or more.	<ul style="list-style-type: none"> <li>● Electric throttle control actuator</li> <li>● Intake air leak</li> </ul>

**DTC Confirmation Procedure**

**NOTE:**

- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.
- If the target idle speed is out of the specified value, perform [EC-1255, "Idle Air Volume Learning"](#), before conducting "DTC Confirmation Procedure". For the target idle speed, refer to the [EC-1862, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#).

**TESTING CONDITION:**

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C (14°F).

**WITH CONSULT-II**

1. Open engine hood.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Turn ignition switch "ON" again and select "DATA MONITOR" mode with CONSULT-II.
5. Start engine and run it for at least 1 minute at idle speed.
6. If 1st trip DTC is detected, go to [EC-1580, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

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**Diagnostic Procedure****1. CHECK INTAKE AIR LEAK**

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1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

**OK or NG**

- OK >> GO TO 2.  
NG >> Discover air leak location and repair.

**2. REPLACE ECM**

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1. Stop engine.
2. Replace ECM.
3. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [EC-1275, "NVIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .
4. Perform [EC-1255, "Accelerator Pedal Released Position Learning"](#) .
5. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
6. Perform [EC-1255, "Idle Air Volume Learning"](#) .

**>> INSPECTION END**

**DTC P0507 ISC SYSTEM**

**Description**

**NOTE:**

If DTC P0507 is displayed with other DTC, first perform the trouble diagnosis for the other DTC displayed.

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

**On Board Diagnosis Logic**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0507 0507	Idle speed control system RPM higher than expected	The idle speed is more than the target idle speed by 200 rpm or more.	<ul style="list-style-type: none"> <li>● Electric throttle control actuator</li> <li>● Intake air leak</li> <li>● PCV system</li> </ul>

**DTC Confirmation Procedure**

**NOTE:**

- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.
- If the target idle speed is out of the specified value, perform [EC-1255, "Idle Air Volume Learning"](#), before conducting "DTC Confirmation Procedure". For the target idle speed, refer to the [EC-1862, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#).

**TESTING CONDITION:**

- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C (14°F).

**WITH CONSULT-II**

1. Open engine hood.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Turn ignition switch "ON" again and select "DATA MONITOR" mode with CONSULT-II.
5. Start engine and run it for at least 1 minute at idle speed.
6. If 1st trip DTC is detected, go to [EC-1582, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

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## Diagnostic Procedure

### 1. CHECK PCV HOSE CONNECTION

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Confirm that PCV hose is connected correctly.

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace.

### 2. CHECK INTAKE AIR LEAK

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1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

- OK >> GO TO 3.
- NG >> Discover air leak location and repair.

### 3. REPLACE ECM

---

1. Stop engine.
2. Replace ECM.
3. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [EC-1275, "NVIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .
4. Perform [EC-1255, "Accelerator Pedal Released Position Learning"](#) .
5. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
6. Perform [EC-1255, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

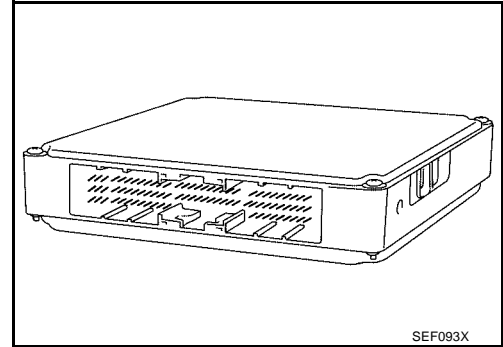
**DTC P0605 ECM**

PF023710

**Component Description**

UBS002FW

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



UBS002FX

**On Board Diagnosis Logic**

This self-diagnosis has one or two trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0605 0605	Engine control module	A)	ECM calculation function is malfunctioning.	● ECM
		B)	ECM EEPROM system is malfunctioning.	
		C)	ECM self shut-off function is malfunctioning.	

**FAIL-SAFE MODE**

ECM enters fail-safe mode when malfunction A is detected.

Detected items	Engine operation condition in fail-safe mode
Malfunction A	<ul style="list-style-type: none"> <li>● ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</li> <li>● ECM deactivates ASCD operation.</li> </ul>

**DTC Confirmation Procedure**

UBS002FY

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B". If there is no malfunction on "PROCEDURE FOR MALFUNCTION B", perform "PROCEDURE FOR MALFUNCTION C".

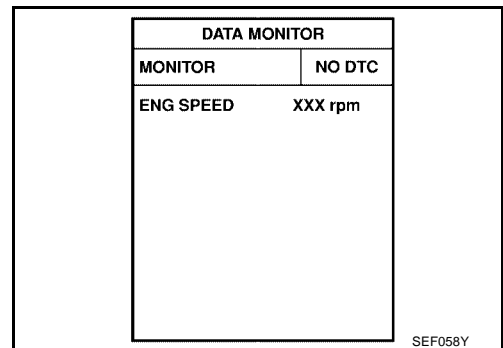
**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**PROCEDURE FOR MALFUNCTION A**

Ⓜ With CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If 1st trip DTC is detected, go to [EC-1584, "Diagnostic Procedure"](#).



Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

**PROCEDURE FOR MALFUNCTION B****With CONSULT-II**

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
4. If 1st trip DTC is detected, go to [EC-1584, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**With GST**

Follow the procedure "With CONSULT-II" above.

**PROCEDURE FOR MALFUNCTION C****With CONSULT-II**

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
4. Repeat step 3 procedure, 32 times.
5. If 1st trip DTC is detected, go to [EC-1584, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**With GST**

Follow the procedure "With CONSULT-II" above.

**Diagnostic Procedure****1. INSPECTION START**

UBS002FZ

**With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "SELF DIAG RESULTS" mode with CONSULT-II.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure"**.  
See [EC-1583](#).
5. Is the 1st trip DTC P0605 displayed again?

**With GST**

1. Turn ignition switch "ON".
2. Select MODE 4 with GST.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure"**.  
See [EC-1583](#).
5. Is the 1st trip DTC P0605 displayed again?

Yes or No

Yes >> GO TO 2.

No >> **INSPECTION END**



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**2. REPLACE ECM**

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1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [EC-1275, "NVIS \(Nissan Vehicle Immobilizer System — NATS\)"](#).
3. Perform [EC-1255, "Accelerator Pedal Released Position Learning"](#).
4. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#).
5. Perform [EC-1255, "Idle Air Volume Learning"](#).

**>> INSPECTION END**

A

EC

C

D

E

F

G

H

I

J

K

L

M

**DTC P0650 MIL**

**Component Description**

UBS002G0

Malfunction Indicator Lamp (MIL) is located on the instrument panel. When the ignition switch is turned ON without engine running, MIL will light up. This is a bulb check. When the engine is started, MIL should go off. If MIL remains on, the on board diagnostic system has detected an engine system malfunction.

**On Board Diagnosis Logic**

UBS002G1

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0650 0650	Malfunction indicator (MIL) control circuit	<ul style="list-style-type: none"> <li>An excessively high voltage is sent to ECM through the MIL circuit under the condition that calls for MIL light up.</li> <li>An excessively low voltage is sent to ECM through the MIL circuit under the condition that calls for MIL not to light up.</li> </ul>	<ul style="list-style-type: none"> <li>Harness or connectors (MIL circuit is open or shorted.)</li> <li>MIL</li> </ul>

**FAIL-SAFE MODE**

ECM enters in fail-safe mode when both DTC P0650 and another DTC, which calls for MIL to light up, are detected at the same time.

Detected items	Engine operating condition in fail-safe mode
MIL circuit	Engine speed will not rise more than 2,500 rpm due to the fuel cut

**DTC Confirmation Procedure**

UBS002G2

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-1588, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**WITH GST**

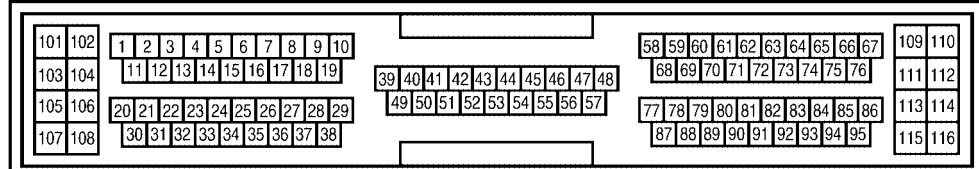
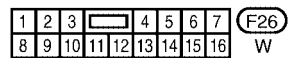
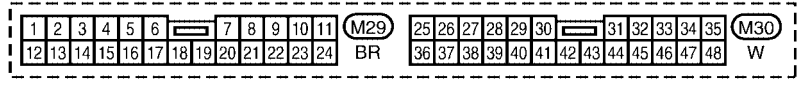
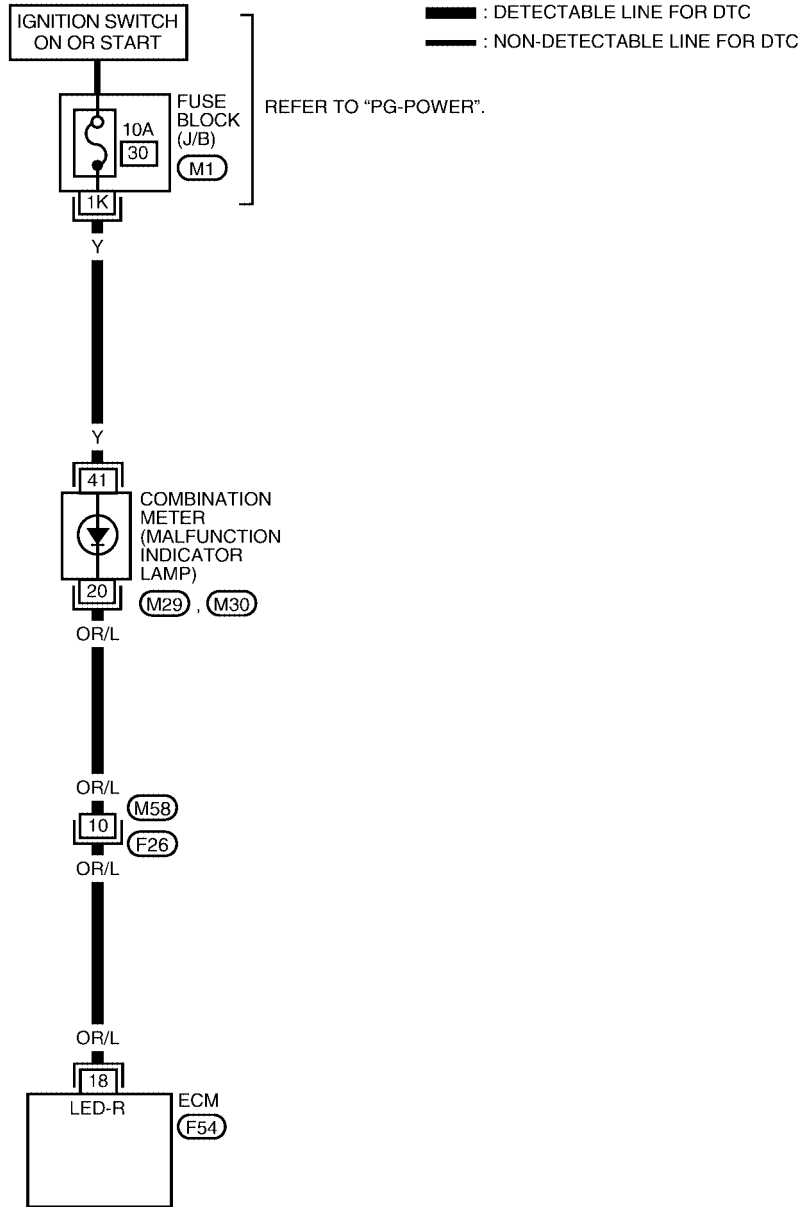
Follow the procedure "WITH CONSULT-II" above.

Wiring Diagram

UBS002G3

EC-MIL-01

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



REFER TO THE FOLLOWING.  
 (M1) - FUSE BLOCK  
 - JUNCTION BOX (J/B)



BBWA0230E

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
18	OR/L	MIL	[Ignition switch "ON"]	0 - 1.0V
			[Engine is running] ● Idle speed	BATTERY VOLTAGE (11 - 14V)

**Diagnostic Procedure**

UBS002G4

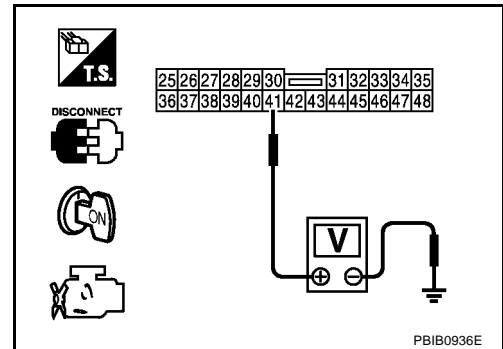
**1. CHECK MIL POWER SUPPLY**

1. Turn ignition switch "OFF".
2. Disconnect combination meter harness connector.
3. Turn ignition switch "ON".
4. Check voltage between combination meter terminal 41 and ground with CONSULT-II or tester

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



**2. DETECT MALFUNCTIONING PART**

Check the following.

- Fuse block (J/B) connector M1
- 10A fuse
- Harness for open or short between fuse and combination meter

>> Repair harness or connectors.

**3. CHECK MIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 18 and combination meter terminal 20. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.

#### 4. DETECT MALFUNCTIONING PART

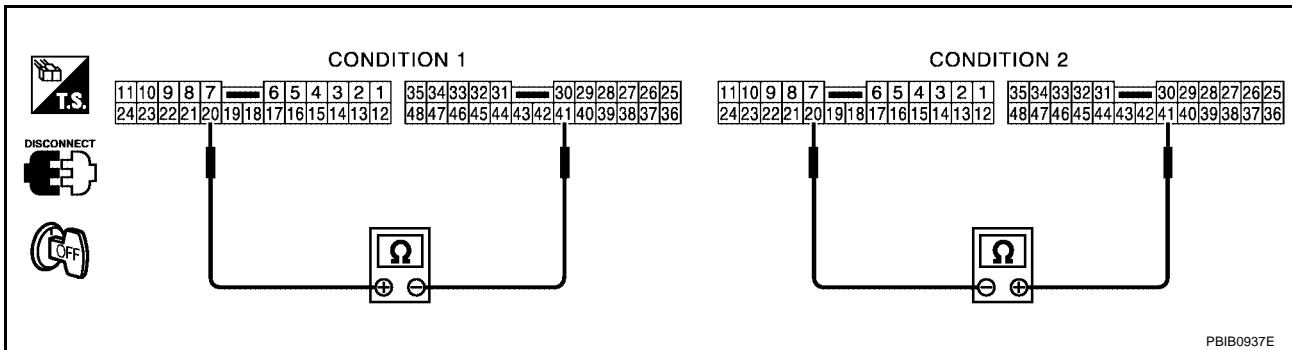
Check the following.

- Harness connectors M58, F26
- Harness for open or short between ECM and combination meter

>> Repair open circuit or short to ground or short to power in harness or connectors.

#### 5. CHECK COMBINATION METER

1. Turn ignition switch "OFF".
2. Disconnect combination meter harness connectors.
3. Check continuity under the following conditions.



CONDITION	Combination meter terminal No. (Polarity)	Continuity
1	20 (+) - 41 (-)	Should not exist.
2	41 (+) - 20 (-)	Should exist.

OK or NG

- OK >> GO TO 6.
- NG >> Replace combination meter. Refer to [DI-8, "Combination Meter"](#).

#### 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

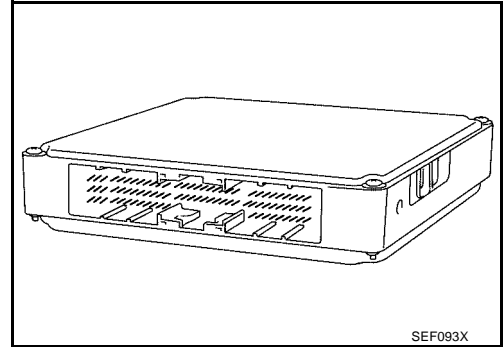
>> INSPECTION END

**DTC P1065 ECM POWER SUPPLY**

**Component Description**

UBS002G5

Battery voltage is supplied to the ECM even when the ignition switch is turned OFF for the ECM memory function of the DTC memory, the air-fuel ratio feedback compensation value memory, the idle air volume learning value memory, etc.



**On Board Diagnosis Logic**

UBS002G6

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1065 1065	ECM power supply circuit	ECM back-up RAM system does not function properly.	<ul style="list-style-type: none"> <li>● Harness or connectors [ECM power supply (back-up) circuit is open or shorted.]</li> <li>● ECM</li> </ul>

**DTC Confirmation Procedure**

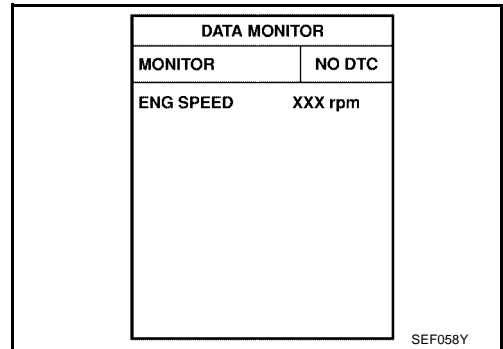
UBS002G7

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch “ON” and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. Turn ignition switch “OFF”, wait at least 10 seconds, and then turn “ON”.
5. Repeat steps 3 and 4 four times.
6. If 1st trip DTC is detected, go to [EC-1592. "Diagnostic Procedure"](#) .



**WITH GST**

Follow the procedure “WITH CONSULT-II” above.

# DTC P1065 ECM POWER SUPPLY

[QR25DE]

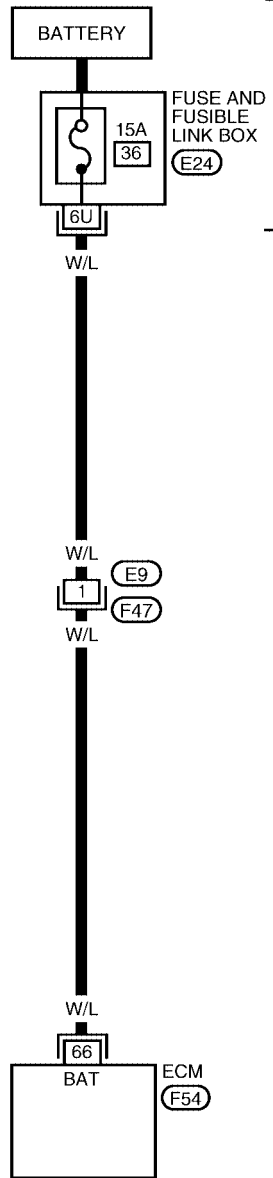
## Wiring Diagram

UBS002G8

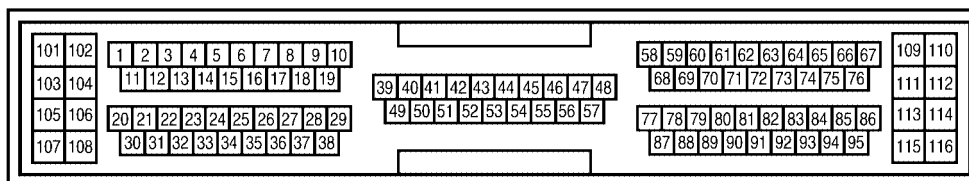
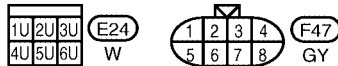
### EC-ECM/PW-01

: DETECTABLE LINE FOR DTC  
 : NON-DETECTABLE LINE FOR DTC

REFER TO "PG-POWER".



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BBWA0419E

# DTC P1065 ECM POWER SUPPLY

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
66	W/L	Power supply for ECM (Buck-up)	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS002G9

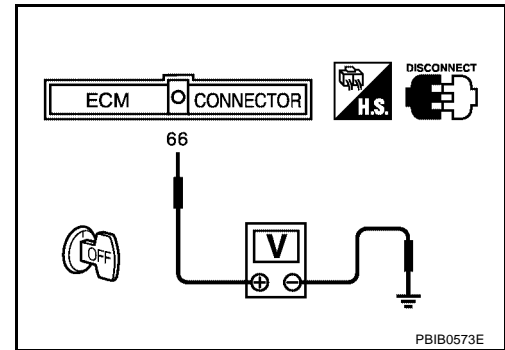
### 1. CHECK ECM POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check voltage between ECM terminal 66 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E9, F47
- Fuse and fusible link box connector E24
- 15A fuse
- Harness for open or short between ECM and battery

>> Repair or replace harness or connectors.

### 3. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace harness or connectors.



**4. PERFORM DTC CONFIRMATION PROCEDURE****Ⓟ With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "SELF DIAG RESULTS" mode with CONSULT-II.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure".**  
See [EC-1590](#) .
5. Is the 1st trip DTC P1065 displayed again?

**Ⓢ With GST**

1. Turn ignition switch "ON".
2. Select MODE 4 with GST.
3. Touch "ERASE".
4. **Perform "DTC Confirmation Procedure".**  
See [EC-1590](#) .
5. Is the 1st trip DTC P1065 displayed again?

Yes or No

Yes &gt;&gt; GO TO 5.

No >> **INSPECTION END****5. REPLACE ECM**

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to [EC-1275, "NVIS \(Nissan Vehicle Immobilizer System — NATS\)"](#) .
3. Perform [EC-1255, "Accelerator Pedal Released Position Learning"](#) .
4. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-1255, "Idle Air Volume Learning"](#) .

>> **INSPECTION END**

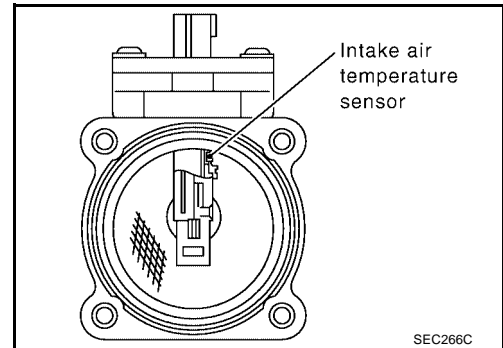
## DTC P1102 MAF SENSOR

PFP:22680

### Component Description

UBS002GA

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss. Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.



### CONSULT-II Reference Value in Data Monitor Mode

UBS002GB

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS A/F SE-B1	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Air conditioner switch: OFF</li> <li>● Shift lever: N</li> <li>● No-load</li> </ul> Idle	Approx. 1.1 - 1.5V
	2,500 rpm	Approx. 1.6 - 2.0V
CAL/LD VALUE	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N</li> <li>● Air conditioner switch: OFF</li> <li>● No-load</li> </ul> Idle	10% - 35%
	2,500 rpm	10% - 35%
MASS AIRFLOW	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N</li> <li>● Air conditioner switch: OFF</li> <li>● No-load</li> </ul> Idle	1.0 - 4.0 g-m/s
	2,500 rpm	4.0 - 10.0 g-m/s

### On Board Diagnosis Logic

UBS002GC

**This self-diagnosis has the one trip detection logic.**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1102 1102	Mass air flow sensor circuit range/performance problem	A voltage from the sensor is constantly approx.1.0V when engine is running.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Mass air flow sensor</li> </ul>

### FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

### DTC Confirmation Procedure

UBS002GD

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### WITH CONSULT-II

1. Turn ignition switch "ON".

# DTC P1102 MAF SENSOR

[QR25DE]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait at least 5 seconds.
4. If DTC is detected, go to [EC-1597, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

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## WITH GST

Follow the procedure "With CONSULT-II" above.

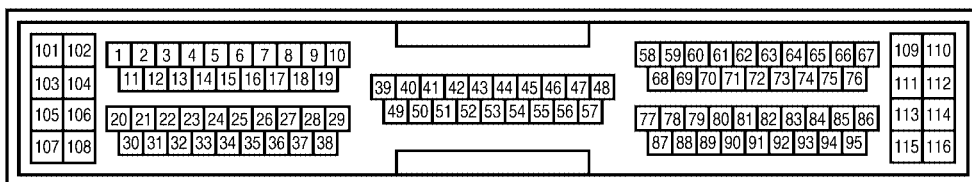
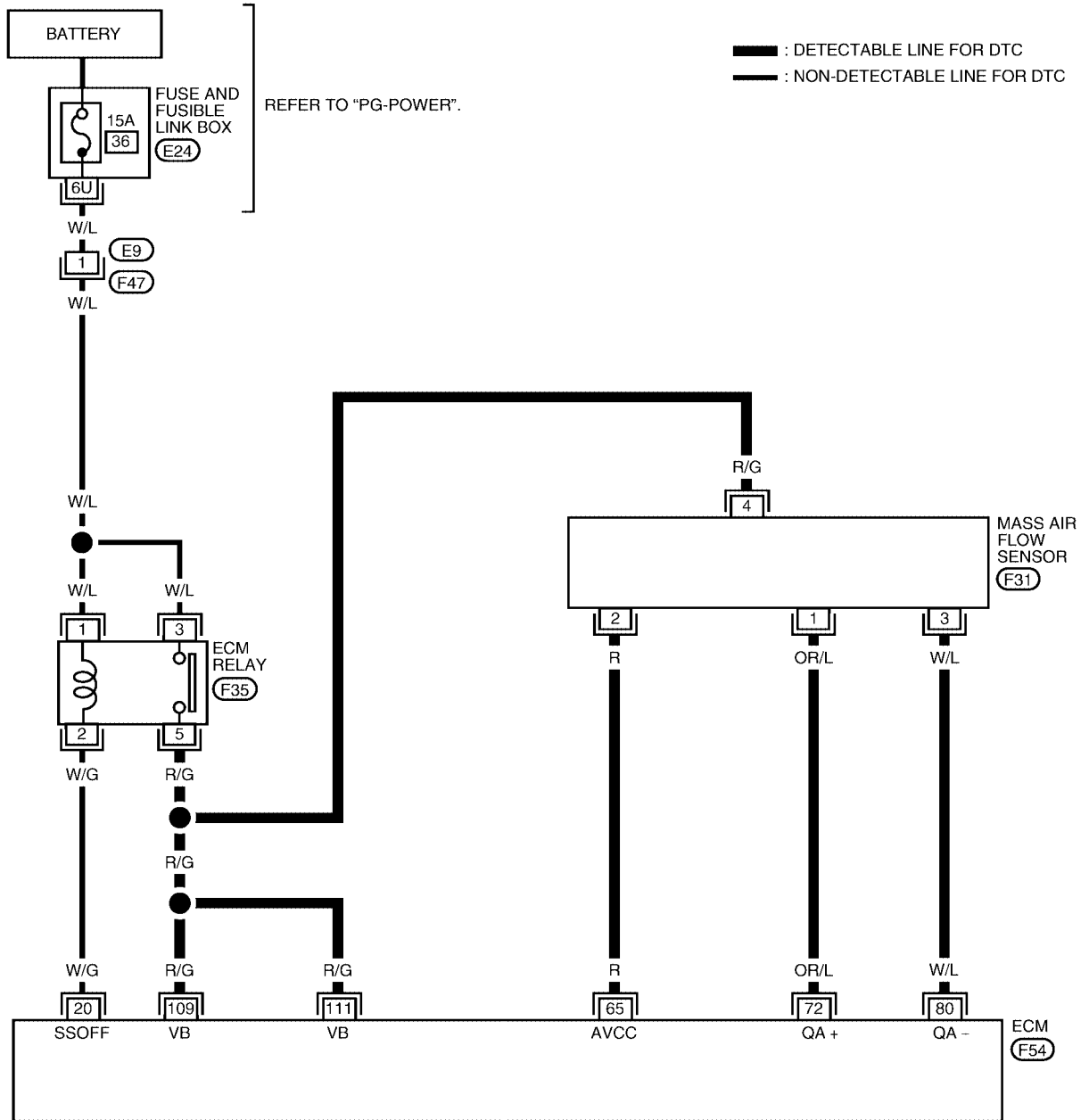
# DTC P1102 MAF SENSOR

[QR25DE]

UBS002GE

## Wiring Diagram

EC-MAFS-01



BBWA0213E

# DTC P1102 MAF SENSOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
72	OR/L	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.1 - 1.5V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm.	1.6 - 2.0V
80	W/L	Mass air flow sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V

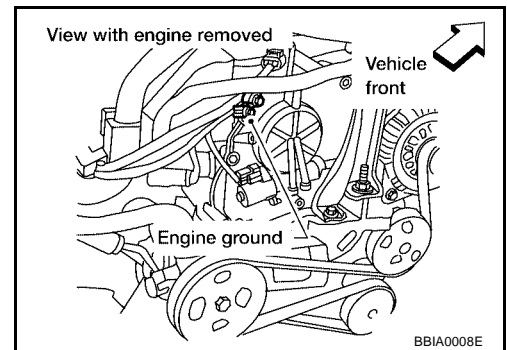
## Diagnostic Procedure

UBS002GF

### 1. RETIGHTEN GROUND SCREWS

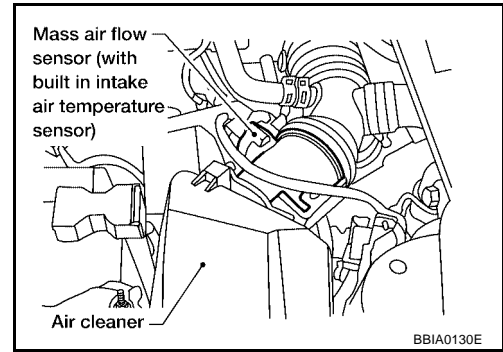
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect MAF sensor harness connector.
2. Turn ignition switch "ON".

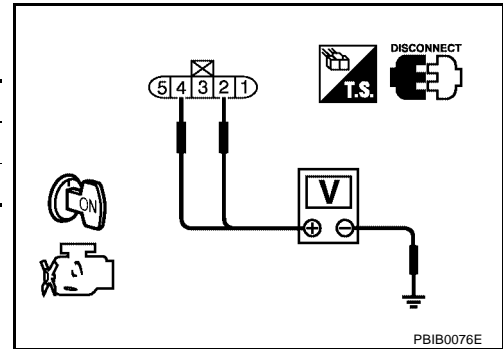


3. Check voltage between MAF sensor terminals 2, 4 and ground with CONSULT-II or tester.

Terminal	Voltage
2	Approximately 5V
4	Battery voltage

OK or NG

- OK >> GO TO 4.  
 NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between mass air flow sensor and ECM relay
- Harness for open or short between mass air flow sensor and ECM

>> Repair harness or connectors.

## 4. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 80. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 5.  
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 5. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 1 and ECM terminal 72. Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK MASS AIR FLOW SENSOR**

Refer to [EC-1599, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace mass air flow sensor.

**7. CHECK INTERMITTENT INCIDENT**

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection  
MASS AIR FLOW SENSOR**

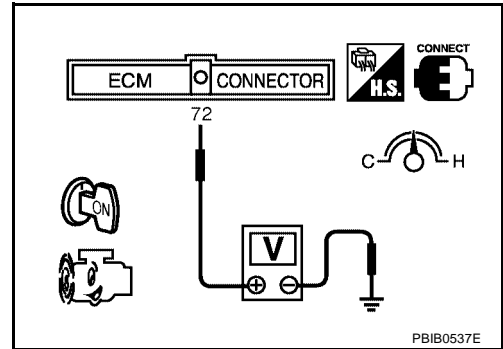
UBS002GG

1. Reconnect harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 72 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch "ON" (Engine stopped.)	Approx. 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.1 - 1.5
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 2.0
Idle to about 4,000 rpm*	1.5 - 2.0 to Approx. 4.0

\*: Check for liner voltage rise in response to engine being increased to about 4,000 rpm.

4. If the voltage is out of specification, proceed the following.
  - a. Turn ignition switch "OFF".
  - b. Disconnect mass air flow sensor harness connector and reconnect it again.
  - c. Perform steps 2 and 3 again.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.
6. If NG, clean or replace mass air flow sensor.



PBIB0537E

**Removal and Installation  
MASS AIR FLOW SENSOR**

UBS002GH

Refer to [EM-103, "AIR CLEANER AND AIR DUCT"](#) .

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## DTC P1111 IVT CONTROL SOLENOID VALVE

PFP:23796

### Component Description

UBS002GI

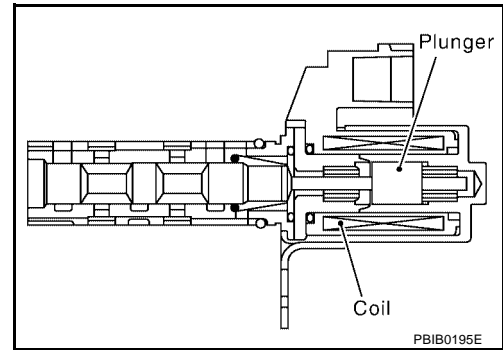
Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

The intake valve timing control solenoid valve changes the oil amount and direction of flow through intake valve timing control unit or stops oil flow.

The longer pulse width advances valve angle.

The shorter pulse width retards valve angle.

When ON and OFF pulse widths become equal, the solenoid valve stops oil pressure flow to fix the intake valve angle at the control position.



### CONSULT-II Reference Value in Data Monitor Mode

UBS002GJ

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
INT/V SOL (B1)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N</li> <li>● Air conditioner switch: OFF</li> <li>● No-load</li> </ul>	Idle	0% - 2%
		2,000 rpm	Approx. 25% - 60%

### On Board Diagnosis Logic

UBS002GK

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1111 1111	Intake valve timing control solenoid valve circuit	An improper voltage is sent to the ECM through intake valve timing control solenoid valve.	<ul style="list-style-type: none"> <li>● Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.)</li> <li>● Intake valve timing control solenoid valve</li> </ul>

### DTC Confirmation Procedure

UBS002GL

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If 1st trip DTC is detected, go to [EC-1602, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### WITH GST

Following the procedure "WITH CONSULT-II" above.



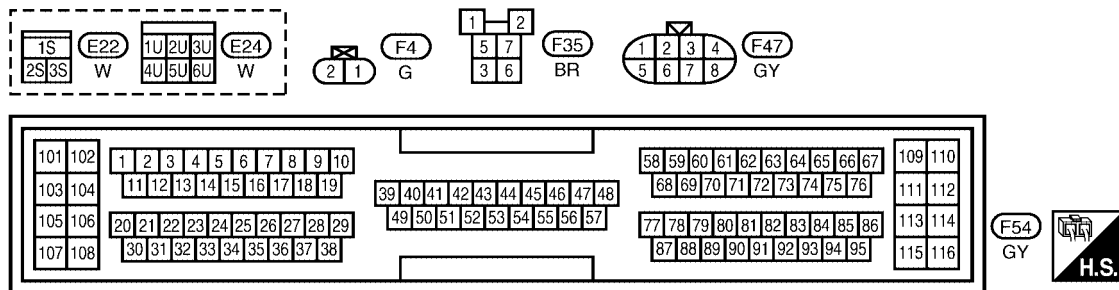
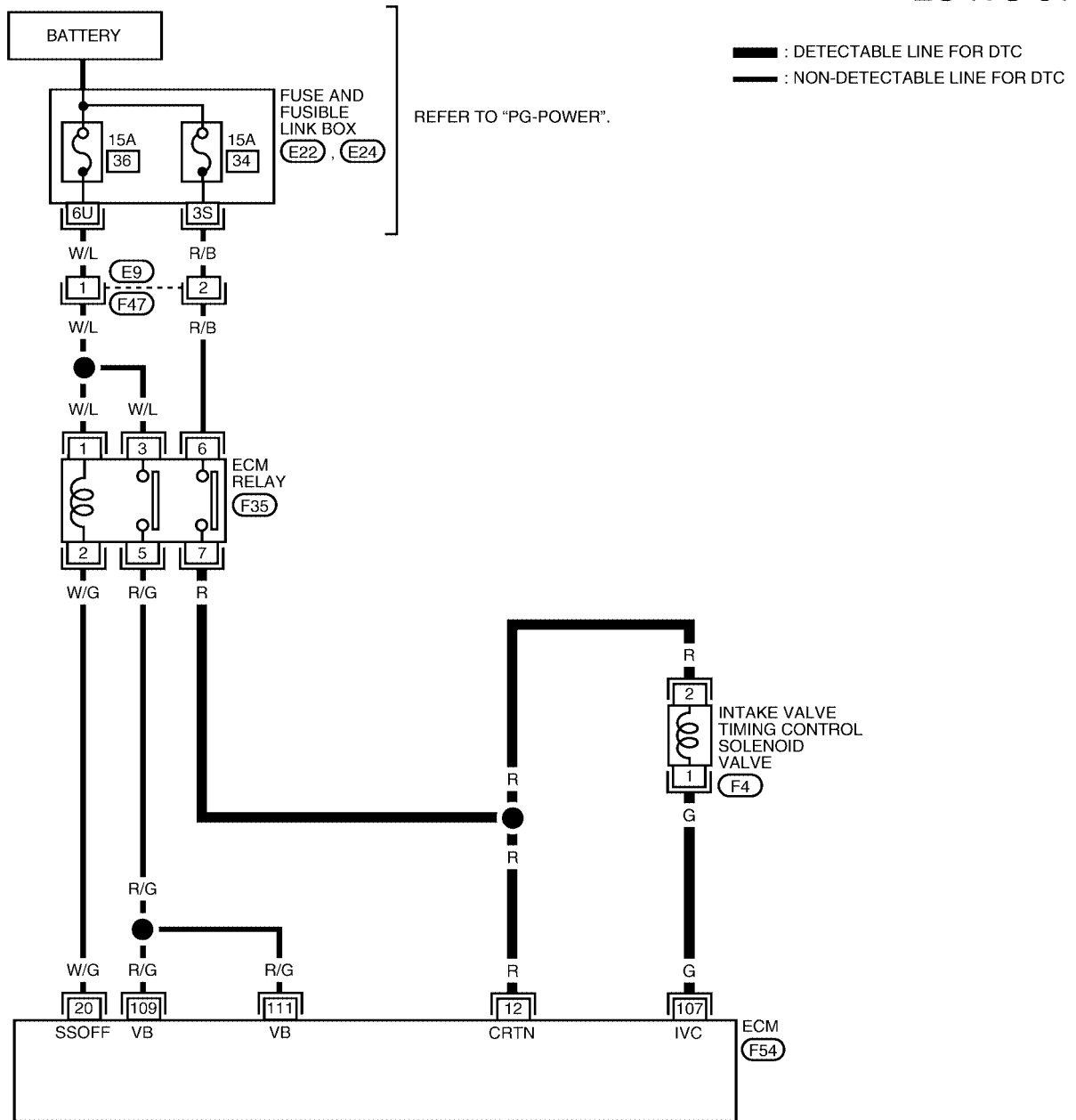
# DTC P1111 IVT CONTROL SOLENOID VALVE

[QR25DE]

UBS002GM

## Wiring Diagram

EC-IVC-01



BBWA0232E

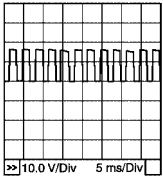
# DTC P1111 IVT CONTROL SOLENOID VALVE

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
107	G	Intake valve timing control solenoid valve	[Engine is running] ● Warm-up condition ● Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Warm-up condition ● Engine speed is 2,000 rpm	Approximately 9V★ 

PBIB0532E

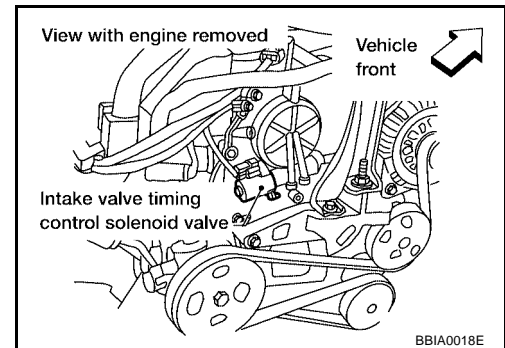
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS002GN

### 1. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Turn ignition switch "ON".



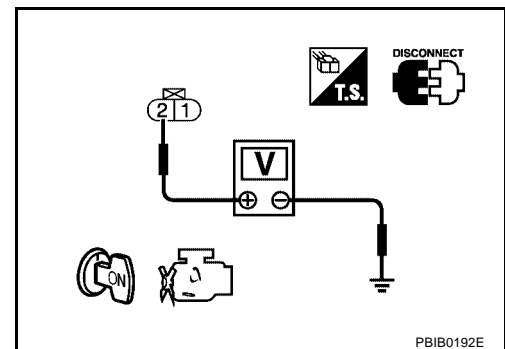
BBI A0018E

4. Check voltage between intake valve timing control solenoid valve terminal 2 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



PBIB0192E

### 2. DETECT MALFUNCTION PART

Check the following.

- Harness for open or short between intake valve timing control solenoid valve and ECM
- Harness for open or short between intake valve timing control solenoid valve and ECM relay

>> Repair or replace harness or connectors.

## 3. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 107 and intake valve timing control solenoid valve terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to [EC-1603, "Component Inspection"](#) .

OK or NG

OK >> GO TO 5.

NG >> Replace intake valve timing control solenoid valve.

## 5. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

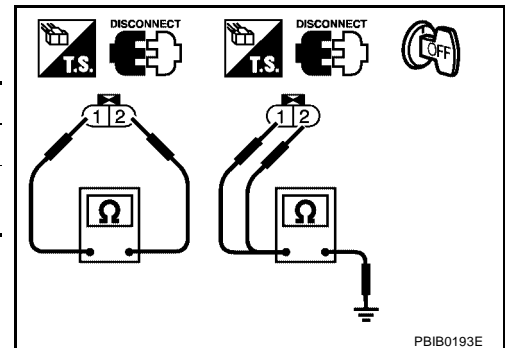
>> **INSPECTION END**

### Component Inspection INTAKE VALVE TIMING CONTROL SOLENOID VALVE

UBS002GO

1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve terminals 1 and 2.

Terminals	Resistance
1 and 2	Approximately 8Ω at 20°C (68°F)
1 or 2 and ground	∞Ω (Continuity should not exist)



PBIB0193E

### Removal and Installation INTAKE VALVE TIMING CONTROL SOLENOID VALVE

UBS002GP

Refer to [EM-134, "TIMING CHAIN"](#) .

## DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

PFP:16119

### Component Description

UBS0056D

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc. The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

### On Board Diagnosis Logic

UBS0056E

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1121 1121	Electric throttle control actuator	A)	Electric throttle control actuator does not function properly due to the return spring malfunction.	● Electric throttle control actuator
		B)	Throttle valve opening angle in fail-safe mode is not in specified range.	
		C)	ECM detect the throttle valve is stuck open. <b>This self-diagnosis has the one trip detection logic.</b>	

### FAIL-SAFE MODE

When the malfunction A or B is detected in the two consecutive trips, the ECM enters fail-safe mode and the MIL lights up.

When the malfunction C is detected even in the 1st trip, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Malfunction A	The ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.
Malfunction B	ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.
Malfunction C	While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in "N" or "P" position, and engine speed will not exceed 1,000 rpm or more.

### DTC Confirmation Procedure

UBS0056F

#### NOTE:

- Perform "PROCEDURE FOR MALFUNCTION A AND B" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION C".  
If there is no malfunction on "PROCEDURE FOR MALFUNCTION A AND B", perform "PROCEDURE FOR MALFUNCTION C".
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### PROCEDURE FOR MALFUNCTION A AND B

##### ④ With CONSULT-II

1. Turn ignition witch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Shift selector lever to "D" position (A/T), "1st" position (M/T) and wait at least 2 seconds.
4. Turn ignition switch "OFF", wait at least 10 seconds, and then turn "ON".
5. If 1st trip DTC is detected, go to [EC-1605. "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

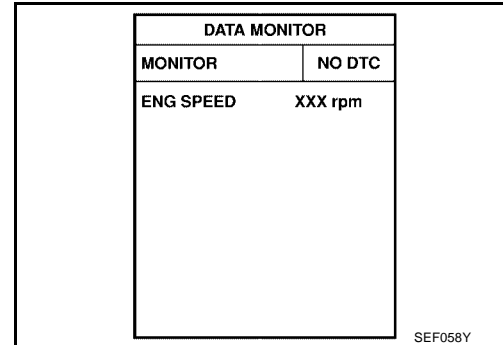
**With GST**

Follow the procedure "With CONSULT-II" above.

**PROCEDURE FOR MALFUNCTION C**

**With CONSULT-II**

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Shift selector lever to "D" position (A/T), "1st" position (M/T) and wait at least 2 seconds.
4. Shift selector lever to "N" or "P" position.
5. Start engine and let it idle for 3 seconds.
6. If DTC is detected, go to [EC-1605, "Diagnostic Procedure"](#) .



**With GST**

Follow the procedure "With CONSULT-II" above.

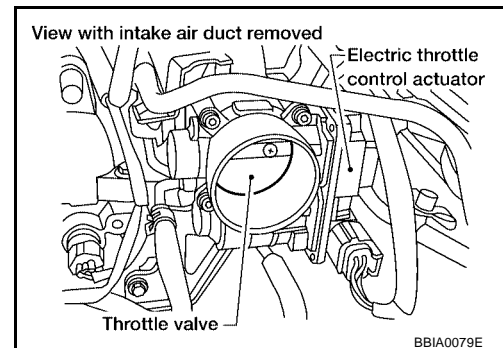
**Diagnostic Procedure**

**1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY**

1. Remove the intake air duct.
2. Check if a foreign matter is caught between the throttle valve and the housing.

**OK or NG**

- OK >> GO TO 2.
- NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



**2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-1255, "Idle Air Volume Learning"](#) .

**>> INSPECTION END**

## DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

PFP:16119

### Description

UBS006JN

**NOTE:**

If DTC P1122 is displayed with DTC P1121 or 1126, first perform the trouble diagnosis for DTC P1121 or P1126. Refer to [EC-1604](#) or [EC-1613](#).

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc.

The throttle control motor is operated by the ECM and it opens and closes the throttle valve.

The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

### On Board Diagnosis Logic

UBS006JO

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1122 1122	Electric throttle control performance problem	Electric throttle control function does not operate properly.	<ul style="list-style-type: none"> <li>● Harness or connectors (Throttle control motor circuit is open or shorted)</li> <li>● Electric throttle control actuator</li> </ul>

### FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

### DTC Confirmation Procedure

UBS006JP

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-1608, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

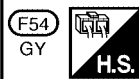
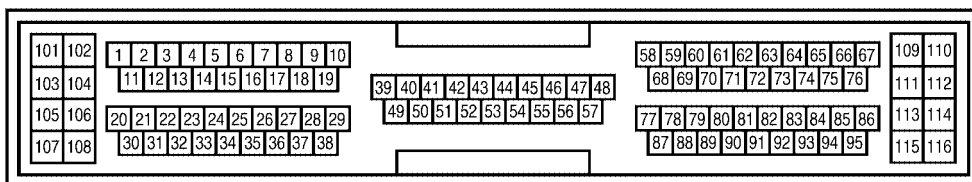
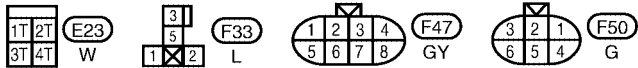
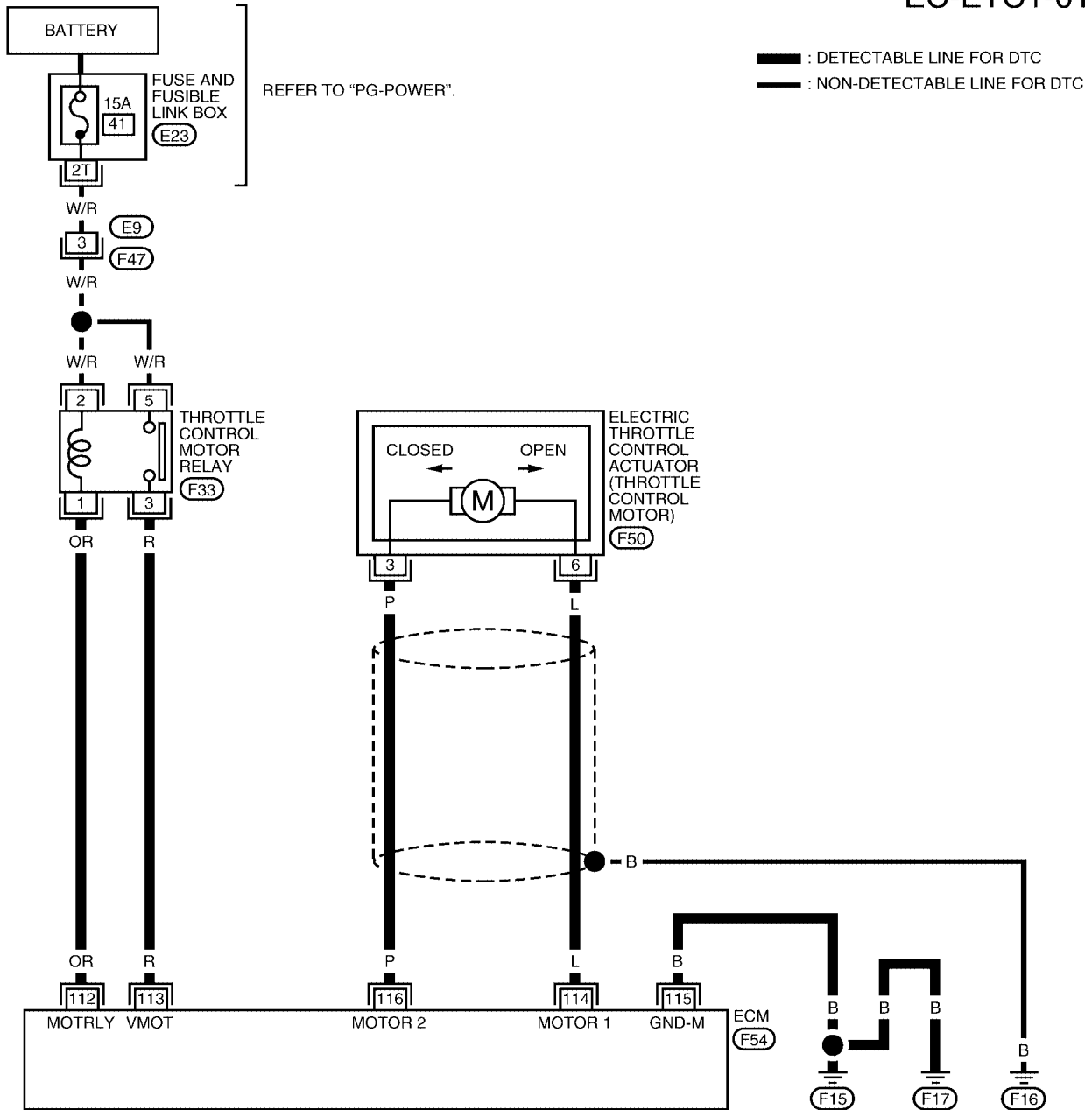
# DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

[QR25DE]

UBS006JQ

## Wiring Diagram

EC-ETC1-01



BBWA0249E

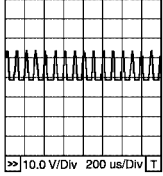
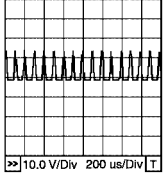
# DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
112	OR	Throttle control motor relay	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V
113	R	Throttle control motor relay power supply	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
114	L	Throttle control motor (Open)	<p>[Ignition switch "ON"]</p> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal is depressing</li> </ul>	<p>0 - 14V★</p>  <p>PBIB0533E</p>
115	B	Throttle control motor ground	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	Approximately 0V
116	P	Throttle control motor (Close)	<p>[Ignition switch "ON"]</p> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal is releasing</li> </ul>	<p>0 - 14V★</p>  <p>PBIB0534E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

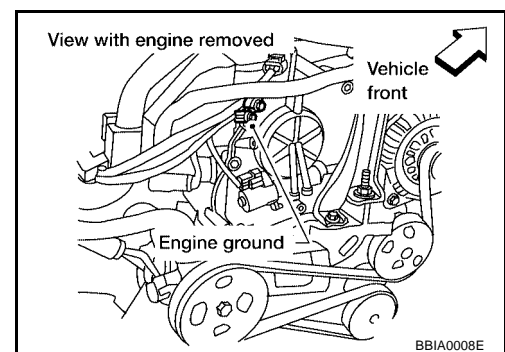
## Diagnostic Procedure

UBS006JR

### 1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.





## 2. CHECK THROTTLE CONTROL MOTOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 115 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to power in harness or connectors.

## 3. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-I

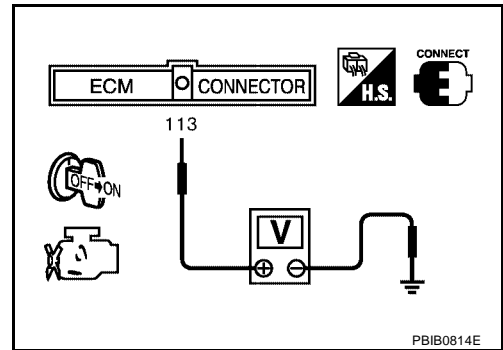
1. Reconnect harness connectors disconnected.
2. Check voltage between ECM terminal 113 and ground under the following conditions with CONSULT-II or tester.

Ignition switch	Voltage
OFF	Approximately 0V
ON	Battery voltage (11 - 14V)

OK or NG

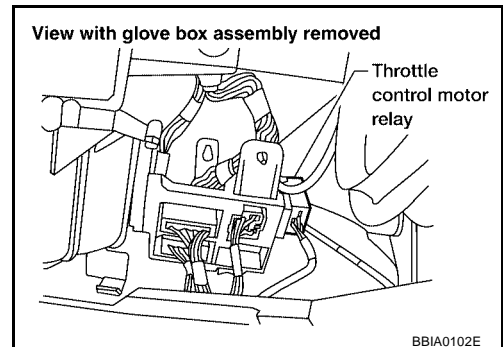
OK >> GO TO 10.

NG >> GO TO 4.



## 4. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect throttle control motor relay harness connector.



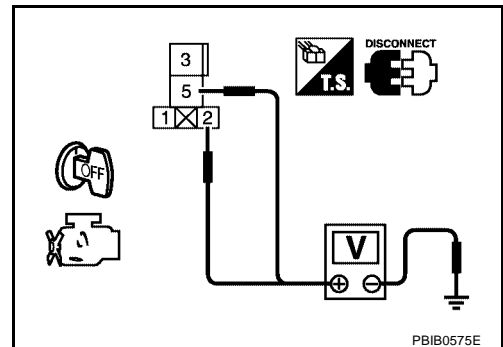
3. Check voltage between throttle control motor relay terminals 2, 5 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

OK >> GO TO 6.

NG >> GO TO 5.



---

## 5. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors E9, F47
- Fuse and fusible link box connector E23
- 15A fuse
- Harness for open or short between throttle control motor relay and battery

>> Repair or replace harness or connectors.

---

## 6. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Disconnect ECM harness connector.
2. Check continuity between ECM terminal 113 and throttle control motor relay terminal 3.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 7. CHECK THROTTLE CONTROL MOTOR RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Check continuity between ECM terminal 112 and throttle control motor relay terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 8. CHECK THROTTLE CONTROL MOTOR RELAY

---

Refer to [EC-1612, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> Replace throttle control motor relay.

---

## 9. CHECK INTERMITTENT INCIDENT

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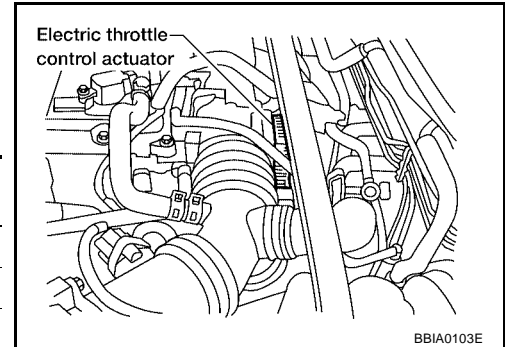
Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

## 10. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch "OFF".
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

Electric throttle control actuator terminal	ECM terminal	Continuity
3	114	Should not exist
	116	Should exist
6	114	Should exist
	116	Should not exist



5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 11.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

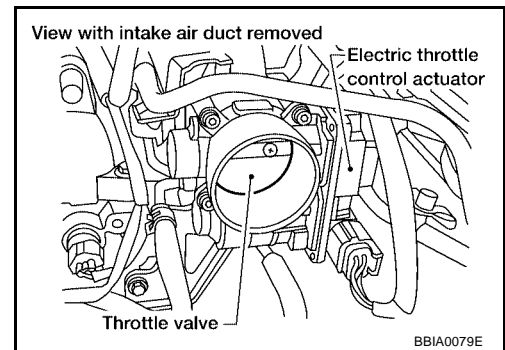
## 11. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve and the housing.

OK or NG

OK >> GO TO 12.

NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



## 12. CHECK THROTTLE CONTROL MOTOR

Refer to [EC-1612, "Component Inspection"](#) .

OK or NG

OK >> GO TO 13.

NG >> GO TO 14.

## 13. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

OK >> GO TO 14.

NG >> Repair or replace harness or connectors.

## 14. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-1255, "Idle Air Volume Learning"](#) .

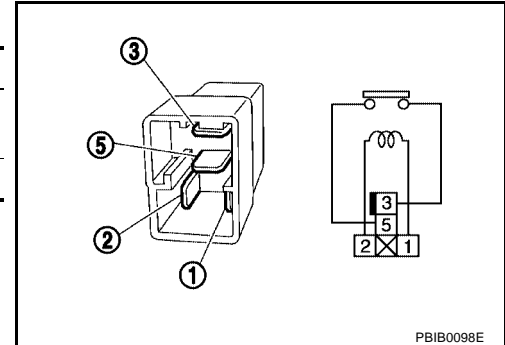
>> INSPECTION END

## Component Inspection THROTTLE CONTROL MOTOR RELAY

1. Apply 12V direct current between relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

3. If NG, replace throttle control motor relay.

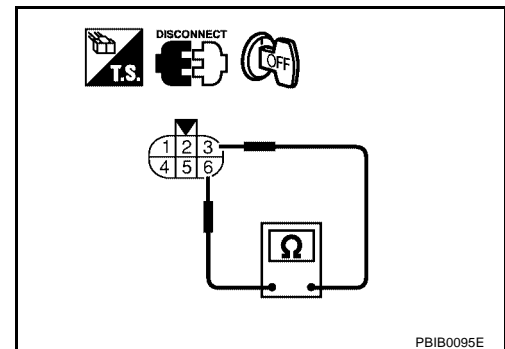


## THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 and 6.

**Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]**

3. If NG, replace electric throttle control actuator and go to next step.
4. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-1255, "Idle Air Volume Learning"](#) .



## Remove and Installation ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EM-105, "INTAKE MANIFOLD"](#) .

# DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

[QR25DE]

## DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

PF1:16119

### Component Description

UBS006JU

Power supply for the Throttle Control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

### CONSULT-II Reference Value in Data Monitor Mode

UBS006JV

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL RELAY	● Ignition switch: ON	ON

### On Board Diagnosis Logic

UBS006JW

These self-diagnosis have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1124 1124	Throttle control motor relay circuit short	ECM detect the throttle control motor relay is stuck ON.	<ul style="list-style-type: none"><li>● Harness or connectors (Throttle control motor relay circuit is shorted)</li><li>● Throttle control motor relay</li></ul>
P1126 1126	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low.	<ul style="list-style-type: none"><li>● Harness or connectors (Throttle control motor relay circuit is open)</li><li>● Throttle control motor relay</li></ul>

### FAIL-SAFE MODE

When the DTC is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

### DTC Confirmation Procedure

UBS006JX

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### PROCEDURE FOR DTC P1124

##### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

##### With CONSULT-II

1. Turn ignition switch "ON" and wait at least 1 second.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. If DTC is detected, go to [EC-1616, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

# DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

[QR25DE]

## With GST

Follow the procedure "With CONSULT-II" above.

### PROCEDURE FOR DTC P1126

#### With CONSULT-II

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-1616, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

## With GST

Follow the procedure "With CONSULT-II" above.

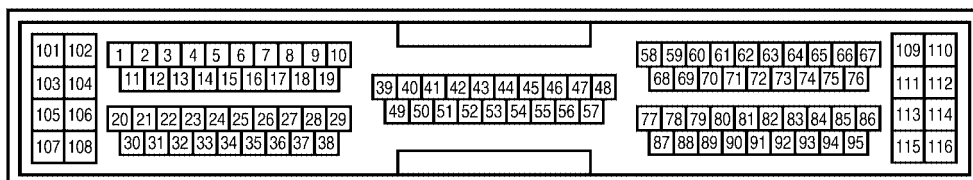
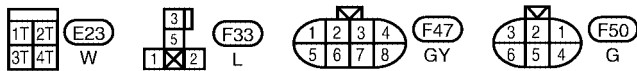
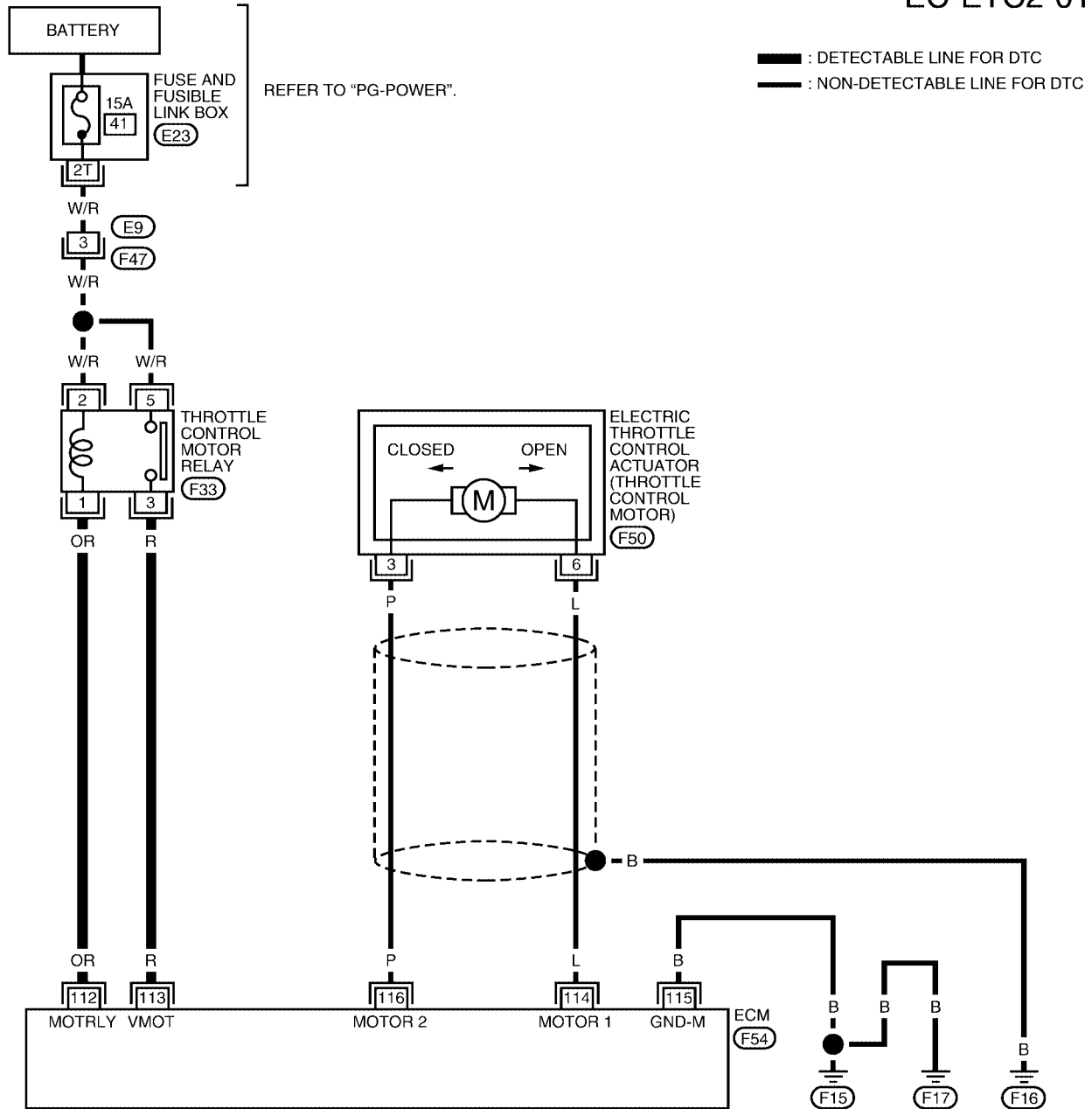
# DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

[QR25DE]

UBS006JY

## Wiring Diagram

EC-ETC2-01



BBWA0250E

# DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

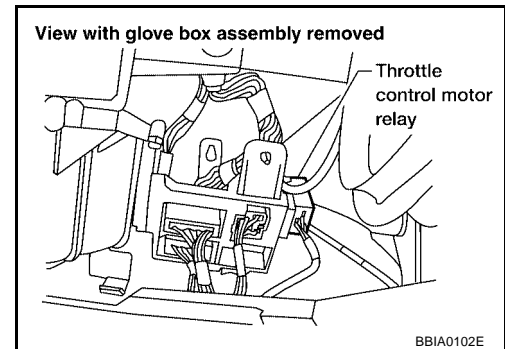
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
112	OR	Throttle control motor relay	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"]	0 - 1.0V
113	R	Throttle control motor relay power supply	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS006JZ

### 1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect throttle control motor relay harness connector.

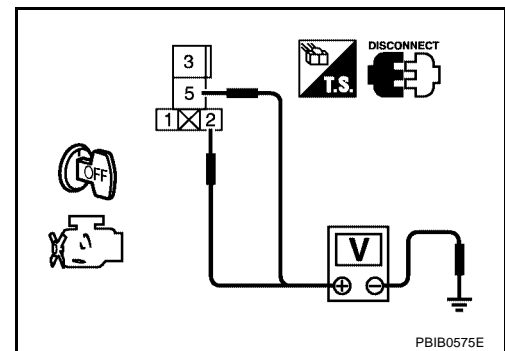


3. Check voltage between throttle control motor relay terminal 2, 5 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.  
NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E9, F47
- Fuse and fusible link connector E23
- 15A fuse
- Harness for open or short between throttle control motor relay and battery

>> Repair or replace harness or connectors.



**3. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check continuity between ECM terminal 113 and throttle control motor relay terminal 3.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**4. CHECK THROTTLE CONTROL MOTOR RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Check continuity between ECM terminal 112 and throttle control motor relay terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**5. CHECK THROTTLE CONTROL MOTOR RELAY**

Refer to [EC-1617, "Component Inspection"](#) .

OK or NG

OK >> GO TO 6.

NG >> Replace throttle control motor relay.

**6. CHECK INTERMITTENT INCIDENT**

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

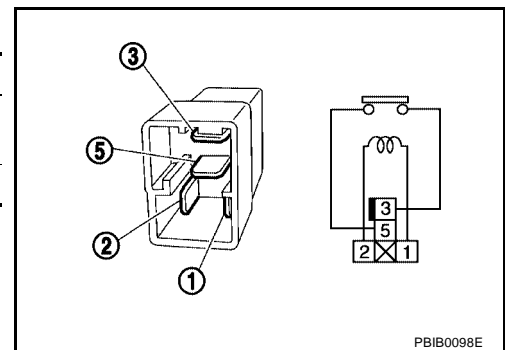
**Component Inspection  
THROTTLE CONTROL MOTOR RELAY**

UBS006K0

1. Apply 12V direct current between relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

3. If NG, replace throttle control motor relay.



PBIB0098E

## DTC P1128 THROTTLE CONTROL MOTOR

PFP:16119

### Component Description

UBS006K1

The throttle control motor is operated by the ECM and it opens and closes the throttle valve. The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

### On Board Diagnosis Logic

UBS006K2

**This self-diagnosis has the one trip detection logic.**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1128 1128	Throttle control motor circuit short	ECM detects short in both circuits between ECM and throttle control motor.	<ul style="list-style-type: none"> <li>● Harness or connectors (Throttle control motor circuit is shorted.)</li> <li>● Electric throttle control actuator (Throttle control motor)</li> </ul>

### FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

### DTC Confirmation Procedure

UBS006K3

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### WITH CONSULT-II

1. Turn ignition switch "ON" and wait at least 2 seconds.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to [EC-1620, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### WITH GST

Follow the procedure "WITH CONSULT-II" above.

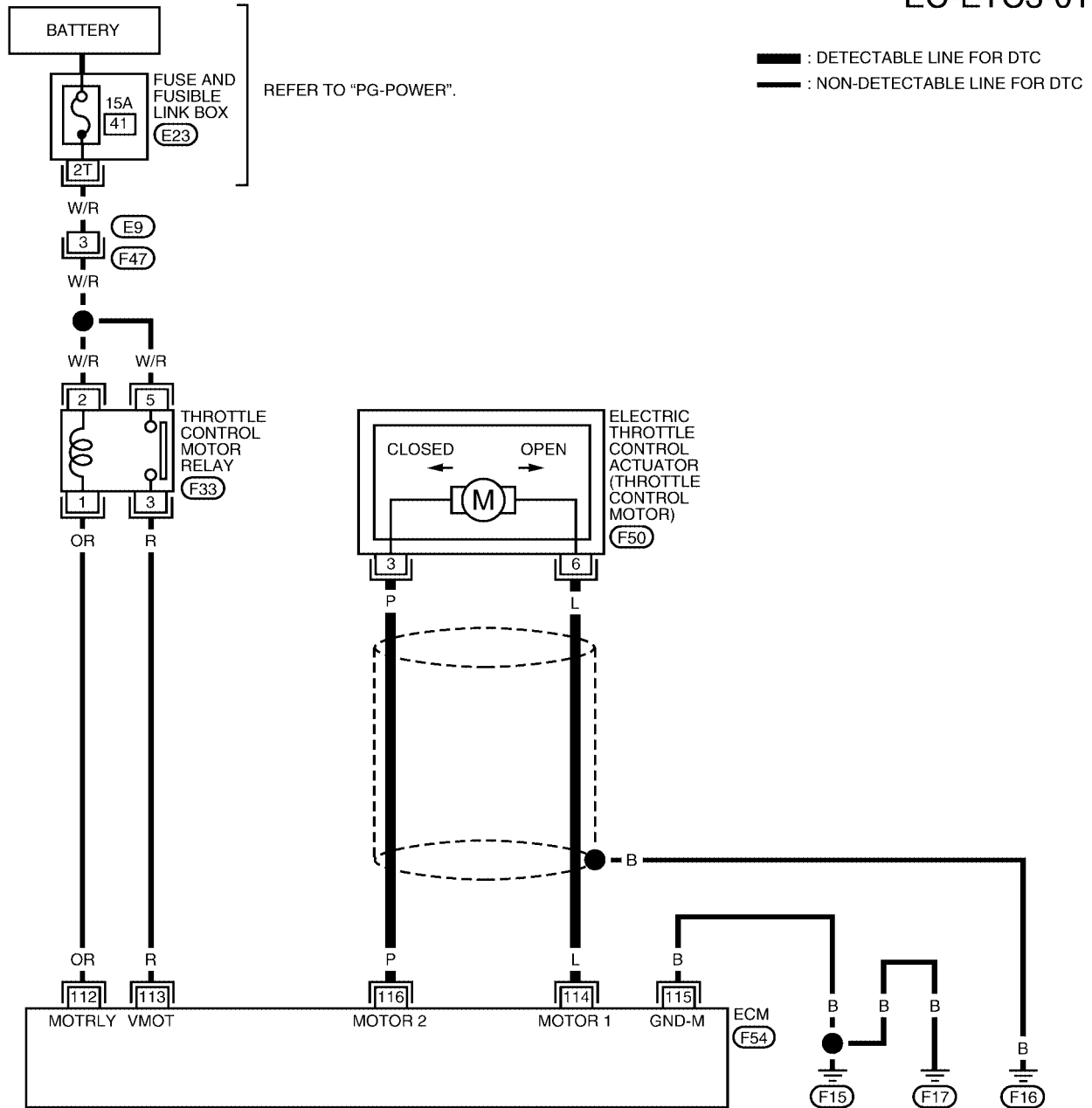
# DTC P1128 THROTTLE CONTROL MOTOR

[QR25DE]

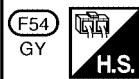
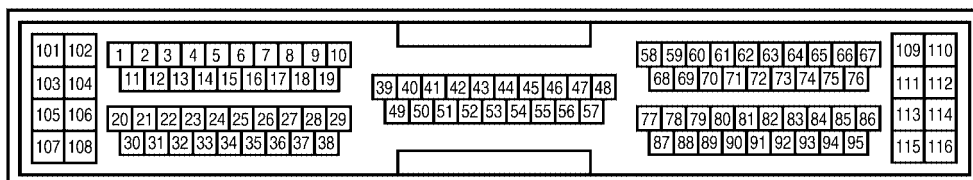
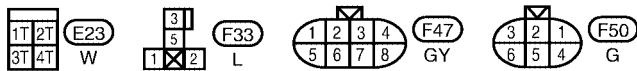
UBS006K4

## Wiring Diagram

EC-ETC3-01



A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



BBWA0251E

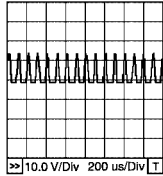
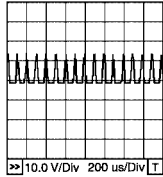
# DTC P1128 THROTTLE CONTROL MOTOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
114	L	Throttle control motor (Open)	<p>[Ignition switch "ON"]</p> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal is depressing</li> </ul>	<p>0 - 14V★</p>  <p>PBIB0533E</p>
116	P	Throttle control motor (Close)	<p>[Ignition switch "ON"]</p> <ul style="list-style-type: none"> <li>● Engine stopped</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal is releasing</li> </ul>	<p>0 - 14V★</p>  <p>PBIB0534E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

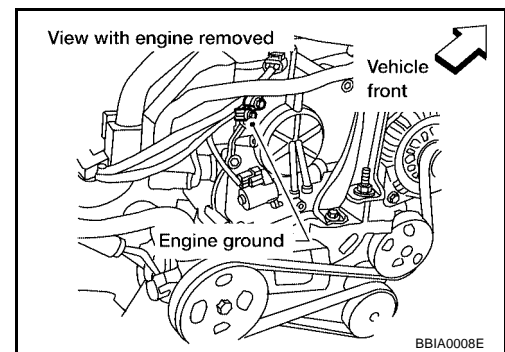
## Diagnostic Procedure

UBS006K5

### 1. RETIGHTEN GROUND SCREWS

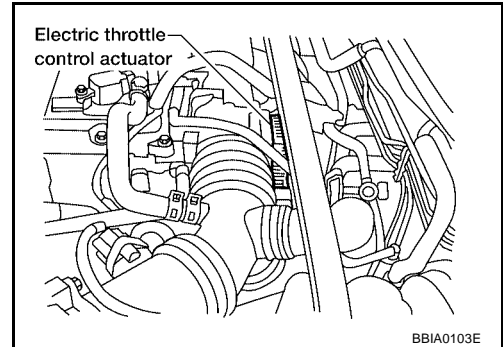
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



**2. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT**

1. Turn ignition switch "OFF".
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.



Electric throttle control actuator terminal	ECM terminal	Continuity
3	114	Should not exist
	116	Should exist
6	114	Should exist
	116	Should not exist

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace.

**3. CHECK THROTTLE CONTROL MOTOR**

Refer to [EC-1621, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 5.

**4. CHECK INTERMITTENT INCIDENT**

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace harness or connectors.

**5. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-1255, "Idle Air Volume Learning"](#) .

>> INSPECTION END

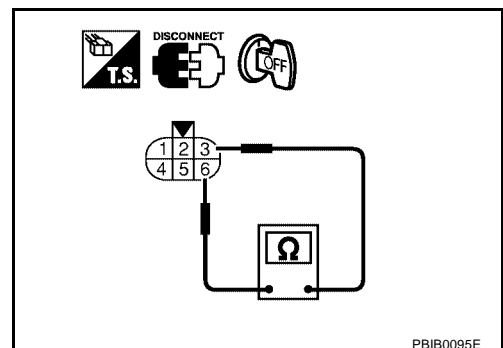
**Component Inspection  
THROTTLE CONTROL MOTOR**

UBS006K6

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 and 6.

**Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]**

3. If NG, replace electric throttle control actuator and go to next step.
4. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
5. Perform [EC-1255, "Idle Air Volume Learning"](#) .



---

**Remove and Installation**  
**ELECTRIC THROTTLE CONTROL ACTUATOR**

UBS006K7

Refer to [EM-105, "INTAKE MANIFOLD"](#) .

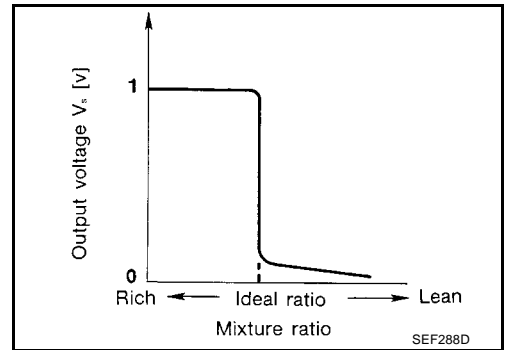
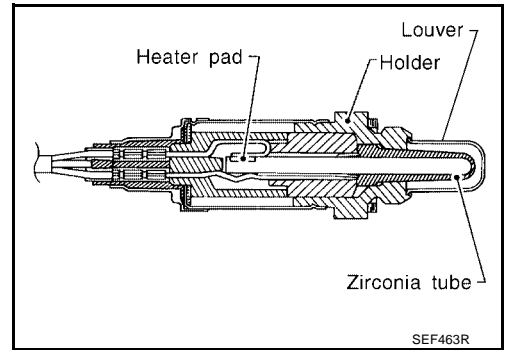
DTC P1143 HO2S1

PF2:22690

Component Description

UBS002HF

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



CONSULT-II Reference Value in Data Monitor Mode

UBS002HG

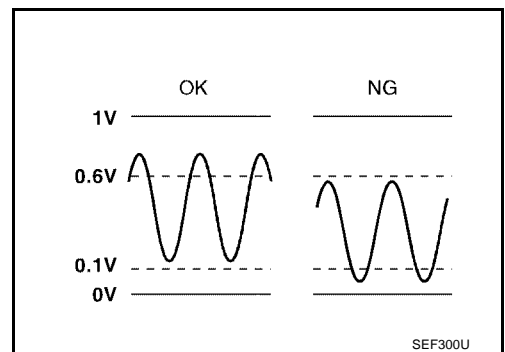
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

UBS002HH

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the “rich” output is sufficiently high and whether the “lean” output is sufficiently low. When both the outputs are shifting to the lean side, the malfunction will be detected.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1143 1143	Heated oxygen sensor 1 lean shift monitoring	The maximum and minimum voltage from the sensor are not reached to the specified voltages.	<ul style="list-style-type: none"> <li>● Heated oxygen sensor 1</li> <li>● Heated oxygen sensor 1 heater</li> <li>● Fuel pressure</li> <li>● Injectors</li> <li>● Intake air leaks</li> </ul>

**DTC Confirmation Procedure**

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- Always perform at a temperature above –10°C (14°F).
- Before performing following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch “ON” and select “HO2S1 (B1) P1143” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

**NOTE:**

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.

HO2S1 (B1) P1143	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0546E

6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 50 seconds or more.)

ENG SPEED	1,200 - 3,200 rpm
Vehicle speed	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	1.9 - 13.0 msec
Selector lever	Suitable position

HO2S1 (B1) P1143	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
VHCL SPEED SEN	XXX km/h

PBIB0547E

If “TESTING” is not displayed after 5 minutes, retry from step 2.

7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to [EC-1625, "Diagnostic Procedure"](#).

HO2S1 (B1) P1143	
COMPLETED	

SEC769C

**Overall Function Check**

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a DTC might not be confirmed.

**WITH GST**

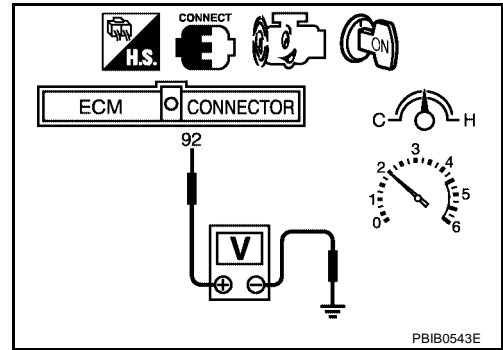
1. Start engine and warm it up to normal operating temperature.



# DTC P1143 HO2S1

[QR25DE]

2. Set voltmeter probes between ECM terminal 92 [HO2S1(B1) signal] and engine ground.
3. Check one of the following with engine speed held at 2,000 rpm constant under no load.
  - The maximum voltage is over 0.6V at least one time.
  - The minimum voltage is over 0.1V at least one time.
4. If NG, go to [EC-1625, "Diagnostic Procedure"](#) .

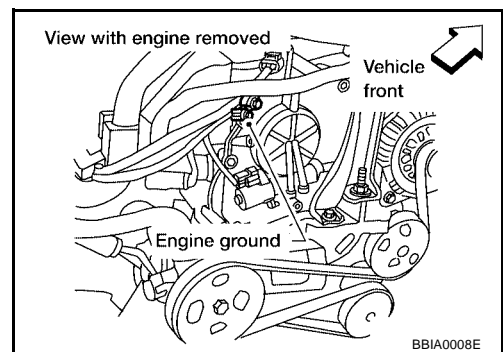


## Diagnostic Procedure

### 1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



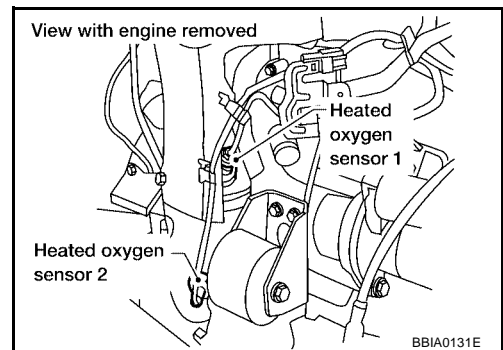
### 2. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

**Tightening torque:**

**40 - 50 N·m (4.1 - 5.1 kg·m, 30 - 37 ft·lb)**

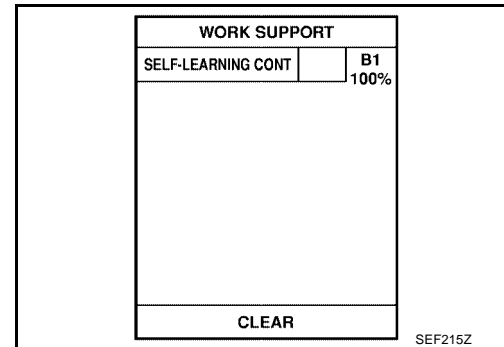
>> GO TO 3.



### 3. CLEAR THE SELF-LEARNING DATA

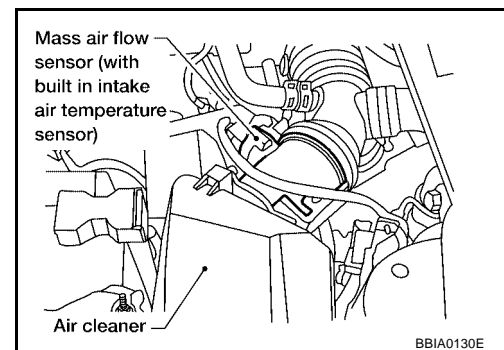
#### ④ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 detected?**  
**Is it difficult to start engine?**



#### ⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-1273, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 detected?**  
**Is it difficult to start engine?**



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171. Refer to [EC-1442](#).
- No >> GO TO 4.

### 4. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to [EC-1361, "Component Inspection"](#).

OK or NG

- OK >> GO TO 5.
- NG >> Replace heated oxygen sensor 1.

### 5. CHECK HEATED OXYGEN SENSOR 1

Refer to [EC-1627, "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace heated oxygen sensor 1.

### 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

For circuit, refer to [EC-1408, "Wiring Diagram"](#).

>> INSPECTION END



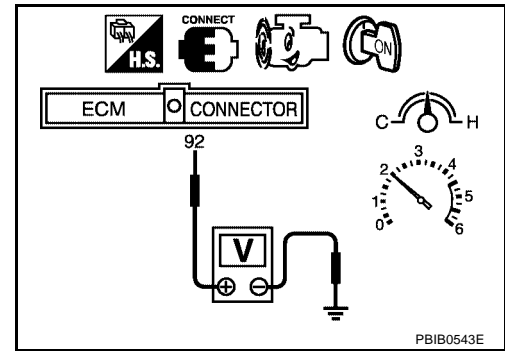
3. Check the following with engine speed held at 2,000 rpm constant under no load.
- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
  - The maximum voltage is over 0.6V at least one time.
  - The minimum voltage is below 0.3V at least one time.
  - The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



PBIB0543E

## Removal and Installation HEATED OXYGEN SENSOR 1

UBS002HM

Refer to [EM-110, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

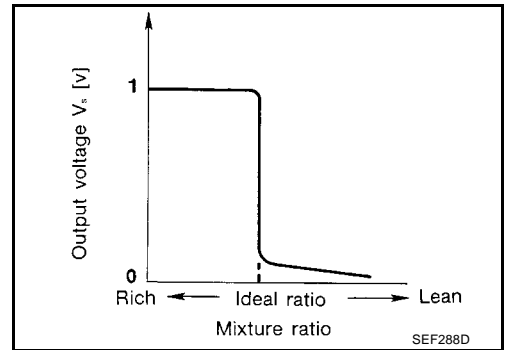
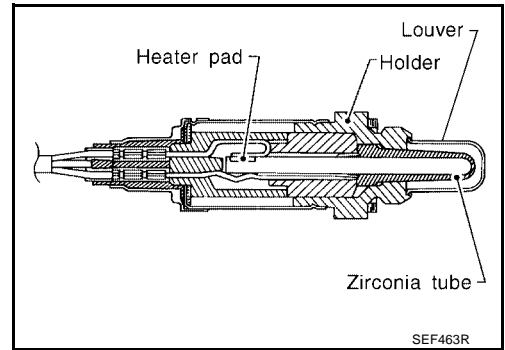
**DTC P1144 HO2S1**

PF2:22690

**Component Description**

UBS002HN

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS002HO

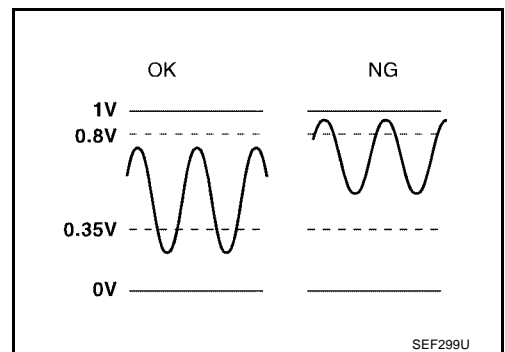
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

**On Board Diagnosis Logic**

UBS002HP

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the “rich” output is sufficiently high. The “lean” output is sufficiently low. When both the outputs are shifting to the rich side, the malfunction will be detected.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1144 1144	Heated oxygen sensor 1 rich shift monitoring	The maximum and minimum voltages from the sensor are beyond the specified voltages.	<ul style="list-style-type: none"> <li>● Heated oxygen sensor 1</li> <li>● Heated oxygen sensor 1 heater</li> <li>● Fuel pressure</li> <li>● Injectors</li> </ul>

**DTC Confirmation Procedure**

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

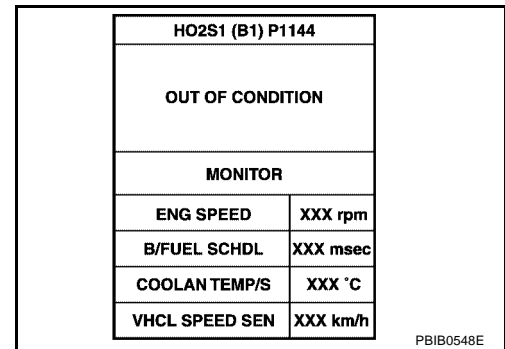
- Always perform at a temperature above –10°C (14°F).
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 5 seconds.
3. Turn ignition switch “ON” and select “HO2S1 (B1) P1144” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

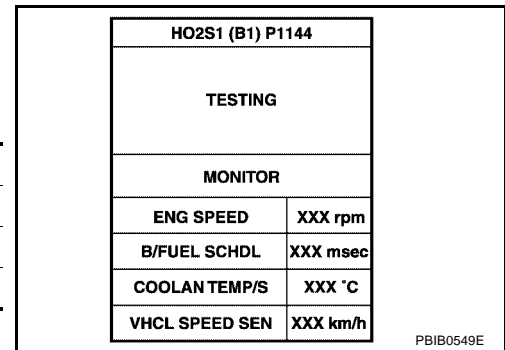
**NOTE:**

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.



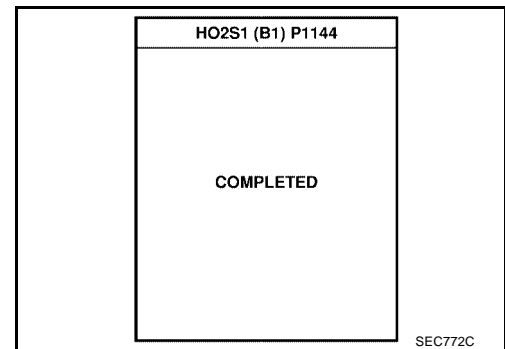
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 50 seconds or more.)

ENG SPEED	1,200 - 3,200 rpm
Vehicle speed	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	1.9 - 13.0 msec
Selector lever	Suitable position



If “TESTING” is not displayed after 5 minutes, retry from step 2.

7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to [EC-1631, "Diagnostic Procedure"](#).



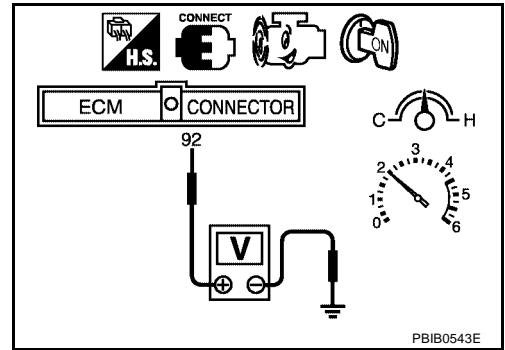
**Overall Function Check**

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a DTC might not be confirmed.

**WITH GST**

1. Start engine and warm it up to normal operating temperature.

2. Set voltmeter probes between ECM terminal 92 [HO2S1(B1) signal] and engine ground.
3. Check one of the following with engine speed held at 2,000 rpm constant under no load.
  - The maximum voltage is below 0.8V at least one time.
  - The minimum voltage is below 0.35V at least one time.
4. If NG, go to [EC-1631, "Diagnostic Procedure"](#) .

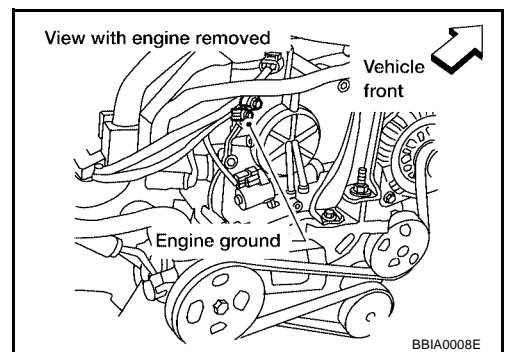


## Diagnostic Procedure

### 1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.

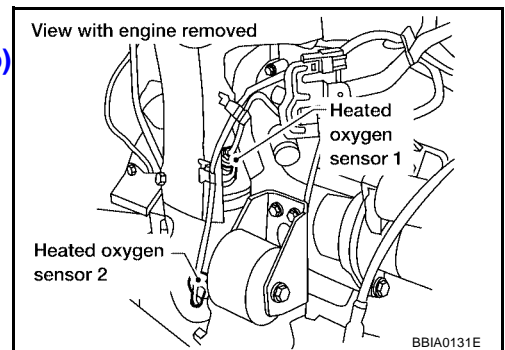


### 2. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

**Tightening torque: 40 - 50 N·m (4.1 - 5.1 kg·m, 30 - 37 ft·lb)**

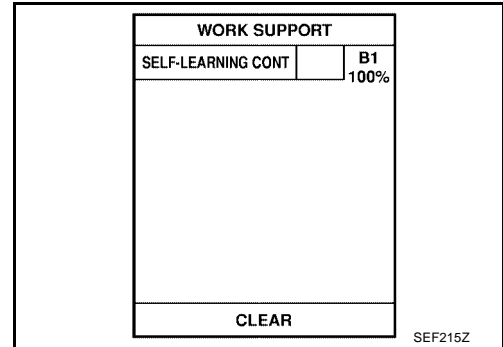
>> GO TO 3.



### 3. CLEAR THE SELF-LEARNING DATA

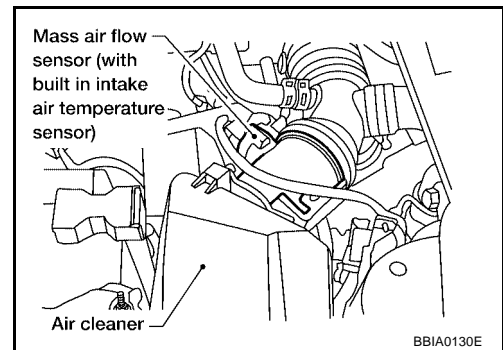
**With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0172 detected?**  
**Is it difficult to start engine?**



**Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-1273, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0172 detected?**  
**Is it difficult to start engine?**



Yes or No

- Yes >> Perform trouble diagnosis for DTC P0172. Refer to [EC-1449](#).
- No >> GO TO 4.

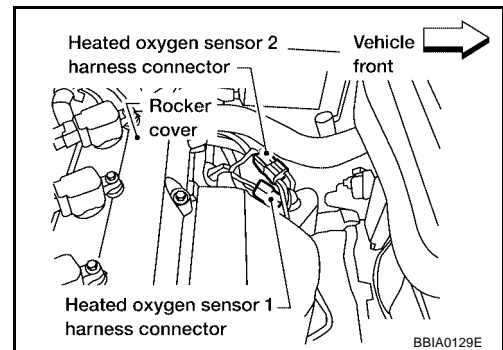
### 4. CHECK HO2S1 CONNECTOR FOR WATER

1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 1 harness connector.
3. Check connectors for water.

**Water should not exist.**

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace harness or connectors.



### 5. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to [EC-1361, "Component Inspection"](#).

OK or NG

- OK >> GO TO 6.
- NG >> Replace heated oxygen sensor 1.





- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 92 [HO2S1 (B1) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.

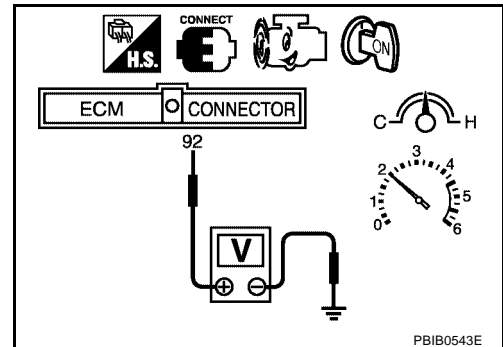
- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



## Removal and Installation HEATED OXYGEN SENSOR 1

UBS002HU

Refer to [EM-110, "EXHAUST MANIFOLD AND THREE WAY CATALYST"](#) .

**DTC P1146 HO2S2**

PF2:226A0

**Component Description**

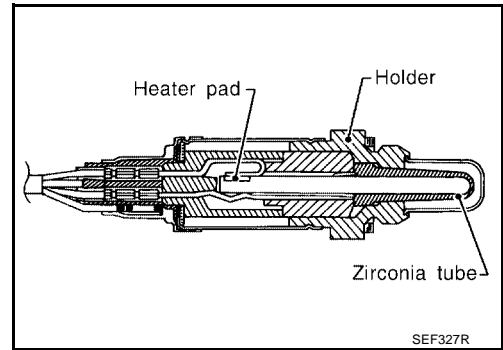
UBS002HV

The heated oxygen sensor 2, after three way catalyst (Manifold), monitors the oxygen level in the exhaust gas on each bank.

Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



**CONSULT-II Reference Value in Data Monitor Mode**

UBS002HW

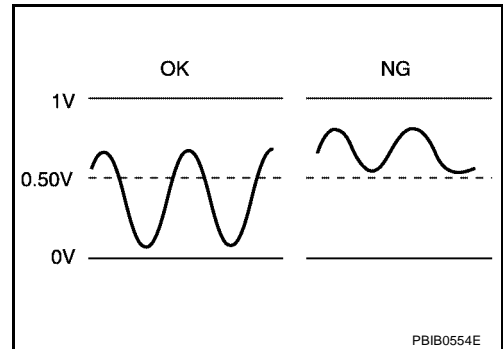
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> <li>Warm-up condition</li> </ul>		0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)	<ul style="list-style-type: none"> <li>After keeping engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	Revsing engine from idle to 3,000 rpm quickly.	LEAN ↔ RICH

**On Board Diagnosis Logic**

UBS002HX

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the minimum voltage of sensor is sufficiently low during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1146 1146	Heated oxygen sensor 2 minimum voltage monitoring	The minimum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> <li>Fuel pressure</li> <li>Injectors</li> </ul>

**DTC Confirmation Procedure**

UBS002HY

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

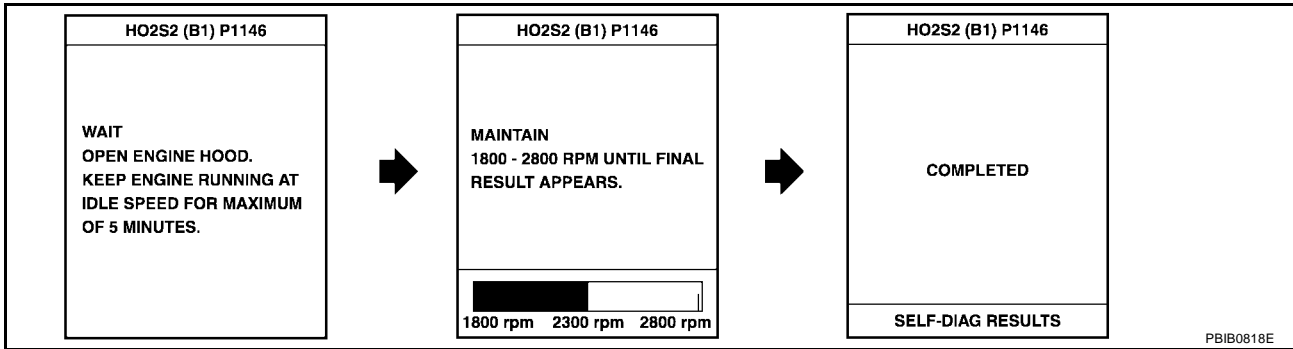
**TESTING CONDITION:**

Open engine hood before conducting following procedure.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.

4. Let engine idle for one minutes.
5. Select "HO2S2 (B1) P1146" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II and follow the instruction of CONSULT-II.



6. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".  
 If "NG" is displayed, go to [EC-1638, "Diagnostic Procedure"](#) .  
 If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
  - a. Turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle).
  - b. Turn ignition switch "ON" and select "COOLANTEMP/S" in "DATA MONITOR" mode with CONSULT-II.
  - c. Start engine and warm it up while monitoring "COOLANTEMP/S" indication on CONSULT-II.
  - d. When "COOLANTEMP/S" indication reaches to 70°C (158°F), go to step3.

**Overall Function Check**

UBS002HZ

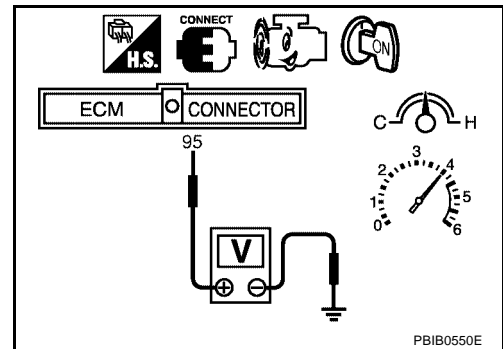
Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a DTC might not be confirmed.

**CAUTION:**

**Always drive vehicle at a safe speed.**

**WITH GST**

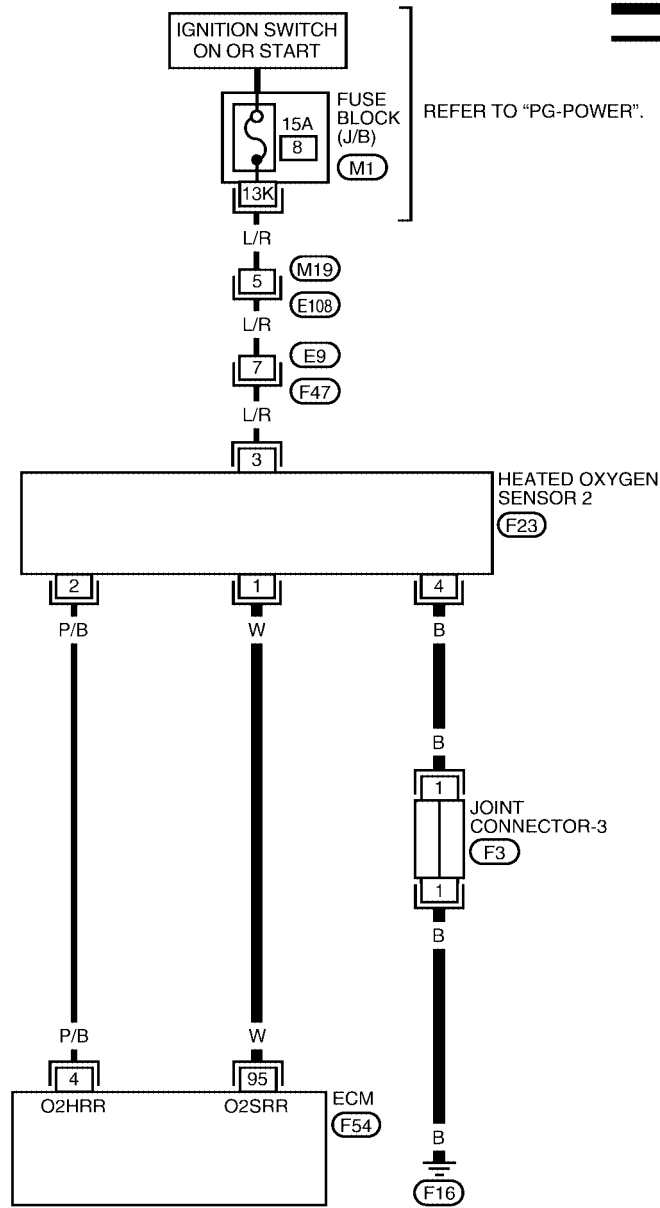
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Set voltmeter probes between ECM terminal 95 [HO2S2 (B1) signal] and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
 (Depress and release accelerator pedal as soon as possible.)  
**The voltage should be below 0.50V at least once during this procedure.**  
**If the voltage can be confirmed in step 6, step 7 is not necessary.**
7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).  
**The voltage should be below 0.50V at least once during this procedure.**
8. If NG, go to [EC-1638, "Diagnostic Procedure"](#) .



Wiring Diagram

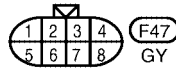
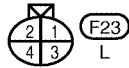
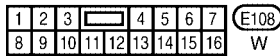
EC-HO2S2-01

A  
EC  
C  
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F  
G  
H  
I  
J  
K  
L  
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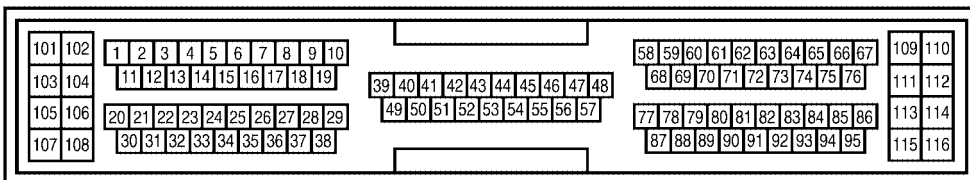


— : DETECTABLE LINE FOR DTC  
- - - : NON-DETECTABLE LINE FOR DTC

REFER TO "PG-POWER".



REFER TO THE FOLLOWING.  
 (M1) - FUSE BLOCK - JUNCTION BOX (J/B)  
 (F3) - JOINT CONNECTOR



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
95	W	Heated oxygen sensor 2	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Engine speed is below 3,600rpm after the following conditions are met.                             <ul style="list-style-type: none"> <li>- Engine after warming up</li> <li>- Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul> </li> <li>● Revving engine from idle to 3,000 rpm quickly.</li> </ul>	0 - Approximately 1.0V

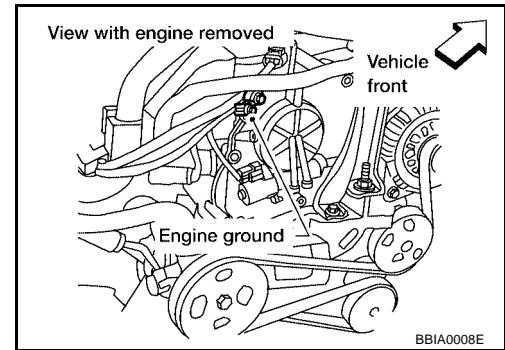
**Diagnostic Procedure**

UBS00211

**1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

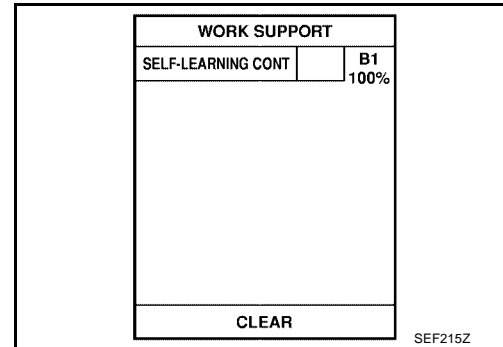
>> GO TO 2.



## 2. CLEAR THE SELF-LEARNING DATA

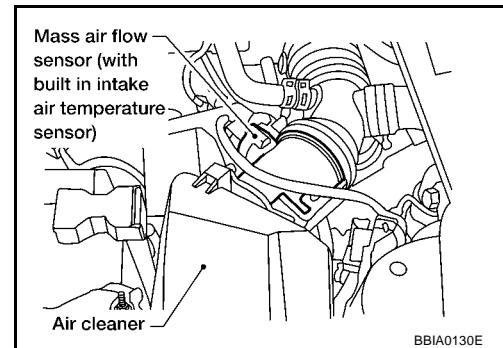
### ④ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0172 detected?  
Is it difficult to start engine?**



### ⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-1273, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0172 detected?  
Is it difficult to start engine?**



#### Yes or No

- Yes >> Perform trouble diagnosis for DTC P0172. Refer to [EC-1449](#).
- No >> GO TO 3.

## 3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

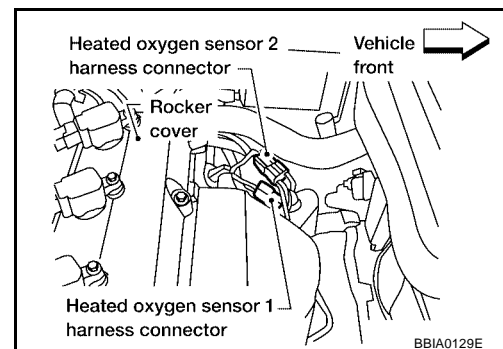
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Check harness continuity between HO2S2 terminal 4 and engine ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

#### OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



## 4. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-3
- Harness for open and short between HO2S2 and engine ground

>> Repair open circuit or short to power in harness or connectors.

**5. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 95 and HO2S2 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Check harness continuity between ECM terminal 95 or HO2S2 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

4. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 6.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK HEATED OXYGEN SENSOR 2**

Refer to [EC-1640, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace heated oxygen sensor 2.

**7. CHECK INTERMITTENT INCIDENT**

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Component Inspection  
HEATED OXYGEN SENSOR 2**

UBS00212

**With CONSULT-II**

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
5. Let engine idle for one minutes.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

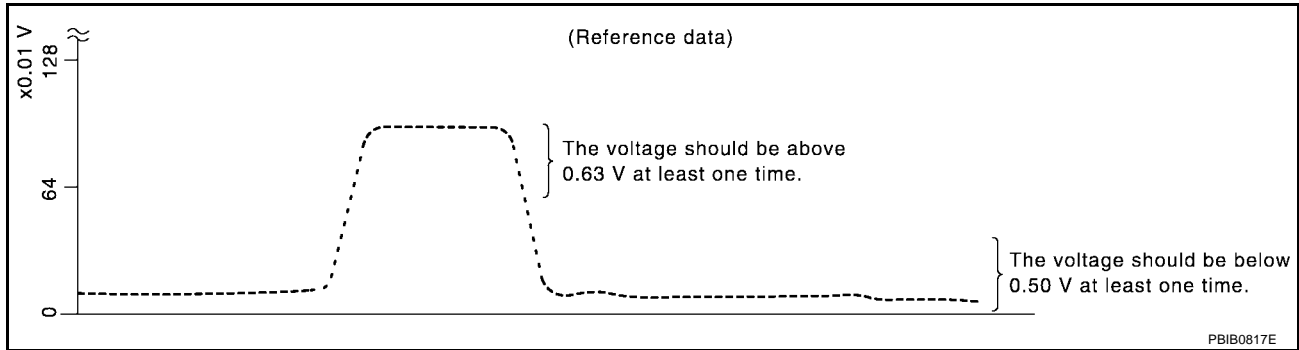
6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y



7. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .



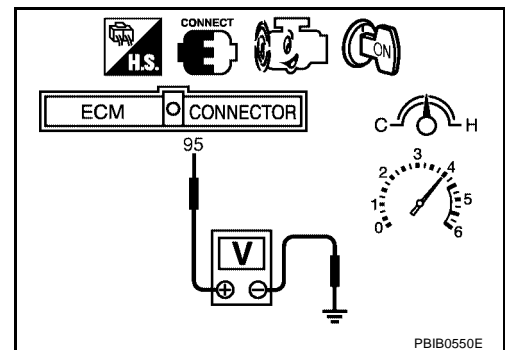
"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.  
 "HO2S2 (B1)" should be below 0.50V at least once when the "FUEL INJECTION" is -25%.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ **Without CONSULT-II**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minutes.
5. Set voltmeter probes between ECM terminal 95 [HO2S2 (B1) signal] and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
 (Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.63V at least once during this procedure.**  
**If the voltage is above 0.63V at step 6, step 7 is not necessary.**
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).  
**The voltage should be below 0.50V at least once during this procedure.**
8. If NG, replace heated oxygen sensor 2.



**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation**  
**HEATED OXYGEN SENSOR 2**

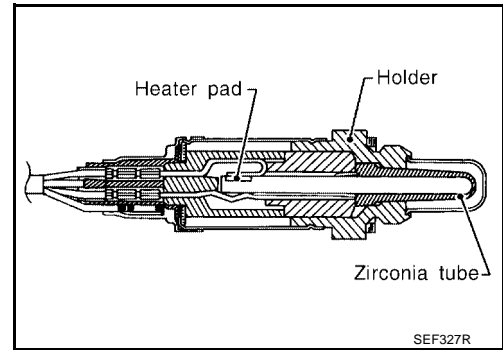
UBS00213

Refer to [EX-3. "EXHAUST SYSTEM"](#) .

**DTC P1147 HO2S2**

**Component Description**

The heated oxygen sensor 2, after three way catalyst (Manifold), monitors the oxygen level in the exhaust gas on each bank. Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2. This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



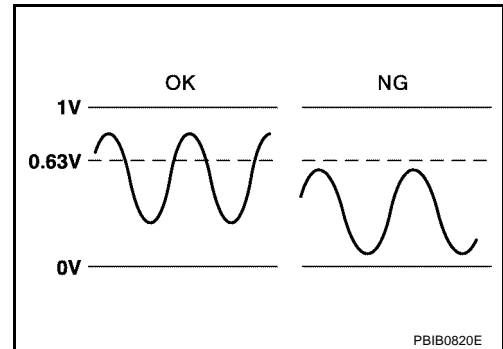
**CONSULT-II Reference Value in Data Monitor Mode**

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> <li>Warm-up condition</li> </ul>		0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)	<ul style="list-style-type: none"> <li>After keeping engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul>	Revsing engine from idle to 3,000 rpm quickly.	LEAN ↔ RICH

**On Board Diagnosis Logic**

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1147 1147	Heated oxygen sensor 2 maximum voltage monitoring	The maximum voltage from the sensor is not reached to the specified voltage.	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>Heated oxygen sensor 2</li> <li>Fuel pressure</li> <li>Injectors</li> <li>Intake air leaks</li> </ul>

**DTC Confirmation Procedure**

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

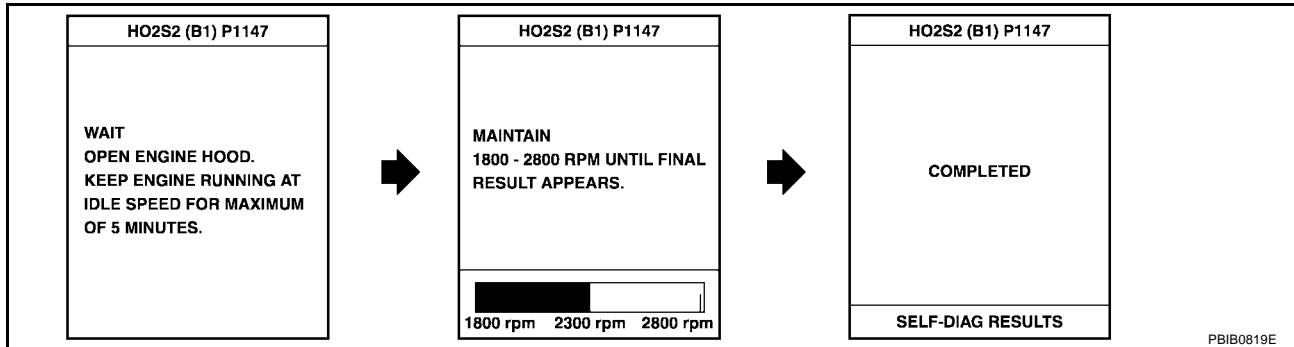
**TESTING CONDITION:**

For the best result, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C (32 to 86°F).

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.

3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minute.
5. Select "HO2S2 (B1) P1147" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II and follow the instruction of CONSULT-II.



6. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".  
 If "NG" is displayed, go to [EC-1645, "Diagnostic Procedure"](#) .  
 If "CAN NOT BE DIAGNOSED" is displayed, perform the following.
  - a. Turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle).
  - b. Turn ignition switch "ON" and select "COOLANTEMP/S" in "DATA MONITOR" mode with CONSULT-II.
  - c. Start engine and warm it up while monitoring "COOLANTEMP/S" indication on CONSULT-II.
  - d. When "COOLANTEMP/S" indication reaches to 70°C (158°F), go to step 3.

## Overall Function Check

UBS00218

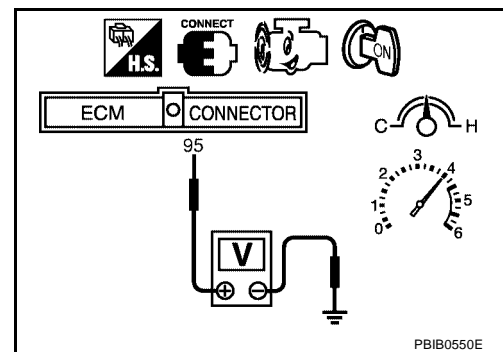
Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a DTC might not be confirmed.

### CAUTION:

**Always drive vehicle at a safe speed.**

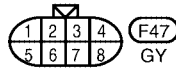
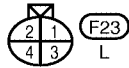
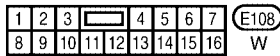
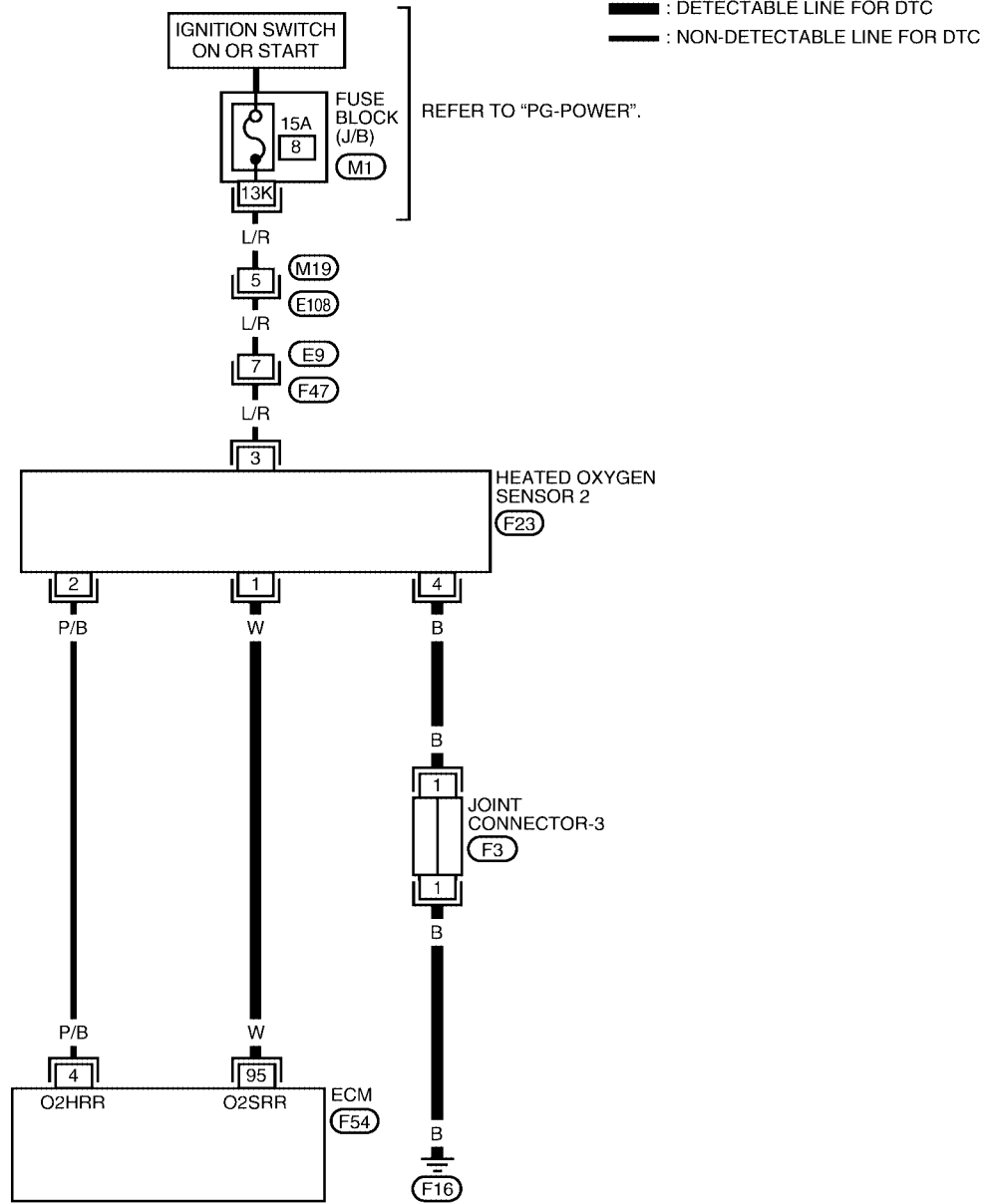
### WITH GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Set voltmeter probes between ECM terminal 95 [HO2S2 (B1) signal] and engine ground.
5. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
 (Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.63V at least once during this procedure.**  
**If the voltage can be confirmed in step 5, step 6 is not necessary.**
6. Keep vehicle idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).  
**The voltage should be above 0.63V at least once during this procedure.**
7. If NG, go to [EC-1645, "Diagnostic Procedure"](#) .



Wiring Diagram

EC-HO2S2-01

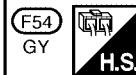
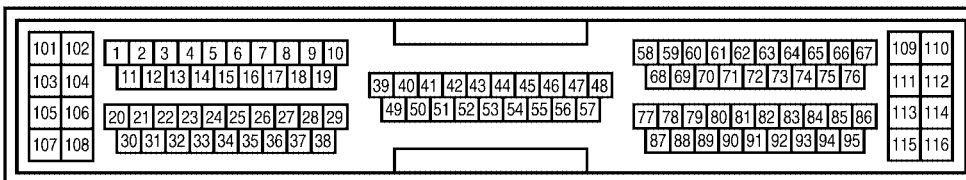


REFER TO THE FOLLOWING.

(M1) - FUSE BLOCK -

JUNCTION BOX (J/B)

(F3) - JOINT CONNECTOR



Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
95	W	Heated oxygen sensor 2	<p><b>[Engine is running]</b></p> <ul style="list-style-type: none"> <li>● Engine speed is below 3,600rpm after the following conditions are met.                             <ul style="list-style-type: none"> <li>- Engine after warming up</li> <li>- Keeping the engine speed between 3,500 and 4,000 rpm for one minute and at idle for one minute under no load.</li> </ul> </li> <li>● Revving engine from idle to 3,000 rpm quickly.</li> </ul>	0 - Approximately 1.0V

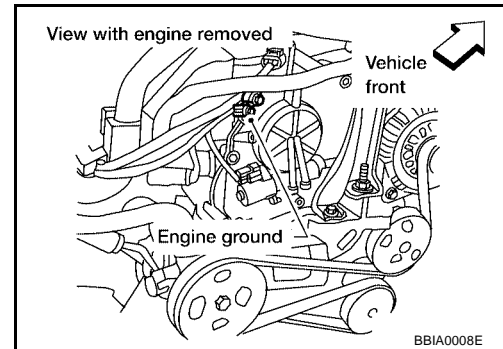
**Diagnostic Procedure**

UBS002IA

**1. RETIGHTEN GROUND SCREWS**

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

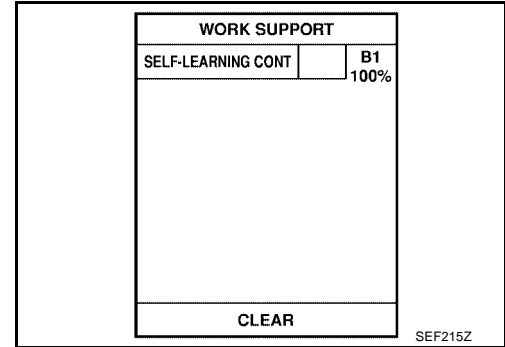
>> GO TO 2.



## 2. CLEAR THE SELF-LEARNING DATA

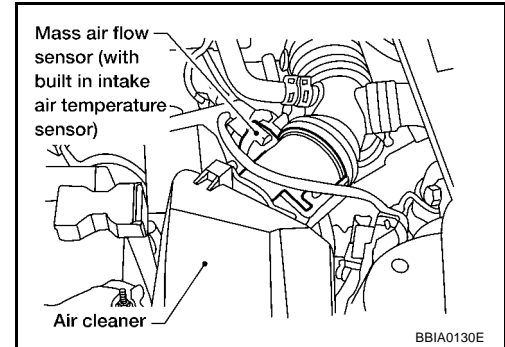
### ① With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 detected?**  
**Is it difficult to start engine?**



### ⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to [EC-1273, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#).
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.  
**Is the 1st trip DTC P0171 detected?**  
**Is it difficult to start engine?**



#### Yes or No

- Yes >> Perform trouble diagnosis for DTC P0171. Refer to [EC-1442](#).
- No >> GO TO 3.

## 3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

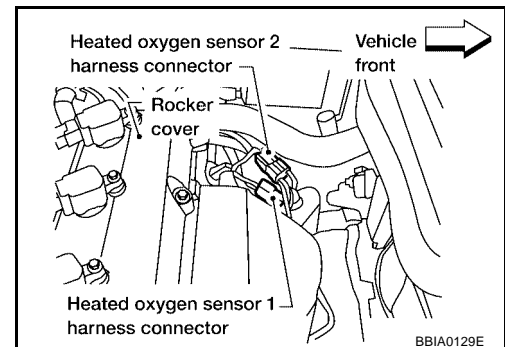
1. Turn ignition switch "OFF".
2. Disconnect heated oxygen sensor 2 harness connector.
3. Check harness continuity between HO2S2 terminal 4 and engine ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

#### OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



## 4. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-3
- Harness for open or short between HO2S2 and engine ground

>> Repair open circuit or short to power in harness or connectors.

**5. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 95 and HO2S2 terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Check harness continuity between ECM terminal 95 or HO2S2 terminal 1 and ground.  
Refer to Wiring Diagram.

**Continuity should not exist.**

4. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 6.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK HEATED OXYGEN SENSOR 2**

Refer to [EC-1647, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace heated oxygen sensor 2.

**7. CHECK INTERMITTENT INCIDENT**

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

**Component Inspection  
HEATED OXYGEN SENSOR 2**

UBS0021B

**With CONSULT-II**

1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
5. Let engine idle for one minutes.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

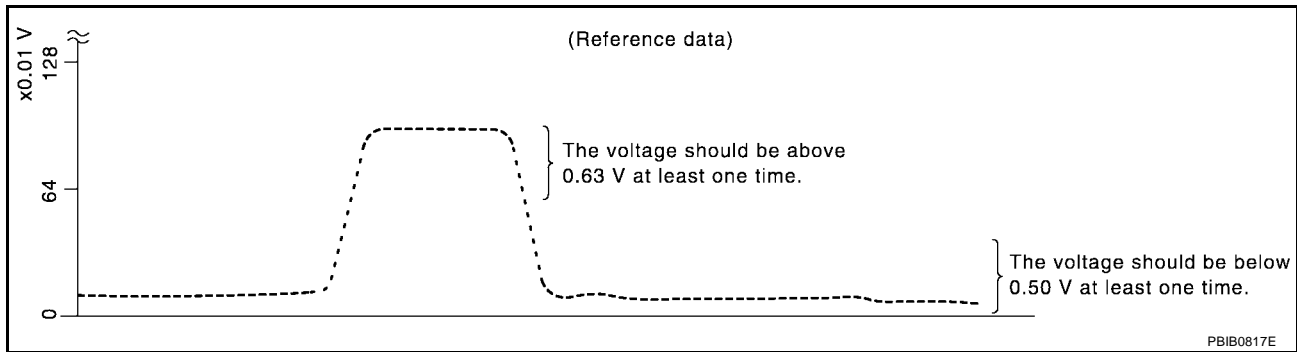
SEF174Y

6. Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

7. Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to  $\pm 25\%$ .



"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.

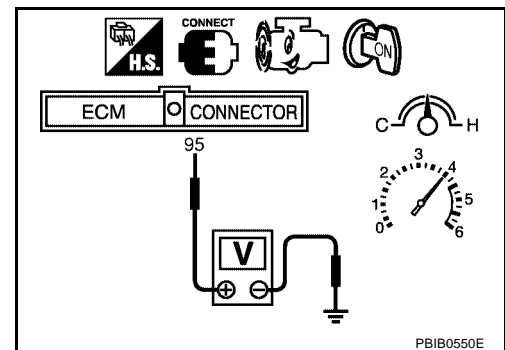
"HO2S2 (B1)" should be below 0.50V at least once when the "FUEL INJECTION" is -25%.

**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ **Without CONSULT-II**

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least one minute under no load.
4. Let engine idle for one minutes.
5. Set voltmeter probes between ECM terminal 95 [HO2S2 (B1) signal] and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.  
(Depress and release accelerator pedal as soon as possible.)  
**The voltage should be above 0.63V at least once during this procedure.**  
**If the voltage is above 0.63V at step 6, step 7 is not necessary.**
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in "D" position with "OD" OFF (A/T), 3rd gear position (M/T).  
**The voltage should be below 0.50V at least once during this procedure.**
8. If NG, replace heated oxygen sensor 2.



**CAUTION:**

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

**Removal and Installation  
HEATED OXYGEN SENSOR 2**

Refer to [EX-3, "EXHAUST SYSTEM"](#) .

UBS0021C



DTC P1148 CLOSED LOOP CONTROL

PF2:22690

On Board Diagnosis Logic

UBS002ID

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1148 1148	Closed loop control function	The closed loop control function does not operate even when vehicle is driving in the specified condition.	<ul style="list-style-type: none"> <li>● The heated oxygen sensor 1 circuit is open or shorted.</li> <li>● Heated oxygen sensor 1</li> <li>● Heated oxygen sensor heater</li> </ul>

DTC Confirmation Procedure

UBS002IE

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

- Never raise engine speed above 3,600 rpm during the "DTC Confirmation Procedure". If the engine speed limit is exceeded, retry the procedure from step 2.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

**WITH CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Hold engine speed at 2,000 rpm and check one of the following.
  - "HO2S1 (B1)" voltage should go above 0.70V at least once.
  - "HO2S1 (B1)" voltage should go below 0.21V at least once.
 If the check result is NG, perform [EC-1650, "Diagnostic Procedure"](#).  
 If the check result is OK, perform the following step.
4. Let engine idle at least 5 minutes.
5. Maintain the following condition at least 50 consecutive seconds.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
VHCL SPEED SE	XXX km/h

SEF682Y

B/FUEL SCHDL	2.8 msec or more
ENG SPEED	More than 1,600 rpm
Selector lever	Suitable position
VHCL SPEED SE	More than 70 km/h (43 MPH)

During this test, P0134 may be displayed on CONSULT-II screen.

6. If DTC is detected, go to [EC-1650, "Diagnostic Procedure"](#).

Overall Function Check

UBS002IF

Use this procedure to check the overall function of the closed loop control. During this check, a DTC might not be confirmed.

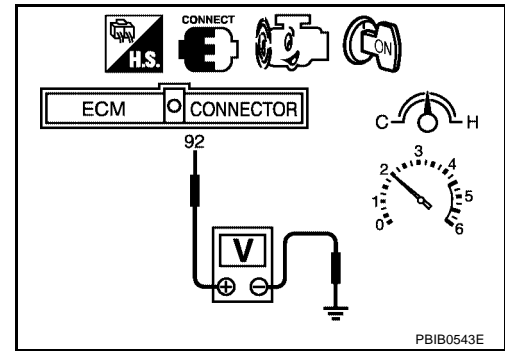
**WITH GST**

1. Start engine and warm it up to normal operating temperature.

## DTC P1148 CLOSED LOOP CONTROL

[QR25DE]

- Set voltmeter probes between ECM terminal 92 [HO2S1 (B1) signal] and engine ground.
- Check the following with engine speed held at 2,000 rpm constant under no-load.
  - The voltage should go above 0.70V at least once.
  - The voltage should go below 0.21V at least once.
- If NG, go to [EC-1650, "Diagnostic Procedure"](#).



UBS002IG

### Diagnostic Procedure

Perform trouble diagnosis for "DTC P0133", [EC-1416](#).

# DTC P1217 ENGINE OVER TEMPERATURE

[QR25DE]

PF0:0000

UBS002IH

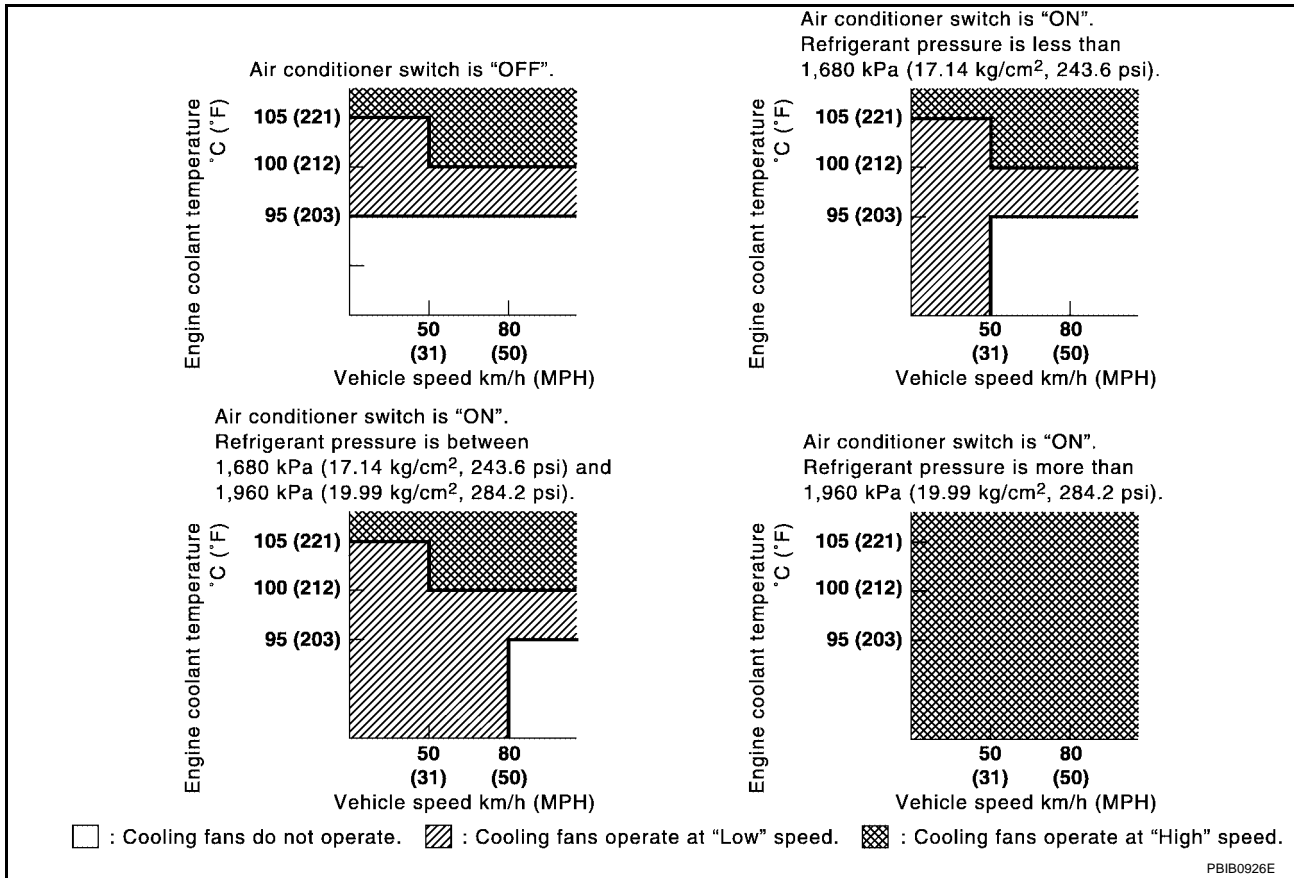
## DTC P1217 ENGINE OVER TEMPERATURE

### System Description COOLING FAN CONTROL

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed sensor	Vehicle speed	Cooling fan control	Cooling fan relay(s)
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner "ON" signal		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

### OPERATION



### CONSULT-II Reference Value in Data Monitor Mode

UBS002II

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
COOLING FAN	● Engine: After warming up, idle the engine ● Air conditioner switch: OFF	Engine coolant temperature is 94°C (201°F) or less	OFF
		Engine coolant temperature is between 95°C (203°F) and 104°C (219°F)	LOW
		Engine coolant temperature is 105°C (221°F) or more	HIGH

## On Board Diagnosis Logic

**This self-diagnosis has the one trip detection logic.**

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise. When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217 1217	Engine over temperature (Overheat)	<ul style="list-style-type: none"> <li>● Cooling fan does not operate properly (Overheat).</li> <li>● Cooling fan system does not operate properly (Overheat).</li> <li>● Engine coolant was not added to the system using the proper filling method.</li> </ul>	<ul style="list-style-type: none"> <li>● Harness or connectors (The cooling fan circuit is open or shorted.)</li> <li>● Cooling fan</li> <li>● Radiator hose</li> <li>● Radiator</li> <li>● Radiator cap</li> <li>● Water pump</li> <li>● Thermostat</li> </ul> <p>For more information, refer to <a href="#">EC-1662</a>, "<a href="#">Main 12 Causes of Overheating</a>".</p>

**CAUTION:**

When a malfunction is indicated, be sure to replace the coolant. Refer to [MA-23](#), "[Changing Engine Coolant](#)". Also, replace the engine oil. Refer to [LU-17](#), "[Changing Engine Oil](#)".

1. Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to [MA-14](#), "[Anti-freeze Coolant Mixture Ratio](#)".
2. After refilling coolant, run engine to ensure that no water-flow noise is emitted.

## Overall Function Check

Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

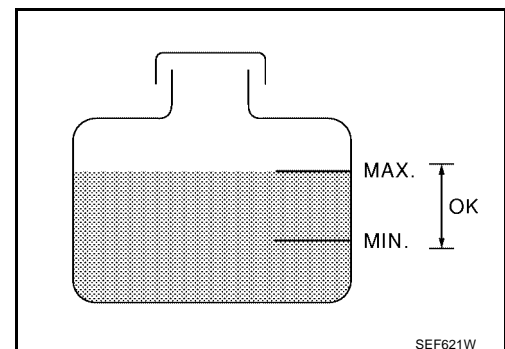
**WARNING:**

**Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.**

**Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.**

**WITH CONSULT-II**

1. Check the coolant level in the reservoir tank and radiator.  
**Allow engine to cool before checking coolant level.**  
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to [EC-1655](#), "[Diagnostic Procedure](#)".
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-1655](#), "[Diagnostic Procedure](#)".
3. Turn ignition switch "ON".



# DTC P1217 ENGINE OVER TEMPERATURE

[QR25DE]

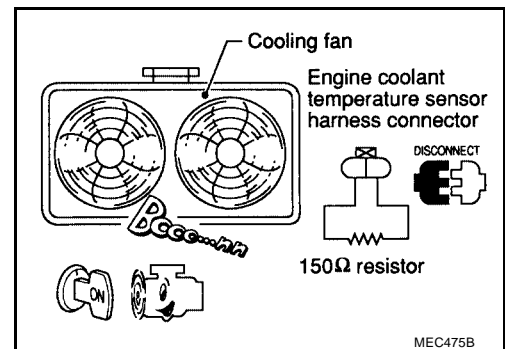
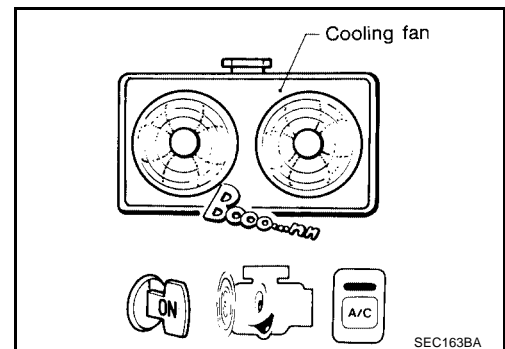
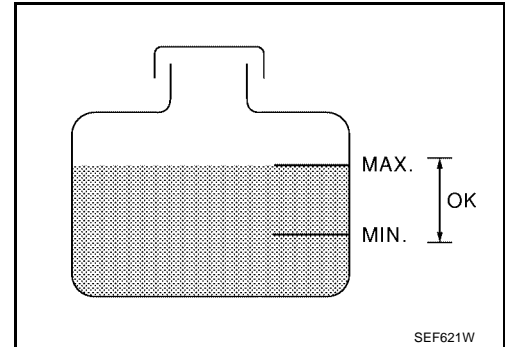
4. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
5. If the results are NG, go to [EC-1655, "Diagnostic Procedure"](#).

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLANT TEMP/S	XXX °C

SEF646X

## WITH GST

1. Check the coolant level in the reservoir tank and radiator.  
**Allow engine to cool before checking coolant level.**  
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to [EC-1655, "Diagnostic Procedure"](#).
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to [EC-1655, "Diagnostic Procedure"](#).
3. Start engine.  
**Be careful not to overheat engine.**
4. Turn air conditioner switch "ON".
5. Turn blower fan switch "ON".
6. Make sure that cooling fan operates at low speed.  
If NG, go to [EC-1655, "Diagnostic Procedure"](#).  
If OK, go to the following step.
7. Turn ignition switch "OFF".
8. Turn air conditioner switch and blower fan switch "OFF".
9. Disconnect engine coolant temperature sensor harness connector.
10. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
11. Restart engine and make sure that cooling fan operates at higher speed than low speed.  
**Be careful not to overheat engine.**
12. If NG, go to [EC-1655, "Diagnostic Procedure"](#).

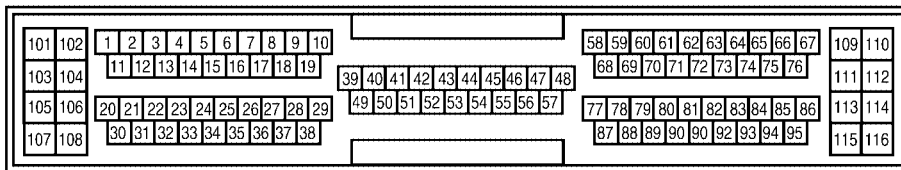
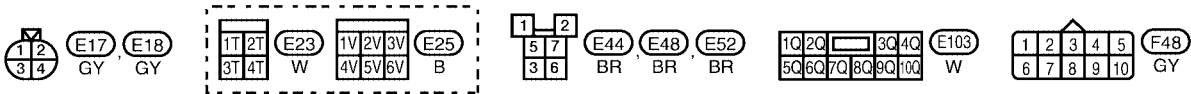
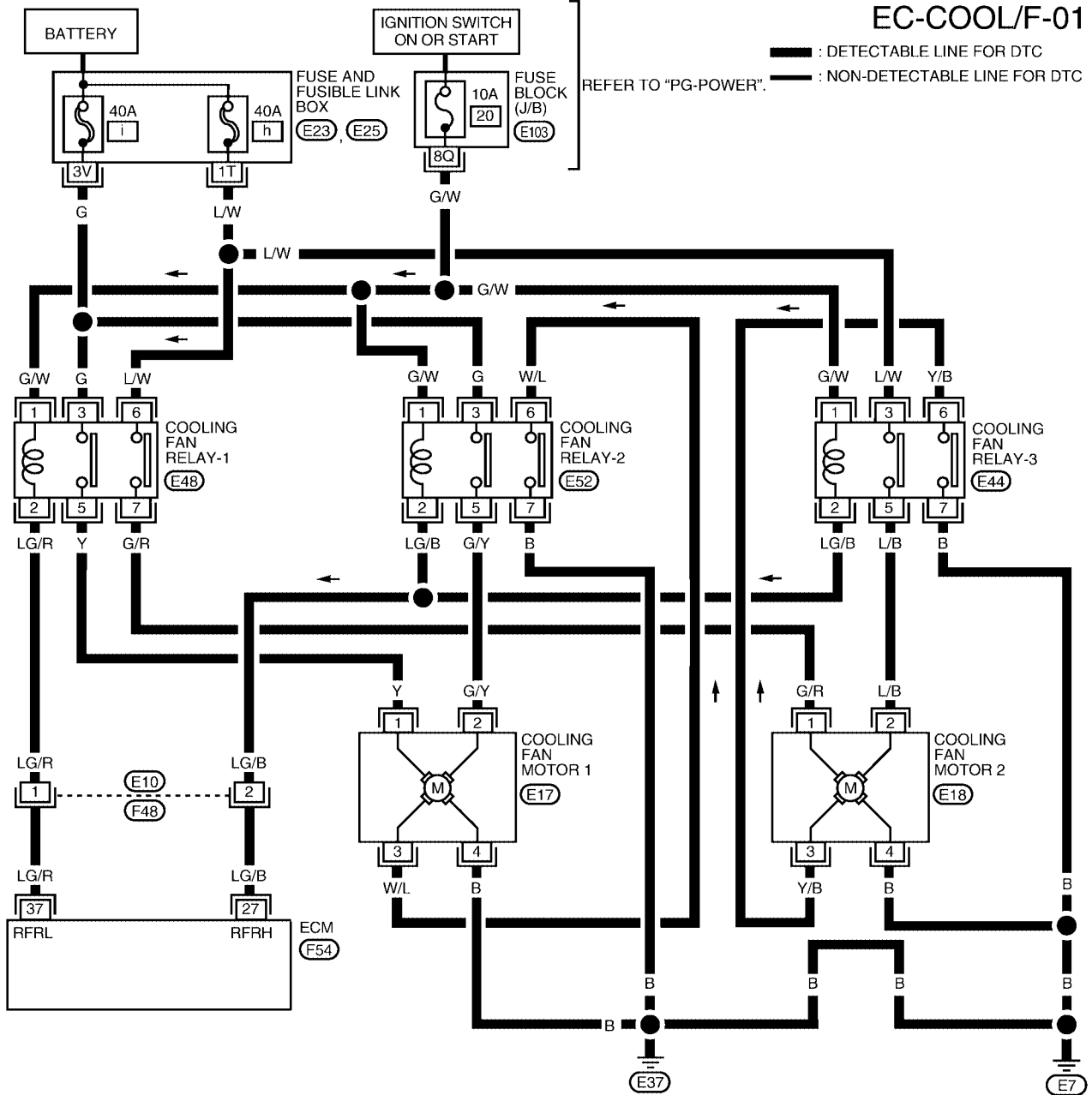


# DTC P1217 ENGINE OVER TEMPERATURE

[QR25DE]

UBS002L

## Wiring Diagram



BBWA0431E

## Diagnostic Procedure

### 1. INSPECTION START

Do you have CONSULT-II?

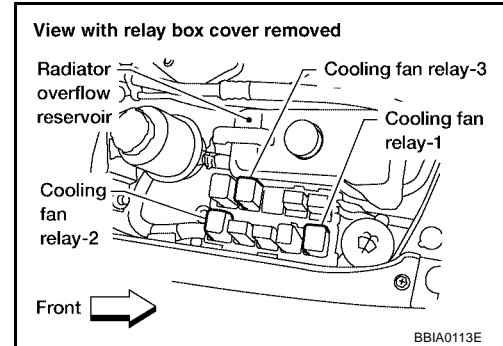
Yes or No

- Yes >> GO TO 2.
- No >> GO TO 4.

### 2. CHECK COOLING FAN LOW SPEED OPERATION

 **With CONSULT-II**

1. Disconnect cooling fan relays-2 and -3.
2. Start engine and let it idle.



3. Select "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II and touch "LOW" on the CONSULT-II screen.
4. Make sure that cooling fans-1 and -2 operate at low speed.

OK or NG

- OK >> GO TO 3.
- NG >> Check cooling fan low speed control circuit. (Go to [EC-1659, "PROCEDURE A"](#) .)

ACTIVE TEST	
COOLING FAN	LOW
MONITOR	
COOLAN TEMP/S	XXX °C

SEF784Z

### 3. CHECK COOLING FAN HIGH SPEED OPERATION

 **With CONSULT-II**

1. Turn ignition switch "OFF".
2. Reconnect cooling fan relays-2 and -3.
3. Start engine and let it idle.
4. Select "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II and touch "HIGH" on the CONSULT-II screen.
5. Make sure that cooling fans-1 and -2 operate at high speed.

OK or NG

- OK >> GO TO 6.
- NG >> Check cooling fan high speed control circuit. (Go to [EC-1661, "PROCEDURE B"](#) .)

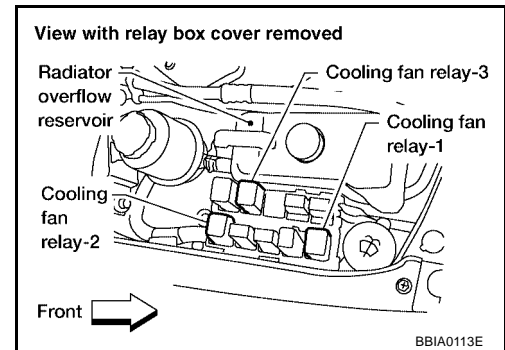
ACTIVE TEST	
COOLING FAN	HIGH
MONITOR	
COOLAN TEMP/S	XXX °C

SEF785Z

## 4. CHECK COOLING FAN LOW SPEED OPERATION

⊗ **Without CONSULT-II**

1. Disconnect cooling fan relays-2 and -3.
2. Start engine and let it idle.
3. Turn air conditioner switch "ON".
4. Turn blower fan switch "ON".

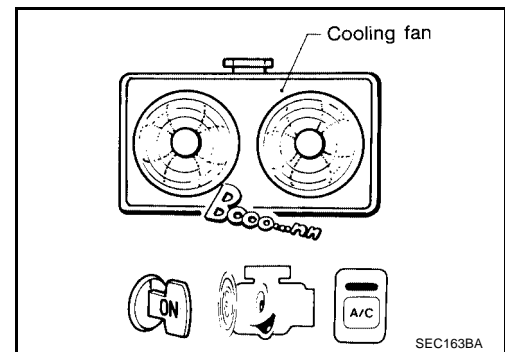


5. Make sure that cooling fans-1 and -2 operate at low speed.

OK or NG

OK >> GO TO 5.

NG >> Check cooling fan low speed control circuit. (Go to [EC-1659, "PROCEDURE A"](#).)



## 5. CHECK COOLING FAN HIGH SPEED OPERATION

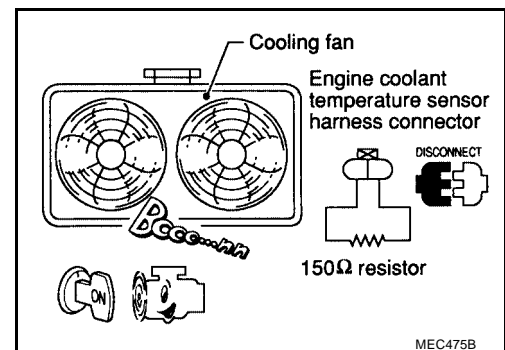
⊗ **Without CONSULT-II**

1. Turn ignition switch "OFF".
2. Reconnect cooling fan relays-2 and -3.
3. Turn air conditioner switch and blower fan switch "OFF".
4. Disconnect engine coolant temperature sensor harness connector.
5. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
6. Restart engine and make sure that cooling fans-1 and -2 operate at high speed.

OK or NG

OK >> GO TO 6.

NG >> Check cooling fan high speed control circuit. (Go to [EC-1661, "PROCEDURE B"](#).)





**6. CHECK COOLING SYSTEM FOR LEAK**

Apply pressure to the cooling system with a tester, and check if the pressure drops.

**Testing pressure: 157 kPa (1.6 kg/cm<sup>2</sup> , 23 psi)**

**CAUTION:**

Higher than the specified pressure may cause radiator damage.

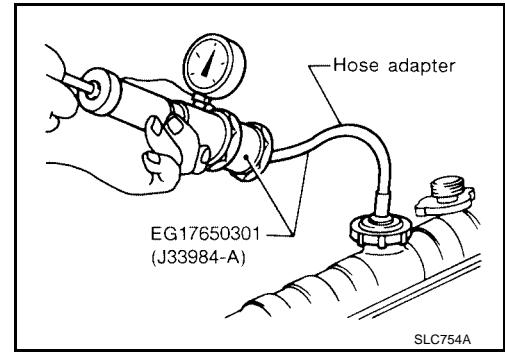
**Pressure should not drop.**

OK or NG

OK >> GO TO 7.

NG >> Check the following for leak.

- Hose
  - Radiator
  - Water pump
- Refer to [CO-26, "WATER PUMP"](#) .



**7. CHECK RADIATOR CAP**

Apply pressure to cap with a tester.

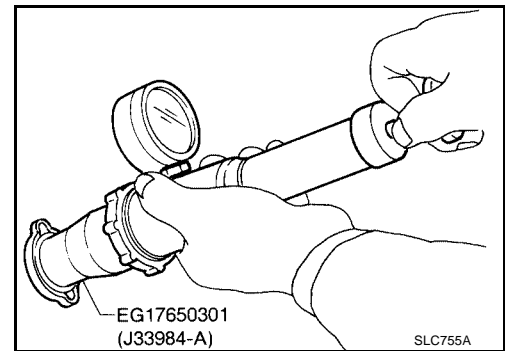
**Radiator cap relief pressure:**

**59 - 98 kPa (0.6 - 1.0 kg/cm<sup>2</sup> , 9 - 14 psi)**

OK or NG

OK >> GO TO 8.

NG >> Replace radiator cap.



**8. CHECK THERMOSTAT**

1. Check valve seating condition at normal room temperatures.  
**It should seat tightly.**
2. Check valve opening temperature and valve lift.

**Valve opening temperature:**

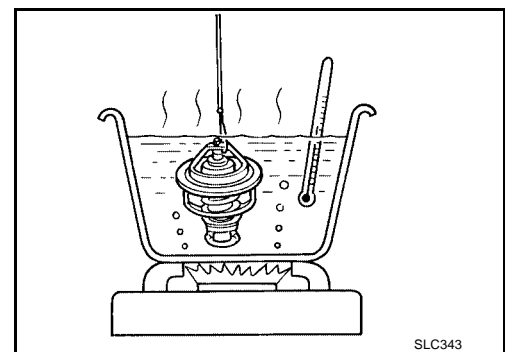
**82°C (180°F) [standard]**

**Valve lift:**

**More than 8 mm/95°C (0.31 in/203°F)**

3. Check if valve is closed at 5°C (9°F) below valve opening temperature.

For details, refer to [CO-28, "THERMOSTAT AND THERMOSTAT HOUSING"](#) .



OK or NG

OK >> GO TO 9.

NG >> Replace thermostat.

**9. CHECK ENGINE COOLANT TEMPERATURE SENSOR**

Refer to [EC-1390, "Component Inspection"](#) .

OK or NG

OK >> GO TO 10.

NG >> Replace engine coolant temperature sensor.

---

**10. CHECK MAIN 12 CAUSES**

---

If the cause cannot be isolated, go to [EC-1662. "Main 12 Causes of Overheating"](#) .

**>> INSPECTION END**

## PROCEDURE A

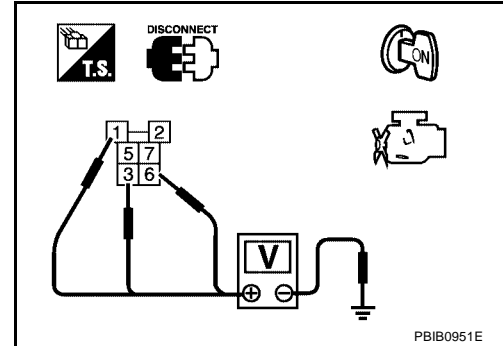
### 1. CHECK POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect cooling fan relay-1.
3. Turn ignition switch "ON".
4. Check voltage between cooling fan relay-1 terminals 1, 3, 6 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- Fuse block (J/B) connector E103
- 40A fusible links
- Fuse and fusible link box connectors E23, E25
- Harness for open or short between cooling fan relay-1 and fuse
- Harness for open or short between cooling fan relay-1 and fusible links

>> Repair open circuit or short to ground or short to power in harness or connectors.

### 3. CHECK COOLING FAN MOTORS CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
3. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-1 terminal 1, cooling fan motor-1 terminal 4 and body ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

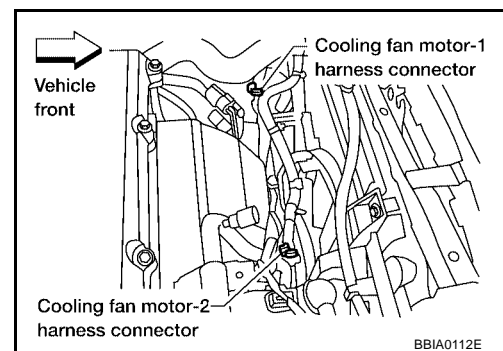
4. Also check harness for short to ground and short to power.
5. Check harness continuity between cooling fan relay-1 terminal 7 and cooling fan motor-2 terminal 1, cooling fan motor-2 terminal 4 and body ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

6. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



---

## 4. CHECK OUTPUT SIGNAL CIRCUIT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 37 and cooling fan relay-1 terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
NG >> GO TO 5.

---

## 5. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors E10, F48
- Harness for open or short between cooling fan relay-1 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 6. CHECK COOLING FAN RELAY-1

---

Refer to [EC-1663, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.  
NG >> Replace cooling fan relay.

---

## 7. CHECK COOLING FAN MOTORS-1 AND -2

---

Refer to [EC-1663, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.  
NG >> Replace cooling fan motors.

---

## 8. CHECK INTERMITTENT INCIDENT

---

Perform [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

## PROCEDURE B

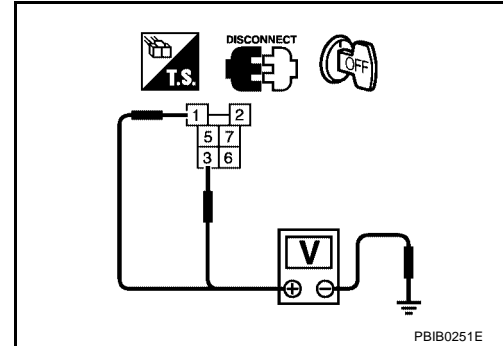
### 1. CHECK POWER SUPPLY

1. Turn ignition switch "OFF".
2. Disconnect cooling fan relays-2 and -3.
3. Turn ignition switch "ON".
4. Check voltage between cooling fan relays-2 and -3 terminals 1, 3 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between cooling fan relays-2 and -3 and fuse
- Harness for open or short between cooling fan relays-2 and -3 and fusible links

>> Repair harness or connectors.

### 3. CHECK COOLING FAN MOTORS CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
3. Check harness continuity between the following; cooling fan relay-2 terminal 5 and cooling fan motor-1 terminal 2, cooling fan relay-2 terminal 6 and cooling fan motor-1 terminal 3, cooling fan relay-2 terminal 7 and body ground. Refer to Wiring Diagram.

**Continuity should exist.**

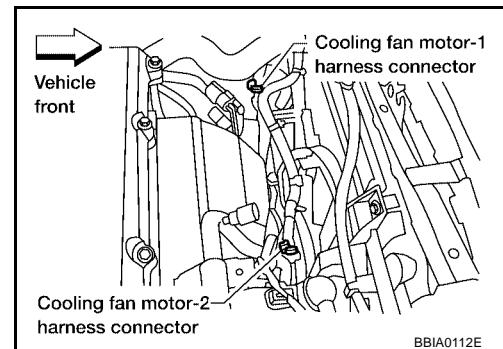
4. Also check harness for short to ground and short to power.
5. Check harness continuity between the following; cooling fan relay-3 terminal 5 and cooling fan motor-2 terminal 2, cooling fan relay-3 terminal 6 and cooling fan motor-2 terminal 3, cooling fan relay-3 terminal 7 and body ground. Refer to Wiring Diagram.

**Continuity should exist.**

6. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



## 4. CHECK OUTPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 27 and cooling fan relay-2 terminal 2, cooling fan relay-3 terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E10, F48
- Harness for open or short between cooling fan relays-2, -3 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 6. CHECK COOLING FAN RELAYS-2 AND -3

Refer to [EC-1663, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Replace cooling fan relays.

## 7. CHECK COOLING FAN MOTORS

Refer to [EC-1663, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace cooling fan motors.

## 8. CHECK INTERMITTENT INCIDENT

Perform [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

## Main 12 Causes of Overheating

UBS002IN

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> <li>● Blocked radiator</li> <li>● Blocked condenser</li> <li>● Blocked radiator grille</li> <li>● Blocked bumper</li> </ul>	<ul style="list-style-type: none"> <li>● Visual</li> </ul>	No blocking	—
	2	<ul style="list-style-type: none"> <li>● Coolant mixture</li> </ul>	<ul style="list-style-type: none"> <li>● Coolant tester</li> </ul>	50 - 50% coolant mixture	See <a href="#">MA-14, "Anti-freeze Coolant Mixture Ratio"</a> .
	3	<ul style="list-style-type: none"> <li>● Coolant level</li> </ul>	<ul style="list-style-type: none"> <li>● Visual</li> </ul>	Coolant up to MAX level in reservoir tank and radiator filler neck	See <a href="#">MA-23, "Changing Engine Coolant"</a> .
	4	<ul style="list-style-type: none"> <li>● Radiator cap</li> </ul>	<ul style="list-style-type: none"> <li>● Pressure tester</li> </ul>	59 - 98 kPa (0.6 - 1.0 kg/cm <sup>2</sup> , 9 - 14 psi) (Limit)	See <a href="#">CO-34, "CHECKING RADIATOR CAP"</a> .

# DTC P1217 ENGINE OVER TEMPERATURE

[QR25DE]

Engine	Step	Inspection item	Equipment	Standard	Reference page
ON*2	5	● Coolant leaks	● Visual	No leaks	See <a href="#">CO-24, "CHECKING COOLING SYSTEM FOR LEAKS"</a> .
ON*2	6	● Thermostat	● Touch the upper and lower radiator hoses	Both hoses should be hot	See <a href="#">CO-28, "THERMOSTAT AND THERMOSTAT HOUSING"</a> , and <a href="#">CO-30, "RADIATOR"</a> .
ON*1	7	● Cooling fan	● CONSULT-II	Operating	See trouble diagnosis for DTC P1217 ( <a href="#">EC-1651</a> ) .
OFF	8	● Combustion gas leak	● Color checker chemical tester 4 Gas analyzer	Negative	—
ON*3	9	● Coolant temperature gauge	● Visual	Gauge less than 3/4 when driving	—
		● Coolant overflow to reservoir tank	● Visual	No overflow during driving and idling	See <a href="#">MA-23, "Changing Engine Coolant"</a> .
OFF*4	10	● Coolant return from reservoir tank to radiator	● Visual	Should be initial level in reservoir tank	See <a href="#">CO-24, "CHECKING RESERVOIR LEVEL"</a> .
OFF	11	● Cylinder head	● Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See <a href="#">EM-145, "CYLINDER HEAD"</a> .
	12	● Cylinder block and pistons	● Visual	No scuffing on cylinder walls or piston	See <a href="#">EM-145, "CYLINDER HEAD"</a> .

\*1: Turn the ignition switch ON.

\*2: Engine running at 3,000 rpm for 10 minutes.

\*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

\*4: After 60 minutes of cool down time.

For more information, refer to [CO-22, "OVERHEATING CAUSE ANALYSIS"](#) .

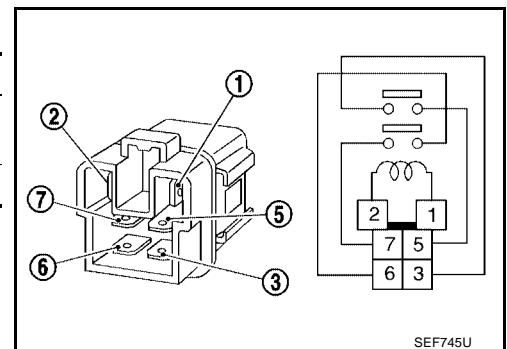
## Component Inspection COOLING FAN RELAYS-1, -2 AND -3

UBS00210

Check continuity between terminals 3 and 5, 6 and 7.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

If NG, replace relay.



SEF745U

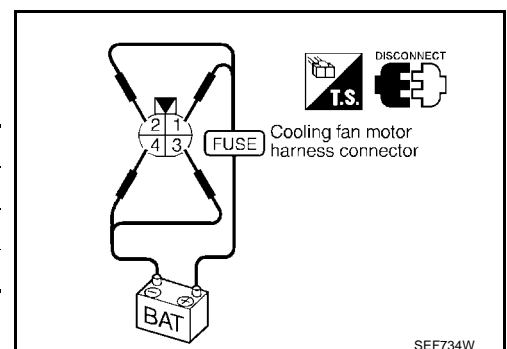
## COOLING FAN MOTORS-1 AND -2

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

	Speed	Terminals	
		(+)	(-)
Cooling fan motor	Low	1	4
	High	1, 2	3, 4

**Cooling fan motor should operate.**

If NG, replace cooling fan motor.



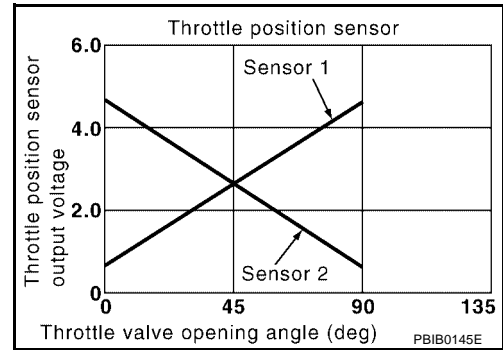
SEF734W

**DTC P1225 TP SENSOR**

**Component Description**

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



**On Board Diagnosis Logic**

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225 1225	Closed throttle position learning performance problem	Closed throttle position learning value is excessively low.	<ul style="list-style-type: none"> <li>Electric throttle control actuator (TP sensor 1 and 2)</li> </ul>

**DTC Confirmation Procedure**

**NOTE:**

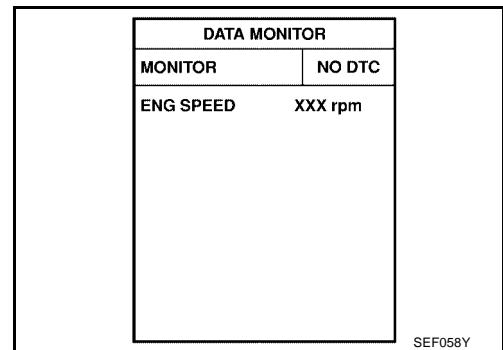
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds.
4. Turn ignition switch "ON".
5. If 1st trip DTC is detected, go to [EC-1665, "Diagnostic Procedure"](#).



**WITH GST**

Follow the procedure "With CONSULT-II" above.

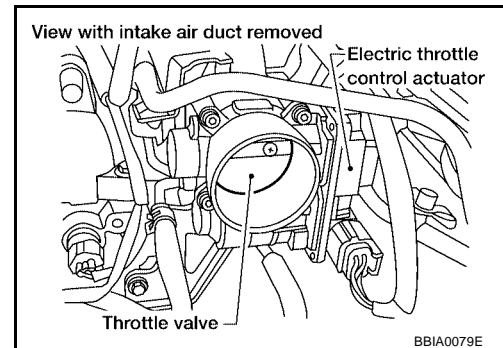


**Diagnostic Procedure****1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY**

1. Turn ignition switch "OFF".
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve and the housing.

**OK or NG**

- OK >> GO TO 2.  
 NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

**2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-1255, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**Remove and Installation**  
**ELECTRIC THROTTLE CONTROL ACTUATOR**

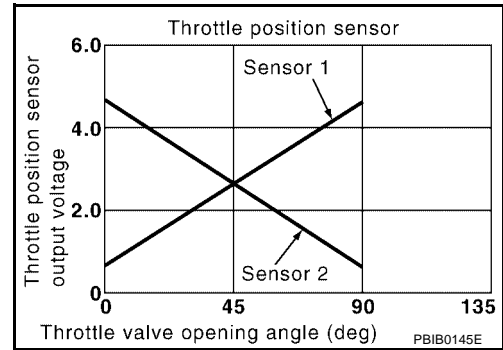
Refer to [EM-105, "INTAKE MANIFOLD"](#) .

## DTC P1226 TP SENSOR

### Component Description

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



### On Board Diagnosis Logic

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226 1226	Closed throttle position learning performance problem	Closed throttle position learning is not performed successfully, repeatedly.	<ul style="list-style-type: none"> <li>Electric throttle control actuator (TP sensor 1 and 2)</li> </ul>

### DTC Confirmation Procedure

#### NOTE:

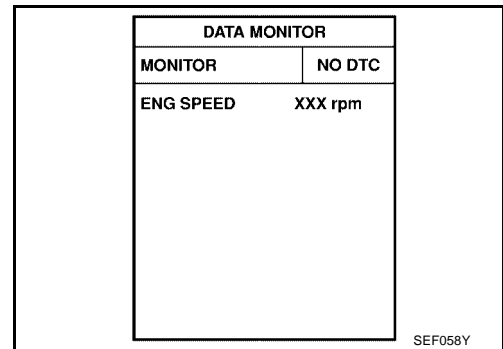
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

#### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Turn ignition switch "OFF", wait at least 10 seconds.
4. Turn ignition switch "ON".
5. Repeat steps 3 and 4, 32 times.
6. If 1st trip DTC is detected, go to [EC-1667, "Diagnostic Procedure"](#).



#### WITH GST

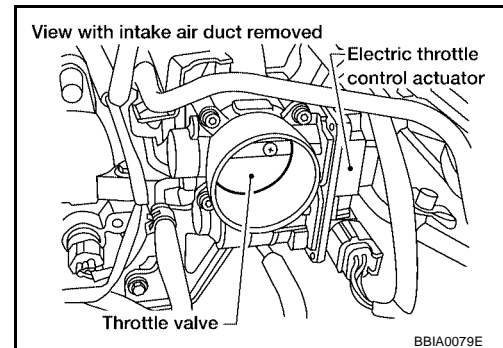
Follow the procedure "With CONSULT-II" above.

**Diagnostic Procedure****1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY**

1. Turn ignition switch "OFF".
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve and the housing.

**OK or NG**

- OK >> GO TO 2.  
 NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

**2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-1255, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**Remove and Installation**  
**ELECTRIC THROTTLE CONTROL ACTUATOR**

Refer to [EM-105, "INTAKE MANIFOLD"](#) .

## DTC P1229 SENSOR POWER SUPPLY

PFP:16119

### On Board Diagnosis Logic

UBS002JF

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1229 1229	Sensor power supply circuit short	ECM detects a voltage of power source for sensor is excessively low or high.	<ul style="list-style-type: none"> <li>● Harness or connectors (The TP sensor 1 and 2 circuit is shorted.) (APP sensor 1 circuit is shorted.) (MAF sensor circuit is shorted.) (EVAP control system pressure sensor circuit is shorted.) (Refrigerant pressure sensor circuit is shorted.)</li> <li>● Electric throttle control actuator (TP sensor 1 and 2)</li> <li>● Accelerator pedal position sensor (APP sensor 1)</li> <li>● MAF sensor</li> <li>● EVAP control system pressure sensor</li> <li>● Refrigerant pressures sensor</li> <li>● ECM pin terminal</li> </ul>

### FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

### DTC Confirmation Procedure

UBS002JG

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

#### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-1670, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### WITH GST

Follow the procedure "WITH CONSULT-II" above.

# DTC P1229 SENSOR POWER SUPPLY

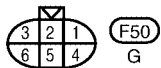
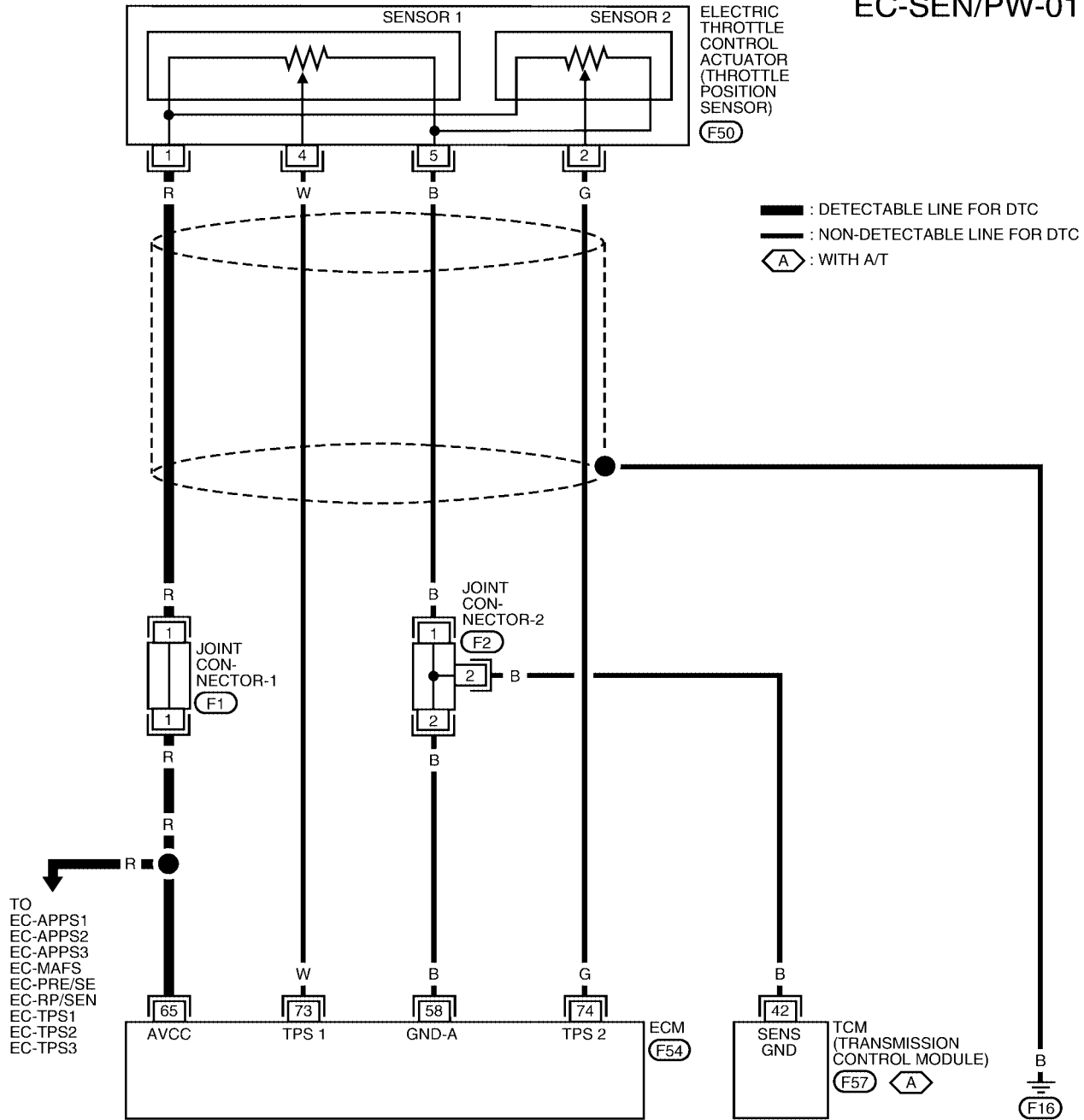
[QR25DE]

UBS002JH

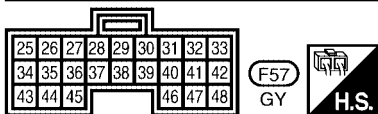
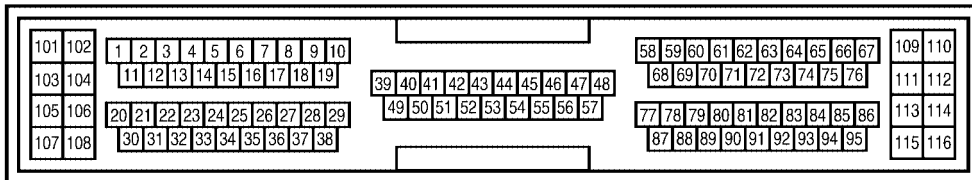
## Wiring Diagram

EC-SEN/PW-01

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



REFER TO THE FOLLOWING.  
(F1), (F2) - JOINT CONNECTOR



BBWA0239E

# DTC P1229 SENSOR POWER SUPPLY

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

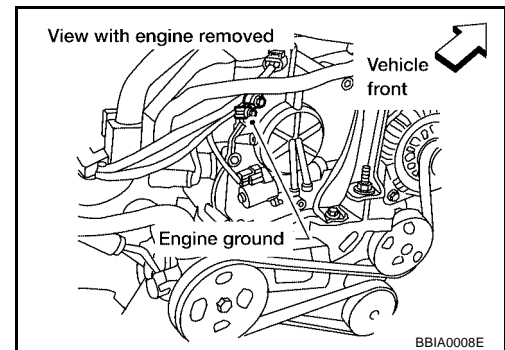
## Diagnostic Procedure

UBS002J1

### 1. RETIGHTEN GROUND SCREWS

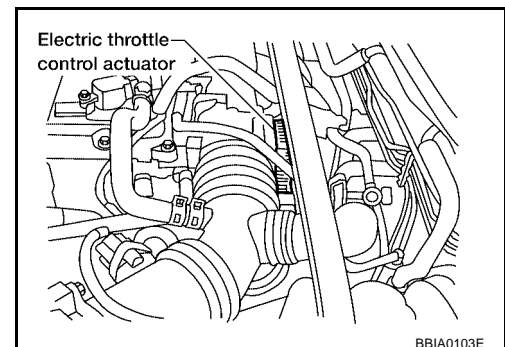
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



### 2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

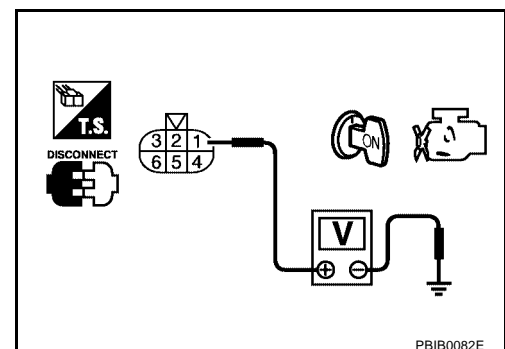


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 5.  
NG >> GO TO 3.



## 3. CHECK SENSOR POWER SUPPLY CIRCUITS FOR SHORT

Check the following.

- Harness for short to power and short to ground, between the following terminals

ECM terminal	Sensor terminals	Reference Wiring Diagram
65	Electric throttle control actuator terminal 1	<a href="#">EC-1765</a>
	APP sensor terminal 2	<a href="#">EC-1772</a>
	MAF sensor terminal 2	<a href="#">EC-1371</a>
	EVAP control system pressure sensor terminal 1	<a href="#">EC-1536</a>
	Refrigerant pressure sensor terminal 3	<a href="#">EC-1817</a>

- Joint connector-1
- ECM pin terminal

OK or NG

OK >> GO TO 4.

NG >> Repair short to ground or short to power in harness or connectors.

## 4. CHECK COMPONENTS

Check the following.

- Accelerator pedal position sensor (Refer to [EC-1775, "Component Inspection"](#) .)
- Mass air flow sensor (Refer to [EC-1374, "Component Inspection"](#) .)
- EVAP control system pressure sensor (Refer to [EC-1539, "Component Inspection"](#) .)
- Refrigerant pressure sensor (Refer to [MTC-19, "TROUBLE DIAGNOSIS"](#) .)

OK or NG

OK >> GO TO 7.

NG >> Replace malfunctioning component.

## 5. CHECK THROTTLE POSITION SENSOR

Refer to [EC-1768, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> GO TO 6.

## 6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-1255, "Idle Air Volume Learning"](#) .

>> INSPECTION END

## 7. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

[QR25DE]

## DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

PFP:14920

UBS002JJ

### Description

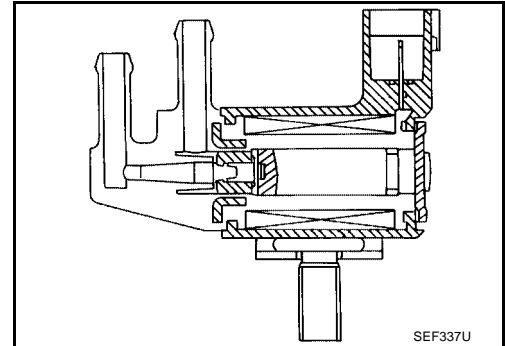
#### SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	EVAP canister purge flow control	EVAP canister purge vol- ume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Vehicle speed sensor (CAN communication line)	Vehicle speed		

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

### COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



### CONSULT-II Reference Value in Data Monitor Mode

UBS002JK

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PURG VOL C/V	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N</li> <li>● Air conditioner switch: OFF</li> <li>● No-load</li> </ul>	Idle	0%
		2,000 rpm	20 - 30%



# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QR25DE]

UBS002JL

## On Board Diagnosis Logic

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1444 1444	EVAP canister purge volume control solenoid valve	The canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed.	<ul style="list-style-type: none"> <li>● EVAP control system pressure sensor</li> <li>● EVAP canister purge volume control solenoid valve (The valve is stuck open.)</li> <li>● EVAP canister vent control valve</li> <li>● EVAP canister</li> <li>● Hoses (Hoses are connected incorrectly or clogged.)</li> </ul>

## DTC Confirmation Procedure

UBS002JM

### NOTE:

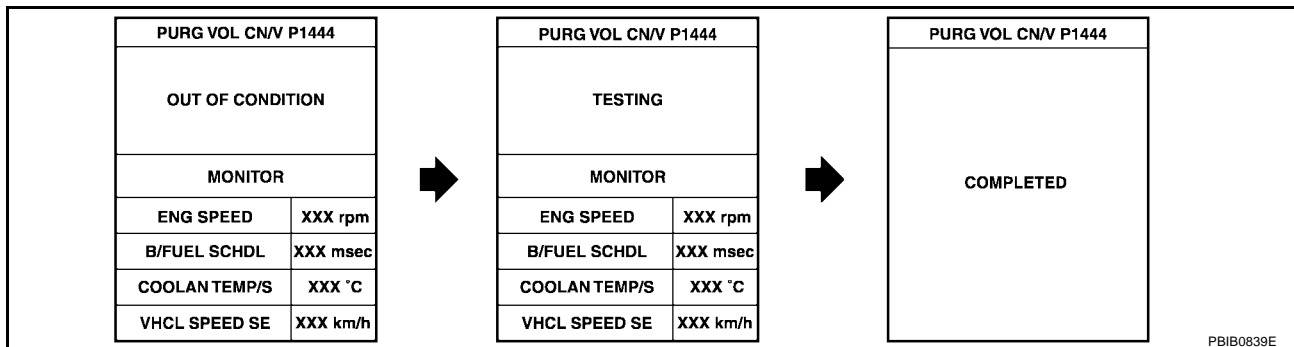
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

**Always perform test at a temperature of 5°C (41°F) or more.**

### WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON".
4. Select "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
5. Touch "START".
6. Start engine and let it idle until "TESTING" on CONSULT-II changes to "COMPLETED". (It will take approximately 10 seconds.)  
If "TESTING" is not displayed after 5 minutes, retry from step 2.



7. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to [EC-1675, "Diagnostic Procedure"](#).

### WITH GST

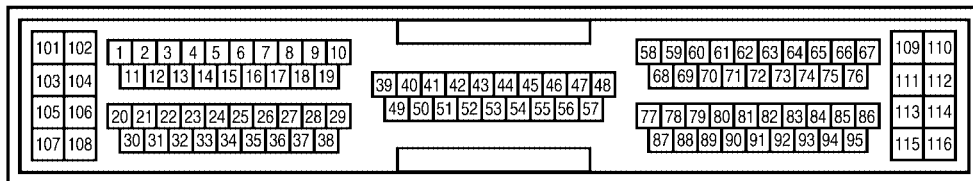
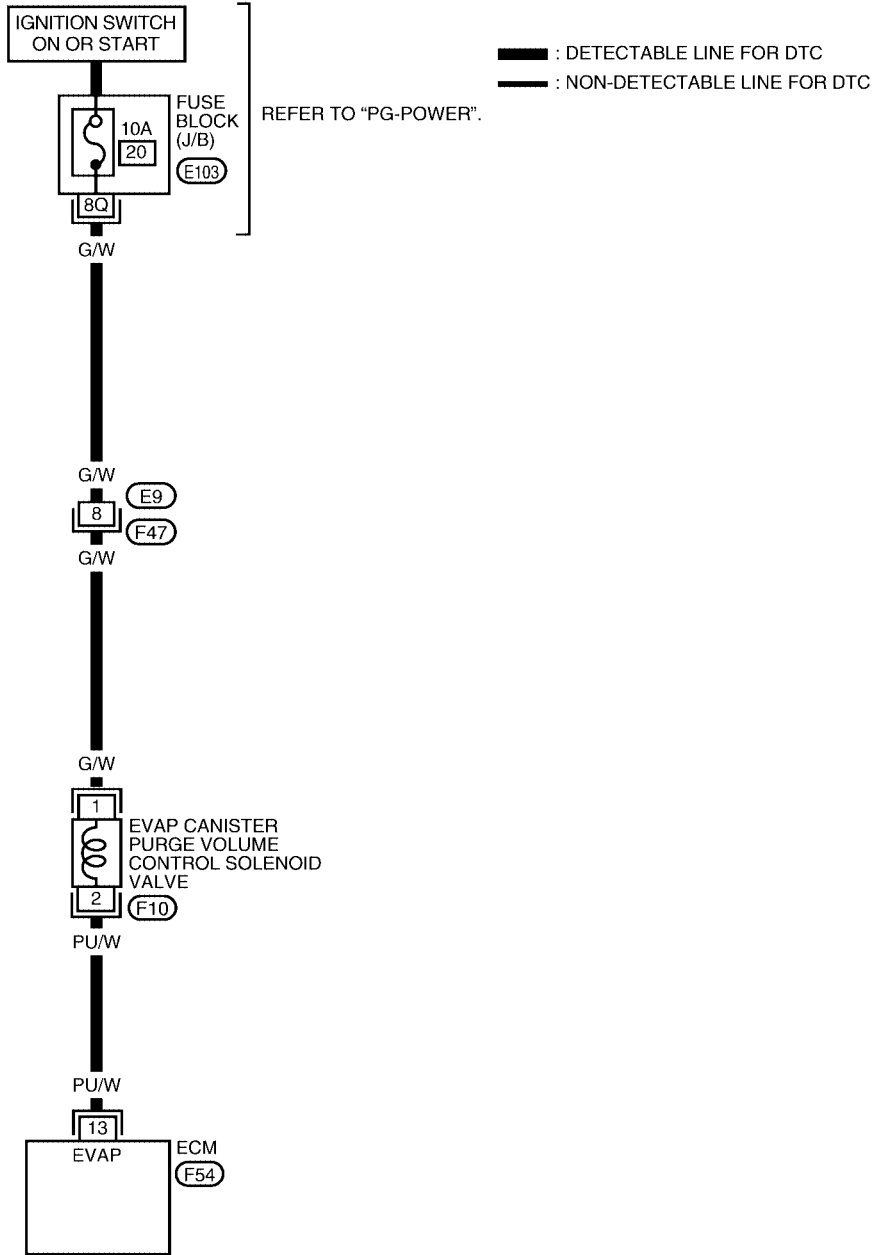
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and let it idle for at least 20 seconds.
4. Select "MODE 7" with GST.
5. If 1st trip DTC is detected, go to [EC-1675, "Diagnostic Procedure"](#).

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QR25DE]

UBS002JN

## Wiring Diagram

EC-PGC/V-01



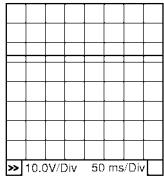
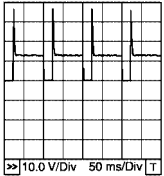
BBWA0224E

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
13	PU/W	EVAP canister purge volume control solenoid valve	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Idle speed</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>PBIB0050E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine)</li> </ul>	<p>Approximately 10V★</p>  <p>PBIB0520E</p>

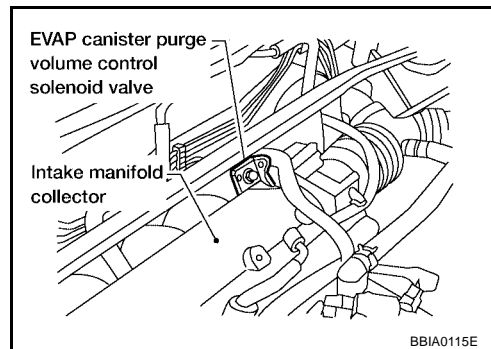
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS002JO

### 1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Turn ignition switch "ON".

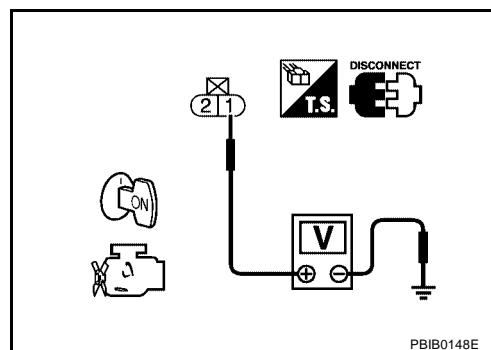


4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and engine ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QR25DE]

## 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E9, F47
- Fuse block (J/B) connector E103
- 10A fuse
- Harness for open or short between EVAP canister purge volume control solenoid valve and fuse

>> Repair harness or connectors.

## 3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 13 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE

Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

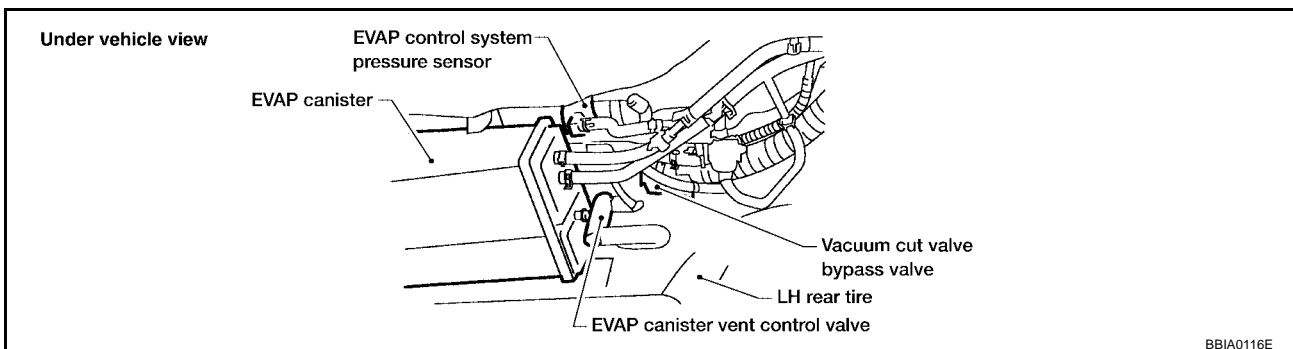
OK or NG

OK >> GO TO 5.

NG >> Repair it.

## 5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



BBIA0116E

2. Check connectors for water.

**Water should not exist.**

OK or NG

OK >> GO TO 6.

NG >> Replace EVAP control system pressure sensor.

# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QR25DE]

## 6. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1539, "Component Inspection"](#) .

OK or NG

- OK (With CONSULT-II)>>GO TO 7.
- OK (Without CONSULT-II)>>GO TO 8.
- NG >> Replace EVAP control system pressure sensor.

## 7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

 With CONSULT-II

1. Turn ignition switch "OFF".
2. Reconnect harness connectors disconnected.
3. Start engine.
4. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 8.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

## 8. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EC-1526, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace EVAP canister purge volume control solenoid valve.

## 9. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 10.
- NG >> Clean the rubber tube using an air blower.

## 10. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-1532, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 11.
- NG >> Replace EVAP canister vent control valve.

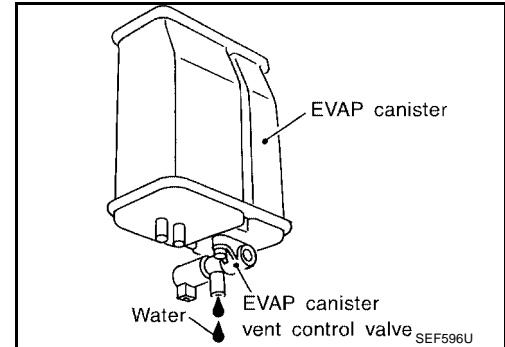
# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QR25DE]

## 11. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will drain from the EVAP canister.

Yes or No

- Yes >> GO TO 12.  
No >> GO TO 14.



## 12. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.  
**The weight should be less than 1.8 kg (4.0 lb).**

OK or NG

- OK >> GO TO 14.  
NG >> GO TO 13.

## 13. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

## 14. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

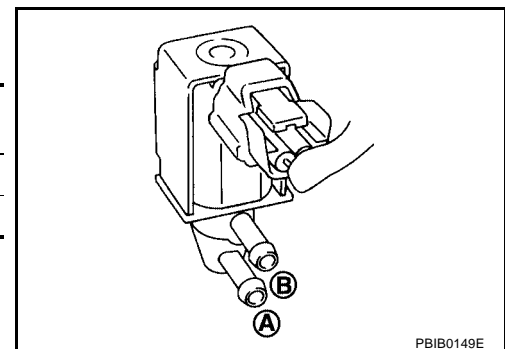
### Component Inspection EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

UBS002.JP

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100.0%	Yes
0.0%	No

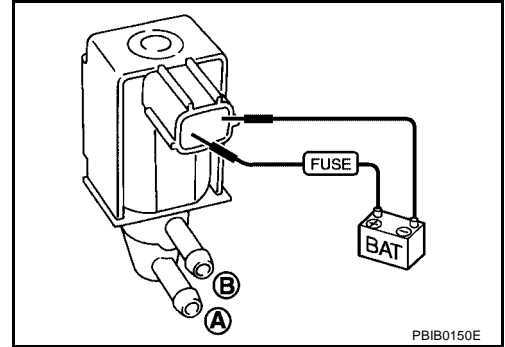


# DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE [QR25DE]

**⊗ Without CONSULT-II**

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between <b>A</b> and <b>B</b>
12V direct current supply between terminals 1 and 2	Yes
No supply	No



## Removal and Installation EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to [EM-105, "INTAKE MANIFOLD"](#) .

UBS002JQ

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

## DTC P1446 EVAP CANISTER VENT CONTROL VALVE

PFP:14935

### Component Description

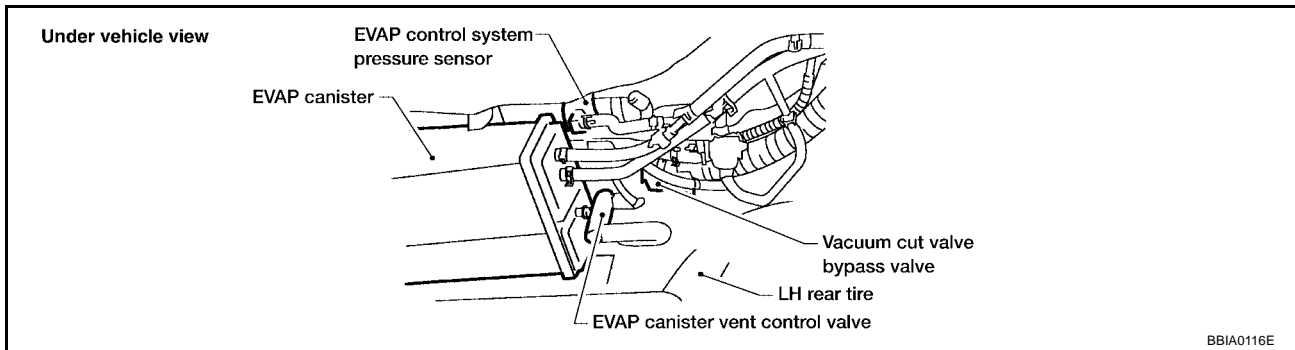
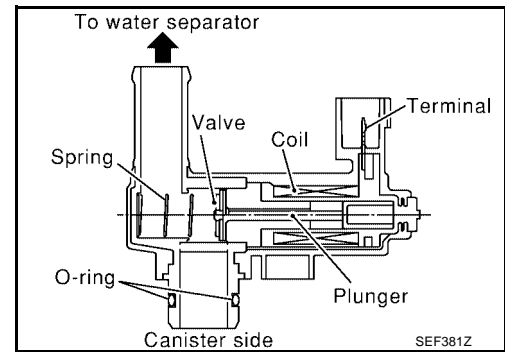
UBS002JR

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.



### CONSULT-II Reference Value in Data Monitor Mode

UBS002JS

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

### On Board Diagnosis Logic

UBS002JT

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1446 1446	EVAP canister vent control valve close	EVAP canister vent control valve remains closed under specified driving conditions.	<ul style="list-style-type: none"> <li>● EVAP canister vent control valve</li> <li>● EVAP control system pressure sensor and the circuit</li> <li>● Blocked rubber tube to EVAP canister vent control valve</li> <li>● EVAP canister is saturated with water</li> </ul>

### DTC Confirmation Procedure

UBS002JU

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON".



# DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[QR25DE]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine.
4. Drive vehicle at a speed of approximately 80 km/h (50 MPH) for a maximum of 15 minutes.

**NOTE:**

**If a malfunction exists, NG result may be displayed quicker.**

5. If 1st trip DTC is detected, go to [EC-1683, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

PBIB0164E

 **WITH GST**

Follow the procedure "WITH CONSULT-II" above.

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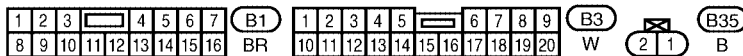
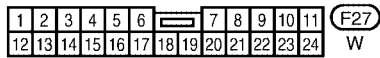
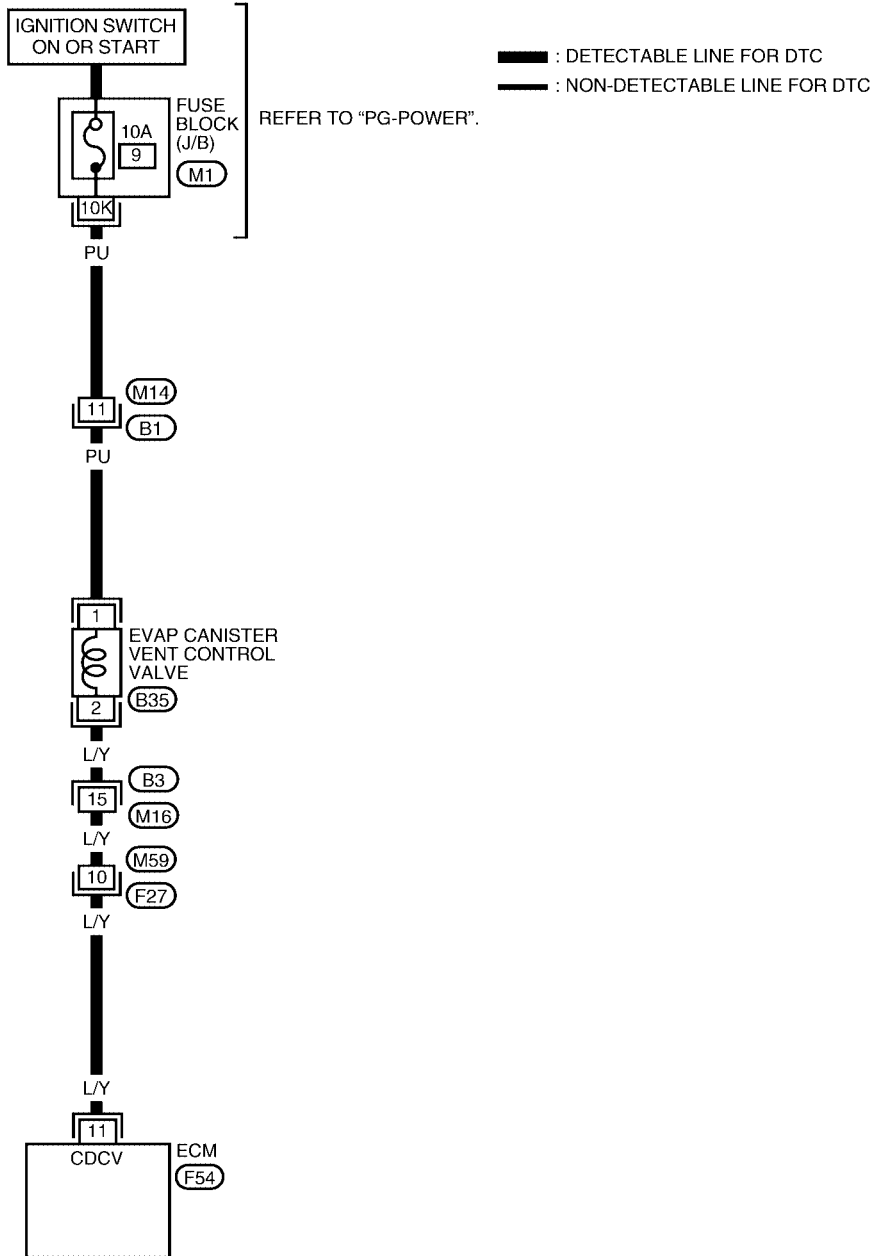
# DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[QR25DE]

UBS002JV

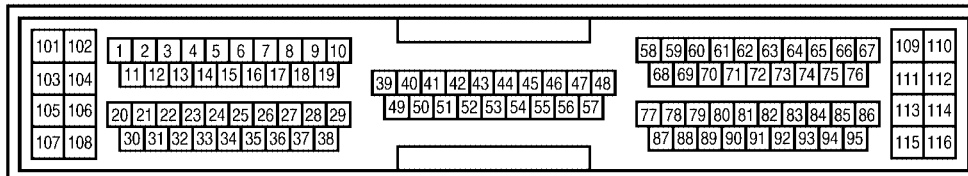
## Wiring Diagram

### EC-VENT/V-01



REFER TO THE FOLLOWING.

(M1) - JUNCTION BLOCK -  
JUNCTION BOX (J/B)



BBWA0225E

# DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

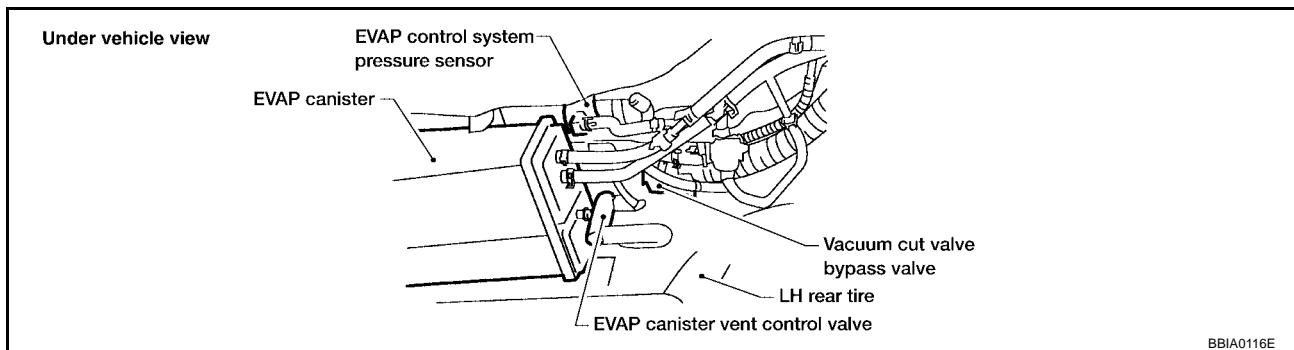
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
11	L/Y	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS002JW

### 1. CHECK RUBBER TUBE

1. Turn ignition switch "OFF".
2. Disconnect rubber tube connected to EVAP canister vent control valve.



3. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 2.
- NG >> Clean rubber tube using an air blower.

### 2. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-1685, "Component Inspection"](#).

OK or NG

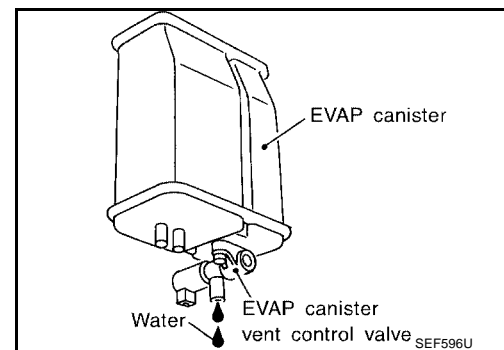
- OK >> GO TO 3.
- NG >> Replace EVAP canister vent control valve.

### 3. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will drain from the EVAP canister.

Yes or No

- Yes >> GO TO 4.
- No >> GO TO 6.



#### 4. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.

**The weight should be less than 1.8 kg (4.0 lb).**

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

#### 5. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

#### 6. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE

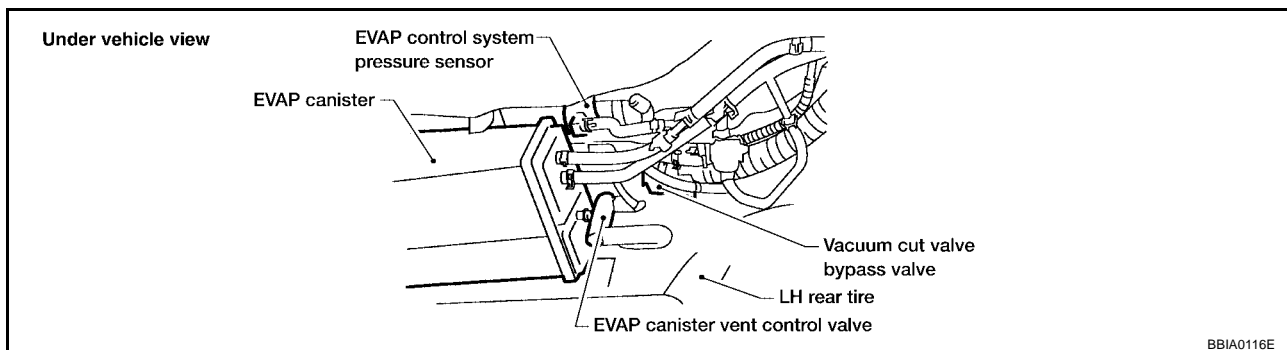
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

OK or NG

- OK >> GO TO 7.
- NG >> Repair it.

#### 7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



2. Check connectors for water.

**Water should not exist.**

OK or NG

- OK >> GO TO 8.
- NG >> Replace EVAP control system pressure sensor.

#### 8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1539, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace EVAP control system pressure sensor.

#### 9. CHECK INTERMITTENT INCIDENT

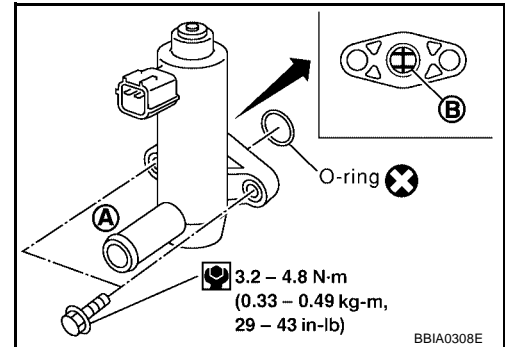
Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

## Component Inspection EVAP CANISTER VENT CONTROL VALVE

### With CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.
3. Reconnect harness connectors disconnected.
4. Turn ignition switch "ON".



5. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
6. Check air passage continuity and operation delay time.

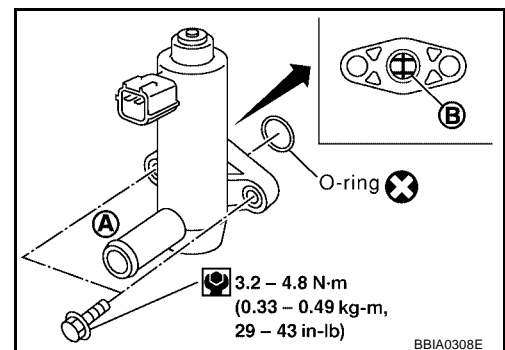
Condition	Air passage continuity between <b>A</b> and <b>B</b>
ON	No
OFF	Yes

**Operation takes less than 1 second.**  
**Make sure new O-ring is installed properly.**  
 If NG, go to next step.

7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform inspection again.

### Without CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.

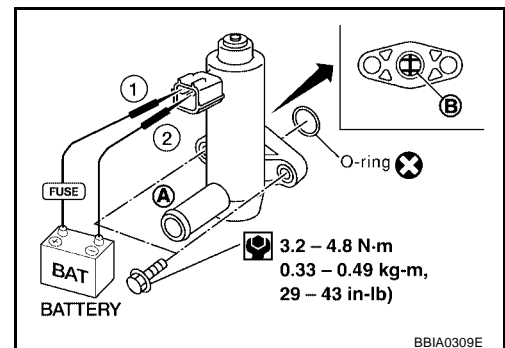


3. Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between <b>A</b> and <b>B</b>
12V direct current supply between terminals 1 and 2	No
OFF	Yes

**Operation takes less than 1 second.**  
**Make sure new O-ring is installed properly.**  
 If NG, go to next step.

4. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.



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## DTC P1446 EVAP CANISTER VENT CONTROL VALVE

[QR25DE]

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5. Perform inspection again.

## DTC P1448 EVAP CANISTER VENT CONTROL VALVE

PFP:14935

### Component Description

UBS002JY

**NOTE:**

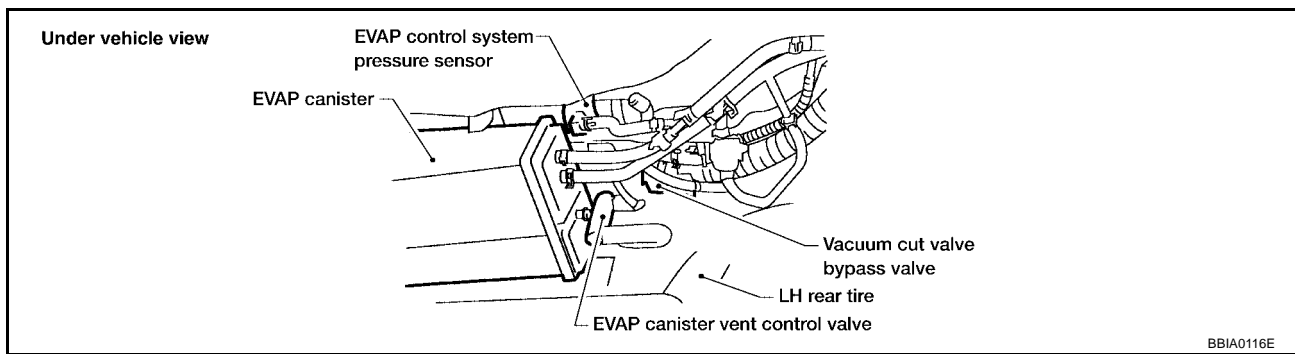
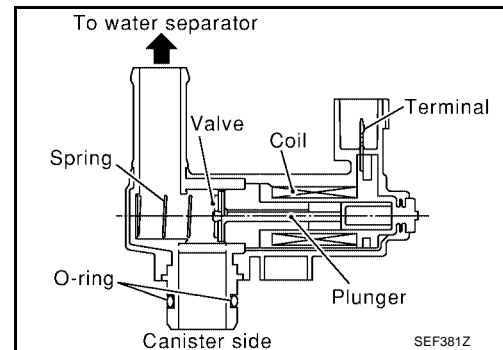
**If DTC P1448 is displayed with P0442, perform trouble diagnosis for DTC P1448 first.**

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.



### CONSULT-II Reference Value in Data Monitor Mode

UBS002JZ

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

### On Board Diagnosis Logic

UBS002K0

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1448 1448	EVAP canister vent control valve open	EVAP canister vent control valve remains opened under specified driving conditions.	<ul style="list-style-type: none"> <li>● EVAP canister vent control valve</li> <li>● EVAP control system pressure sensor and the circuit</li> <li>● Blocked rubber tube to EVAP canister vent control valve</li> <li>● EVAP canister is saturated with water</li> <li>● Vacuum cut valve</li> </ul>

### DTC Confirmation Procedure

UBS002K1

**NOTE:**

- If DTC P1448 is displayed with P0442, perform trouble diagnosis for DTC P1448 first.
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

**TESTING CONDITION:**

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Always perform test at a temperature of 0 to 30°C (32 to 86°F).

# DTC P1448 EVAP CANISTER VENT CONTROL VALVE

[QR25DE]

1. Turn ignition switch "ON".
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
4. Make sure that the following conditions are met.

COOLANT TEMP/S	0 - 70°C (32 - 158°F)
INT/A TEMP SE	0 - 30°C (32 - 86°F)

5. Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.  
Follow the instruction displayed.

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to [EC-1291, "Basic Inspection"](#).

6. Make sure that "OK" is displayed.  
If "NG" is displayed, go to the following step.

**NOTE:**

**Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.**

7. Stop engine and wait at least 10 seconds, then turn "ON".
8. Disconnect hose from vehicle frame.

9. Select "VENT CONTROL/V" of "ACTIVE TEST" mode with CONSULT-II.
10. Touch "ON" and "OFF" alternately.

11. Make sure the following.

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

If the result is NG, go to [EC-1691, "Diagnostic Procedure"](#).  
If the result is OK, go to "Diagnostic Procedure" for DTC P0442, [EC-1515](#).



## Overall Function Check

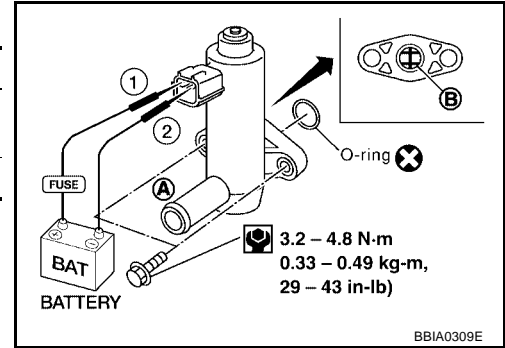
Use this procedure to check the overall function of the EVAP canister vent control valve circuit. During this check, a DTC might not be confirmed.

**WITH GST**

1. Disconnect hose from vehicle frame.
2. Disconnect EVAP canister vent control valve harness connector.
3. Verify the following.

Condition	Air passage continuity
12V direct current supply between terminals 1 and 2	No
No supply	Yes

If the result is NG, go to [EC-1691, "Diagnostic Procedure"](#).  
 If the result is OK, go to "Diagnostic Procedure" for DTC P0442, [EC-1515](#).



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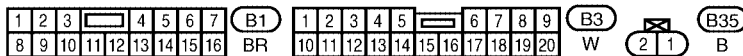
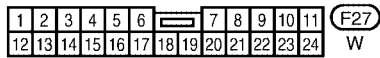
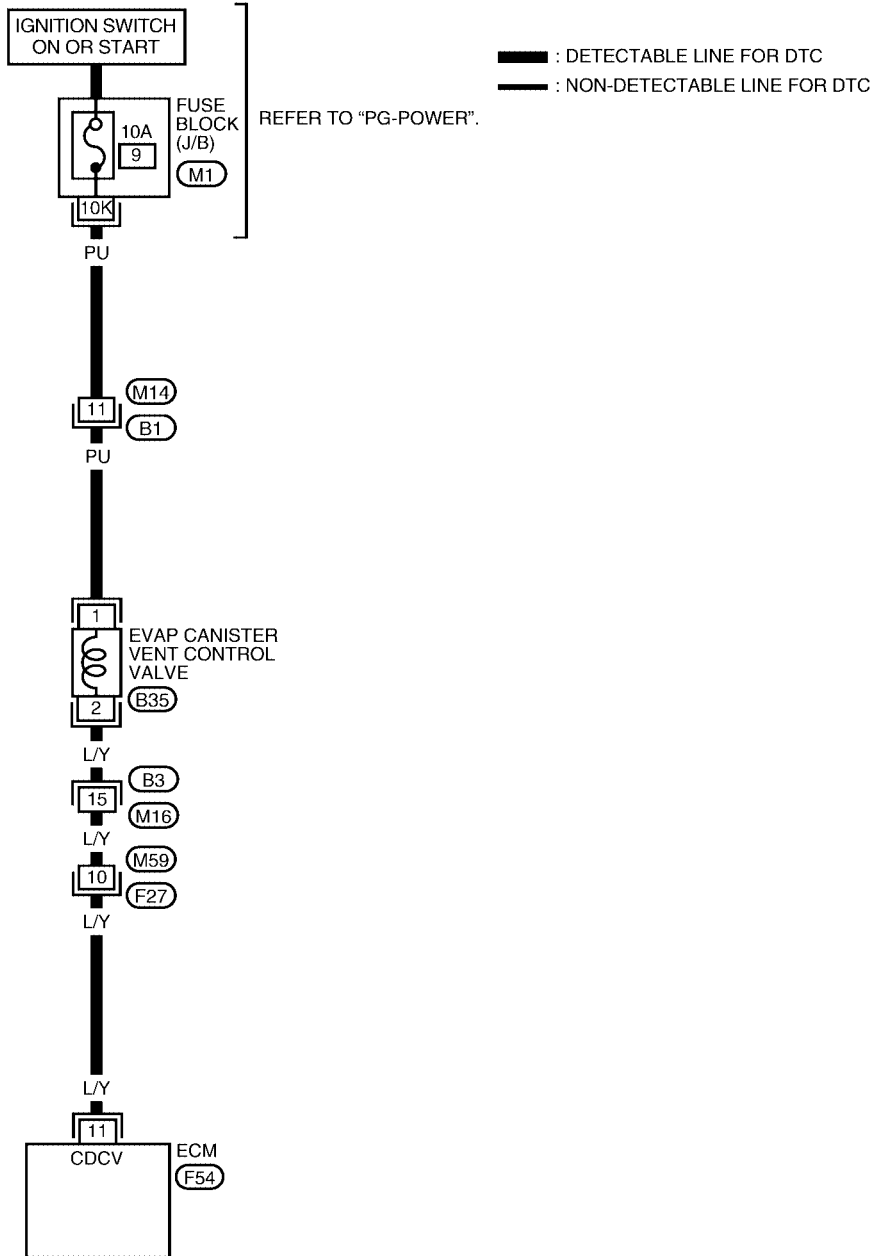
# DTC P1448 EVAP CANISTER VENT CONTROL VALVE

[QR25DE]

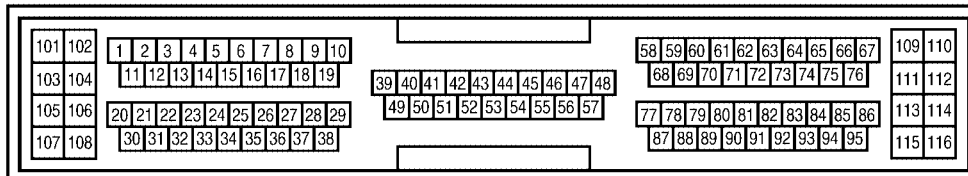
UBS002K3

## Wiring Diagram

### EC-VENT/V-01



REFER TO THE FOLLOWING.  
(M1) - JUNCTION BLOCK - JUNCTION BOX (J/B)



BBWA0225E

# DTC P1448 EVAP CANISTER VENT CONTROL VALVE

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

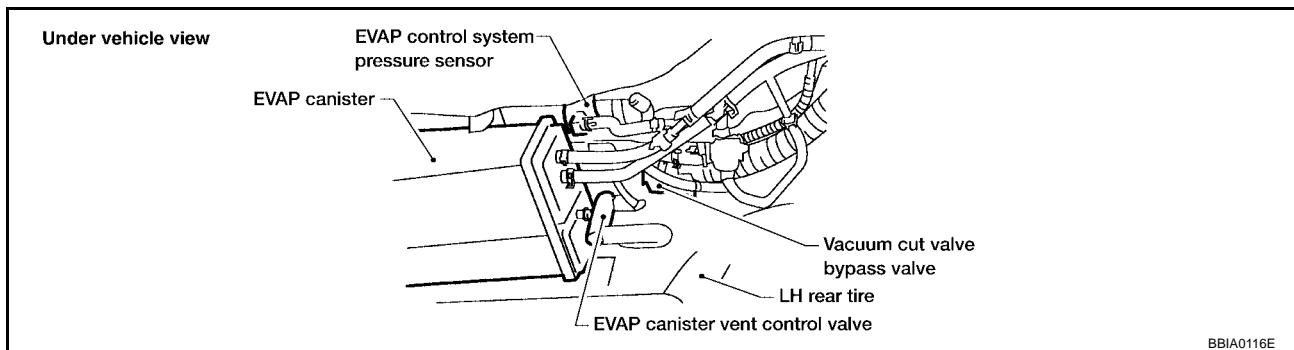
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
11	L/Y	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS002K4

### 1. CHECK RUBBER TUBE

1. Turn ignition switch "OFF".
2. Disconnect rubber tube connected to EVAP canister vent control valve.



3. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 2.
- NG >> Clean rubber tube using an air blower.

### 2. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to [EC-1693, "Component Inspection"](#).

OK or NG

- OK >> GO TO 3.
- NG >> Replace EVAP canister vent control valve.

### 3. CHECK VACUUM CUT VALVE

Refer to [EC-1721, "Component Inspection"](#).

OK or NG

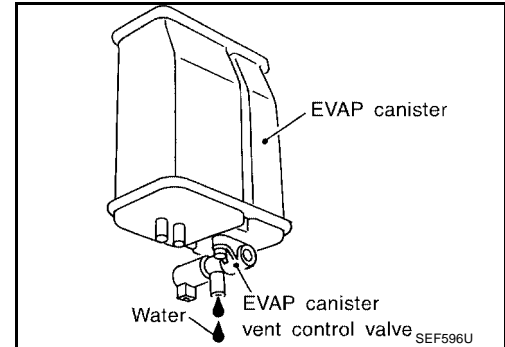
- OK >> GO TO 4.
- NG >> Replace vacuum cut valve.

#### 4. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Check if water will drain from the EVAP canister.

Yes or No

- Yes >> GO TO 5.  
No >> GO TO 7.



#### 5. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve attached.

**The weight should be less than 1.8 kg (4.0 lb).**

OK or NG

- OK >> GO TO 7.  
NG >> GO TO 6.

#### 6. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

#### 7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE

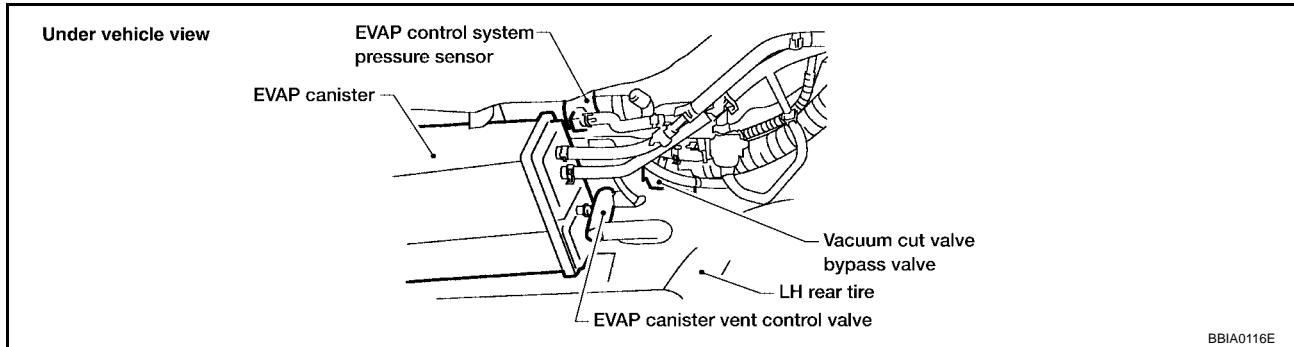
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

OK or NG

- OK >> GO TO 8.  
NG >> Repair it.

## 8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



2. Check connectors for water.

**Water should not exist.**

OK or NG

OK >> GO TO 9.

NG >> Replace EVAP control system pressure sensor.

## 9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to [EC-1539, "Component Inspection"](#) .

OK or NG

OK >> GO TO 10.

NG >> Replace EVAP control system pressure sensor.

## 10. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

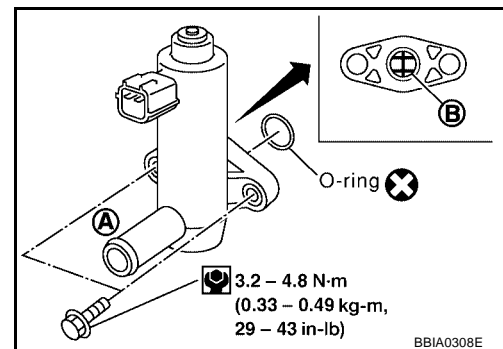
>> INSPECTION END

### Component Inspection EVAP CANISTER VENT CONTROL VALVE

UBS002K5

#### With CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.
3. Reconnect harness connectors disconnected.
4. Turn ignition switch "ON".



# DTC P1448 EVAP CANISTER VENT CONTROL VALVE

[QR25DE]

5. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
6. Check air passage continuity and operation delay time.

Condition	Air passage continuity between <b>A</b> and <b>B</b>
ON	No
OFF	Yes

**Operation takes less than 1 second.**  
**Make sure new O-ring is installed properly.**  
 If NG, go to next step.

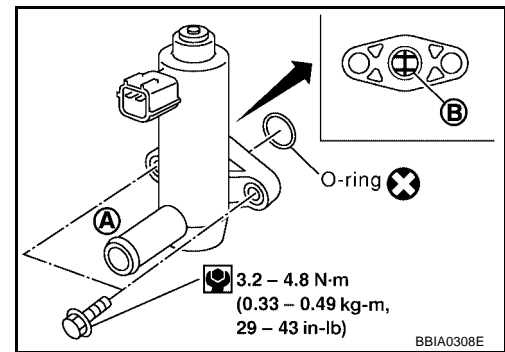
7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform inspection again.

⊗ **Without CONSULT-II**

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 (B1)	XXX V

PBIB0834E

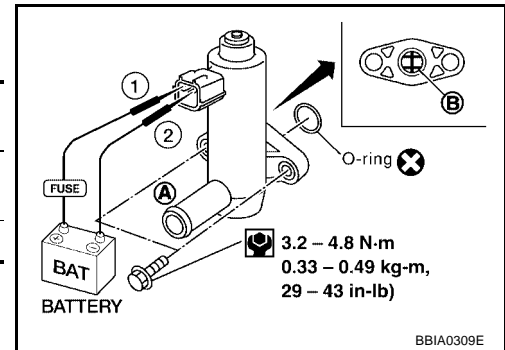


3. Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between <b>A</b> and <b>B</b>
12V direct current supply between terminals 1 and 2	No
OFF	Yes

**Operation takes less than 1 second.**  
**Make sure new O-ring is installed properly.**  
 If NG, go to next step.

4. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
5. Perform inspection again.



DTC P1456 EVAP CONTROL SYSTEM

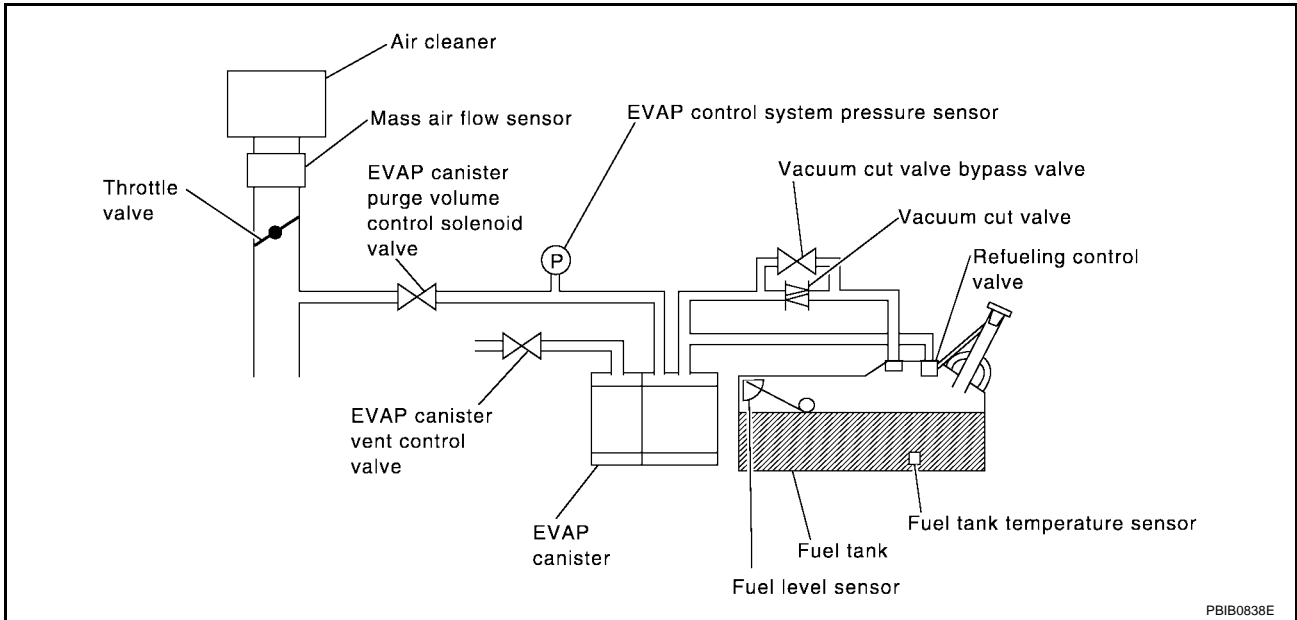
PFP:14710

On Board Diagnosis Logic

UBS002K6

This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using of vapor pressure in the fuel tank.

The EVAP canister vent control valve is closed to shut the EVAP purge line. The vacuum cut valve bypass valve will then be opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP control system pressure sensor can now monitor the pressure inside the fuel tank. If pressure increases, the ECM will check for leaks in the line between the vacuum cut valve and EVAP canister purge volume control solenoid valve.



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# DTC P1456 EVAP CONTROL SYSTEM

[QR25DE]

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1456 1456	Evaporative emission control system very small leak (positive pressure check)	<ul style="list-style-type: none"> <li>● EVAP system has a very small leak.</li> <li>● EVAP system does not operate properly.</li> </ul>	<ul style="list-style-type: none"> <li>● Incorrect fuel tank vacuum relief valve</li> <li>● Incorrect fuel filler cap used</li> <li>● Fuel filler cap remains open or fails to close.</li> <li>● Foreign matter caught in fuel filler cap.</li> <li>● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.</li> <li>● Foreign matter caught in EVAP canister vent control valve.</li> <li>● EVAP canister or fuel tank leaks</li> <li>● EVAP purge line (pipe and rubber tube) leaks</li> <li>● EVAP purge line rubber tube bent</li> <li>● Blocked or bent rubber tube to EVAP control system pressure sensor</li> <li>● Loose or disconnected rubber tube</li> <li>● EVAP canister vent control valve and the circuit</li> <li>● EVAP canister purge volume control solenoid valve and the circuit</li> <li>● Fuel tank temperature sensor</li> <li>● O-ring of EVAP canister vent control valve is missing or damaged</li> <li>● EVAP canister is saturated with water</li> <li>● EVAP control system pressure sensor</li> <li>● Refueling control valve</li> <li>● ORVR system leaks</li> <li>● Fuel level sensor and the circuit</li> <li>● Foreign matter caught in EVAP canister purge volume control solenoid valve</li> </ul>

## CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

## DTC Confirmation Procedure

UBS002K7

### NOTE:

- After repair, make sure that the hoses and clips are installed properly.
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

### TESTING CONDITION:

- Open engine hood before conducting following procedure.
- If any of following conditions are met just before the DTC confirmation procedure, leave the vehicle for more than 1 hour.
  - Fuel filler cap is removed.
  - Refilled or drained the fuel.
  - EVAP component parts is/are removed.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

### WITH CONSULT-II

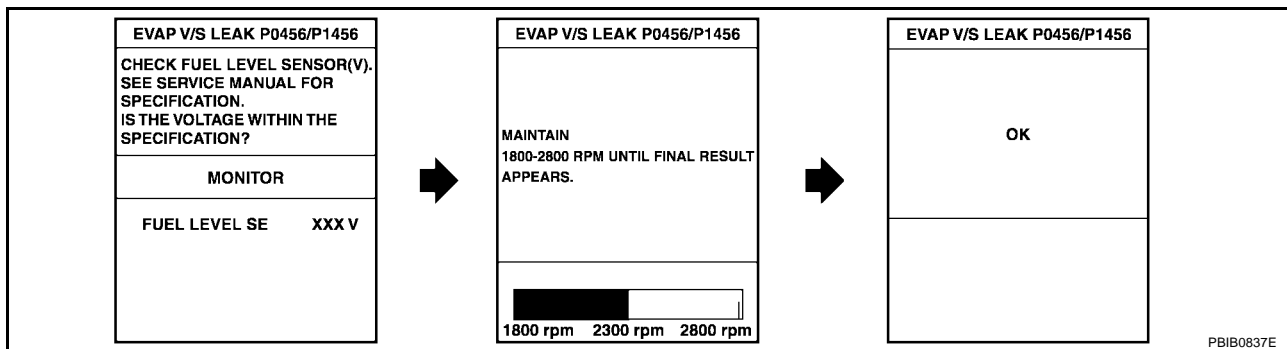
1. Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
2. Make sure the following conditions are met.
  - FUEL LEVEL SE: 0.25 - 1.15V
  - COOLAN TEMP/S: 0 - 32°C (32 - 90°F)
  - FUEL T/TMP SE: 0 - 35°C (32 - 95°F)



**INT A/TEMP SE: More than 0°C (32°F)**

If NG, turn ignition switch "OFF" and leave the vehicle in a cool place (soak the vehicle) or refilling/draining fuel until the output voltage condition of the "FUEL LEVEL SE" meets within the range above and leave the vehicle for more than 1 hour. Then start from step 1).

3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Turn ignition switch "ON".
5. Select "EVAP V/S LEAK P0456/P1456" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.  
Follow the instruction displayed.



6. Make sure that "OK" is displayed.  
If "NG" is displayed, refer to [EC-1698, "Diagnostic Procedure"](#).

**NOTE:**

- If the engine speed cannot be maintained within the range displayed on CONSULT-II screen, go to [EC-1291, "Basic Inspection"](#).
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

## Overall Function Check

UBS002K8

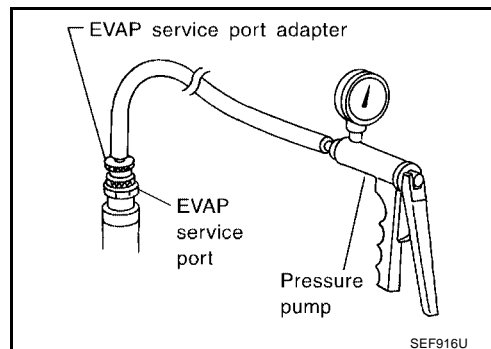
**WITH GST**

Use this procedure to check the overall function of the EVAP very small leak function. During this check, a 1st trip DTC might not be confirmed.

**CAUTION:**

- Never use compressed air, doing so may damage the EVAP system.
- Do not start engine.
- Do not exceeded 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi).

1. Attach the EVAP service port adapter securely to the EVAP service port.
2. Set the pressure pump and a hose.
3. Also set a vacuum gauge via 3-way connector and a hose.
4. Turn ignition switch "ON".
5. Connect GST and select MODE 8.
6. Using MODE 8 control the EVAP canister vent control valve (close) and vacuum cut valve bypass valve (open).
7. Apply pressure and make sure the following conditions are satisfied.



**Pressure to be applied: 2.7 kPa (20 mmHg, 0.79 inHg)**

**Time to be waited after the pressure drawn in to the EVAP system and the pressure to be dropped: 60 seconds and the pressure should not be dropped more than 0.4 kPa (3 mmHg, 0.12 inHg).**

If NG, go to [EC-1698, "Diagnostic Procedure"](#).

If OK, go to next step.

8. Disconnect GST.
9. Start engine and warm it up to normal operating temperature.
10. Turn ignition switch "OFF" and wait at least 10 seconds.
11. Restart engine and let it idle for 90 seconds.

12. Keep engine speed at 2,000 rpm for 30 seconds.
13. Turn ignition switch "OFF".

**NOTE:**

For more information, refer to GST instruction manual.

## Diagnostic Procedure

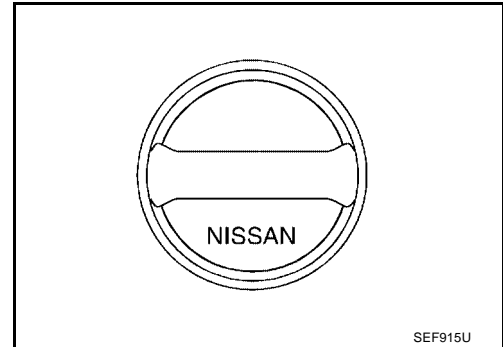
UBS002K9

### 1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch "OFF".
2. Check for genuine NISSAN fuel filler cap design.

OK or NG

- OK >> GO TO 2.  
NG >> Replace with genuine NISSAN fuel filler cap.



### 2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

- OK >> GO TO 3.  
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.  
2. Retighten until ratcheting sound is heard.

### 3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

- OK >> GO TO 5.  
NG >> GO TO 4.

### 4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to [EC-1849, "FUEL TANK VACUUM RELIEF VALVE \(BUILT INTO FUEL FULLER CAP\)"](#).

OK or NG

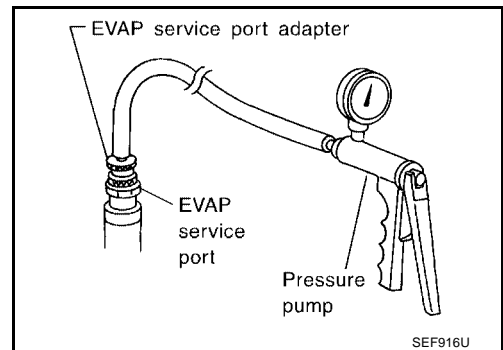
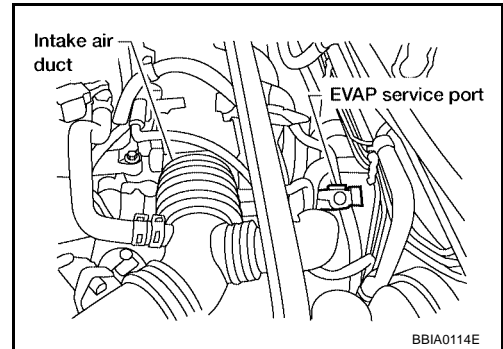
- OK >> GO TO 5.  
NG >> Replace fuel filler cap with a genuine one.

**5. INSTALL THE PRESSURE PUMP**

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.

**NOTE:**

**Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.**



Models with CONSULT-II>>GO TO 6.  
Models without CONSULT-II>>GO TO 7.

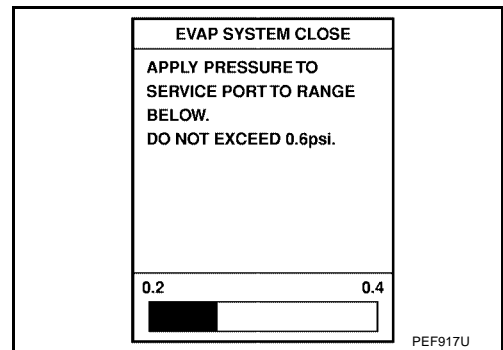
**6. CHECK FOR EVAP LEAK**

**Ⓜ With CONSULT-II**

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

**NOTE:**

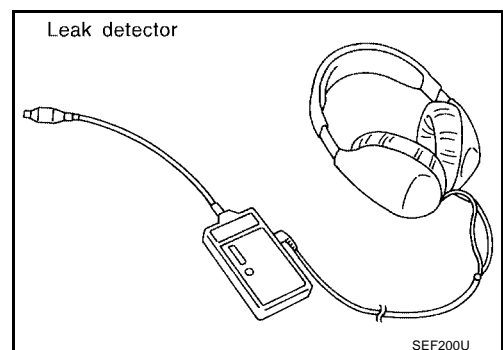
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup> , 0.6 psi) of pressure in the system.



4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#).

**OK or NG**

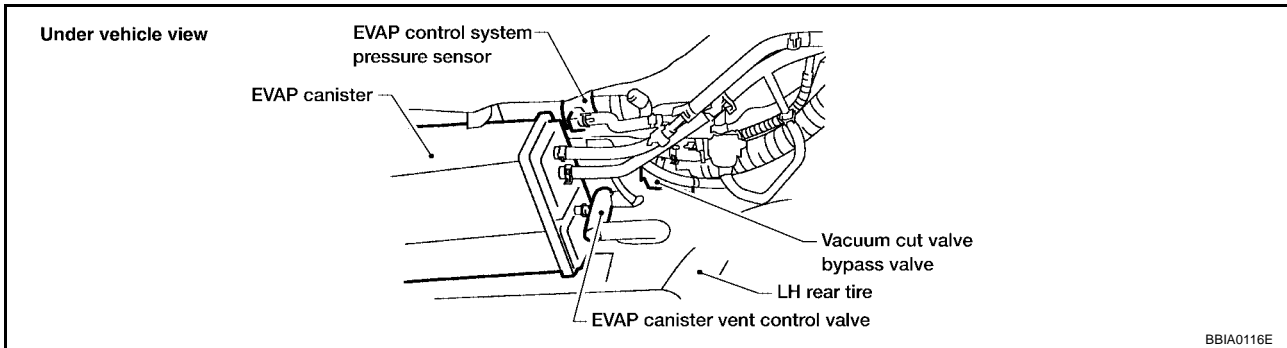
- OK >> GO TO 8.
- NG >> Repair or replace.



**7. CHECK FOR EVAP LEAK**

⊗ **Without CONSULT-II**

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)

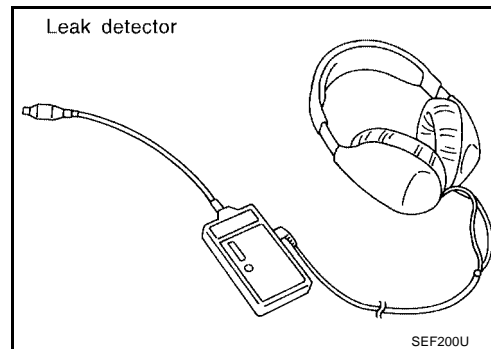


4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

**NOTE:**

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#).



**OK or NG**

- OK >> GO TO 8.  
 NG >> Repair or replace.

**8. CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT**

Refer to "DTC Confirmation Procedure", [EC-1687](#).

**OK or NG**

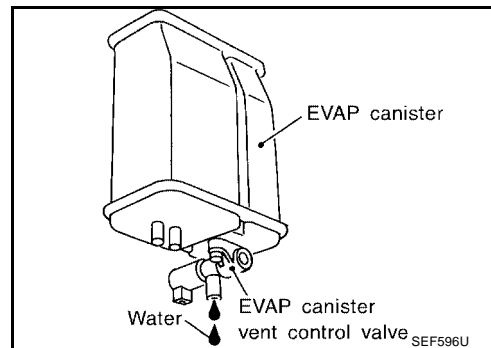
- OK >> GO TO 9.  
 NG >> Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

**9. CHECK IF EVAP CANISTER SATURATED WITH WATER**

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Does water drain from the EVAP canister?

**Yes or No**

- Yes >> GO TO 11.  
 No (With CONSULT-II)>>GO TO 12.  
 No (Without CONSULT-II)>>GO TO 13.



**10. CHECK EVAP CANISTER**

Weigh the EVAP canister with the EVAP canister vent control valve attached.  
**The weight should be less than 1.8 kg (4.0 lb).**

OK or NG

- OK (With CONSULT-II)>>GO TO 12.
- OK (Without CONSULT-II)>>GO TO 13.
- NG >> GO TO 12.

**11. DETECT MALFUNCTIONING PART**

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and vehicle frame for clogging or poor connection

>> Repair hose or replace EVAP canister.

**12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION**

 **With CONSULT-II**

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode.
4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
HO2S1 MNTR (B1)	LEAN

PBIB0828E

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.

**13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION**

 **Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

**Vacuum should exist.**

OK or NG

- OK >> GO TO 16.
- NG >> GO TO 14.

**14. CHECK VACUUM HOSE**

Check vacuum hoses for clogging or disconnection. Refer to [EC-1237, "Vacuum Hose Drawing"](#) .

OK or NG

- OK >> GO TO 15.
- NG >> Repair or reconnect the hose.

---

**15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE**

---

Refer to [EC-1526, "Component Inspection"](#) .

OK or NG

OK >> GO TO 16.

NG >> Replace EVAP canister purge volume control solenoid valve.

---

**16. CHECK FUEL TANK TEMPERATURE SENSOR**

---

Refer to [EC-1456, "Component Inspection"](#) .

OK or NG

OK >> GO TO 17.

NG >> Replace fuel level sensor unit.

---

**17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR**

---

Refer to [EC-1539, "Component Inspection"](#) .

OK or NG

OK >> GO TO 18.

NG >> Replace EVAP control system pressure sensor.

---

**18. CHECK EVAP PURGE LINE**

---

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection.

Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#) .

OK or NG

OK >> GO TO 19.

NG >> Repair or reconnect the hose.

---

**19. CLEAN EVAP PURGE LINE**

---

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 20.

---

**20. CHECK REFUELING EVAP VAPOR LINE**

---

Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to [EC-1852, "ON BOARD REFUELING VAPOR RECOVERY \(ORVR\)"](#) .

OK or NG

OK >> GO TO 21.

NG >> Repair or replace hoses and tubes.

---

**21. CHECK SIGNAL LINE AND RECIRCULATION LINE**

---

Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 22.

NG >> Repair or replace hoses, tubes or filler neck tube.

---

**22. CHECK REFUELING CONTROL VALVE**

---

Refer to [EC-1855, "Component Inspection"](#) .

OK or NG

OK >> GO TO 23.

NG >> Replace refueling control valve with fuel tank.

---

**23. CHECK FUEL LEVEL SENSOR**

---

Refer to [DI-26, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

OK >> GO TO 24.

NG >> Replace fuel level sensor unit.

---

**24. CHECK INTERMITTENT INCIDENT**

---

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

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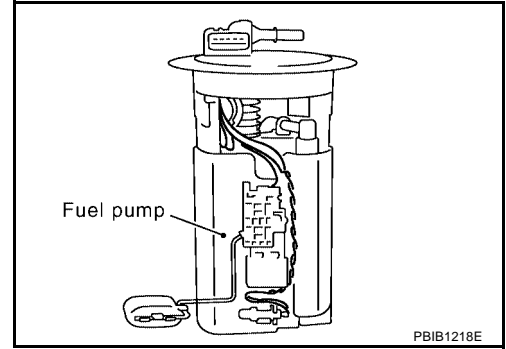
M

**DTC P1464 FUEL LEVEL SENSOR**

**Component Description**

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



**On Board Diagnosis Logic**

ECM receives two signals from the fuel level sensor.

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the latter to detect open circuit malfunction.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1464 1464	Fuel level sensor circuit ground signal	A high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted)</li> </ul>

**DTC Confirmation Procedure**

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-1706, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.



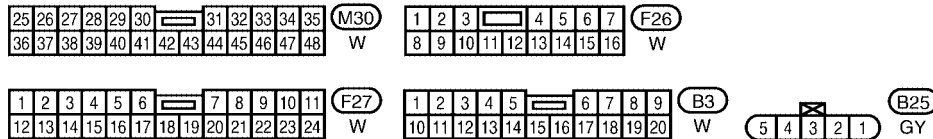
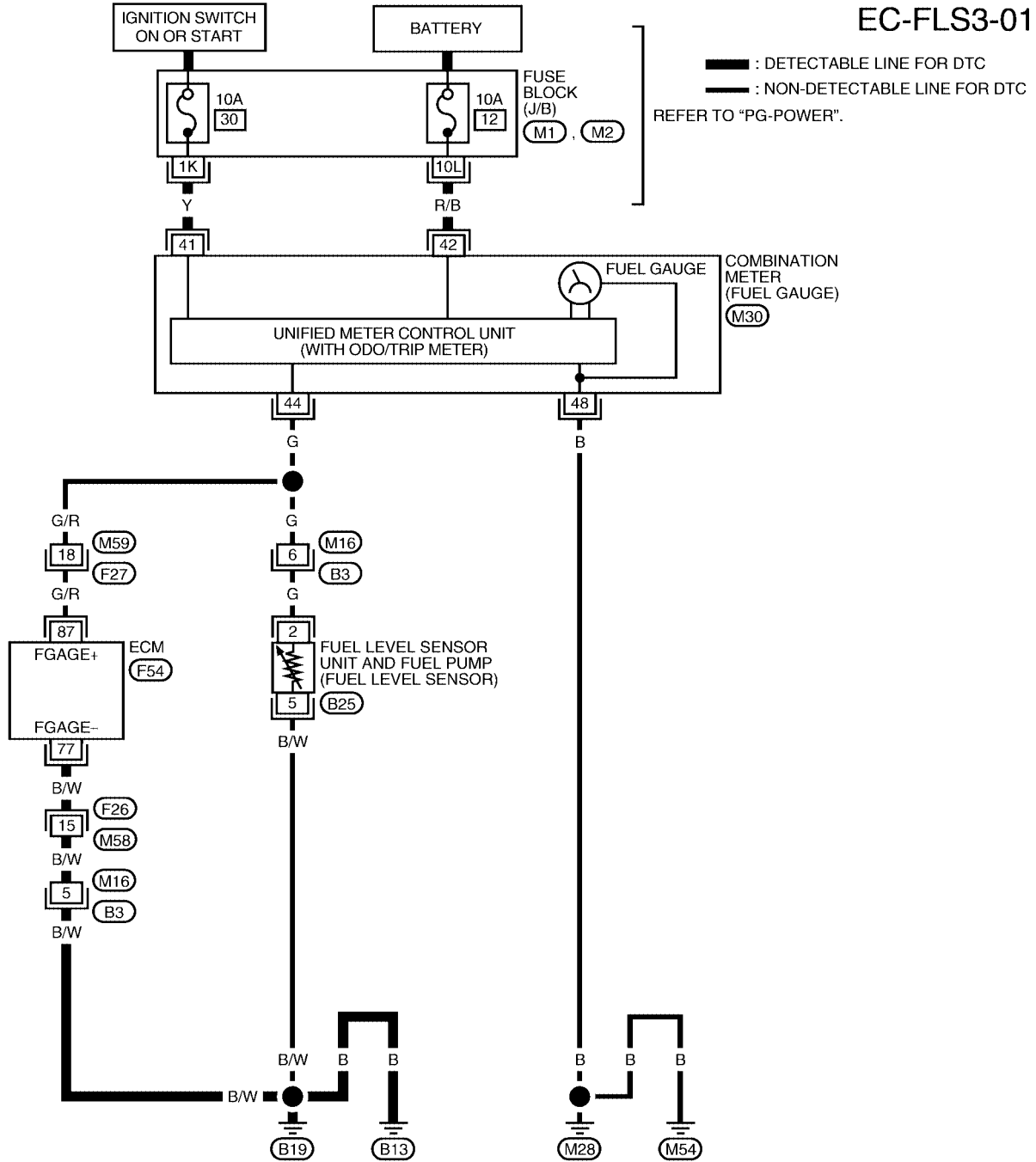
# DTC P1464 FUEL LEVEL SENSOR

[QR25DE]

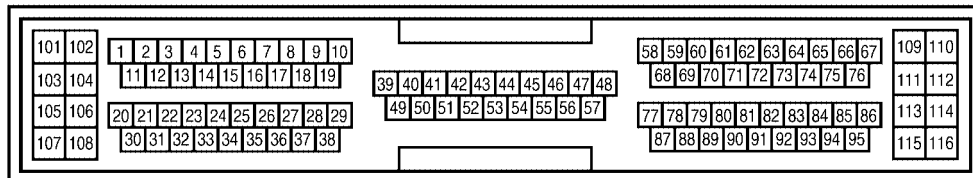
UBS002KE

## Wiring Diagram

EC-FLS3-01



REFER TO THE FOLLOWING.  
 (M1), (M2) - FUSE BLOCK - JUNCTION BOX (J/B)



BBWA0229E

# DTC P1464 FUEL LEVEL SENSOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
77	B/W	Fuel level sensor ground	[Engine is running] ● Idle speed	Approximately 0V
87	G/R	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.

## Diagnostic Procedure

UBS002KF

### 1. CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 77 and body ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to power.

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.

### 2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F26, M58
- Harness connectors M16, B3
- Harness for open and short between ECM and body ground

>> Replace open circuit or short to power in harness or connectors.

### 3. CHECK FUEL LEVEL SENSOR

Refer to [DI-26, "FUEL LEVEL SENSOR UNIT CHECK"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> Replace fuel level sensor unit.

### 4. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

## Removal and Installation FUEL LEVEL SENSOR

UBS002KG

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

DTC P1490 VACUUM CUT VALVE BYPASS VALVE

PF17372

Description

UBS002KH

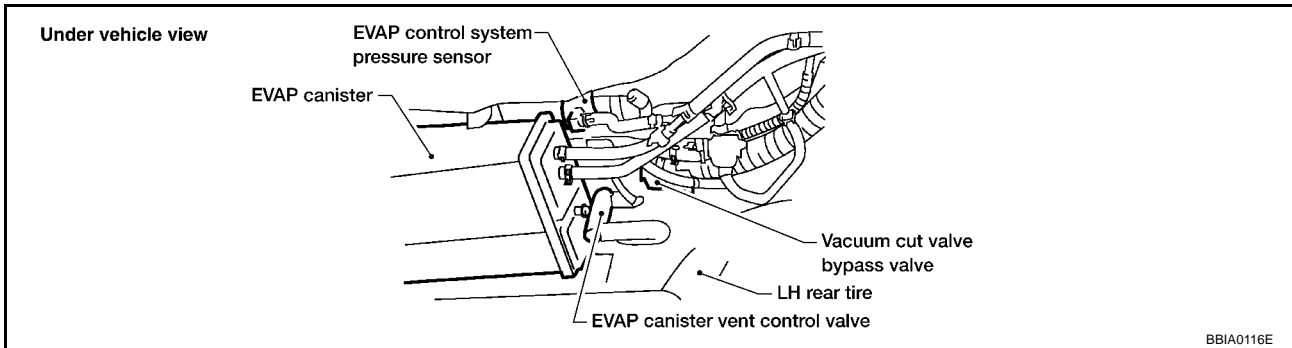
COMPONENT DESCRIPTION

The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

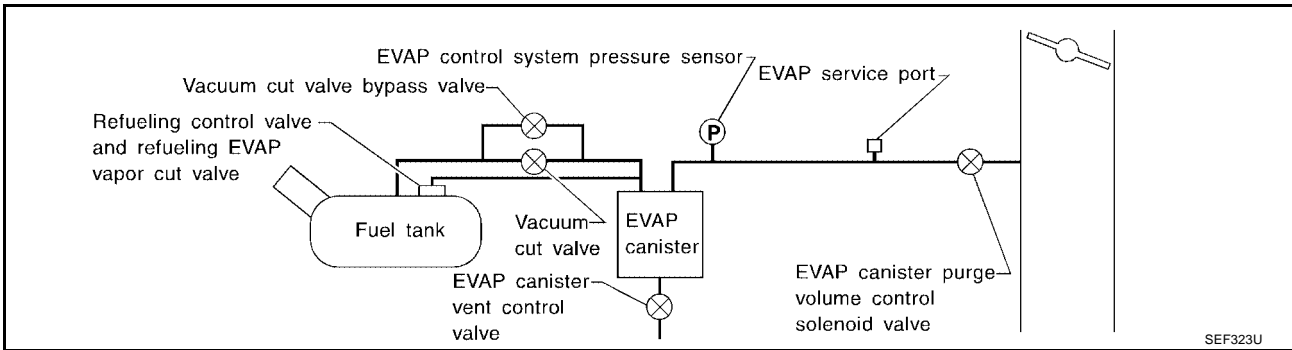
The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis.

The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened. The vacuum cut valve is then bypassed to apply intake manifold vacuum to the fuel tank.



EVAPORATIVE EMISSION SYSTEM DIAGRAM



CONSULT-II Reference Value in Data Monitor Mode

UBS002K1

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPAS S/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

UBS002KJ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1490 1490	Vacuum cut valve bypass valve circuit	An improper voltage signal is sent to ECM through vacuum cut valve bypass valve.	<ul style="list-style-type: none"> <li>● Harness or connectors (The vacuum cut valve bypass valve circuit is open or shorted)</li> <li>● Vacuum cut valve bypass valve</li> </ul>

DTC Confirmation Procedure

UBS002KK

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle speed.

# DTC P1490 VACUUM CUT VALVE BYPASS VALVE

[QR25DE]

## WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait at least 5 seconds.
4. If 1st trip DTC is detected, go to [EC-1710, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

## WITH GST

Follow the procedure "WITH CONSULT-II" above.

# DTC P1490 VACUUM CUT VALVE BYPASS VALVE

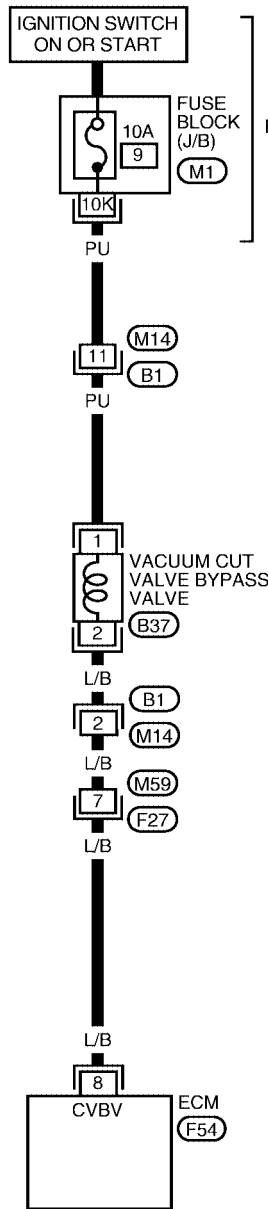
[QR25DE]

UBS002KL

## Wiring Diagram

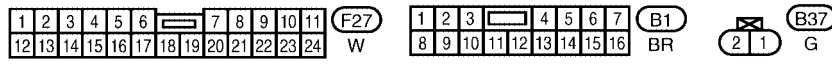
EC-BYPS/V-01

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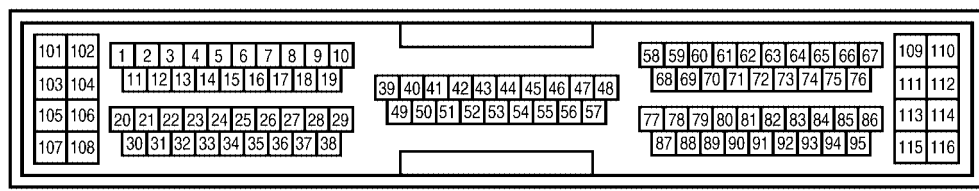


— : DETECTABLE LINE FOR DTC  
— : NON-DETECTABLE LINE FOR DTC

REFER TO "PG-POWER".



REFER TO THE FOLLOWING.  
 (M1) - FUSE BLOCK - JUNCTION BOX (J/B)



BBWA0240E

# DTC P1490 VACUUM CUT VALVE BYPASS VALVE

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	L/B	Vacuum cut valve bypass valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS002KM

### 1. INSPECTION START

Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

### 2. CHECK VACUUM CUT VALVE BYPASS VALVE CIRCUIT

#### With CONSULT-II

1. Turn ignition switch "OFF" and then "ON".
2. Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II.
3. Touch "ON/OFF" on CONSULT-II screen.
4. Make sure that clicking sound is heard from the vacuum cut valve bypass valve.

OK or NG

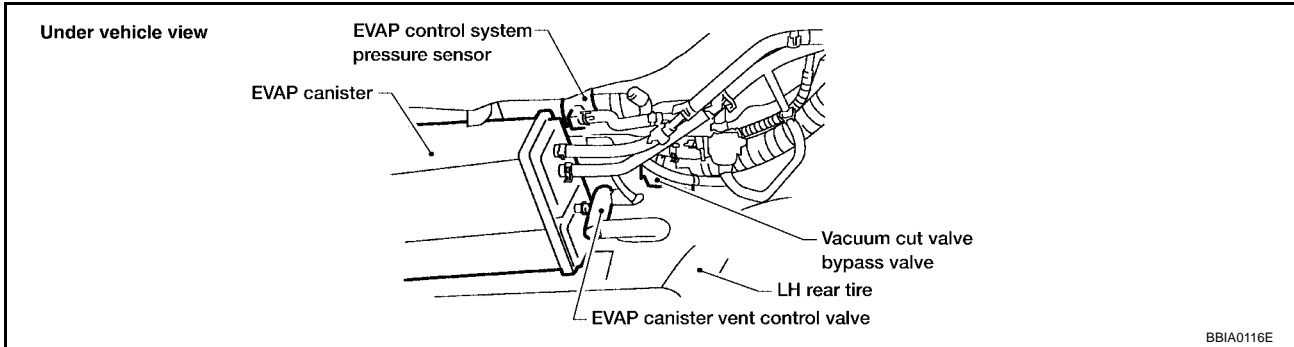
- OK >> GO TO 7.
- NG >> GO TO 3.

ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 MNTR (B1)	LEAN

PBIB0840E

**3. CHECK VACUUM CUT VALVE BYPASS VALVE POWER SUPPLY CIRCUIT**

1. Turn ignition switch "OFF".
2. Disconnect vacuum cut valve bypass valve harness connector.

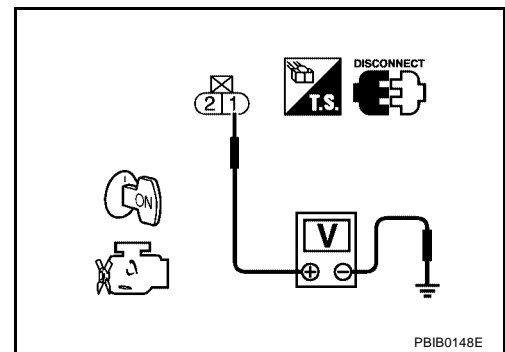


3. Turn ignition switch "ON".
4. Check voltage between vacuum cut valve bypass valve terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



**4. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M14, B1
- Fuel block (J/B) connector M1
- 10A fuse
- Harness for open or short between vacuum cut valve bypass valve and fuse

>> Repair harness or connectors.

**5. CHECK VACUUM CUT VALVE BYPASS VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 8 and vacuum cut valve bypass valve terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

## 6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B1, M14
- Harness connectors M59, F27
- Harness for open or short between vacuum cut valve bypass valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK VACUUM CUT VALVE BYPASS VALVE

Refer to [EC-1712, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace vacuum cut valve bypass valve.

## 8. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection VACUUM CUT VALVE BYPASS VALVE

UBS002KN

#### With CONSULT-II

1. Reconnect harness disconnected connectors.
2. Turn ignition switch ON.
3. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode.

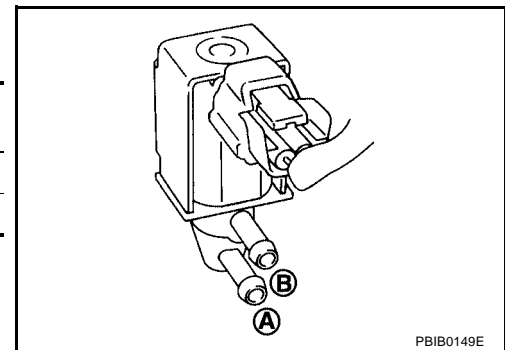
ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 MNTR (B1)	LEAN

PBIB0840E

4. Check air passage continuity and operation delay time under the following conditions.

Condition VC/V BYPASS/V	Air passage continuity between <b>A</b> and <b>B</b>
ON	Yes
OFF	No

**Operation takes less than 1 second.**  
If NG, replace vacuum cut valve bypass valve.





# DTC P1490 VACUUM CUT VALVE BYPASS VALVE

[QR25DE]

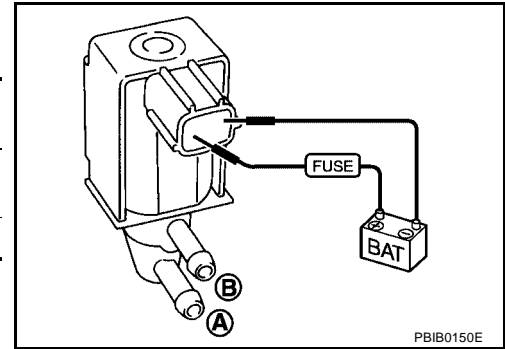
## ⊗ Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between <b>A</b> and <b>B</b>
12V direct current supply between terminals 1 and 2	Yes
No supply	No

**Operation takes less than 1 second.**

If NG, replace vacuum cut valve bypass valve.



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## DTC P1491 VACUUM CUT VALVE BYPASS VALVE

PFP:17372

### Description

UBS002KO

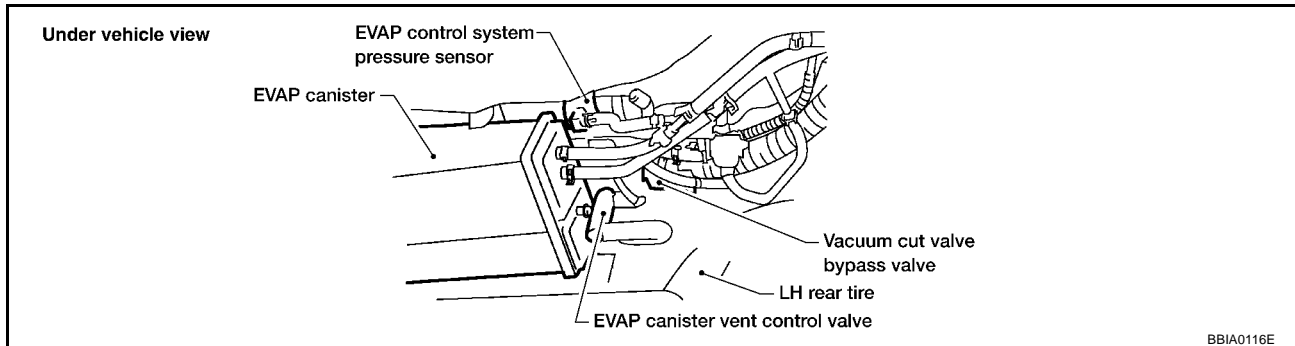
#### COMPONENT DESCRIPTION

The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

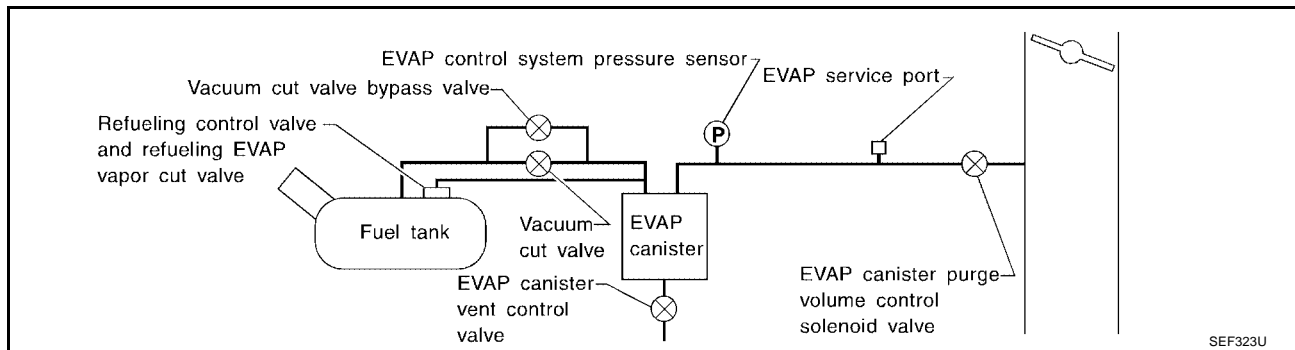
The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis.

The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened. The vacuum cut valve is then bypassed to apply intake manifold vacuum to the fuel tank.



BBIA0116E

#### EVAPORATIVE EMISSION SYSTEM DIAGRAM



SEF323U

#### CONSULT-II Reference Value in Data Monitor Mode

UBS002KP

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPAS S/V	● Ignition switch: ON	OFF

#### On Board Diagnosis Logic

UBS002KQ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1491 1491	Vacuum cut valve bypass valve	Vacuum cut valve bypass valve does not operate properly.	<ul style="list-style-type: none"> <li>● Vacuum cut valve bypass valve</li> <li>● Vacuum cut valve</li> <li>● Bypass hoses for clogging</li> <li>● EVAP control system pressure sensor and circuit</li> <li>● EVAP canister vent control valve</li> <li>● Hose between fuel tank and vacuum cut valve clogged</li> <li>● Hose between vacuum cut valve and EVAP canister clogged</li> <li>● EVAP canister</li> <li>● EVAP purge port of fuel tank for clogging</li> </ul>

## DTC Confirmation Procedure

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

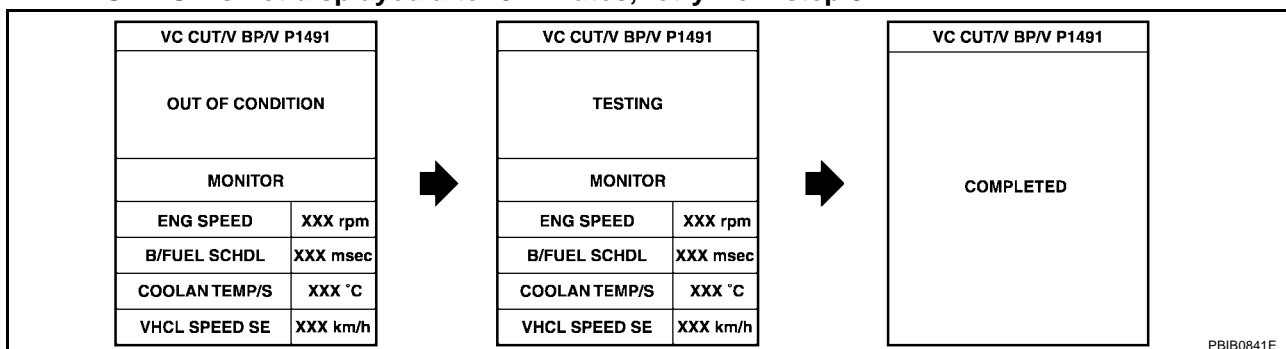
Always perform test at a temperature of 5 to 30°C (41 to 86°F).

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and let it idle for at least 70 seconds.
5. Select "VC CUT/V BP/V P1491" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
6. Touch "START".
7. When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 30 seconds.)

ENG SPEED	1,000 - 3,800 rpm
Selector lever	Suitable position
Vehicle speed	36 - 120 km/h (22 - 75 MPH)
B/FUEL SCHDL	1.0 - 7.2 msec

**If "TESTING" is not displayed after 5 minutes, retry from step 3.**



8. Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to [EC-1718, "Diagnostic Procedure"](#).

## Overall Function Check

Use this procedure to check the overall function of vacuum cut valve bypass valve. During this check, the 1st trip DTC might not be confirmed.

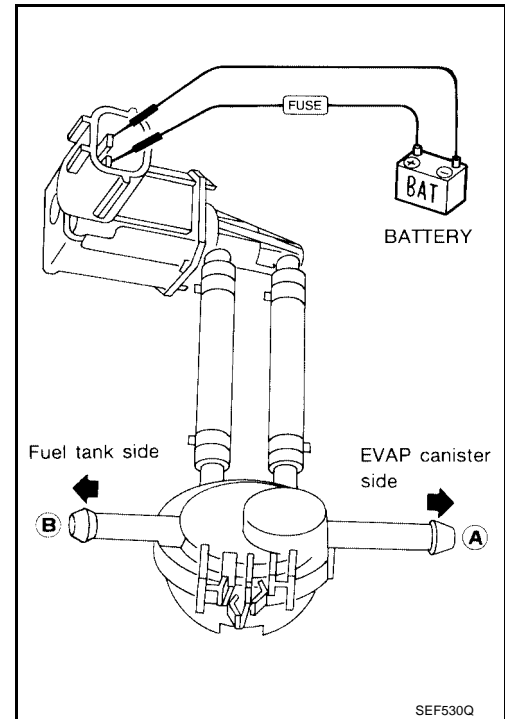
**WITH GST**

1. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.

## DTC P1491 VACUUM CUT VALVE BYPASS VALVE

[QR25DE]

2. Apply vacuum to port **A** and check that there is no suction from port **B**.
3. Apply vacuum to port **B** and check that there is suction from port **A**.
4. Blow air in port **B** and check that there is a resistance to flow out of port **A**.
5. Supply battery voltage to the terminal.
6. Blow air in port **A** and check that air flows freely out of port **B**.
7. Blow air in port **B** and check that air flows freely out of port **A**.
8. If NG, go to [EC-1718, "Diagnostic Procedure"](#).



# DTC P1491 VACUUM CUT VALVE BYPASS VALVE

[QR25DE]

UBS002KT

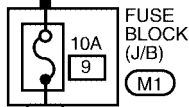
## Wiring Diagram

### EC-BYPS/V-01

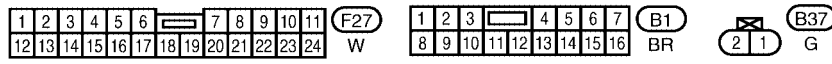
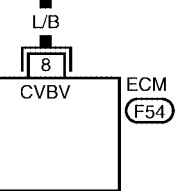
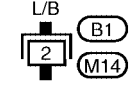
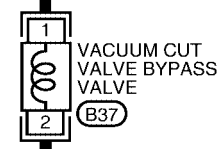
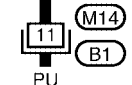
A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

IGNITION SWITCH  
ON OR START

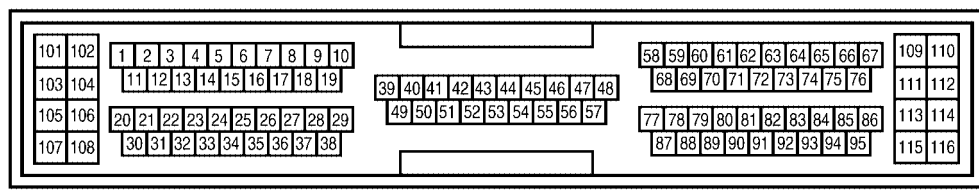
— : DETECTABLE LINE FOR DTC  
— : NON-DETECTABLE LINE FOR DTC



REFER TO "PG-POWER".



REFER TO THE FOLLOWING.  
 (M1) - FUSE BLOCK - JUNCTION BOX (J/B)



BBWA0240E

# DTC P1491 VACUUM CUT VALVE BYPASS VALVE

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
8	L/B	Vacuum cut valve bypass valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS002KU

### 1. INSPECTION START

Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

### 2. CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION

**With CONSULT-II**

1. Turn ignition switch "OFF".
2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.
3. Apply vacuum to port **A** and check that there is no suction from port **B**.
4. Apply vacuum to port **B** and check that there is suction from port **A**.
5. Blow air in port **B** and check that there is a resistance to flow out of port **A**.
6. Turn ignition switch "ON".
7. Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II and touch "ON".
8. Blow air in port **A** and check that air flows freely out of port **B**.
9. Blow air in port **B** and check that air flows freely out of port **A**.

B Fuel tank side  
A EVAP canister side

ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 MNTR (B1)	LEAN

PBIB0842E

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 7.

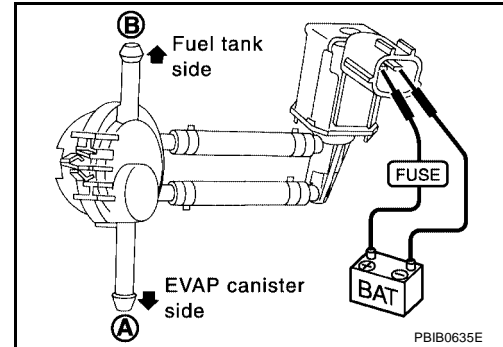
### 3. CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION

⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.
3. Apply vacuum to port **A** and check that there is no suction from port **B** .
4. Apply vacuum to port **B** and check that there is suction from port **A** .
5. Blow air in port **B** and check that there is a resistance to flow out of port **A** .
6. Disconnect vacuum cut valve bypass valve harness connector.
7. Supply battery voltage to the terminal.
8. Blow air in port **A** and check that air flows freely out of port **B** .
9. Blow air in port **B** and check that air flows freely out of port **A** .

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 7.



### 4. CHECK EVAP PURGE LINE

Check EVAP purge line between EVAP canister and fuel tank for clogging or disconnection.

OK or NG

- OK >> GO TO 5.
- NG >> Repair it.

### 5. CHECK EVAP PURGE PORT

Check EVAP purge port of fuel tank for clogging.

OK or NG

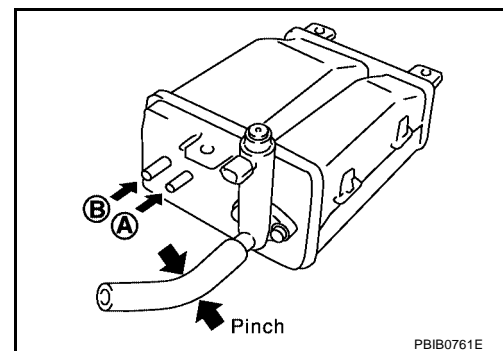
- OK >> GO TO 6.
- NG >> Clean EVAP purge port.

### 6. CHECK EVAP CANISTER

1. Pinch the fresh air hose.
2. Blow air into port **A** and check that it flows freely out of port **B** .

OK or NG

- OK >> GO TO 12.
- NG >> Replace EVAP canister.



### 7. CHECK BYPASS HOSE

Check bypass hoses for clogging.

OK or NG

- OK >> GO TO 8.
- NG >> Repair or replace hoses.

---

## 8. CHECK VACUUM CUT VALVE BYPASS VALVE

---

Refer to [EC-1721, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace vacuum cut valve bypass valve.

---

## 9. CHECK VACUUM CUT VALVE

---

Refer to [EC-1721, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 10.
- NG >> Replace vacuum cut valve.

---

## 10. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE

---

1. Turn ignition switch "OFF".
2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.

OK or NG

- OK >> GO TO 11.
- NG >> Repair or replace.

---

## 11. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

---

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

**Water should not exist.**

OK or NG

- OK >> GO TO 12.
- NG >> Replace EVAP control system pressure sensor.

---

## 12. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

---

Refer to [EC-1539, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 13.
- NG >> Replace EVAP control system pressure sensor.

---

## 13. CHECK RUBBER TUBE FOR CLOGGING

---

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

- OK >> GO TO 14.
- NG >> Clean the rubber tube using an air blower.

---

## 14. CHECK EVAP CANISTER VENT CONTROL VALVE

---

Refer to [EC-1532, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 15.
- NG >> Replace EVAP canister vent control valve.



15. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection**  
**VACUUM CUT VALVE BYPASS VALVE**

UBS002KV

**With CONSULT-II**

1. Reconnect harness disconnected connectors.
2. Turn ignition switch ON.
3. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode.

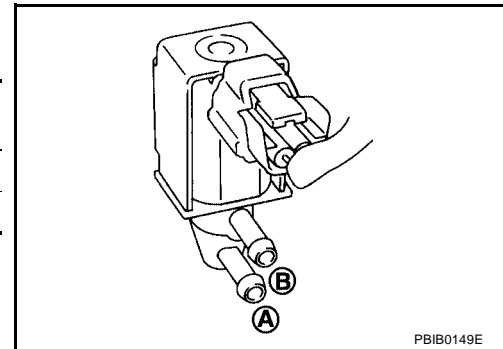
ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 MNTR (B1)	LEAN

PBIB0840E

4. Check air passage continuity and operation delay time under the following conditions.

Condition VC/V BYPASS/V	Air passage continuity between <b>A</b> and <b>B</b>
ON	Yes
OFF	No

**Operation takes less than 1 second.**  
If NG, replace vacuum cut valve bypass valve.

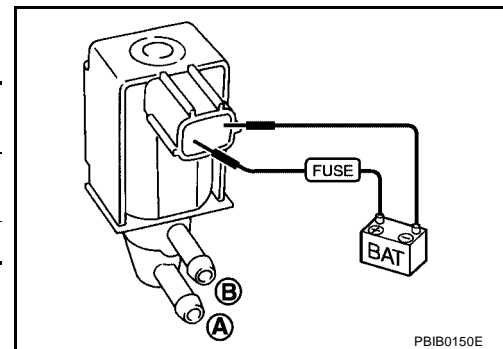


**Without CONSULT-II**

Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between <b>A</b> and <b>B</b>
12V direct current supply between terminals 1 and 2	Yes
No supply	No

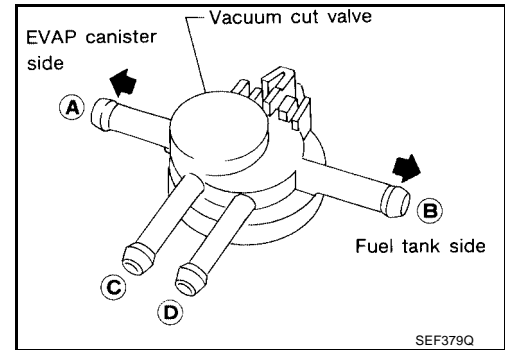
**Operation takes less than 1 second.**  
If NG, replace vacuum cut valve bypass valve.



## VACUUM CUT VALVE

Check vacuum cut valve as follows:

1. Plug port **C** and **D** with fingers.
2. Apply vacuum to port **A** and check that there is no suction from port **B**.
3. Apply vacuum to port **B** and check that there is suction from port **A**.
4. Blow air in port **B** and check that there is a resistance to flow out of port **A**.
5. Open port **C** and **D**.
6. Blow air in port **A** check that air flows freely out of port **C**.
7. Blow air in port **B** check that air flows freely out of port **D**.
8. If NG, replace vacuum cut valve.



# DTC P1564 ASCD STEERING SWITCH

[QR25DE]

PF2:25551

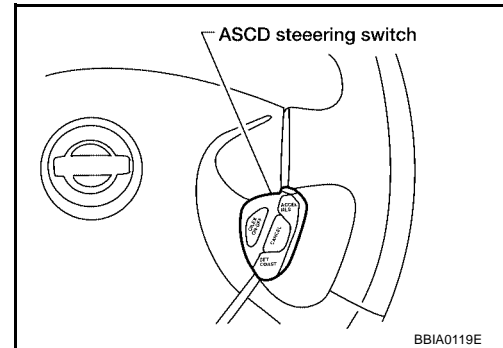
## DTC P1564 ASCD STEERING SWITCH

### Component Description

UBS002KW

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated.

Refer to [EC-1860, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



### CONSULT-II Reference Value in Data Monitor Mode

UBS002KX

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN SW	● Ignition switch: ON	● CRUISE switch: Depressed	ON
		● CRUISE switch: Released	OFF
CANCEL	● Ignition switch: ON	● CANCEL switch: Depressed	ON
		● CANCEL switch: Released	OFF
RESUME/ACC SW	● Ignition switch: ON	● ACCEL/RES switch: Depressed	ON
		● ACCEL/RES switch: Released	OFF
SET SW	● Ignition switch: ON	● COAST/SET switch: Depressed	ON
		● COAST/SET switch: Released	OFF

### On Board Diagnosis Logic

UBS002KY

This self-diagnosis has the one trip detection logic.  
The MIL will not light up for this diagnosis.

#### NOTE:

If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-1583](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1564 1564	ASCD steering switch	<ul style="list-style-type: none"> <li>● An excessively high voltage signal from the ASCD steering switch is sent to ECM.</li> <li>● ECM detects that input signal from the ASCD steering switch is out of the specified range.</li> <li>● ECM detects that the ASCD steering switch is stuck ON.</li> </ul>	<ul style="list-style-type: none"> <li>● Harness or connectors (The switch circuit is open or shorted.)</li> <li>● ASCD steering switch</li> <li>● ECM</li> </ul>

### DTC Confirmation Procedure

UBS002KZ

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### Ⓟ WITH CONSULT-II

1. Turn ignition switch "ON".

## DTC P1564 ASCD STEERING SWITCH

[QR25DE]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 10 seconds.
4. Press "CRUISE" switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press "ACCEL/RES" switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press "COAST/SET" switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. Press "CANCEL" switch for at least 10 seconds, then release it and wait at least 10 seconds.
8. If 1st trip DTC is detected, go to [EC-1727, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



### WITH GST

Follow the procedure "WITH CONSULT-II" above.



# DTC P1564 ASCD STEERING SWITCH

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 0V
89	G	ASCD steering switch	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● ASCD steering switch is "OFF".</li> </ul>	Approximately 4.0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● CRUISE switch is "ON".</li> </ul>	Approximately 0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● CANCEL switch is "ON".</li> </ul>	Approximately 1.0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● SET/COAST switch is "ON".</li> </ul>	Approximately 2.0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● ACCEL/RES switch is "ON".</li> </ul>	Approximately 3.0V

## Diagnostic Procedure

### 1. CHECK ASCD STEERING SWITCH CIRCUIT

#### With CONSULT-II

1. Turn ignition switch "ON".
2. Select "MAIN SW", "RESUME/ACC SW", "SET SW" and "CANCEL SW" in "DATA MONITOR" mode with CONSULT-II.
3. Check each item indication under the following conditions.

Switch	Monitor item	Condition	Indication
CRUISE	MAIN SW	Pressed	ON
		Released	OFF
COAST/SET	SET SW	Pressed	ON
		Released	OFF
ACCEL/RES	RESUME/ACC SW	Pressed	ON
		Released	OFF
CANCEL	CANCEL SW	Pressed	ON
		Released	OFF

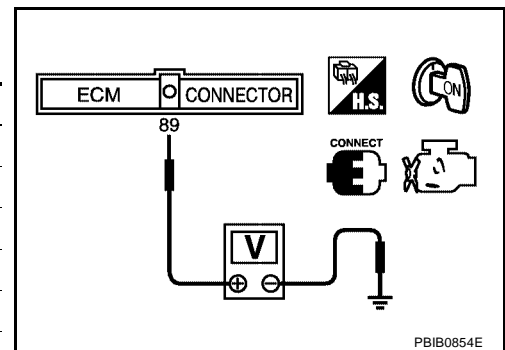
DATA MONITOR	
MONITOR	NO DTC
MAIN SW	OFF
CANCEL SW	OFF
RESUME/ACC SW	OFF
SET SW	OFF

SEC006D

#### Without CONSULT-II

1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 89 and ground with pressing each button.

Switch	Condition	Voltage [V]
CRUISE	Pressed	Approx. 0.5
	Released	Approx. 4.0
COAST/SET	Pressed	Approx. 2.0
	Released	Approx. 4.0
ACCEL/RES	Pressed	Approx. 3.0
	Released	Approx. 4.0
CANCEL	Pressed	Approx. 1.0
	Released	Approx. 4.0



#### OK or NG

- OK >> GO TO 7.  
 NG >> GO TO 2.

### 2. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

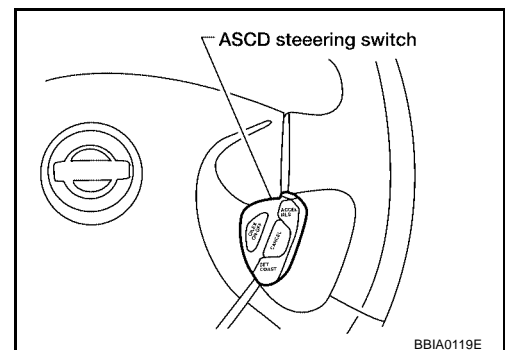
1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Disconnect ASCD steering switch harness connector.
4. Check harness continuity between ASCD steering switch terminal 1 and ECM terminal 58. Refer to Wiring Diagram.

**Continuity should exist.**

5. Also check harness for short to ground and short to power.

#### OK or NG

- OK >> GO TO 4.  
 NG >> GO TO 3.



### 3. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M59, F27
- Harness connectors M102, M401
- Joint connector-2
- Spiral cable
- Harness for open and short between ECM and ASCD steering switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

### 4. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Check harness continuity between ECM terminal 89 and ASCD steering switch terminal 4. Refer to Wiring Diagram.

**Continuity should exist.**

2. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
NG >> GO TO 5.

### 5. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M59, F27
- Harness connectors M102, M401
- Spiral cable
- Harness for open and short between ECM and ASCD steering switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

### 6. CHECK ASCD STEERING SWITCH

---

Refer to [EC-1728, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.  
NG >> Replace ASCD steering switch.

### 7. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-1606, "DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION"](#) .

>> INSPECTION END

### Component Inspection ASCD STEERING SWITCH

UBS002L2

1. Disconnect ASCD steering switch.

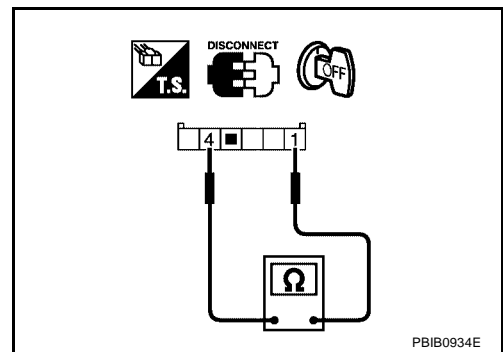


# DTC P1564 ASCD STEERING SWITCH

[QR25DE]

2. Check continuity between ASCD steering switch terminals 1 and 4 with pushing each switch.

Switch	Condition	Resistance [ $\Omega$ ]
CRUISE SW	Pressed	Approx. 4,000
	Released	Approx. 0
COAST/SET SW	Pressed	Approx. 660
	Released	Approx. 0
ACCEL/RES SW	Pressed	Approx. 1,000
	Released	Approx. 0
CANCEL SW	Pressed	Approx. 250
	Released	Approx. 0



If NG, replace ASCD steering switch.

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

## DTC P1572 ASCD BRAKE SWITCH

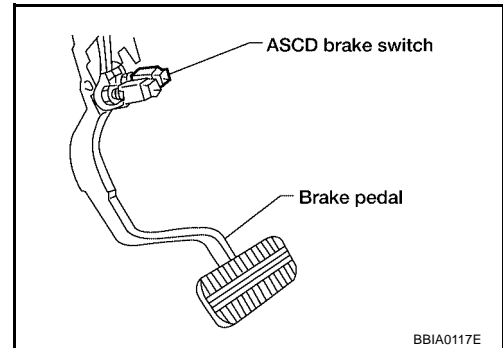
PFP:25320

### Component Description

UBS002L3

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).

Refer to [EC-1860, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



### CONSULT-II Reference Value in Data Monitor Mode

UBS002L4

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW1 (ASCD brake switch)	● Ignition switch: ON	● Brake pedal: Fully released	ON
		● Brake pedal: Slightly depressed	OFF
BRAKE SW2 (stop lamp switch)	● Ignition switch: ON	● Brake pedal: Fully released	OFF
		● Brake pedal: Slightly depressed	ON

### On Board Diagnosis Logic

UBS002L5

The MIL will not light up for this diagnosis.

**NOTE:**

If DTC P1572 is displayed with DTC P0605 or P1805, first perform the trouble diagnosis for DTC P0605 or P1805. Refer to [EC-1583](#) or [EC-1746](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1572 1572	ASCD brake switch	ON signals from the stop lamp switch and the ASCD brake switch are sent to ECM at the same time.	<ul style="list-style-type: none"> <li>● Harness or connectors (The stop lamp switch circuit is open or shorted.)</li> <li>● Harness or connectors (The ASCD brake switch circuit is open or shorted.)</li> <li>● Harness or connectors (The ASCD clutch switch circuit is open or shorted.)</li> <li>● Stop lamp switch</li> <li>● ASCD brake switch</li> <li>● ASCD clutch switch</li> <li>● Incorrect stop lamp switch installation</li> <li>● Incorrect ASCD brake switch installation</li> <li>● Incorrect ASCD clutch switch installation</li> <li>● ECM</li> </ul>

### DTC Confirmation Procedure

UBS002L6

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

# DTC P1572 ASCD BRAKE SWITCH

[QR25DE]

Steps 3 and 4 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

## WITH CONSULT-II

1. Start engine.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Drive the vehicle for at least 5 consecutive seconds under the following condition.

VHCL SPEED SE	More than 30 km/h (19 MPH)
Selector lever	Suitable position

If 1st trip DTC is detected, go to [EC-1733, "Diagnostic Procedure"](#) .  
If 1st trip DTC is not detected, go to the following step.

4. Drive the vehicle for at least 5 consecutive seconds under the following condition.

VHCL SPEED SE	More than 30 km/h (19 MPH)
Selector lever	Suitable position
Driving location	Depress the brake pedal for more than five seconds so as not to come off from the above-mentioned condition.

5. If 1st trip DTC is detected, go to [EC-1733, "Diagnostic Procedure"](#) .

## WITH GST

Follow the procedure "WITH CONSULT-II" above.

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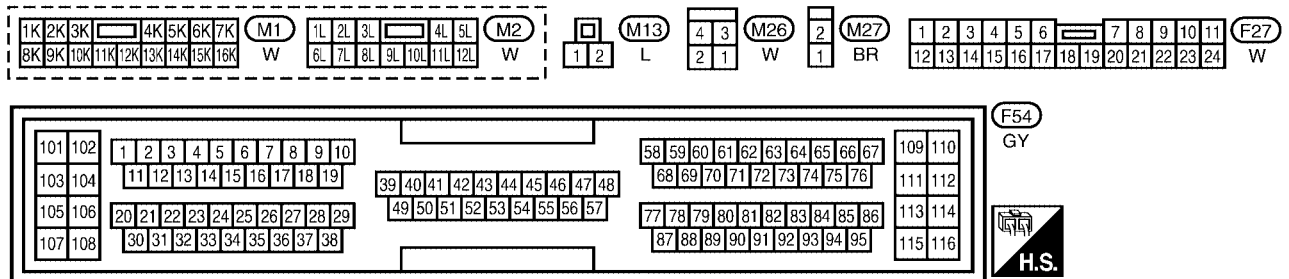
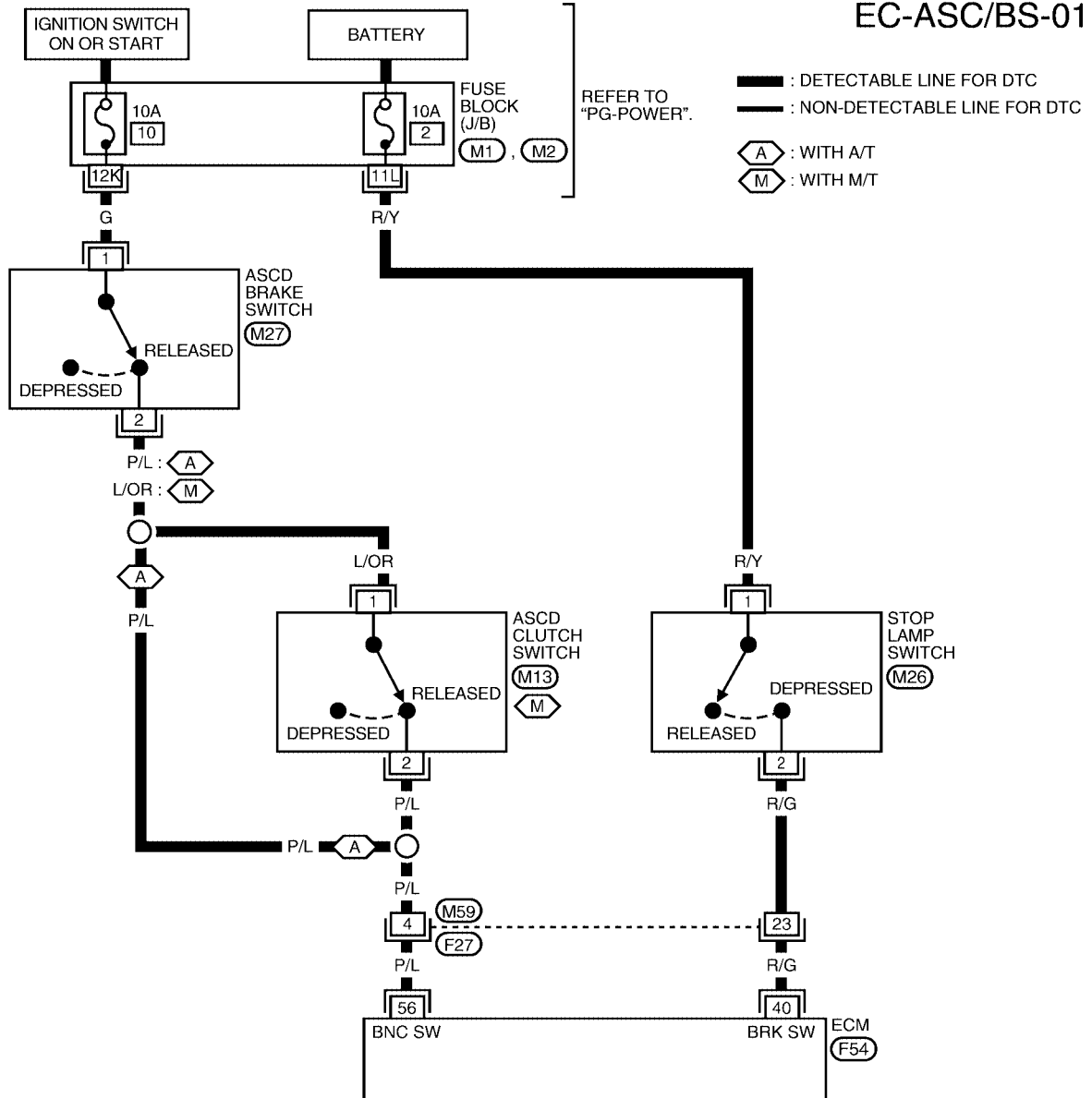
# DTC P1572 ASCD BRAKE SWITCH

[QR25DE]

UBS002L7

## Wiring Diagram

EC-ASC/BS-01



BBWA0421E

# DTC P1572 ASCD BRAKE SWITCH

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
40	R/G	Stop lamp switch	[Engine is running] ● Brake pedal fully released	Approximately 0V
			[Engine is running] ● Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)
56	P/L	ASCD brake switch	[Ignition switch "ON"] ● Brake pedal is depressed ● Clutch pedal is depressed (M/T models)	Approximately 0V
			[Ignition switch "ON"] ● Brake pedal is fully released ● Clutch pedal is fully released (M/T models)	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS002L8

### 1. CHECK OVERALL FUNCTION-I

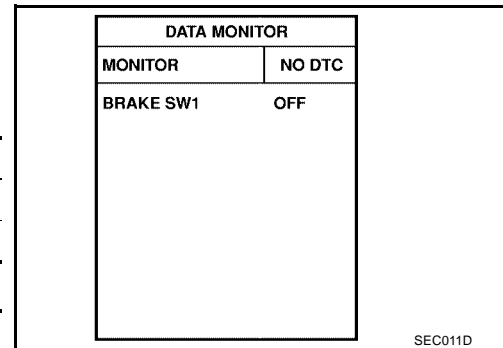
**With CONSULT-II**

- Turn ignition switch "ON".
- Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-II.
- Check "BRAKE SW1" indication under the following conditions.  
**M/T models**

CONDITION	INDICATION
When clutch pedal or brake pedal is depressed	OFF
When clutch pedal and brake pedal are fully released	ON

**A/T models**

CONDITION	INDICATION
When brake pedal is depressed	OFF
When brake pedal is fully released	ON



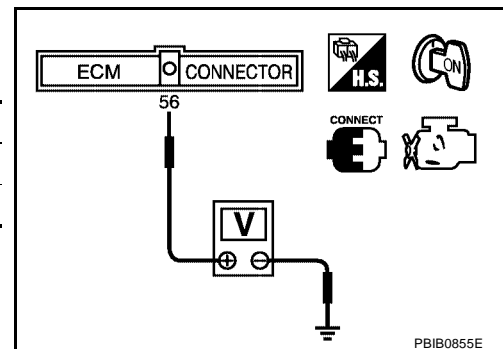
**Without CONSULT-II**

- Turn ignition switch "ON".
- Check voltage between ECM terminal 56 and ground under the following conditions.  
**M/T models**

CONDITION	VOLTAGE
When clutch pedal or brake pedal is depressed	Approximately 0V
When clutch pedal and brake pedal are fully released	Battery voltage

**A/T models**

CONDITION	VOLTAGE
When brake pedal is depressed	Approximately 0V
When brake pedal is fully released	Battery voltage



OK or NG

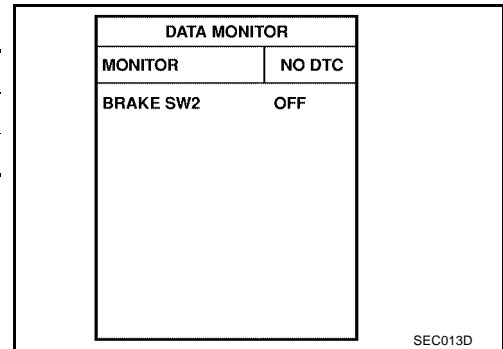
- OK >> GO TO 2.
- NG (M/T models) >>GO TO 3.
- NG (A/T models) >>GO TO 4.

## 2. CHECK OVERALL FUNCTION-II

### ④ With CONSULT-II

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

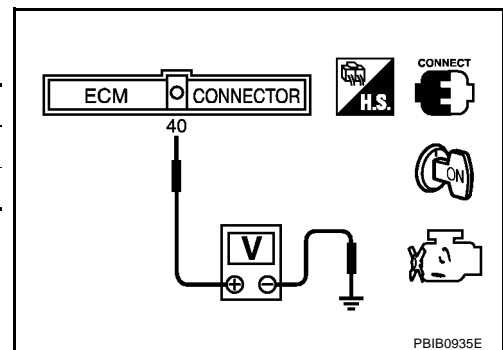
CONDITION	INDICATION
When brake pedal is released	OFF
When brake pedal is depressed	ON



### ⊗ Without CONSULT-II

Check voltage between ECM terminal 40 and ground under the following conditions.

CONDITION	VOLTAGE
When brake pedal is released	Approximately 0V
When brake pedal is depressed	Battery voltage

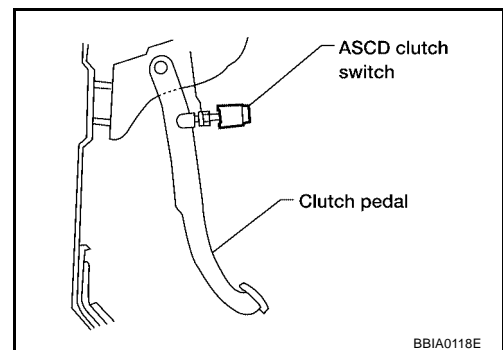


#### OK or NG

- OK >> GO TO 18.
- NG >> GO TO 13.

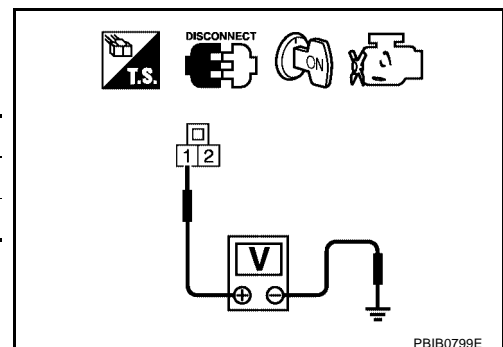
## 3. CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch "ON".



4. Check voltage between ASCD clutch switch terminal 1 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
When brake pedal is released	Battery voltage
When brake pedal is depressed	Approx. 0V

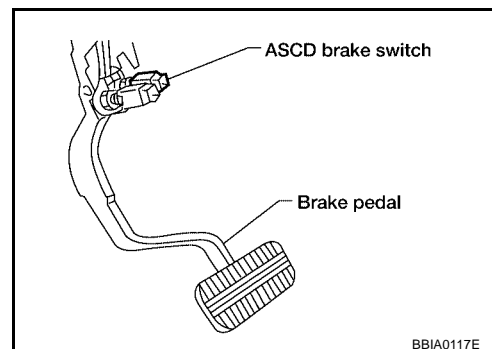


#### OK or NG

- OK >> GO TO 10.
- NG >> GO TO 4.

#### 4. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".

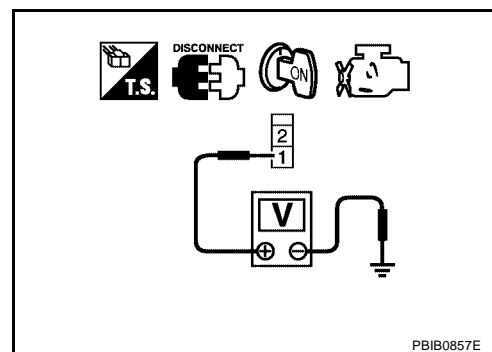


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK (M/T models)>>GO TO 6.
- OK (A/T models)>>GO TO 7.
- NG >> GO TO 5.



#### 5. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M1
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

#### 6. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between ASCD brake switch terminal 2 and ASCD clutch switch terminal 1. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 7. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 56 and ASCD brake switch terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 9.  
NG >> GO TO 8.

---

## 8. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and ASCD brake switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 9. CHECK ASCD BRAKE SWITCH

---

Refer to [EC-1738, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.  
NG >> Replace ASCD brake switch.

---

## 10. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 56 and ASCD clutch switch terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 12.  
NG >> GO TO 11.

---

## 11. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and ASCD clutch switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 12. CHECK ASCD CLUTCH SWITCH

---

Refer to [EC-1738, "Component Inspection"](#)

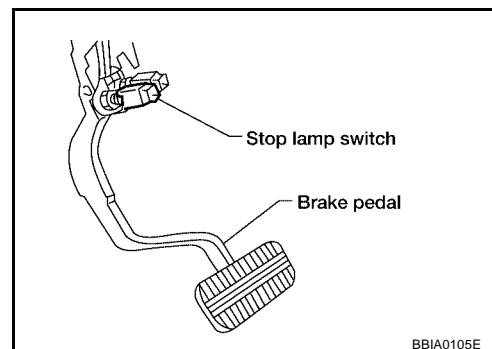
OK or NG

- OK >> GO TO 18.  
NG >> Replace ASCD clutch switch.



**13. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT**

1. Turn ignition switch "OFF".
2. Disconnect stop lamp switch harness connector.

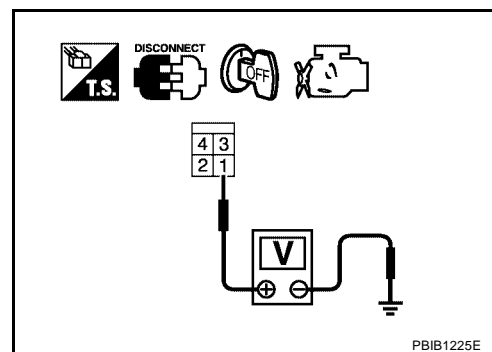


3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT -II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.

**14. DETECT MALFUNCTIONING PART**

Check the following.

- Fuse block (J/B) connector M2
- 10A fuse
- Harness for open or short between stop lamp switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

**15. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 40 and stop lamp switch terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 17.
- NG >> GO TO 16.

**16. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

**17. CHECK STOP LAMP SWITCH**

Refer to [EC-1738, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 18.
- NG >> Replace stop lamp switch.

**18. CHECK INTERMITTENT INCIDENT**

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

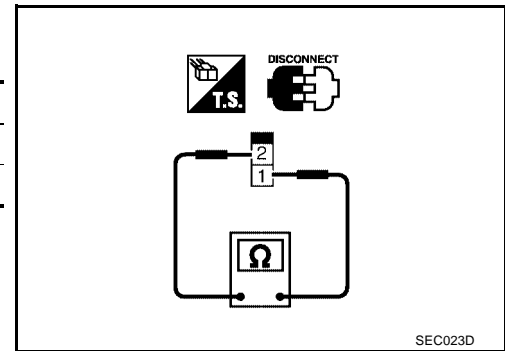
**Component Inspection  
ASC D BRAKE SWITCH**

UBS002L9

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Check continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should exist.
When brake pedal is depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to [BR-11, "BRAKE PEDAL AND BRACKET"](#) , and perform step 3 again.

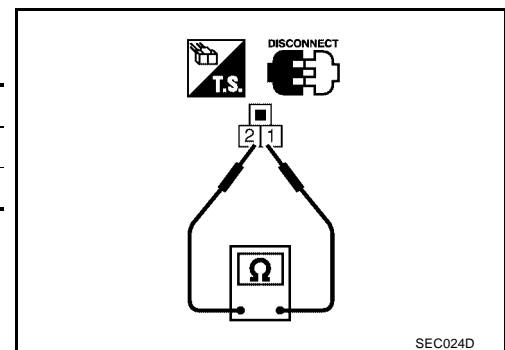


**ASC D CLUTCH SWITCH (FOR M/T MODELS)**

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Check continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When clutch pedal is fully released.	Should exist.
When clutch pedal is depressed.	Should not exist.

If NG, adjust ASCD clutch switch installation, refer to [CL-23, "CLUTCH SYSTEM"](#) , and perform step 3 again.

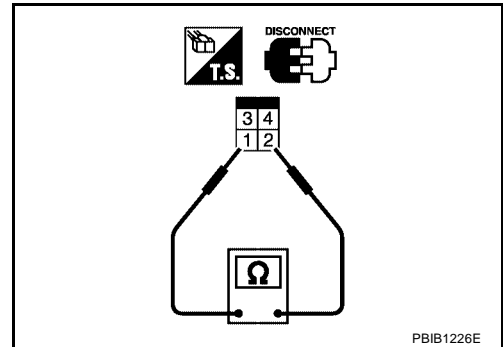


## STOP LAMP SWITCH

1. Turn ignition switch "OFF".
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.

Condition	Continuity
When brake pedal is fully released.	Should not exist.
When brake pedal is depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to [BR-11](#), "[BRAKE PEDAL AND BRACKET](#)", and perform step 3 again.



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# DTC P1574 ASCD VEHICLE SPEED SENSOR

[QR25DE]

## DTC P1574 ASCD VEHICLE SPEED SENSOR

PF3:31036

### Component Description

UBS002LA

The ECM receives two vehicle speed sensor signals. One is sent from combination meter, and the other is from TCM (Transmission control module) via CAN communication line. The ECM uses these signals for ASCD control. Refer to [EC-1860, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for ASCD functions.

### On Board Diagnosis Logic

UBS002LB

The MIL will not light up for this diagnosis.

#### NOTE:

- If DTC P1574 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to [EC-1350, "DTC U1000, U1001 CAN COMMUNICATION LINE"](#).
- If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to [EC-1575, "DTC P0500 VSS"](#).
- If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to [EC-1583, "DTC P0605 ECM"](#).

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1574 1574	ASCD vehicle speed sensor	ECM detects a difference between two vehicle speed signals is out of the specified range.	<ul style="list-style-type: none"><li>● Harness or connectors (The CAN communication line is open or shorted.)</li><li>● Harness or connectors (The combination meter circuit is open or shorted.)</li><li>● TCM</li><li>● Combination meter</li><li>● Vehicle speed sensor</li><li>● ECM</li></ul>

### DTC Confirmation Procedure

UBS002LC

#### CAUTION:

Always drive vehicle at a safe speed.

#### NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

#### TESTING CONDITION:

Step 3 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

#### Ⓟ WITH CONSULT-II

1. Start engine.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Drive the vehicle at more than 40 km/h (25MPH).
4. If 1st trip DTC is detected, go to [EC-1741, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

#### Ⓟ WITH GST

Follow the procedure "WITH CONSULT-II" above.

**Diagnostic Procedure****1. CHECK DTC WITH TCM**

Check DTC with TCM. Refer to [AT-428, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION"](#) .

OK or NG

OK >> GO TO 2.

NG >> Perform trouble shooting relevant to DTC indicated.

**2. CHECK VEHICLE SPEED SENSOR CIRCUIT**

Refer to [DI-26, "VEHICLE SPEED SENSOR SIGNAL CHECK"](#) .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace.

**3. CHECK COMBINATION METER**

Check combination meter function.

Refer to [DI-3, "METERS AND GAUGES"](#) .

>> **INSPECTION END**

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## DTC P1706 PNP SWITCH

PFP:32006

### Component Description

UBS002LE

When the shift lever position is "P" (A/T models only) or "N", park/neutral position (PNP) switch is "ON". ECM detects the position because the continuity of the line (the "ON" signal) exists.

### CONSULT-II Reference Value in Data Monitor Mode

UBS002LF

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
P/N POSI SW	● Ignition switch: ON	ON
	Shift lever: Except above	OFF

### On Board Diagnosis Logic

UBS002LG

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1706 1706	Park/neutral position switch	The signal of the park/neutral position (PNP) switch is not changed in the process of engine starting and driving.	<ul style="list-style-type: none"> <li>● Harness or connectors [The park/neutral position (PNP) switch circuit is open or shorted.]</li> <li>● Park/neutral position (PNP) switch</li> </ul>

### DTC Confirmation Procedure

UBS002LH

**CAUTION:**

**Always drive vehicle at a safe speed.**

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Select "P/N POSI SW" in "DATA MONITOR" mode with CONSULT-II. Then check the "P/N POSI SW" signal under the following conditions.

Position (Selector lever)	Known-good signal
"N" and "P" position	ON
Except the above position	OFF

If NG, go to [EC-1745, "Diagnostic Procedure"](#) .

If OK, go to following step.

3. Select "DATA MONITOR" mode with CONSULT-II.
4. Start engine and warm it up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	1,500 - 3,000 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	3.0 - 31.8 msec
VHCL SPEED SE	More than 64 km/h (40 MPH)
Selector lever	Suitable position

6. If 1st trip DTC is detected, go to [EC-1745, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
P/N POSI SW	ON

SEF212Y

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
P/N POSI SW	OFF
B/FUEL SCHDL	XXX msec

SEF213Y

## Overall Function Check

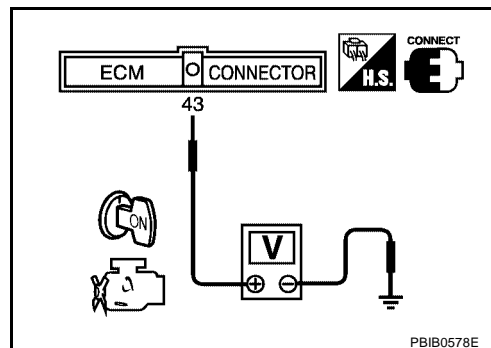
Use this procedure to check the overall function of the park/neutral position (PNP) switch circuit. During this check, a 1st trip DTC might not be confirmed.

**WITH GST**

1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 43 (PNP switch signal) and body ground under the following conditions.

Condition (Gear position)	Voltage V (Known good data)
"P" (A/T models only) and "N" position	Approx. 0
Except the above position	A/T models: Battery voltage M/T: Approximately 5V

3. If NG, go to [EC-1745, "Diagnostic Procedure"](#).



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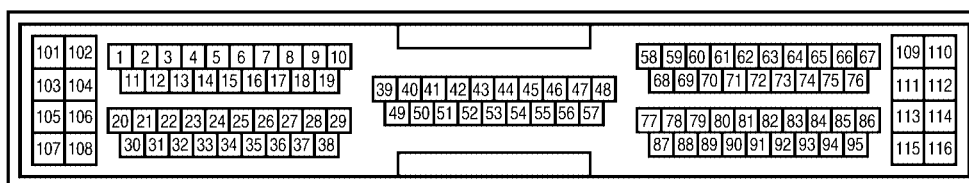
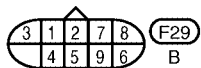
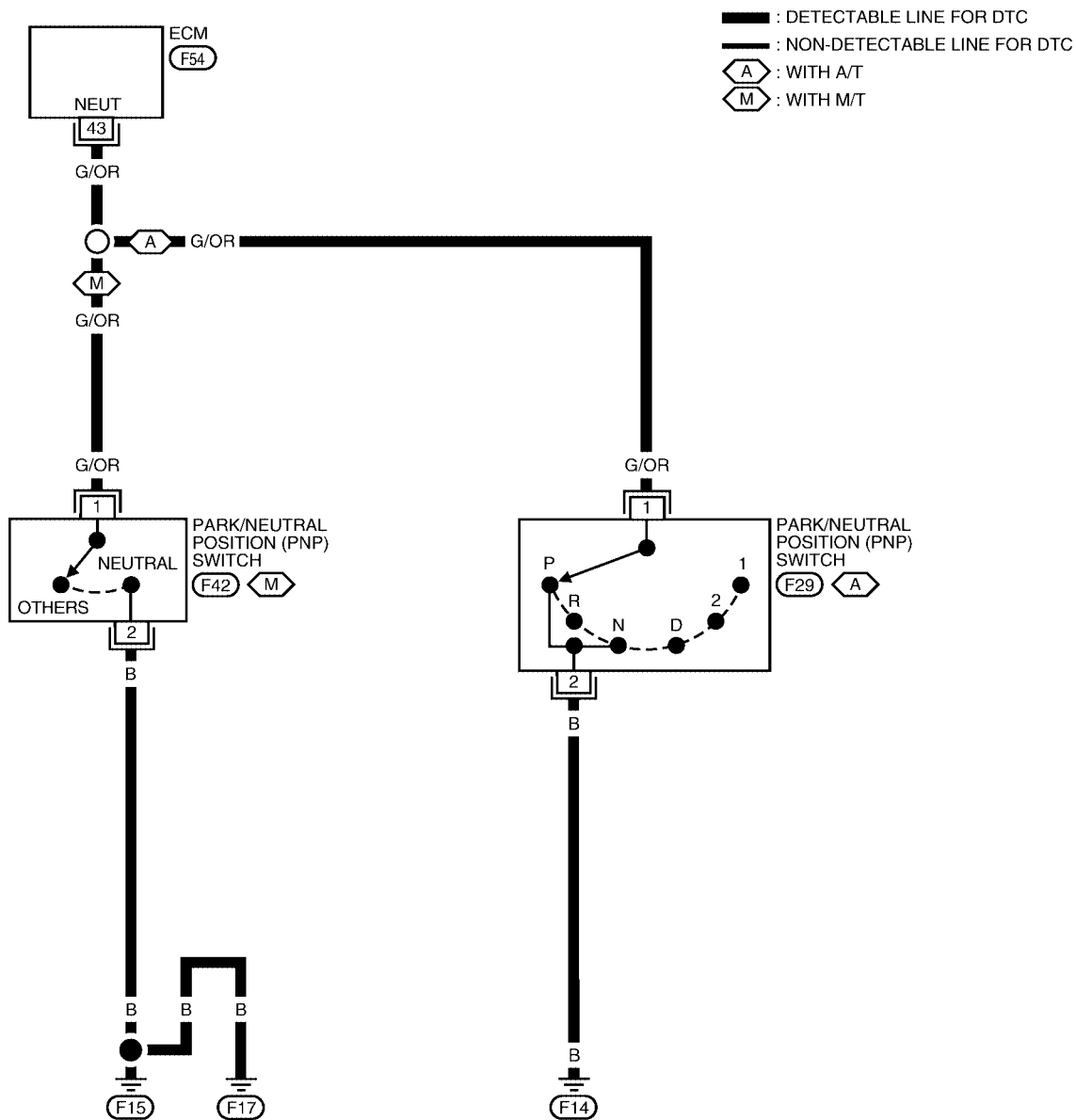
# DTC P1706 PNP SWITCH

[QR25DE]

UBS002LJ

## Wiring Diagram

### EC-PNP/SW-01



BBWA0241E



# DTC P1706 PNP SWITCH

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

## CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
43	G/OR	PNP switch	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"><li>Shift lever position is "P" or "N" (A/T models), "Neutral" (M/T models).</li></ul>	Approximately 0V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"><li>Except the above gear position</li></ul>	<b>A/T models</b> BATTERY VOLTAGE (11 - 14V) <b>M/T models</b> Approximately 5V

## Diagnostic Procedure

UBS002LK

### 1. CHECK GROUND CIRCUIT

- Turn ignition switch "OFF".
- Disconnect PNP switch harness connector.
- Check harness continuity between PNP switch terminal 2 and body ground. Refer to Wiring Diagram.

**Continuity should exist.**

- Also check harness for short to power.

OK or NG

OK >> GO TO 2.

NG >> Repair open circuit or short to power in harness or connectors.

### 2. CHECK INPUT SIGNAL CIRCUIT

- Disconnect ECM harness connector.
- Check harness continuity between ECM terminal 43 and PNP switch terminal 1. Refer to Wiring Diagram.

**Continuity should exist.**

- Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to power in harness or connectors.

### 3. CHECK PNP SWITCH

Refer to [AT-491, "DTC P0705 PARK/NEUTRAL POSITION SWITCH"](#) (A/T models), [MT-139, "POSITION SWITCH"](#) (6M/T models) or [MT-78, "POSITION SWITCH"](#) (5M/T models).

OK or NG

OK >> GO TO 4.

NG >> Replace PNP switch.

### 4. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> INSPECTION END

**DTC P1805 BRAKE SWITCH**

PF2:25320

**Description**

UBS002LL

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driving.

**CONSULT-II Reference Value in Data Monitor Mode**

UBS002LM

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

**On Board Diagnosis Logic**

UBS002LN

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805 1805	Brake switch	A brake switch signal is not sent to ECM for an extremely long time while the vehicle is driving.	<ul style="list-style-type: none"> <li>● Harness or connectors (Stop lamp switch circuit is open or shorted.)</li> <li>● Stop lamp switch</li> </ul>

**FAIL-SAFE MODE**

When the malfunction is detected, the ECM enters fail-safe mode.

Engine operating condition in fail-safe mode	
ECM controls the electric throttle control actuator by regulating the throttle opening to a small range.	
	Driving condition
When engine is idling	Normal
When accelerating	Poor acceleration

**DTC Confirmation Procedure**

UBS002LO

**WITH CONSULT-II**

1. Turn ignition switch "ON".
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-II.
4. Select "DATA MONITOR" mode with CONSULT-II.
5. If 1st trip DTC is detected, go to [EC-1748, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

**WITH GST**

Follow the procedure "WITH CONSULT-II" above.

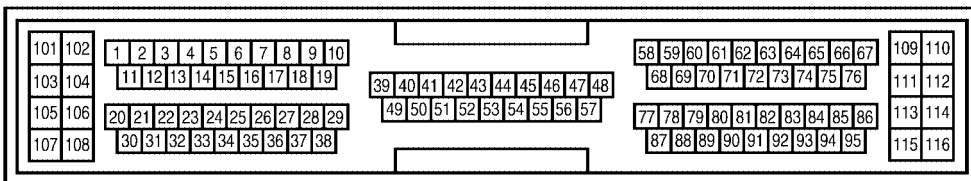
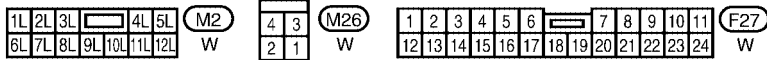
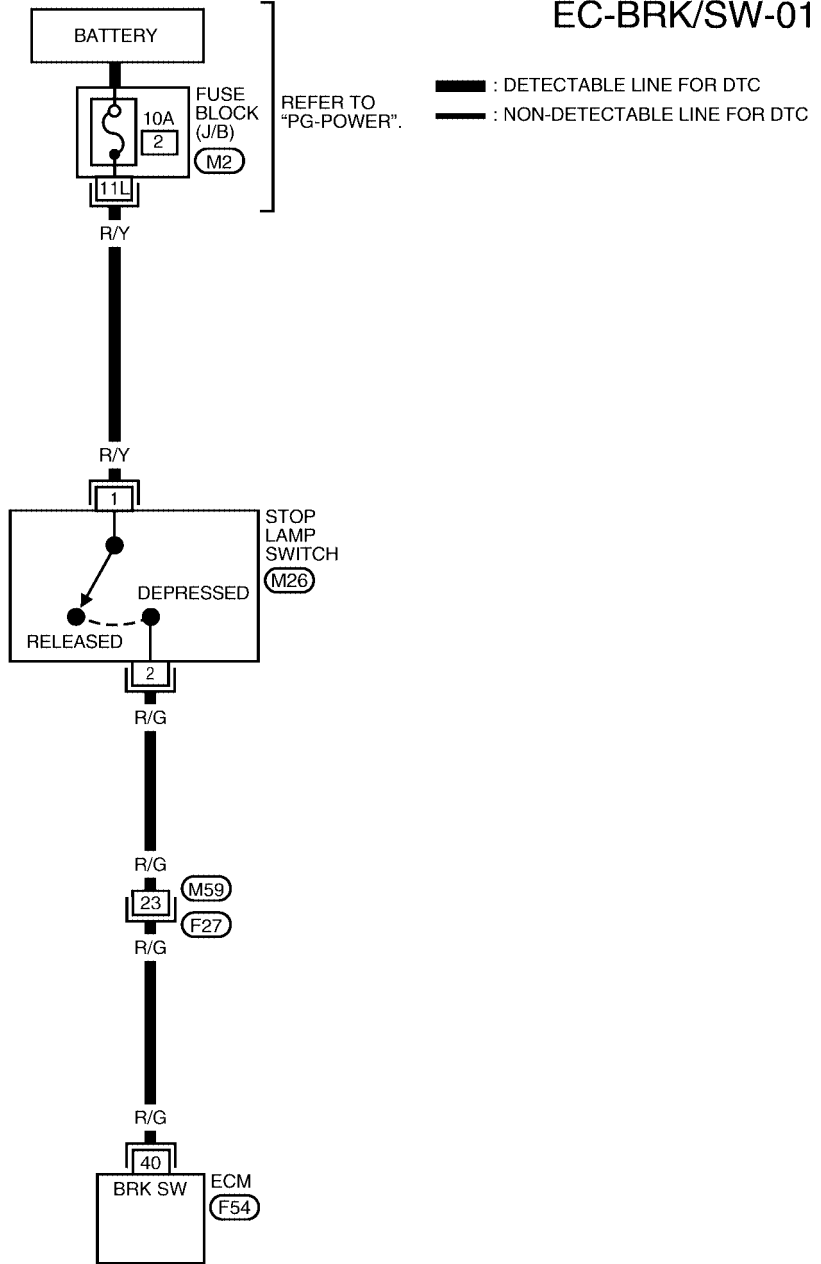
# DTC P1805 BRAKE SWITCH

[QR25DE]

UBS002LP

## Wiring Diagram

EC-BRK/SW-01



BBWA0422E

# DTC P1805 BRAKE SWITCH

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
40	R/G	Stop lamp switch	[Engine is running] ● Brake pedal fully released	Approximately 0V
			[Engine is running] ● Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS002LQ

### 1. CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch "OFF".
2. Check the stop lamp when depressing and releasing the brake pedal.

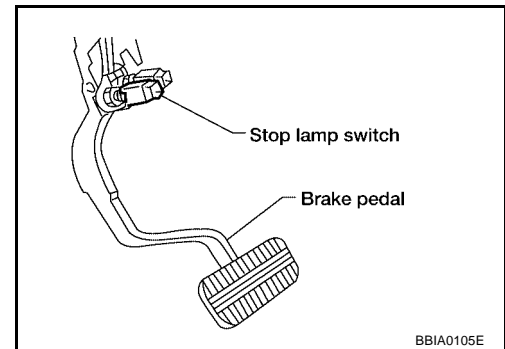
Brake pedal	Stop lamp
Fully released	Not illuminated
Depressed	Illuminated

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 2.

### 2. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch harness connector.



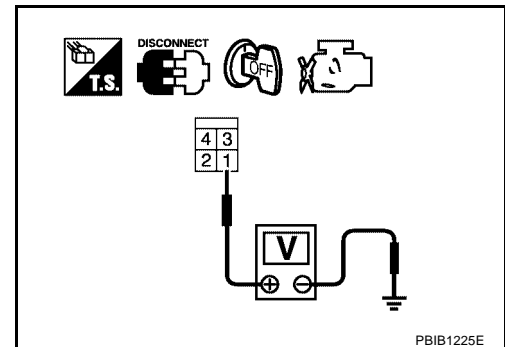
BBA0105E

2. Check voltage between stop lamp switch terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



PBIB1225E

### 3. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- Fuse block (J/B) connector M2
- Harness for open and short between stop lamp switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

### 4. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

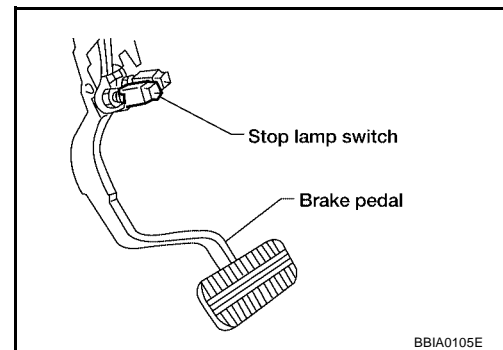
1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Disconnect stop lamp switch harness connector.
4. Check harness continuity between ECM terminal 40 and stop lamp switch terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
NG >> GO TO 5.



### 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

### 6. CHECK STOP LAMP SWITCH

Refer to [EC-1750, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.  
NG >> Replace stop lamp switch.

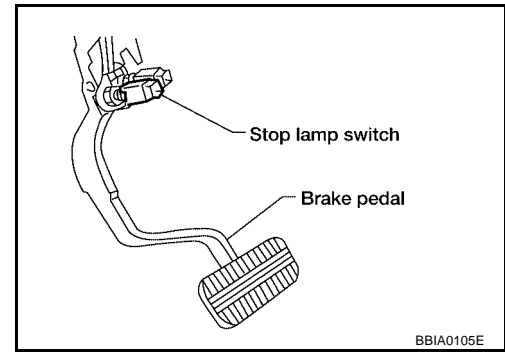
### 7. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

## Component Inspection STOP LAMP SWITCH

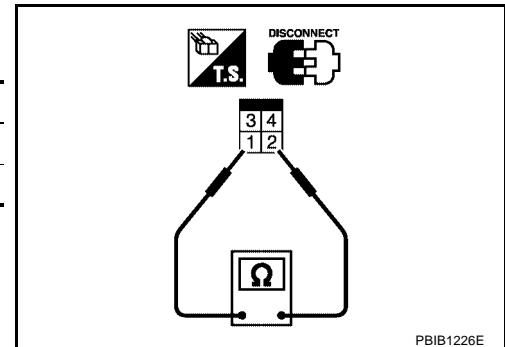
1. Disconnect stop lamp switch harness connector.



2. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.

Conditions	Continuity
Brake pedal fully released	Should not exist.
Brake pedal depressed	Should exist.

If NG, adjust brake pedal installation, refer to [BR-11, "BRAKE PEDAL AND BRACKET"](#), and perform step 2 again.



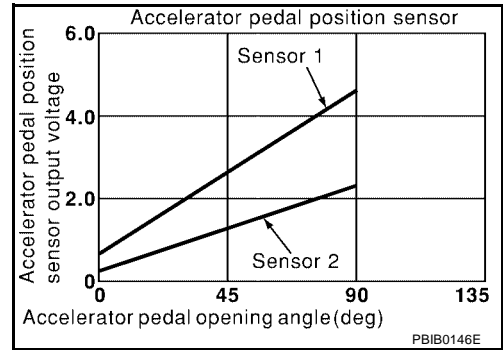
**DTC P2122, P2123 APP SENSOR**

**Component Description**

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.

Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



**CONSULT-II Reference Value in Data Monitor Mode**

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 4.2V
CLSD THL POS	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

**On Board Diagnosis Logic**

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2122 2122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The APP sensor 1 circuit is open or shorted.)</li> <li>● Accelerator pedal position sensor (Accelerator pedal position sensor 1)</li> </ul>
P2123 2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

**FAIL-SAFE MODE**

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

**DTC Confirmation Procedure**

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON".

# DTC P2122, P2123 APP SENSOR

[QR25DE]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-1754, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



## WITH GST

Follow the procedure "WITH CONSULT-II" above.



# DTC P2122, P2123 APP SENSOR

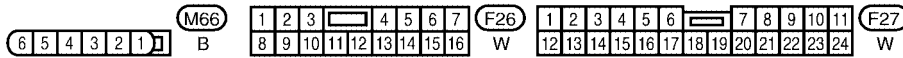
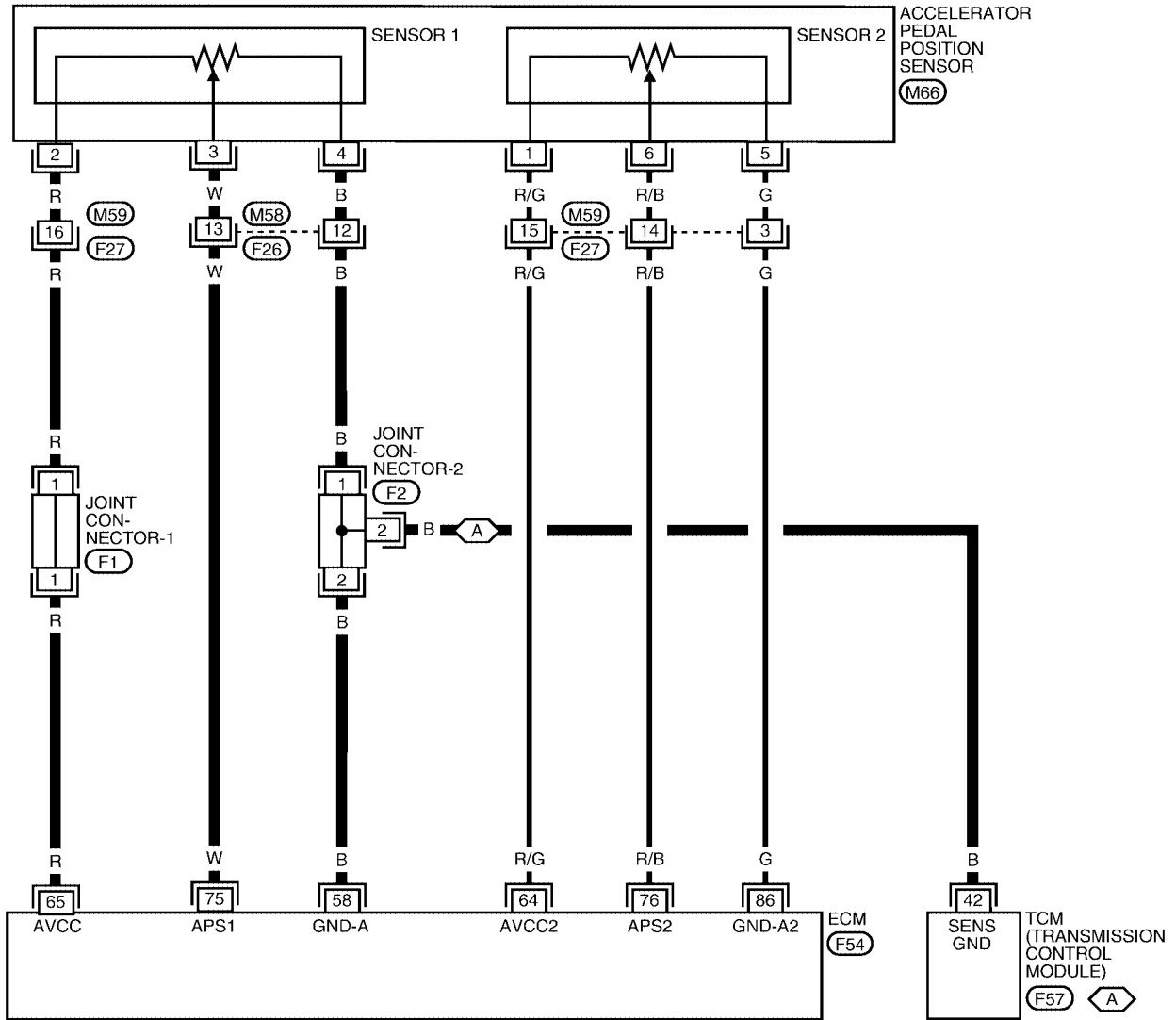
[QR25DE]

## Wiring Diagram

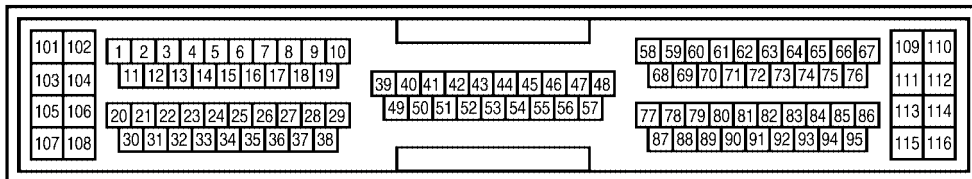
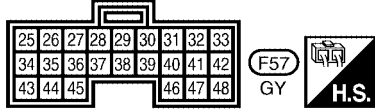
UBS006KC

EC-APPS1-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- ⬡** : WITH A/T



REFER TO THE FOLLOWING.  
 (F1), (F2) - JOINT CONNECTOR



BBWA0252E

# DTC P2122, P2123 APP SENSOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 0V
64	R/G	Accelerator pedal position sensor 2 power supply	<b>[Ignition switch "ON"]</b>	Approximately 2.5V
65	R	Sensor's power supply	<b>[Ignition switch "ON"]</b>	Approximately 5V
75	W	Accelerator pedal position sensor 1	<b>[Ignition switch "ON"]</b> ● Engine speed ● Accelerator pedal fully released	0.41 - 0.71V
			<b>[Ignition switch "ON"]</b> ● Engine speed ● Accelerator pedal fully depressed	More than 4.2V
76	R/B	Accelerator pedal position sensor 2	<b>[Ignition switch "ON"]</b> ● Engine speed ● Accelerator pedal fully released	0.21 - 0.36V
			<b>[Ignition switch "ON"]</b> ● Engine speed ● Accelerator pedal fully depressed	More than 2.1V
86	G	Accelerator pedal position sensor 2 ground	<b>[Ignition switch "ON"]</b>	Approximately 0V

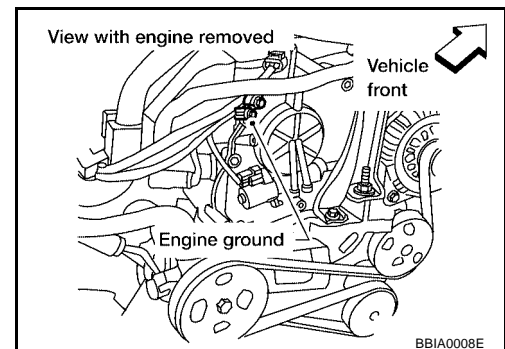
## Diagnostic Procedure

UBS006KD

### 1. RETIGHTEN GROUND SCREWS

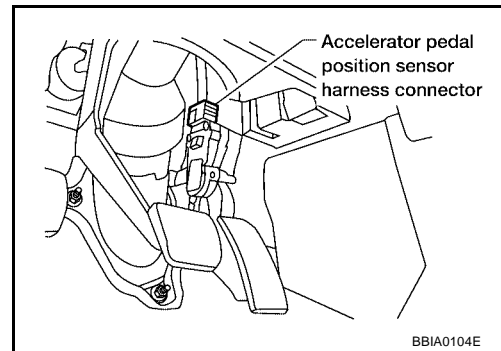
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

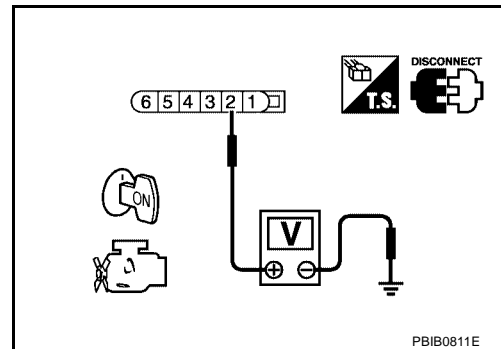


3. Check voltage between APP sensor terminal 2 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 4.  
NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M59, F27
- Joint connector-1
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between APP sensor terminal 4 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
NG >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M58, F26
- Joint connector-2
- Harness for open or short between ECM and accelerator pedal position sensor
- Harness for open or short between TCM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 75 and APP sensor terminal 3.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

**7. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M58, F26
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK APP SENSOR**

Refer to [EC-1756, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace accelerator pedal assembly.

**9. CHECK INTERMITTENT INCIDENT**

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

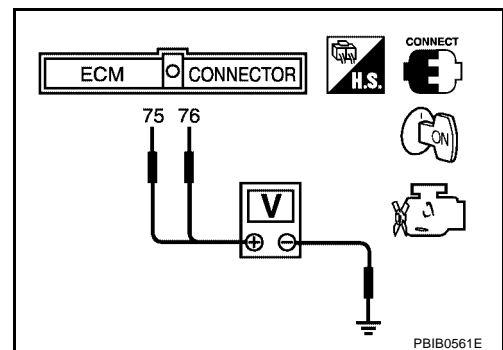
>> INSPECTION END

**Component Inspection  
ACCELERATOR PEDAL POSITION SENSOR**

UBS006KE

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 75 (APP sensor 1 signal), 76 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
75 (Accelerator pedal position sensor 1)	Fully released	0.41 - 0.71V
	Fully depressed	More than 4.2V
76 (Accelerator pedal position sensor 2)	Fully released	0.21 - 0.36V
	Fully depressed	More than 2.1V



4. If NG, replace accelerator pedal assembly and go to next step.
5. Perform [EC-1255, "Accelerator Pedal Released Position Learning"](#) .
6. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
7. Perform [EC-1255, "Idle Air Volume Learning"](#) .

**Remove and Installation  
ACCELERATOR PEDAL**

UBS006KF

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

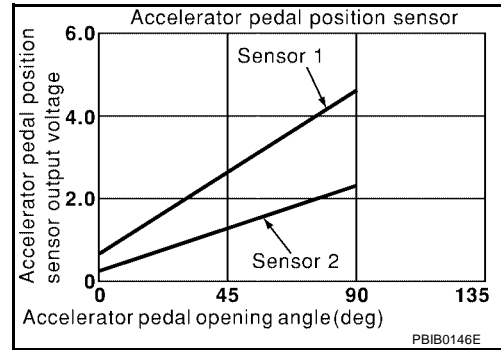
DTC P2127, P2128 APP SENSOR

Component Description

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.

Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN2★	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 4.2V
CLSD THL POS	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

★: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2127 2127	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	<ul style="list-style-type: none"> <li>● Harness or connectors (The APP sensor 2 circuit is open or shorted.)</li> <li>● Accelerator pedal position sensor (Accelerator pedal position sensor 2)</li> </ul>
P2128 2128	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch "ON".

# DTC P2127, P2128 APP SENSOR

[QR25DE]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-1760, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



## WITH GST

Follow the procedure "WITH CONSULT-II" above.

# DTC P2127, P2128 APP SENSOR

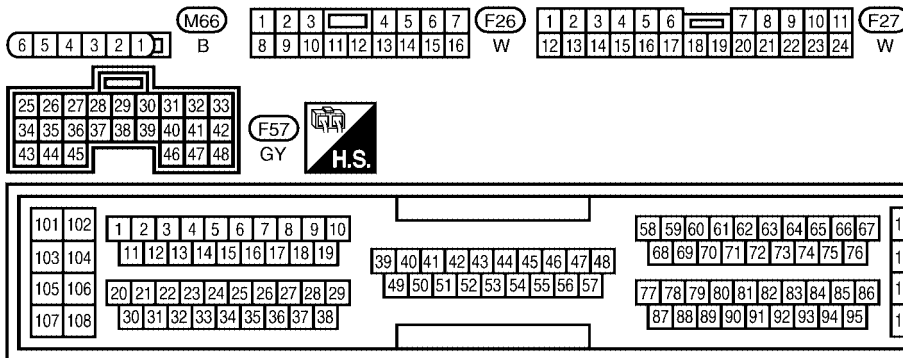
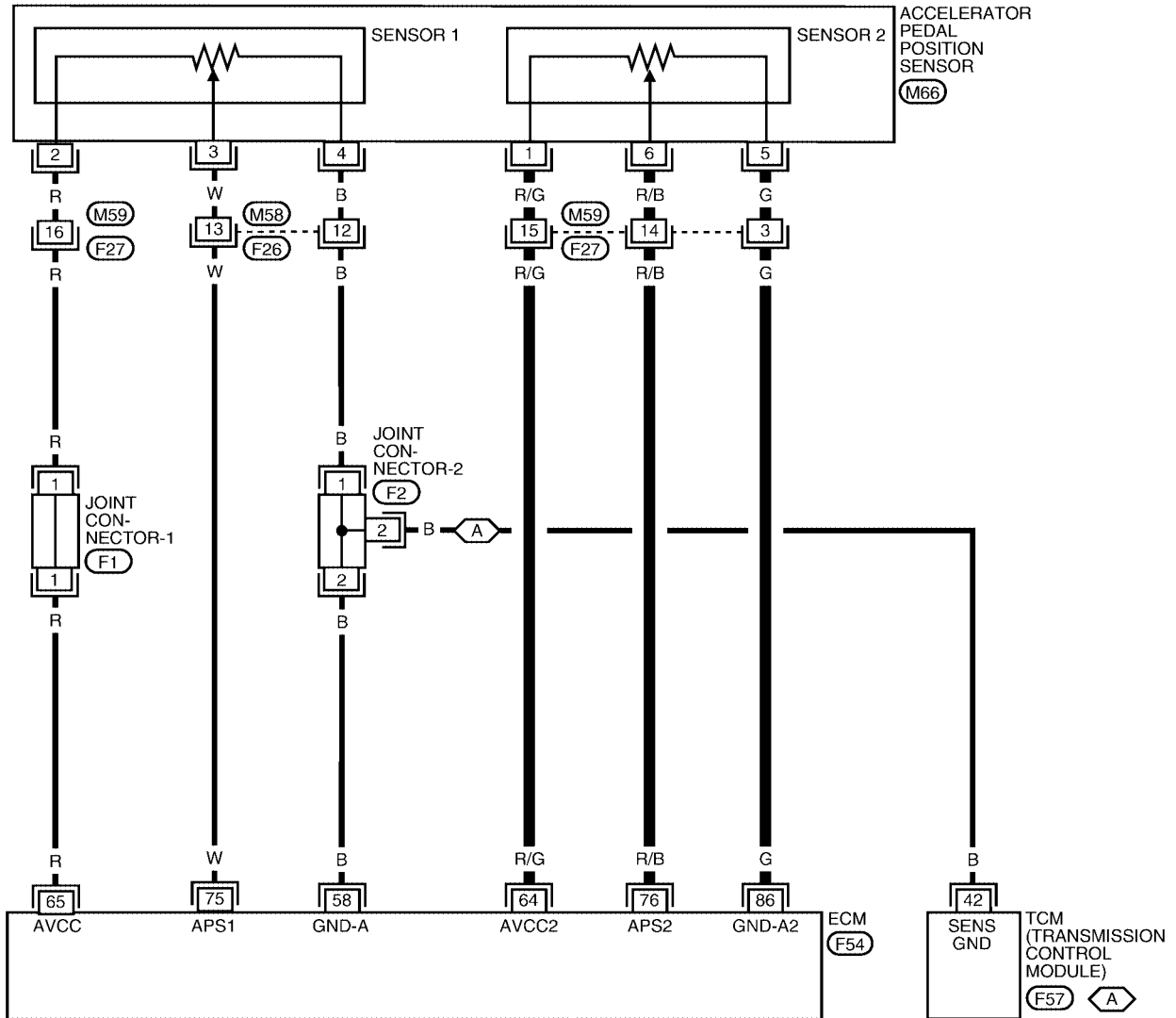
[QR25DE]

UBS006KK

## Wiring Diagram

EC-APPS2-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- ⬡** : WITH A/T



REFER TO THE FOLLOWING.  
**(F1)**, **(F2)** - JOINT CONNECTOR

BBWA0253E

# DTC P2127, P2128 APP SENSOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 0V
64	R/G	Accelerator pedal position sensor 2 power supply	<b>[Ignition switch "ON"]</b>	Approximately 2.5V
65	R	Sensor's power supply	<b>[Ignition switch "ON"]</b>	Approximately 5V
75	W	Accelerator pedal position sensor 1	<b>[Ignition switch "ON"]</b> ● Engine speed ● Accelerator pedal fully released	0.41 - 0.71V
			<b>[Ignition switch "ON"]</b> ● Engine speed ● Accelerator pedal fully depressed	More than 4.2V
76	R/B	Accelerator pedal position sensor 2	<b>[Ignition switch "ON"]</b> ● Engine speed ● Accelerator pedal fully released	0.21 - 0.36V
			<b>[Ignition switch "ON"]</b> ● Engine speed ● Accelerator pedal fully depressed	More than 2.1V
86	G	Accelerator pedal position sensor 2 ground	<b>[Ignition switch "ON"]</b>	Approximately 0V

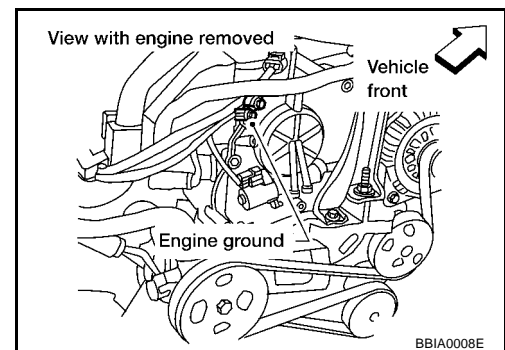
## Diagnostic Procedure

UBS006KL

### 1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.

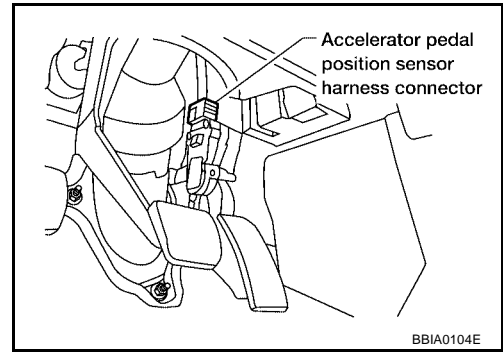


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## 2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

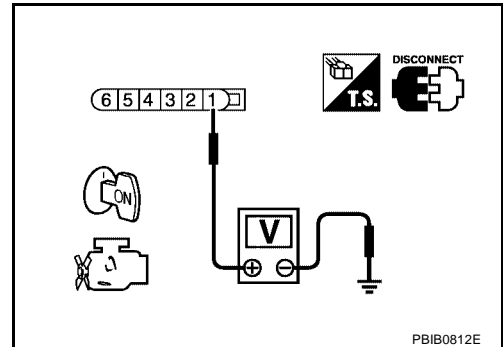


3. Check voltage between APP sensor terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 2.5V**

OK or NG

- OK >> GO TO 4.  
 NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between APP sensor terminal 5 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
 NG >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 76 and APP sensor terminal 6.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

**7. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK APP SENSOR**

Refer to [EC-1762, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace accelerator pedal assembly.

**9. CHECK INTERMITTENT INCIDENT**

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

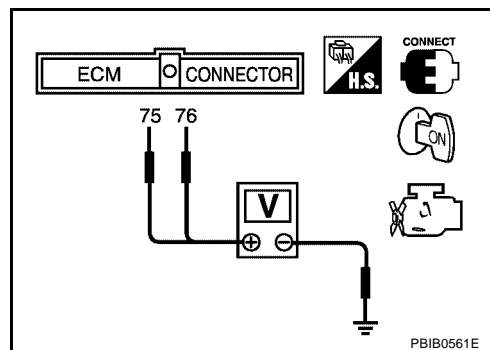
>> INSPECTION END

**Component Inspection  
ACCELERATOR PEDAL POSITION SENSOR**

UBS006KM

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".
3. Check voltage between ECM terminals 75 (APP sensor 1 signal), 76 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
75 (Accelerator pedal position sensor 1)	Fully released	0.41 - 0.71V
	Fully depressed	More than 4.2V
76 (Accelerator pedal position sensor 2)	Fully released	0.21 - 0.36V
	Fully depressed	More than 2.1V



PBIB0561E

4. If NG, replace accelerator pedal assembly and go to next step.
5. Perform [EC-1255, "Accelerator Pedal Released Position Learning"](#) .
6. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
7. Perform [EC-1255, "Idle Air Volume Learning"](#) .

**Remove and Installation  
ACCELERATOR PEDAL**

UBS006KN

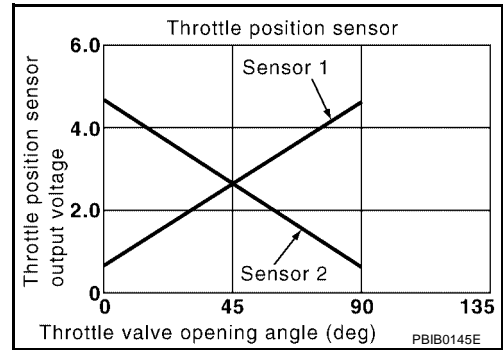
Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

**DTC P2135 TP SENSOR**

**Component Description**

Electric Throttle Control Actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



**CONSULT-II Reference Value in Data Monitor Mode**

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1	<ul style="list-style-type: none"> <li>Ignition switch: ON (Engine stopped)</li> <li>Shift lever: D (A/T model) 1st (M/T model)</li> </ul>	Accelerator pedal: Fully released	More than 0.36V
THRTL SEN2★		Accelerator pedal: Fully depressed	Less than 4.75V

★: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

**On Board Diagnosis Logic**

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135 2135	Throttle position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	<ul style="list-style-type: none"> <li>Harness or connector (The TP sensor 1 and 2 circuit is open or shorted.)</li> <li>Electric throttle control actuator (TP sensor 1 and 2)</li> </ul>

**FAIL-SAFE MODE**

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.

So, the acceleration will be poor.

**DTC Confirmation Procedure**

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON".

# DTC P2135 TP SENSOR

[QR25DE]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-1766, "Diagnostic Procedure"](#).

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



## WITH GST

Follow the procedure "WITH CONSULT-II" above.

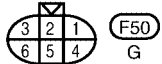
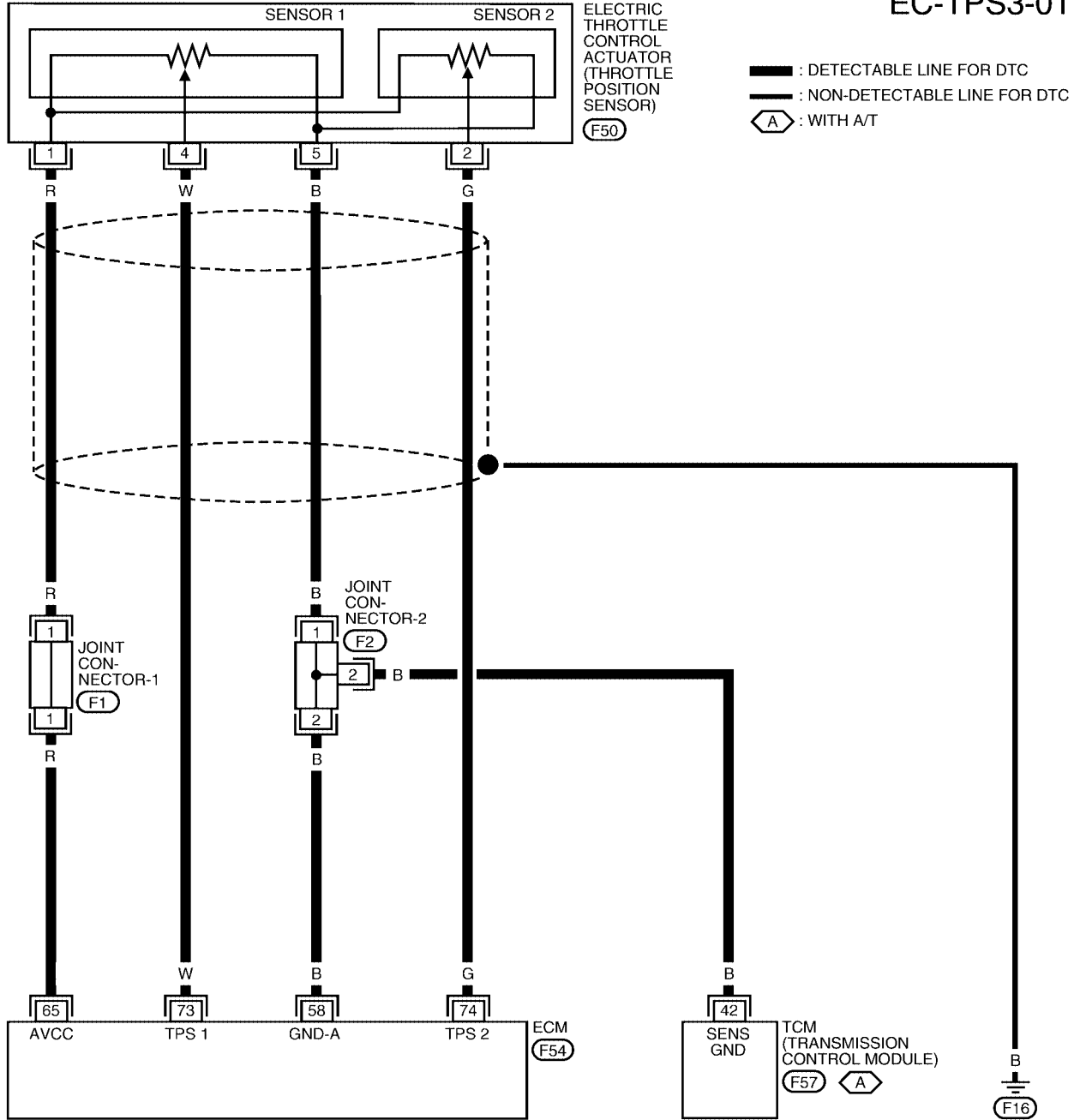
# DTC P2135 TP SENSOR

[QR25DE]

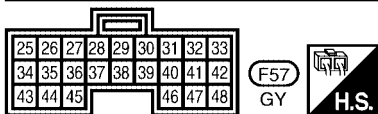
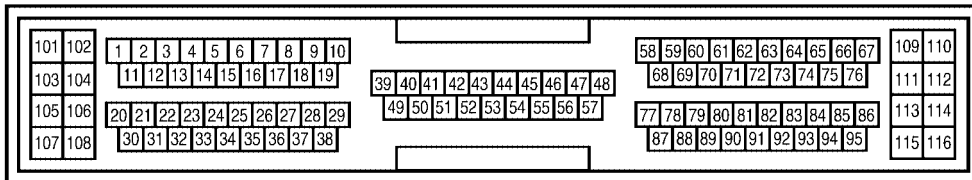
UBS006KS

## Wiring Diagram

EC-TPS3-01



REFER TO THE FOLLOWING.  
(F1), (F2) - JOINT CONNECTOR



BBWA0238E

# DTC P2135 TP SENSOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	<b>[Engine is running]</b> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	Approximately 0V
65	R	Sensor's power supply	<b>[Ignition switch "ON"]</b>	Approximately 5V
73	W	Throttle position sensor 1	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine speed</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully released</li> </ul>	More than 0.36V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine speed</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully depressed</li> </ul>	Less than 4.75V
74	G	Throttle position sensor 2	<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine speed</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully released</li> </ul>	Less than 4.75V
			<b>[Ignition switch "ON"]</b> <ul style="list-style-type: none"> <li>● Engine speed</li> <li>● Shift lever position is "D" (A/T model)</li> <li>● Shift lever position is "1st" (M/T model)</li> <li>● Accelerator pedal fully depressed</li> </ul>	More than 0.36V

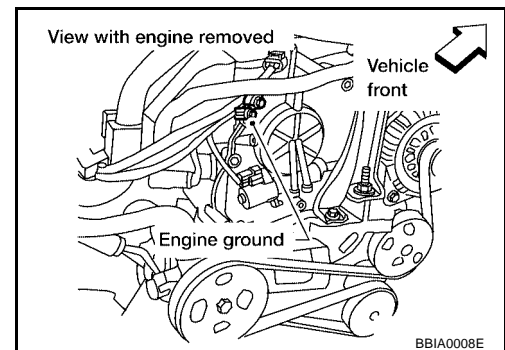
## Diagnostic Procedure

UBS006KT

### 1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

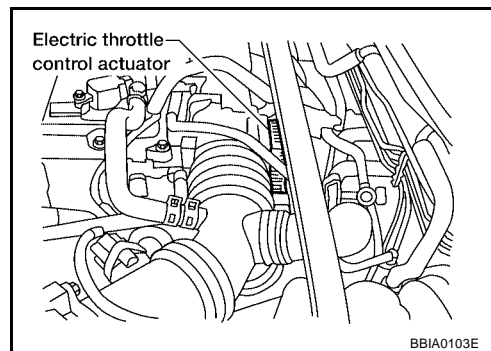
>> GO TO 2.



B8IA0008E

## 2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch "ON".

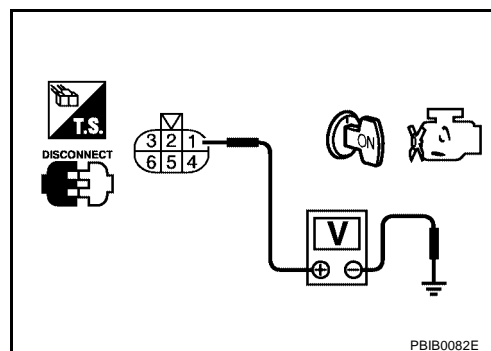


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 4.  
NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-1
- Harness for open or short between electric throttle control actuator and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between electric throttle control actuator terminal 5 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
NG >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-2
- Harness for open or short between electric throttle control actuator and ECM
- Harness for open or short between electric throttle control actuator and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 73 and electric throttle control actuator terminal 4, ECM terminal 74 and electric throttle control actuator terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

**7. CHECK THROTTLE POSITION SENSOR**

Refer to [EC-1768, "Component Inspection"](#) .

OK or NG

OK >> GO TO 9.

NG >> GO TO 8.

**8. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR**

1. Replace the electric throttle control actuator.
2. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
3. Perform [EC-1255, "Idle Air Volume Learning"](#) .

>> INSPECTION END

**9. CHECK INTERMITTENT INCIDENT**

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

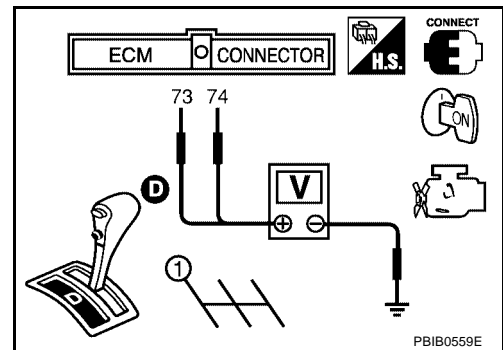
**Component Inspection  
THROTTLE POSITION SENSOR**

UBS006KU

1. Reconnect all harness connectors disconnected.
2. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
3. Turn ignition switch "ON".
4. Set selector lever to "D" position (A/T models) or "1st" position (M/T models).
5. Check voltage between ECM terminals 73 (TP sensor 1), 74 (TP sensor 2) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
73 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
74 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .
8. Perform [EC-1255, "Idle Air Volume Learning"](#) .





**Remove and Installation**  
**ELECTRIC THROTTLE CONTROL ACTUATOR**

Refer to [EM-105, "INTAKE MANIFOLD"](#) .

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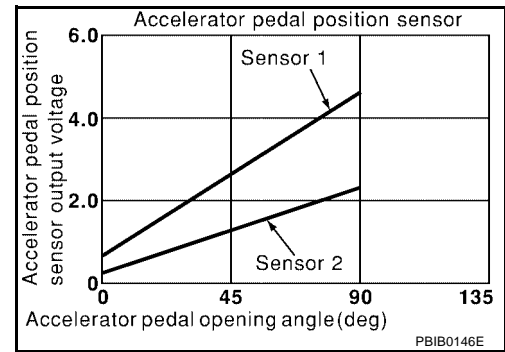
**DTC P2138 APP SENSOR**

**Component Description**

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.

Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



**CONSULT-II Reference Value in Data Monitor Mode**

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1 ACCEL SEN2★	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	0.41 - 0.71V
		Accelerator pedal: Fully depressed	More than 4.2V
CLSD THL POS	● Ignition switch: ON (engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

★: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

**On Board Diagnosis Logic**

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2138 2138	Accelerator pedal position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	<ul style="list-style-type: none"> <li>● Harness or connector (The APP sensor 1 and 2 circuit is open or shorted.)</li> <li>● Accelerator pedal position sensor 1 and 2</li> </ul>

**FAIL-SAFE MODE**

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode

The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.

The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

**DTC Confirmation Procedure**

**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

**TESTING CONDITION:**

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

**WITH CONSULT-II**

1. Turn ignition switch "ON".

# DTC P2138 APP SENSOR

[QR25DE]

2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to [EC-1773, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

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## WITH GST

Follow the procedure "WITH CONSULT-II" above.

# DTC P2138 APP SENSOR

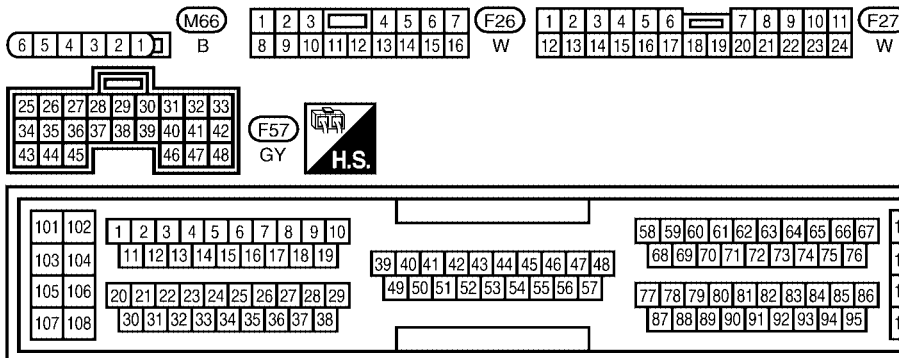
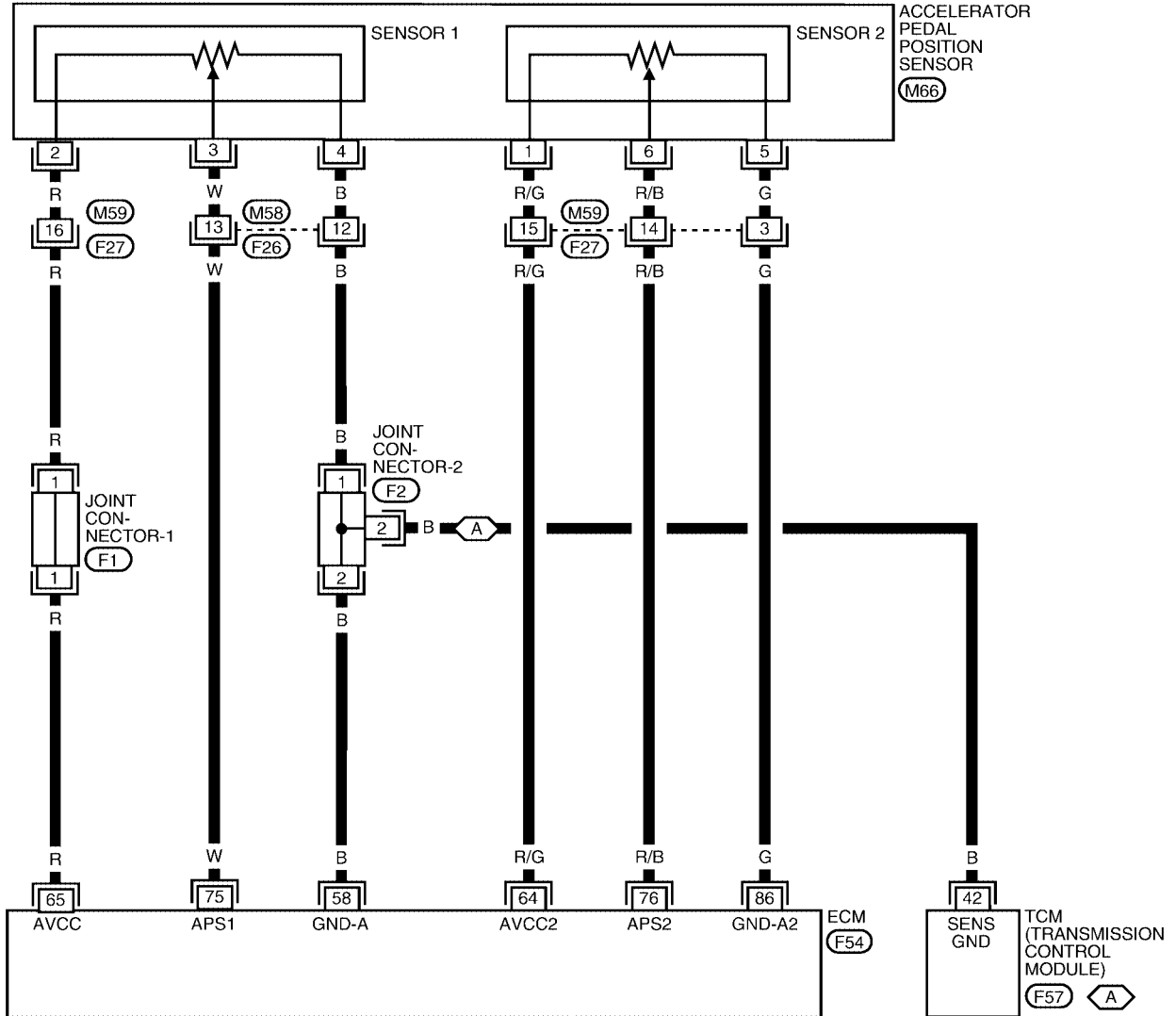
[QR25DE]

UBS006L0

## Wiring Diagram

EC-APPS3-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- A** : WITH A/T



REFER TO THE FOLLOWING.  
**(F1)** , **(F2)** - JOINT CONNECTOR

BBWA0254E

# DTC P2138 APP SENSOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	<b>[Engine is running]</b> ● Warm-up condition ● Idle speed	Approximately 0V
64	R/G	Accelerator pedal position sensor 2 power supply	<b>[Ignition switch "ON"]</b>	Approximately 2.5V
65	R	Sensor's power supply	<b>[Ignition switch "ON"]</b>	Approximately 5V
75	W	Accelerator pedal position sensor 1	<b>[Ignition switch "ON"]</b> ● Engine speed ● Accelerator pedal fully released	0.41 - 0.71V
			<b>[Ignition switch "ON"]</b> ● Engine speed ● Accelerator pedal fully depressed	More than 4.2V
76	R/B	Accelerator pedal position sensor 2	<b>[Ignition switch "ON"]</b> ● Engine speed ● Accelerator pedal fully released	0.21 - 0.36V
			<b>[Ignition switch "ON"]</b> ● Engine speed ● Accelerator pedal fully depressed	More than 2.1V
86	G	Accelerator pedal position sensor 2 ground	<b>[Ignition switch "ON"]</b>	Approximately 0V

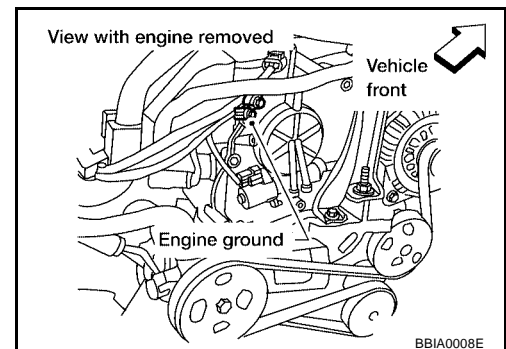
## Diagnostic Procedure

UBS006L1

### 1. RETIGHTEN GROUND SCREWS

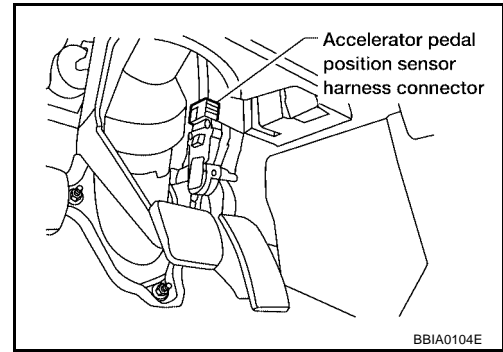
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

>> GO TO 2.



## 2. CHECK APP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch "ON".

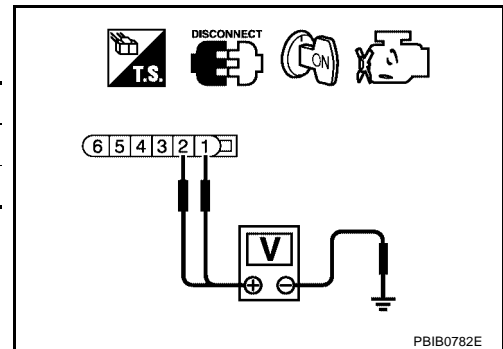


3. Check voltage between APP sensor terminals 1, 2 and ground with CONSULT-II or tester.

APP sensor terminal	Voltage (V)
1	Approximately 2.5
2	Approximately 5

OK or NG

- OK >> GO TO 4.  
 NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E59, F27
- Joint connector-1
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 4. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between APP sensor terminal 4, 5 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
 NG >> GO TO 5.

## 5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M58, F26
- Harness connectors M59, F27
- Joint connector-2
- Harness for open or short between ECM and accelerator pedal position sensor
- Harness for open or short between TCM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 6. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 75 and APP sensor terminal 3, ECM terminal 76 and APP sensor terminal 6.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

## 7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M58, F26
- Harness connectors M59, F27
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 8. CHECK APP SENSOR

Refer to [EC-1775, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace accelerator pedal assembly.

## 9. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

### Component Inspection ACCELERATOR PEDAL POSITION SENSOR

UBS006L2

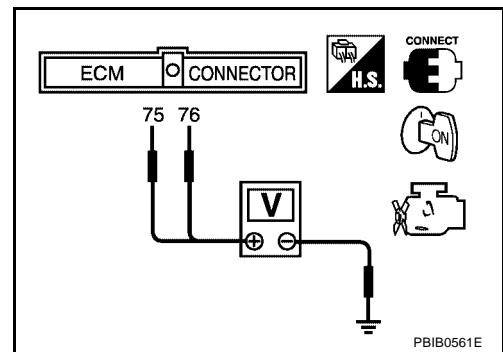
1. Reconnect all harness connectors disconnected.
2. Turn ignition switch "ON".

# DTC P2138 APP SENSOR

[QR25DE]

3. Check voltage between ECM terminals 75 (APP sensor 1 signal), 76 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
75 (Accelerator pedal position sensor 1)	Fully released	0.41 - 0.71V
	Fully depressed	More than 4.2V
76 (Accelerator pedal position sensor 2)	Fully released	0.21 - 0.36V
	Fully depressed	More than 2.1V



4. If NG, replace accelerator pedal assembly and go to next step.  
5. Perform [EC-1255, "Accelerator Pedal Released Position Learning"](#) .  
6. Perform [EC-1255, "Throttle Valve Closed Position Learning"](#) .  
7. Perform [EC-1255, "Idle Air Volume Learning"](#) .

## Remove and Installation ACCELERATOR PEDAL

UBS006L3

Refer to [ACC-2, "ACCELERATOR CONTROL SYSTEM"](#) .

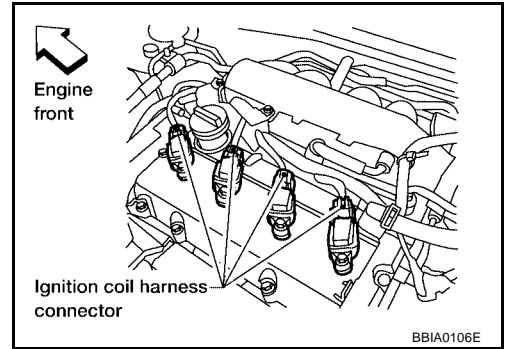


## IGNITION SIGNAL

### Component Description

#### IGNITION COIL & POWER TRANSISTOR

The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns on and off the ignition coil primary circuit. This on-off operation induces the proper high voltage in the coil secondary circuit.



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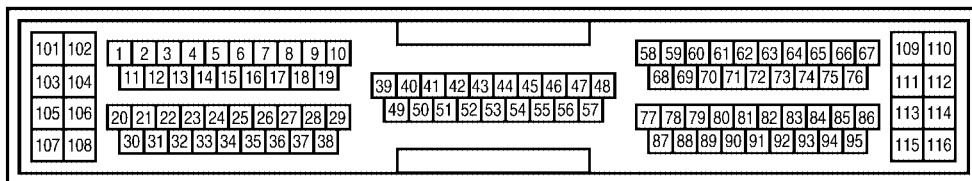
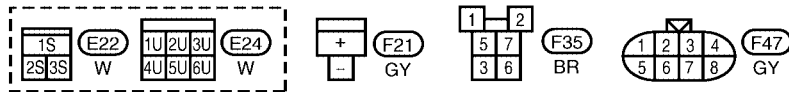
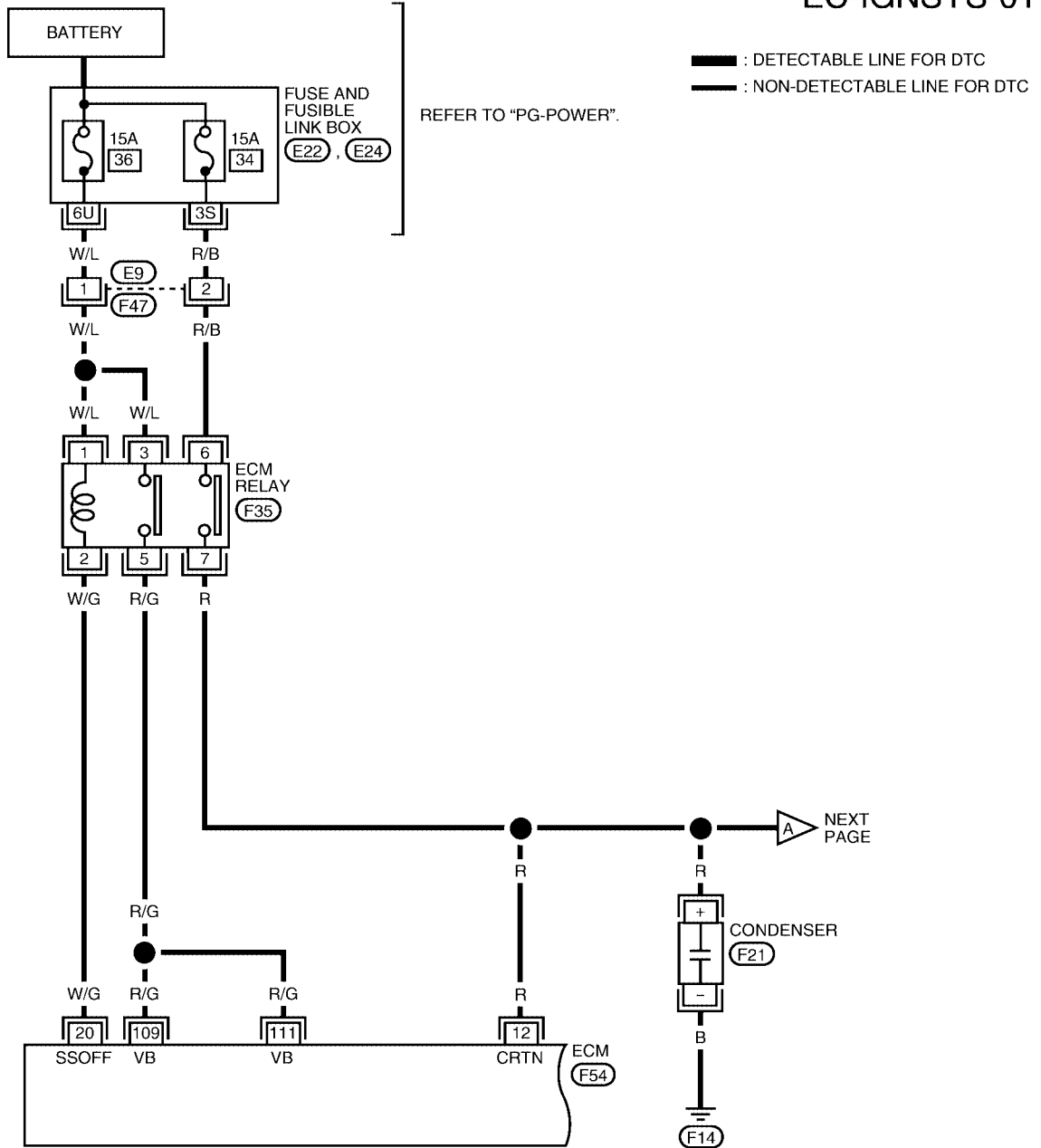
# IGNITION SIGNAL

[QR25DE]

UBS002LT

## Wiring Diagram

### EC-IGNSYS-01



BBWA0233E

# IGNITION SIGNAL

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

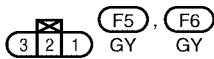
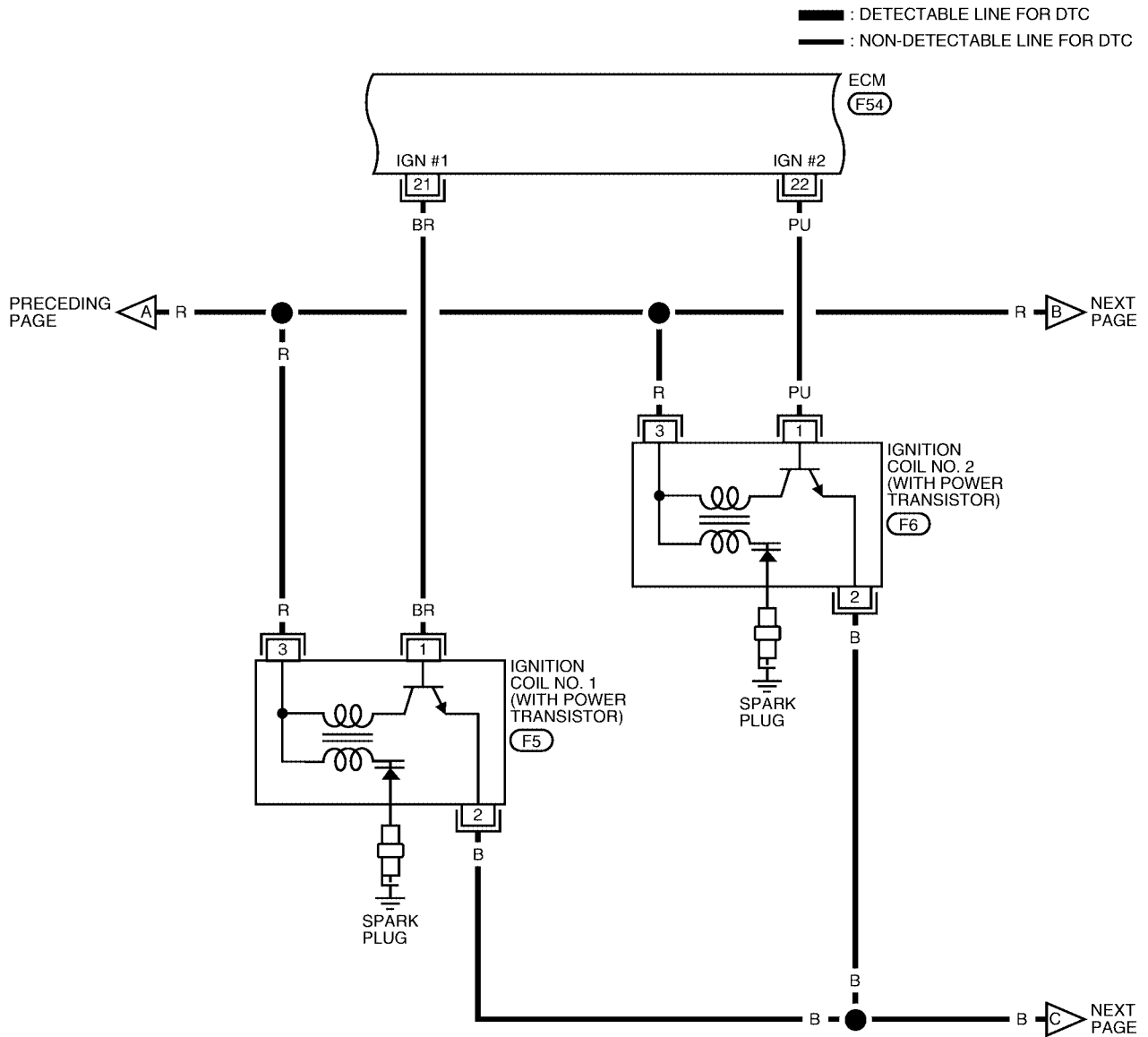
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
12	R	Counter current return	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
20	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For 5 seconds after turning ignition switch "OFF"	0 - 1.0V
			[Ignition switch "OFF"] ● 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
109 111	R/G R/G	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

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# IGNITION SIGNAL

[QR25DE]

## EC-IGNSYS-02



101	102	1	2	3	4	5	6	7	8	9	10			58	59	60	61	62	63	64	65	66	67	109	110
103	104	11	12	13	14	15	16	17	18	19				68	69	70	71	72	73	74	75	76		111	112
105	106	20	21	22	23	24	25	26	27	28	29	39	40	41	42	43	44	45	46	47	48			113	114
107	108	30	31	32	33	34	35	36	37	38				77	78	79	80	81	82	83	84	85	86	115	116
														87	88	89	90	91	92	93	94	95			

F54  
GY



BBWA0234E

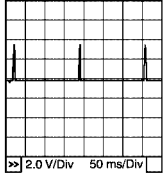
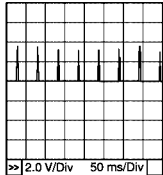
# IGNITION SIGNAL

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

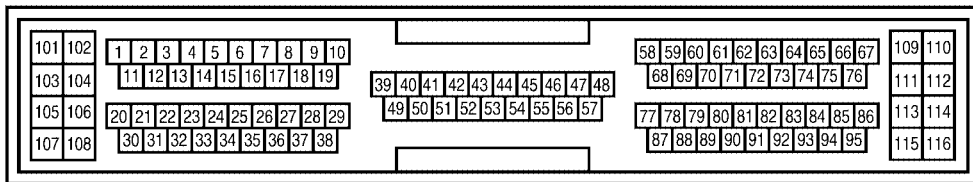
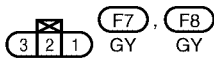
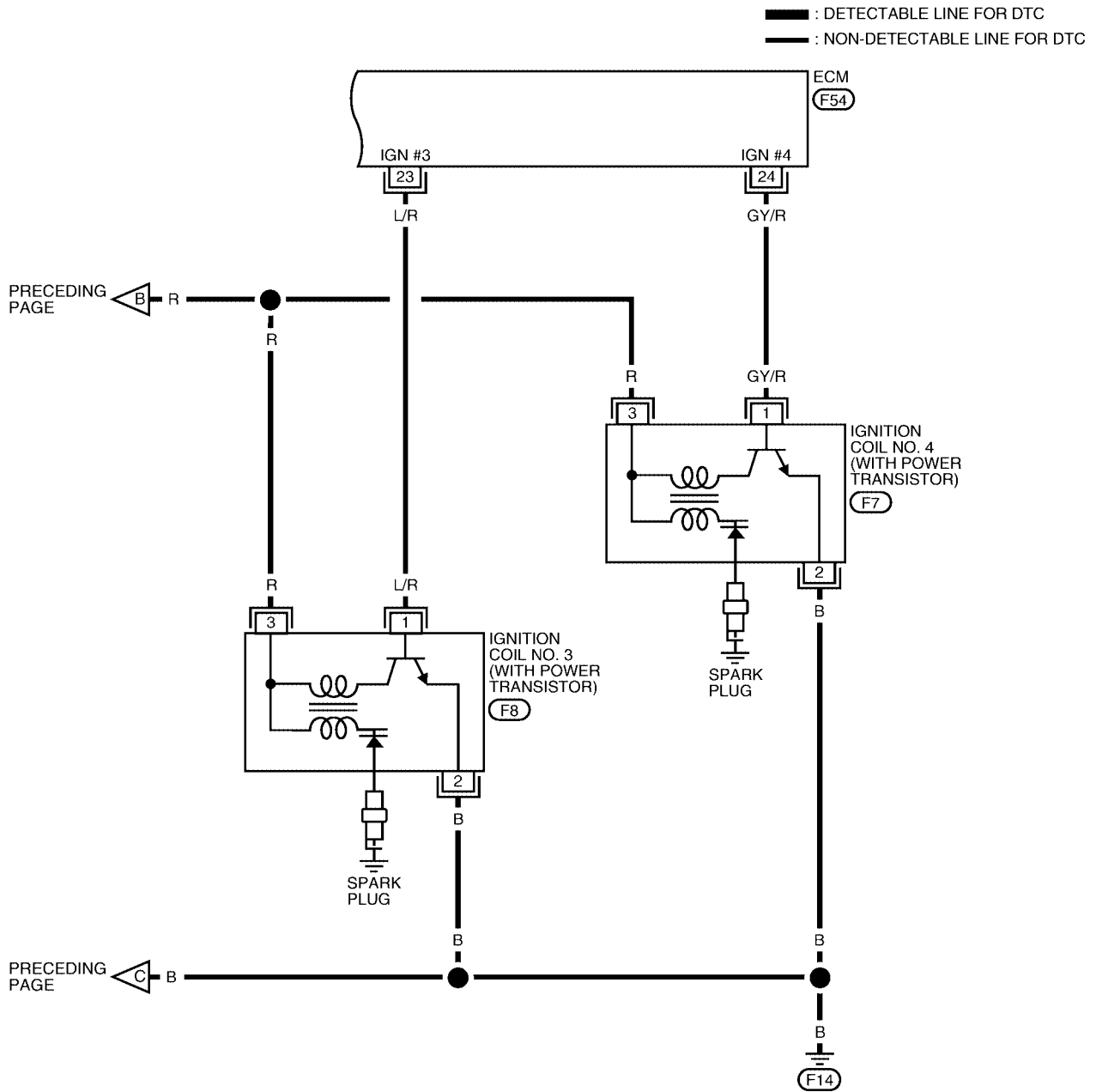
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
21 22	BR PU	Ignition signal No. 1 Ignition signal No. 2	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>0 - 0.1V★</p>  <p>PBIB0521E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm.</li> </ul>	<p>0 - 0.2V★</p>  <p>PBIB0522E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

# IGNITION SIGNAL

[QR25DE]

## EC-IGNSYS-03



BBWA0235E

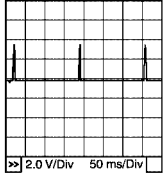
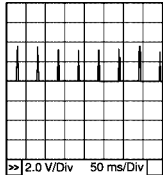
# IGNITION SIGNAL

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
23 24	L/R GY/R	Ignition signal No. 3 Ignition signal No. 4	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>0 - 0.1V★</p>  <p>PBIB0521E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm.</li> </ul>	<p>0 - 0.2V★</p>  <p>PBIB0522E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS002LU

### 1. CHECK ENGINE START

Turn ignition switch "OFF", and restart engine.

**Is engine running?**

Yes or No

- Yes (With CONSULT-II)>>GO TO 2.
- Yes (Without CONSULT-II)>>GO TO 3.
- No >> GO TO 4.

### 2. CHECK OVERALL FUNCTION

**With CONSULT-II**

- Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
- Make sure that all circuits do not produce a momentary engine speed drop.

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 8.

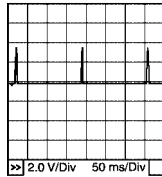
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

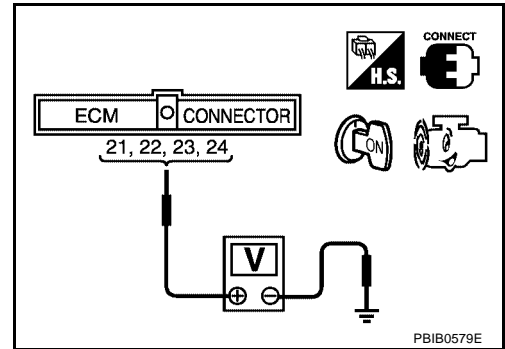
## 3. CHECK OVERALL FUNCTION

### ⊗ Without CONSULT-II

1. Let engine idle.
2. Read the voltage signal between ECM terminals 21, 22, 23, 24 and ground with an oscilloscope.
3. Verify that the oscilloscope screen shows the signal wave as shown below.



PBIB0521E



PBIB0579E

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 8.

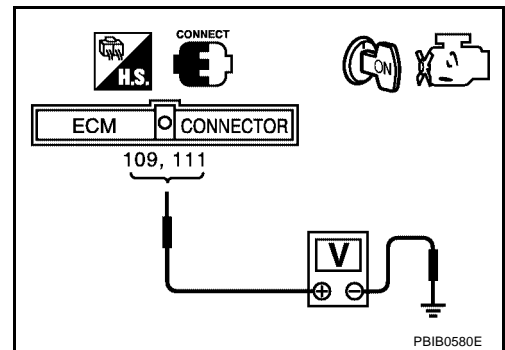
## 4. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check voltage between ECM terminals 109, 111 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 5.
- NG >> Go to [EC-1342. "POWER SUPPLY CIRCUIT FOR ECM"](#).



PBIB0580E

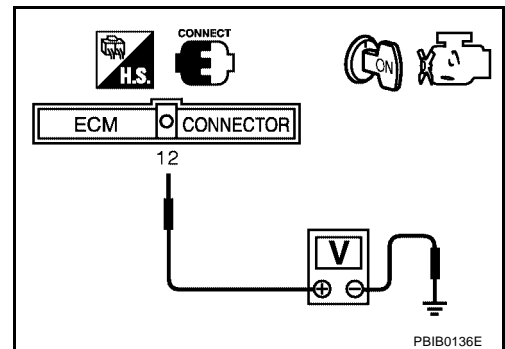
## 5. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

Check voltage between ECM terminal 12 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

- OK >> GO TO 6.
- NG >> Go to [EC-1342. "POWER SUPPLY CIRCUIT FOR ECM"](#).



PBIB0136E



## 6. CHECK CONDENSER CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Check harness continuity between ECM terminal 12 and condenser terminal + , condenser terminal - and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK CONDENSER

Refer to [EC-1786, "Component Inspection"](#) .

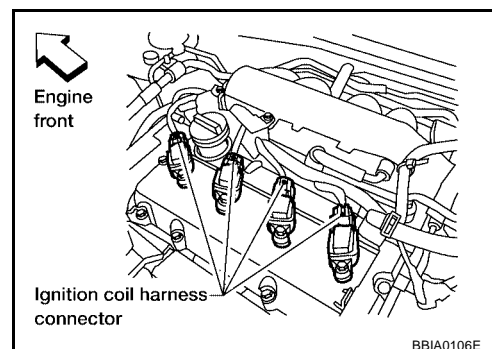
OK or NG

OK >> GO TO 8.

NG >> Replace condenser.

## 8. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect ignition coil harness connector.
4. Turn ignition switch ON.



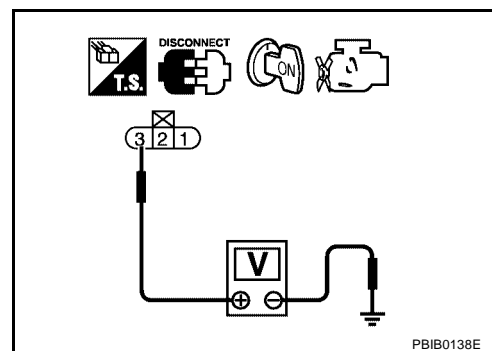
5. Check voltage between ignition coil terminal 3 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

OK >> GO TO 10.

NG >> GO TO 9.



## 9. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between ignition coil and ECM relay
- Harness for open or short between ignition coil and ECM

>> Repair or replace harness or connectors.

## 10. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ignition coil terminal 2 and engine ground.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to power.

OK or NG

- OK     >> GO TO 11.  
 NG     >> Repair open circuit or short to power in harness or connectors.

## 11. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 21, 22, 23, 24 and ignition coil terminal 1.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK     >> GO TO 12.  
 NG     >> Repair open circuit or short to ground or short to power in harness or connectors.

## 12. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to [EC-1786, "Component Inspection"](#) .

OK or NG

- OK     >> GO TO 13.  
 NG     >> Replace ignition coil with power transistor.

## 13. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

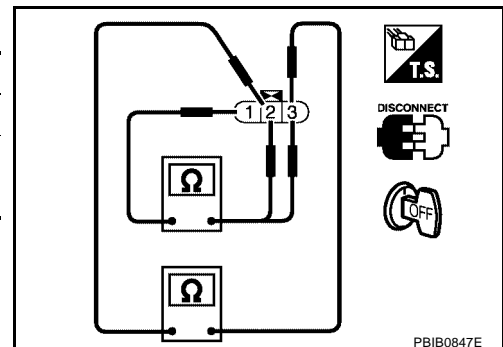
>> INSPECTION END

### Component Inspection IGNITION COIL WITH POWER TRANSISTOR

UBS002LV

1. Turn ignition switch "OFF".
2. Disconnect ignition coil harness connector.
3. Check resistance between ignition coil terminals as follows.

Terminal No.	Resistance $\Omega$ [at 25°C (77°F)]
1 and 2	Except 0 or $\infty$
1 and 3	Except 0
2 and 3	



PBIB0847E

### CONDENSER

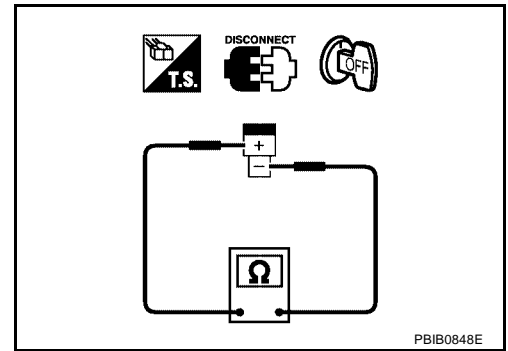
1. Turn ignition switch "OFF".
2. Disconnect condenser harness connector.

# IGNITION SIGNAL

[QR25DE]

3. Check resistance between condenser terminals as + and - .

**Resistance: Above 1 MΩ at 25°C (77°F)**



## Removal and Installation IGNITION COIL WITH POWER TRANSISTOR

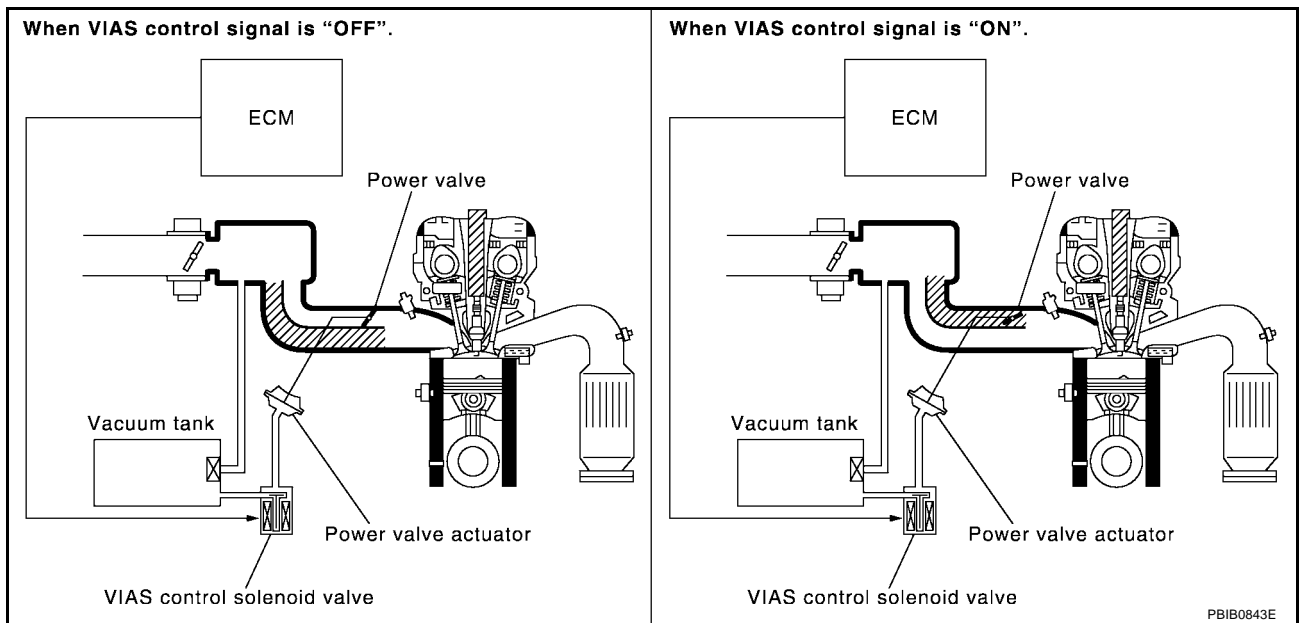
Refer to [EM-115, "IGNITION COIL"](#) .

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

**VIAS**

**Description  
SYSTEM DESCRIPTION**

Sensor	Input Signal to ECM	ECM function	Actuator
Mass air flow sensor	Amount of intake air	VIAS control	VIAS control solenoid valve
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Closed throttle position		
Ignition switch	Start signal		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Engine coolant temperature sensor	Engine coolant temperature		



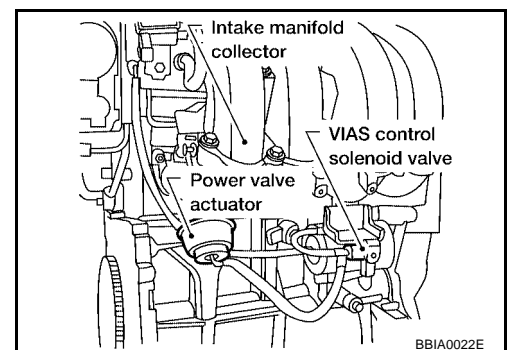
When the engine is running at low or medium speed, the power valve is fully closed. Under this condition, the effective suction port length is equivalent to the total length of the intake manifold collector's suction port including the intake valve. This long suction port provides increased air intake which results in improved suction efficiency and higher torque generation.

The surge tank and one-way valve are provided. When engine is running at high speed, the ECM sends the signal to the VIAS control solenoid valve. This signal introduces the intake manifold vacuum into the power valve actuator and therefore opens the power valve to two suction passages together in the collector. Under this condition, the effective port length is equivalent to the length of the suction port provided independently for each cylinder. This shortened port length results in enhanced engine output with reduced suction resistance under high speeds.

**COMPONENT DESCRIPTION**

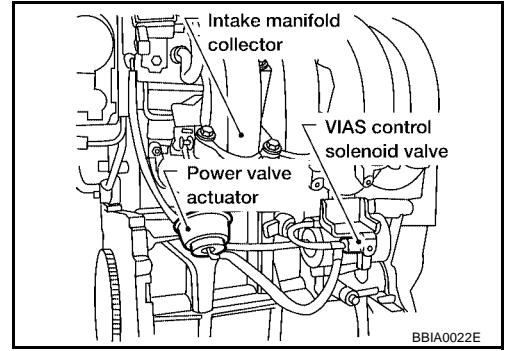
**Power Valve**

The power valve is installed in intake manifold collector and used to control the suction passage of the variable induction air control system. It is set in the fully closed or fully opened position by the power valve actuator operated by the vacuum stored in the surge tank. The vacuum in the surge tank is controlled by the VIAS control solenoid valve.



**VIAS Control Solenoid Valve**

The VIAS control solenoid valve cuts the intake manifold vacuum signal for power valve control. It responds to ON/OFF signals from the ECM. When the solenoid is off, the vacuum signal from the intake manifold is cut. When the ECM sends an ON signal the coil pulls the plunger downward and feeds the vacuum signal to the power valve actuator.



**CONSULT-II Reference Value in Data Monitor Mode**

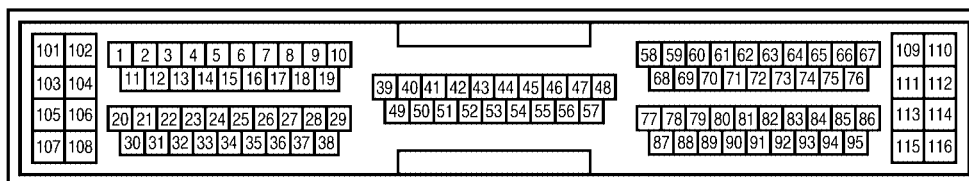
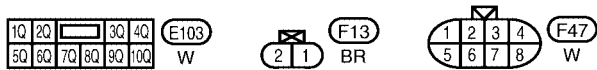
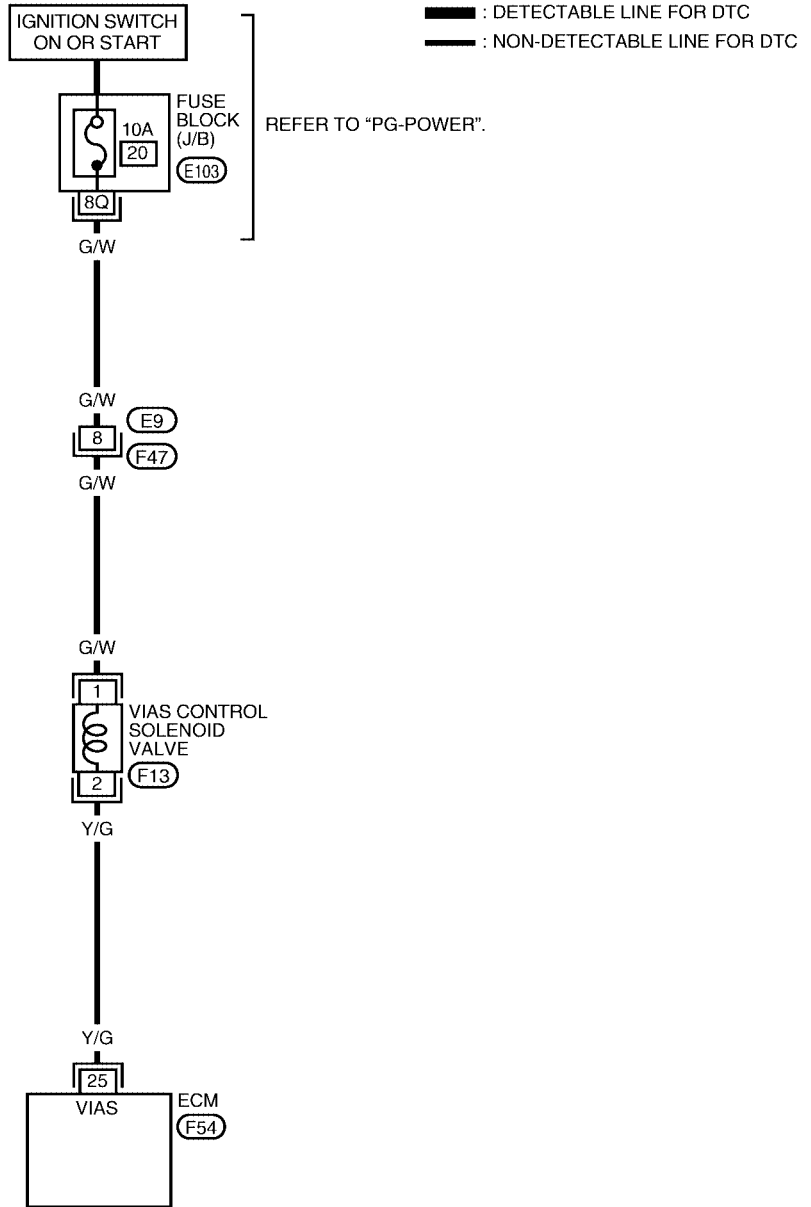
UBS002LY

MONITOR ITEM	CONDITION		SPECIFICATION
VIAS S/V	● Engine: After warming up	Idle	OFF
		More than 5,000 rpm	ON

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

Wiring Diagram

EC-VIAS-01



# VIAS

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
25	Y/G	VIAS control solenoid valve	[Engine is running] ● Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Engine speed is above 5,000 rpm	0 - 1.0V

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

**Diagnostic Procedure**

**1. CHECK OVERALL FUNCTION**

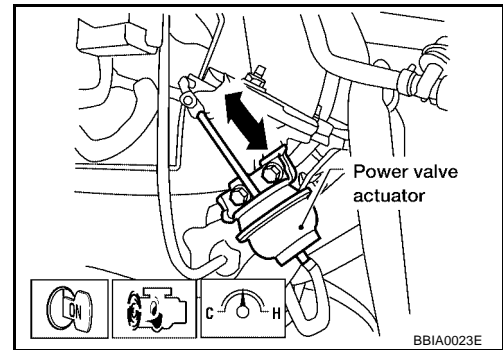
**④ With CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode with CONSULT-II.

ACTIVE TEST	
VIAS SOL VALVE	OFF
MONITOR	
ENG SPEED	XXX rpm

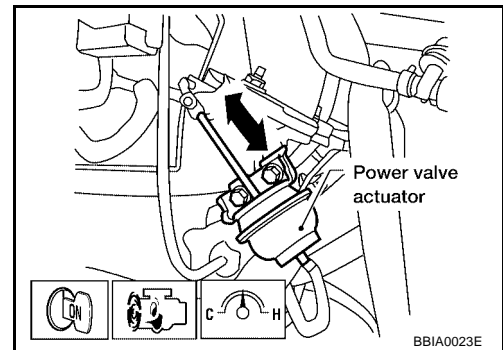
PBIB0844E

3. Turn VIAS control solenoid valve "ON" and "OFF", and make sure that power valve actuator rod moves.



**⊗ Without CONSULT-II**

1. Start engine and warm it up to normal operating temperature.
2. Rev engine quickly up to above 5,000 rpm and make sure that power valve actuator rod moves.



OK or NG

- OK >> **INSPECTION END**
- NG (With CONSULT-II)>>GO TO 2.
- NG (Without CONSULT-II)>>GO TO 3.



## 2. CHECK VACUUM EXISTENCE

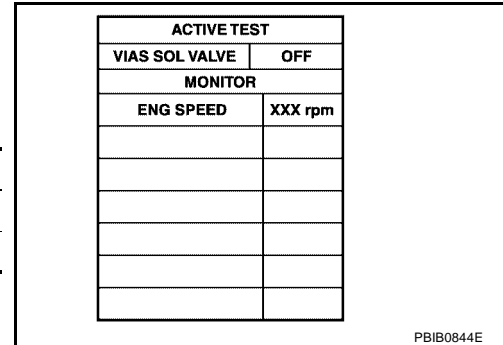
### With CONSULT-II

1. Stop engine and disconnect vacuum hose connected to power valve actuator.
2. Start engine and let it idle.
3. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode with CONSULT-II.
4. Turn VIAS control solenoid valve "ON" and "OFF", and check vacuum existence under the following conditions.

VIAS SOL VALVE	Vacuum
ON	Should exist.
OFF	Should not exist.

#### OK or NG

- OK >> Repair or replace power valve actuator.
- NG >> GO TO 4.



## 3. CHECK VACUUM EXISTENCE

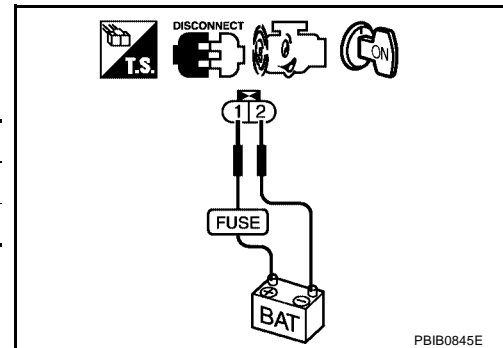
### Without CONSULT-II

1. Stop engine and disconnect vacuum hose connected to power valve actuator.
2. Disconnect VIAS control solenoid valve harness connector.
3. Start engine and let it idle.
4. Apply 12V of direct current between VIAS control solenoid valve terminals 1 and 2.
5. Check vacuum existence under the following conditions.

Condition	Vacuum
12V direct current supply	Should exist.
No supply	Should not exist.

#### OK or NG

- OK >> Repair or replace power valve actuator.
- NG >> GO TO 4.

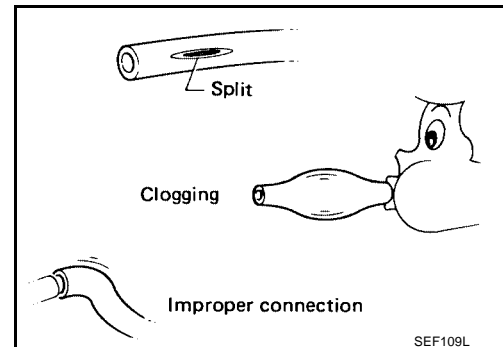


## 4. CHECK VACUUM HOSE

1. Stop engine.
2. Check hoses and tubes between intake manifold and power valve actuator for crack, clogging, improper connection or disconnection. Refer to [EC-1237, "Vacuum Hose Drawing"](#).

#### OK or NG

- OK >> GO TO 5.
- NG >> Repair hoses or tubes.



## 5. CHECK VACUUM TANK

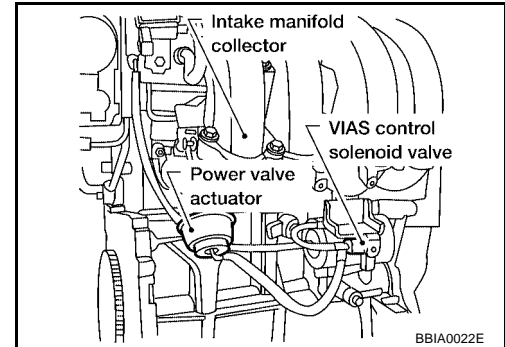
Refer to [EC-1795, "Component Inspection"](#).

#### OK or NG

- OK >> GO TO 6.
- NG >> Replace vacuum tank.

## 6. CHECK VIAS CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "ON".
2. Disconnect VIAS control solenoid valve harness connector.
3. Turn ignition switch "ON".

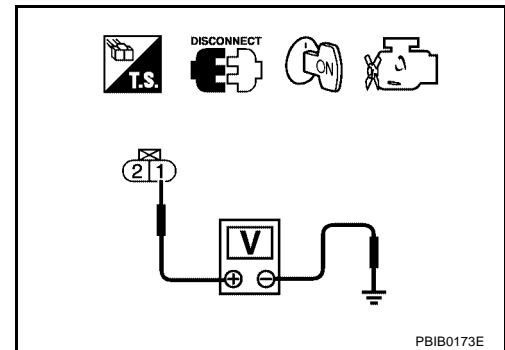


4. Check voltage between VIAS control solenoid valve terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 8.  
NG >> GO TO 7.



## 7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E9, F47
- Fuse block (J/B) connector E103
- 10A fuse
- Harness continuity between fuse and VIAS control solenoid valve

>> Repair harness or connectors.

## 8. CHECK VIAS CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 25 and VIAS control solenoid valve terminal 2. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.  
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

## 9. CHECK VIAS CONTROL SOLENOID VALVE

Refer to [EC-1795, "Component Inspection"](#).

OK or NG

- OK >> GO TO 10.  
NG >> Replace VIAS control solenoid valve.

10. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection**  
**VIAS CONTROL SOLENOID VALVE**

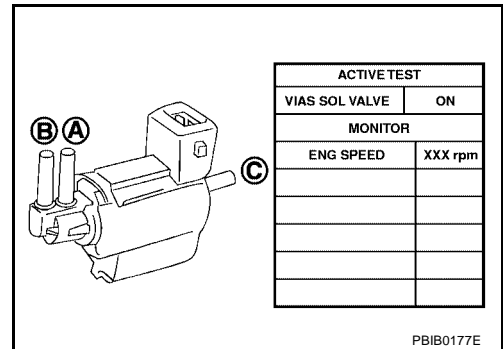
UBS002M1

**With CONSULT-II**

1. Reconnect harness connectors disconnected.
2. Turn ignition switch ON.
3. Perform "VIAS SOL VALVE" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time under the following conditions.

Condition VIAS SOL VALVE	Air passage continuity between <b>A</b> and <b>B</b>	Air passage continuity between <b>A</b> and <b>C</b>
ON	Yes	No
OFF	No	Yes

Operation takes less than 1 second.



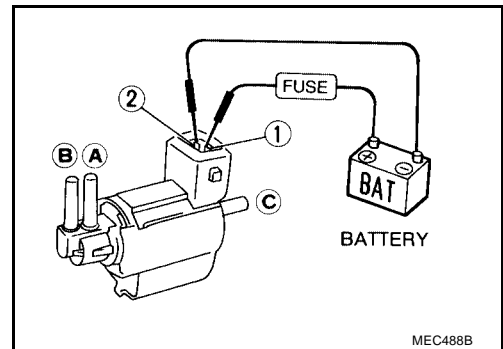
PBIB0177E

**With GST**

Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between <b>A</b> and <b>B</b>	Air passage continuity between <b>A</b> and <b>C</b>
12V direct current supply between terminals 1 and 2	Yes	No
No supply	No	Yes

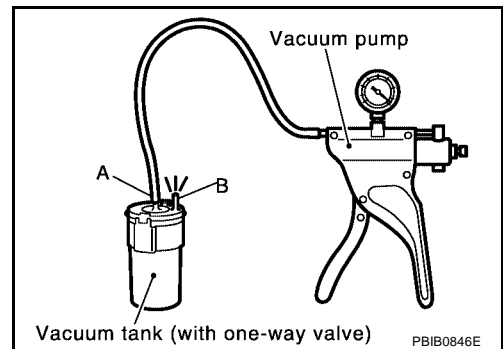
Operation takes less than 1 second.



MEC488B

**VACUUM TANK**

1. Disconnect vacuum hose connected to vacuum tank.
2. Connect a vacuum pump to the port **A** of vacuum pump.
3. Apply vacuum and make sure that vacuum exists at the port **B** .



PBIB0846E

**Removal and Installation**  
**VIAS CONTROL SOLENOID VALVE**

UBS002M2

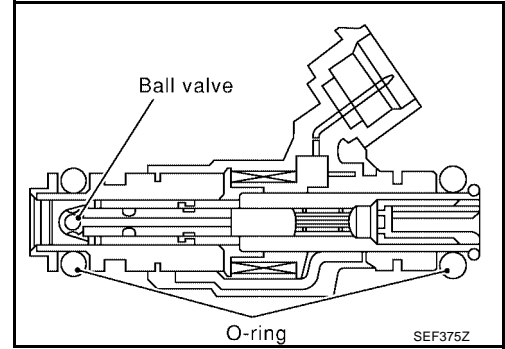
Refer to [EM-105, "INTAKE MANIFOLD"](#) .

## INJECTOR CIRCUIT

### Component Description

UBS002M3

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the injector circuit, the coil in the injector is energized. The energized coil pulls the needle valve back and allows fuel to flow through the injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.



### CONSULT-II Reference Value in Data Monitor Mode

UBS002M4

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
B/FUEL SCHDL	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N</li> <li>● Air conditioner switch: OFF</li> <li>● No-load</li> </ul>	Idle	2.5 - 3.5 msec
		2,000 rpm	2.5 - 3.5 msec
INJ PULSE-B1	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N</li> <li>● Air conditioner switch: OFF</li> <li>● No-load</li> </ul>	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec

# INJECTOR CIRCUIT

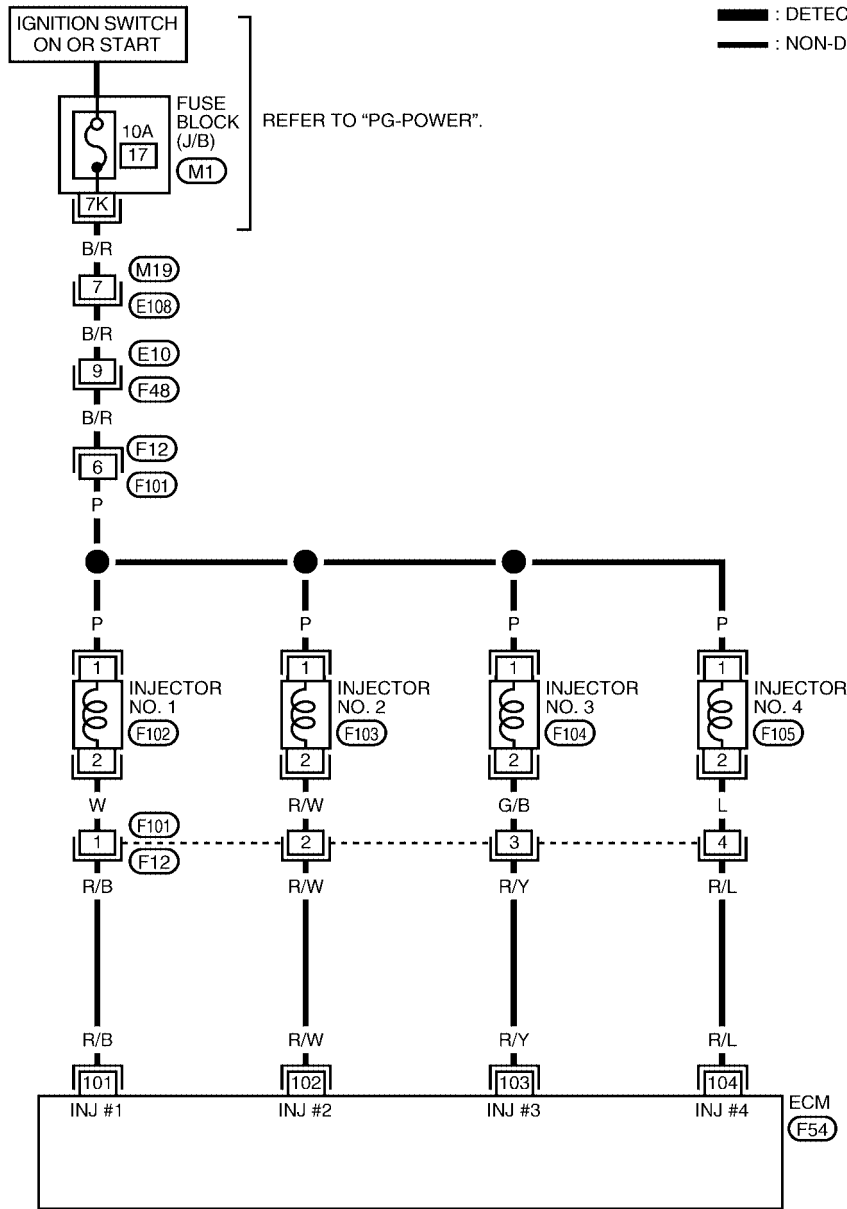
[QR25DE]

## Wiring Diagram

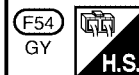
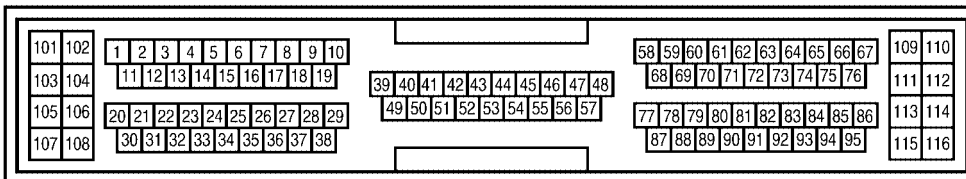
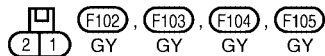
UBS002M5

### EC-INJECT-01

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



REFER TO THE FOLLOWING.  
 (M1) - FUSE BLOCK  
 - JUNCTION BOX (J/B)



BBWA0244E

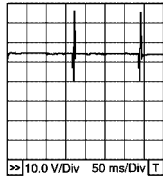
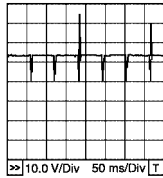
# INJECTOR CIRCUIT

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101 102 103 104	R/B R/W R/Y R/L	Injector No. 1 Injector No. 2 Injector No. 3 Injector No. 4	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>PBIB0529E</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,000 rpm</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p>PBIB0530E</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS002M6

### 1. INSPECTION START

Turn ignition switch to "START".

**Is any cylinder ignited?**

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

## 2. CHECK OVERALL FUNCTION

**Ⓟ With CONSULT-II**

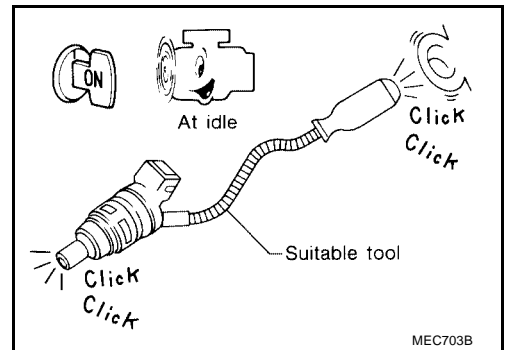
1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V

PBIB0133E

**ⓧ Without CONSULT-II**

1. Start engine.
2. Listen to each injector operating sound.  
**Clicking noise should be heard.**

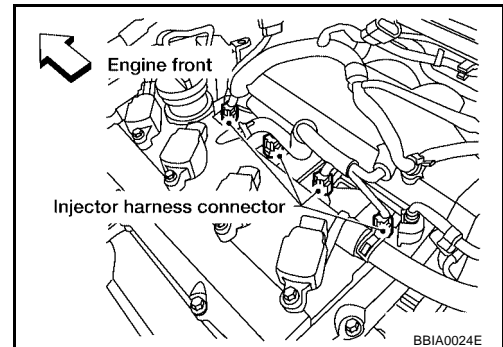


OK or NG

- OK    >> **INSPECTION END**  
 NG    >> **GO TO 3.**

## 3. CHECK INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect injector harness connector.
3. Turn ignition switch "ON".

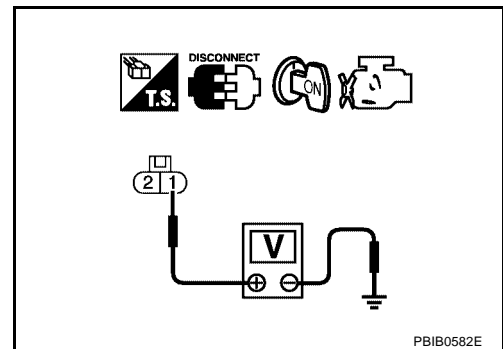


4. Check voltage between injector terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.



## 4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M19, E108
- Harness connectors E10, F48
- Harness connectors F12, F101
- Fuse block (J/B) connector M1
- 10A fuse
- Harness for open or short between injector and fuse

>> Repair harness or connectors.

## 5. CHECK INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between injector terminal 2 and ECM terminals 101, 102, 103, 104. Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.



## 6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F12, F101
- Harness for open or short between injector and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK INJECTOR

Refer to [EC-1801, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace injector.

## 8. CHECK INTERMITTENT INCIDENT

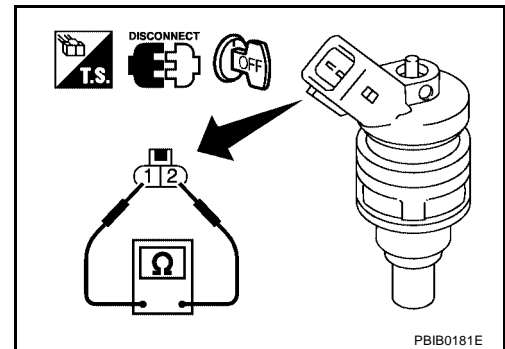
Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

### Component Inspection INJECTOR

1. Disconnect injector harness connector.
2. Check resistance between terminals as shown in the figure.

**Resistance: 12.1 - 12.9Ω [at 20°C (68°F)]**



### Removal and Installation INJECTOR

Refer to [EM-118, "FUEL INJECTOR AND FUEL TUBE"](#) .

# START SIGNAL

[QR25DE]

## START SIGNAL

PF:48750

### CONSULT-II Reference Value in Data Monitor Mode

UBS002M9

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
START SIGNAL	● Ignition switch: ON → START → ON	OFF → ON → OFF

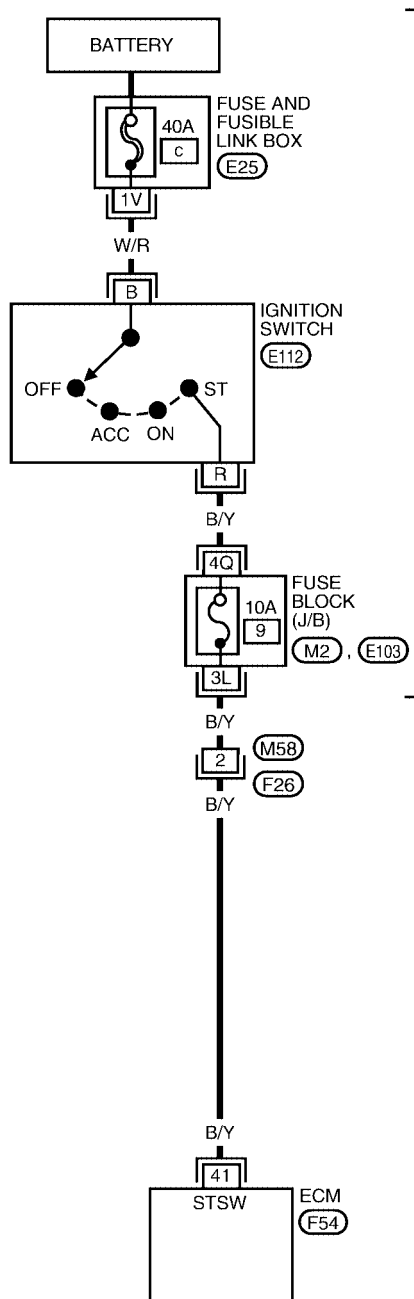
# START SIGNAL

[QR25DE]

## Wiring Diagram

UBS002MA

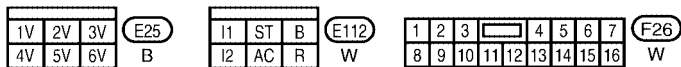
EC-S/SIG-01



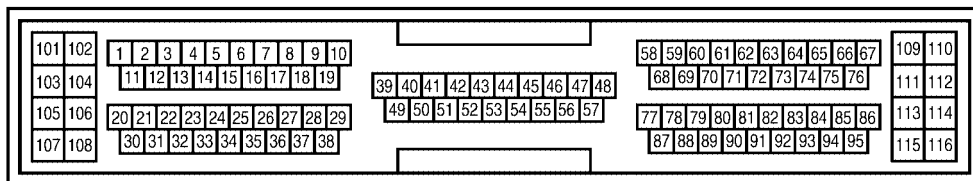
— : DETECTABLE LINE FOR DTC  
 — : NON-DETECTABLE LINE FOR DTC

REFER TO "PG-POWER".

A  
 EC  
 C  
 D  
 E  
 F  
 G  
 H  
 I  
 J  
 K  
 L  
 M



REFER TO THE FOLLOWING.  
 (M2), (E103) - FUSE BLOCK  
 - JUNCTION BOX (J/B)



BBWA0245E

# START SIGNAL

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
41	B/Y	Start signal	[Ignition switch "ON"]	Approximately 0V
			[Ignition switch "START"]	9 - 14V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

UBS002MB

### 1. INSPECTION START

Do you have CONSULT-II?

Yes or No

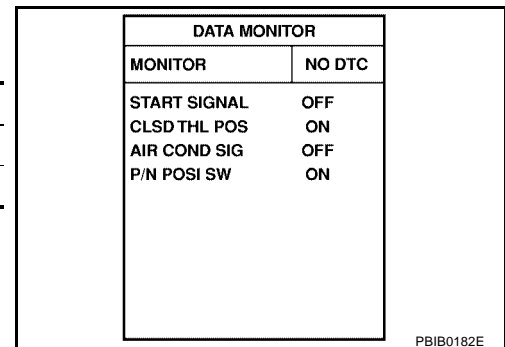
- Yes >> GO TO 2.
- No >> GO TO 3.

### 2. CHECK OVERALL FUNCTION

 **With CONSULT-II**

1. Turn ignition switch "ON".
2. Check "START SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.

Condition	START SIGNAL
Ignition switch "ON"	OFF
Ignition switch "START"	ON



OK or NG

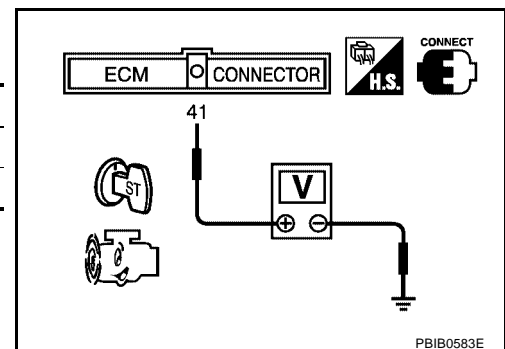
- OK >> **INSPECTION END**
- NG >> GO TO 4.

### 3. CHECK OVERALL FUNCTION

 **Without CONSULT-II**

Check voltage between ECM terminal 41 and ground under the following conditions.

Condition	Voltage
Ignition switch "START"	Battery voltage
Other positions	Approximately 0V



OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 4.

### 4. CHECK STARTING SYSTEM

Turn ignition switch "OFF", then turn it to "START".

**Does starter motor operate?**

Yes or No

- Yes >> GO TO 5.
- No >> Refer to [SC-9, "STARTING SYSTEM"](#).

**5. CHECK FUSE**

1. Turn ignition switch "OFF".
2. Disconnect 10A fuse.
3. Check if 10A fuse is OK.

OK or NG

- OK >> GO TO 6.  
 NG >> Replace 10A fuse.

**6. CHECK START SIGNAL INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Disconnect ECM harness connector.
2. Disconnect ignition switch harness connector.
3. Check harness continuity between ECM terminal 41 and fuse block (J/B), ignition switch and fuse block (J/B). Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.  
 NG >> GO TO 7.

**7. DETECT MALFUNCTIONING PART**

Check the following.

- Harness connectors M58, F26
- Fuse block (J/B) connectors M2, E103
- Harness for open or short between ignition switch and fuse block (J/B)
- Harness for open or short between ECM and fuse block (J/B)

>> Repair open circuit or short to ground or short to power in harness or connectors.

**8. CHECK INTERMITTENT INCIDENT**

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**

# FUEL PUMP CIRCUIT

[QR25DE]

## FUEL PUMP CIRCUIT

PF1:17042

### Description SYSTEM DESCRIPTION

UBS002MC

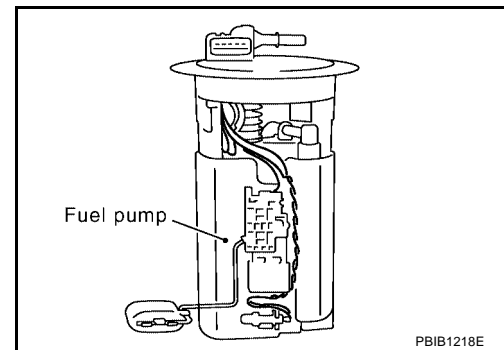
Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed	Fuel pump control	Fuel pump relay
Ignition switch	Start signal		

The ECM activates the fuel pump for several seconds after the ignition switch is turned on to improve engine startability. If the ECM receives a engine speed signal from the crankshaft position sensor (POS) and camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 1 second.
Engine running and cranking	Operates.
When engine is stopped	Stops in 1.5 seconds.
Except as shown above	Stops.

### COMPONENT DESCRIPTION

A turbine type design fuel pump is used in the fuel tank.



### CONSULT-II Reference Value in Data Monitor Mode

UBS002MD

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
FUEL PUMP RLY	● For 1 seconds after turning ignition switch ON	ON
	● Engine running or cranking	
	● Except above conditions	OFF







# FUEL PUMP CIRCUIT

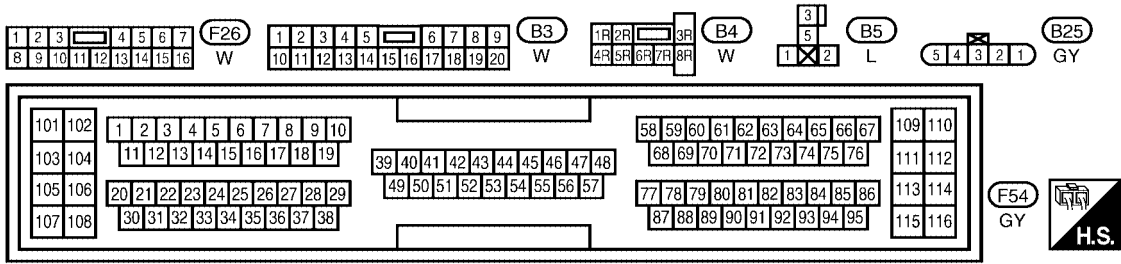
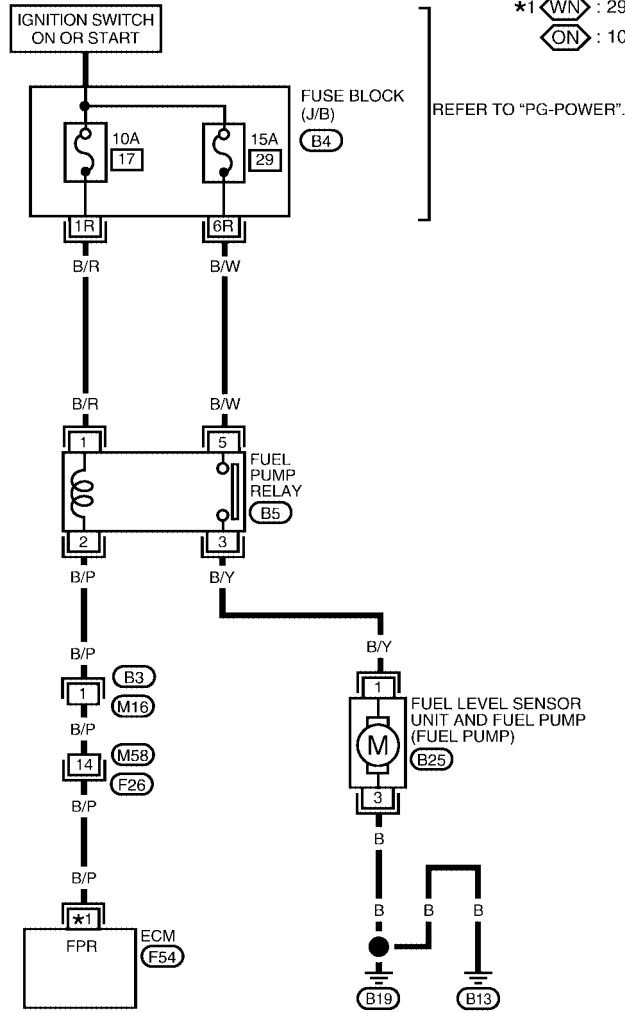
[QR25DE]

## Wiring Diagram

UBS002ME

EC-F/PUMP-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : WITH NVIS (NATS)
-  : WITHOUT NVIS (NATS)
- \*1  : 29
-  : 10



BBWA0423E

# FUEL PUMP CIRCUIT

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
10 (Without NVIS)	B/P	Fuel pump relay	[Ignition switch "ON"] ● For 1 seconds after turning ignition switch "ON"	0 - 1.0V
29 (With NVIS)			[Engine is running] [Ignition switch "ON"] ● More than 1 seconds after turning ignition switch "ON".	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

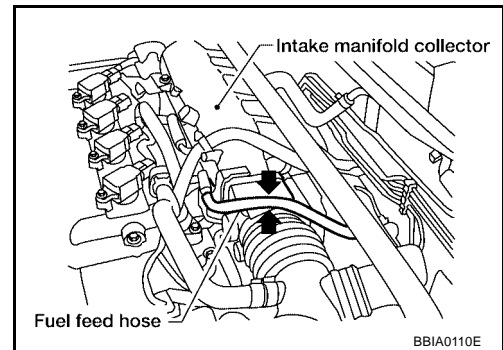
UBS002MF

### 1. CHECK OVERALL FUNCTION

- Turn ignition switch "ON".
- Pinch fuel feed hose with two fingers.  
**Fuel pressure pulsation should be felt on the fuel hose for 1 second after ignition switch is turned "ON".**

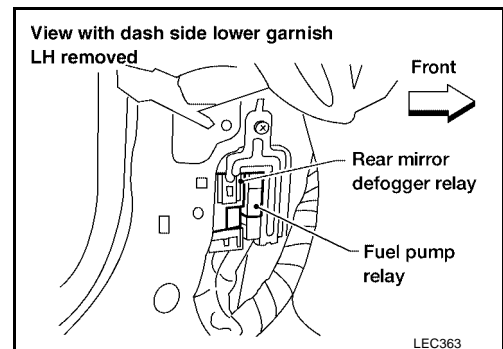
OK or NG

- OK >> **INSPECTION END**  
 NG >> GO TO 2.



### 2. CHECK FUEL PUMP RELAY POWER SUPPLY CIRCUIT

- Turn ignition switch "OFF".
- Disconnect fuel pump relay.
- Turn ignition switch "ON".

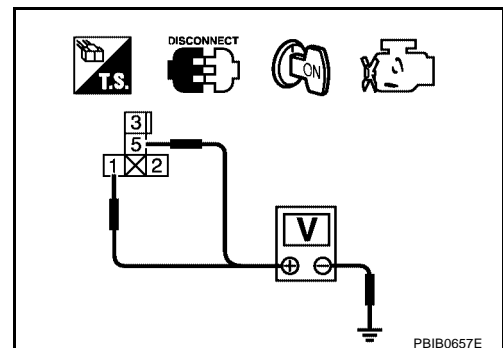


- Check voltage between fuel pump relay terminals 1, 5 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 4.  
 NG >> GO TO 3.





## 3. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector B4
- 10A fuse
- 15A fuse
- Harness for open or short between fuse and fuel pump relay

>> Repair harness or connectors.

## 4. CHECK FUEL PUMP POWER SUPPLY AND GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect fuel level sensor unit and fuel pump harness connector.
3. Check harness continuity between fuel pump relay terminal 3 and fuel pump terminal 1, fuel pump terminal 3 and body ground.  
Refer to Wiring Diagram.

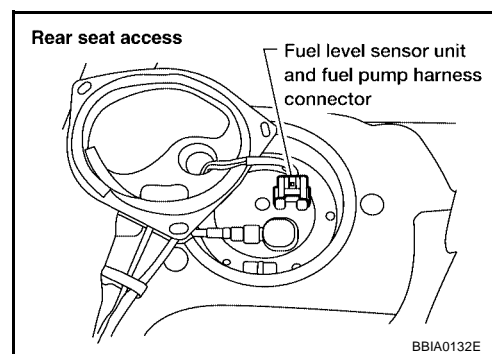
**Continuity should exist.**

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



## 5. CHECK FUEL PUMP RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 10 or 29 and fuel pump relay terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.

NG >> GO TO 6.

## 6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B3, M16
- Harness connectors M58, F26
- Harness for open or short between ECM and fuel pump relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 7. CHECK FUEL PUMP RELAY

Refer to [EC-1810, "Component Inspection"](#) .

OK or NG

OK >> GO TO 8.

NG >> Replace fuel pump relay.

## 8. CHECK FUEL PUMP

Refer to [EC-1810, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace fuel pump.

## 9. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

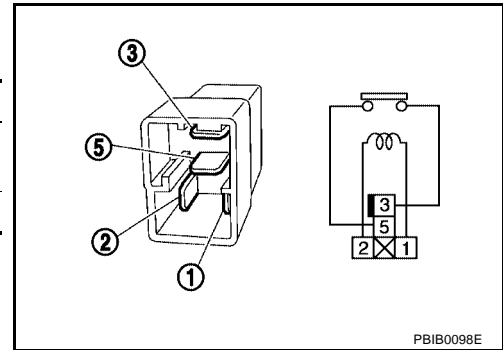
>> INSPECTION END

### Component Inspection FUEL PUMP RELAY

UBS002MG

Check continuity between terminals 3 and 5 under the following conditions.

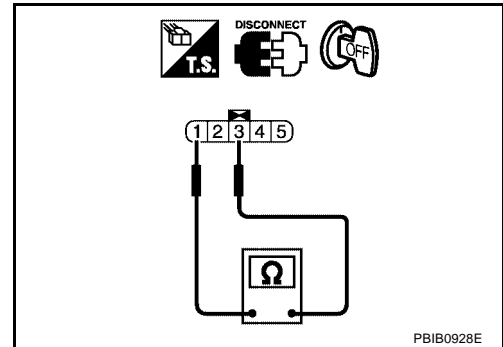
Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No



### FUEL PUMP

1. Disconnect fuel level sensor unit and fuel pump harness connector.
2. Check resistance between fuel level sensor unit and fuel pump terminals 1 and 3.

**Resistance: Approximately 1.0Ω [at 25°C (77°F)]**



### Removal and Installation FUEL PUMP

UBS002MH

Refer to [FL-3, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"](#) .

# POWER STEERING OIL PRESSURE SWITCH

[QR25DE]

## POWER STEERING OIL PRESSURE SWITCH

PF:49761

### Component Description

UBS002MI

The power steering oil pressure switch is attached to the power steering high-pressure tube and detects a power steering load. When a power steering load is detected, it signals the ECM. The ECM controls the electric throttle control actuator and adjusts the throttle valve opening angle to increase the engine speed and adjusts the idle speed for the increased load.

### CONSULT-II Reference Value in Data Monitor Mode

UBS002MJ

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
PW/ST SIGNAL	● Engine: After warming up, idle the engine	Steering wheel in neutral position (forward direction) OFF
		The steering wheel is fully turned ON

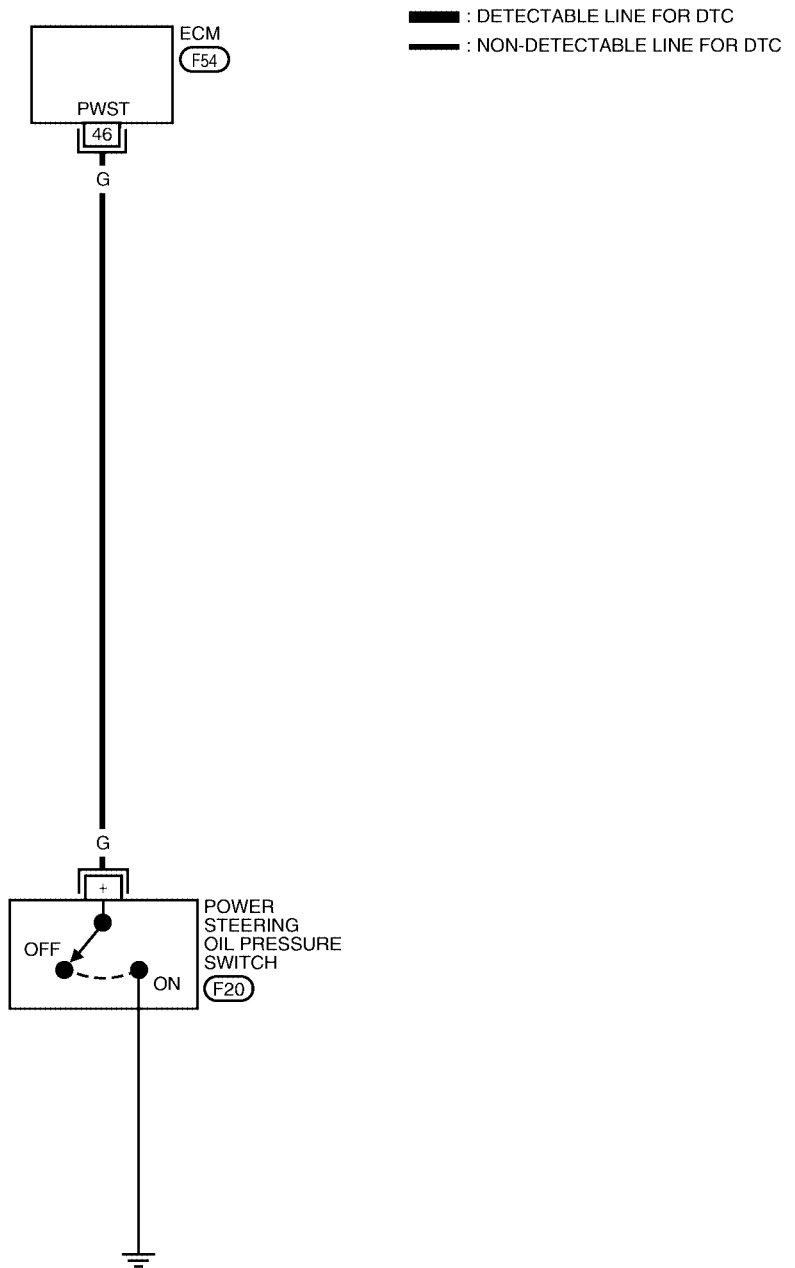
# POWER STEERING OIL PRESSURE SWITCH

[QR25DE]

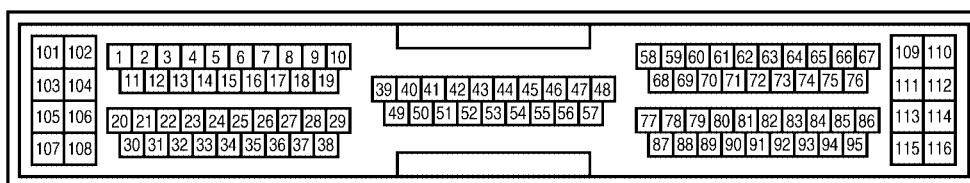
## Wiring Diagram

UBS002MK

EC-PST/SW-01



(+) F20  
GY



(F54) GY  
H.S.

BBWA0247E

# POWER STEERING OIL PRESSURE SWITCH

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
46	G	Power steering oil pressure switch	[Engine is running] ● Steering wheel is being turned	Approximately 0V
			[Engine is running] ● Steering wheel is not being turned	Approximately 5V

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

## Diagnostic Procedure

### 1. INSPECTION START

Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

### 2. CHECK OVERALL FUNCTION

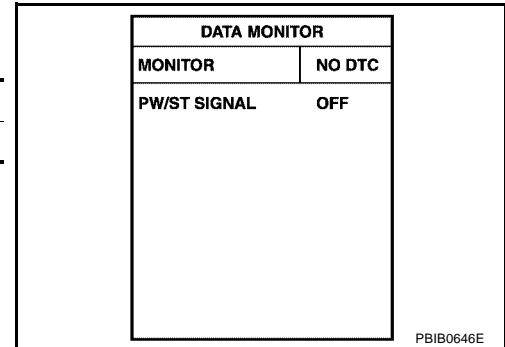
#### With CONSULT-II

1. Start engine.
2. Check "PW/ST SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.

Steering in neutral position	OFF
Steering is turned	ON

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 4.



### 3. CHECK OVERALL FUNCTION

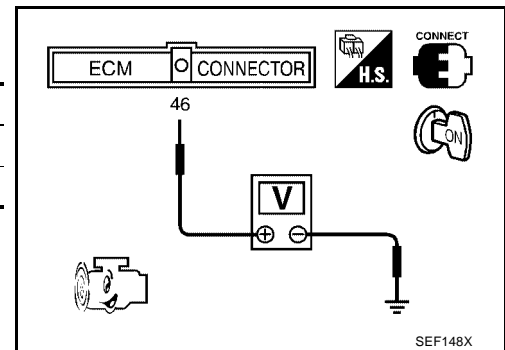
#### Without CONSULT-II

1. Start engine.
2. Check voltage between ECM terminal 46 and ground under the following conditions.

Condition	Voltage
When steering wheel is turned quickly	Approximately 0V
Except above	Approximately 5V

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 4.



### 4. CHECK INPUT SIGNAL CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Disconnect power steering oil pressure switch harness connector.
4. Check harness continuity between ECM terminal 46 and power steering oil pressure switch terminal + . Refer to Wiring Diagram.

**Continuity should exist.**

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

**5. DETECT MALFUNCTIONING PART**

Check the harness for open or short between ECM and power steering oil pressure switch.

>> Repair open circuit or short to ground or short to power in harness or connectors.

**6. CHECK POWER STEERING OIL PRESSURE SWITCH**

Refer to [EC-1815, "Component Inspection"](#) .

OK or NG

OK >> GO TO 7.

NG >> Replace power steering oil pressure switch.

**7. CHECK INTERMITTENT INCIDENT**

Perform [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END

**Component Inspection  
POWER STEERING OIL PRESSURE SWITCH**

UBS002MM

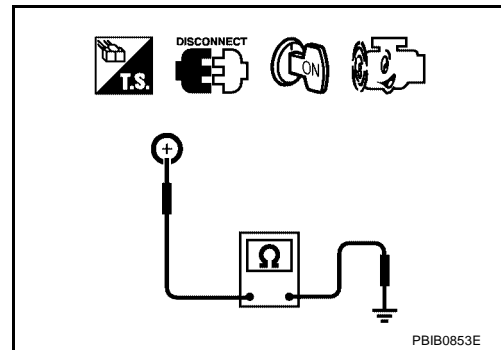
1. Turn ignition switch "OFF".
2. Disconnect power steering oil pressure switch harness connector.
3. Start engine.
4. Check continuity between power steering oil pressure switch terminal + and body ground.

Conditions	Continuity
Steering wheel is being turned	Yes
Steering wheel is not being turned	No

If NG, replace power steering oil pressure switch.

**Removal and Installation  
POWER STEERING OIL PRESSURE SWITCH**

Refer to [PS-21, "POWER STEERING OIL PUMP"](#) .



UBS002MN

# REFRIGERANT PRESSURE SENSOR

[QR25DE]

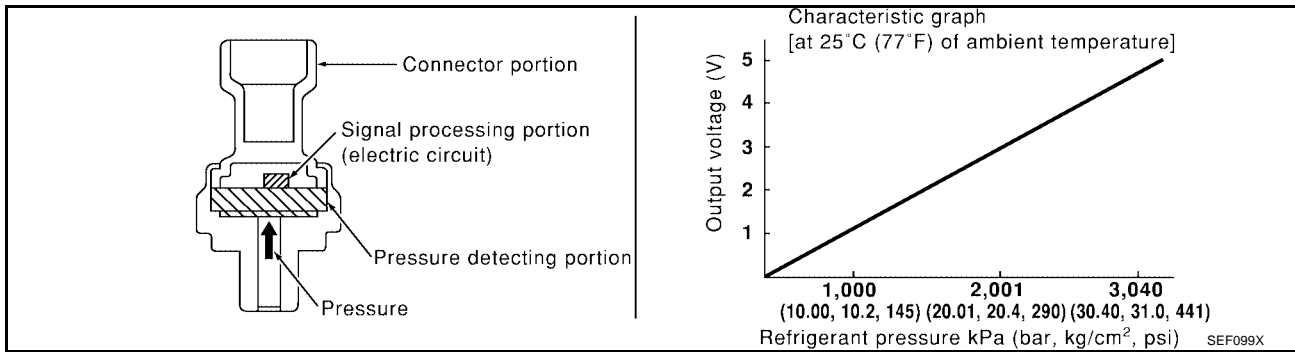
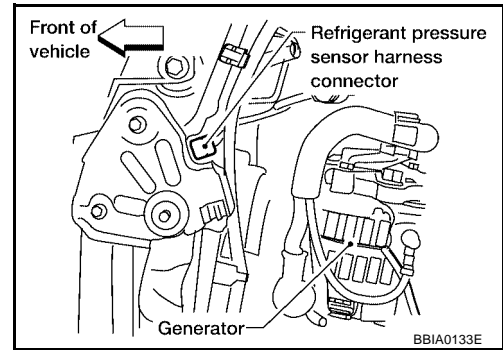
## REFRIGERANT PRESSURE SENSOR

PFP:92136

### Component Description

UBS002MO

The refrigerant pressure sensor is installed at the liquid tank of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.





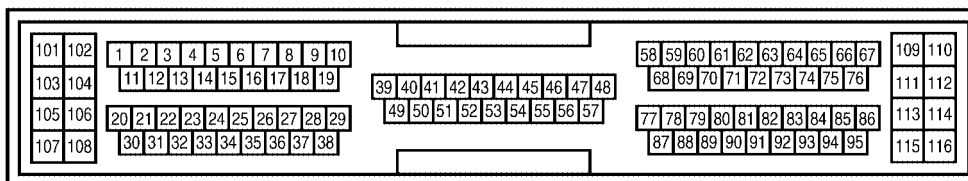
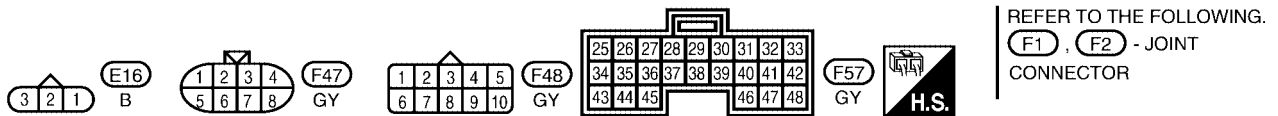
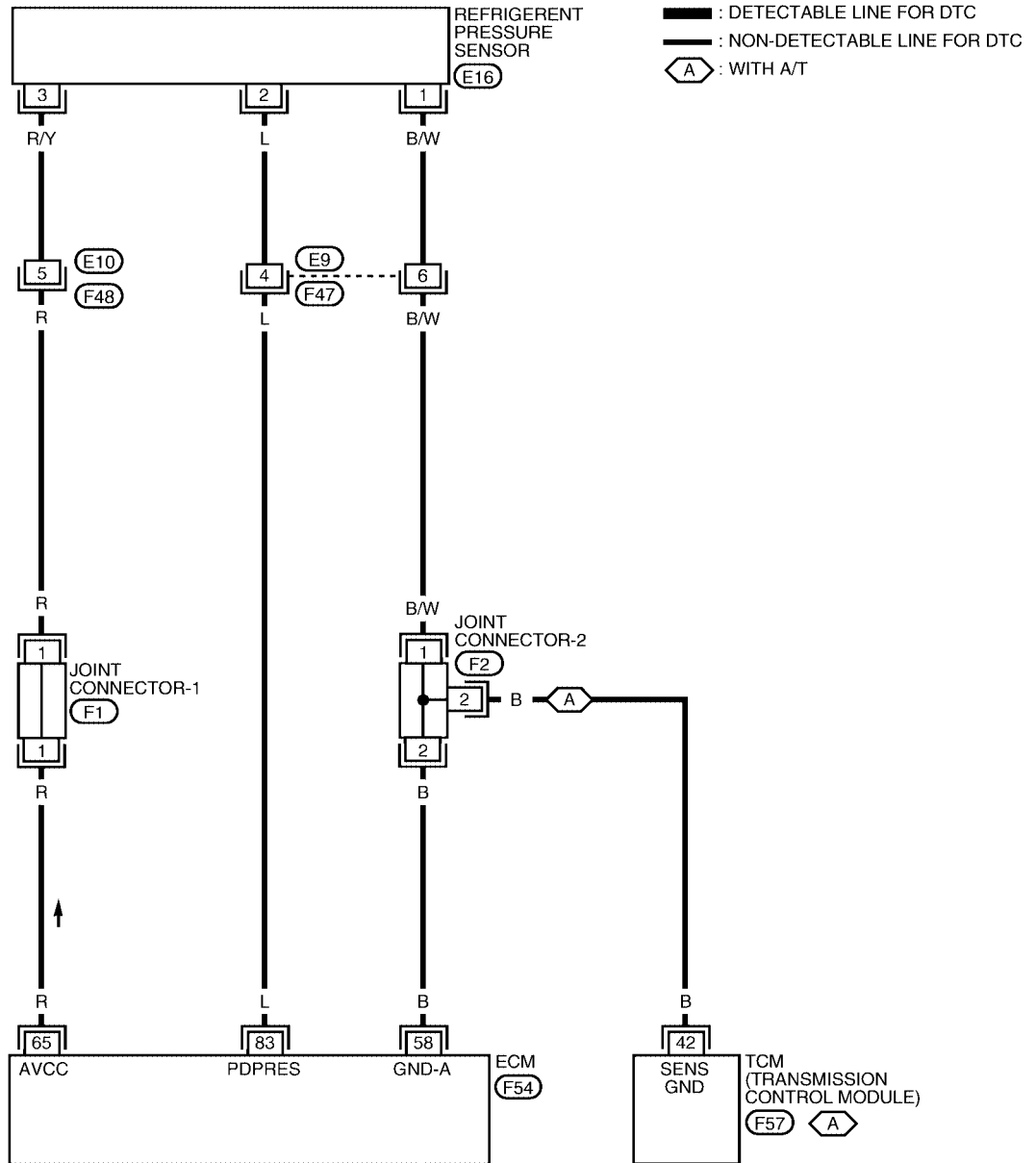
# REFRIGERANT PRESSURE SENSOR

[QR25DE]

## Wiring Diagram

UBS002MP

EC-RP/SEN-01



# REFRIGERANT PRESSURE SENSOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
65	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
83	L	Refrigerant pressure sensor	[Engine is running] ● Warm-up condition ● Both A/C switch and blower switch are "ON". (Compressor operates.)	1.0 - 4.0V

## Diagnostic Procedure

UBS002MQ

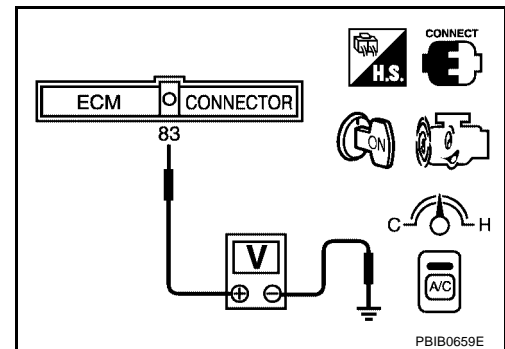
### 1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower switch "ON".
3. Check voltage between ECM terminal 83 and ground with CONSULT-II or tester.

**Voltage: 1.0 - 4.0V**

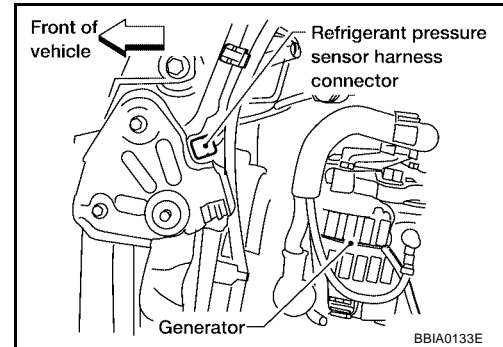
OK or NG

- OK >> **INSPECTION END**
- NG >> **GO TO 2.**



## 2. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn A/C switch and blower switch "OFF".
2. Stop engine.
3. Disconnect refrigerant pressure sensor harness connector.
4. Turn ignition switch "ON".

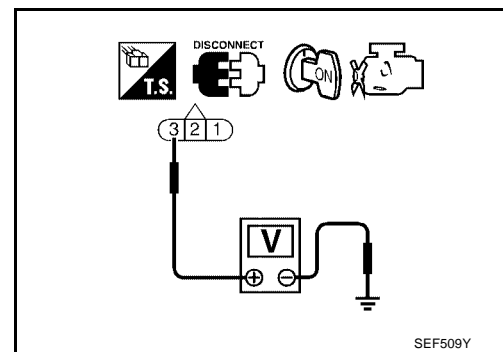


5. Check voltage between refrigerant pressure sensor terminal 3 and ground with CONSULT-II or tester.

**Voltage: Approximately 5V**

OK or NG

- OK >> GO TO 4.  
 NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E10, F48
- Joint connector-1
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair harness or connectors.

## 4. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between refrigerant pressure sensor terminal 1 and engine ground. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 6.  
 NG >> GO TO 5.

---

## 5. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors E9, F47
- Joint connector-2
- Harness for open or short between ECM and refrigerant pressure sensor
- Harness for open or short between TCM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 6. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 83 and refrigerant pressure sensor terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.

---

## 7. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors E9, F47
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 8. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

OK or NG

- OK >> Replace refrigerant pressure sensor.
- NG >> Repair or replace.

### Removal and Installation REFRIGERANT PRESSURE SENSOR

Refer to [MTC-82, "REFRIGERANT LINES"](#) .

UBS002MR

# ELECTRICAL LOAD SIGNAL

[QR25DE]

PF2:25350

## ELECTRICAL LOAD SIGNAL

### CONSULT-II Reference Value in Data Monitor Mode

UBS002MS

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
LOAD SIGNAL	● Ignition switch: ON	ON
		OFF

A

EC

C

D

E

F

G

H

I

J

K

L

M

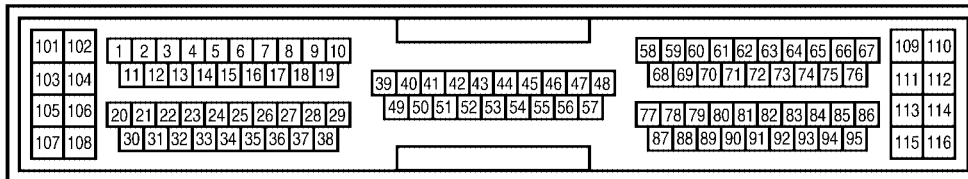
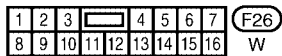
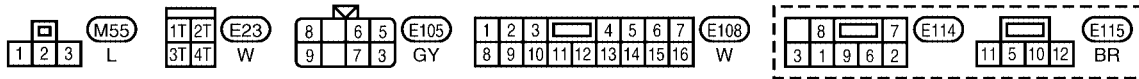
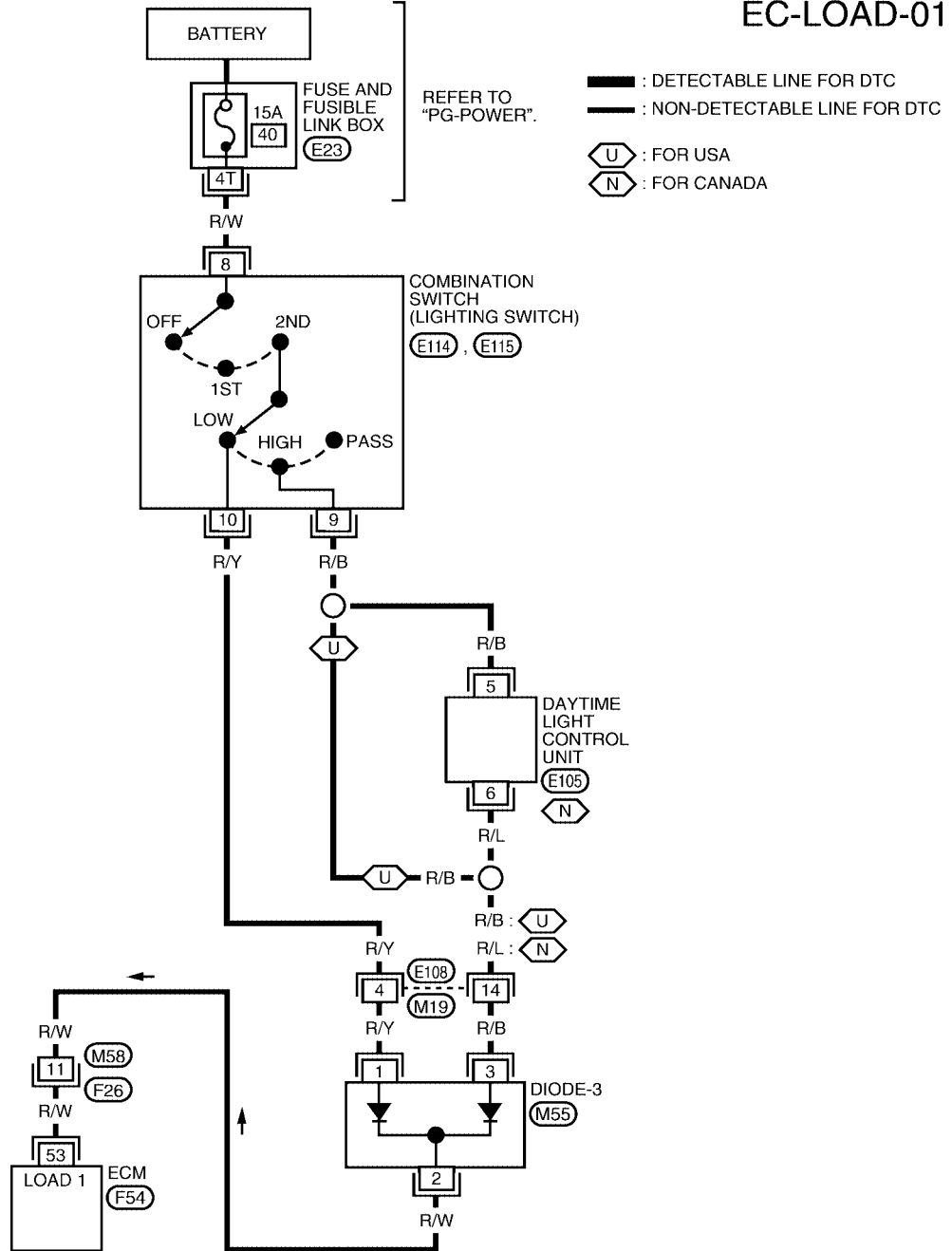
# ELECTRICAL LOAD SIGNAL

[QR25DE]

UBS002MT

## Wiring Diagram

### EC-LOAD-01



BBWA0428E

# ELECTRICAL LOAD SIGNAL

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

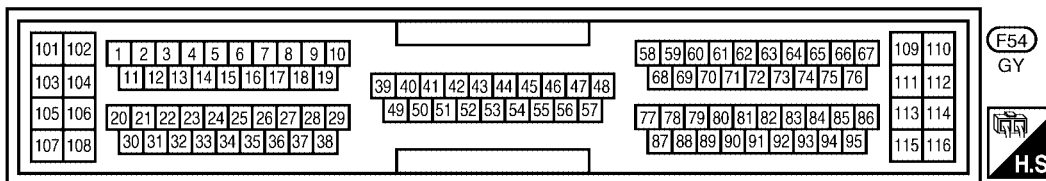
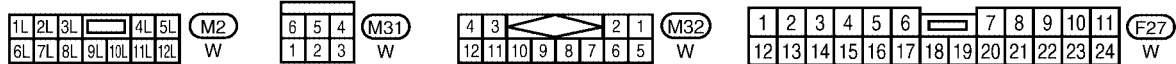
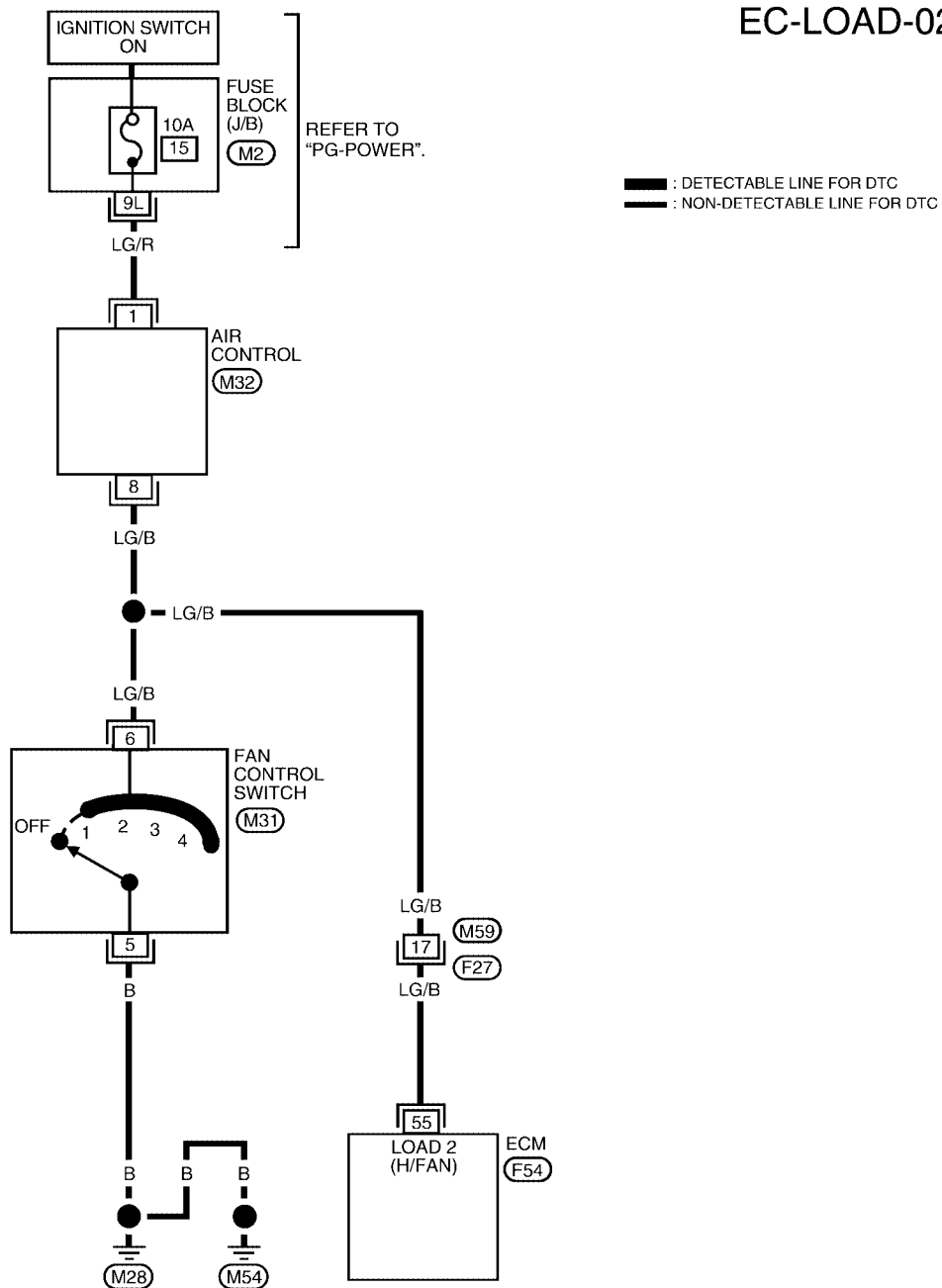
TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
53	R/W	Electrical load signal (Headlamp signal)	<b>[Ignition switch "ON"]</b> ● Lighting switch is "2ND" position	BATTERY VOLTAGE (11 - 14V)
			<b>[Ignition switch "ON"]</b> ● Lighting switch is "OFF"	Approximately 0V

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

# ELECTRICAL LOAD SIGNAL

[QR25DE]

## EC-LOAD-02



BBWA0429E



# ELECTRICAL LOAD SIGNAL

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

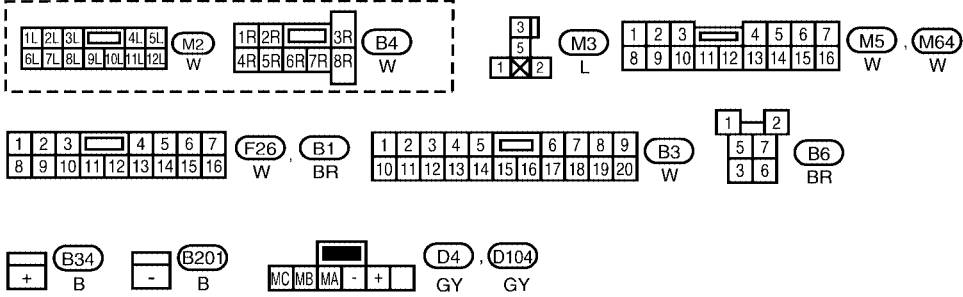
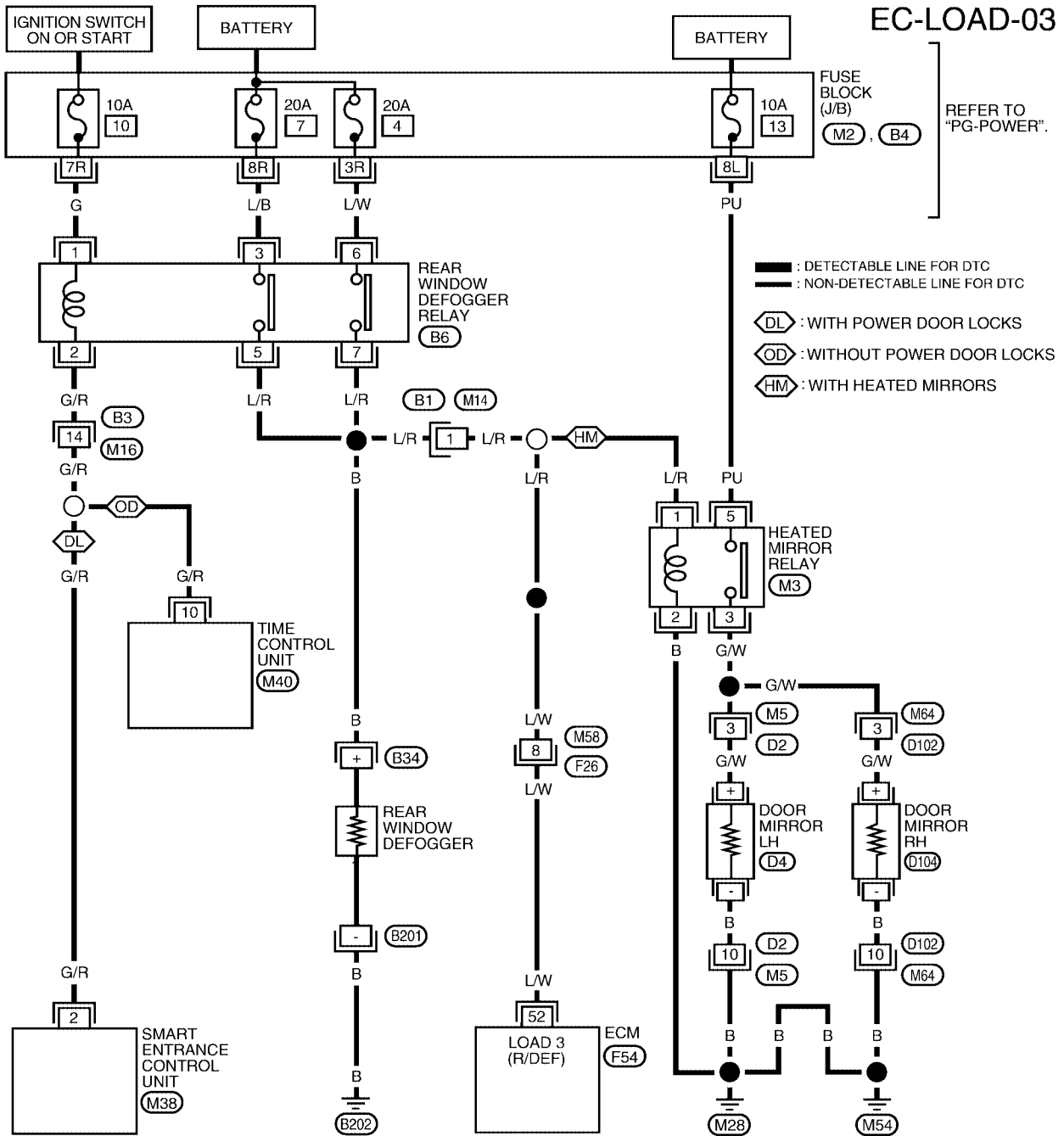
**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
55	LG/B	Heater fan switch	[Engine is running] ● Heater fan switch "ON"	Approximately 0V
			[Engine is running] ● Heater fan switch "OFF"	Approximately 5V

A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

# ELECTRICAL LOAD SIGNAL

[QR25DE]



REFER TO THE FOLLOWING.  
 (M38), (M40), (F54)  
 - ELECTRICAL UNITS

BBWA0430E

# ELECTRICAL LOAD SIGNAL

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
52	L/W	Electrical load signal (Rear window defogger signal)	[Ignition switch "ON"] ● Rear window defogger switch is "ON"	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"] ● Rear window defogger switch is "OFF"	Approximately 0V

## Diagnostic Procedure

UBS002MU

### 1. INSPECTION START

Do you have CONSULT-II?

Yes or No

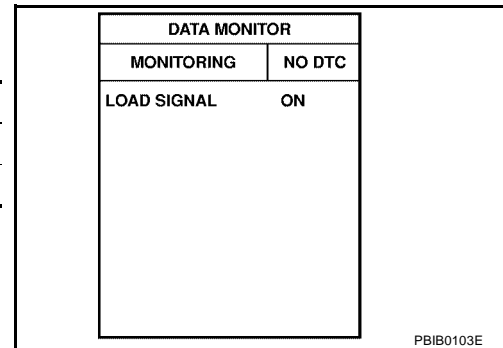
- Yes >> GO TO 2.
- No >> GO TO 3.

### 2. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-1

 **With CONSULT-II**

- Turn ignition switch "ON".
- Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.

Condition	LOAD SIGNAL
Lighting switch "ON" at 2nd position	ON
Lighting switch "OFF"	OFF



OK or NG

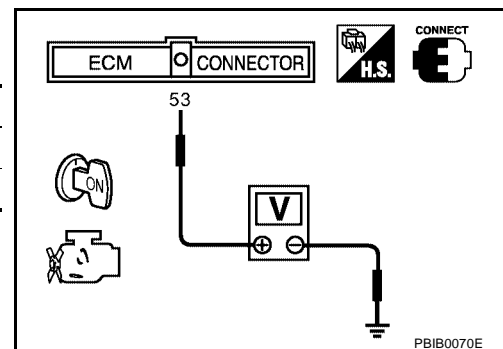
- OK >> GO TO 4.
- NG >> GO TO 8.

### 3. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-1

 **Without CONSULT-II**

- Turn ignition switch "ON".
- Check voltage between ECM terminal 53 and ground under the following conditions.

Condition	Voltage
Lighting switch "ON" at 2nd position	BATTERY VOLTAGE
Lighting switch "OFF"	0V



OK or NG

- OK >> GO TO 5.
- NG >> GO TO 8.

**4. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-2**

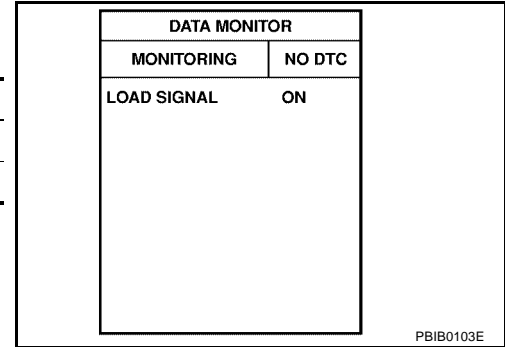
**With CONSULT-II**

1. Turn ignition switch "ON".
2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.

Condition	LOAD SIGNAL
FAN control switch "ON" in any position	ON
FAN control switch "OFF"	OFF

**OK or NG**

- OK >> GO TO 6.
- NG >> GO TO 13.



**5. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-2**

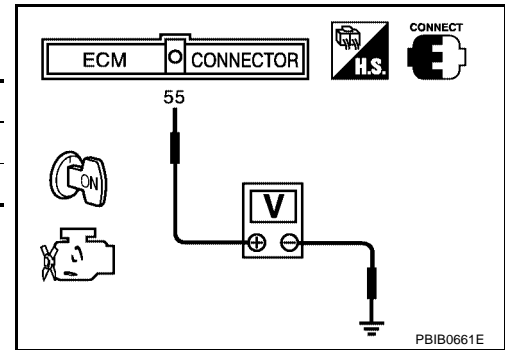
**Without CONSULT-II**

1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 55 and ground under the following conditions.

Condition	Voltage
FAN control switch "ON" in any position	Approximately 0V
FAN control switch "OFF"	Approximately 5V

**OK or NG**

- OK >> GO TO 7.
- NG >> GO TO 13.



**6. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-3**

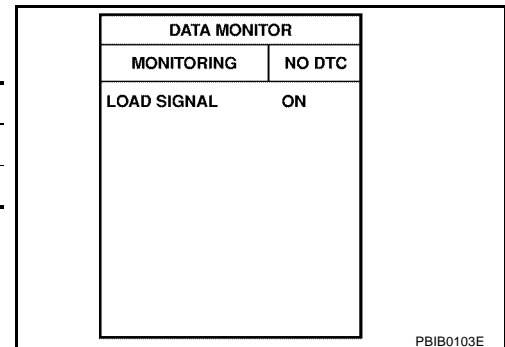
**With CONSULT-II**

1. Turn ignition switch "ON".
2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.

Condition	LOAD SIGNAL
Rear window defogger switch "ON"	ON
Rear window defogger switch "OFF"	OFF

**OK or NG**

- OK >> INSPECTION END.
- NG >> GO TO 16.



**7. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-3**

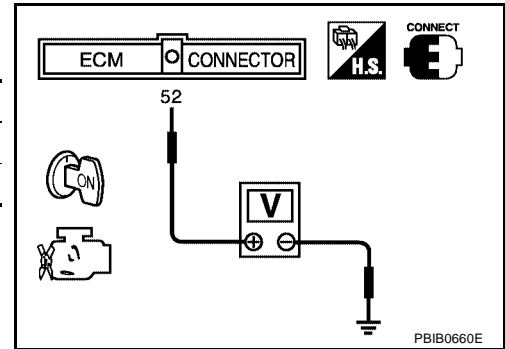
**⊗ Without CONSULT-II**

1. Turn ignition switch "ON".
2. Check voltage between ECM terminal 52 and ground under the following conditions.

Condition	Voltage
Rear window defogger switch "ON"	BATTERY VOLTAGE
Rear window defogger switch "OFF"	Approximately 0V

**OK or NG**

- OK >> INSPECTION END.
- NG >> GO TO 16.



**8. CHECK HEADLAMP FUNCTION**

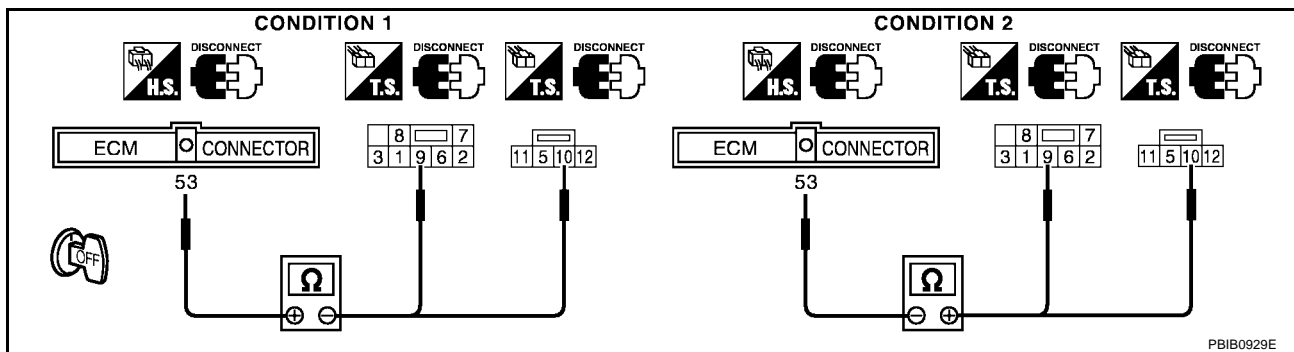
1. Start engine.
2. Turn the lighting switch "ON" at 2nd position.
3. Check that headlamps are illuminated.

**OK or NG**

- OK (Models for USA)>>GO TO 8.
- OK (Models for Canada)>>GO TO 11.
- NG >> Refer to [LT-6, "HEADLAMP \(FOR USA\)"](#) or [LT-10, "HEADLAMP \(FOR CANADA\) — DAYTIME LIGHT SYSTEM —"](#) .

**9. CHECK HEADLAMP INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT**

1. Stop engine.
2. Disconnect ECM harness connector.
3. Disconnect lighting switch harness connectors.
4. Check harness continuity between ECM terminal 53 and lighting switch terminal 9, 10 under the following conditions.



Condition	Continuity
1	Should not exist
2	Should exist

5. Also check harness for short to ground and short to power.

**OK or NG**

- OK >> GO TO 19.
- NG >> GO TO 10.

## 10. DETECT MALFUNCTIONING PART

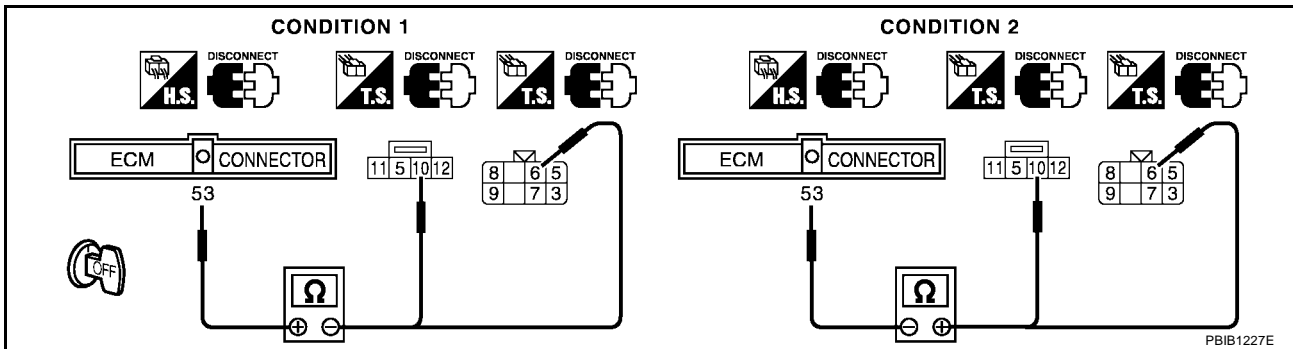
Check the following.

- Harness connectors E108, M19
- Harness connectors M58, F26
- Diode M55
- Harness for open and short between ECM and lighting switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 11. CHECK HEADLAMP INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Stop engine.
2. Disconnect ECM harness connector.
3. Disconnect lighting switch harness connector E114.  
Disconnect daytime light control unit harness connector.
4. Check harness continuity between ECM terminal 53 and lighting switch terminal 10, daytime light control unit terminal 6 under the following conditions.



Condition	Continuity
1	Should not exist
2	Should exist

5. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 19.  
NG >> GO TO 12.

## 12. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E108, M19
- Harness connectors M58, F26
- Diode M55
- Harness for open and short between ECM and lighting switch
- Harness for open and short between ECM and daytime light control unit

>> Repair open circuit or short to ground or short to power in harness or connectors.

### 13. CHECK HEATER FAN SWITCH FUNCTION

1. Start engine.
2. Turn the heater fan switch "ON" in any position.
3. Check that heater fan turns properly.

OK or NG

OK >> GO TO 14.

NG >> Refer to [MTC-19, "TROUBLE DIAGNOSIS"](#)

### 14. CHECK HEATER FAN INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Stop engine.
2. Disconnect ECM harness connector.
3. Disconnect air control connector.
4. Check harness continuity between ECM terminal 55 and air control terminal 8.

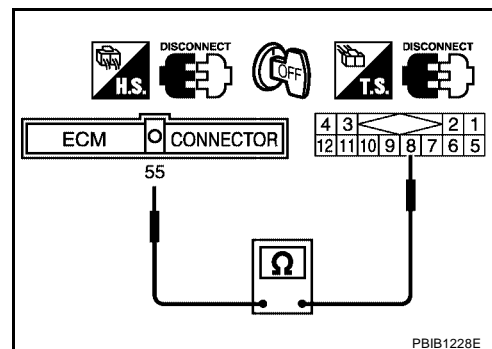
**Continuity should exist.**

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 19.

NG >> GO TO 15.



### 15. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M59, F27
- Harness for open and short between ECM and air control

>> Repair open circuit or short to ground or short to power in harness or connectors.

### 16. CHECK REAR WINDOW DEFOGGER FUNCTION

1. Start engine.
2. Turn "ON" the rear window defogger switch.
3. Check the rear windshield. Is the rear windshield heated up?

Yes or No

Yes >> GO TO 17.

No >> Refer to [GW-17, "REAR WINDOW DEFOGGER"](#)

### 17. CHECK REAR WINDOW DEFOGGER INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Stop engine.
2. Disconnect ECM harness connector.
3. Disconnect rear window defogger relay.
4. Check harness continuity between ECM terminal 52 and rear window defogger terminal 5, 7.

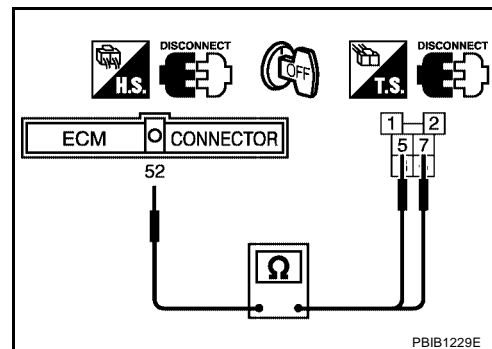
**Continuity should exist.**

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 19.

NG >> GO TO 18.



---

## 18. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors B1, M14
- Harness connectors M56, F26
- Harness for open and short between ECM and rear window defogger relay.

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 19. CHECK INTERMITTENT INCIDENT

---

Perform [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> INSPECTION END



# ASCD BRAKE SWITCH

[QR25DE]

PF25320

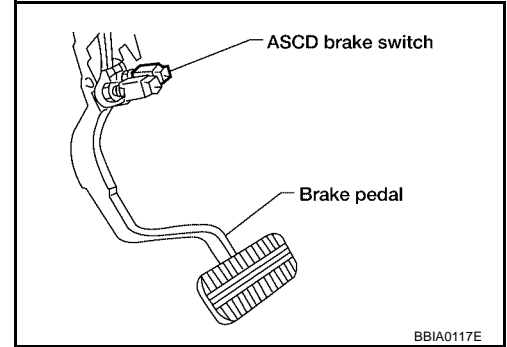
UBS002MV

## ASCD BRAKE SWITCH

### Component Description

When depress on the brake pedal, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal)

Refer to [EC-1860, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.



### CONSULT-II Reference Value in Data Monitor Mode

UBS002MV

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW1 (ASCD brake switch)	● Ignition switch: ON	● Brake pedal: Fully released	ON
		● Brake pedal: Slightly	OFF
BRAKE SW2 (Stop lamp switch)	● Ignition switch: ON	● Brake pedal: Fully released	OFF
		● Brake pedal: Depressed	ON



# ASCD BRAKE SWITCH

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
40	R/G	Stop lamp switch	<b>[Engine is running]</b> ● Brake pedal fully released	Approximately 0V
			<b>[Engine is running]</b> ● Brake pedal depressed	BATTERY VOLTAGE (11 - 14V)
56	P/L	ASCD brake switch	<b>[Ignition switch "ON"]</b> ● Brake pedal is depressed ● Clutch pedal is depressed (M/T models)	Approximately 0V
			<b>[Ignition switch "ON"]</b> ● Brake pedal is fully released ● Clutch pedal is fully released (M/T models)	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

### 1. CHECK OVERALL FUNCTION-I

UBS002MY

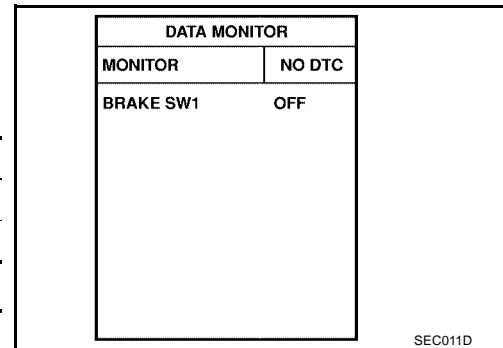
**Ⓜ With CONSULT-II**

- Turn ignition switch "ON".
- Select "BRAKE SW1" in "DATA MONITOR" mode with CONSULT-II.
- Check "BRAKE SW1" indication under the following conditions.  
**M/T models**

CONDITION	INDICATION
When clutch pedal or brake pedal is depressed	OFF
When clutch pedal and brake pedal are fully released	ON

**A/T models**

CONDITION	INDICATION
When brake pedal is depressed	OFF
When brake pedal is fully released	ON



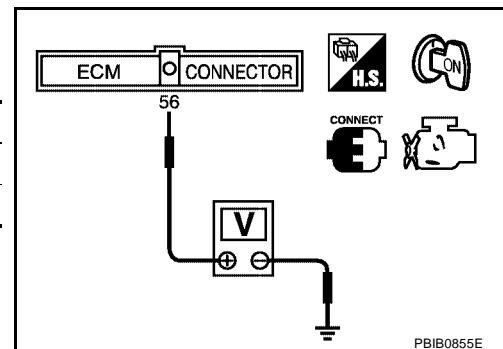
**⊗ Without CONSULT-II**

- Turn ignition switch "ON".
- Check voltage between ECM terminal 56 and ground under the following conditions.  
**M/T models**

CONDITION	VOLTAGE
When clutch pedal or brake pedal is depressed	Approximately 0V
When clutch pedal and brake pedal are fully released	Battery voltage

**A/T models**

CONDITION	VOLTAGE
When brake pedal is depressed	Approximately 0V
When brake pedal is fully released	Battery voltage



OK or NG

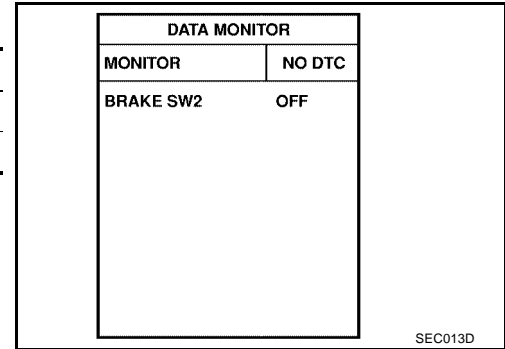
- OK >> GO TO 2.
- NG (M/T models) >>GO TO 3.
- NG (A/T models) >>GO TO 4.

## 2. CHECK OVERALL FUNCTION-II

**④ With CONSULT-II**

Check "BRAKE SW2" indication in "DATA MONITOR" mode.

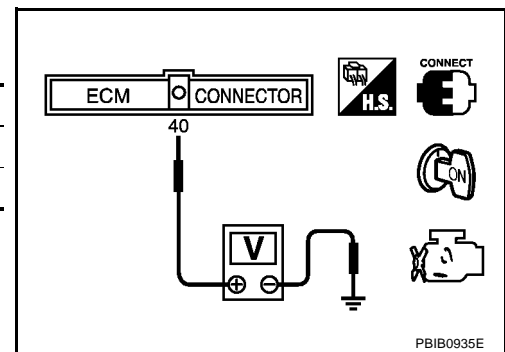
CONDITION	INDICATION
When brake pedal is released	OFF
When brake pedal is depressed	ON



**⊗ Without CONSULT-II**

Check voltage between ECM terminal 40 and ground under the following conditions.

CONDITION	VOLTAGE
When brake pedal is released	Approximately 0V
When brake pedal is depressed	Battery voltage

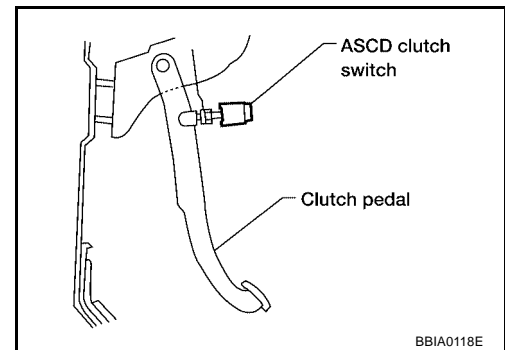


OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 13.

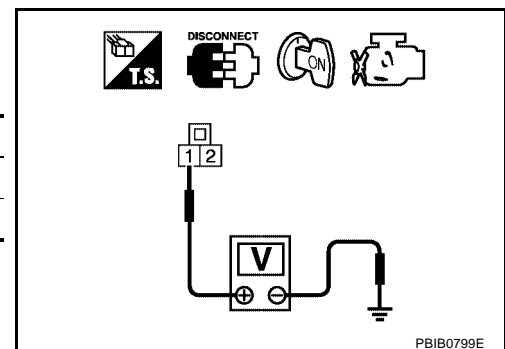
## 3. CHECK ASCD BRAKE SWITCH CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch "ON".



4. Check voltage between ASCD clutch switch terminal 1 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
When brake pedal is released	Battery voltage
When brake pedal is depressed	Approx. 0V

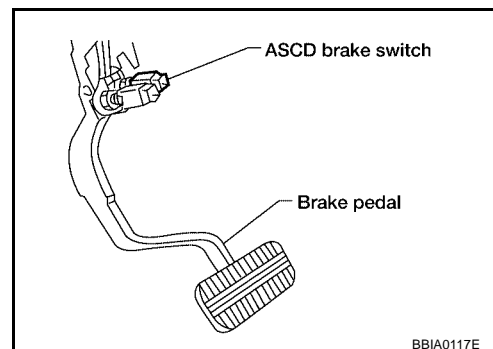


OK or NG

- OK >> GO TO 10.
- NG >> GO TO 4.

## 4. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch "ON".

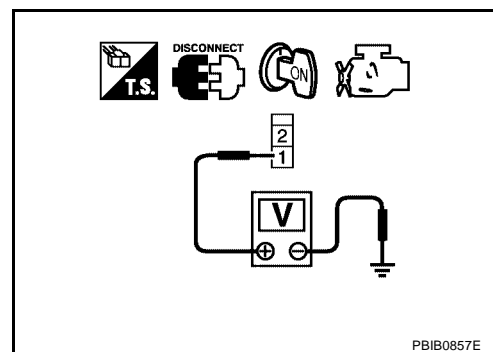


4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK (M/T models)>>GO TO 6.
- OK (A/T models)>>GO TO 7.
- NG >> GO TO 5.



## 5. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M1
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

## 6. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Check harness continuity between ASCD brake switch terminal 2 and ASCD clutch switch terminal 1. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 9.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 7. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 56 and ASCD brake switch terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 9.  
NG >> GO TO 8.

---

## 8. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and ASCD brake switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 9. CHECK ASCD BRAKE SWITCH

---

Refer to [EC-1738, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.  
NG >> Replace ASCD brake switch.

---

## 10. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

---

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 56 and ASCD clutch switch terminal 2.  
Refer to Wiring Diagram.

**Continuity should exist.**

4. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 12.  
NG >> GO TO 11.

---

## 11. DETECT MALFUNCTIONING PART

---

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and ASCD clutch switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 12. CHECK ASCD CLUTCH SWITCH

---

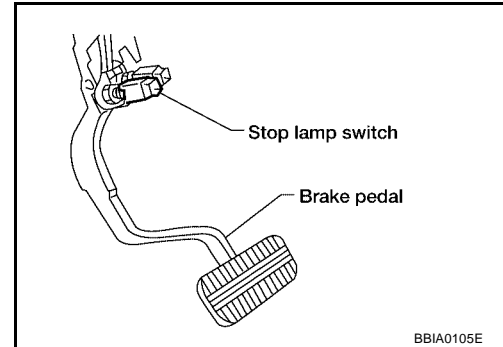
Refer to [EC-1738, "Component Inspection"](#)

OK or NG

- OK >> GO TO 18.  
NG >> Replace ASCD clutch switch.

### 13. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect stop lamp switch harness connector.

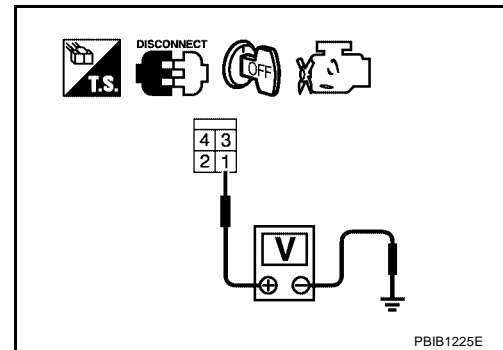


3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT -II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 15.
- NG >> GO TO 14.



### 14. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M2
- 10A fuse
- Harness for open or short between stop lamp switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

### 15. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 40 and stop lamp switch terminal 1. Refer to Wiring Diagram.

**Continuity should exist.**

3. Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 17.
- NG >> GO TO 16.

### 16. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M59, F27
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

---

## 17. CHECK STOP LAMP SWITCH

---

Refer to [EC-1738, "Component Inspection"](#) .

OK or NG

OK >> GO TO 18.

NG >> Replace stop lamp switch.

---

## 18. CHECK INTERMITTENT INCIDENT

---

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

>> **INSPECTION END**



**ASCD INDICATOR**

**Component Description**

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.

CRUISE indicator illuminates when CRUISE switch on ASCD steering switch is turned ON to indicated that ASCD system is ready for operation.

SET indicator illuminates when following conditions are met.

- CRUISE indicator is illuminated.
- SET switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET indicator remains lit during ASCD control.

Refer to [EC-1860, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\)"](#) for the ASCD function.

**CONSULT-II Reference Value in Data Monitor Mode**

Specification data are reference value.

MONITOR ITEM	CONDITION		SPECIFICATION
CRUISE LAMP	● Ignition switch: ON	● CRUISE switch is depressed at first time → second time	ON → OFF
SET LAMP	● CRUISE switch: ON ● When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH)	● SET switch pressed	ON
		● ASCD control is canceled	OFF

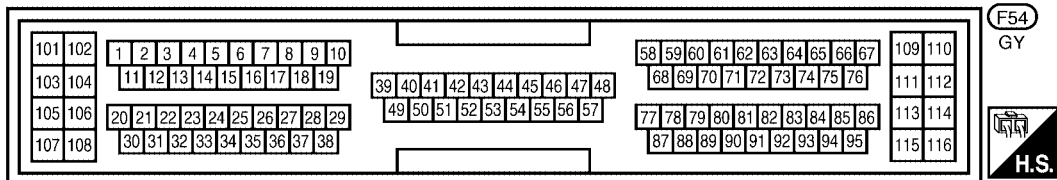
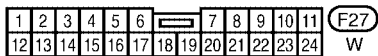
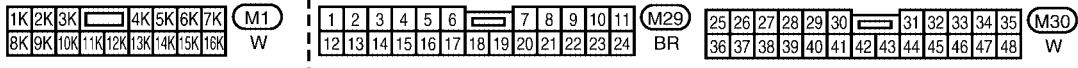
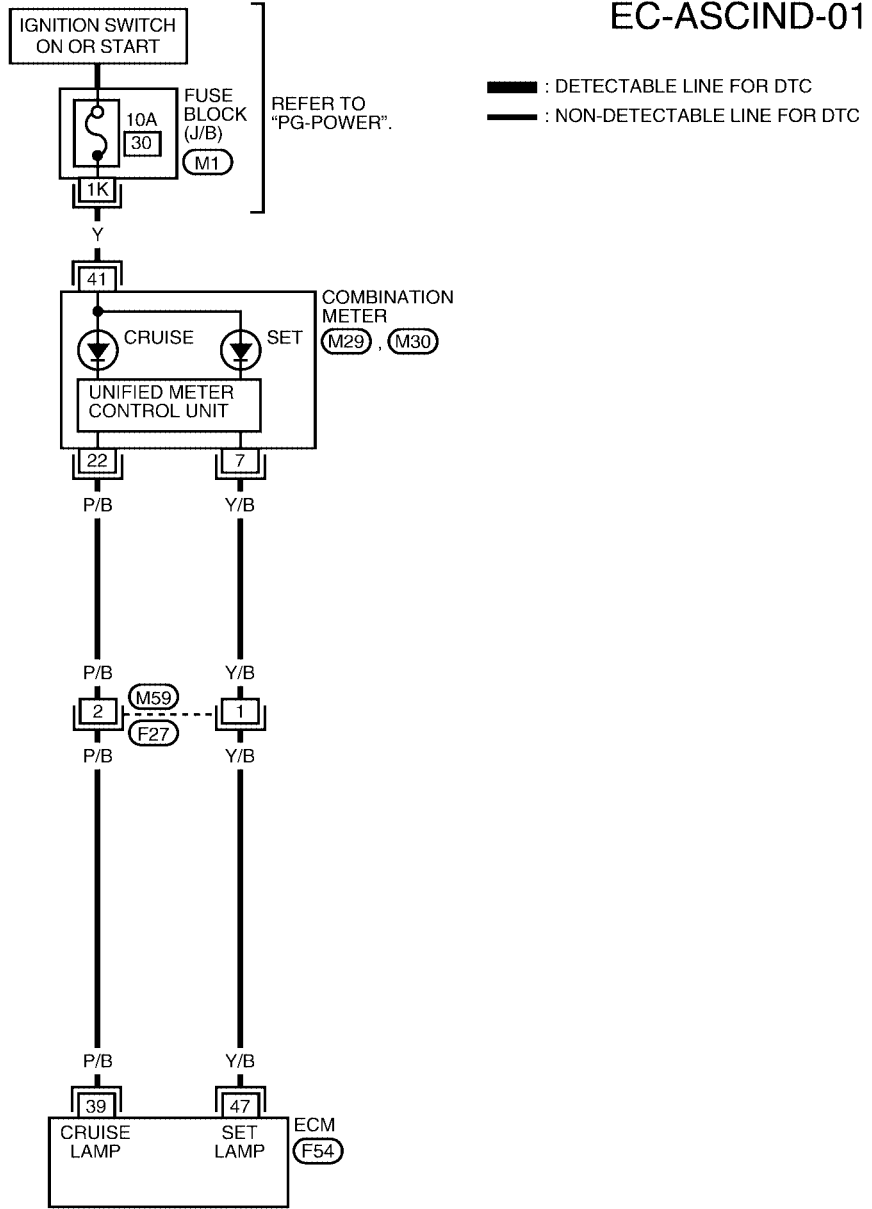
# ASC D INDICATOR

[QR25DE]

UBS002N1

## Wiring Diagram

EC-ASCIND-01



BBWA0426E

# ASCD INDICATOR

[QR25DE]

Specification data are reference values and are measured between each terminal and ground.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
39	P/B	ASCD CRUISE lamp	<b>[Ignition switch "ON"]</b> ● CRUISE switch is depressed at first time → second time	Approximately 0V ↓ BATTERY VOLTAGE (11 - 14V)
47	Y/B	ASCD SET lamp	<b>[Engine is running]</b> ● SET switch is "ON". ● ASCD control is operating.	Approximately 0V
			<b>[Engine is running]</b> ● ASCD control is not operating.	BATTERY VOLTAGE (11 - 14V)

## Diagnostic Procedure

UBS002N2

### 1. CHECK OVERALL FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	CONDITION		SPECIFICATION
CRUISE lamp	● Ignition switch: ON	● CRUISE switch is depressed at first time → second time	ON → OFF
SET lamp	● CRUISE switch: ON ● When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH)	● SET switch pressed	ON
		● ASCD control is canceled	OFF

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 2.

### 2. CHECK COMBINATION METER OPERATION

Does combination meter operate normally?

Yes or No

- Yes >> GO TO 3.
- No >> Check combination meter circuit. Refer to [DI-8, "Combination Meter"](#).

### 3. CHECK ASCD INDICATOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch "OFF".
2. Disconnect combination meter harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

ECM terminal	Combination meter terminal
39	22
47	7

**Continuity should exist.**

5. Also check harness for short to ground or short to power.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 4.

## 4. DETECT MALFUNCTIONING PART

Check the following.

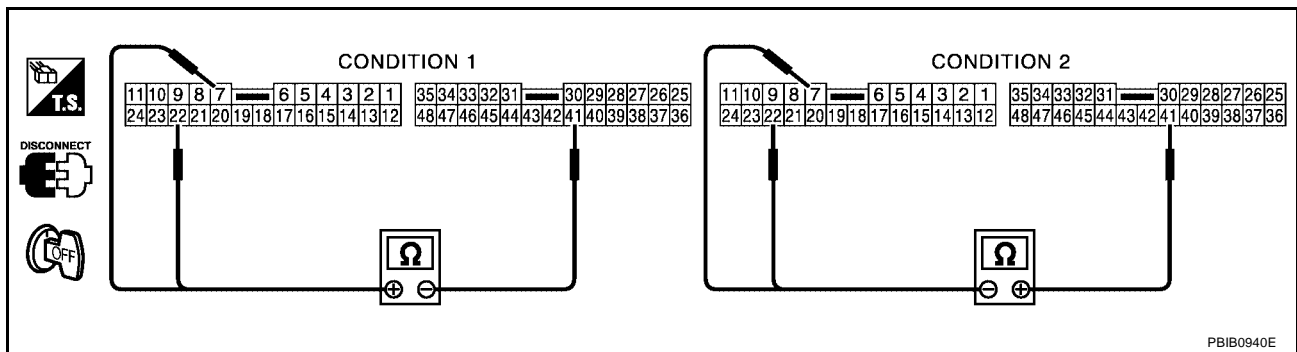
- Harness connectors M59, F27
- Harness for open and short between ECM and combination meter

>> Repair open circuit or short to ground or short to power in harness or connectors

## 5. CHECK COMBINATION METER

Check continuity under the following conditions.

CONDITION	Combination meter terminal No. (Polarity)	Continuity
1	7 (+) - 41 (-)	Should not exist.
	22 (+) - 41 (-)	
2	41 (+) - 7 (-)	Should exist.
	41 (+) - 22 (-)	



OK or NG

- OK >> GO TO 6.
- NG >> Replace combination meter. Refer to [DI-8](#).

## 6. CHECK INTERMITTENT INCIDENT

Refer to [EC-1341, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#).

>> INSPECTION END

# DATA LINK CONNECTOR

[QR25DE]

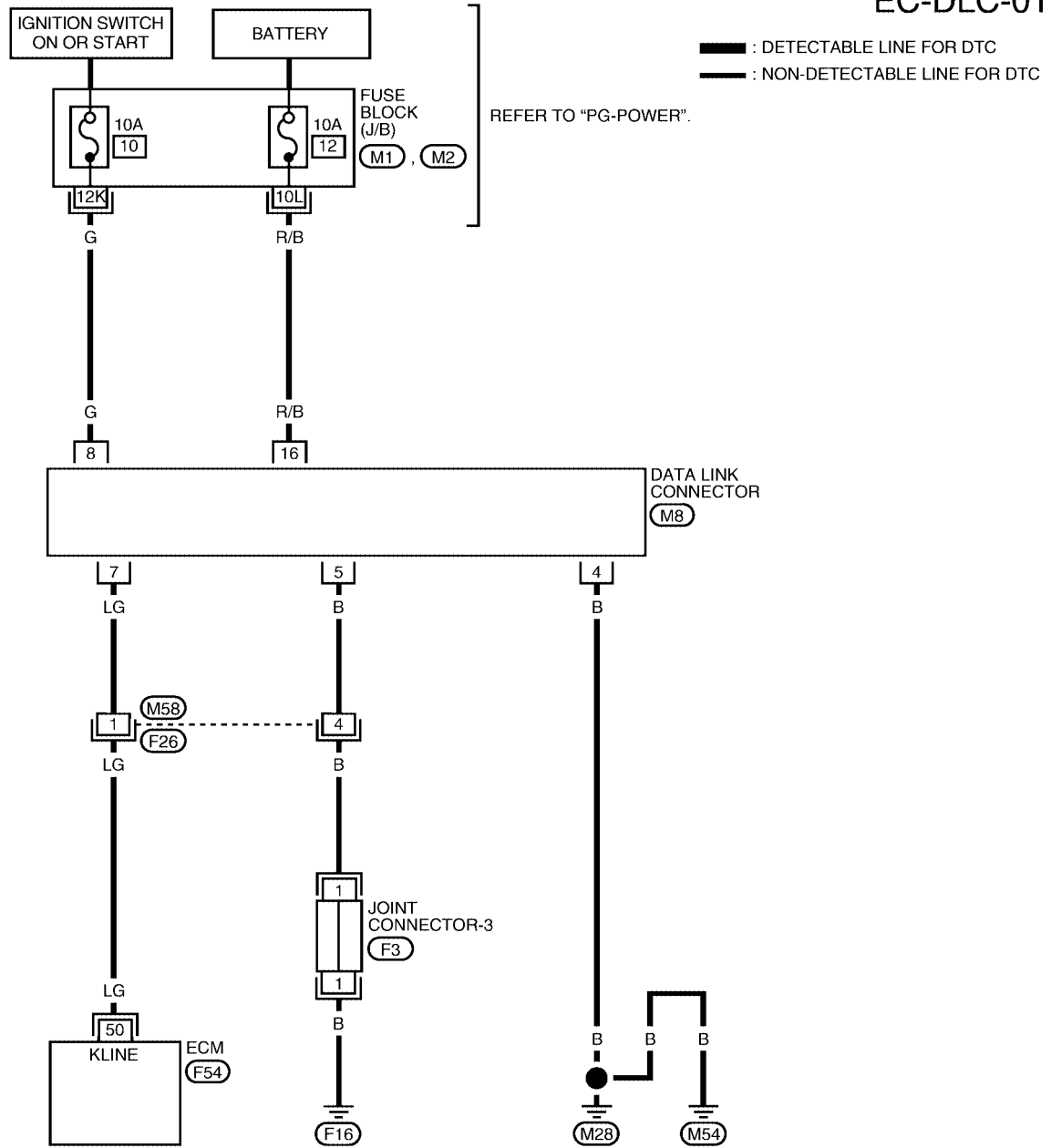
## DATA LINK CONNECTOR

PFP:24814

### Wiring Diagram

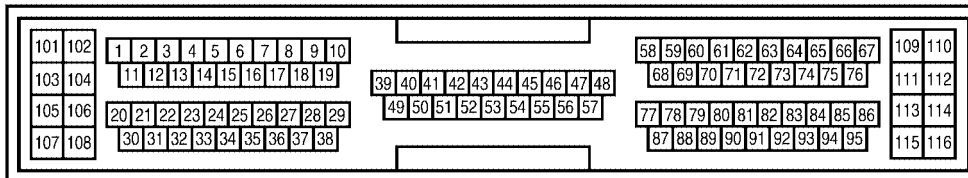
EBS00KLH

### EC-DLC-01



REFER TO THE FOLLOWING.

- M1, M2 - FUSE BLOCK
- JUNCTION BOX (J/B)
- F3 - JOINT CONNECTOR



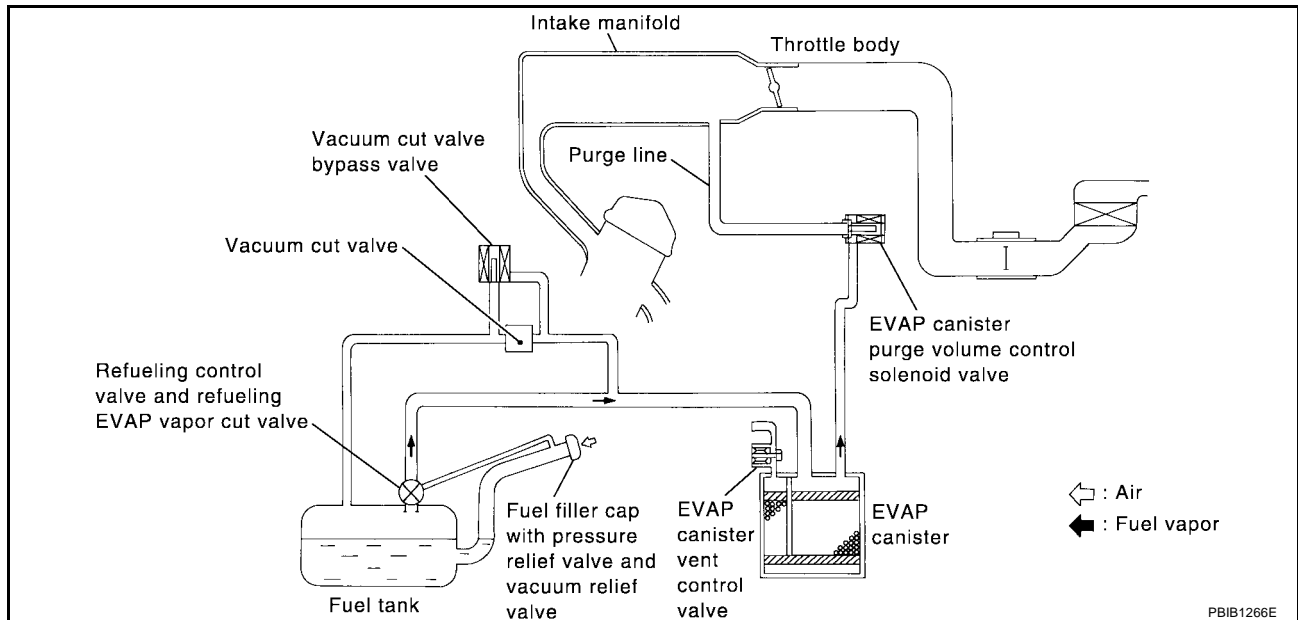
BBWA0427E

## EVAPORATIVE EMISSION SYSTEM

PFP:14950

### Description SYSTEM DESCRIPTION

UBS002N4

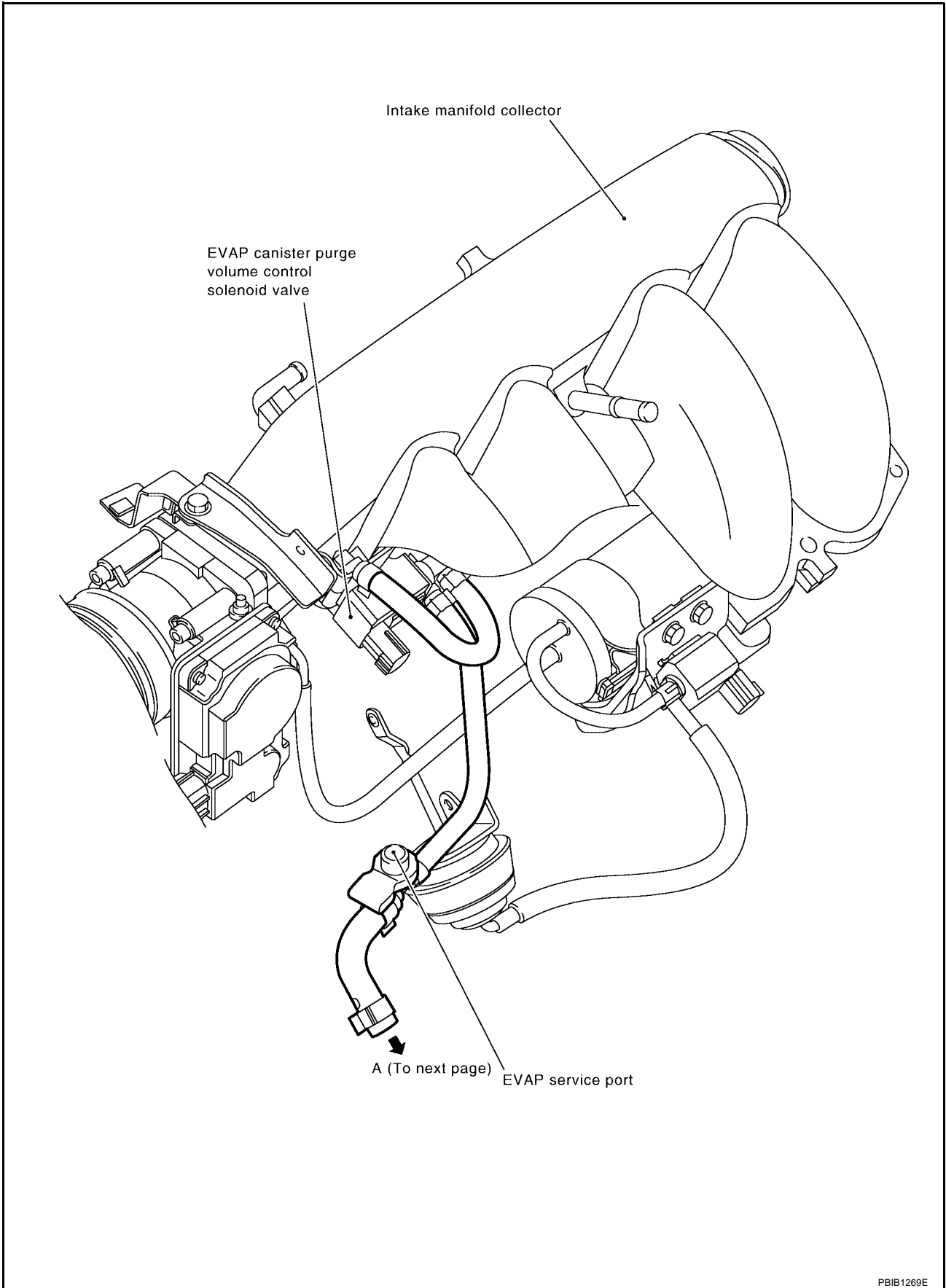


The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister. The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank. The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases. EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating and idling.

# EVAPORATIVE EMISSION SYSTEM

[QR25DE]

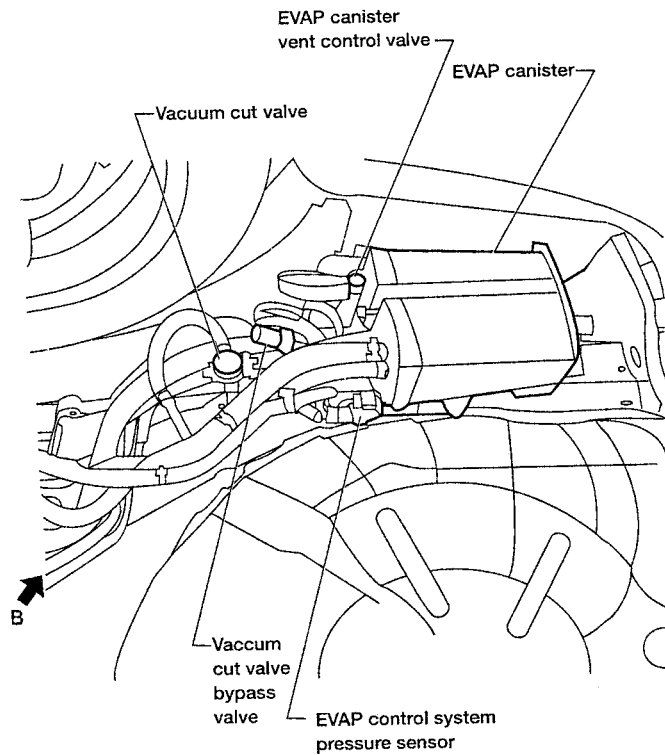
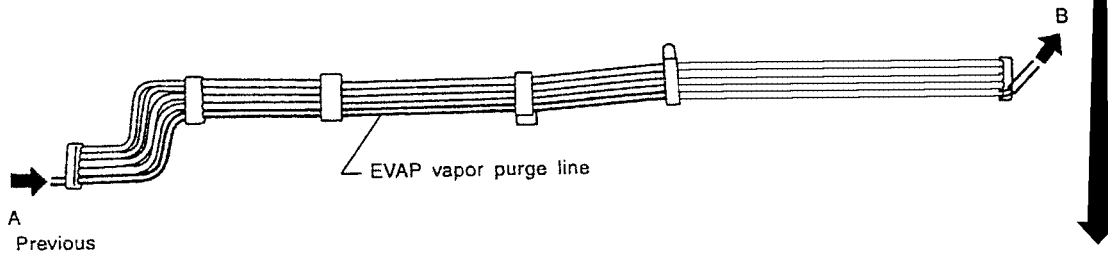
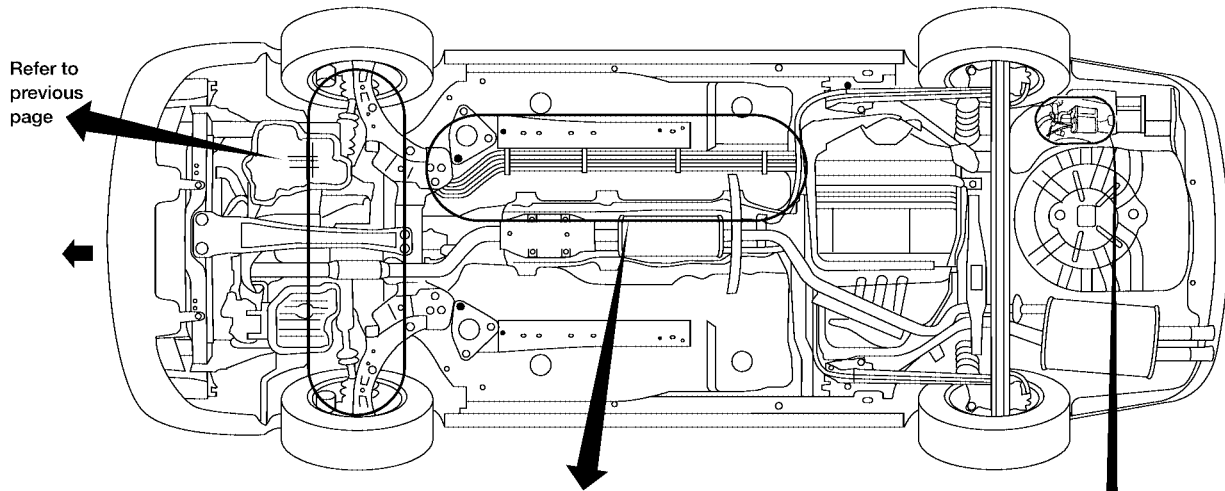
## EVAPORATIVE EMISSION LINE DRAWING



A  
EC  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

# EVAPORATIVE EMISSION SYSTEM

[QR25DE]



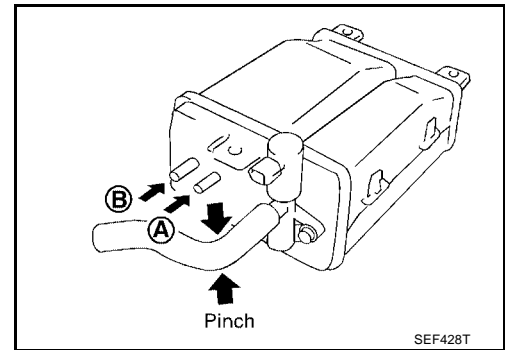
BBIA0212E



## Component Inspection EVAP CANISTER

Check EVAP canister as follows:

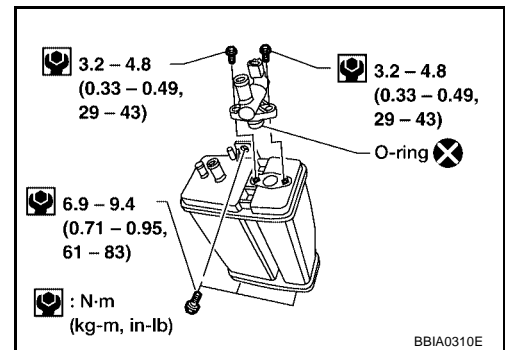
1. Pinch the fresh air hose.
2. Blow air into port **A** and check that it flows freely out of port **B**.



## Tightening Torque

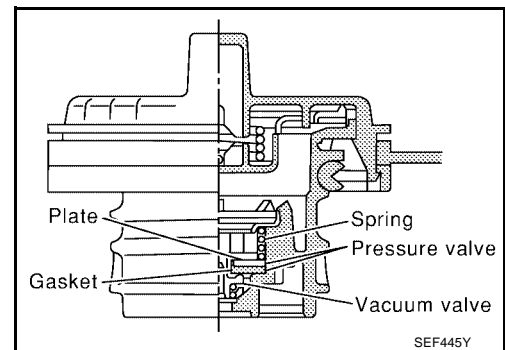
Tighten EVAP canister as shown in the figure.

**Make sure new O-ring is installed properly between EVAP canister and EVAP canister vent control valve.**



## FUEL TANK VACUUM RELIEF VALVE (BUILT INTO FUEL FULLER CAP)

1. Wipe clean valve housing.



2. Check valve opening pressure and vacuum.

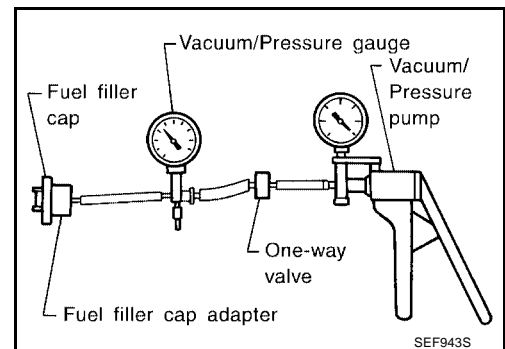
**Pressure:** 15.3 - 20.0 kPa  
(0.156 - 0.204 kg/cm<sup>2</sup>, 2.22 - 2.90 psi)

**Vacuum:** -6.0 to -3.4 kPa  
(-0.061 to -0.035 kg/cm<sup>2</sup>, -0.87 to -0.48 psi)

3. If out of specification, replace fuel filler cap as an assembly.

### CAUTION:

**Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.**



## VACUUM CUT VALVE AND VACUUM CUT VALVE BYPASS VALVE

Refer to [EC-1712](#).

## EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

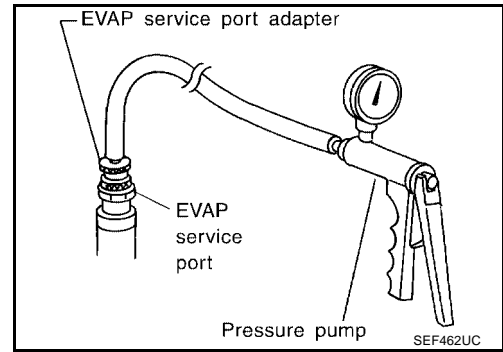
Refer to [EC-1526](#).

## FUEL TANK TEMPERATURE SENSOR

Refer to [EC-1456](#).

## EVAP SERVICE PORT

Positive pressure is delivered to the EVAP system through the EVAP service port. If fuel vapor leakage in the EVAP system occurs, use a leak detector to locate the leak.



UBS002N6

## How to Detect Fuel Vapor Leakage

### CAUTION:

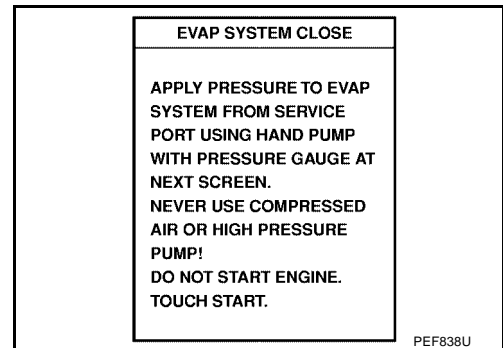
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm<sup>2</sup>, 0.6 psi) of pressure in EVAP system.

### NOTE:

- Do not start engine.
- Improper installation of EVAP service port adapter to the EVAP service port may cause a leak.

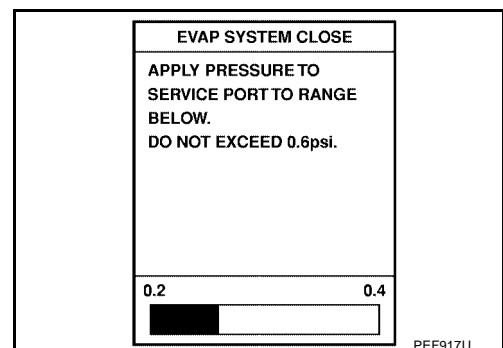
### Ⓟ WITH CONSULT-II

1. Attach the EVAP service port adapter securely to the EVAP service port.
2. Also attach the pressure pump and hose to the EVAP service port adapter.
3. Turn ignition switch "ON".
4. Select the "EVAP SYSTEM CLOSE" of "WORK SUPPORT MODE" with CONSULT-II.
5. Touch "START". A bar graph (Pressure indicating display) will appear on the screen.



PEF838U

6. Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
7. Remove EVAP service port adapter and hose with pressure pump.

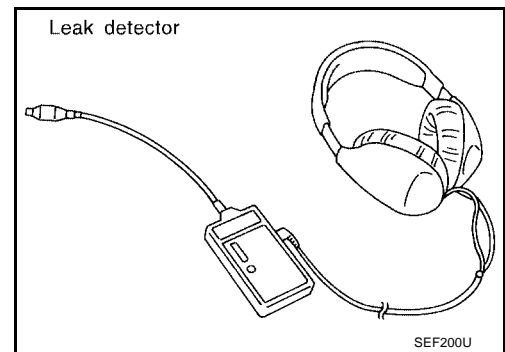


PEF917U

# EVAPORATIVE EMISSION SYSTEM

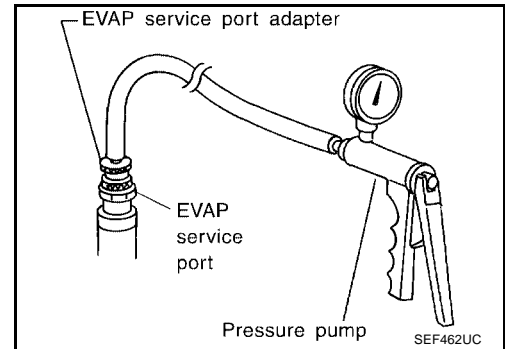
[QR25DE]

8. Locate the leak using a leak detector. Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#).

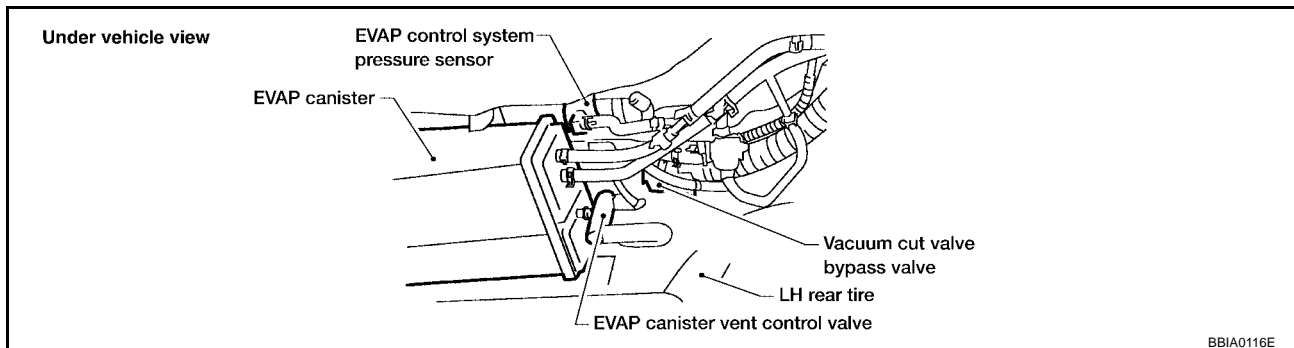


⊗ **WITHOUT CONSULT-II**

1. Attach the EVAP service port adapter securely to the EVAP service port.
2. Also attach the pressure pump with pressure gauge to the EVAP service port adapter.



3. Apply battery voltage to between the terminals of both EVAP canister vent control valve and vacuum cut valve bypass valve to make a closed EVAP system.



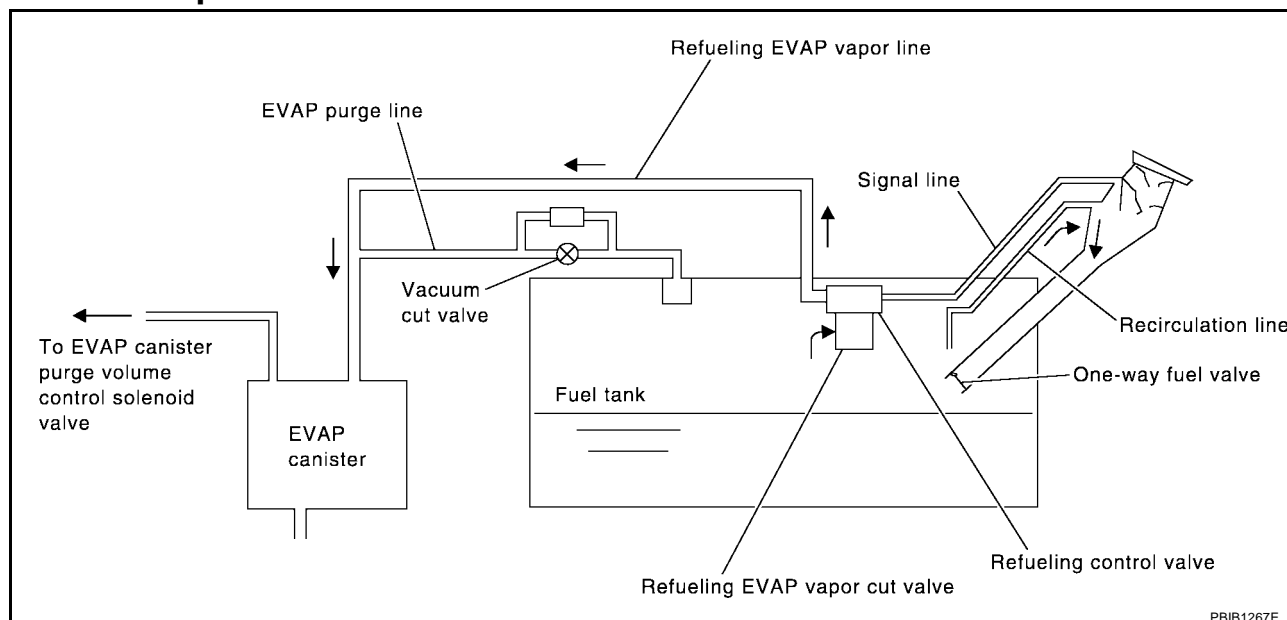
4. To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm<sup>2</sup>, 0.2 to 0.4 psi).
5. Remove EVAP service port adapter and hose with pressure pump.
6. Locate the leak using a leak detector. Refer to [EC-1847, "EVAPORATIVE EMISSION LINE DRAWING"](#).

## ON BOARD REFUELING VAPOR RECOVERY (ORVR)

PFP:00032

## System Description

UBS002N7



PBIB1267E

From the beginning of refueling, the fuel tank pressure goes up. When the pressure reaches the setting value of the refueling control valve (RCV) opening pressure, the RCV is opened. After RCV opens, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve, RCV and refueling vapor line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is released to the atmosphere.

When the refueling has reached the full level of the fuel tank, the refueling EVAP vapor cut valve is closed and refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.

The RCV is always closed during driving and the evaporative emission control system is operated the same as conventional system.

**WARNING:**

When conducting inspections below, be sure to observe the following:

- Put a "CAUTION: INFLAMMABLE" sign in workshop.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Be sure to furnish the workshop with a CO<sub>2</sub> fire extinguisher.

**CAUTION:**

- Before removing fuel line parts, carry out the following procedures:
  - Put drained fuel in an explosion-proof container and put lid on securely.
  - Release fuel pressure from fuel line. Refer to [EC-1257, "FUEL PRESSURE RELEASE"](#).
  - Disconnect battery ground cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Do not kink or twist hose and tube when they are installed.
- Do not tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leaks at connection.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.

## Diagnostic Procedure

**SYMPTOM: FUEL ODOR FROM EVAP CANISTER IS STRONG.**

### 1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Weigh the EVAP canister with EVAP canister vent control valve attached.  
The weight should be less than 1.8 kg (4.0 lb).

OK or NG

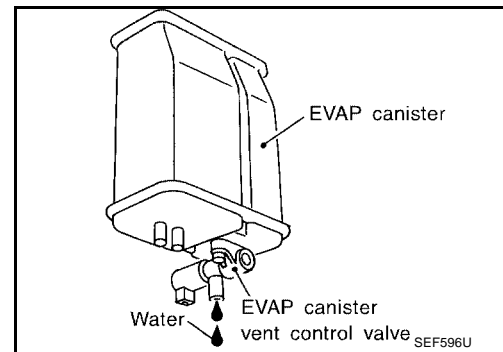
- OK    >> GO TO 2.  
NG    >> GO TO 3.

### 2. CHECK IF EVAP CANISTER SATURATED WITH WATER

Does water drain from the EVAP canister?

Yes or No

- Yes    >> GO TO 3.  
No    >> GO TO 5.



### 3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 4.

### 4. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

### 5. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-1855, "Component Inspection"](#) .

OK or NG

- OK    >> GO TO 6.  
NG    >> Replace refueling EVAP vapor cut valve with fuel tank.

### 6. CHECK REFUELING CONTROL VALVE

Refer to [EC-1855, "Component Inspection"](#) .

OK or NG

- OK    >> **INSPECTION END**  
NG    >> Replace refueling control valve with fuel tank.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QR25DE]

**SYMPTOM: CANNOT REFUEL/FUEL ODOR FROM THE FUEL FILLER OPENING IS STRONG WHILE REFUELING.**

## 1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve attached.
2. Weigh the EVAP canister with EVAP canister vent control valve attached.  
The weight should be less than 1.8 kg (4.0 lb).

OK or NG

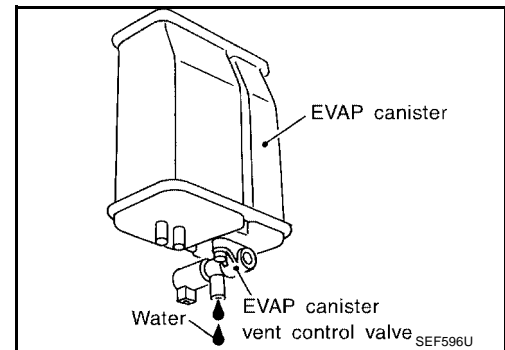
- OK >> GO TO 2.  
NG >> GO TO 3.

## 2. CHECK IF EVAP CANISTER SATURATED WITH WATER

Does water drain from the EVAP canister?

Yes or No

- Yes >> GO TO 3.  
No >> GO TO 5.



## 3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 4.

## 4. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle frame for clogging or poor connection.

>> Repair or replace EVAP hose.

## 5. CHECK VENT HOSES AND VENT TUBES

Check hoses and tubes between EVAP canister and refueling control valve for clogging, kink, looseness and improper connection.

OK or NG

- OK >> GO TO 6.  
NG >> Repair or replace hoses and tubes.

## 6. CHECK FILLER NECK TUBE

Check signal line and recirculation line for clogging, dents and cracks.

OK or NG

- OK >> GO TO 7.  
NG >> Replace filler neck tube.

## 7. CHECK REFUELING CONTROL VALVE

Refer to [EC-1855, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.  
NG >> Replace refueling control valve with fuel tank.

## 8. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to [EC-1855, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace refueling EVAP vapor cut valve with fuel tank.

## 9. CHECK FUEL FILLER TUBE

Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.

OK or NG

- OK >> GO TO 10.
- NG >> Replace fuel filler tube.

## 10. CHECK ONE-WAY FUEL VALVE-I

Check one-way valve for clogging.

OK or NG

- OK >> GO TO 11.
- NG >> Repair or replace one-way fuel valve with fuel tank.

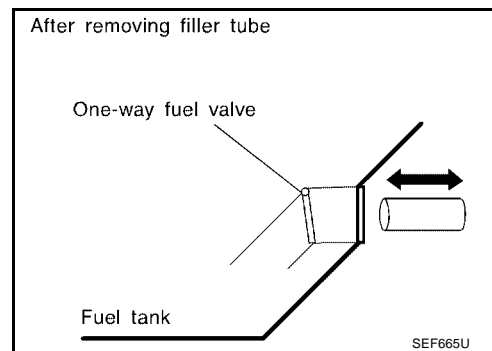
## 11. CHECK ONE-WAY FUEL VALVE-II

1. Make sure that fuel is drained from the tank.
2. Remove fuel filler tube and hose.
3. Check one-way fuel valve for operation as follows.  
When a stick is inserted, the valve should open, when removing stick it should close.

**Do not drop any material into the tank.**

OK or NG

- OK >> **INSPECTION END**
- NG >> Replace fuel filler tube or replace one-way fuel valve with fuel tank.



### Component Inspection REFUELING EVAP VAPOR CUT VALVE

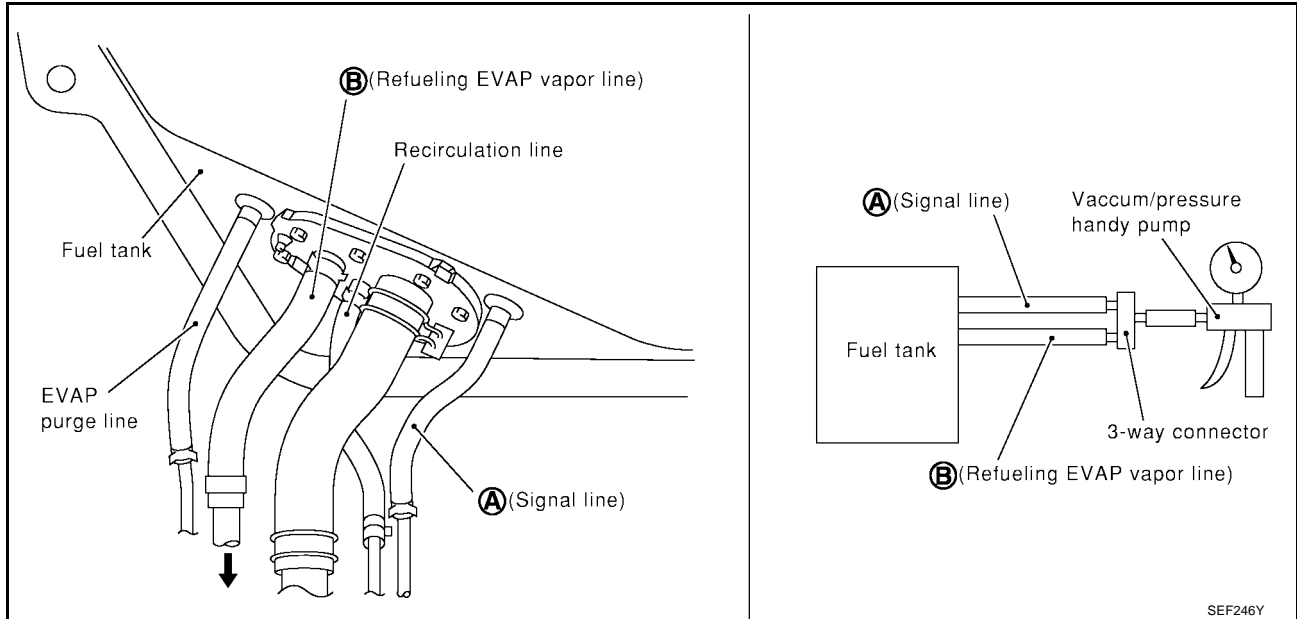
#### Ⓟ With CONSULT-II

1. Remove fuel tank. Refer to [FL-7, "FUEL TANK"](#) .
2. Drain fuel from the tank as follows:
  - a. Remove fuel feed hose located on the fuel gauge retainer.
  - b. Connect a spare fuel hose, one side to fuel gauge retainer where the hose was removed and the other side to a fuel container.
  - c. Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-II.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.  
Blow air into the refueling EVAP vapor cut valve (from hose end **B** ), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows.
  - a. Connect vacuum pump to hose ends **A** and **B** using a suitable 3-way connector.
  - b. Remove fuel gauge retainer with fuel gauge unit.  
**Always replace O-ring with new one.**
  - c. Put fuel tank upside down.

# ON BOARD REFUELING VAPOR RECOVERY (ORVR)

[QR25DE]

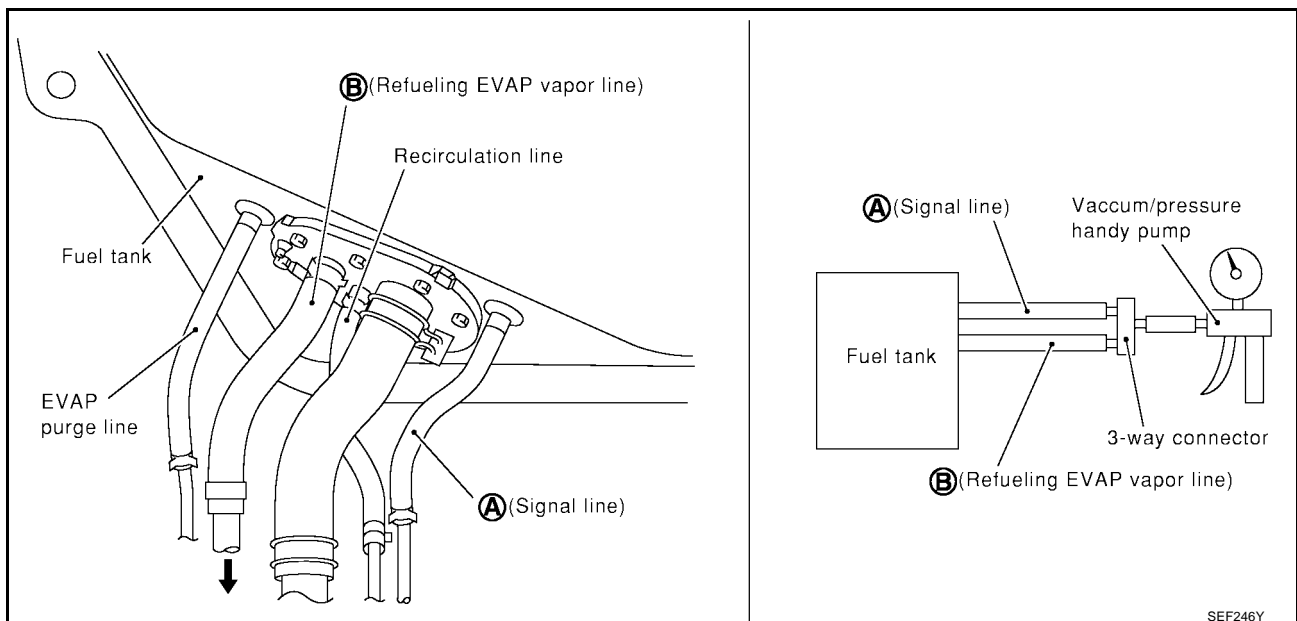
- d. Apply vacuum pressure to both hose ends **A** and **B** [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



SEF246Y

## With GST

1. Remove fuel tank. Refer to [FL-7, "FUEL TANK"](#).
2. Drain fuel from the tank as follows:
  - a. Remove fuel gauge retainer.
  - b. Drain fuel from the tank using a hand pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows. Blow air into the refueling EVAP vapor cut valve (from hose end **B**), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows.
  - a. Connect vacuum pump to hose ends **A** and **B** using a suitable 3-way connector.
  - b. Remove fuel gauge retainer with fuel gauge unit.  
**Always replace O-ring with new one.**
  - c. Put fuel tank upside down.
  - d. Apply vacuum pressure to both hose ends **A** and **B** [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.

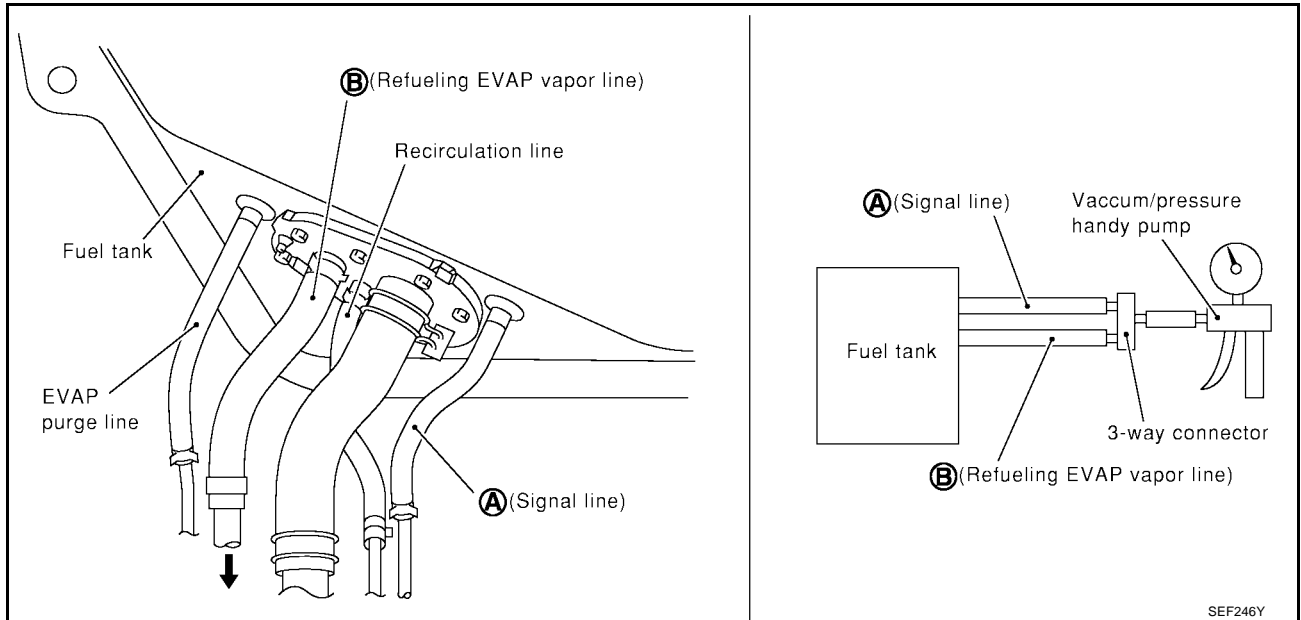


SEF246Y



## REFUELING CONTROL VALVE

1. Remove fuel filler cap.
2. Check air continuity between hose ends **A** and **B**.  
Blow air into the hose end **B**. Air should flow freely into the fuel tank.
3. Blow air into hose end **A** and check there is no leakage.
4. Apply pressure to both hose ends **A** and **B** [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.



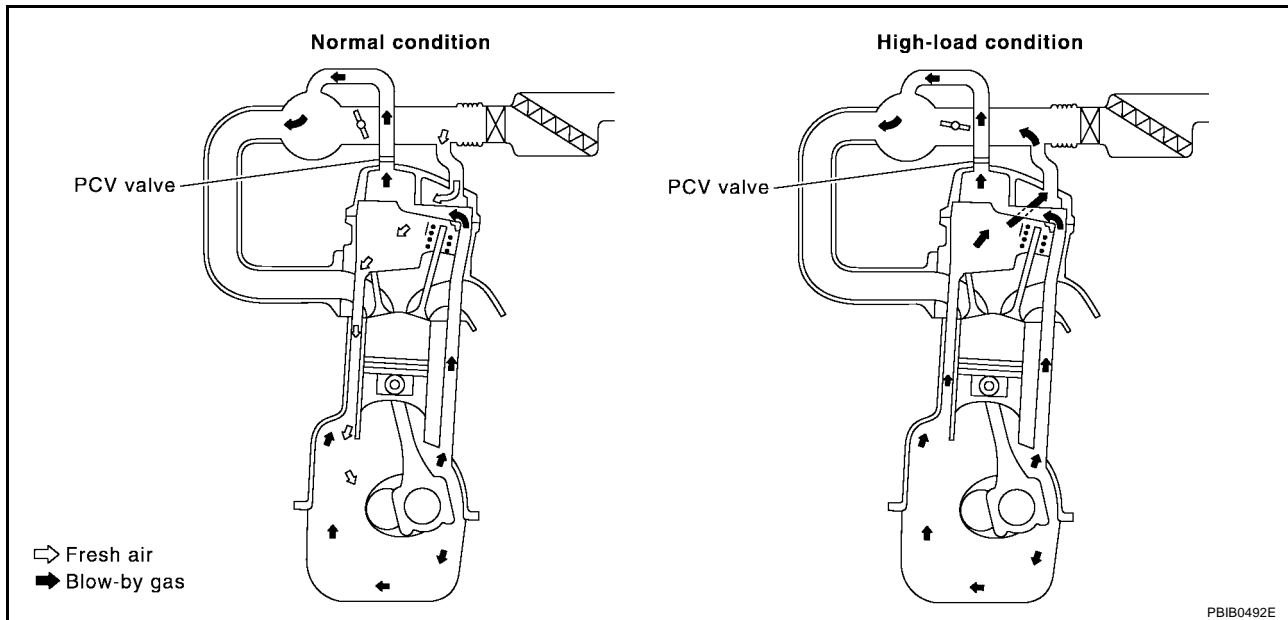
SEF246Y

POSITIVE CRANKCASE VENTILATION

PF1:11810

Description  
SYSTEM DESCRIPTION

UBS002NA

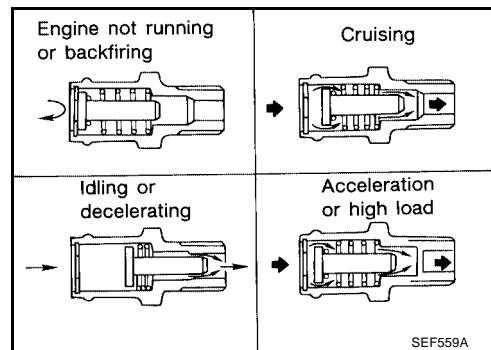


PBIB0492E

This system returns blow-by gas to the intake manifold.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold. During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve. Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air. The ventilating air is then drawn from the air inlet tubes into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover. Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.

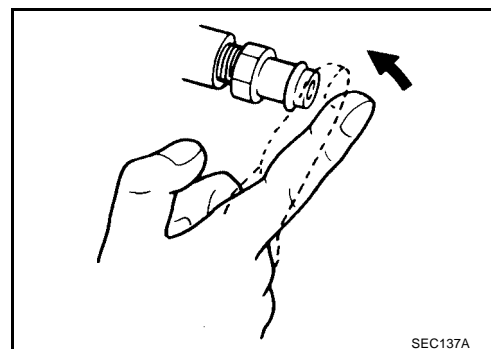


SEF559A

Component Inspection  
PCV (POSITIVE CRANKCASE VENTILATION) VALVE

UBS002NB

With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over valve inlet.



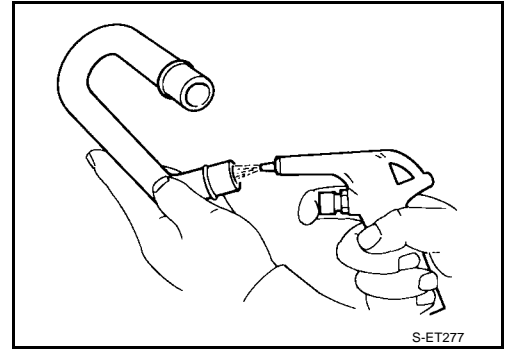
SEC137A

# POSITIVE CRANKCASE VENTILATION

[QR25DE]

## PCV VALVE VENTILATION HOSE

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace.



A

EC

C

D

E

F

G

H

I

J

K

L

M

# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[QR25DE]

## AUTOMATIC SPEED CONTROL DEVICE (ASCD)

PF1:18930

### System Description INPUT/OUTPUT SIGNAL CHART

UBS002NC

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation	ASCD vehicle speed control	Electric throttle control actuator
Stop lamp switch	Brake pedal operation		
ASCD clutch switch (MT models)	Clutch pedal operation		
ASCD steering switch	ASCD steering switch operation		
Park/Neutral position (PNP) switch (AT models)	Gear position		
Combination meter	Vehicle speed		
TCM	Power train revolution		

### BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.

Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH).

ECM controls throttle angle of electric throttle control actuator to regulate engine speed.

Operation status of ASCD is indicated by CRUISE indicator and SET indicator in combination meter. If any malfunction occurs in ASCD system, it automatically deactivates control.

### SET OPERATION

Press ASCD CRUISE switch (Main switch). (The CRUISE indicator in combination meter illuminates.)

When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH), press SET switch. (Then SET indicator in combination meter illuminates.)

### ACCEL OPERATION

If the RESUME/ACCEL switch is depressed during cruise control driving, increase the vehicle speed until the switch is released or vehicle speed reaches maximum speed controlled by the system.

And then ASCD will keep the new set speed.

### CANCEL OPERATION

When any of following conditions exist, cruise operation will be canceled.

- CANCEL switch is depressed
- Brake pedal is depressed
- Clutch pedal is depressed (M/T models)
- A/T selector lever is shifted to P or N position (A/T models)

If MAIN switch is turned to OFF during ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

### COAST OPERATION

When the SET/COAST switch is depressed during cruise control driving, decrease vehicle set speed until the switch is released. And then ASCD will keep the new set speed.

### RESUME OPERATION

When the RESUME/ACCEL switch is depressed after cancel operation other than depressing MAIN switch is performed, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must meet following conditions.

- Brake pedal is released.
- Clutch pedal is released (M/T models)
- A/T selector lever is in other than P and N positions (A/T models)
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 144 km/h (89 MPH)

# AUTOMATIC SPEED CONTROL DEVICE (ASCD)

[QR25DE]

UBS002ND

## Component Description

### ASCD STEERING SWITCH

Refer to [EC-1723](#).

### ASCD BRAKE SWITCH

Refer to [EC-1730](#).

### ASCD CLUTCH SWITCH

Refer to [EC-1730](#).

### STOP LAMP SWITCH

Refer to [EC-1730](#).

### ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to [EC-1604](#).

### ASCD INDICATOR

Refer to [EC-1841](#).

A

EC

C

D

E

F

G

H

I

J

K

L

M

# SERVICE DATA AND SPECIFICATIONS (SDS)

[QR25DE]

## SERVICE DATA AND SPECIFICATIONS (SDS)

PF0:00030

### Fuel Pressure

UBS002NE

Fuel pressure at idle	Approximately 350 kPa (3.57kg/cm <sup>2</sup> , 51psi)
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### Idle Speed and Ignition Timing

UBS002NF

Target idle speed	No-load*1 (in "P" or N" position)	700±50 rpm
Air conditioner: ON	In "P" or N" position	800 rpm or more
Ignition timing	In "P" or N" position	15°±5° BTDC

\*1: Under the following conditions:

- Air conditioner switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

### Calculated Load Value

UBS002NG

	Calculated load value % (Using CONSULT-II or GST)
At idle	10 - 35
At 2,500 rpm	10 - 35

### Mass Air Flow Sensor

UBS002NH

Supply voltage	Battery voltage (11 - 14V)
Output voltage at idle	1.1 - 1.5*V
Mass air flow (Using CONSULT-II or GST)	1.0 - 4.0 g·m/sec at idle* 4.0 - 10.0 g·m/sec at 2,500 rpm*

\*: Engine is warmed up to normal operating temperature and running under no-load.

### Intake Air Temperature Sensor

UBS002NI

Temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1
80 (176)	0.31 - 0.37

### Engine Coolant Temperature Sensor

UBS002NJ

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

### Heated Oxygen Sensor 1 Heater

UBS002NK

Resistance [at 25°C (77°F)]	2.3 - 4.3Ω
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### Heated Oxygen Sensor 2 Heater

UBS002NL

Resistance [at 25°C (77°F)]	2.3 - 4.3Ω
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### Crankshaft Position Sensor (POS)

UBS002NM

Refer to [EC-1494, "Component Inspection"](#) .

### Camshaft Position Sensor (PHASE)

UBS002NN

Refer to [EC-1500, "Component Inspection"](#) .

### Throttle Control Motor

UBS002NO

Resistance [at 25°C (77°F)]	Approximately 1 - 15Ω
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# SERVICE DATA AND SPECIFICATIONS (SDS)

[QR25DE]

## Injector

UBS002NP

Resistance [at 20°C (68°F)]	12.1 - 12.9Ω
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## Fuel Pump

UBS002NQ

Resistance [at 25°C (77°F)]	Approximately 1.0Ω
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