

ENGINE CONTROL SYSTEM

SECTION EC

GI
MA
EM
LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

CONTENTS

TROUBLE DIAGNOSIS - INDEX	8
Alphabetical & P No. Index for DTC	8
PRECAUTIONS	14
Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"	14
Precautions for On Board Diagnostic (OBD) System of Engine and A/T	14
Engine Fuel & Emission Control System	15
Precautions	16
Wiring Diagrams and Trouble Diagnosis	17
PREPARATION	18
Special Service Tools	18
Commercial Service Tools	18
ENGINE AND EMISSION CONTROL OVERALL SYSTEM	20
Engine Control Component Parts Location	20
Circuit Diagram	24
System Diagram	26
Vacuum Hose Drawing	27
System Chart	28
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION	29
Multiport Fuel Injection (MFI) System	29
Distributor Ignition (DI) System	31
Air Conditioning Cut Control	32
Fuel Cut Control (at no load & high engine speed)	33
Evaporative Emission System	33
On Board Refueling Vapor Recovery (ORVR)	39
Positive Crankcase Ventilation	48
BASIC SERVICE PROCEDURE	50
Fuel Pressure Release	50
Fuel Pressure Check	50
Fuel Pressure Regulator Check	51
Injector	51
Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment	53
Idle Air Volume Learning	65
ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION	67
Introduction	67
Two Trip Detection Logic	67
Emission-related Diagnostic Information	68
Malfunction Indicator Lamp (MIL)	81
OBD System Operation Chart	83
CONSULT-II	88
Generic Scan Tool (GST)	101
TROUBLE DIAGNOSIS - INTRODUCTION	103
Introduction	103
Work Flow	105
TROUBLE DIAGNOSIS - BASIC INSPECTION	107
Basic Inspection	107
TROUBLE DIAGNOSIS - GENERAL DESCRIPTION	123
DTC Inspection Priority Chart	123
Fail-safe Chart	124
Symptom Matrix Chart	125
CONSULT-II Reference Value in Data Monitor Mode	129
Major Sensor Reference Graph in Data Monitor Mode	131
ECM Terminals and Reference Value	134
TROUBLE DIAGNOSIS - SPECIFICATION VALUE ..	142
Description	142
Testing Condition	142
Inspection Procedure	142
Diagnostic Procedure	143
TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT	146
Description	146
Diagnostic Procedure	146
TROUBLE DIAGNOSIS FOR POWER SUPPLY	147
Main Power Supply and Ground Circuit	147
DTC P0100 MASS AIR FLOW SENSOR (MAFS)	154
Component Description	154
CONSULT-II Reference Value in Data Monitor Mode	154

CONTENTS (Cont'd)

ECM Terminals and Reference Value	154	Component Description	196
On Board Diagnosis Logic.....	155	CONSULT-II Reference Value in Data Monitor	
DTC Confirmation Procedure	155	Mode	196
Overall Function Check	157	ECM Terminals and Reference Value	196
Wiring Diagram	158	On Board Diagnosis Logic.....	197
Diagnostic Procedure	159	DTC Confirmation Procedure	197
Component Inspection.....	162	Overall Function Check	198
DTC P0105 ABSOLUTE PRESSURE SENSOR	163	Wiring Diagram	199
Component Description	163	Diagnostic Procedure	200
On Board Diagnosis Logic.....	163	Component Inspection.....	202
DTC Confirmation Procedure	163	DTC P0131 HEATED OXYGEN SENSOR 1	
Diagnostic Procedure	164	(FRONT) (LEAN SHIFT MONITORING)	204
DTC P0110 INTAKE AIR TEMPERATURE		Component Description	204
SENSOR	165	CONSULT-II Reference Value in Data Monitor	
Component Description	165	Mode	204
On Board Diagnosis Logic.....	165	ECM Terminals and Reference Value	204
DTC Confirmation Procedure	165	On Board Diagnosis Logic.....	205
Wiring Diagram	167	DTC Confirmation Procedure	205
Diagnostic Procedure	168	Overall Function Check	206
Component Inspection.....	170	Diagnostic Procedure	206
DTC P0115 ENGINE COOLANT TEMPERATURE		Component Inspection.....	208
SENSOR (ECTS) (CIRCUIT)	171	DTC P0132 HEATED OXYGEN SENSOR 1	
Component Description	171	(FRONT) (RICH SHIFT MONITORING)	210
CONSULT-II Reference Value in Data Monitor		Component Description	210
Mode	171	CONSULT-II Reference Value in Data Monitor	
On Board Diagnosis Logic.....	171	Mode	210
DTC Confirmation Procedure	172	ECM Terminals and Reference Value	210
Wiring Diagram	173	On Board Diagnosis Logic.....	211
Diagnostic Procedure	174	DTC Confirmation Procedure	211
Component Inspection.....	176	Overall Function Check	212
DTC P0120 THROTTLE POSITION SENSOR	177	Diagnostic Procedure	213
Component Description	177	Component Inspection.....	215
CONSULT-II Reference Value in Data Monitor		DTC P0133 HEATED OXYGEN SENSOR 1	
Mode	177	(FRONT) (RESPONSE MONITORING)	217
ECM Terminals and Reference Value	178	Component Description	217
On Board Diagnosis Logic.....	178	CONSULT-II Reference Value in Data Monitor	
DTC Confirmation Procedure	179	Mode	217
Wiring Diagram	183	ECM Terminals and Reference Value	217
Diagnostic Procedure	184	On Board Diagnosis Logic.....	218
Component Inspection.....	188	DTC Confirmation Procedure	218
DTC P0125 ENGINE COOLANT TEMPERATURE		Overall Function Check	219
(ECT) SENSOR	190	Wiring Diagram	220
Component Description	190	Diagnostic Procedure	221
CONSULT-II Reference Value in Data Monitor		Component Inspection.....	224
Mode	190	DTC P0134 HEATED OXYGEN SENSOR 1	
On Board Diagnosis Logic.....	190	(FRONT) (HIGH VOLTAGE)	226
DTC Confirmation Procedure	191	Component Description	226
Wiring Diagram	192	CONSULT-II Reference Value in Data Monitor	
Diagnostic Procedure	193	Mode	226
Component Inspection.....	195	ECM Terminals and Reference Value	226
DTC P0130 HEATED OXYGEN SENSOR 1		On Board Diagnosis Logic.....	227
(FRONT) (CIRCUIT)	196	DTC Confirmation Procedure	227

CONTENTS (Cont'd)

Wiring Diagram	228	
Diagnostic Procedure	229	
Component Inspection.....	230	
DTC P0135 HEATED OXYGEN SENSOR 1		
HEATER (FRONT)	232	
Description.....	232	
CONSULT-II Reference Value in Data Monitor		
Mode	232	
ECM Terminals and Reference Value	232	
On Board Diagnosis Logic.....	232	
DTC Confirmation Procedure	233	
Wiring Diagram	234	
Diagnostic Procedure	235	
Component Inspection.....	236	
DTC P0137 HEATED OXYGEN SENSOR 2		
(REAR) (MIN. VOLTAGE MONITORING)	237	
Component Description	237	
CONSULT-II Reference Value in Data Monitor		
Mode	237	
ECM Terminals and Reference Value	237	
On Board Diagnosis Logic.....	237	
DTC Confirmation Procedure	238	
Overall Function Check	238	
Wiring Diagram	239	
Diagnostic Procedure	240	
Component Inspection.....	243	
DTC P0138 HEATED OXYGEN SENSOR 2		
(REAR) (MAX. VOLTAGE MONITORING)	245	
Component Description	245	
CONSULT-II Reference Value in Data Monitor		
Mode	245	
ECM Terminals and Reference Value	245	
On Board Diagnosis Logic.....	245	
DTC Confirmation Procedure	246	
Overall Function Check	246	
Wiring Diagram	247	
Diagnostic Procedure	248	
Component Inspection.....	251	
DTC P0139 HEATED OXYGEN SENSOR 2		
(REAR) (RESPONSE MONITORING)	253	
Component Description	253	
CONSULT-II Reference Value in Data Monitor		
Mode	253	
ECM Terminals and Reference Value	253	
On Board Diagnosis Logic.....	253	
DTC Confirmation Procedure	254	
Overall Function Check	254	
Wiring Diagram	255	
Diagnostic Procedure	256	
Component Inspection.....	259	
DTC P0140 HEATED OXYGEN SENSOR 2		
(REAR) (HIGH VOLTAGE)	261	
Component Description	261	GI
CONSULT-II Reference Value in Data Monitor		
Mode	261	MA
ECM Terminals and Reference Value	261	
On Board Diagnosis Logic.....	261	
DTC Confirmation Procedure	262	EM
Overall Function Check	262	
Wiring Diagram	263	
Diagnostic Procedure	264	LC
Component Inspection.....	265	
DTC P0141 HEATED OXYGEN SENSOR 2		
HEATER (REAR)	267	EC
Description.....	267	
CONSULT-II Reference Value in Data Monitor		
Mode	267	FE
ECM Terminals and Reference Value	267	
On Board Diagnosis Logic.....	267	CL
DTC Confirmation Procedure	268	
Wiring Diagram	269	
Diagnostic Procedure	270	MT
Component Inspection.....	271	
DTC P0171 FUEL INJECTION SYSTEM		
FUNCTION (LEAN SIDE)	272	AT
On Board Diagnosis Logic.....	272	
DTC Confirmation Procedure	272	AX
Wiring Diagram	274	
Diagnostic Procedure	275	
DTC P0172 FUEL INJECTION SYSTEM		
FUNCTION (RICH SIDE)	279	SU
On Board Diagnosis Logic.....	279	
DTC Confirmation Procedure	279	BR
Wiring Diagram	281	
Diagnostic Procedure	282	ST
DTC P0180 FUEL TANK TEMPERATURE		
SENSOR	286	RS
Component Description	286	
On Board Diagnosis Logic.....	286	
DTC Confirmation Procedure	286	BT
Wiring Diagram	288	
Diagnostic Procedure	289	
Component Inspection.....	290	HA
DTC P0217 COOLANT OVERTEMPERATURE		
ENRICHMENT PROTECTION	291	SC
System Description.....	291	
CONSULT-II Reference Value in Data Monitor		
Mode	291	
ECM Terminals and Reference Value	292	EL
On Board Diagnosis Logic.....	292	
Possible Cause.....	292	
Overall Function Check	293	IDX
Wiring Diagram	296	
Diagnostic Procedure (A/T Models)	298	

CONTENTS (Cont'd)

Diagnostic Procedure (M/T Models).....	309	DTC Confirmation Procedure	359
Main 12 Causes of Overheating.....	321	Wiring Diagram	360
DTC P0300 - P0304 NO. 4 - 1 CYLINDER		Diagnostic Procedure	361
MISFIRE, MULTIPLE CYLINDER MISFIRE	322	DTC P0420 THREE WAY CATALYST FUNCTION ...	364
On Board Diagnosis Logic.....	322	On Board Diagnosis Logic.....	364
DTC Confirmation Procedure	322	DTC Confirmation Procedure	364
Diagnostic Procedure	323	Overall Function Check	365
Component Inspection.....	328	Diagnostic Procedure	365
DTC P0325 KNOCK SENSOR (KS)	329	DTC P0440 EVAP CONTROL SYSTEM (SMALL	
Component Description	329	LEAK) (NEGATIVE PRESSURE)	368
ECM Terminals and Reference Value	329	On Board Diagnosis Logic.....	368
On Board Diagnosis Logic.....	329	Possible Cause.....	368
DTC Confirmation Procedure	329	DTC Confirmation Procedure	369
Wiring Diagram	330	Diagnostic Procedure	370
Diagnostic Procedure	331	DTC P0443 EVAP CANISTER PURGE VOLUME	
Component Inspection.....	332	CONTROL SOLENOID VALVE (CIRCUIT)	382
DTC P0335 CRANKSHAFT POSITION SENSOR		Description	382
(CKPS) (OBD)	333	CONSULT-II Reference Value in Data Monitor	
Component Description	333	Mode	382
ECM Terminals and Reference Value	333	ECM Terminals and Reference Value	383
On Board Diagnosis Logic.....	333	On Board Diagnosis Logic.....	383
DTC Confirmation Procedure	334	Possible Cause.....	383
Wiring Diagram	335	DTC Confirmation Procedure	384
Diagnostic Procedure	336	Wiring Diagram	385
Component Inspection.....	338	Diagnostic Procedure	386
DTC P0340 CAMSHAFT POSITION SENSOR		DTC P0446 EVAPORATIVE EMISSION (EVAP)	
(CMPS)	339	CANISTER VENT CONTROL VALVE (CIRCUIT)	389
Component Description	339	Component Description	389
ECM Terminals and Reference Value	339	CONSULT-II Reference Value in Data Monitor	
On Board Diagnosis Logic.....	340	Mode	389
DTC Confirmation Procedure	340	ECM Terminals and Reference Value	389
Wiring Diagram	342	On Board Diagnosis Logic.....	389
Diagnostic Procedure	343	Possible Cause.....	390
Component Inspection.....	346	DTC Confirmation Procedure	390
DTC P0400 EGR FUNCTION (CLOSE)	347	Wiring Diagram	391
Description	347	Diagnostic Procedure	392
CONSULT-II Reference Value in Data Monitor		DTC P0450 EVAPORATIVE EMISSION (EVAP)	
Mode	348	CONTROL SYSTEM PRESSURE SENSOR	396
ECM Terminals and Reference Value	348	Component Description	396
On Board Diagnosis Logic.....	348	CONSULT-II Reference Value in Data Monitor	
Possible Cause.....	349	Mode	396
DTC Confirmation Procedure	349	ECM Terminals and Reference Value	396
Wiring Diagram	351	On Board Diagnosis Logic.....	397
Diagnostic Procedure	352	Possible Cause.....	397
DTC P0403 EGR VOLUME CONTROL VALVE		DTC Confirmation Procedure	397
(CIRCUIT)	357	Wiring Diagram	399
Description	357	Diagnostic Procedure	400
CONSULT-II Reference Value in Data Monitor		DTC P0455 EVAP CONTROL SYSTEM (GROSS	
Mode	358	LEAK)	409
ECM Terminals and Reference Value	358	On Board Diagnosis Logic.....	409
On Board Diagnosis Logic.....	358	Possible Cause.....	409
Possible Cause.....	359	DTC Confirmation Procedure	410

CONTENTS (Cont'd)

Diagnostic Procedure	411	
DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)	420	
Component Description	420	
ECM Terminals and Reference Value	420	
On Board Diagnostic Logic.....	420	
Possible Cause.....	420	
DTC Confirmation Procedure	421	
Wiring Diagram	422	
Diagnostic Procedure	423	
DTC P0461 FUEL LEVEL SENSOR FUNCTION	425	
Component Description	425	
On Board Diagnostic Logic.....	425	
Possible Cause.....	425	
Overall Function Check	425	
DTC P0464 FUEL LEVEL SENSOR CIRCUIT	427	
Component Description	427	
ECM Terminals and Reference Value	427	
On Board Diagnostic Logic.....	427	
Possible Cause.....	427	
DTC Confirmation Procedure	428	
Wiring Diagram	429	
Diagnostic Procedure	430	
DTC P0500 VEHICLE SPEED SENSOR (VSS)	432	
Component Description	432	
ECM Terminals and Reference Value	432	
On Board Diagnostic Logic.....	432	
DTC Confirmation Procedure	432	
Overall Function Check	433	
Wiring Diagram	434	
Diagnostic Procedure	435	
DTC P0505 IDLE AIR CONTROL VALVE (IACV) - AUXILIARY AIR CONTROL (AAC) VALVE	436	
Description	436	
CONSULT-II Reference Value in Data Monitor Mode	437	
ECM Terminals and Reference Value	437	
On Board Diagnostic Logic.....	437	
DTC Confirmation Procedure	437	
Wiring Diagram	439	
Diagnostic Procedure	440	
DTC P0510 CLOSED THROTTLE POSITION SWITCH	445	
Component Description	445	
CONSULT-II Reference Value in Data Monitor Mode	445	
ECM Terminals and Reference Value	445	
On Board Diagnostic Logic.....	445	
DTC Confirmation Procedure	446	
Overall Function Check	446	
Wiring Diagram	447	
Diagnostic Procedure	448	
DTC P0600 A/T CONTROL	453	GI
System Description.....	453	
ECM Terminals and Reference Value	453	
On Board Diagnostic Logic.....	453	MA
DTC Confirmation Procedure	453	
Wiring Diagram.....	454	EM
Diagnostic Procedure	455	
DTC P0605 ECM	456	LC
Component Description	456	
On Board Diagnostic Logic.....	456	
DTC Confirmation Procedure	456	
Diagnostic Procedure	457	EC
DTC P1126 THERMOSTAT FUNCTION	458	
On Board Diagnostic Logic.....	458	FE
Possible Cause.....	458	
DTC Confirmation Procedure	458	
Diagnostic Procedure	459	CL
DTC P1148 CLOSED LOOP CONTROL	460	
On Board Diagnostic Logic.....	460	MT
DTC Confirmation Procedure	460	
Overall Function Check	461	
Diagnostic Procedure	461	AT
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)	462	
System Description.....	462	AX
CONSULT-II Reference Value in Data Monitor Mode.....	462	
ECM Terminals and Reference Value	463	SU
On Board Diagnostic Logic.....	463	
Overall Function Check	464	BR
Wiring Diagram.....	465	
Diagnostic Procedure (A/T Models)	467	
Diagnostic Procedure (M/T Models).....	478	ST
Main 12 Causes of Overheating.....	490	
DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)	491	RS
Component Description	491	
ECM Terminals and Reference Value	491	
On Board Diagnostic Logic.....	491	BT
DTC Confirmation Procedure	492	
Wiring Diagram	493	HA
Diagnostic Procedure	494	
Component Inspection.....	496	
DTC P1401 EGR TEMPERATURE SENSOR	497	SC
Component Description	497	
On Board Diagnostic Logic.....	497	
Possible Cause.....	497	EL
DTC Confirmation Procedure	498	
Wiring Diagram	500	IDX
Diagnostic Procedure	501	
DTC P1402 EGR FUNCTION (OPEN)	505	
Description.....	505	

CONTENTS (Cont'd)

CONSULT-II Reference Value in Data Monitor Mode	506	Possible Cause.....	550
ECM Terminals and Reference Value	506	DTC Confirmation Procedure	550
On Board Diagnosis Logic.....	506	Overall Function Check	551
Possible Cause.....	507	Wiring Diagram.....	552
DTC Confirmation Procedure	507	Diagnostic Procedure	553
Wiring Diagram.....	509	DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)	558
Diagnostic Procedure	510	Component Description	558
DTC P1440 EVAP CONTROL SYSTEM (SMALL LEAK) (POSITIVE PRESSURE)	515	ECM Terminals and Reference Value	558
On Board Diagnosis Logic.....	515	On Board Diagnostic Logic.....	558
Possible Cause.....	515	Possible Cause.....	558
DTC Confirmation Procedure	516	DTC Confirmation Procedure	559
Diagnostic Procedure	516	Wiring Diagram.....	560
DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	517	Diagnostic Procedure	561
Description.....	517	DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)	562
CONSULT-II Reference Value in Data Monitor Mode	517	Description	562
ECM Terminals and Reference Value	518	CONSULT-II Reference Value in Data Monitor Mode	562
On Board Diagnosis Logic.....	518	ECM Terminals and Reference Value	562
Possible Cause.....	518	On Board Diagnosis Logic.....	563
DTC Confirmation Procedure	519	Possible Cause.....	563
Wiring Diagram.....	520	DTC Confirmation Procedure	563
Diagnostic Procedure	521	Wiring Diagram	564
DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)	529	Diagnostic Procedure	565
Component Description	529	DTC P1491 VACUUM CUT VALVE BYPASS VALVE	568
CONSULT-II Reference Value in Data Monitor Mode	529	Description	568
ECM Terminals and Reference Value	529	CONSULT-II Reference Value in Data Monitor Mode	568
On Board Diagnosis Logic.....	529	ECM Terminals and Reference Value	568
Possible Cause.....	530	On Board Diagnosis Logic.....	569
DTC Confirmation Procedure	530	Possible Cause.....	569
Wiring Diagram.....	531	DTC Confirmation Procedure	569
Diagnostic Procedure	532	Overall Function Check	570
DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING	537	Wiring Diagram	571
System Description.....	537	Diagnostic Procedure	572
On Board Diagnosis Logic.....	537	DTC P1605 A/T DIAGNOSIS COMMUNICATION LINE	580
Possible Cause.....	537	System Description.....	580
DTC Confirmation Procedure	538	ECM Terminals and Reference Value	580
Overall Function Check	538	On Board Diagnosis Logic.....	580
Diagnostic Procedure	540	DTC Confirmation Procedure	580
DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)	549	Wiring Diagram.....	581
Component Description	549	Diagnostic Procedure	582
CONSULT-II Reference Value in Data Monitor Mode	549	DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH	583
ECM Terminals and Reference Value	549	Component Description	583
On Board Diagnosis Logic.....	549	CONSULT-II Reference Value in Data Monitor Mode	583
		ECM Terminals and Reference Value	583
		On Board Diagnosis Logic.....	583

CONTENTS (Cont'd)

DTC Confirmation Procedure	583	ECM Terminals and Reference Value	614	GI
Overall Function Check	584	Wiring Diagram	615	
Wiring Diagram	585	Diagnostic Procedure	616	
Diagnostic Procedure For M/T Models.....	586	Component Inspection.....	618	MA
Diagnostic Procedure For A/T Models	588	REFRIGERANT PRESSURE SENSOR	619	
IGNITION SIGNAL	590	Description	619	EM
Component Description	590	ECM Terminals and Reference Value	619	
CONSULT-II Reference Value in Data Monitor		Wiring Diagram	620	
Mode	590	Diagnostic Procedure	621	LC
ECM Terminals and Reference Value	590	ELECTRICAL LOAD SIGNAL	624	
Wiring Diagram	591	CONSULT-II Reference Value in Data Monitor		
Diagnostic Procedure	592	Mode	624	EC
Component Inspection.....	595	ECM Terminals and Reference Value	624	
INJECTOR	596	Wiring Diagram	625	FE
Component Description	596	Diagnostic Procedure	627	
CONSULT-II Reference Value in Data Monitor		MIL & DATA LINK CONNECTORS	631	
Mode	596	Wiring Diagram	631	CL
ECM Terminals and Reference Value	596	SERVICE DATA AND SPECIFICATIONS (SDS)	632	
Wiring Diagram	597	Fuel Pressure Regulator.....	632	MT
Diagnostic Procedure	598	Idle Speed and Ignition Timing.....	632	
START SIGNAL	601	Ignition Coil.....	632	AT
CONSULT-II Reference Value in Data Monitor		Mass Air Flow Sensor.....	632	
Mode	601	Engine Coolant Temperature Sensor	632	AX
ECM Terminals and Reference Value	601	EGR Volume Control Valve	632	
Wiring Diagram	602	EGR Temperature Sensor	632	AX
Diagnostic Procedure	603	Fuel Pump	633	SU
FUEL PUMP	605	IACV-AAC Valve	633	
System Description.....	605	Injector	633	BR
Component Description	605	Resistor.....	633	
CONSULT-II Reference Value in Data Monitor		Throttle Position Sensor	633	ST
Mode	605	Heated Oxygen Sensor 1 Heater (Front).....	633	
ECM Terminals and Reference Value	606	Calculated Load Value.....	633	RS
Wiring Diagram	607	Intake Air Temperature Sensor.....	633	
Diagnostic Procedure	608	EVAP Canister Purge Volume Control Valve	633	BT
Component Inspection.....	613	Heated Oxygen Sensor 2 Heater (Rear).....	633	
POWER STEERING OIL PRESSURE SWITCH	614	Crankshaft Position Sensor (OBD).....	633	HA
Component Description	614	Fuel Tank Temperature Sensor	634	
CONSULT-II Reference Value in Data Monitor				
Mode	614			

TROUBLE DIAGNOSIS — INDEX

Alphabetical & P No. Index for DTC

Alphabetical & P No. Index for DTC

NCEC0001

NCEC0001S01

ALPHABETICAL INDEX FOR DTC

Items (CONSULT-II screen terms)	DTC*1	Reference page
Unable to access ECM	—	EC-124
ABSL PRES SEN/CIRC	P0105	EC-163
AIR TEMP SEN/CIRC	P0110	EC-165
A/T 1ST GR FNCTN	P0731	AT-128
A/T 2ND GR FNCTN	P0732	AT-135
A/T 3RD GR FNCTN	P0733	AT-141
A/T 4TH GR FNCTN	P0734	AT-147
A/T COMM LINE	P0600*2	EC-453
A/T DIAG COMM LINE	P1605	EC-580
A/T TCC S/V FNCTN	P0744	AT-163
ATF TEMP SEN/CIRC	P0710	AT-113
CKP SEN/CIRCUIT	P0335	EC-333
CKP SENSOR (COG)	P1336	EC-491
CLOSED LOOP-B1	P1148	EC-460
CLOSED TP SW/CIRC	P0510	EC-445
CMP SEN/CIRC	P0340	EC-339
COOLANT T SEN/CIRC*3	P0115	EC-171
*COOLAN T SEN/CIRC	P0125	EC-190
CYL 1 MISFIRE	P0301	EC-322
CYL 2 MISFIRE	P0302	EC-322
CYL 3 MISFIRE	P0303	EC-322
CYL 4 MISFIRE	P0304	EC-322
ECM	P0605	EC-456
EGR SYSTEM	P0400	EC-347
EGR SYSTEM	P1402	EC-505
EGR TEMP SEN/CIRC	P1401	EC-497
EGR VOL CONT/V CIR	P0403	EC-357
ENGINE SPEED SIG	P0725	AT-124
ENG OVER TEMP	P0217	EC-291
ENG OVER TEMP	P1217*2	EC-462
EVAP GROSS LEAK	P0455	EC-409
EVAP PURG FLOW/MON	P1447	EC-537
EVAP SYS PRES SEN	P0450	EC-396
EVAP SMALL LEAK	P0440	EC-368
EVAP SMALL LEAK	P1440	EC-515

TROUBLE DIAGNOSIS — INDEX

Alphabetical & P No. Index for DTC (Cont'd)

Items (CONSULT-II screen terms)	DTC*1	Reference page	
FUEL LEVL SEN/CIRC	P0464	EC-427	GI
FUEL LEVL SEN/CIRC	P1464	EC-558	MA
FUEL LEVEL SENSOR	P0461	EC-425	
FUEL LEV SEN SLOSH	P0460	EC-420	EM
FUEL SYS-LEAN/BK1	P0171	EC-272	
FUEL SYS-RICH/BK1	P0172	EC-279	LC
FUEL TEMP SEN/CIRC	P0180	EC-286	
HO2S1 (B1)	P0130	EC-196	EC
HO2S1 (B1)	P0131	EC-204	
HO2S1 (B1)	P0132	EC-210	FE
HO2S1 (B1)	P0133	EC-217	
HO2S1 (B1)	P0134	EC-226	CL
HO2S1 HTR (B1)	P0135	EC-232	
HO2S2 (B1)	P0137	EC-237	MT
HO2S2 (B1)	P0138	EC-245	
HO2S2 (B1)	P0139	EC-253	AT
HO2S2 (B1)	P0140	EC-261	
HO2S2 HTR (B1)	P0141	EC-267	AX
IACV/AAC VLV/CIRC	P0505	EC-436	
KNOCK SEN/CIRC-B1	P0325*2	EC-329	SU
L/PRES SOL/CIRC	P0745	AT-174	BR
MAF SEN/CIRCUIT*3	P0100	EC-154	
MULTI CYL MISFIRE	P0300	EC-322	ST
NATS MALFUNCTION	P1610 - P1615*2	EL-247	
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	—	RS
O/R CLTCH SOL/CIRC	P1760	AT-202	BT
P-N POS SW/CIRCUIT	P1706	EC-583	
PNP SW/CIRC	P0705	AT-107	HA
PURG VOLUME CONT/V	P0443	EC-382	
PURG VOLUME CONT/V	P1444	EC-517	SC
SFT SOL A/CIRC*3	P0750	AT-181	
SFT SOL B/CIRC*3	P0755	AT-187	EL
TCC SOLENOID/CIRC	P0740	AT-157	
THERMOSTAT FNCTN	P1126	EC-458	IDX
TP SEN/CIRC A/T*3	P1705	AT-193	
TRTL POS SEN/CIRC*3	P0120	EC-177	
TW CATALYST SYS-B1	P0420	EC-364	

TROUBLE DIAGNOSIS — INDEX

Alphabetical & P No. Index for DTC (Cont'd)

Items (CONSULT-II screen terms)	DTC*1	Reference page
VC CUT/V BYPASS/V	P1491	EC-568
VC/V BYPASS/V	P1490	EC-562
VEH SPEED SEN/CIRC*4	P0500	EC-432
VEH SPD SEN/CIR A/T*4	P0720	AT-119
VENT CONTROL VALVE	P0446	EC-389
VENT CONTROL VALVE	P1446	EC-529
VENT CONTROL VALVE	P1448	EC-549

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

*2: This DTC is displayed with CONSULT-II only.

*3: When the fail-safe operation occurs, the MIL illuminates.

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

TROUBLE DIAGNOSIS — INDEX

Alphabetical & P No. Index for DTC (Cont'd)

P NO. INDEX FOR DTC

=NCEC0001S02

DTC*1	Items (CONSULT-II screen terms)	Reference page	
—	Unable to access ECM	EC-124	GI
P0000	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	—	MA
P0100	MAF SEN/CIRCUIT*3	EC-154	EM
P0105	ABSL PRES SEN/CIRC	EC-163	LC
P0110	AIR TEMP SEN/CIRC	EC-165	
P0115	COOLANT T SEN/CIRC*3	EC-171	
P0120	THRTL POS SEN/CIRC*3	EC-177	EC
P0125	*COOLAN T SEN/CIRC	EC-190	
P0130	HO2S1 (B1)	EC-196	FE
P0131	HO2S1 (B1)	EC-204	CL
P0132	HO2S1 (B1)	EC-210	
P0133	HO2S1 (B1)	EC-217	MT
P0134	HO2S1 (B1)	EC-226	
P0135	HO2S1 HTR (B1)	EC-232	AT
P0137	HO2S2 (B1)	EC-237	
P0138	HO2S2 (B1)	EC-245	AX
P0139	HO2S2 (B1)	EC-253	
P0140	HO2S2 (B1)	EC-261	SU
P0141	HO2S2 HTR (B1)	EC-267	
P0171	FUEL SYS-LEAN/BK1	EC-272	BR
P0172	FUEL SYS-RICH/BK1	EC-279	
P0180	FUEL TEMP SEN/CIRC	EC-286	ST
P0217	ENG OVER TEMP	EC-291	
P0300	MULTI CYL MISFIRE	EC-322	RS
P0301	CYL 1 MISFIRE	EC-322	
P0302	CYL 2 MISFIRE	EC-322	BT
P0303	CYL 3 MISFIRE	EC-322	
P0304	CYL 4 MISFIRE	EC-322	HA
P0325*2	KNOCK SEN/CIRC-B1	EC-329	SC
P0335	CKP SEN/CIRCUIT	EC-333	
P0340	CMP SEN/CIRCUIT	EC-339	EL
P0400	EGR SYSTEM	EC-347	
P0403	EGR VOL CONT/V CIR	EC-357	IDX
P0420	TW CATALYST SYS-B1	EC-364	
P0440	EVAP SMALL LEAK	EC-368	
P0443	PURG VOLUME CONT/V	EC-382	

TROUBLE DIAGNOSIS — INDEX

Alphabetical & P No. Index for DTC (Cont'd)

DTC*1	Items (CONSULT-II screen terms)	Reference page
P0446	VENT CONTROL VALVE	EC-389
P0450	EVAP SYS PRES SEN	EC-396
P0455	EVAP GROSS LEAK	EC-409
P0460	FUEL LEV SEN SLOSH	EC-420
P0461	FUEL LEVEL SENSOR	EC-425
P0464	FUEL LEVL SEN/CIRC	EC-427
P0500	VEH SPEED SEN/CIRC*4	EC-432
P0505	IACV/AAC VLV/CIRC	EC-436
P0510	CLOSED TP SW/CIRC	EC-445
P0600*2	A/T COMM LINE	EC-453
P0605	ECM	EC-456
P0705	PNP SW/CIRC	AT-107
P0710	ATF TEMP SEN/CIRC	AT-113
P0720	VEH SPD SEN/CIR A/T*4	AT-119
P0725	ENGINE SPEED SIG	AT-124
P0731	A/T 1ST GR FNCTN	AT-128
P0732	A/T 2ND GR FNCTN	AT-135
P0733	A/T 3RD GR FNCTN	AT-141
P0734	A/T 4TH GR FNCTN	AT-147
P0740	TCC SOLENOID/CIRC	AT-157
P0744	A/T TCC S/V FNCTN	AT-163
P0745	L/PRESS SOL/CIRC	AT-174
P0750	SFT SOL A/CIRC*3	AT-181
P0755	SFT SOL B/CIRC*3	AT-187
P1126	THERMOSTAT FNCTN	EC-458
P1148	CLOSED LOOP-B1	EC-460
P1217*2	ENG OVER TEMP	EC-462
P1336	CKP SENSOR (COG)	EC-491
P1401	EGR TEMP SEN/CIRC	EC-497
P1402	EGR SYSTEM	EC-505
P1440	EVAP SMALL LEAK	EC-515
P1444	PURG VOLUME CONT/V	EC-517
P1446	VENT CONTROL VALVE	EC-529
P1447	EVAP PURG FLOW/MON	EC-537
P1448	VENT CONTROL VALVE	EC-549
P1464	FUEL LEVL SEN/CIRC	EC-558
P1490	VC/V BYPASS/V	EC-562

TROUBLE DIAGNOSIS — INDEX

Alphabetical & P No. Index for DTC (Cont'd)

DTC*1	Items (CONSULT-II screen terms)	Reference page
P1491	VC CUT/V BYPASS/V	EC-568
P1605	A/T DIAG COMM LINE	EC-580
P1610 - P1615*2	NATS MALFUNCTION	EL-247
P1705	TP SEN/CIRC A/T*3	AT-193
P1706	P-N POS SW/CIRCUIT	EC-583
P1760	O/R CLTCH SOL/CIRC	AT-202

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

*2: This DTC is displayed with CONSULT-II only.

*3: When the fail-safe operation occurs, the MIL illuminates.

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

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

PRECAUTIONS

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

NCEC0002

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER" used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to INFINITI G20 is as follows:

- For a frontal collision
The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, warning lamp, wiring harness and spiral cable.
- For a side collision
The Supplemental Restraint System consists of side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS** 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 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 RS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses (except "SEAT BELT PRE-TENSIONER" connector) can be identified by yellow harness connector.

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

NCEC0003

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 terminal 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 EGR 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

Engine Fuel & Emission Control System

Engine Fuel & Emission Control System

NCEC0004

BATTERY

- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.

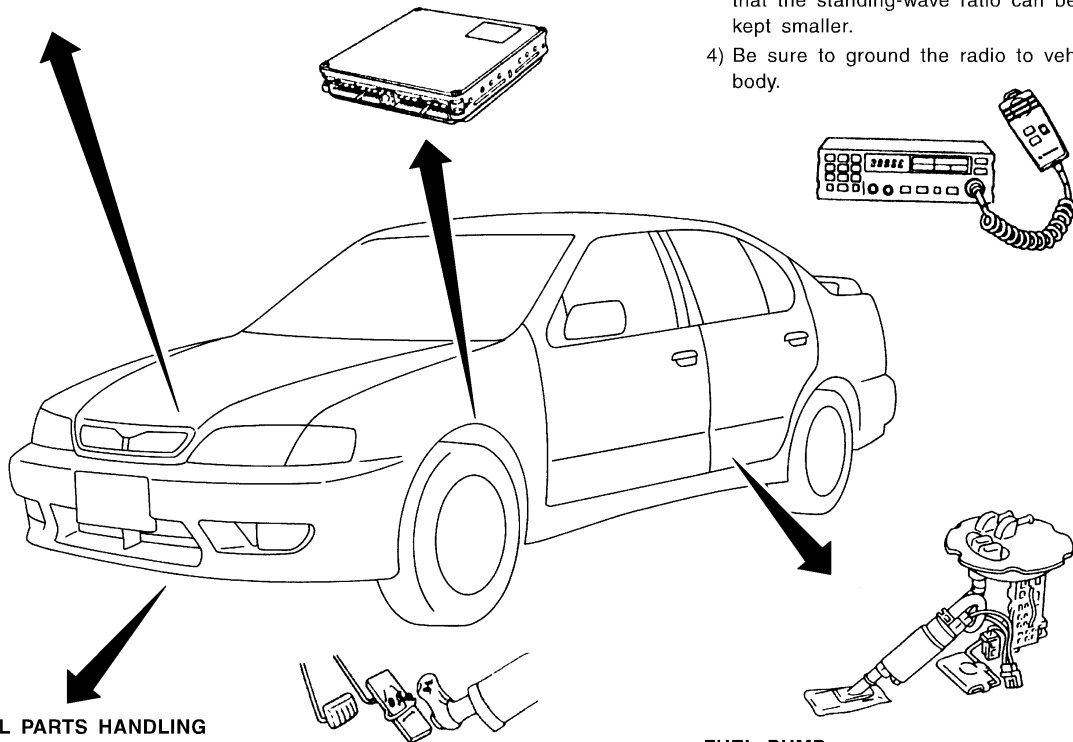
ECM

- Do not disassemble ECM.
- Do not turn diagnosis test mode selector forcibly.
- 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.

WIRELESS EQUIPMENT

- 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.
 - 1) Keep the antenna as far as possible from the electronic control units.
 - 2) 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.
 - 3) Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
 - 4) Be sure to ground the radio to vehicle body.



ENGINE CONTROL PARTS HANDLING

- 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 IAC valve-AAC valve.
- Even a slight leak in the air intake system can cause serious problems.
- Do not shock or jar the camshaft position sensor.

WHEN STARTING

- 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.

FUEL PUMP

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

ECM HARNESS HANDLING

- 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 ECM harness at least 10 cm (4 in) away from adjacent harness, to prevent an ECM system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep ECM parts and harness dry.
- Before removing parts, turn off ignition switch and then disconnect battery ground cable.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

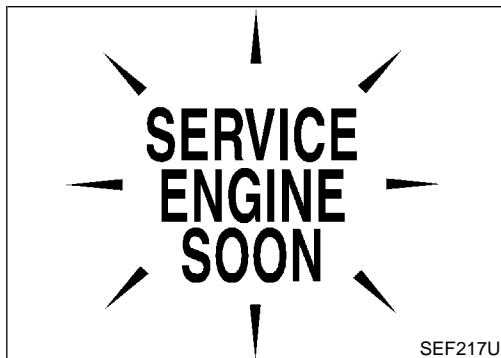
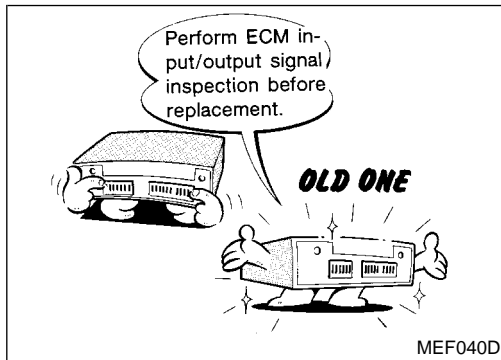
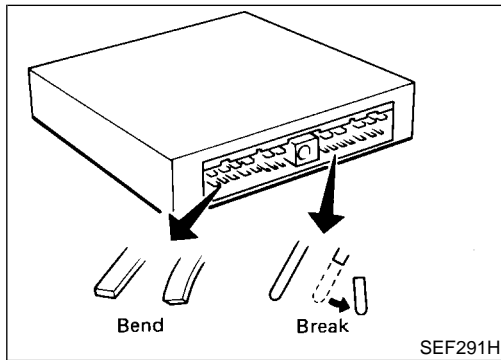
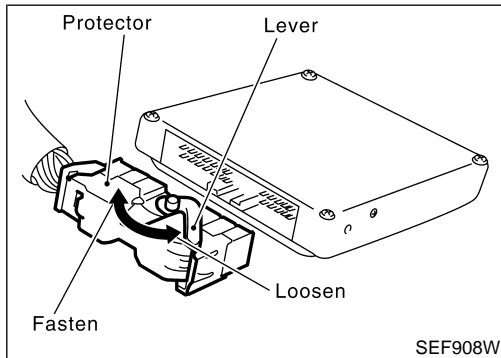
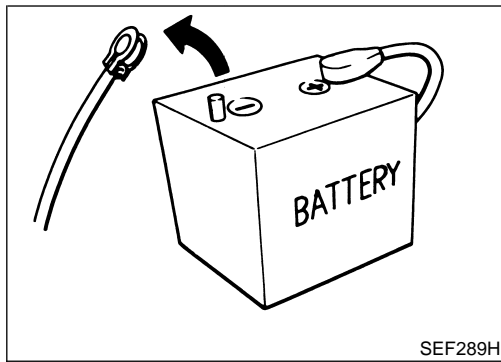
EL

IDX

SEF331WC

PRECAUTIONS

Precautions



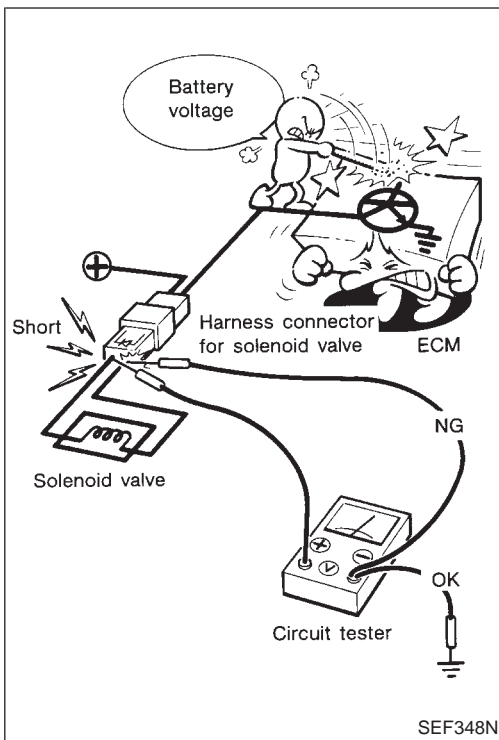
Precautions

NCEC0005

- 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.
- 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.
- Before replacing ECM, perform Terminals and Reference Value inspection and make sure ECM functions properly. Refer to EC-134.
- 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.

PRECAUTIONS

Precautions (Cont'd)



- 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.

GI

MA

EM

LC

EC

FE

CL

MT

Wiring Diagrams and Trouble Diagnosis

NCEC0006

When you read Wiring diagrams, refer to the following:

- GI-11, "HOW TO READ WIRING DIAGRAMS"
- EL-9, "POWER SUPPLY ROUTING" for power distribution circuit

When you perform trouble diagnosis, refer to the following:

- GI-35, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"
- GI-24, "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT"

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

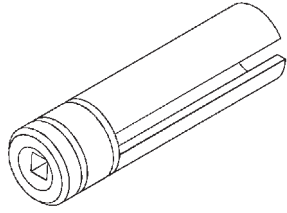
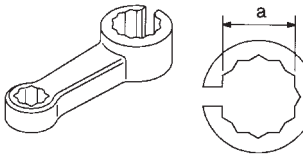
PREPARATION

Special Service Tools

Special Service Tools


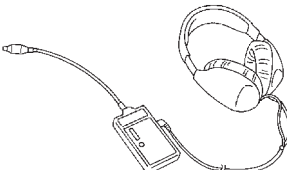
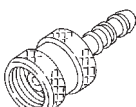
NCEC0007

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>NT379</p>	Loosening or tightening front heated oxygen sensor with 22 mm (0.87 in) hexagon nut
KV10114400 (J-38365) Heated oxygen sensor wrench	 <p>NT636</p>	Loosening or tightening rear heated oxygen sensor a: 22 mm (0.87 in)

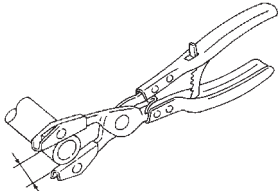
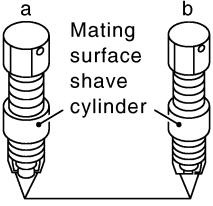
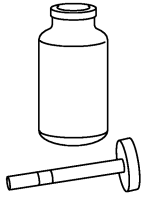
Commercial Service Tools

NCEC0008

Tool name	Description	
Fuel filler cap adapter	 <p>NT653</p>	Checking fuel tank vacuum relief valve opening pressure
Leak detector (J41416)	 <p>NT703</p>	Locating the EVAP leak
EVAP service port adapter (J41413-OBD)	 <p>NT704</p>	Applying positive pressure through EVAP service port

PREPARATION

Commercial Service Tools (Cont'd)

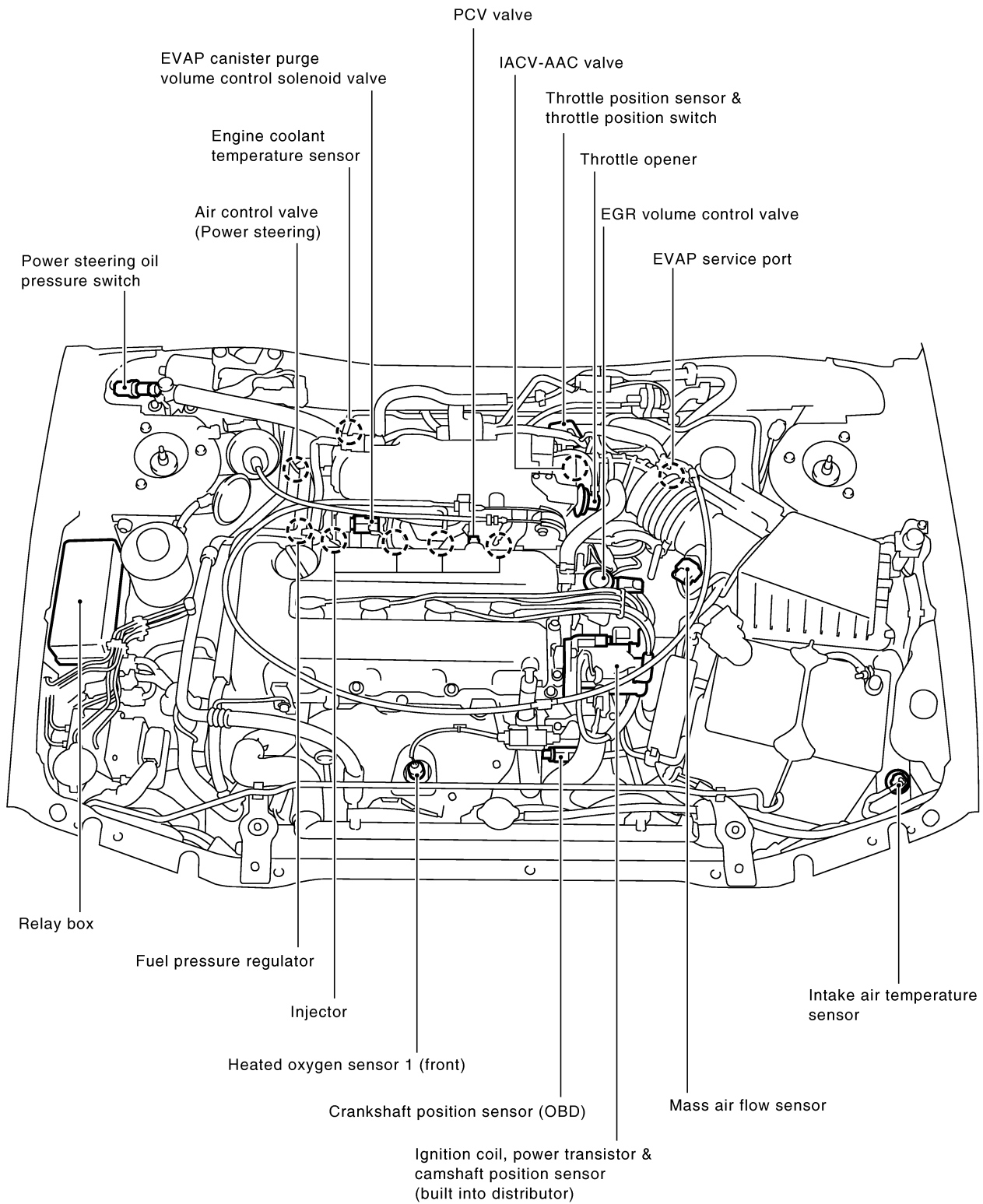
Tool name	Description	
Hose clipper NT720	 <p>Approx. 20 mm (0.79 in)</p> <p>Clamping the EVAP purge hose between the fuel tank and EVAP canister applied to DTC P1440 [EVAP control system (Small leak — Positive pressure)]</p>	GI MA EM LC
Oxygen sensor thread cleaner (J-43897-18) (J-43897-12) NT778	 <p>Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below.</p> <p>a: J-43897-18 (18 mm diameter with pitch 1.5 mm) for Zirconia Oxygen Sensor b: J-43897-12 (12 mm diameter with pitch 1.25 mm) for Titania Oxygen Sensor</p>	EC FE CL
Anti-seize lubricant (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907) NT779	 <p>Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.</p>	MT AT AX SU BR ST RS BT HA SC EL IDX

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Engine Control Component Parts Location

Engine Control Component Parts Location

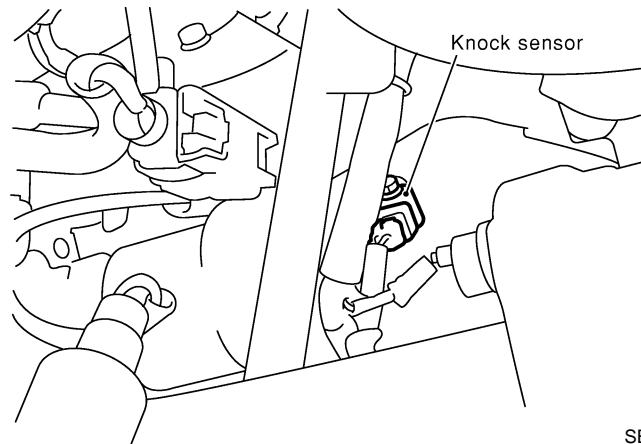
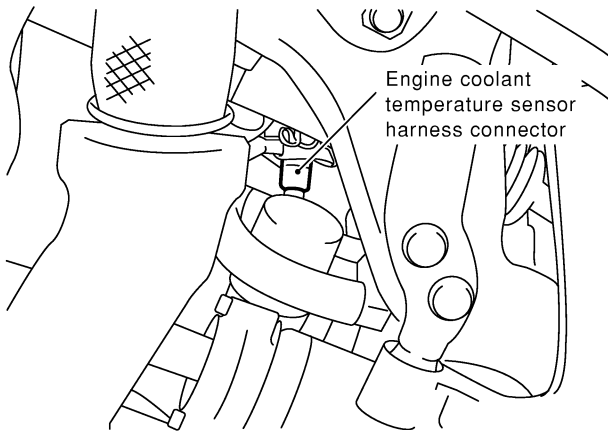
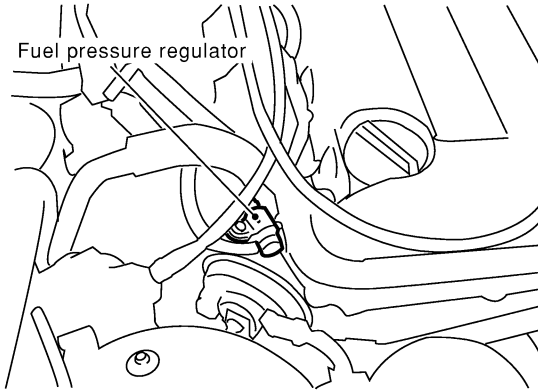
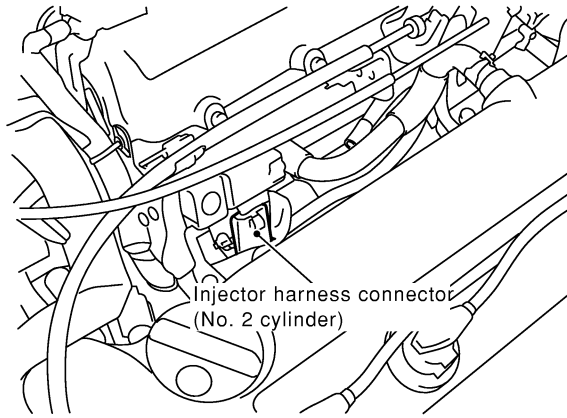
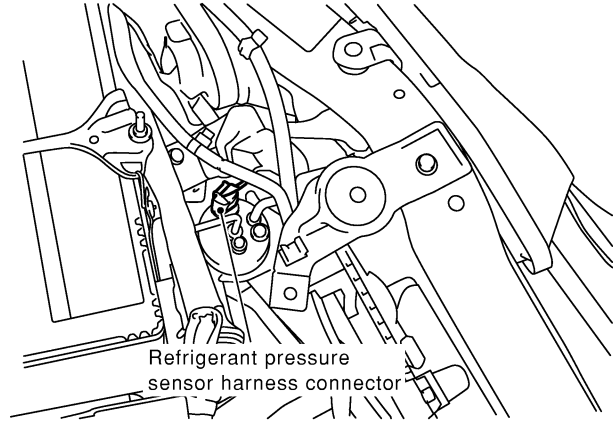
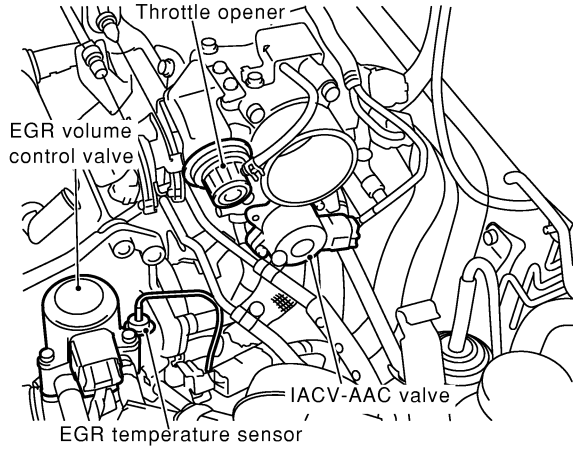
NCEC0009



SEF912Z

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Engine Control Component Parts Location (Cont'd)



GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

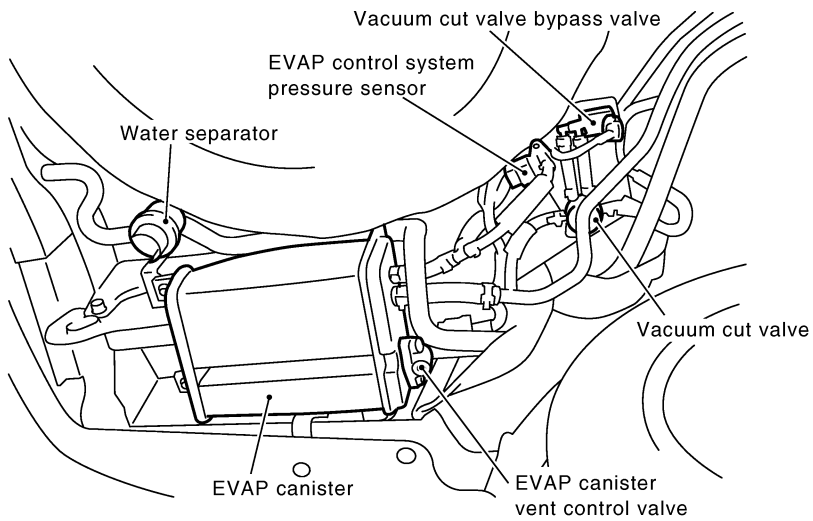
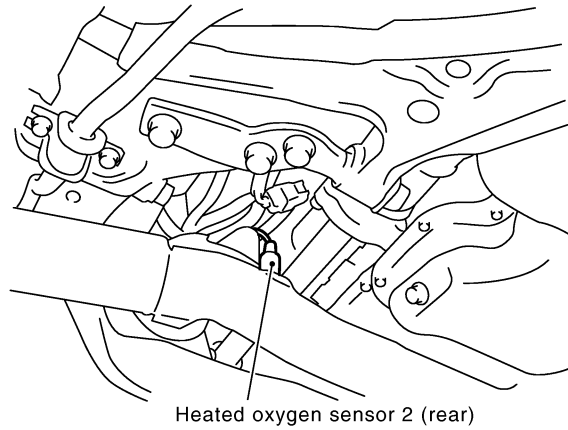
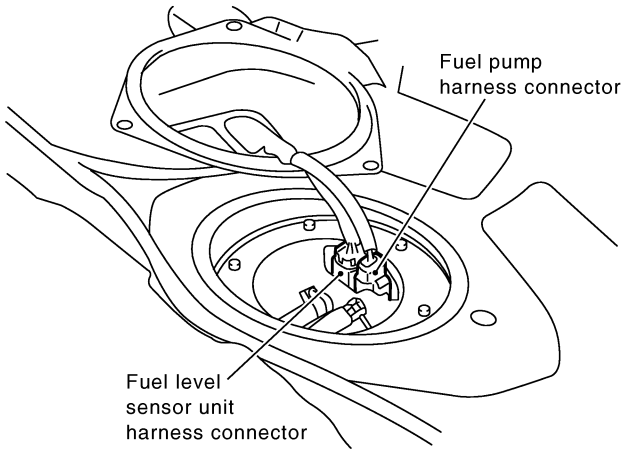
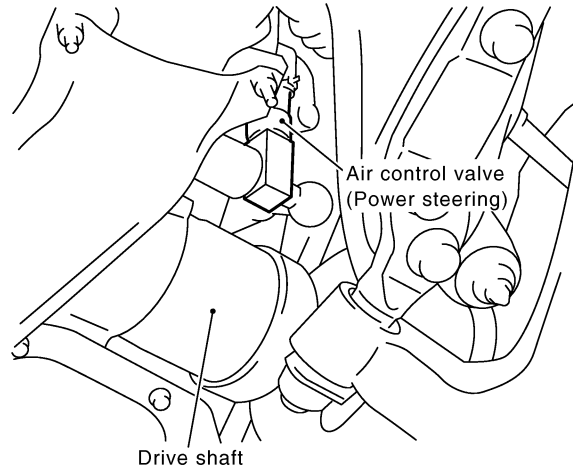
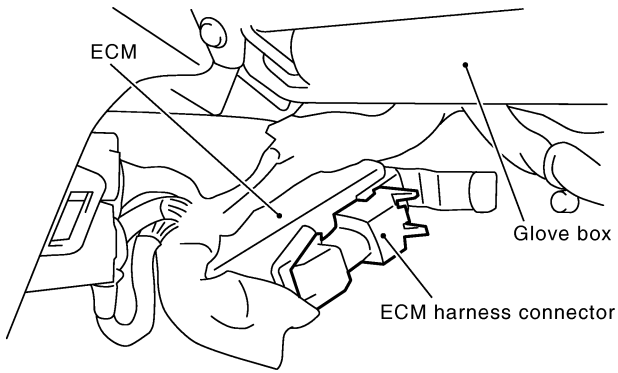
EL

IDX

SEF835X

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Engine Control Component Parts Location (Cont'd)



SEF913Z

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Engine Control Component Parts Location (Cont'd)

NOTE:

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

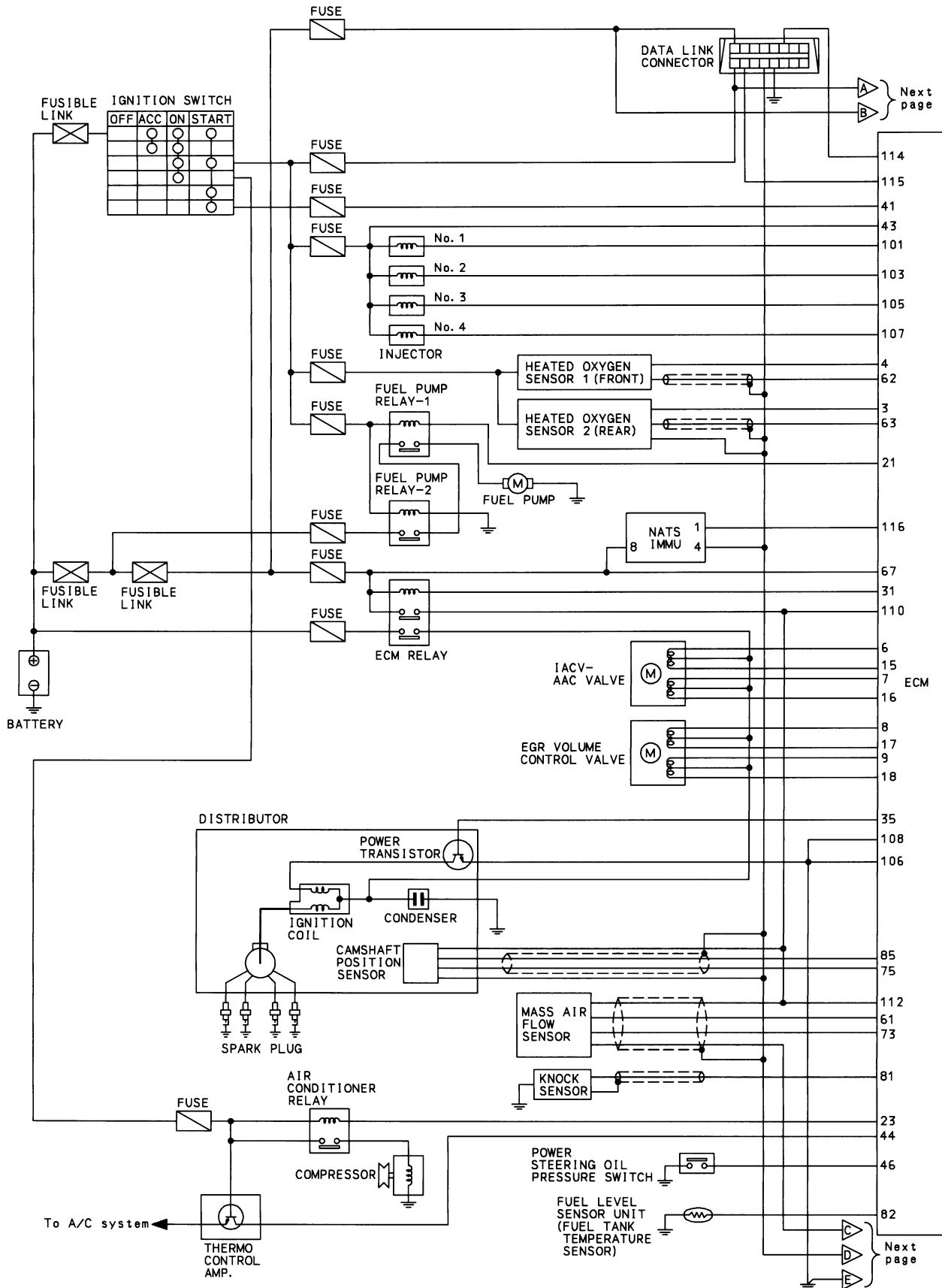
IDX

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Circuit Diagram

Circuit Diagram

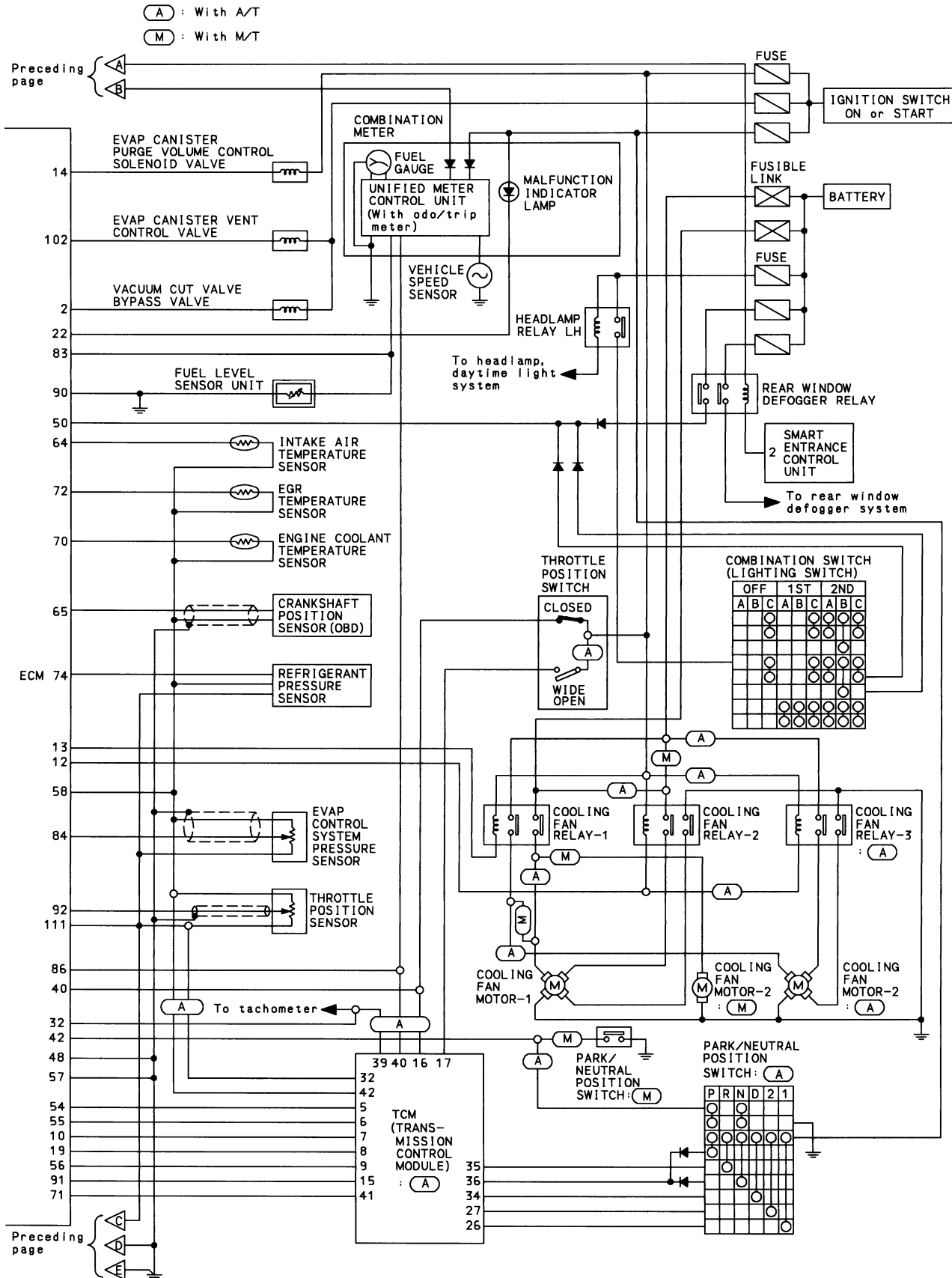
NCEC0010



TEC824

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Circuit Diagram (Cont'd)



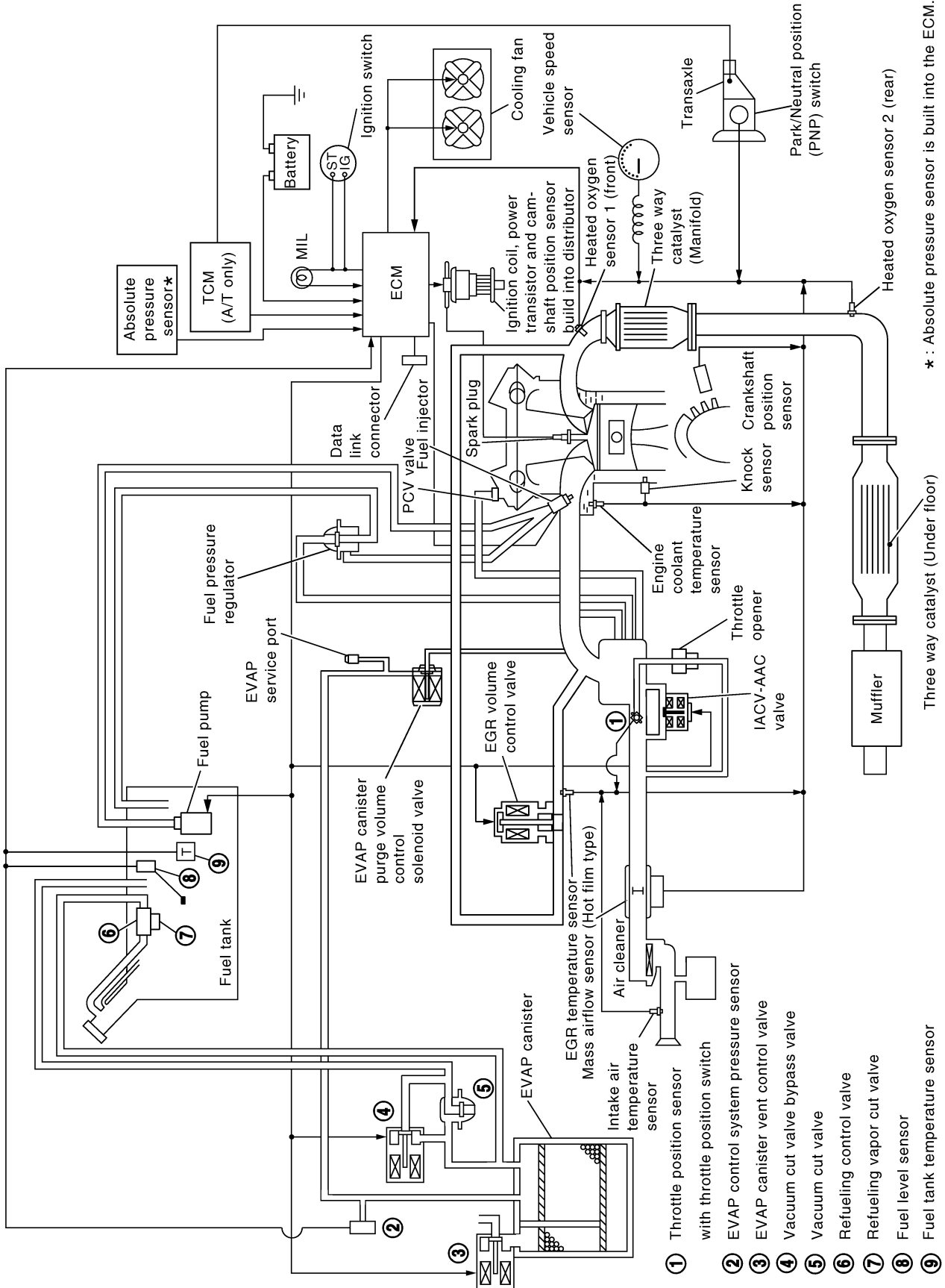
GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

System Diagram

System Diagram

NCEC0011



* : Absolute pressure sensor is built into the ECM.

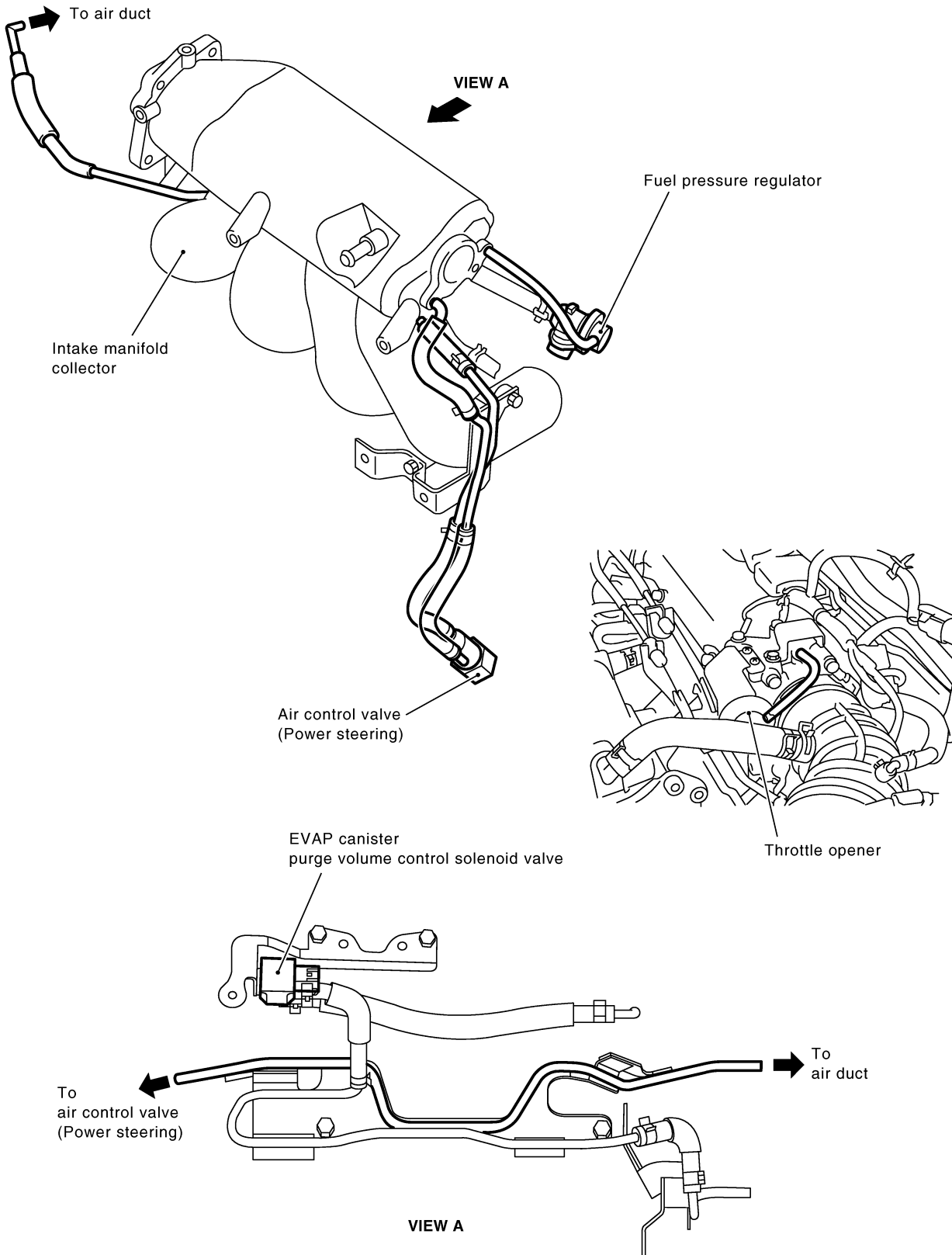
ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Vacuum Hose Drawing

Vacuum Hose Drawing

NCEC0012

Refer to "System Diagram" on EC-26 for vacuum control system.



GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

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

SEF914Z

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

System Chart

System Chart

NCEC0013

Input (Sensor)	ECM Function	Output (Actuator)
<ul style="list-style-type: none"> ● Camshaft position sensor ● Mass air flow sensor ● Engine coolant temperature sensor ● Heated oxygen sensor 1 (front) ● Ignition switch ● Throttle position sensor ● PNP switch ● Air conditioner switch ● Knock sensor ● EGR temperature sensor*1 ● Crankshaft position sensor (OBD)*1 ● EVAP control system pressure sensor*1 ● Fuel tank temperature sensor*1 ● Battery voltage ● Power steering oil pressure switch ● Vehicle speed sensor ● Intake air temperature sensor ● Heated oxygen sensor 2 (rear)*3 ● TCM (Transmission control module)*2 ● Closed throttle position switch*4 ● Electrical load ● Fuel level sensor*1 ● Refrigerant pressure sensor 	Fuel injection & mixture ratio control	Injectors
	Distributor ignition system	Power transistor
	Idle air control system	IACV-AAC valve
	Fuel pump control	Fuel pump relay
	On board diagnostic system	Malfunction indicator lamp (On the instrument panel)
	EGR control	EGR volume control valve
	Heated oxygen sensor 1 heater (front) control	Heated oxygen sensor 1 heater (front)
	Heated oxygen sensor 2 heater (rear) control	Heated oxygen sensor 2 heater (rear)
	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
	ON BOARD DIAGNOSIS for EVAP system	<ul style="list-style-type: none"> ● EVAP canister vent control valve ● Vacuum cut valve bypass valve

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

*2: The DTC related to A/T will be sent to ECM.

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

*4: This switch will operate in place of the throttle position sensor to control EVAP parts if the sensor malfunctions.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Multiport Fuel Injection (MFI) System

Multiport Fuel Injection (MFI) System

DESCRIPTION

Input/Output Signal Chart

NCEC0014

NCEC0014S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed 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 (front)	Density of oxygen in exhaust gas		
Throttle position sensor	Throttle position Throttle valve idle position		
PNP switch	Gear position		
Vehicle speed sensor	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		
Power steering oil pressure switch	Power steering operation		
Heated oxygen sensor 2 (rear)*	Density of oxygen in exhaust gas		

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

Basic Multiport Fuel Injection System

NCEC0014S02

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

NCEC0014S03

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>

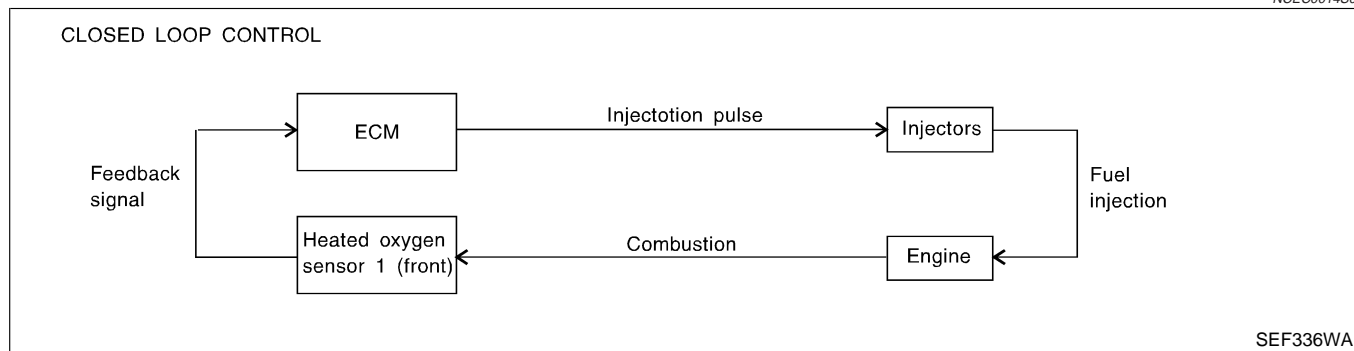
- During deceleration
- During high engine speed operation
- During high vehicle speed operation (M/T models)
- Extremely high engine coolant temperature

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Multiport Fuel Injection (MFI) System (Cont'd)

Mixture Ratio Feedback Control (Closed loop control)

NCEC0014S04



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_x emissions. This system uses a heated oxygen sensor 1 (front) 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 (front), refer to EC-196. 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 (rear) is located downstream of the three way catalyst. Even if the switching characteristics of the heated oxygen sensor 1 (front) shift, the air-fuel ratio is controlled to stoichiometric by the signal from the heated oxygen sensor 2 (rear).

Open Loop Control

NCEC0014S05

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 (front) or its circuit
- Insufficient activation of heated oxygen sensor 1 (front) at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- When starting the engine

Mixture Ratio Self-learning Control

NCEC0014S06

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from the heated oxygen sensor 1 (front). 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 (front) 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.

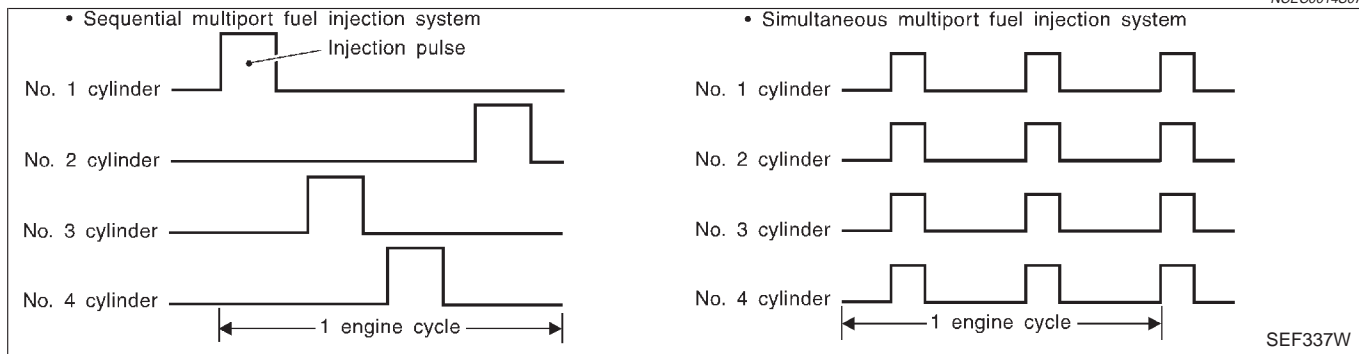
"Long term fuel trim" is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Multiport Fuel Injection (MFI) System (Cont'd)

Fuel Injection Timing

NCEC0014S07



SEF337W

Two types of systems are used.

Sequential Multiport Fuel Injection System

NCEC0014S0701

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

NCEC0014S0702

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

NCEC0014S08

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

Distributor Ignition (DI) System

DESCRIPTION

Input/Output Signal Chart

NCEC0015

NCEC0015S01

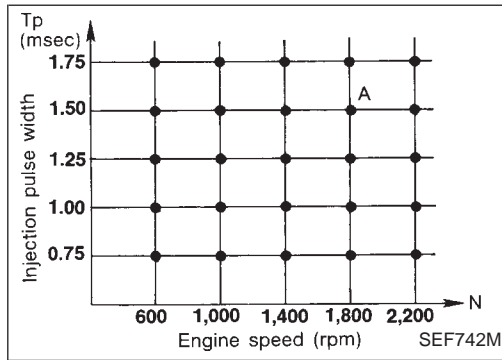
Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed and piston position	Ignition timing control	Power transistor
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position Throttle valve idle position		
Vehicle speed sensor	Vehicle speed		
Ignition switch	Start signal		
Knock sensor	Engine knocking		
PNP switch	Gear position		
Battery	Battery voltage		

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Distributor Ignition (DI) System (Cont'd)

System Description

NCEC0015S02



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

DESCRIPTION

Input/Output Signal Chart

NCEC0016

NCEC0016S01

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		
Camshaft position sensor	Engine speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		

System Description

NCEC0016S02

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.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Fuel Cut Control (at no load & high engine speed)

Fuel Cut Control (at no load & high engine speed)

DESCRIPTION

Input/Output Signal Chart

NCEC0017

NCEC0017S01

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed sensor	Vehicle speed	Fuel cut control	Injectors
PNP switch	Neutral position		
Throttle position sensor	Throttle position		
Engine coolant temperature sensor	Engine coolant temperature		
Camshaft position sensor	Engine speed		

If the engine speed is above 3,950 rpm with no load, (for example, in Neutral and engine speed over 4,000 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 1,150 rpm, then fuel cut is cancelled.

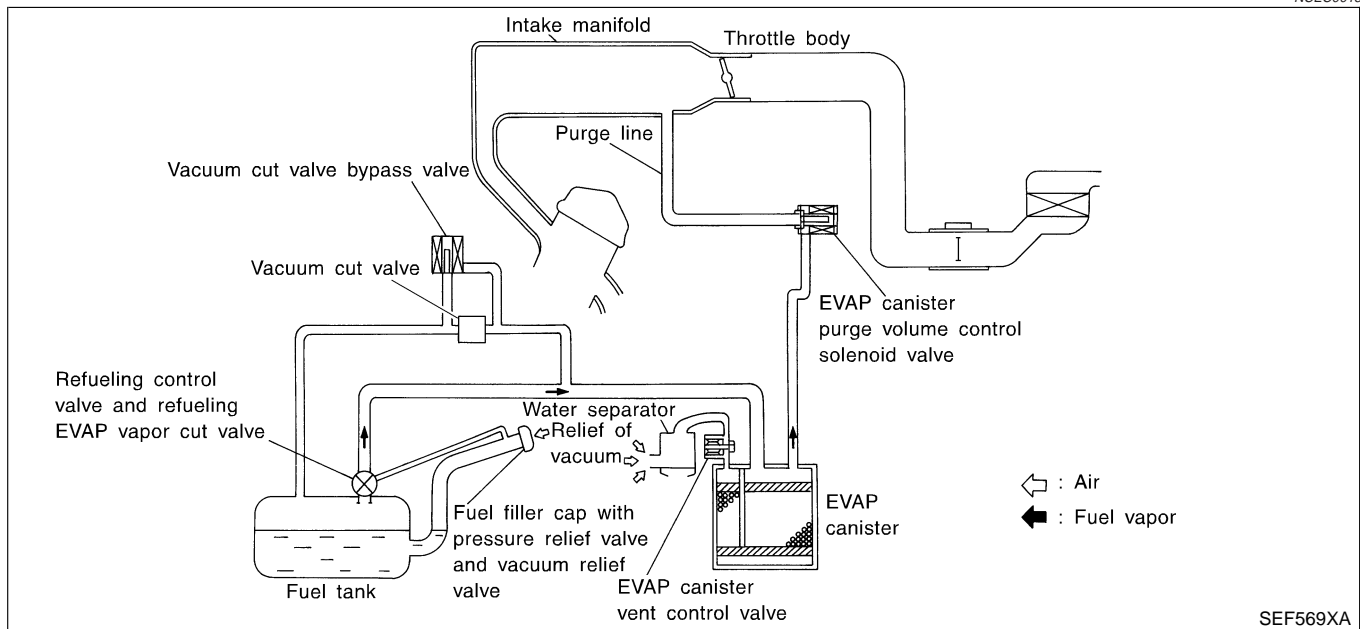
NOTE:

This function is different from deceleration control listed under “Multiport Fuel Injection (MFI) System”, EC-29.

Evaporative Emission System

DESCRIPTION

NCEC0018



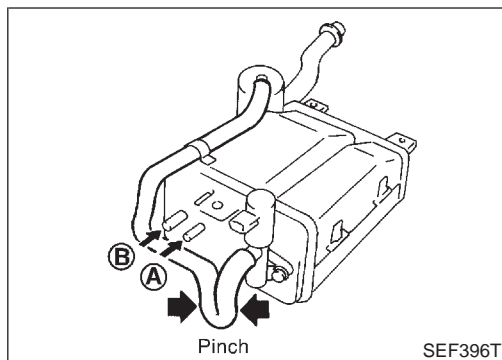
The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister. The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon 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.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Evaporative Emission System (Cont'd)



INSPECTION

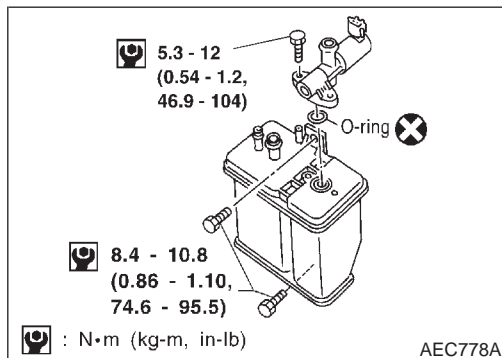
EVAP Canister

NCEC0019

NCEC0019S01

Check EVAP canister as follows:

1. Pinch the fresh air hose.
2. Blow air into port A and check that air flows freely through port B.

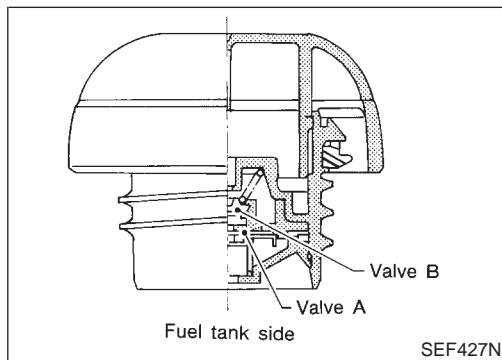


Tightening Torque

NCEC0019S02

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 filler cap)

NCEC0019S03

1. Wipe clean valve housing.
2. Check valve opening pressure and vacuum.

Pressure:

15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

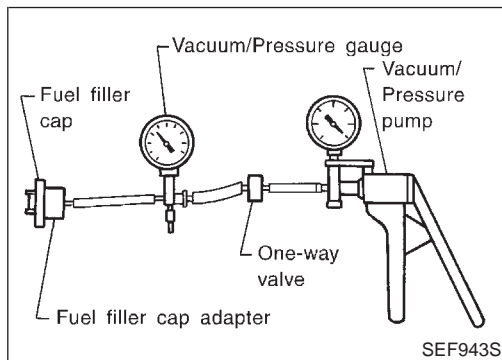
Vacuum:

-6.0 to -3.4 kPa (-0.061 to -0.035 kg/cm², -0.87 to -0.49 psi)

3. If out of specification, replace fuel filler cap as an assembly.

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.



Vacuum Cut Valve and Vacuum Cut Valve Bypass Valve

NCEC0019S05

Refer to EC-568.

Evaporative Emission (EVAP) Canister Purge Volume Control Solenoid Valve

NCEC0019S06

Refer to EC-382.

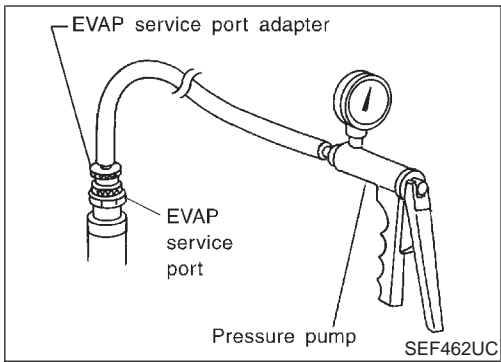
Fuel Tank Temperature Sensor

NCEC0019S08

Refer to EC-286.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Evaporative Emission System (Cont'd)



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.

NCEC0019S09

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Evaporative Emission System (Cont'd)

NCEC0019S10

EVAP SYSTEM CLOSE

APPLY PRESSURE TO EVAP SYSTEM FROM SERVICE PORT USING HAND PUMP WITH PRESSURE GAUGE AT NEXT SCREEN.
NEVER USE COMPRESSED AIR OR HIGH PRESSURE PUMP!
DO NOT START ENGINE. TOUCH START.

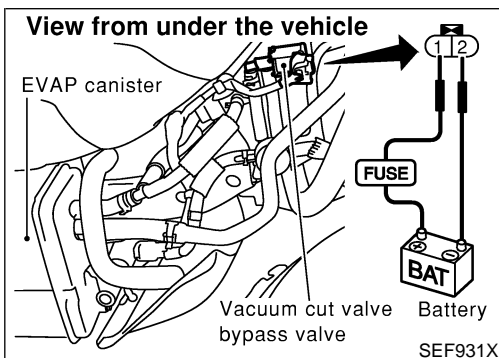
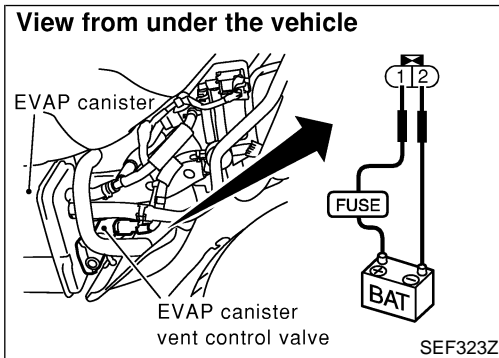
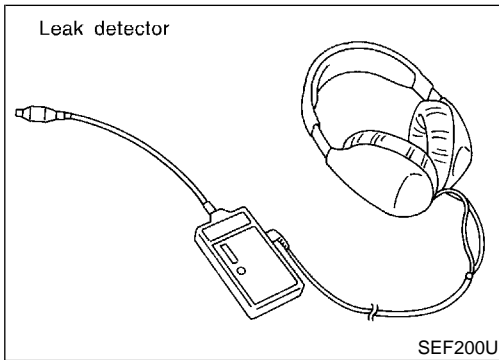
PEF838U

EVAP SYSTEM CLOSE

APPLY PRESSURE TO SERVICE PORT TO RANGE BELOW.
DO NOT EXCEED 0.6psi.

0.2 0.4

PEF917U



How to Detect Fuel Vapor Leakage

CAUTION:

- Never use compressed air or a high pressure pump.
- Do not start engine.
- Do not exceed 4.12 kPa (0.042 kg/cm², 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 "EVAPORATIVE EMISSION LINE DRAWING", EC-37.

Without CONSULT-II

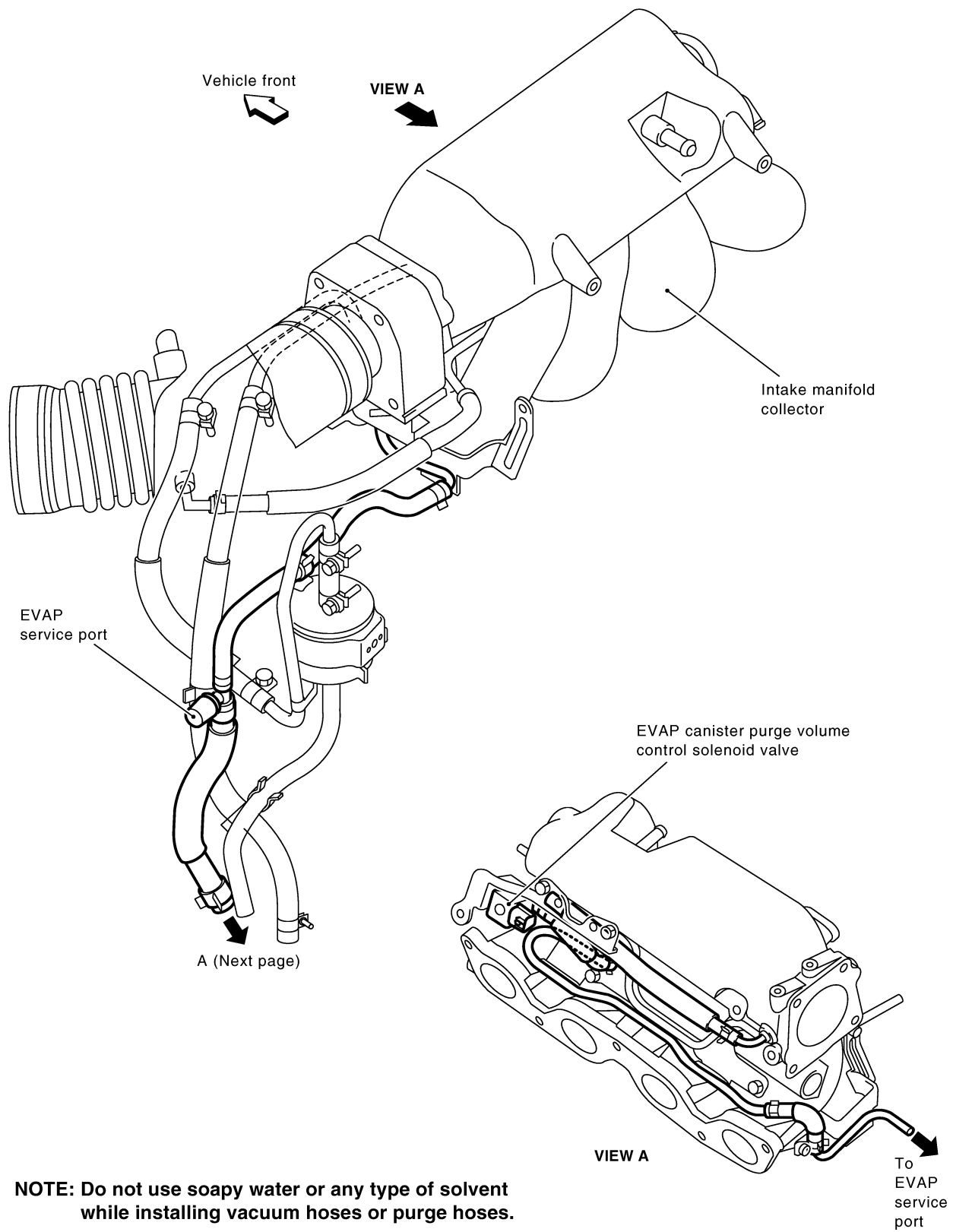
- 1) Attach the EVAP service port adapter securely to the EVAP service port and pressure pump with pressure gauge to the EVAP service port.
- 2) Apply battery voltage to between the terminals of both EVAP canister vent control valve and vacuum cut valve bypass valve to make a closed EVAP system.
- 3) 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/cm², 0.2 to 0.4 psi).
- 4) Remove the EVAP service port adapter and hose with pressure pump.
- 5) Locate the leak using a leak detector. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-37.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Evaporative Emission System (Cont'd)

EVAPORATIVE EMISSION LINE DRAWING

NCEC0020



GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

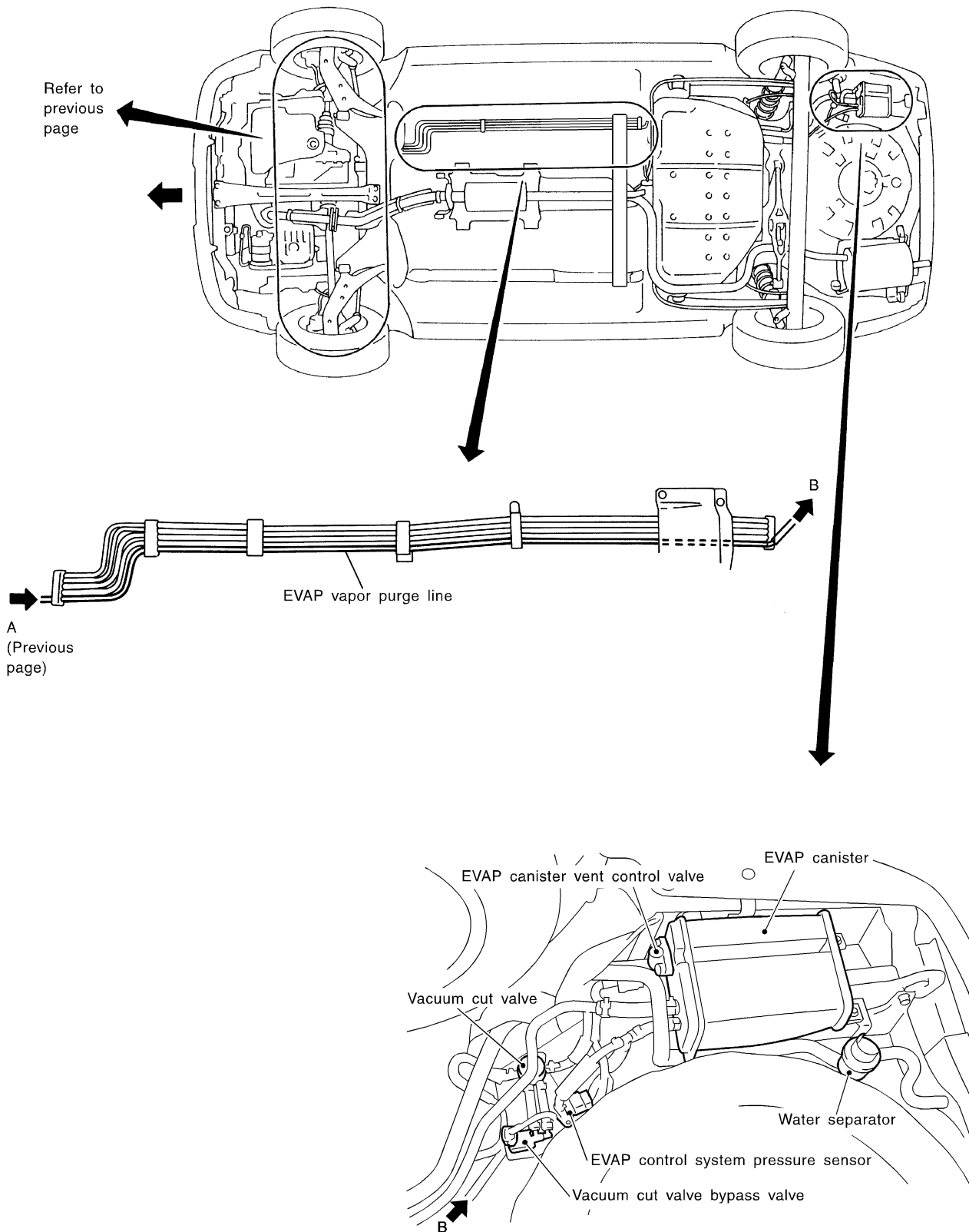
SEF915Z

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Evaporative Emission System (Cont'd)

NOTE:

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



ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

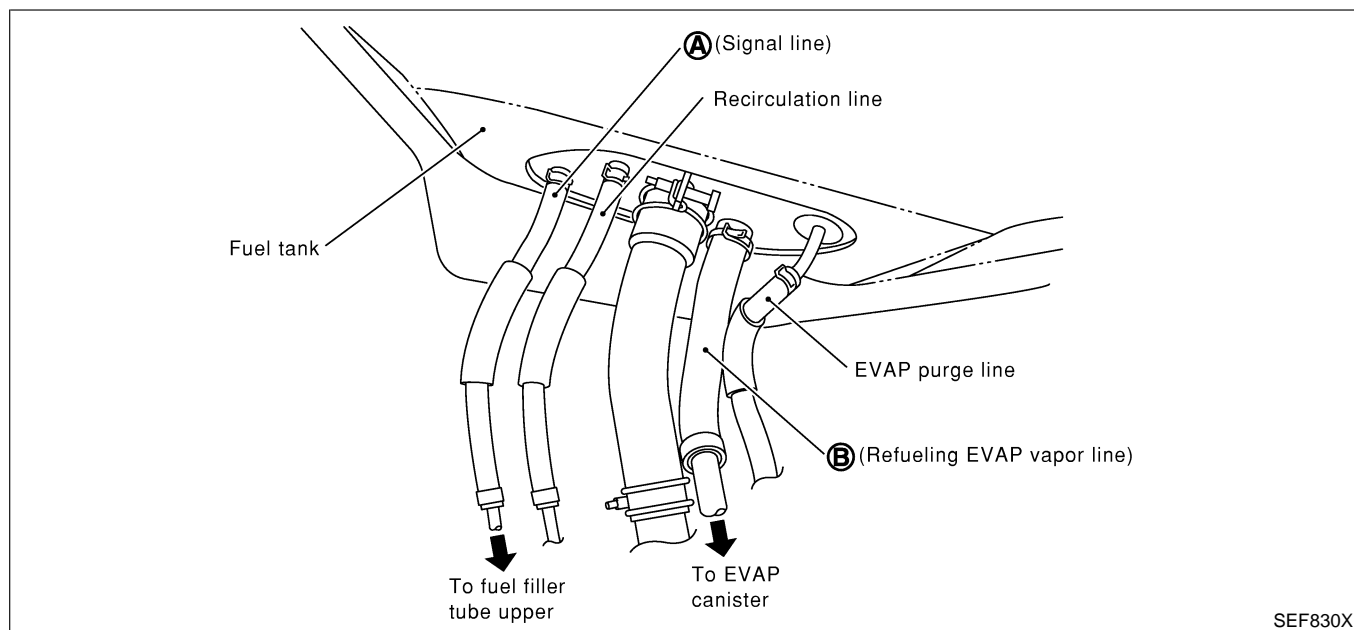
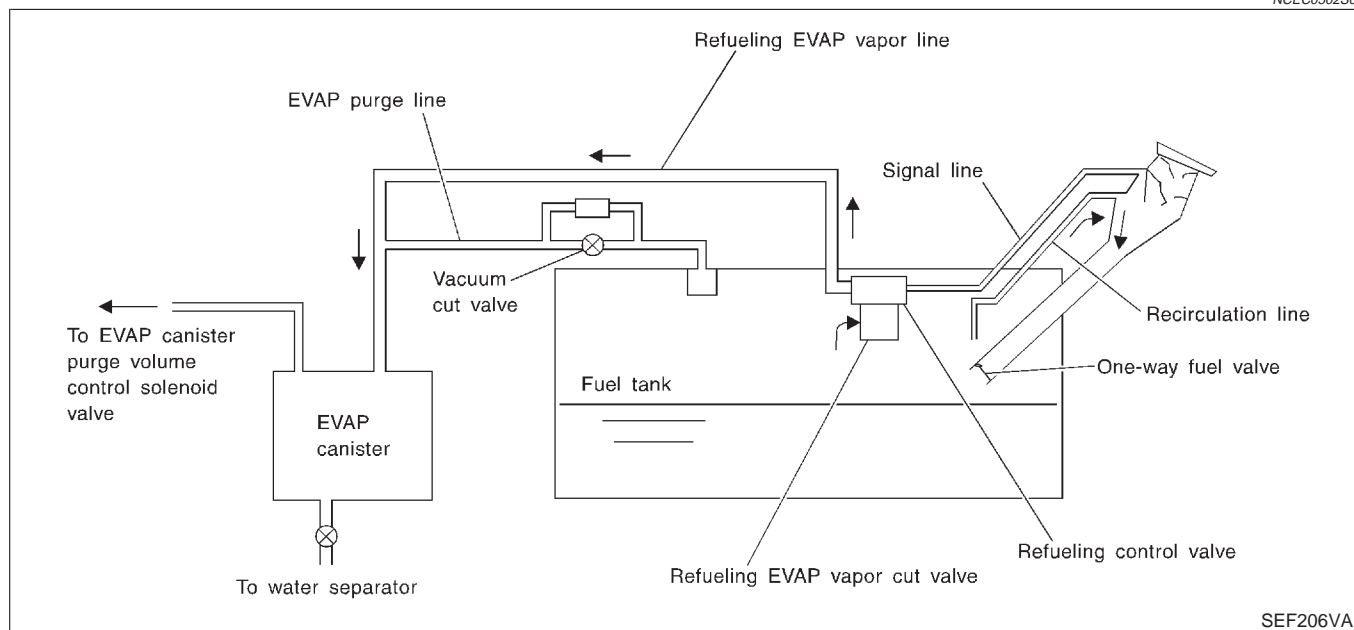
On Board Refueling Vapor Recovery (ORVR)

On Board Refueling Vapor Recovery (ORVR)

NCEC0502

SYSTEM DESCRIPTION

NCEC0502S01



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 CO₂ fire extinguisher.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

CAUTION:

- Before removing fuel line parts, carry out the following procedures:
 - a) Put drained fuel in an explosion-proof container and put lid on securely.
 - b) Release fuel pressure from fuel line. Refer to "Fuel Pressure Release", EC-50.
 - c) 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.

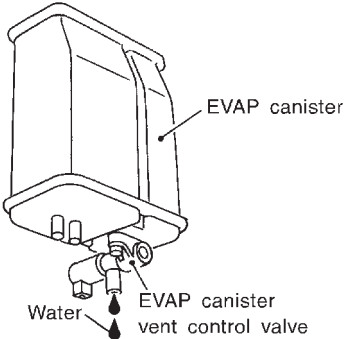
DIAGNOSTIC PROCEDURE

Symptom: Fuel Odor from EVAP Canister Is Strong.

NCEC0502S02

NCEC0502S0201

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 (With CONSULT-II)	▶	GO TO 6.
No (Without CONSULT-II)	▶	GO TO 7.

SEF596U

3	REPLACE EVAP CANISTER	
Replace EVAP canister with a new one.		
	▶	GO TO 4.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

4	CHECK WATER SEPARATOR	
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 		GI MA EM LC EC FE CL MT
<p style="text-align: center;">* A : Bottom hole (To atmosphere) B : Emergency tube (From EVAP canister) C : Inlet port (To member)</p>		SEF829T
<p>5. In case of NG in items 2 - 4, replace the parts.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • Do not disassemble water separator. 		AT AX SU BR ST RS BT HA SC EL IDX
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace water separator.

5	DETECT MALFUNCTIONING PART	
Check the EVAP hose between EVAP canister and water separator for clogging or poor connection.		
	▶	Repair or replace EVAP hose.

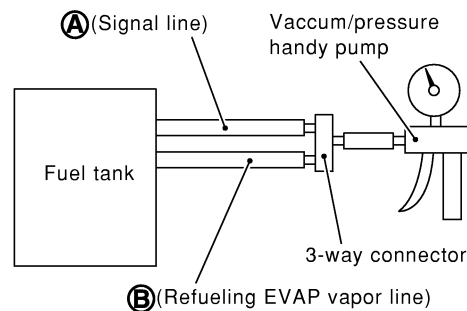
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

6 CHECK REFUELING EVAP VAPOR CUT VALVE

Ⓟ With CONSULT-II

1. Remove fuel tank. Refer to FE-5, "FUEL SYSTEM".
2. Drain fuel from the tank as follows:
 - a. Remove fuel feed hose located on the fuel level sensor unit retainer.
 - b. 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.
 - 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 level sensor 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 level sensor unit retainer remaining open and check that the pressure is applicable.



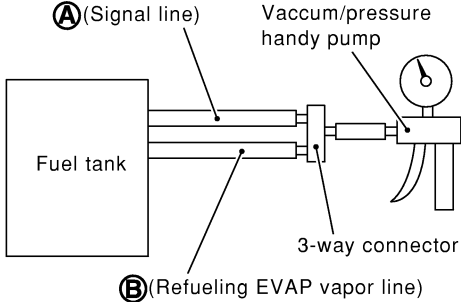
SEF968X

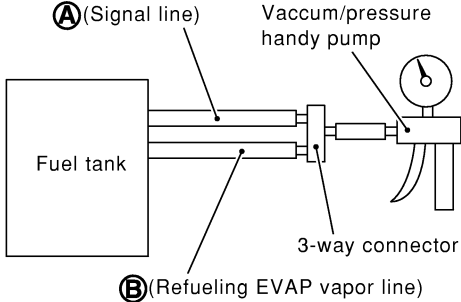
OK or NG

OK	▶	GO TO 8.
NG	▶	Replace refueling EVAP vapor cut valve with fuel tank.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

7	CHECK REFUELING EVAP VAPOR CUT VALVE
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove fuel tank. Refer to FE-5, "FUEL SYSTEM". 2. Drain fuel from the tank as follows: <ol style="list-style-type: none"> a. Remove fuel level sensor unit 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. <ol style="list-style-type: none"> a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector. b. Remove fuel level sensor unit retainer with fuel level sensor 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 level sensor unit retainer remaining open and check that the pressure is applicable. <div style="text-align: center;">  <p style="text-align: center;">OK or NG</p> </div> <p style="text-align: right;">SEF968X</p>	
OK	▶ GO TO 8.
NG	▶ Replace refueling EVAP vapor cut valve with fuel tank.

8	CHECK REFUELING CONTROL VALVE
<ol style="list-style-type: none"> 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. <div style="text-align: center;">  <p style="text-align: center;">OK or NG</p> </div> <p style="text-align: right;">SEF968X</p>	
OK	▶ INSPECTION END
NG	▶ Replace refueling control valve with fuel tank.

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

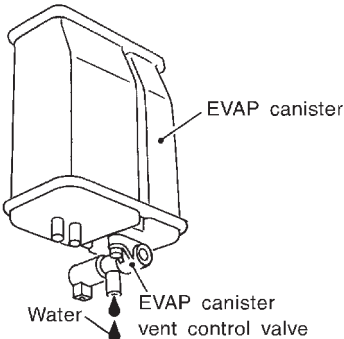
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

Symptom: Cannot Refuel/Fuel Odor From The Fuel Filler Opening Is Strong While Refueling.

NCEC0502S0202

1	CHECK EVAP CANISTER		
<p>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).</p> <p style="text-align: center;">OK or NG</p>			
OK	▶	GO TO 2.	
NG	▶	GO TO 3.	

2	CHECK IF EVAP CANISTER SATURATED WITH WATER		
<p>Does water drain from the EVAP canister?</p> <div style="text-align: center;">  <p style="text-align: right; margin-right: 50px;">EVAP canister</p> <p style="text-align: center;">Water EVAP canister vent control valve</p> </div> <p style="text-align: right; margin-right: 50px;">SEF596U</p> <p style="text-align: center;">Yes or No</p>			
Yes	▶	GO TO 3.	
No	▶	GO TO 6.	

3	REPLACE EVAP CANISTER		
<p>Replace EVAP canister with a new one.</p>			
	▶	GO TO 4.	

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

4	CHECK WATER SEPARATOR	
	<p>1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged.</p> <div style="text-align: center;"> <p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p> </div> <p style="text-align: right;">SEF829T</p>	
	<p>5. In case of NG in items 2 - 4, replace the parts. NOTE: • Do not disassemble water separator.</p> <p style="text-align: center;">OK or NG</p>	
	OK	▶ GO TO 5.
	NG	▶ Replace water separator.

5	DETECT MALFUNCTIONING PART	
	Check the EVAP hose between EVAP canister and water separator for clogging or poor connection.	
	▶	Repair or replace EVAP hose.

6	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 7.
	NG	▶ Repair or replace hoses and tubes.

7	CHECK FILLER NECK TUBE	
	Check signal line and recirculation line for clogging, dents and cracks.	
	OK or NG	
	OK	▶ GO TO 8.
	NG	▶ Replace filler neck tube.

GI
 MA
 EM
 LC
 EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

8		CHECK REFUELING CONTROL VALVE
<ol style="list-style-type: none"> 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. 		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 9.
OK (Without CONSULT-II)	▶	GO TO 10.
NG	▶	Replace refueling control valve with fuel tank.

SEF968X

9		CHECK REFUELING EVAP VAPOR CUT VALVE
<p>(B) With CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove fuel tank. Refer to FE-5, "FUEL SYSTEM". 2. Drain fuel from the tank as follows: <ol style="list-style-type: none"> a. Remove fuel feed hose located on the fuel level sensor unit retainer. b. 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. 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. <ol style="list-style-type: none"> a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector. b. Remove fuel level sensor unit retainer with fuel level sensor 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 level sensor unit retainer remaining open and check that the pressure is applicable. 		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Replace refueling EVAP vapor cut valve with fuel tank.

SEF968X

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

10	CHECK REFUELING EVAP VAPOR CUT VALVE
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove fuel tank. Refer to FE-5, "FUEL SYSTEM". 2. Drain fuel from the tank as follows: <ol style="list-style-type: none"> a. Remove fuel level sensor unit 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. <ol style="list-style-type: none"> a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector. b. Remove fuel level sensor unit retainer with fuel level sensor 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 level sensor unit retainer remaining open and check that the pressure is applicable. <div style="text-align: center;"> </div> <p style="text-align: right;">SEF968X</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 11.
NG	▶ Replace refueling EVAP vapor cut valve with fuel tank.

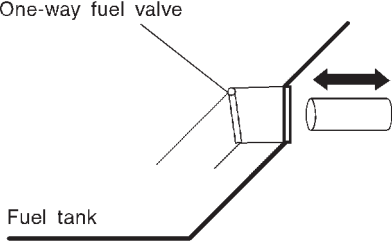
11	CHECK FUEL FILLER TUBE
<p>Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 12.
NG	▶ Replace fuel filler tube.

12	CHECK ONE-WAY FUEL VALVE-I
<p>Check one-way valve for clogging.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 13.
NG	▶ Repair or replace one-way fuel valve with fuel tank.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

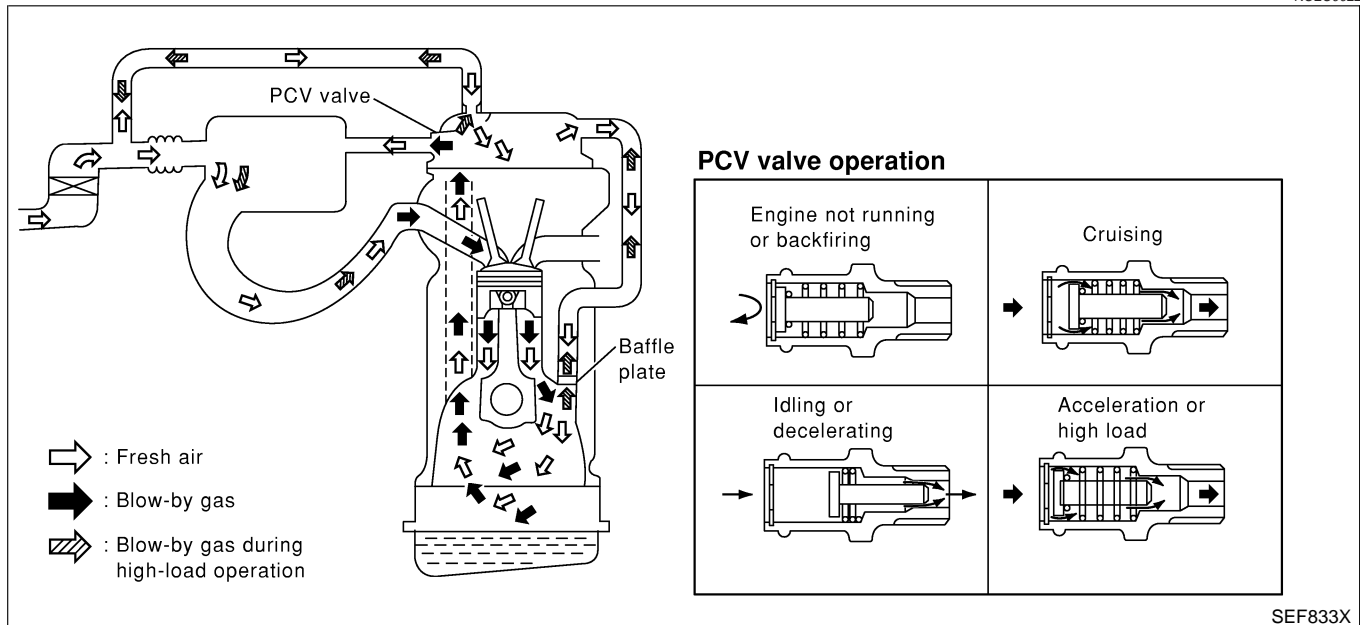
On Board Refueling Vapor Recovery (ORVR) (Cont'd)

13	CHECK ONE-WAY FUEL VALVE-II
<p>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.</p> <p style="text-align: center;">After removing filler tube</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF665U</p>	
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.

Positive Crankcase Ventilation

DESCRIPTION

NCEC0022



This system returns blow-by gas to the intake collector.

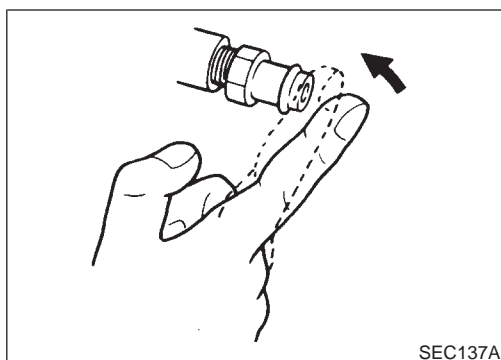
The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

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

NCEC0023

NCEC0023S01

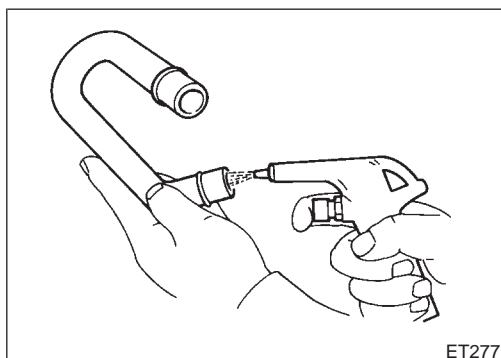
With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over the valve inlet.

GI

MA

EM

LC



Ventilation Hose

NCEC0023S02

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.

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

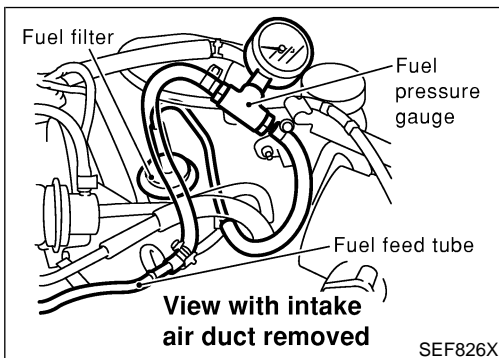
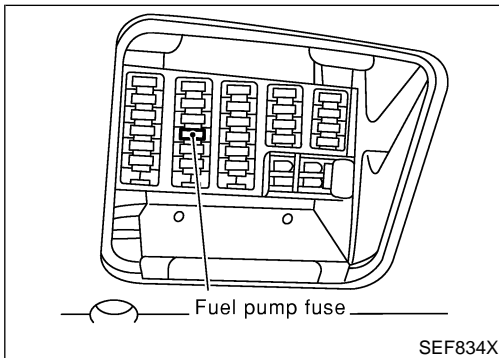
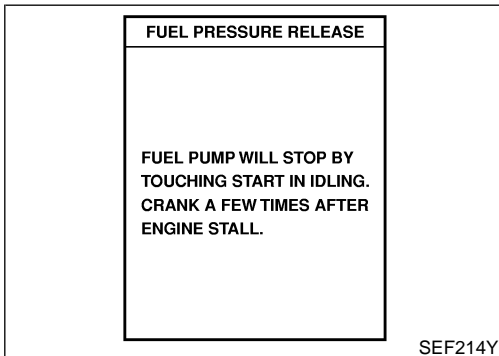
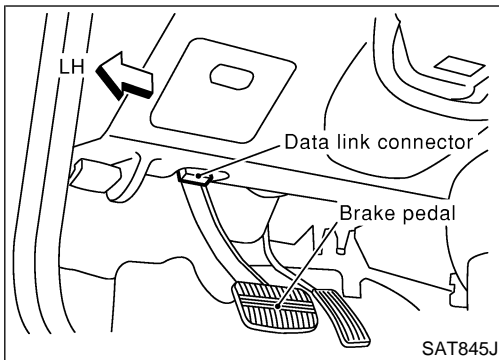
SC

EL

IDX

BASIC SERVICE PROCEDURE

Fuel Pressure Release



Fuel Pressure Release

NCEC0024

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

WITH CONSULT-II

NCEC0024S01

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

NCEC0024S02

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

NCEC0025

- 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 system operating. Fuel pressure gauge may indicate false readings.

1. Release fuel pressure to zero.
2. Disconnect fuel hose from fuel feed tube (engine side).
3. Install pressure gauge between fuel hose and fuel feed tube.
4. Start engine and check for fuel leakage.
5. Read the indication of fuel pressure gauge.

At idle speed:

With vacuum hose connected

Approximately 235 kPa (2.4 kg/cm², 34 psi)

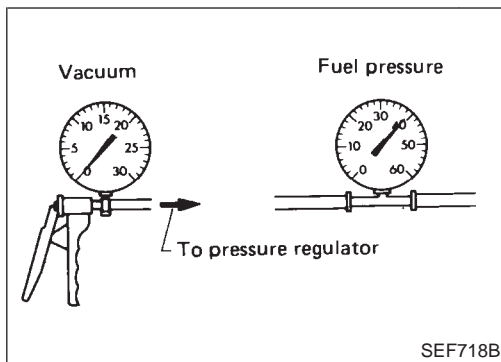
With vacuum hose disconnected

Approximately 294 kPa (3.0 kg/cm², 43 psi)

If results are unsatisfactory, perform Fuel Pressure Regulator Check, EC-51.

BASIC SERVICE PROCEDURE

Fuel Pressure Regulator Check



Fuel Pressure Regulator Check

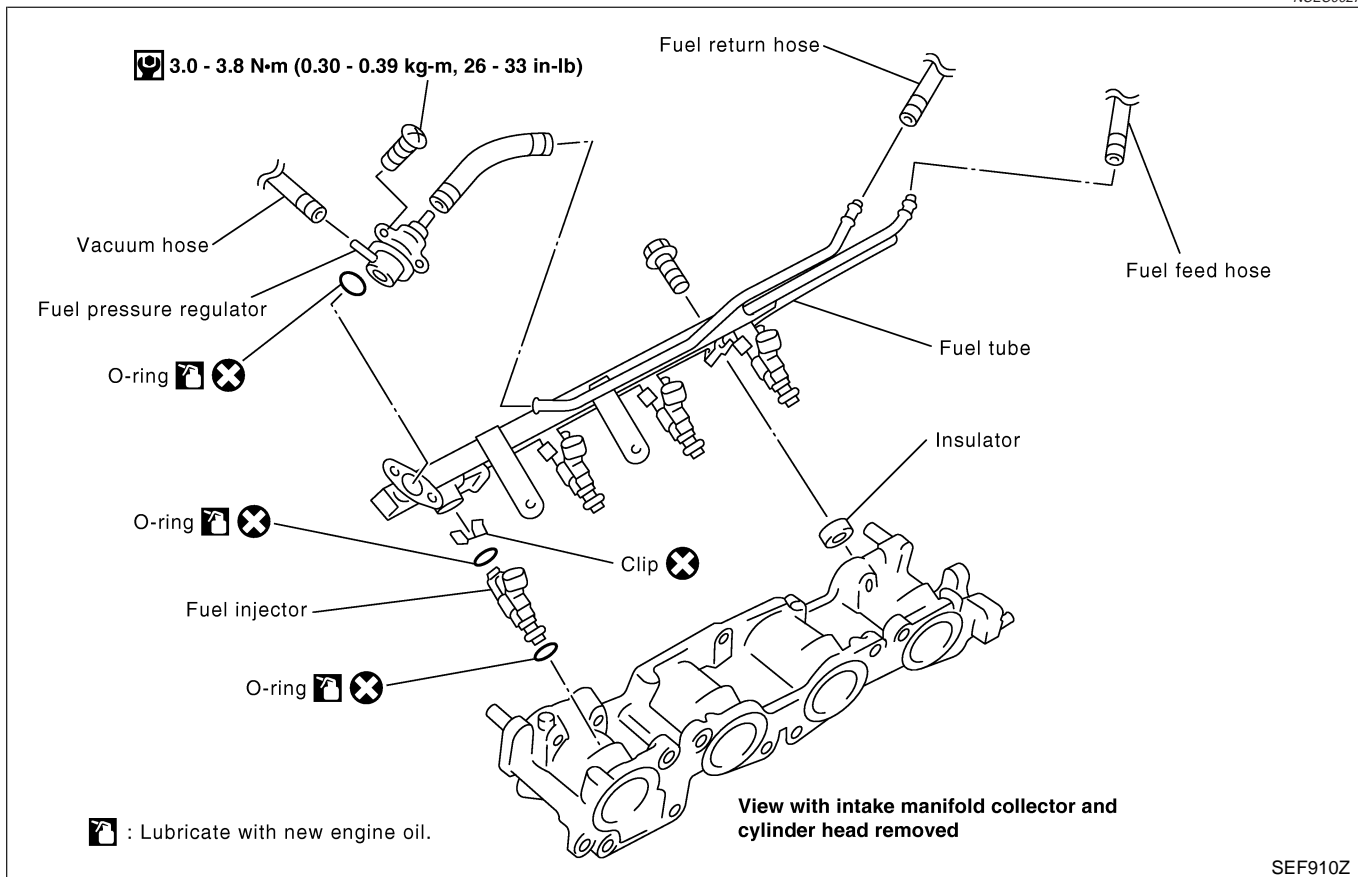
NCEC0026

1. Stop engine and disconnect fuel pressure regulator vacuum hose from intake manifold collector.
2. Plug intake manifold collector with a rubber cap.
3. Connect variable vacuum source to fuel pressure regulator.
4. Start engine and read indication of fuel pressure gauge as vacuum is changed.

Fuel pressure should decrease as vacuum increases. If results are unsatisfactory, replace fuel pressure regulator.

Injector REMOVAL AND INSTALLATION

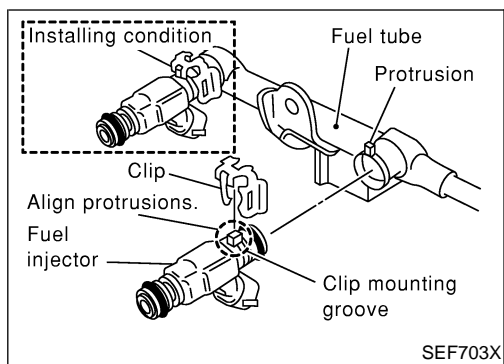
NCEC0027



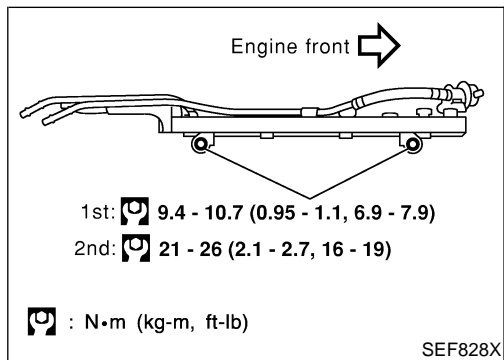
1. Release fuel pressure to zero.
2. Remove accelerator wire bracket.
3. Remove EVAP canister purge volume control solenoid valve and the bracket.
4. Remove ventilation hose.
5. Disconnect injector harness connectors.
6. Disconnect fuel pressure regulator vacuum hose from intake manifold collector.
7. Disconnect fuel hoses from fuel tube assembly.
8. Remove injectors with fuel tube assembly.

BASIC SERVICE PROCEDURE

Injector (Cont'd)



9. Expand and remove clips securing fuel injectors.
10. Extract fuel injectors straight from fuel tubes.
 - **Be careful not to damage injector nozzles during removal.**
 - **Do not bump or drop fuel injectors.**
11. Carefully install O-rings, including the one used with the pressure regulator.
 - **Lubricate O-rings with a smear of engine oil.**
 - **Be careful not to damage O-rings with service tools or finger nails or clips. Do not expand or twist O-rings.**
 - **Discard old clips; replace with new ones.**
12. Position clips in grooves on fuel injectors.
 - **Make sure that protrusions of fuel injectors are aligned with cutouts of clips after installation.**
13. Align protrusions of fuel tubes with those of fuel injectors.
14. After properly inserting fuel injectors, check to make sure that fuel tube protrusions are engaged with those of fuel injectors, and that flanges of fuel tubes are engaged with clips.



15. Tighten fuel tube assembly mounting nuts in two stages.

 : Tightening torque N·m (kg-m, ft-lb)

1st stage:

9.4 - 10.7 (0.95 - 1.1, 6.9 - 7.9)

2nd stage:

21 - 26 (2.1 - 2.7, 16 - 19)

16. Install all removed parts in the reverse order of removal.

CAUTION:

After properly connecting fuel tube assembly to injector and fuel hose, check connection for fuel leakage.

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment

=NCEC0028

NCEC0028S01

PREPARATION

- Make sure that the following parts are in good order.
- a) Battery
- b) Ignition system
- c) Engine oil and coolant levels
- d) Fuses
- e) ECM harness connector
- f) Vacuum hoses
- g) Air intake system
(Oil filler cap, oil level gauge, etc.)
- h) Fuel pressure
- i) Engine compression
- j) EGR valve operation
- k) Throttle valve
- l) 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.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

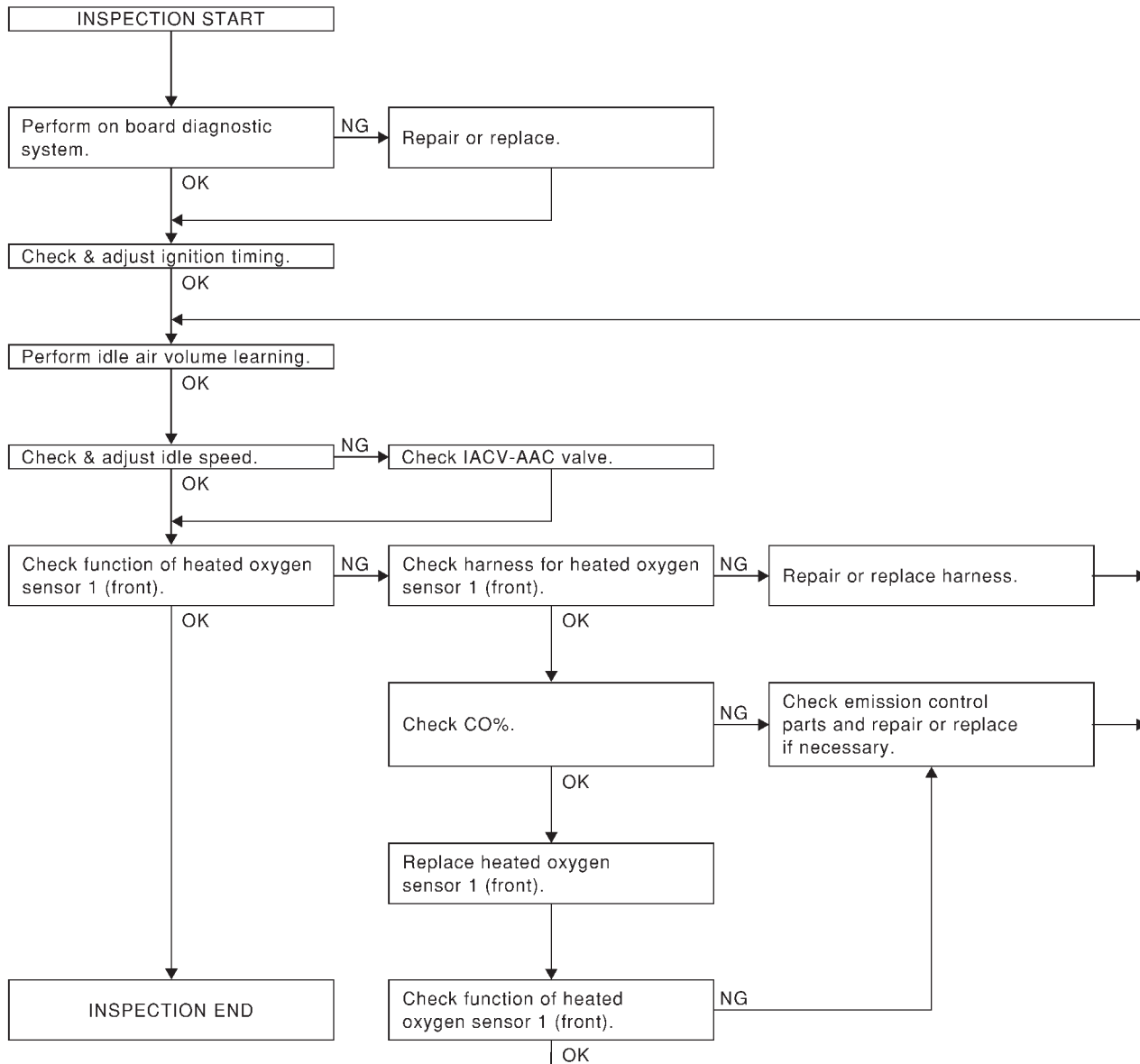
IDX

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

Overall Inspection Sequence

NCEC0028S0101



SEF906XA

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

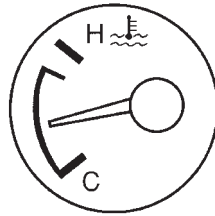
INSPECTION PROCEDURE

=NCEC0028S02

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

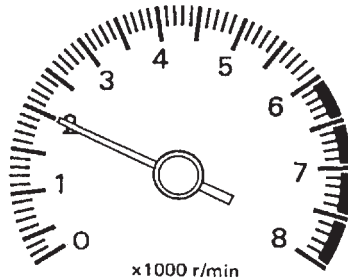
1 INSPECTION START

1. Visually check the following:
 - Air cleaner clogging
 - Hoses and ducts for leaks
 - EGR valve operation
 - Electrical connectors
 - Gasket
 - Throttle valve and throttle position sensor operation
2. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge. Ensure engine stays below 1,000 rpm.



AEC692

3. Open engine hood and run engine at about 2,000 rpm for about 2 minutes under no-load.



SEF977U

4. Make sure that no DTC is displayed with CONSULT-II or GST.

OK or NG

OK (With CONSULT-II)	▶▶	GO TO 3.
OK (Without CONSULT-II)	▶▶	GO TO 4.
NG	▶▶	GO TO 2.

2 REPAIR OR REPLACE

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

With CONSULT-II	▶▶	GO TO 3.
Without CONSULT-II	▶▶	GO TO 4.

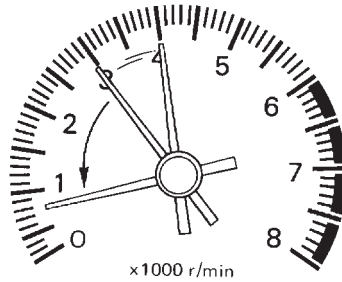
BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

3 CHECK IGNITION TIMING

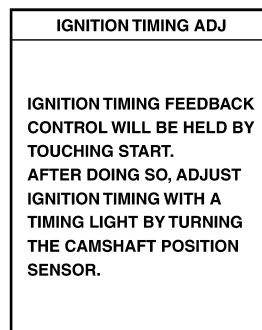
 With CONSULT-II

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.



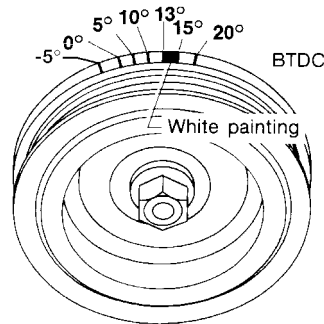
SEF978U

3. Select "IGNITION TIMING ADJ" in WORK SUPPORT mode.
4. Touch "START".



PEF546N

5. Start and rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run at idle speed.
6. Check ignition timing with a timing light.



AEC804

M/T: 15°±2° BTDC

A/T: 15°±2° BTDC (in "P" or "N" position)

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

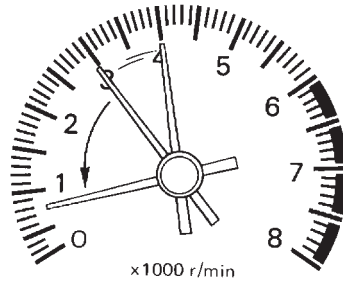
BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

4 CHECK IGNITION TIMING

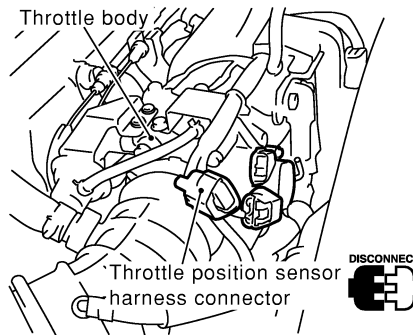
⊗ Without CONSULT-II

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.



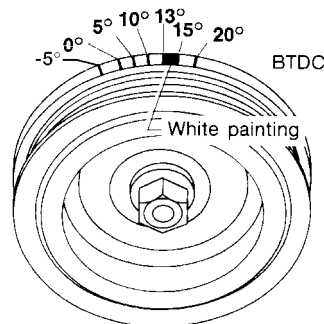
SEF978U

3. Turn off engine and disconnect throttle position sensor harness connector.



SEF863X

4. Start and rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run at idle speed.
5. Check ignition timing with a timing light.



AEC804

M/T: 15°±2° BTDC

A/T: 15°±2° BTDC (in "P" or "N" position)



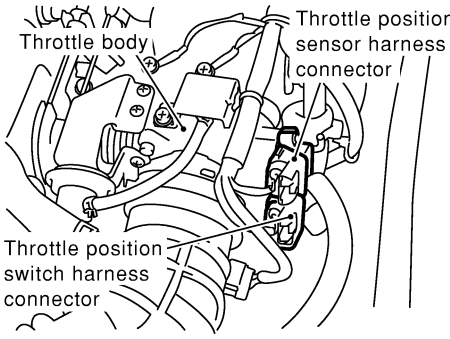
OK or NG



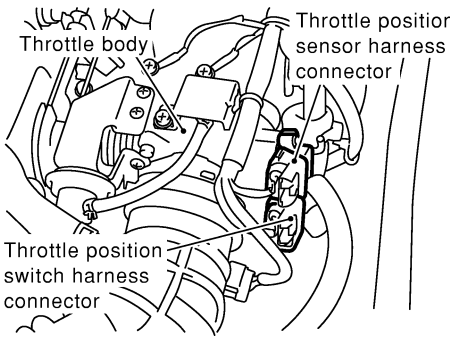
OK	▶	GO TO 6.
NG	▶	GO TO 5.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

BASIC SERVICE PROCEDURE



Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

5	ADJUST IGNITION TIMING
 With CONSULT-II	1. Adjust ignition timing to the specified value by turning distributor after loosening bolts which secure distributor.
 Without CONSULT-II	1. Adjust ignition timing to the specified value by turning distributor after loosening bolts which secure distributor. 2. Turn off engine and connect throttle position sensor harness connector to throttle position sensor.
 <p>Throttle body</p> <p>Throttle position sensor harness connector</p> <p>Throttle position switch harness connector</p> <p>SEF837X</p>	
With CONSULT-II	▶ GO TO 3.
Without CONSULT-II	▶ GO TO 4.

6	PERFORM IDLE AIR VOLUME LEARNING
 With CONSULT-II	1. Start and rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run it at idle speed. 2. Perform "Idle Air Volume Learning", EC-65.
 Without CONSULT-II	1. Turn off engine and connect throttle position sensor harness connector.
 <p>Throttle body</p> <p>Throttle position sensor harness connector</p> <p>Throttle position switch harness connector</p> <p>SEF837X</p>	
	2. Start and rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run it at idle speed. 3. Perform "Idle Air Volume Learning", EC-65.
	▶ GO TO 7.

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)


7	CHECK TARGET IDLE SPEED						
<p> With CONSULT-II 1. Read idle speed in "DATA MONITOR" mode with CONSULT-II.</p> <div style="text-align: center; border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <table border="1"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> </tbody> </table> </div> <p style="text-align: right; margin-top: 20px;">SEF058Y</p> <p>M/T: 800±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</p>		DATA MONITOR		MONITOR	NO DTC	ENG SPEED	XXX rpm
DATA MONITOR							
MONITOR	NO DTC						
ENG SPEED	XXX rpm						
<p> Without CONSULT-II 1. Check idle speed.</p> <p>M/T: 800±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>							
OK (With CONSULT-II)	▶ GO TO 9.						
OK (Without CONSULT-II)	▶ GO TO 10.						
NG	▶ GO TO 8.						


8	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Check IACV-AAC valve and replace if necessary. Refer to EC-436. ● Check IACV-AAC valve harness and repair if necessary. Refer to EC-436. ● Check ECM function by substituting another known-good ECM. (ECM may be the cause of a problem, but this is rarely the case.) 	
With CONSULT-II	▶ GO TO 9.
Without CONSULT-II	▶ GO TO 10.

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

9	CHECK HEATED OXYGEN SENSOR 1 (FRONT) SIGNAL									
<p> With CONSULT-II</p> <p>1. See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode.</p> <p>2. Maintaining engine at 2,000 rpm under no-load (engine is warmed up to normal operating temperature.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.</p>										
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="padding: 2px;">DATA MONITOR</th> </tr> <tr> <th style="padding: 2px;">MONITOR</th> <th style="padding: 2px;">NO DTC</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">ENG SPEED</td> <td style="padding: 2px;">XXX rpm</td> </tr> <tr> <td style="padding: 2px;">HO2S1 MNTR (B1)</td> <td style="padding: 2px;">RICH</td> </tr> </tbody> </table>			DATA MONITOR		MONITOR	NO DTC	ENG SPEED	XXX rpm	HO2S1 MNTR (B1)	RICH
DATA MONITOR										
MONITOR	NO DTC									
ENG SPEED	XXX rpm									
HO2S1 MNTR (B1)	RICH									
SEF820Y										
<p>1 time: RICH → LEAN → RICH</p> <p>2 times: RICH → LEAN → RICH → LEAN → RICH</p> <p style="text-align: center;">OK or NG</p>										
OK	▶	INSPECTION END								
NG (Monitor does not fluctuate.)	▶	GO TO 13.								
NG (Monitor fluctuates less than 5 times.)	▶	GO TO 11.								

10	CHECK HEATED OXYGEN SENSOR 1 (FRONT) SIGNAL	
<p> Without CONSULT-II</p> <p>1. Set voltmeter probe between ECM terminal 62 and ground.</p> <p>2. Make sure that the voltage fluctuates between 0 - 0.3V and 0.6 - 1.0V more than 5 times during 10 seconds at 2,000 rpm.</p> <p>1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V</p> <p>2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V</p>		
OK or NG		
OK	▶	INSPECTION END
NG (Voltage does not fluctuate.)	▶	GO TO 13.
NG (Voltage fluctuates less than 5 times.)	▶	GO TO 11.

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

11	CHECK HEATED OXYGEN SENSOR 1 (FRONT) SIGNAL	
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop engine. 2. Replace heated oxygen sensor 1 (front). 3. Start engine and warm it up to normal operating temperature. 4. Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load. 5. See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode. 6. Maintaining engine at 2,000 rpm under no-load (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 		
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop engine. 2. Replace heated oxygen sensor 1 (front). 3. Start engine and warm it up to normal operating temperature. 4. Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load. 5. Set voltmeter probe between ECM terminal 62 and ground. 6. Make sure that the voltage fluctuates between 0 - 0.3V and 0.6 - 1.0V more than 5 times during 10 seconds at 2,000 rpm. 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 → 0 - 0.3V <p style="text-align: center;">OK or NG</p>		
OK		▶ INSPECTION END
NG		▶ GO TO 12.

GI
 MA
 EM
 LG
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

12	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Check fuel pressure regulator. Refer to EC-51. ● Check mass air flow sensor and its circuit. Refer to EC-154. ● Check injector and its circuit. Refer to EC-596. Clean or replace if necessary. ● Check engine coolant temperature sensor and its circuit. Refer to EC-171. ● Check ECM function by substituting another known-good ECM. (ECM may be the cause of a problem, but this is rarely the case.) 		
		▶ GO TO 6.

13	CHECK HEATED OXYGEN SENSOR 1 (FRONT) HARNESS	
<ol style="list-style-type: none"> 1. Turn off engine and disconnect battery ground cable. 2. Disconnect ECM harness connector. 3. Disconnect heated oxygen sensor 1 (front) harness connector. 4. Check harness continuity between ECM terminal 62 and heated oxygen sensor 1 (front) harness connector terminal 2. Refer to Wiring Diagram, EC-199. Continuity should exist. <p style="text-align: center;">OK or NG</p>		
OK		▶ GO TO 15.
NG		▶ GO TO 14.

14	REPAIR OR REPLACE	
Repair or replace harness between ECM and heated oxygen sensor 1 (front).		
		▶ GO TO 6.

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

15 PREPARATION FOR "CO" % CHECK

With CONSULT-II

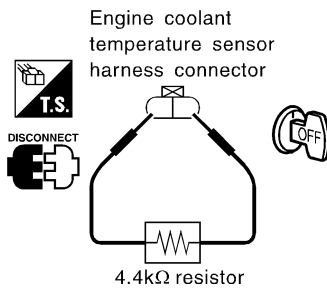
1. Reconnect ECM harness connector.
2. Turn ignition switch "ON".
3. Select "ENG COOLANT TEMP" in "ACTIVE TEST" mode.
4. Set "ENG COOLANT TEMP" to 5°C (41°F) by touching "DWN" and "Qd".

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

SEF172Y

Without CONSULT-II

1. Disconnect ECM harness connector.
2. Disconnect engine coolant temperature sensor harness connector.
3. Connect a resistor (4.4 kΩ) between terminals of engine coolant temperature sensor harness connector.



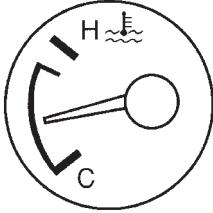
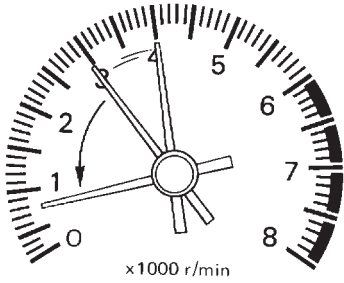
SEF982UA



GO TO 16.

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

16	CHECK "CO" %	GI
1. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge.		MA
		EM
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.		LC
		AEC692
3. Check "CO" %. Idle CO: Less than 11%		EC
4. <input checked="" type="checkbox"/> Without CONSULT-II After checking CO%, a. Disconnect the resistor from terminals of engine coolant temperature sensor. b. Connect engine coolant temperature sensor harness connector to engine coolant temperature sensor.		FE
OK or NG		CL
OK	▶	GO TO 17.
NG	▶	GO TO 18.
		MT
		SEF978U
		AT
		AX
		SU
		BR
		ST
		RS
		BT
		HA
		SC
		EL
		IDX

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

17	CHECK HEATED OXYGEN SENSOR 1 (FRONT) SIGNAL	
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop engine. 2. Replace heated oxygen sensor 1 (front). 3. Start engine and warm it up to normal operating temperature. 4. Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load. 5. See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode. 6. Maintaining engine at 2,000 rpm under no-load (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 		
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop engine. 2. Replace heated oxygen sensor 1 (front). 3. Start engine and warm it up to normal operating temperature. 4. Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load. 5. Set voltmeter probe between ECM terminal 62 and ground. 6. Make sure that voltage fluctuates between 0 - 0.3V and 0.6 - 1.0V more than 5 times during 10 seconds at 2,000 rpm. 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 → 0 - 0.3V <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	GO TO 18.

18	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Connect heated oxygen sensor 1 (front) harness connector to heated oxygen sensor 1 (front). ● Check fuel pressure regulator. Refer to EC-51. ● Check mass air flow sensor and its circuit. Refer to EC-154. ● Check injector and its circuit. Refer to EC-596. Clean or replace if necessary. ● Check engine coolant temperature sensor and its circuit. Refer to EC-171. ● Check ECM function by substituting another known-good ECM. (ECM may be the cause of a problem, but this is rarely the case.) 		
▶		GO TO 6.

NCEC0503

NCEC0503S01

NCEC0503S02

NCEC0503S03

NCEC0503S0301

SELECT WORK ITEM
TP SW/TP SEN IDLE POSI ADJ
FUEL PRESSURE RELEASE
IDLE AIR VOL LEARN
SELF-LEARNING CONT
EVAP SYSTEM CLOSE
TARGET ING TIM ADJ

SEF452Y

WORK SUPPORT	
IDLE AIR VOL LEARN	
MONITOR	
ENG SPEED	XXX rpm
START	

SEF454Y

WORK SUPPORT	
IDLE AIR VOL LEARN	CMPLT
MONITOR	
ENG SPEED	XXX rpm
Result appears.	
CMPLT: successful	
INCMP: unsuccessful	
START	

SEF455Y

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 IACV-AAC valve, throttle body or ECM is replaced.
- Idle speed or ignition timing is out of specification.

PRE-CONDITIONING

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 running light systems, if the parking brake is applied before the engine is started, the headlamp will not be illuminated.

- Cooling fan motor: Not operating
 - 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

Ⓜ With CONSULT-II

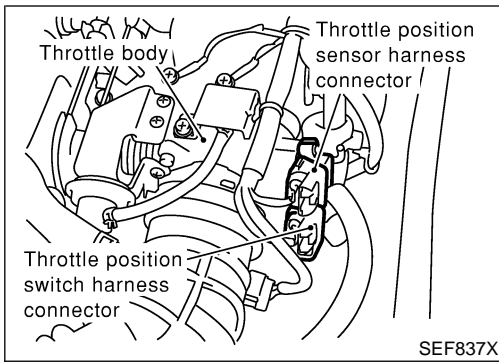
1. Turn ignition switch “ON” and wait at least 1 second.
2. Turn ignition switch “OFF” and wait at least 10 seconds.
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic “PRE-CONDITIONING” (previously mentioned) are in good order.
5. Turn ignition switch “OFF” and wait at least 10 seconds.
6. Start the engine and let it idle for at least 15 seconds.
7. Select “IDLE AIR VOL LEARN” in “WORK SUPPORT” mode.
8. Touch “START” and wait 15 seconds.
9. Make sure that “CMPLT” is displayed on CONSULT-II screen. If “INCMP” is displayed, “Idle Air Volume Learning” will not be carried out successfully. In this case, find the cause of the problem by referring to the NOTE below.
10. Rev up the engine two or three times. Make sure that idle speed and ignition timing are within specifications.

ITEM	SPECIFICATION
Idle speed	M/T: 800±50 rpm A/T: 800±50 rpm (in “P” or “N” position)
Ignition timing	M/T: 15°±2° BTDC A/T: 15°±2° BTDC (in “P” or “N” position)

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

BASIC SERVICE PROCEDURE

Idle Air Volume Learning (Cont'd)



⊗ Without CONSULT-II

=NCEC0503S0302

1. Turn ignition switch "ON" and wait at least 1 second.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic "PRE-CONDITIONING" (previously mentioned) are in good order.
5. Turn ignition switch "OFF" and wait at least 10 seconds.
6. Start the engine and let it idle for at least 15 seconds.
7. Disconnect throttle position sensor harness connector (brown), then reconnect it within 5 seconds.
8. Wait 15 seconds.
9. Make sure that idle speed is within specifications. If not, the result will be incomplete. In this case, find the cause of the problem by referring to the NOTE below.
10. Rev up the engine two or three times. Make sure that idle speed and ignition timing are within specifications.

ITEM	SPECIFICATION
Idle speed	M/T: 800±50 rpm A/T: 800±50 rpm (in "P" or "N" position)
Ignition timing	M/T: 15°±2° BTDC A/T: 15°±2° BTDC (in "P" or "N" position)

NOTE:

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

- 1) Check that throttle valve is fully closed.
- 2) Check that downstream of throttle valve is free from air leakage.
- 3) Adjust closed throttle position switch and reset memory. (Refer to Basic Inspection, EC-107.)
- 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 problem.
- 5) If any of the following conditions occur after the engine has started, eliminate the cause of the problem and perform "Idle air volume learning" all over again:
 - Engine stalls.
 - Erroneous idle.
 - Blown fuses related to the IACV-AAC valve system.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Introduction

Introduction

NCEC0029

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

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

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

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-124.)

Two Trip Detection Logic

NCEC0030

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				
Coolant overtemperature enrichment protection — DTC: P0217	—	X	—	—	X	—	X	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	X	—	—	—	—	—	X	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	—	—	X	—	—	X	—	—
Closed loop control — DTC: P1148	—	X	—	—	X	—	X	—
Fail-safe items (Refer to EC-124.)	—	X	—	—	X*1	—	X*1	—
Except above	—	—	—	X	—	X	X	—

*1: Except “ECM”

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information

Emission-related Diagnostic Information

NCEC0031

DTC AND 1ST TRIP DTC

NCEC0031S01

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-79.

For malfunctions in which 1st trip DTCs are displayed, refer to EC-77. 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 problem. 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-105. Then perform "DTC Confirmation Procedure" or "Overall Function Check" to try to duplicate the problem. If the malfunction is duplicated, the item requires repair.

How to Read DTC and 1st Trip DTC

NCEC0031S0101

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, P1320, 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			DTC RESULTS	
	TIME			TIME	
	MAF SEN/CIRCUIT [P0100]	0		MAF SEN/CIRCUIT [P0100]	1t

SEF992X

FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

NCEC0031S02

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 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.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

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-93.

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-79.

SYSTEM READINESS TEST (SRT) CODE

NCE0031S03

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 SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

SRT Item

=NCEC0031S0307

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

SRT item (CONSULT-II indication)	Performance Priority*2	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	3	Three way catalyst function	P0420
EVAP SYSTEM	2	EVAP control system (small leak) (negative pressure)	P0440
	—	EVAP control system (small leak) (positive pressure)	P1440*1
	3	EVAP control system purge flow monitoring	P1447
O2 SENSOR	3	Heated oxygen sensor 1 (front) (circuit)	P0130
		Heated oxygen sensor 1 (front) (lean shift monitoring)	P0131
		Heated oxygen sensor 1 (front) (rich shift monitoring)	P0132
		Heated oxygen sensor 1 (front) (response monitoring)	P0133
		Heated oxygen sensor 1 (front) (high voltage)	P0134
		Heated oxygen sensor 2 (rear) (min. voltage monitoring)	P0137
		Heated oxygen sensor 2 (rear) (max. voltage monitoring)	P0138
		Heated oxygen sensor 2 (rear) (response monitoring)	P0139
		Heated oxygen sensor 2 (rear) (high voltage)	P0140
O2 SEN HEATER	3	Heated oxygen sensor 1 heater (front)	P0135
		Heated oxygen sensor 2 heater (rear)	P0141
EGR SYSTEM	3	EGR function (close)	P0400
	1	EGR function (open)	P1402

*1: P1440 [EVAP control system (small leak) (positive pressure) diagnosis] is one type of SRT related diagnosis. This diagnosis, however, does not contribute to setting the SRT as "CMPLT", when no malfunction exists in the EVAP system. Therefore, P0440 must be used instead of P1440.

*2: 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.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

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 →
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:

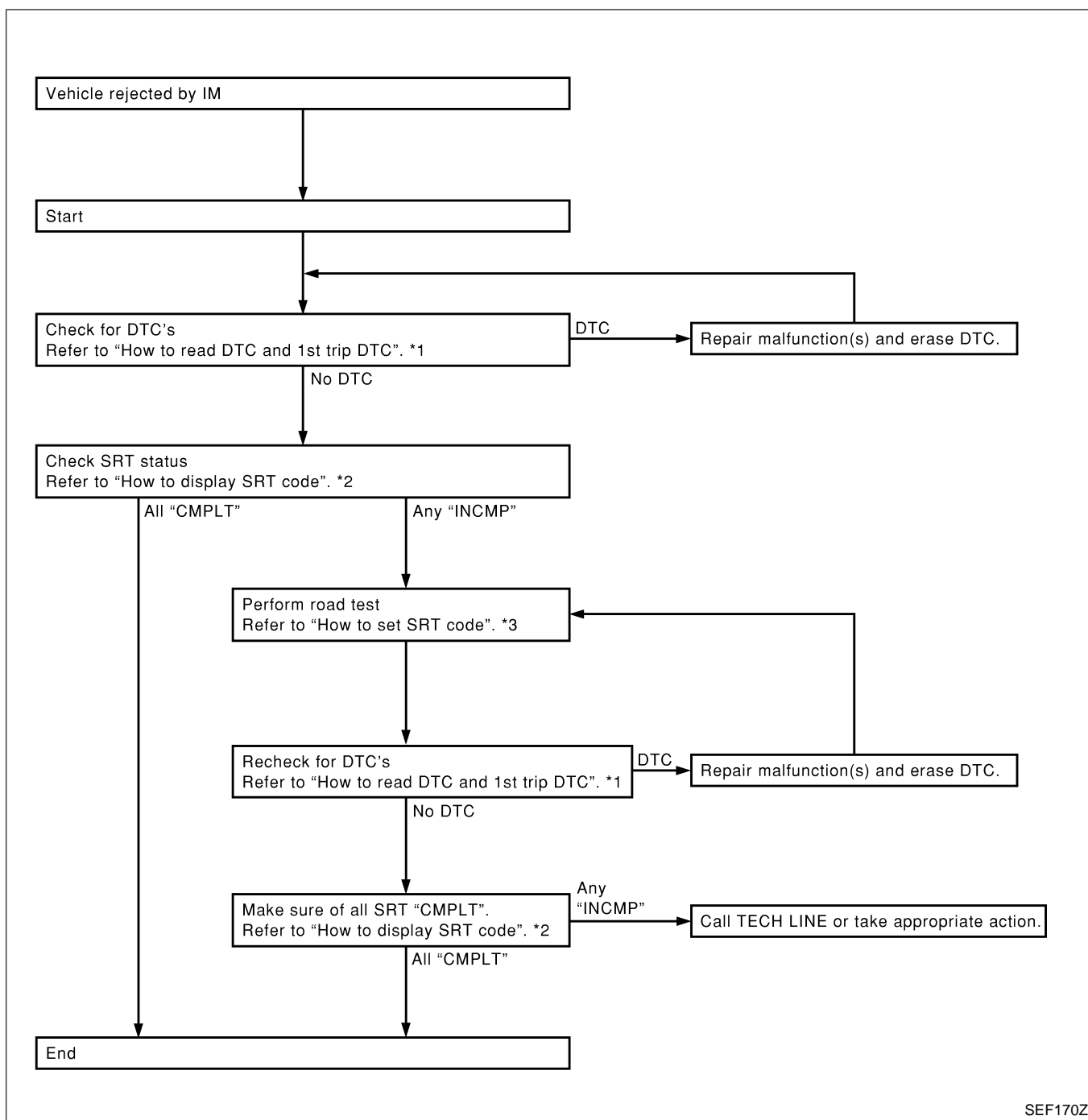
SRT can be set as "CMPLT" together with the DTC(s). Therefore, DTC check must always be carried out prior to the state emission inspection even though the SRT indicates "CMPLT".

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.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)



SEF170Z

*1 EC-68

*2 EC-72

*3 EC-73

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.

NCEC0031S0301

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

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

SEF713Y

GI

MA

EM

LC

EC

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. NCEC0031S0302

With CONSULT-II

Perform corresponding DTC Confirmation Procedure one by one based on "Performance Priority" in the table on EC-70.

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.

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

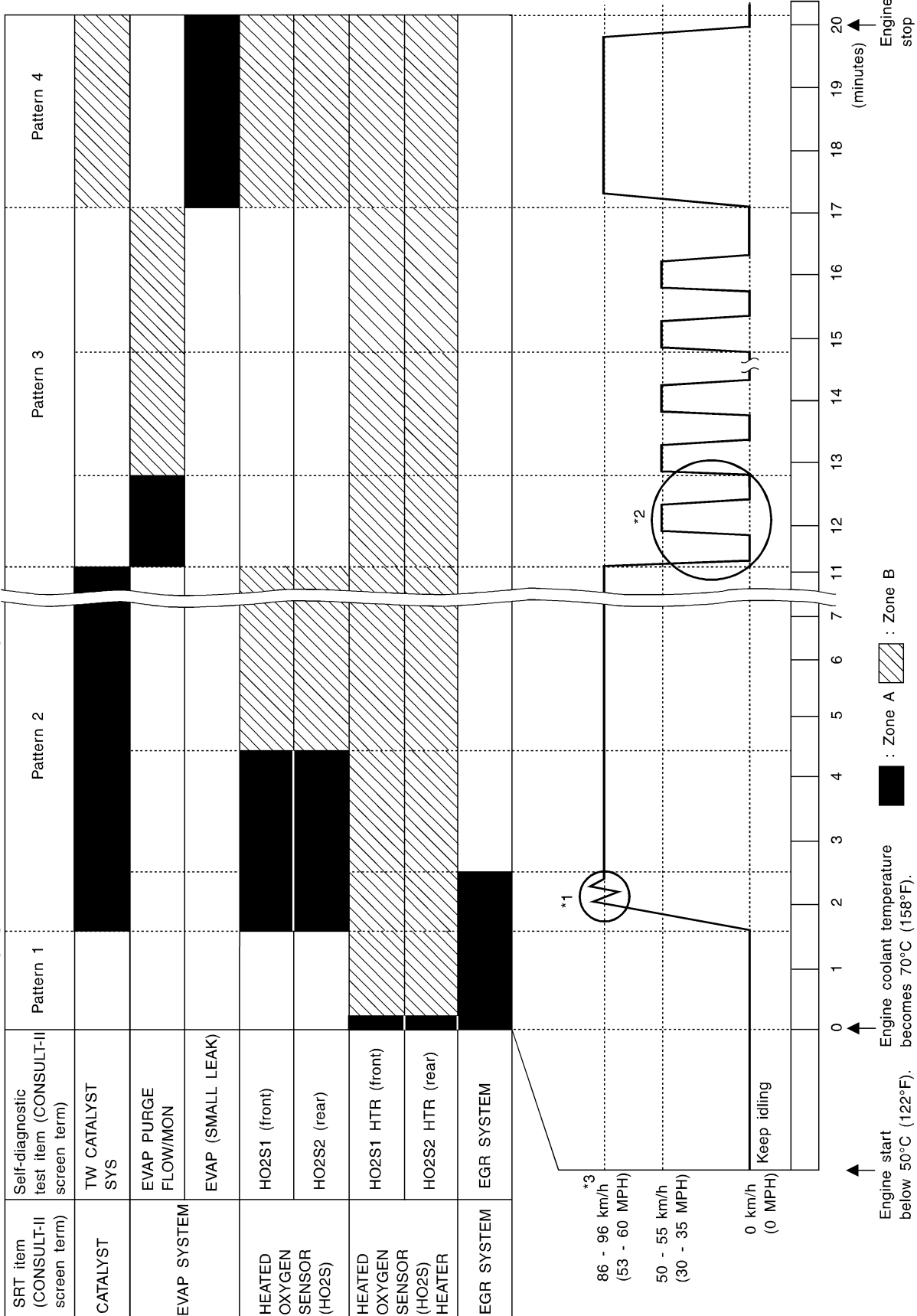
Emission-related Diagnostic Information (Cont'd)

Driving Pattern

NCEC0031S0303

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



SEF676Y

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

- 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 70 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 70 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 82 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.

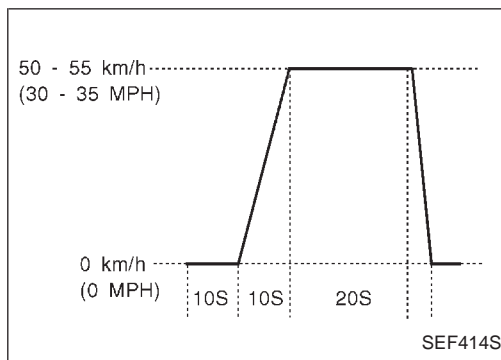
Pattern 4:

- 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) Repeat steps 1 and 2 until the EGR system SRT is set.



*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.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

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)	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	55 (35)
2nd	95 (60)
3rd	135 (85)
4th	—
5th	—

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

NCEC0031S04

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 (9 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.	X
		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

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
O2 SENSOR	Heated oxygen sensor 1 (front)	09H	04H	Max.	X
		0AH	84H	Min.	X
		0BH	04H	Max.	X
		0CH	04H	Max.	X
		0DH	04H	Max.	X
	Heated oxygen sensor 2 (rear)	19H	86H	Min.	X
		1AH	86H	Min.	X
		1BH	06H	Max.	X
1CH		06H	Max.	X	
O2 SENSOR HEATER	Heated oxygen sensor 1 heater (front)	29H	08H	Max.	X
		2AH	88H	Min.	X
	Heated oxygen sensor 2 heater (rear)	2DH	0AH	Max.	X
		2EH	8AH	Min.	X
EGR SYSTEM	EGR function	31H	8CH	Min.	X
		32H	8CH	Min.	X
		33H	8CH	Min.	X
		34H	8CH	Min.	X
		35H	0CH	Max.	X

EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

X: Applicable —: Not applicable NCEC0031S05

Items (CONSULT-II screen terms)	DTC*1	SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	—	—	—	—
MAF SEN/CIRCUIT	P0100	—	—	X	EC-154
ABSL PRES SEN/CIRC	P0105	—	—	X	EC-163
AIR TEMP SEN/CIRC	P0110	—	—	X	EC-165
COOLANT T SEN/CIRC	P0115	—	—	X	EC-171
THRTL POS SEN/CIRC	P0120	—	—	X	EC-177
*COOLAN T SEN/CIRC	P0125	—	—	X	EC-190
HO2S1 (B1)	P0130	X	X	X*2	EC-196
HO2S1 (B1)	P0131	X	X	X*2	EC-204
HO2S1 (B1)	P0132	X	X	X*2	EC-210
HO2S1 (B1)	P0133	X	X	X*2	EC-217
HO2S1 (B1)	P0134	X	X	X*2	EC-226
HO2S1 HTR (B1)	P0135	X	X	X*2	EC-232

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

Items (CONSULT-II screen terms)	DTC*1	SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
HO2S2 (B1)	P0137	X	X	X*2	EC-237
HO2S2 (B1)	P0138	X	X	X*2	EC-245
HO2S2 (B1)	P0139	X	X	X*2	EC-253
HO2S2 (B1)	P0140	X	X	X*2	EC-261
HO2S2 HTR (B1)	P0141	X	X	X*2	EC-267
FUEL SYS-LEAN/BK1	P0171	—	—	X	EC-272
FUEL SYS-RICH/BK1	P0172	—	—	X	EC-279
FUEL TEMP SEN/CIRC	P0180	—	—	X	EC-286
ENG OVER TEMP	P0217	—	—	X	EC-291
MULTI CYL MISFIRE	P0300	—	—	X	EC-322
CYL 1 MISFIRE	P0301	—	—	X	EC-322
CYL 2 MISFIRE	P0302	—	—	X	EC-322
CYL 3 MISFIRE	P0303	—	—	X	EC-322
CYL 4 MISFIRE	P0304	—	—	X	EC-322
KNOCK SEN/CIRC-B1	P0325	—	—	—	EC-329
CKP SEN/CIRCUIT	P0335	—	—	X	EC-333
CMP SEN/CIRC	P0340	—	—	X	EC-339
EGR SYSTEM	P0400	X	X	X*2	EC-347
EGR VOL CONT/V CIR	P0403	—	—	X	EC-357
TW CATALYST SYS-B1	P0420	X	X	X*2	EC-364
EVAP SMALL LEAK	P0440	X	X	X*2	EC-368
PURG VOLUME CONT/V	P0443	—	—	X	EC-382
VENT CONTROL VALVE	P0446	—	—	X	EC-389
EVAPO SYS PRES SEN	P0450	—	—	X	EC-396
EVAP GROSS LEAK	P0455	—	X	X*2	EC-409
FUEL LEV SE SLOSH	P0460	—	—	X	EC-420
FUEL LEVEL SENSOR	P0461	—	—	X	EC-425
FUEL LEVL SEN/CIRC	P0464	—	—	X	EC-427
VEH SPEED SEN/CIRC	P0500	—	—	X	EC-432
IACV/AAC VLV/CIRC	P0505	—	—	X	EC-436
CLOSED TP SW/CIRC	P0510	—	—	X	EC-445
A/T COMM LINE	P0600	—	—	—	EC-453
ECM	P0605	—	—	X	EC-456
PNP SW/CIRC	P0705	—	—	X	AT-107
ATF TEMP SEN/CIRC	P0710	—	—	X	AT-113
VEH SPD SEN/CIR AT	P0720	—	—	X	AT-119
ENGINE SPEED SIG	P0725	—	—	X	AT-124

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

Items (CONSULT-II screen terms)	DTC*1	SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
A/T 1ST GR FNCTN	P0731	—	—	X	AT-128
A/T 2ND GR FNCTN	P0732	—	—	X	AT-135
A/T 3RD GR FNCTN	P0733	—	—	X	AT-141
A/T 4TH GR FNCTN	P0734	—	—	X	AT-147
TCC SOLENOID/CIRC	P0740	—	—	X	AT-157
A/T TCC S/V FNCTN	P0744	—	—	X	AT-163
L/PRESS SOL/CIRC	P0745	—	—	X	AT-174
SFT SOL A/CIRC	P0750	—	—	X	AT-181
SFT SOL B/CIRC	P0755	—	—	X	AT-187
THERMOSTAT FNCTN	P1126	—	—	X	EC-458
CLOSED LOOP-B1	P1148	—	—	X	EC-460
ENG OVER TEMP	P1217	—	—	X	EC-462
CKP SENSOR COG	P1336	—	—	X	EC-491
EGR TEMP SEN/CIRC	P1401	—	—	X	EC-497
EGR SYSTEM	P1402	X	X	X*2	EC-505
EVAP SMALL LEAK	P1440	X	X	X*2	EC-515
PURG VOLUME CONT/V	P1444	—	—	X	EC-517
VENT CONTROL VALVE	P1446	—	—	X	EC-529
EVAP PURG FLOW/MON	P1447	X	X	X*2	EC-537
VENT CONTROL VALVE	P1448	—	—	X	EC-549
FUEL LEVL SEN/CIRC	P1464	—	—	X	EC-558
VC/V BYPASS/V	P1490	—	—	X	EC-562
VC CUT/V BYPASS/V	P1491	—	—	X	EC-568
A/T DIAG COMM LINE	P1605	—	—	X	EC-580
TP SEN/CIRC A/T	P1705	—	—	X	AT-193
P-N POS SW/CIRCUIT	P1706	—	—	X	EC-583
O/R CLTCH SOL/CIRC	P1760	—	—	X	AT-202

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

*2: These are not displayed with GST.

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

How to Erase DTC (🔧) With CONSULT-II

NCEC0031S06

NCEC0031S0601

NOTE:

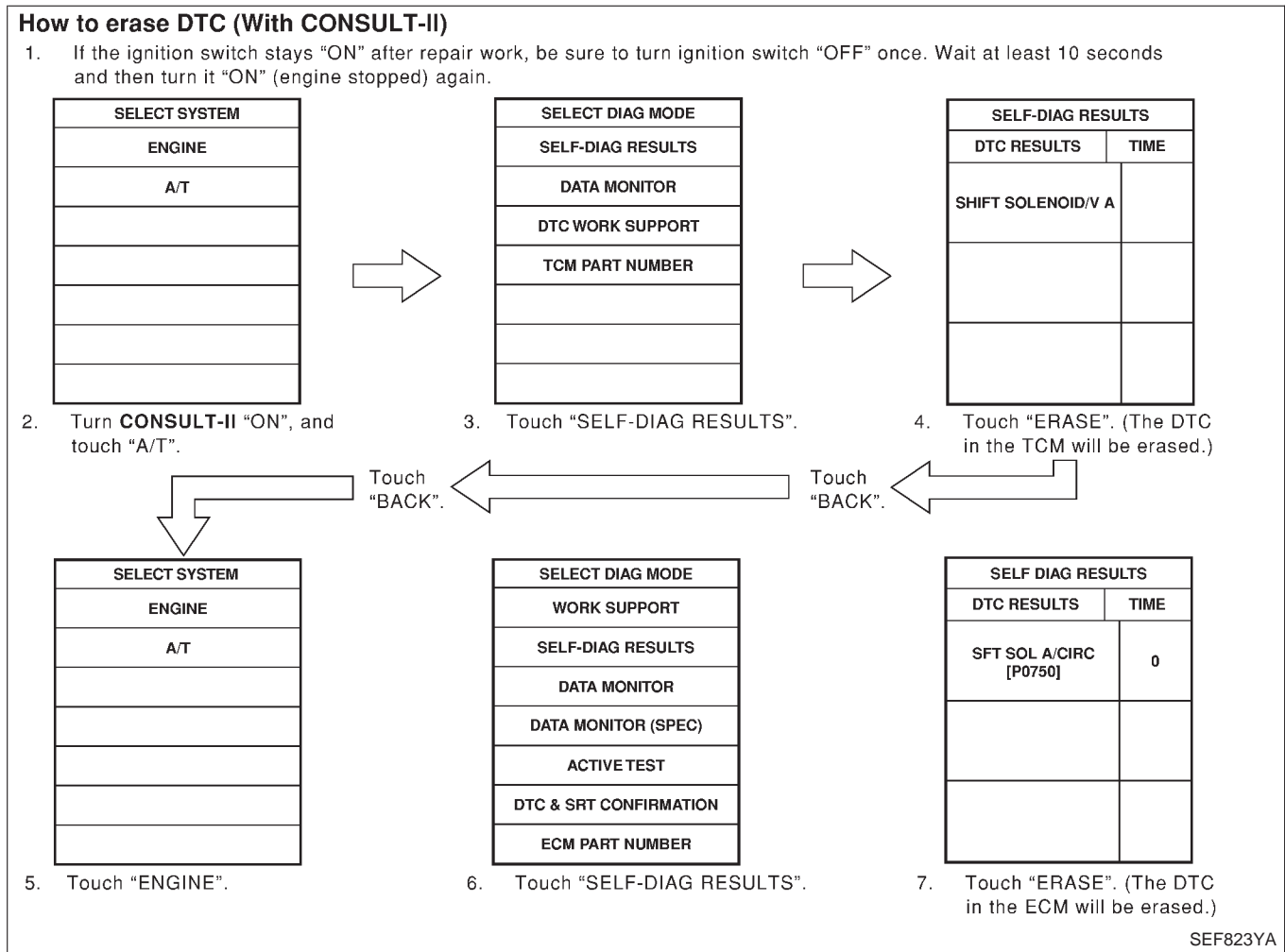
If the DTC is not for A/T related items (see EC-8), skip steps 2 through 4.

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".

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

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 (GST) With GST

NCEC0031S0602

NOTE:

If the DTC is not for A/T related items (see EC-8), 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).

The emission related diagnostic information in the ECM can be erased by selecting Mode 4 with GST.

- **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

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Emission-related Diagnostic Information (Cont'd)

- 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.

IVIS (INFINITI VEHICLE IMMOBILIZER SYSTEM — NATS)

NCEC0031S07

SELF DIAG RESULTS	
DTC RESULTS	TIME
NATS MALFUNCTION [P1610]	0

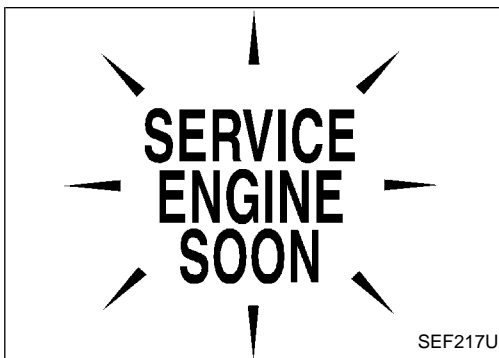
SEF515Y

- 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 EL-247, “IVIS (INFINITI Vehicle Immobilizer System — NATS)”.
- Confirm no self-diagnostic results of IVIS (NATS) is displayed before touching “ERASE” in “SELF-DIAG RESULTS” mode with CONSULT-II.
- When replacing ECM, initialization of IVIS (NATS) system and registration of all IVIS (NATS) ignition key IDs must be carried out with CONSULT-II using NATS program card. Therefore, be sure to receive all keys from vehicle owner. Regarding the procedures of IVIS (NATS) initialization and IVIS (NATS) ignition key ID registration, refer to CONSULT-II operation manual, IVIS/NVIS.

Malfunction Indicator Lamp (MIL)

DESCRIPTION

NCEC0032



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 EL-98, “WARNING LAMPS” or see EC-631.
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 DESCRIPTION

Malfunction Indicator Lamp (MIL) (Cont'd)

On Board Diagnostic System Function

=NCEC0032S01

The on board diagnostic system has the following two functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in "ON" position 	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 stopped 		
	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"> ● Coolant overtemperature enrichment protection ● "Misfire (Possible three way catalyst damage)" ● "Closed loop control" ● Fail-safe mode

Diagnostic Test Mode I — Bulb Check

NCEC0032S0102

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to EL-98, "WARNING LAMPS" or see EC-631.

Diagnostic Test Mode I — Malfunction Warning

NCEC0032S0103

MIL	Condition
ON	When the malfunction is detected or the ECM's CPU is malfunctioning.
OFF	No malfunction.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD System Operation Chart

OBD System Operation Chart

=NCEC0033

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

NCEC0033S01

- 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. GI
- 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-67. MA
- 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. EM
- 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. LC
- The 1st trip DTC is not displayed when the self-diagnosis results in “OK” for the 2nd trip. EC

SUMMARY CHART

NCEC0033S02

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-85.

For details about patterns “A” and “B” under “Other”, see EC-87.

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

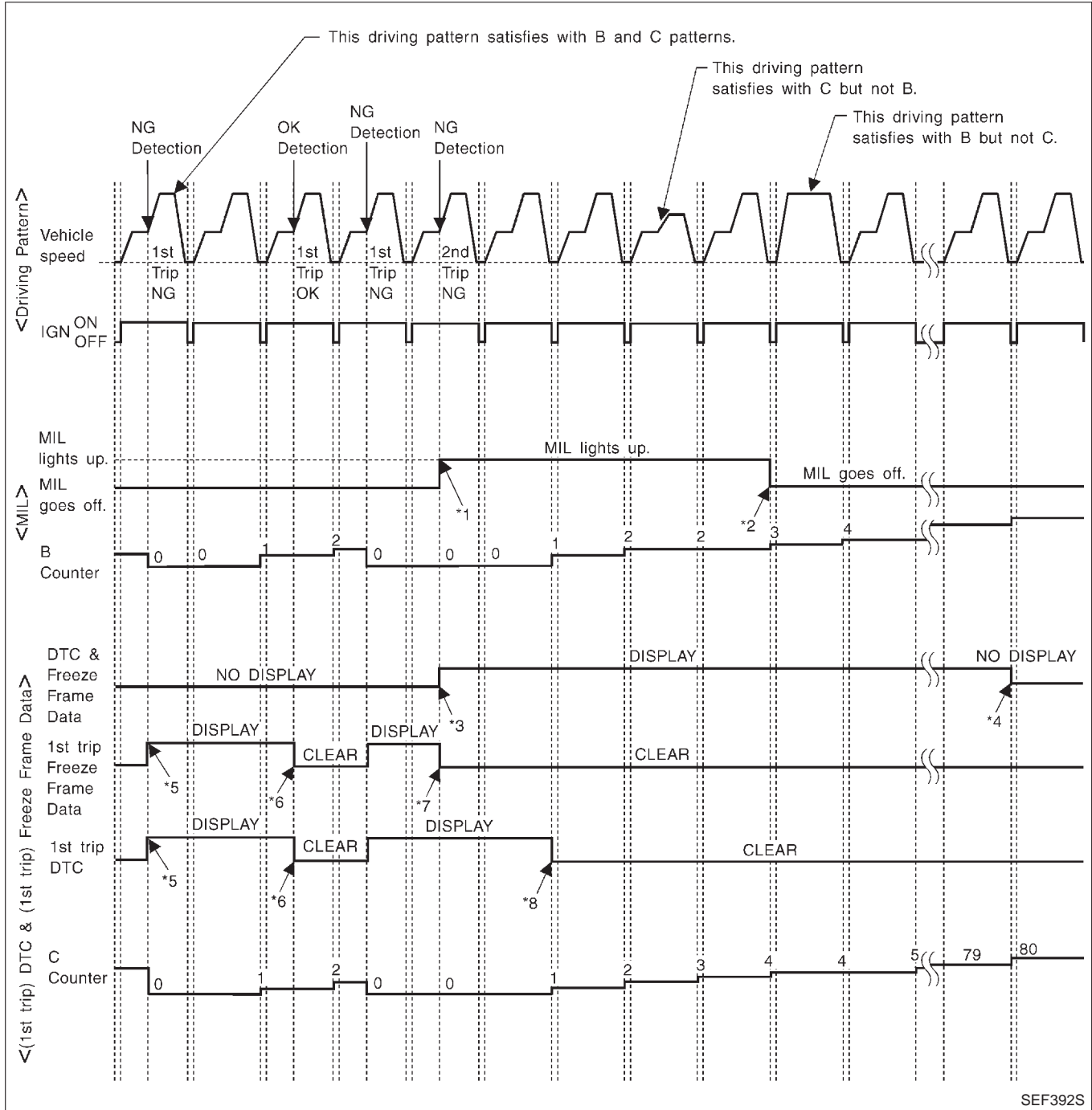
*2: Clear timing is when the same malfunction is detected in the 2nd trip.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD System Operation Chart (Cont'd)

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

=NCEC0033S03



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.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD System Operation Chart (Cont'd)

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

=NCEC0033S04

NCEC0033S0401

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

NCEC0033S0402

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) ± 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 (1).
- The C counter will be counted up when (1) 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.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

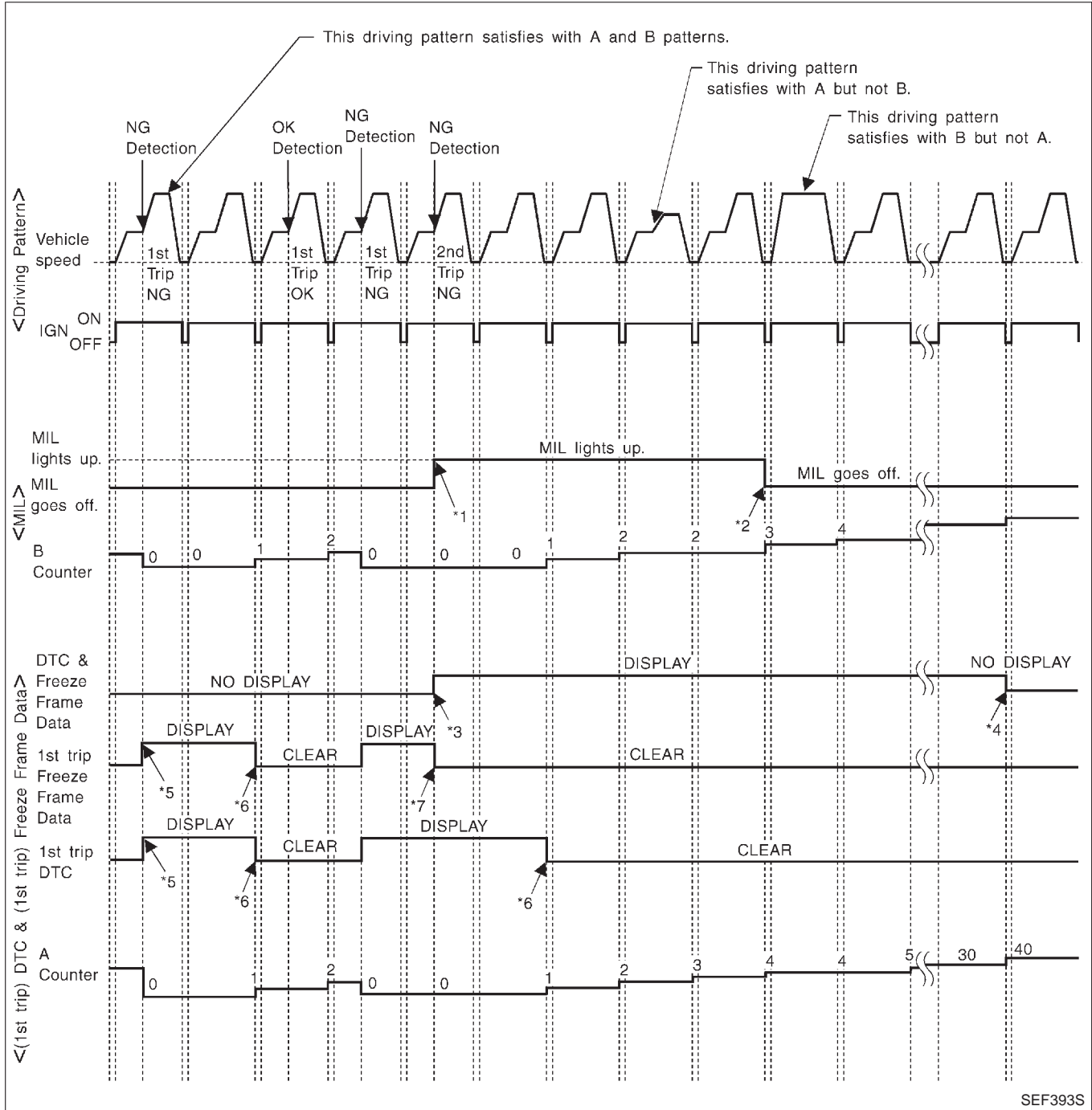
IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD System Operation Chart (Cont'd)

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

NCEC0033S05



- *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.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

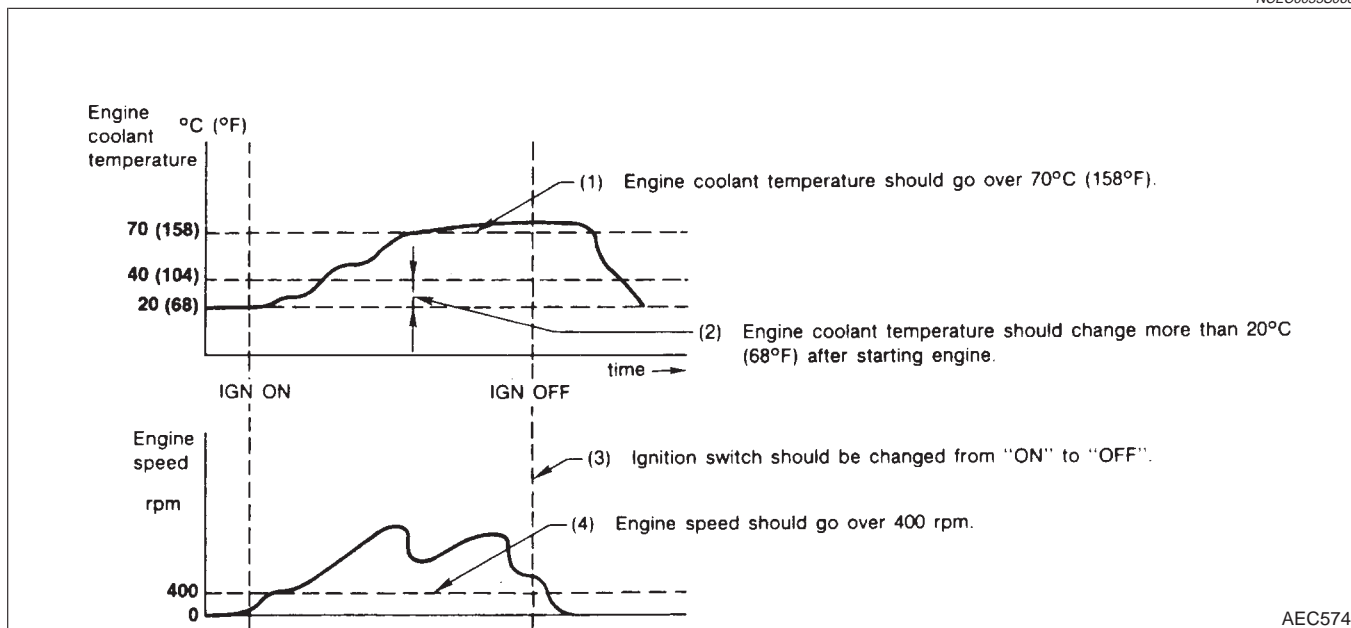
OBD System Operation Chart (Cont'd)

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

Driving Pattern A

NCEC0033S06

NCEC0033S0601



- 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

NCEC0033S0602

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").

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

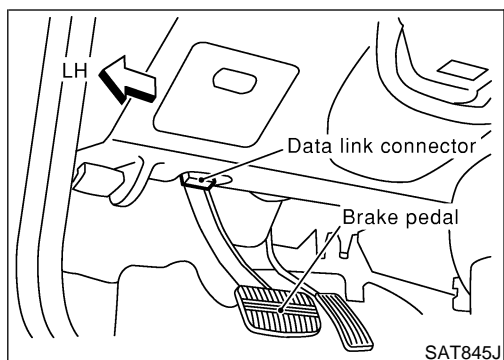
SC

EL

IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II



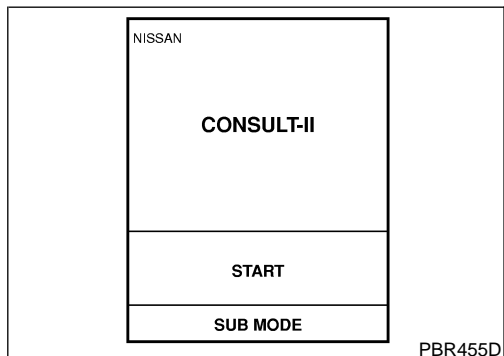
CONSULT-II

CONSULT-II INSPECTION PROCEDURE

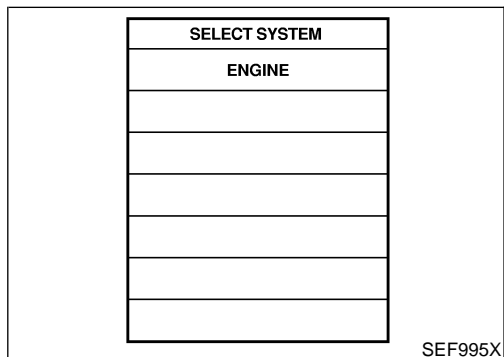
=NCEC0504

NCEC0504S01

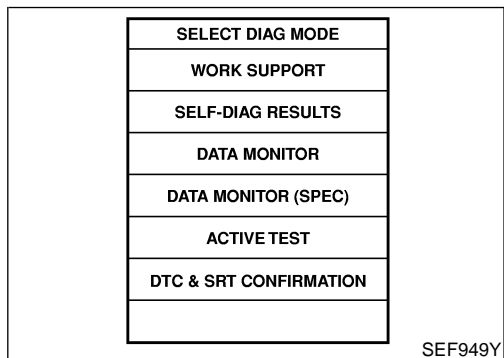
1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector, which is located under LH dash panel near the fuse box cover.



3. Turn ignition switch ON.
4. Touch "START".



5. Touch "ENGINE".



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

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

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

NCEC0504S02

Item		DIAGNOSTIC TEST MODE							GI	
		WORK SUP-PORT	SELF-DIAGNOSTIC RESULTS		DATA MONI-TOR	DATA MONI-TOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION		MA
			DTC*1	FREEZE FRAME DATA*2				SRT STATUS	DTC WORK SUP-PORT	EM
ENGINE CONTROL COMPONENT PARTS INPUT	Camshaft position sensor		X	X	X	X				LC
	Crankshaft position sensor (OBD)		X							EC
	Mass air flow sensor		X		X	X				FE
	Engine coolant temperature sensor		X	X	X	X	X			CL
	Heated oxygen sensor 1 (front)		X		X	X		X	X	CL
	Heated oxygen sensor 2 (rear)		X		X	X		X	X	MT
	Vehicle speed sensor		X	X	X	X				AT
	Throttle position sensor		X	X	X	X				AT
	Fuel tank temperature sensor		X		X	X	X			AX
	EVAP control system pressure sensor		X		X	X				SU
	Absolute pressure sensor (Built into ECM)		X		X	X				SU
	EGR temperature sensor		X		X	X				BR
	Intake air temperature sensor		X	X	X	X				BR
	Knock sensor		X							ST
	Ignition switch (start signal)				X	X				ST
	Closed throttle position switch		X		X	X				RS
	Closed throttle position switch (throttle position sensor signal)				X	X				RS
	Air conditioner switch				X	X				BT
	Park/neutral position (PNP) switch		X		X	X				BT
	Power steering oil pressure switch				X	X				HA
Battery voltage				X	X				SC	
Load signal				X	X				SC	
Fuel level sensor		X		X	X				EL	

IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

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				X	X	X		
	Power transistor (Ignition timing)	X			X	X	X		
	IACV-AAC valve		X		X	X	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		X		X	X	X		
	EGR volume control valve		X		X	X	X		
	Heated oxygen sensor 1 heater (front)		X		X	X		X	
	Heated oxygen sensor 2 heater (rear)		X		X	X		X	
	EVAP canister vent control valve		X		X	X	X		
	Vacuum cut valve bypass valve		X		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-68.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

FUNCTION		
		=NCEC0504S03
Diagnostic test mode	Function	GI
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-II unit.	MA
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	EM
Data monitor	Input/Output data in the ECM can be read.	LC
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.	EC
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.	FE
DTC & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.	CL
ECM part number	ECM part number can be read.	MT

*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

WORK SUPPORT MODE

NCEC0504S04

WORK ITEM	CONDITION	USAGE	
TP SW/TP SEN IDLE POSI ADJ	● FOLLOW THE BASIC INSPECTION IN THE SERVICE MANUAL.	When adjusting the idle throttle position.	AX
IGNITION TIMING ADJ	● IGNITION TIMING FEEDBACK CONTROL WILL BE HELD BY TOUCHING "START". AFTER DOING SO, ADJUST IGNITION TIMING WITH A TIMING LIGHT BY TURNING THE CAMSHAFT POSITION SENSOR.	When adjusting initial ignition timing	SU
FUEL PRESSURE RELEASE	● FUEL PUMP WILL STOP BY TOUCHING "START" DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS.	When releasing fuel pressure from fuel line	BR
IDLE AIR VOL LEARN	● THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM.	When learning the idle air volume	ST
SELF-LEARNING CONT	● THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT.	When clearing the coefficient of self-learning control value	RS

BT

HA

SC

EL

IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

WORK ITEM	CONDITION	USAGE
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"> ● IGN SW "ON" ● ENGINE NOT RUNNING ● AMBIENT TEMPERATURE IS ABOVE 0°C (32°F). ● NO VACUUM AND NO HIGH PRESSURE IN EVAP SYSTEM ● TANK FUEL TEMP. IS MORE THAN 0°C (32°F). ● WITHIN 10 MINUTES AFTER STARTING "EVAP SYSTEM CLOSE" ● WHEN TRYING TO EXECUTE "EVAP SYSTEM CLOSE" UNDER THE CONDITION EXCEPT ABOVE, CONSULT-II WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTION. <p>NOTE: WHEN STARTING ENGINE, CONSULT-II MAY DISPLAY "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", EVEN IN USING CHARGED BATTERY.</p>	When detecting EVAP vapor leak point of EVAP system
TARGET IDLE RPM ADJ*	<ul style="list-style-type: none"> ● IDLE CONDITION 	When setting target idle speed

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

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

SELF-DIAGNOSTIC MODE

DTC and 1st Trip DTC

=NCEC0504S05

Regarding items of "DTC and 1st trip DTC", refer to "TROUBLE DIAGNOSIS — INDEX" (See EC-8.)

NCEC0504S0501

Freeze Frame Data and 1st Trip Freeze Frame Data

NCEC0504S0502

Freeze frame data item*1	Description
DIAG TROUBLE CODE [PXXXX]	<ul style="list-style-type: none"> The engine control component part/control system has a trouble code, it is displayed as "PXXXX". (Refer to "TROUBLE DIAGNOSIS — INDEX", EC-8.)
FUEL SYS-B1	<ul style="list-style-type: none"> "Fuel injection system status" at the moment a malfunction is detected is displayed. One mode in the following is displayed. <ul style="list-style-type: none"> "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 [%]	<ul style="list-style-type: none"> The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	<ul style="list-style-type: none"> The engine coolant temperature at the moment a malfunction is detected is displayed.
S-FUEL TRIM-B1 [%]	<ul style="list-style-type: none"> "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.
L-FUEL TRIM-B1 [%]	<ul style="list-style-type: none"> "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.
ENGINE SPEED [rpm]	<ul style="list-style-type: none"> The engine speed at the moment a malfunction is detected is displayed.
VHCL SPEED [km/h] or [mph]	<ul style="list-style-type: none"> The vehicle speed at the moment a malfunction is detected is displayed.
ABSOL TH-P/S [%]	<ul style="list-style-type: none"> The throttle valve opening angle at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	<ul style="list-style-type: none"> The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	<ul style="list-style-type: none"> The intake air temperature at the moment a malfunction is detected is displayed.

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

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

DATA MONITOR MODE

=NCEC0504S06

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
ENG SPEED [rpm]	○	○	<ul style="list-style-type: none"> Indicates the engine speed computed from the REF signal (180° signal) of the camshaft position sensor. 	
MAS A/F SE-B1 [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the mass air flow sensor is displayed. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated.
B/FUEL SCHDL [msec]			<ul style="list-style-type: none"> "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction. 	
A/F ALPHA-B1 [%]		○	<ul style="list-style-type: none"> The mean value of the air-fuel ratio feedback correction factor per cycle is indicated. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. This data also includes the data for the air-fuel ratio learning control.
COOLAN TEMP/S [°C] or [°F]	○	○	<ul style="list-style-type: none"> The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed. 	<ul style="list-style-type: none"> 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.
HO2S1 (B1) [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 1 (front) is displayed. 	
HO2S2 (B1) [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 2 (rear) is displayed. 	
HO2S1 MNTR (B1) [RICH/LEAN]	○		<ul style="list-style-type: none"> Display of heated oxygen sensor 1 (front) 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. 	<ul style="list-style-type: none"> After turning ON the ignition switch, "RICH" is displayed until air-fuel mixture ratio feedback control begins. When the air-fuel ratio feedback is clamped, the value just before the clamping is displayed continuously.
HO2S2 MNTR (B1) [RICH/LEAN]	○		<ul style="list-style-type: none"> Display of heated oxygen sensor 2 (rear) 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. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated.
VHCL SPEED SE [km/h] or [mph]	○	○	<ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed sensor signal is displayed. 	
BATTERY VOLT [V]	○	○	<ul style="list-style-type: none"> The power supply voltage of ECM is displayed. 	
THRTL POS SEN [V]	○	○	<ul style="list-style-type: none"> The throttle position sensor signal voltage is displayed. 	
FUEL T/TMP SE [°C] or [°F]	○		<ul style="list-style-type: none"> The fuel temperature judged from the tank fuel temperature sensor signal voltage is displayed. 	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks	
INT/A TEMP SE [°C] or [°F]	○	○	<ul style="list-style-type: none"> The intake air temperature determined by the signal voltage of the intake air temperature sensor is indicated. 		GI
EGR TEMP SEN [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the EGR temperature sensor is displayed. 		MA
EVAP SYS PRES [V]	○		<ul style="list-style-type: none"> The signal voltage of EVAP control system pressure sensor is displayed. 		EM
ABSOL PRES/SE [V]	○		<ul style="list-style-type: none"> The signal voltage of the absolute pressure sensor is displayed. 		LC
FUEL LEVEL SE [V]	○		<ul style="list-style-type: none"> The signal voltage of the fuel level sensor is displayed. 		EC
START SIGNAL [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the starter signal. 	<ul style="list-style-type: none"> After starting the engine, [OFF] is displayed regardless of the starter signal. 	FE
CLSD THL POS [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates idle position [ON/OFF] computed by ECM according to the throttle position sensor signal. 		CL
CLSD THL/P SW [ON/OFF]	○		<ul style="list-style-type: none"> Indicates mechanical contact [ON/OFF] condition of the closed throttle position switch. 		MT
AIR COND SIG [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal. 		AT
P/N POSI SW [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal. 		AX
PW/ST SIGNAL [ON/OFF]	○	○	<ul style="list-style-type: none"> [ON/OFF] condition of the power steering oil pressure switch determined by the power steering oil pressure signal is indicated. 		SU
LOAD SIGNAL [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the electrical load signal and/or lighting switch. ON ... rear defogger is operating and/or lighting switch is on. OFF ... rear defogger is not operating and lighting switch is not on. 		BR
IGNITION SW [ON/OFF]	○		<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ignition switch. 		ST
INJ PULSE-B1 [msec]		○	<ul style="list-style-type: none"> Indicates the actual fuel injection pulse width compensated by ECM according to the input signals. 	<ul style="list-style-type: none"> When the engine is stopped, a certain computed value is indicated. 	RS
IGN TIMING [BTDC]		○	<ul style="list-style-type: none"> Indicates the ignition timing computed by ECM according to the input signals. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. 	BT
CAL/LD VALUE [%]			<ul style="list-style-type: none"> "Calculated load value" indicates the value of the current airflow divided by peak airflow. 		HA
ABSOL TH-P/S [%]			<ul style="list-style-type: none"> "Absolute throttle position sensor" indicates the throttle valve opening angle computed by ECM according to the signal voltage of the throttle position sensor. 		SC
					EL
					IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
MASS AIRFLOW [g·m/s]			<ul style="list-style-type: none"> Indicates the mass airflow computed by ECM according to the signal voltage of the mass airflow sensor. 	
IACV-AAC/V [step]		○	<ul style="list-style-type: none"> Indicates the IACV-AAC valve control value computed by ECM according to the input signals. 	
PURG VOL C/V [%]			<ul style="list-style-type: none"> Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. The opening becomes larger as the value increases. 	
EGR VOL CON/V [step]		○	<ul style="list-style-type: none"> Indicates the EGR volume control value computed by the ECM according to the input signals. The opening becomes larger as the value increases. 	
AIR COND RLY [ON/OFF]		○	<ul style="list-style-type: none"> The air conditioner relay control condition (determined by ECM according to the input signal) is indicated. 	
FUEL PUMP RLY [ON/OFF]		○	<ul style="list-style-type: none"> Indicates the fuel pump relay control condition determined by ECM according to the input signals. 	
VC/V BYPASS/V [ON/OFF]			<ul style="list-style-type: none"> The control condition of the vacuum cut valve bypass valve (determined by ECM according to the input signal) is indicated. ON ... Open OFF ... Closed 	
VENT CONT/V [ON/OFF]			<ul style="list-style-type: none"> The control condition of the EVAP canister vent control valve (determined by ECM according to the input signal) is indicated. ON ... Closed OFF ... Open 	
COOLING FAN [HIGH/LOW/OFF]			<ul style="list-style-type: none"> 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 	
HO2S1 HTR (B1) [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition of heated oxygen sensor 1 heater (front) determined by ECM according to the input signals. 	
HO2S2 HTR (B1) [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition of heated oxygen sensor 2 heater (rear) determined by ECM according to the input signals. 	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
IDL A/V LEAN			<ul style="list-style-type: none"> 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. 	
TRVL AFTER MIL [km] or [Mile]			<ul style="list-style-type: none"> Distance traveled while MIL is activated 	
Voltage [V]			<ul style="list-style-type: none"> Voltage measured by the voltage probe. 	
Frequently [msec] or [Hz] or [%]			<ul style="list-style-type: none"> Pulse width, frequency or duty cycle measured by the pulse probe. 	<ul style="list-style-type: none"> Only “#” is displayed if item is unable to be measured. Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.

NOTE:

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

DATA MONITOR (SPEC) MODE

NCEC0504S11

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

NOTE:

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

ACTIVE TEST MODE

NCEC0504S07

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the amount of fuel injection using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connector Fuel injectors Heated oxygen sensor 1 (front)
IGNITION TIMING	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Timing light: Set Retard the ignition timing using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Adjust initial ignition timing

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
IACV-AAC/V OPENING	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine. ● Change the IACV-AAC valve opening percent using CONSULT-II. 	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> ● Harness and connector ● IACV-AAC valve
POWER BAL- ANCE	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine. ● A/C switch "OFF" ● Shift lever "N" ● Cut off each injector signal one at a time using CONSULT-II. 	Engine runs rough or dies.	<ul style="list-style-type: none"> ● Harness and connector ● Compression ● Injectors ● Power transistor ● Spark plugs ● Ignition coil ● Ignition wires
COOLING FAN	<ul style="list-style-type: none"> ● Ignition switch: ON ● Turn the cooling fan "HIGH", "LOW" and "OFF" using CONSULT-II. 	Cooling fan moves high speed, low speed and stops.	<ul style="list-style-type: none"> ● Harness and connector ● Cooling fan motors ● Cooling fan relays
ENG COOLANT TEMP	<ul style="list-style-type: none"> ● Engine: Return to the original trouble condition ● Change the engine coolant temperature using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> ● Harness and connector ● Engine coolant temperature sensor ● Fuel injectors
FUEL PUMP RELAY	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn the fuel pump relay "ON" and "OFF" using CONSULT-II and listen to operating sound. 	Fuel pump relay makes the operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● Fuel pump relay
EGR VOL CONT/V	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Change EGR volume control valve opening step using CONSULT-II. 	EGR volume control valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● EGR volume control valve
PURG VOL CONT/V	<ul style="list-style-type: none"> ● Engine: After warming up, run engine at 1,500 rpm. ● Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-II. 	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> ● Harness and connector ● Solenoid valve
FUEL/T TEMP SEN	<ul style="list-style-type: none"> ● Change the fuel tank temperature using CONSULT-II. 		
VENT CONTROL/V	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● Solenoid valve
VC/V BYPASS/V	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● Solenoid valve

DTC & SRT CONFIRMATION MODE

SRT STATUS Mode

NCEC0504S08

For details, refer to "SYSTEM READINESS TEST (SRT) CODE", EC-69.

SRT Work Support Mode

NCEC0504S0802

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

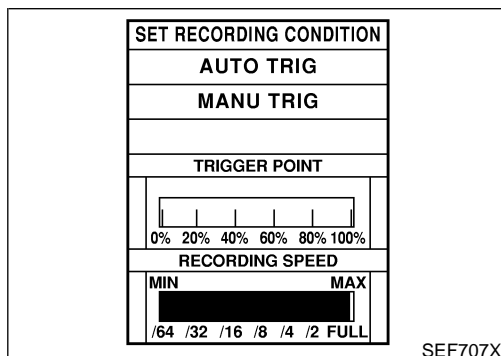
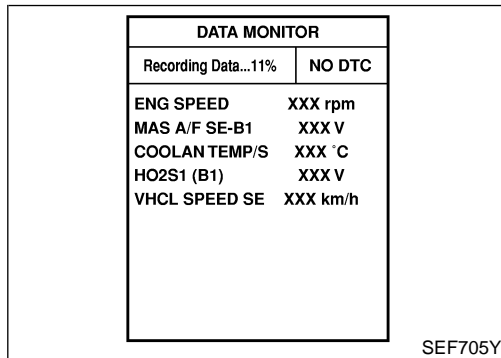
ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

DTC Work Support Mode

NCEC0504S0803

Test mode	Test item	Condition	Reference page			
EVAPORATIVE SYSTEM	EVAP SML LEAK P0440	Refer to corresponding trouble diagnosis for DTC.	EC-368	GI		
	EVAP SML LEAK P1440		EC-515	MA		
	PURG VOL CN/V P1444		EC-517	EM		
	PURGE FLOW P1447		EC-537	EM		
	VC CUT/V BP/V P1491		EC-568	LC		
HEATED OXYGEN SENSOR 1 (FRONT)	HO2S1 (B1) P0130		Refer to corresponding trouble diagnosis for DTC.	EC-196	LC	
	HO2S1 (B1) P0131			EC-204	EC	
	HO2S1 (B1) P0132			EC-210	FE	
	HO2S1 (B1) P0133			EC-217	CL	
HEATED OXYGEN SENSOR 2 (REAR)	HO2S2 (B1) P0137			Refer to corresponding trouble diagnosis for DTC.	EC-237	CL
	HO2S2 (B1) P0138	EC-245			MT	
	HO2S2 (B1) P0139	EC-253			AT	
EGR SYSTEM	EGR SYSTEM P0400	Refer to corresponding trouble diagnosis for DTC.			EC-347	AX
	EGR SYSTEM P1402				EC-505	SU



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

NCEC0504S09

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

- "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.
- "MANU TRIG" (Manual trigger):
 - DTC/1st trip DTC and malfunction item will not be displayed

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

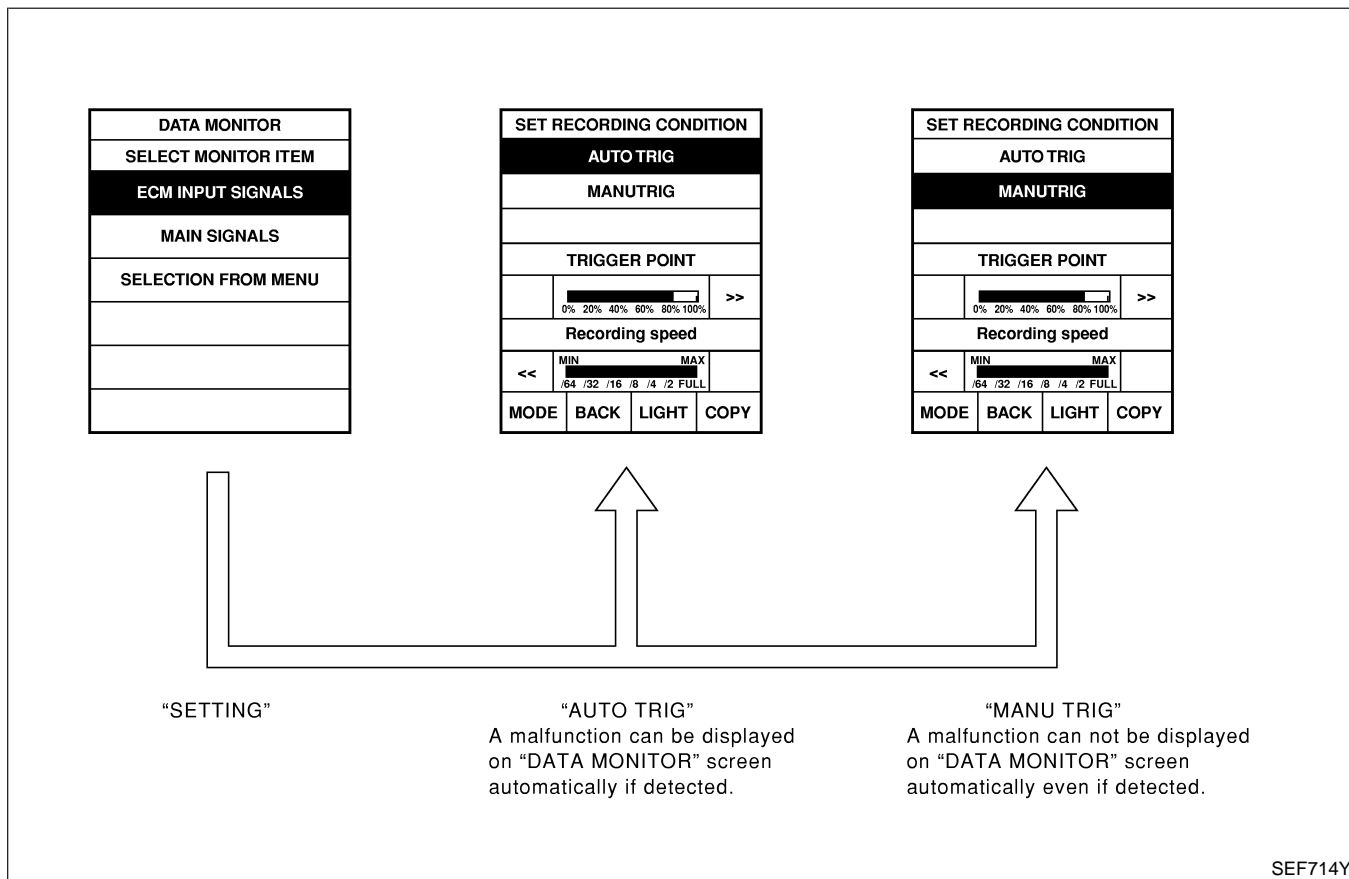
CONSULT-II (Cont'd)

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:

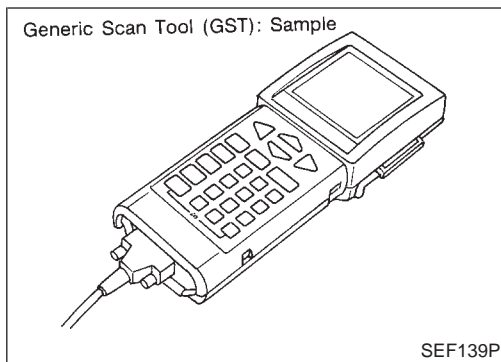
- 1) "AUTO TRIG"
 - While trying to detect the DTC/1st trip DTC by performing the "DTC Confirmation Procedure", be sure to select to "DATA MONITOR (AUTO TRIG)" mode. You can confirm the malfunction at the moment it is detected.
 - While narrowing down the possible causes, CONSULT-II should be set in "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-25, "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.



SEF714Y

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Generic Scan Tool (GST)



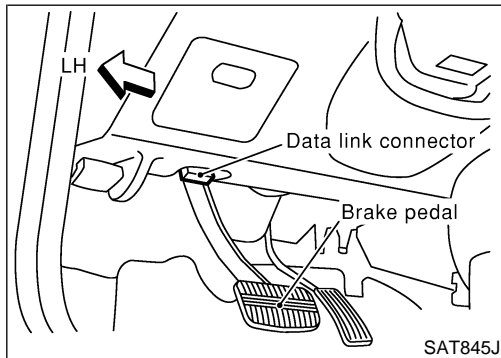
Generic Scan Tool (GST)

=NCEC0035

DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 7 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.

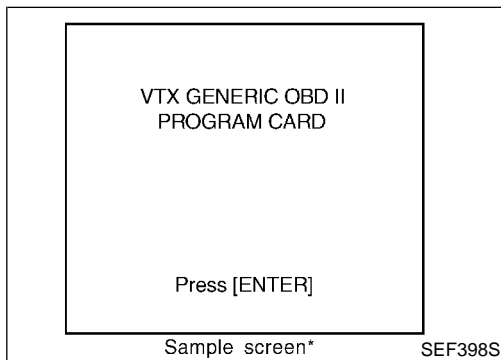
NCEC0035S01



GST INSPECTION PROCEDURE

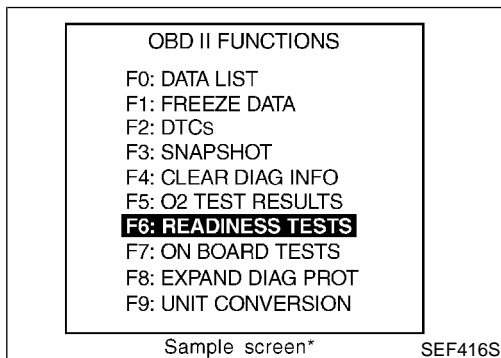
NCEC0035S02

1. Turn ignition switch OFF.
2. Connect "GST" to data link connector for GST. (Data link connector for GST 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.

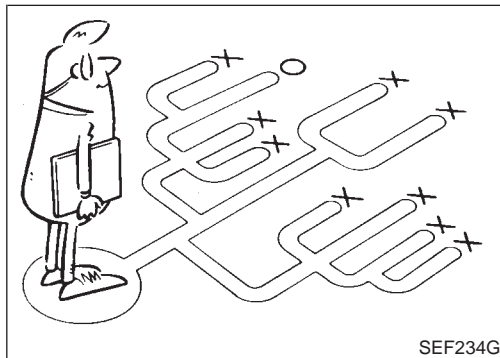
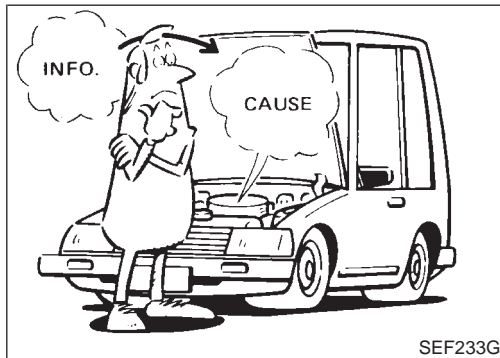
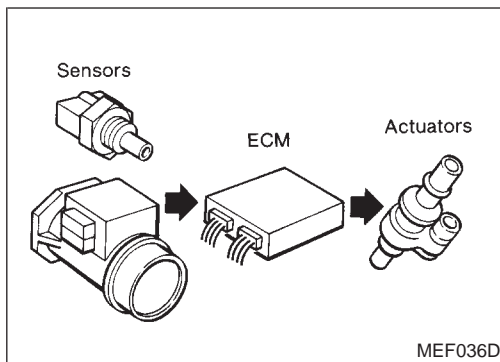
For further information, see the GST Operation Manual of the tool maker.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Generic Scan Tool (GST) (Cont'd)

FUNCTION		NCEC0035S03
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" (EC-93).]
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"> ● Clear number of diagnostic trouble codes (MODE 1) ● Clear diagnostic trouble codes (MODE 3) ● Clear trouble code for freeze frame data (MODE 1) ● Clear freeze frame data (MODE 2) ● Reset status of system monitoring test (MODE 1) ● Clear on board monitoring test results (MODE 6 and 7)
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"> ● EVAP canister vent control valve open ● Vacuum cut valve bypass valve closed In the following conditions, this mode cannot function. <ul style="list-style-type: none"> ● Low ambient temperature ● Low battery voltage ● Engine running ● Ignition switch "OFF" ● Low fuel temperature ● Too much pressure is applied to EVAP system
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.



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

SEF907L

Introduction

NCEC0036

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 problems such as vacuum leaks, fouled spark plugs, or other problems with the engine.

It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems 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 problems. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the "Work Flow" on EC-105.

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 problems, 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" problems first. This will help troubleshoot driveability problems on an electronically controlled engine vehicle.

DIAGNOSTIC WORKSHEET

NCEC0036S01

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 problem. 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 [for the models with EVAP (SMALL LEAK) diagnosis].

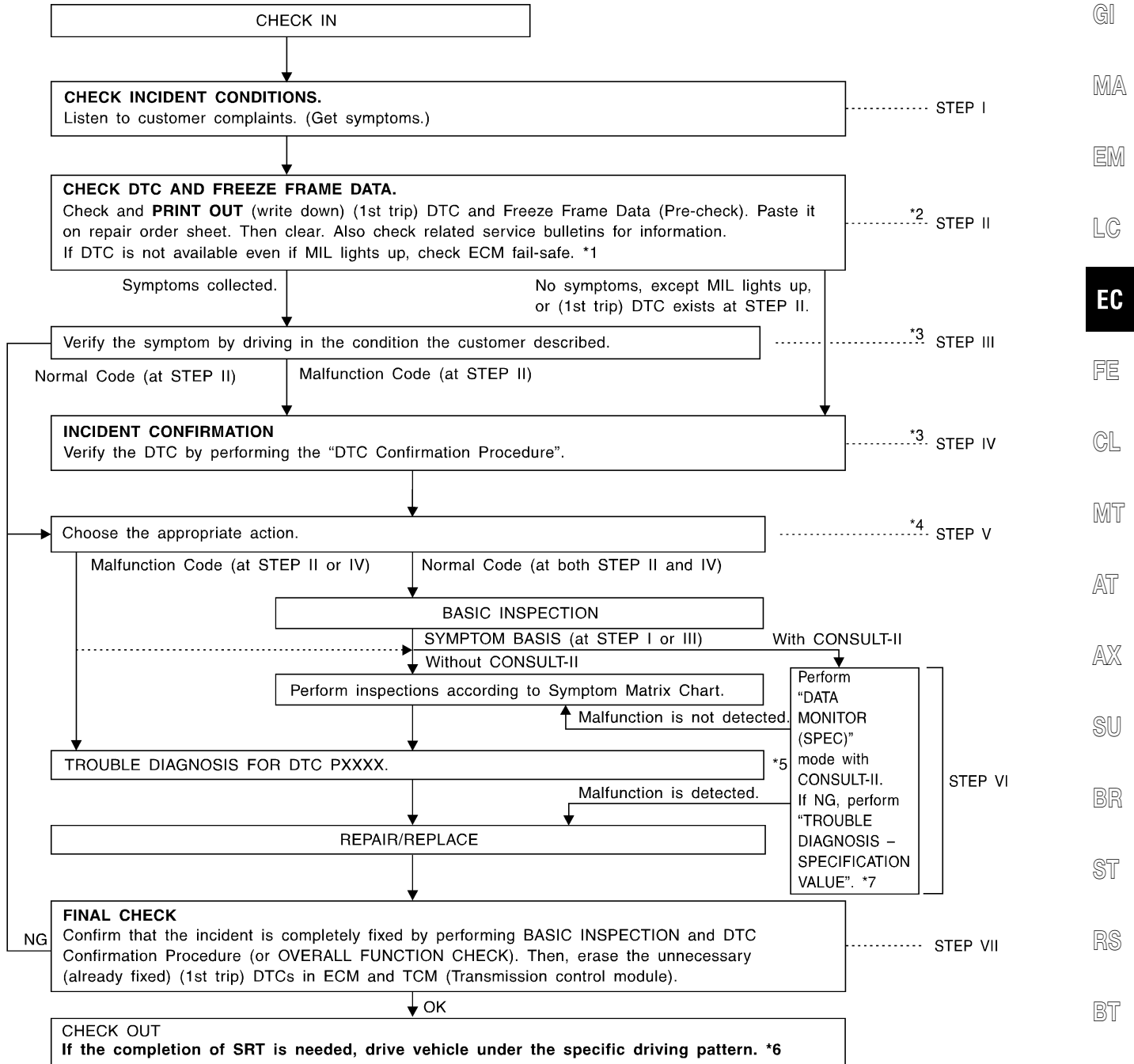
GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

TROUBLE DIAGNOSIS — INTRODUCTION

Work Flow

NCEC0037

Work Flow



*1: EC-124

*2: If time data of "SELF-DIAG RESULTS" is other than "0" or "1t", refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT", EC-146.

*3: If the incident cannot be duplicated, refer to "TROUBLE

DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.

*4: If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to "TROUBLE DIAGNOSIS FOR POWER SUPPLY", EC-147.

*5: If the malfunctioning part cannot be found, refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.

*6: EC-74

*7: EC-142

SEF510ZE

TROUBLE DIAGNOSIS — INTRODUCTION

Work Flow (Cont'd)

DESCRIPTION FOR WORK FLOW

NCEC0037S01

STEP	DESCRIPTION
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the "DIAGNOSTIC WORK SHEET", EC-104.
STEP II	<p>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 EC-79.) The (1st trip) DTC and the (1st trip) freeze frame data can be used when duplicating the incident at STEP III & IV.</p> <p>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 EC-125.)</p> <p>Also check related service bulletins for information.</p>
STEP III	<p>Try to confirm the symptom and under what conditions the incident occurs.</p> <p>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.</p> <p>If the incident cannot be verified, perform INCIDENT SIMULATION TESTS. (Refer to GI-25.)</p> <p>If the malfunction code is detected, skip STEP IV and perform STEP V.</p>
STEP IV	<p>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.</p> <p>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.</p> <p>If the incident cannot be verified, perform INCIDENT SIMULATION TESTS. (Refer to GI-25.)</p> <p>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.</p> <p>The "NG" result of the "OVERALL FUNCTION CHECK" is the same as the (1st trip) DTC detection.</p>
STEP V	<p>Take the appropriate action based on the results of STEP I through IV.</p> <p>If the malfunction code is indicated, proceed to TROUBLE DIAGNOSIS FOR DTC PXXXX.</p> <p>If the normal code is indicated, proceed to the BASIC INSPECTION. (Refer to EC-107.) If CONSULT-II is available, perform "DATA MONITOR (SPEC)" mode with CONSULT-II and proceed to the "TROUBLE DIAGNOSIS — SPECIFICATION VALUE". (Refer to EC-142.) (If malfunction is detected, proceed to "REPAIR/REPLACE".) Then perform inspections according to the Symptom Matrix Chart. (Refer to EC-125.)</p>
STEP VI	<p>Identify where to begin diagnosis based on the relationship study between symptom and possible causes.</p> <p>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.</p> <p>Check the voltage of the related ECM terminals or monitor the output data from the related sensors with CONSULT-II. Refer to EC-134.</p> <p>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").</p> <p>Repair or replace the malfunction parts.</p> <p>If malfunctioning part cannot be detected, perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p>
STEP VII	<p>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.</p> <p>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.</p> <p>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 EC-79.)</p>

Basic Inspection

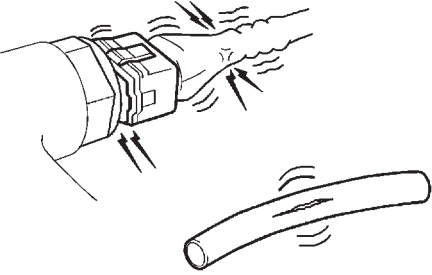
NCEC0038

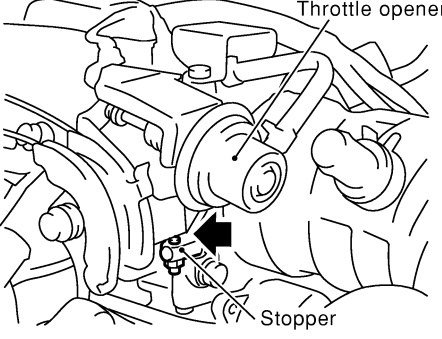
Precaution:

Perform Basic Inspection without electrical or mechanical loads 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.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

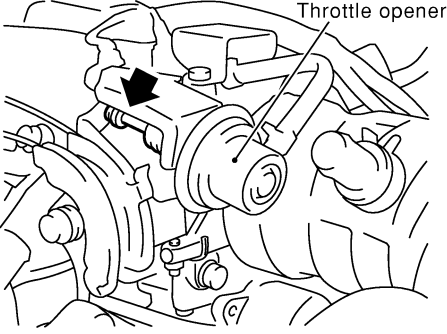
1	INSPECTION START
<p>1. Check service records for any recent repairs that may indicate a related problem, or a current need for scheduled maintenance.</p> <p>2. Open engine hood and check the following:</p> <ul style="list-style-type: none"> ● Harness connectors for improper connections ● Vacuum hoses for splits, kinks and improper connections ● Wiring for improper connections, pinches and cuts ● Air cleaner clogging ● Hoses and ducts for leaks 	
	
SEF983U	
▶ GO TO 2.	

2	CHECK THROTTLE OPENER OPERATION-I
Confirm that there is a clearance between throttle drum and stopper.	
	
SEF864X	
OK or NG	
OK	▶ GO TO 4.
NG	▶ GO TO 3.

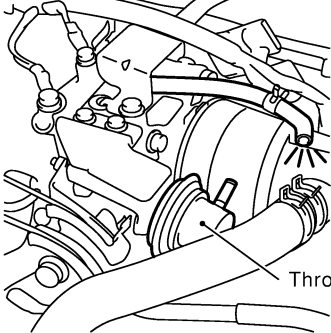
3	CHECK THROTTLE OPENER FIXING BOLTS
Check throttle opener fixing bolts for loosening.	
OK or NG	
OK	▶ Repair or replace throttle body assembly.
NG	▶ Retighten the fixing bolts.

TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

4		CHECK THROTTLE OPENER OPERATION-II
<ol style="list-style-type: none">1. Start engine and let it idle.2. Confirm that throttle opener rod moves backward and there is a clearance between throttle drum and throttle opener rod.		
 <p>Throttle opener</p>		
OK or NG		
OK	▶	GO TO 7.
NG	▶	GO TO 5.

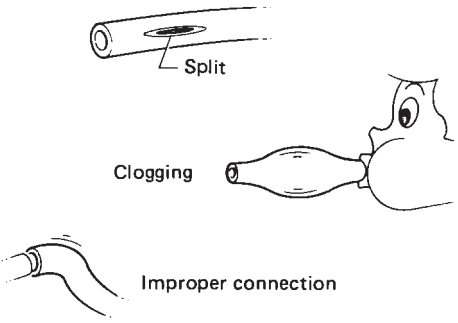
SEF865X

5		CHECK VACUUM SOURCE FOR THROTTLE OPENER
<ol style="list-style-type: none">1. Disconnect vacuum hose connected to throttle opener.2. Check vacuum existence with engine running.		
 <p>Vacuum should exist.</p> <p>Throttle opener</p>		
OK or NG		
OK	▶	Repair or replace throttle body assembly.
NG	▶	GO TO 6.

SEF866X

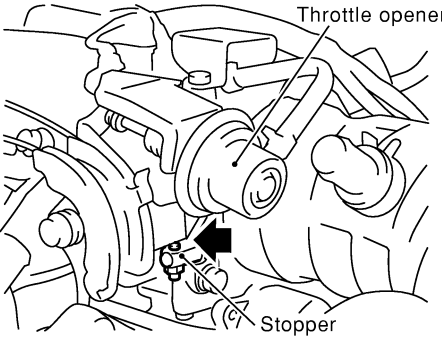
TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

6	CHECK VACUUM HOSE	
<ol style="list-style-type: none"> 1. Stop engine. 2. Remove the vacuum hose. 3. Check the vacuum hose for splits, kinks and clogging. 		
		
SEF109L		
OK or NG		
OK	▶	Clean vacuum port by blowing air.
NG	▶	Replace vacuum hose.

GI
MA
EM
LC
EC

FE
CL

7	CHECK THROTTLE DRUM OPERATION	
Confirm that throttle drum moves to contact the stopper.		
		
SEF864X		
OK or NG		
OK	▶	GO TO 10.
NG	▶	GO TO 8.

MT
AT
AX
SU
BR
ST
RS

8	CHECK ACCELERATOR WIRE INSTALLATION	
<ol style="list-style-type: none"> 1. Stop engine. 2. Check accelerator wire for slack. 		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Adjust accelerator wire. Refer to FE-3, "Adjusting Accelerator Wire".

BT
HA
SC

9	CHECK THROTTLE VALVE OPERATION	
<ol style="list-style-type: none"> 1. Remove intake air ducts. 2. Check throttle valve operation when moving throttle drum by hand. 		
OK or NG		
OK	▶	Retighten the throttle drum fixing nuts.
NG	▶	Clean the throttle body and throttle valve.

EL
IDX

TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

10	CHECK THROTTLE POSITION SWITCH CLOSED POSITION-I
<p>NOTE: Always check ignition timing before performing the following.</p> <ol style="list-style-type: none">1. Warm up engine to normal operating temperature.2. Stop engine.3. Remove the vacuum hose connected to the throttle opener.4. Connect suitable vacuum hose to vacuum pump as shown below. <div><p>The diagram shows a mechanical assembly for testing the throttle. A vacuum pump is connected to a throttle opener rod. The throttle opener rod is attached to a throttle drum. A stopper is positioned to prevent the throttle drum from rotating. An arrow indicates that the throttle opener rod should move upwards when vacuum is applied. Labels include: Throttle opener, Throttle opener rod should move up when the vacuum is applied., Stopper (Never touch), Throttle drum, and Vacuum pump.</p></div> <p style="text-align: right;">SEF793WA</p> <ol style="list-style-type: none">5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum is free from the throttle opener rod.	
With CONSULT-II	▶ GO TO 11.
Without CONSULT-II	▶ GO TO 17.

TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

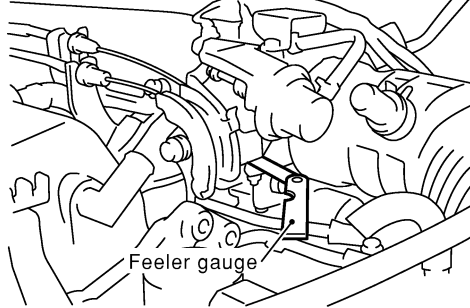
GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

11 CHECK THROTTLE POSITION SWITCH CLOSED POSITION-II

Ⓟ With CONSULT-II

1. Turn ignition switch "ON".
2. Select "TP SW/TP SEN IDLE POSI ADJ" in "WORK SUPPORT" mode with CONSULT-II.
3. Read "CLSD THL/P SW" signal under the following conditions.
 - Insert a 0.05 mm (0.0020 in) and 0.15 mm (0.0059 in) feeler gauge alternately between stopper and throttle drum as shown in the figure and check the signal.

View with blow-by hose removed



SEF862X

TP SW/TP SEN IDLE POSI ADJ	
MONITOR	
COOLAN TEMP/S	91 °C
CLSD THL POS	ON
CLSD THL/P SW	ON

SEF715Y

"CLSD THL/P SW" signal should remain "ON" while inserting 0.05 mm (0.0020 in) feeler gauge.
 "CLSD THL/P SW" signal should remain "OFF" while inserting 0.15 mm (0.0059 in) feeler gauge.

OK or NG

OK	▶	GO TO 14.
NG	▶	GO TO 12.

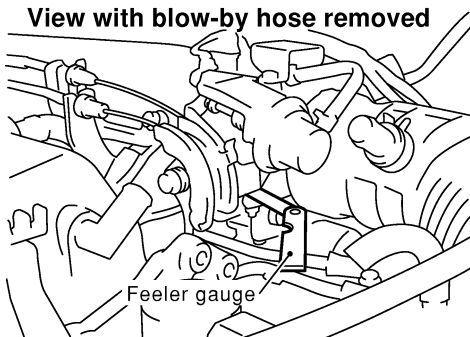
TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

12 | ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-I

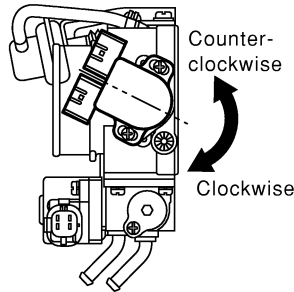
④ With CONSULT-II

1. Loosen throttle position sensor fixing bolts.
2. Confirm that proper vacuum is applied. Refer to test No. 10. During adjustment, vacuum should be applied.
3. Insert 0.05 mm (0.0020 in) feeler gauge between stopper and throttle drum as shown in the figure.



SEF862X

4. Turn throttle position sensor body counterclockwise until "CLSD THL/P SW" signal switches to "OFF".

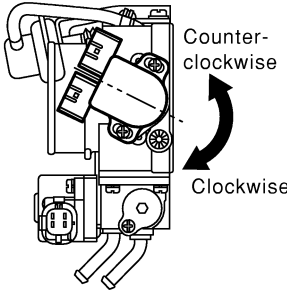


SEF867X

TP SW/TP SEN IDLE POSI ADJ	
MONITOR	
COOLAN TEMP/S	91 °C
CLSD THL POS	ON
CLSD THL/P SW	ON

SEF715Y

▶ GO TO 13.

13	ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-II
<p>Ⓟ With CONSULT-II</p> <p>1. Temporarily tighten sensor body fixing bolts as follows.</p> <ul style="list-style-type: none"> ● Gradually move the sensor body clockwise and stop it when “CLSD THL/P SW” signal switches from “OFF” to “ON”, then temporarily tighten sensor body fixing bolts. <div style="text-align: center; margin: 10px 0;">  </div> <p style="text-align: right; margin-right: 20px;">SEF867X</p> <p>2. Make sure two or three times that the signal is “ON” when the throttle valve is closed and “OFF” when it is opened.</p> <p>3. Remove 0.05 mm (0.0020 in) feeler gauge then insert 0.15 mm (0.0059 in) feeler gauge.</p> <p>4. Make sure two or three times that the signal remains “OFF” when the throttle valve is closed.</p> <p>5. Tighten throttle position sensor.</p> <p>6. Check the “CLSD THL/P SW” signal again.</p> <p style="padding-left: 20px;">The signal remains “OFF” while closing throttle valve.</p> <p style="text-align: center; margin: 10px 0;">OK or NG</p>	
OK	▶ GO TO 14.
NG	▶ GO TO 12.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

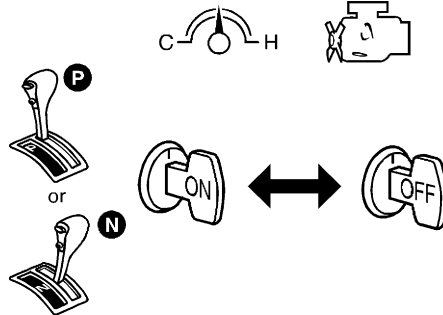
14 RESET THROTTLE POSITION SENSOR IDLE POSITION MEMORY

With CONSULT-II

NOTE:

Always warm up engine to normal operating temperature. If engine is cool, the throttle position sensor idle position memory will not be reset correctly.

1. Confirm that proper vacuum is applied. Refer to Test No. 10.
2. Attach blind cap to vacuum port from which vacuum hose to throttle opener was disconnected.
3. Start engine.
4. Warm up engine to normal operating temperature.
5. Select "TP SW/TP SEN IDLE POSI ADJ" in "WORK SUPPORT" mode.
6. Stop engine. (Turn ignition switch "OFF".)
7. Turn ignition switch "ON" and wait at least 5 seconds.



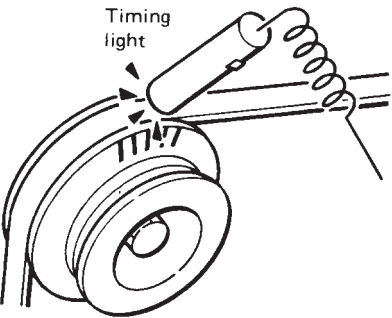
SEF864V

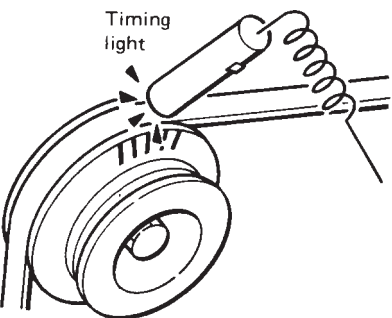
8. Turn ignition switch "OFF" and wait at least 10 seconds.
9. Repeat steps 7 and 8 until "CLSD THL POS" signal changes to "ON".

TP SW/TP SEN IDLE POSI ADJ	
MONITOR	
COOLAN TEMP/S	91°C
CLSD THL POS	ON
CLSD THL/P SW	ON

SEF715Y

▶ GO TO 15.

15	CHECK IGNITION TIMING-I
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Release vacuum from throttle opener. 3. Remove vacuum pump and vacuum hose from throttle opener. 4. Reinstall original vacuum hose to throttle opener securely. 5. Start engine and warm it up to normal operating temperature. 6. Select "IGNITION TIMING ADJ" in "WORK SUPPORT" mode with CONSULT-II. 7. Touch "START". 8. Check ignition timing at idle using a timing light. 	
	
<p>Ignition timing: M/T 15°±2° BTDC A/T 15°±2° BTDC (in "P" or "N" position)</p> <p style="text-align: right;">SEF284G</p>	
OK or NG	
OK	▶ GO TO 16.
NG	▶ <ol style="list-style-type: none"> 1. Adjust ignition timing by turning distributor. Refer to "Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment", EC-53. 2. GO TO 16.

16	CHECK IGNITION TIMING-II
<p>Ⓟ With CONSULT-II</p> <p>Touch "MODE" or "BACK". (Cancel "IGNITION TIMING ADJ" in "WORK SUPPORT" mode.)</p> <p>Check ignition timing at idle using a timing light.</p>	
	
<p>Ignition timing: M/T 15°±2° BTDC A/T 15°±2° BTDC (in "P" or "N" position)</p> <p style="text-align: right;">SEF284G</p>	
OK or NG	
OK	▶ GO TO 30.
NG	▶ GO TO 23.

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

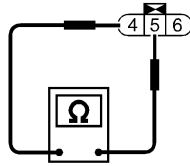
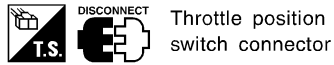
TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

17 CHECK THROTTLE POSITION SWITCH CLOSED POSITION-II

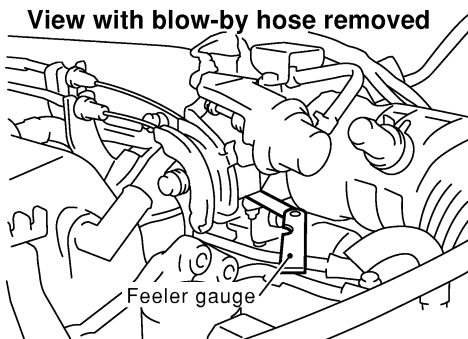
⊗ Without CONSULT-II

1. Disconnect closed throttle position switch harness connector.
2. Check continuity between closed throttle position switch terminals 4 and 5 under the following conditions.



SEF711X

- Insert the 0.05 mm (0.0020 in) and 0.15 mm (0.0059 in) feeler gauge alternately between the stopper and throttle drum as shown in the figure.



SEF862X

- “Continuity should exist” while inserting 0.05 mm (0.0020 in) feeler gauge.
- “Continuity should not exist” while inserting 0.15 mm (0.0059 in) feeler gauge.

OK or NG

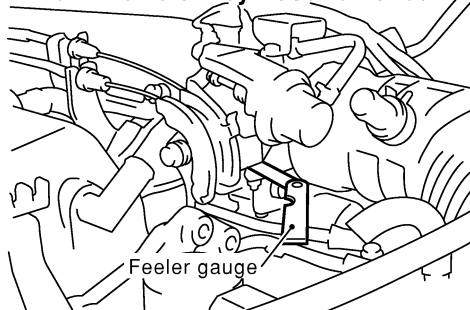
OK	▶	GO TO 20.
NG	▶	GO TO 18.

18 **ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-I**

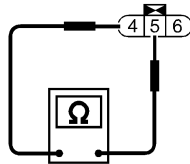
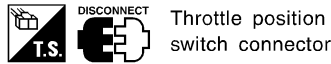
⊗ **Without CONSULT-II**

1. Loosen throttle position sensor fixing bolts.
2. Confirm that proper vacuum is applied. Refer to Test No. 10. During adjustment, vacuum should be applied.
3. Insert 0.05 mm (0.0020 in) feeler gauge between stopper and throttle drum as shown in the figure.

View with blow-by hose removed

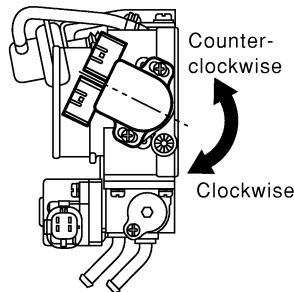


SEF862X



4. Turn throttle position sensor body counterclockwise until continuity does not exist.

SEF711X



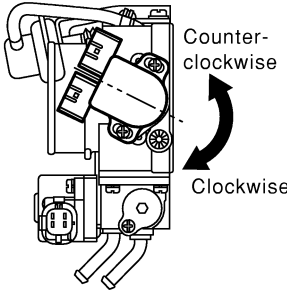
SEF867X

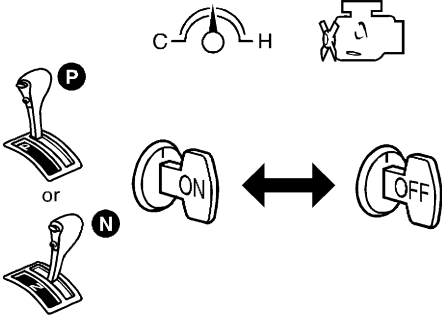
▶ GO TO 19.

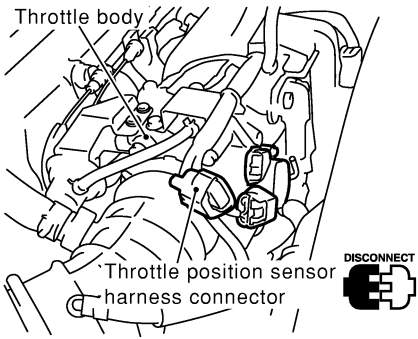
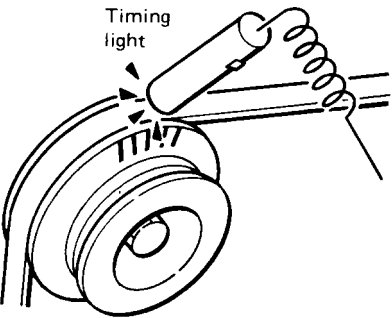
GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

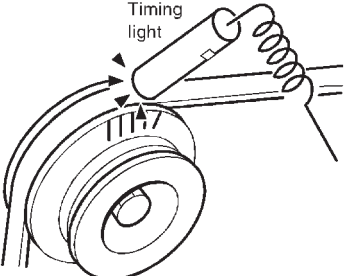
19	ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-II
<p>⊗ Without CONSULT-II</p> <p>1. Temporarily tighten sensor body fixing bolts as follows.</p> <ul style="list-style-type: none"> ● Gradually move the sensor body clockwise and stop it when the continuity comes to exist, then temporarily tighten sensor body fixing bolts. 	
	
SEF867X	
<p>2. Make sure two or three times that the continuity exists when the throttle valve is closed and continuity does not exist when it is opened.</p> <p>3. Remove 0.05 mm (0.0020 in) feeler gauge then insert 0.15 mm (0.0059 in) feeler gauge.</p> <p>4. Make sure two or three times that the continuity does not exist when the throttle valve is closed.</p> <p>5. Tighten throttle position sensor.</p> <p>6. Check the continuity again.</p> <p style="color: blue; text-align: center;">Continuity does not exist while closing the throttle valve.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 20.
NG	▶ GO TO 18.

20	RESET THROTTLE POSITION SENSOR IDLE POSITION MEMORY
<p>⊗ Without CONSULT-II</p> <p>NOTE:</p> <p>Always warm up engine to normal operating temperature. If engine is cool, the throttle position sensor idle position memory will not be reset correctly.</p> <p>1. Confirm that proper vacuum is applied. Refer to Test No. 10.</p> <p>2. Attach blind cap to vacuum port from which vacuum hose to throttle opener was disconnected.</p> <p>3. Start engine.</p> <p>4. Warm up engine to normal operating temperature.</p> <p>5. Stop engine. (Turn ignition switch "OFF".)</p> <p>6. Turn ignition switch "ON" and wait at least 5 seconds.</p>	
	
SEF864V	
<p>7. Turn ignition switch "OFF" and wait at least 10 seconds.</p> <p>8. Repeat steps 6 and 7, 20 times.</p>	
▶	GO TO 21.

21	CHECK IGNITION TIMING-I	<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Release vacuum from throttle opener. 3. Remove vacuum pump and vacuum hose from throttle opener. 4. Reinstall original vacuum hose to throttle opener securely. 5. Start engine and warm it up to normal operating temperature. 6. Stop engine and disconnect throttle position sensor harness connector. <div style="text-align: center; margin: 10px 0;">  </div> <ol style="list-style-type: none"> 7. Start engine. 8. Check ignition timing at idle using a timing light. <div style="text-align: center; margin: 10px 0;">  </div> <p style="margin-top: 10px;">Ignition timing: M/T 15°±2° BTDC A/T 15°±2° BTDC (in "P" or "N" position)</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 2px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
OK	▶	GO TO 22.	
NG	▶	<ol style="list-style-type: none"> 1. Adjust ignition timing by turning distributor. Refer to "Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment", EC-53. 2. GO TO 22. 	

TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

22	CHECK IGNITION TIMING-II										
<p>1. Stop engine. 2. Reconnect throttle position sensor harness connector. 3. Start engine and let it idle. 4. Check ignition timing at idle using a timing light.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF984U</p> <p>Ignition timing: M/T 15°±2° BTDC A/T 15°±2° BTDC (in "P" or "N" position)</p> <p style="text-align: center;">OK or NG</p>											
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 33.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 23.</td> </tr> </table>			OK	▶	GO TO 33.	NG	▶	GO TO 23.			
OK	▶	GO TO 33.									
NG	▶	GO TO 23.									
23 PERFORM IDLE AIR VOLUME LEARNING											
<p>Refer to "Idle Air Volume Learning", EC-65. Is the result CMPLT or INCMP?</p> <p style="text-align: center;">CMPLT or INCMP</p>											
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">CMPLT</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 24.</td> </tr> <tr> <td>INCMP</td> <td style="text-align: center;">▶</td> <td>Follow the construction of "Idle Air Volume Learning".</td> </tr> </table>			CMPLT	▶	GO TO 24.	INCMP	▶	Follow the construction of "Idle Air Volume Learning".			
CMPLT	▶	GO TO 24.									
INCMP	▶	Follow the construction of "Idle Air Volume Learning".									
24 CHECK IGNITION TIMING AGAIN											
<p>Check ignition timing again. Refer to Test No. 16 (With CONSULT-II) or 22 (Without CONSULT-II).</p> <p style="text-align: center;">OK or NG</p>											
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK (With CONSULT-II)</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 30.</td> </tr> <tr> <td>OK (Without CONSULT-II)</td> <td style="text-align: center;">▶</td> <td>GO TO 33.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 25.</td> </tr> </table>			OK (With CONSULT-II)	▶	GO TO 30.	OK (Without CONSULT-II)	▶	GO TO 33.	NG	▶	GO TO 25.
OK (With CONSULT-II)	▶	GO TO 30.									
OK (Without CONSULT-II)	▶	GO TO 33.									
NG	▶	GO TO 25.									
25 CHECK FOR INTAKE AIR LEAK											
<p>1. Start engine and let it idle. 2. Listen for an air leak from PCV hose and after IACV-AAC valve.</p> <p style="text-align: center;">OK or NG</p>											
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 27.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 26.</td> </tr> </table>			OK	▶	GO TO 27.	NG	▶	GO TO 26.			
OK	▶	GO TO 27.									
NG	▶	GO TO 26.									
26 REPAIR MALFUNCTION											
<p>1. Stop engine. 2. Repair or replace malfunctioning part.</p>											
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;"></td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 23.</td> </tr> </table>				▶	GO TO 23.						
	▶	GO TO 23.									

TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

27	DETECT MALFUNCTIONING PART	
Check the IACV-AAC valve circuit and function. Refer to EC-436.		
OK or NG		
OK	▶	GO TO 29.
NG	▶	GO TO 28.

GI

MA

EM

28	REPAIR MALFUNCTION	
Repair or replace malfunction part following the “Diagnostic Procedure” corresponding the detected malfunction.		
▶ GO TO 23.		

LC

29	CHECK ECM FUNCTION	
1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a problem, but this is rarely the case.) 2. Perform initialization of IVIS (NATS) system and registration of IVIS (NATS) ignition key IDs. Refer to “IVIS (INFINITI Vehicle Immobilizer System — NATS)”, EC-81.		
▶ GO TO 23.		

EC

FE

CL

30	CHECK TARGET IDLE SPEED	
ⓘ With CONSULT-II 1. Start engine and warm it up to normal operating temperature. 2. Select “ENG SPEED” in “DATA MONITOR” mode. 3. Check idle speed. M/T: 800±50 rpm A/T: 800±50 rpm (in “P” or “N” position)		
OK or NG		
OK	▶	GO TO 36.
NG	▶	GO TO 31.

MT

AT

AX

SU

31	PERFORM IDLE AIR VOLUME LEARNING	
Refer to “Idle Air Volume Learning”, EC-65. Is the result CMLPT or INCMP?		
CMLPT or INCMP		
CMLPT	▶	GO TO 32.
INCMP	▶	Follow the construction of “Idle Air Volume Learning”.

BR

ST

RS

32	CHECK TARGET IDLE SPEED AGAIN	
1. Start engine and warm it up to normal operating temperature. 2. Select “ENG SPEED” in “DATA MONITOR” mode with CONSULT-II. 3. Check idle speed. M/T: 800±50 rpm A/T: 800±50 rpm (in “P” or “N” position)		
OK or NG		
OK	▶	GO TO 36.
NG	▶	GO TO 25.

BT

HA

SC

EL

IDX

TROUBLE DIAGNOSIS — BASIC INSPECTION

Basic Inspection (Cont'd)

33	CHECK TARGET IDLE SPEED	
<p>⊗ Without CONSULT-II</p> <p>1. Start engine and warm it up to normal operating temperature.</p> <p>2. Check idle speed.</p> <p style="margin-left: 20px;">M/T: 800±50 rpm</p> <p style="margin-left: 20px;">A/T: 800±50 rpm (in “P” or “N” position)</p> <p style="text-align: right;">OK or NG</p>		
OK	▶	GO TO 36.
NG	▶	GO TO 34.

34	PERFORM IDLE AIR VOLUME LEARNING	
<p>Refer to “Idle Air Volume Learning”, EC-65.</p> <p>Is the result CMPLT or INCMP?</p> <p style="text-align: right;">CMPLT or INCMP</p>		
CMPLT	▶	GO TO 35.
INCMP	▶	Follow the construction of “Idle Air Volume Learning”.

35	CHECK TARGET IDLE SPEED AGAIN	
<p>1. Start engine and warm it up to normal operating temperature.</p> <p>2. Check idle speed.</p> <p style="margin-left: 20px;">M/T: 800±50 rpm</p> <p style="margin-left: 20px;">A/T: 800±50 rpm (in “P” or “N” position)</p> <p style="text-align: right;">OK or NG</p>		
OK	▶	GO TO 36.
NG	▶	GO TO 25.

36	ERASE UNNECESSARY DTC	
<p>After this inspection, unnecessary DTC No. might be displayed.</p> <p>Erase the stored memory in ECM and TCM (Transmission control module).</p> <p>Refer to “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”, EC-79 and “HOW TO ERASE DTC”, AT-38.</p>		
	▶	INSPECTION END

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

DTC Inspection Priority Chart

DTC Inspection Priority Chart

NCEC0039

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"> ● P0100 Mass air flow sensor ● P0110 Intake air temperature sensor ● P0115, P0125 Engine coolant temperature sensor ● P0120 Throttle position sensor ● P0180 Fuel tank temperature sensor ● P0325 Knock sensor ● P0340 Camshaft position sensor ● P0403 EGR volume control valve ● P0460, P0461, P0464, P1464 Fuel level sensor ● P0500 Vehicle speed sensor ● P0605 ECM ● P1126 Thermostat function ● P1605 A/T diagnosis communication line ● P1706 Park/Neutral position (PNP) switch 	<p style="text-align: right;">GI</p> <p style="text-align: right;">MA</p> <p style="text-align: right;">EM</p> <p style="text-align: right;">LC</p> <p style="text-align: right;">EC</p> <p style="text-align: right;">FE</p>
2	<ul style="list-style-type: none"> ● P0105 Absolute pressure sensor ● P0130-P0134 Heated oxygen sensor 1 (front) ● P0135 Heated oxygen sensor 1 heater (front) ● P0137-P0140 Heated oxygen sensor 2 (rear) ● P0141 Heated oxygen sensor 2 heater (rear) ● P0217 Coolant overtemperature enrichment protection ● P0335, P1336 Crankshaft position sensor (OBD) ● P0443, P1444 EVAP canister purge volume control solenoid valve ● P0446, P1446, P1448 EVAP canister vent control valve ● P0450 EVAP control system pressure sensor ● P0510 Closed throttle position switch ● P0705-P0725, P0740-P1760 A/T related sensors, solenoid valves and switches ● P1401 EGR temperature sensor ● P1447 EVAP control system purge flow monitoring ● P1490, P1491 Vacuum cut valve bypass valve 	<p style="text-align: right;">CL</p> <p style="text-align: right;">MT</p> <p style="text-align: right;">AT</p> <p style="text-align: right;">AX</p> <p style="text-align: right;">SU</p>
3	<ul style="list-style-type: none"> ● P0171, P0172 Fuel injection system function ● P0300-P0304 Misfire ● P0400, P1402 EGR function ● P0420 Three way catalyst function ● P0440, P1440 EVAP control system (SMALL LEAK) ● P0455 EVAP control system (GROSS LEAK) ● P0505 IACV-AAC valve ● P0600 A/T communication line ● P0731-P0734, P0744 A/T function ● P1148 Closed loop control 	<p style="text-align: right;">BR</p> <p style="text-align: right;">ST</p> <p style="text-align: right;">RS</p>

BT

HA

SC

EL

IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Fail-safe Chart

Fail-safe Chart

=NCEC0040

The ECM enters fail-safe mode if any of the following malfunctions is detected due to the open or short circuit. When the ECM enters the fail-safe mode, the MIL illuminates.

DTC No.	Detected items	Engine operating condition in fail-safe mode	
P0100	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.	
P0115	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)
P0120	Throttle position sensor circuit	Throttle position will be determined based on the injected fuel amount and the engine speed. Therefore, acceleration will be poor.	
		Condition	Driving condition
		When engine is idling	Normal
		When accelerating	Poor acceleration
P0403	EGR volume control valve circuit	Engine speed will not rise more than 2,800 rpm due to the fuel cut.	
Unable to access ECM	ECM	ECM fail-safe activating condition The computing function of the ECM was judged to be malfunctioning. When the fail-safe system activates (i.e., if the ECM detects a malfunction condition in the CPU of ECM), the MIL on the instrument panel lights to warn the driver. However it is not possible to access ECM and DTC cannot be confirmed.	
		Engine control with fail-safe When ECM fail-safe is operating, fuel injection, ignition timing, fuel pump operation and IACV-AAC valve operation are controlled under certain limitations.	
		ECM fail-safe operation	
		Engine speed	Engine speed will not rise more than 3,000 rpm
		Fuel injection	Simultaneous multipoint fuel injection system
		Ignition timing	Ignition timing is fixed at the preset valve
		Fuel pump	Fuel pump relay is "ON" when engine is running and "OFF" when engine stalls
		IACV-AAC valve	Full open
		Replace ECM, if ECM fail-safe condition is confirmed.	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Matrix Chart

Symptom Matrix Chart SYSTEM — ENGINE CONTROL SYSTEM

NCEC0041
NCEC0041S01

		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	EC-605
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-51
	Injector circuit	1	1	2	3	2		2	2			2			EC-596
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			EC-33
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-48
	Incorrect idle speed adjustment	3	3				1	1	1	1		1			EC-107
	IACV-AAC valve circuit	1	1	2	3	3	2	2	2	2		2		2	EC-436
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-107
	Ignition circuit	1	1	2	2	2		2	2			2			EC-590
EGR	EGR volume control valve circuit		2	2	3	3						3			EC-357
	EGR system	2	1	2	3	3	3	2	2	3		3			EC-347, EC-505
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3		2	EC-147
Air conditioner circuit		2	2	3	3	3	3	3	3	3		3		2	HA section

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

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Matrix Chart (Cont'd)

	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	
Camshaft position sensor circuit	2	2	3	3	3		3	3			3			EC-339
Mass air flow sensor circuit	1	1	2	2	2		2	2			2			EC-154
Heated oxygen sensor 1 (front) circuit		1	2	3	2		2	2			2			EC-196
Engine coolant temperature sensor circuit	1	1	2	3	2	3	2	2	3		2			EC-171, 190
Throttle position sensor circuit		1	2		2	2	2	2	2		2			EC-177
Incorrect throttle position sensor adjustment		3	1		1	1	1	1	1		1			EC-107
Vehicle speed sensor circuit		2	3		3						3			EC-432
Knock sensor circuit			2								3			EC-329
ECM	2	2	3	3	3	3	3	3	3	3	3			EC-456, 124
Start signal circuit	2													EC-601
PNP switch circuit			3		3		3	3			3			EC-583
Power steering oil pressure switch circuit		2					3	3						EC-614
Electrical load signal circuit							3	3						EC-624

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

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Matrix Chart (Cont'd)

SYSTEM — ENGINE MECHANICAL & OTHER

NCEC0041S03

		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			
Fuel	Fuel tank	5	5												FE section	—	
	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	5											FE section	—	
	Air cleaner																
	Air leakage from air duct (Mass air flow sensor — throttle body)				5	5		5	5	5			5				
	Throttle body, Throttle wire	5				5		5			5						
	Air leakage from intake manifold/Collector/Gasket																
Cranking	Battery	1	1	1		1		1	1					1	EL section	—	
	Alternator circuit																
	Starter circuit	3										1					
	Flywheel/Drive plate	6															
	PNP switch	4															

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

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Matrix Chart (Cont'd)

		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	
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM section
	Cylinder head gasket										4	3			
	Cylinder block												4		
	Piston														
	Piston ring														
	Connecting rod	6	6	6	6	6		6	6			6			
	Bearing														
	Crankshaft														
Valve mechanism	Timing chain														EM section
	Camshaft	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		FE section	
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5		5	5			5		MA, EM and LC sections	
	Oil level (Low)/Filthy oil														
Cooling	Radiator/Hose/Radiator filler cap													LC section	
	Thermostat									5					
	Water pump														
	Water gallery	5	5	5	5	5		5	5		4	5			
	Cooling fan										5				EC-462
	Coolant level (low)/Contaminated coolant														MA section

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

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

CONSULT-II Reference Value in Data Monitor Mode

CONSULT-II Reference Value in Data Monitor Mode

NCEC0042

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"> ● Tachometer: Connect ● Run engine and compare tachometer indication with the CONSULT-II value. 		Almost the same speed as the CONSULT-II value.
MAS A/F SE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle	1.3 - 1.7V
		2,500 rpm	1.8 - 2.4V
B/FUEL SCHDL	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle	1.0 - 1.6 msec
		2,000 rpm	0.7 - 1.3 msec
A/F ALPHA-B1	<ul style="list-style-type: none"> ● Engine: After warming up 	Maintaining engine speed at 2,000 rpm	53 - 155%
COOLAN TEMP/S	<ul style="list-style-type: none"> ● Engine: After warming up 		More than 70°C (158°F)
HO2S1 (B1)	<ul style="list-style-type: none"> ● Engine: After warming up 	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ 0.6 - 1.0V
HO2S1 MNTR (B1)			LEAN ↔ RICH Changes more than 5 times during 10 seconds.
HO2S2 (B1)	<ul style="list-style-type: none"> ● Engine: After warming up 	Revving engine from idle to 3,000 rpm quickly	0 - 0.3V ↔ 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ↔ RICH
VHCL SPEED SE	<ul style="list-style-type: none"> ● Turn drive wheels and compare speedometer indication with the CONSULT-II value 		Almost the same speed as the CONSULT-II value
BATTERY VOLT	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) 		11 - 14V
THRTL POS SEN	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 	Throttle valve: fully closed	0.15 - 0.85V
	<ul style="list-style-type: none"> ● Engine: After warming up ● Ignition switch: ON (Engine stopped) 	Throttle valve: fully opened	3.5 - 4.7V
EGR TEMP SEN	<ul style="list-style-type: none"> ● Engine: After warming up 		Less than 4.5V
EVAP SYS PRES	<ul style="list-style-type: none"> ● Ignition switch: ON 		Approx. 3.4V
ABSOL PRES/SE	<ul style="list-style-type: none"> ● Ignition switch: ON 		Approx. 4.4V
START SIGNAL	<ul style="list-style-type: none"> ● Ignition switch: ON → START → ON 		OFF → ON → OFF
CLSD THL/P SW CLSD THL POS	<ul style="list-style-type: none"> ● Engine: After warming up ● Ignition switch: ON (Engine stopped) 	Throttle valve: Idle position	ON
		Throttle valve: Slightly open	OFF
AIR COND SIG	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 	A/C switch "OFF"	OFF
		A/C switch "ON" (Compressor operates)	ON

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION	SPECIFICATION	
P/N POSI SW	● Ignition switch: ON	Shift lever "P" or "N"	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 "ON" and/or lighting switch "2ND"	ON
		Rear window defogger switch and lighting switch "OFF"	OFF
IGNITION SW	● Ignition switch: ON → OFF	ON → OFF	
INJ PULSE-B1	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load	Idle	2.4 - 3.2 msec
		2,000 rpm	1.9 - 2.8 msec
IGN TIMING	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load	Idle	15°±2° BTDC
		2,000 rpm	More than 25° BTDC
CAL/LD VALUE	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load	Idle	20.0 - 35.5%
		2,500 rpm	17.0 - 30.0%
ABSOL TH-P/S	● Engine: After warming up, idle the engine	Throttle valve: fully closed	0.0%
	● Engine: After warming up ● Ignition switch: ON (Engine stopped)	Throttle valve: fully opened	Approx. 88.0%
MASS AIRFLOW	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N ● No-load	Idle	2.5 - 5.0 g·m/s
		2,500 rpm	7.1 - 12.5 g·m/s
IACV-AAC/V	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load	Idle	5 - 20 steps
		2,000 rpm	—
PURG VOL C/V	● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load	Idle	0 %
		2,000 rpm	—
EGR VOL CONV	● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load	Idle	0 step
		Engine speed: Revving from idle up to 3,000 rpm quickly	10 - 55 step
AIR COND RLY	● Air conditioner switch: OFF → ON	OFF → ON	
FUEL PUMP RLY	● Ignition switch is turned to ON (Operates for 5 seconds) ● Engine running and cranking ● When engine is stopped (stops in 1.0 seconds)	ON	
	● Except as shown above	OFF	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION	SPECIFICATION		
VC/V BYPASS/V	● Ignition switch: ON	OFF	GI	
VENT CONT/V	● Ignition switch: ON	OFF		
COOLING FAN	<ul style="list-style-type: none"> ● After warming up engine, idle the engine. ● Air conditioner switch: OFF 	Engine coolant temperature is 94°C (201°F) or less	OFF	MA
		Engine coolant temperature is between 95°C (203°F) and 104°C (219°F)	LOW	EM
		Engine coolant temperature is 105°C (221°F) or more	HIGH	LC
HO2S1 HTR (B1)	● Engine speed: Below 3,200 rpm	ON	EC	
	● Engine speed: Above 3,200 rpm	OFF		
HO2S2 HTR (B1)	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Engine speed: Above 3,600 rpm 	OFF	FE	
	● Engine speed: Below 3,600 rpm [After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more]	ON	CL	

Major Sensor Reference Graph in Data Monitor Mode

NCEC0043

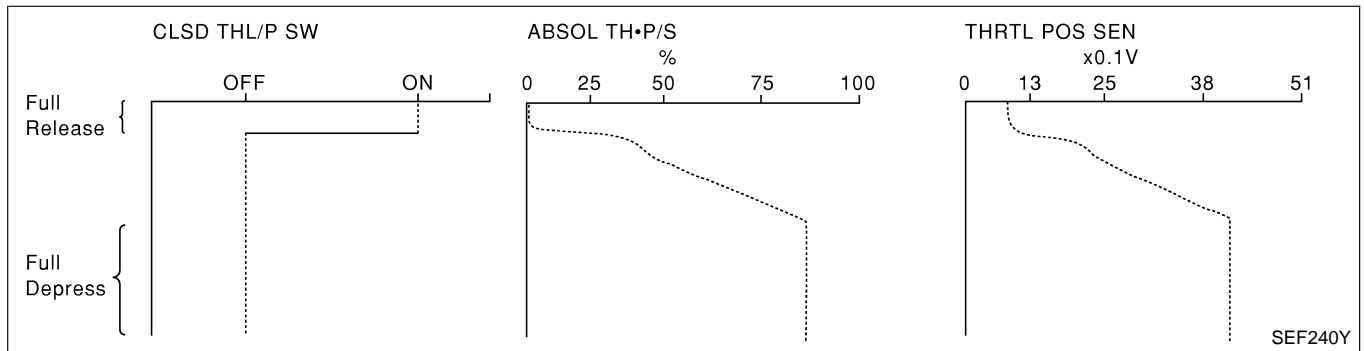
The following are the major sensor reference graphs in "DATA MONITOR" mode.

THRTL POS SEN, ABSOL TH•P/S, CLSD THL/P SW

NCEC0043S01

Below is the data for "THRTL POS SEN", "ABSOL TH•P/S" and "CLSD THL/P SW" when depressing the accelerator pedal with the ignition switch "ON".

The signal of "THRTL POS SEN" and "ABSOL TH•P/S" should rise gradually without any intermittent drop or rise after "CLSD THL/P SW" is changed from "ON" to "OFF".



SEF240Y

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

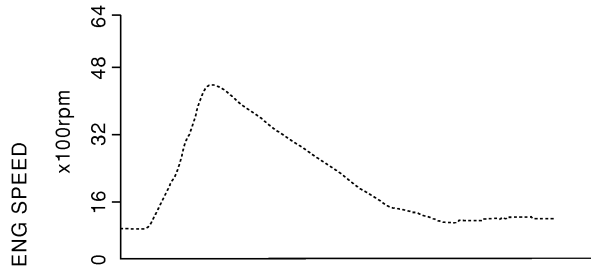
NCEC0043S02

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.

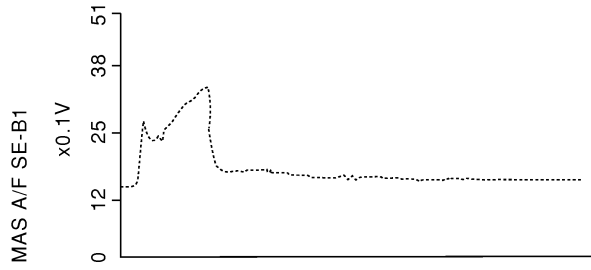
Each value is for reference, the exact value may vary.

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Major Sensor Reference Graph in Data Monitor Mode (Cont'd)



- "ENG SPEED" should increase gradually while depressing the accelerator pedal and should decrease gradually after releasing the pedal without any intermittent drop or rise.

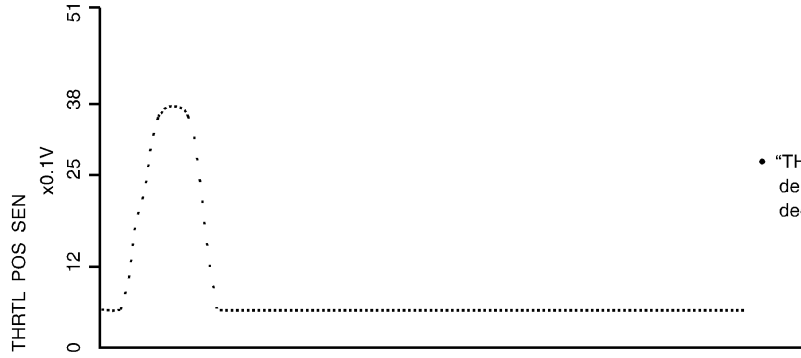


- "MAS A/F SE-B1" should increase when depressing the accelerator pedal and should decrease at the moment "THRTL POS SEN" is closed (accelerator pedal is released).

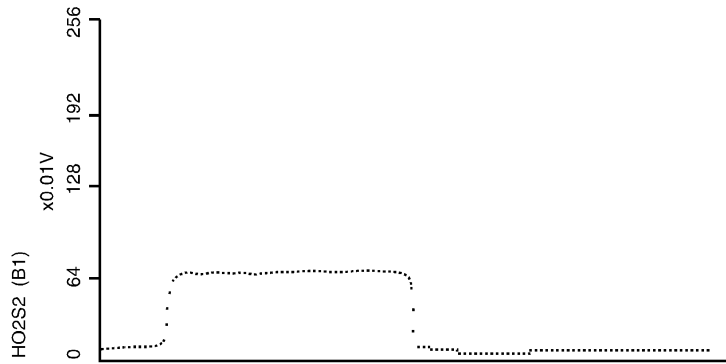
SEF241Y

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

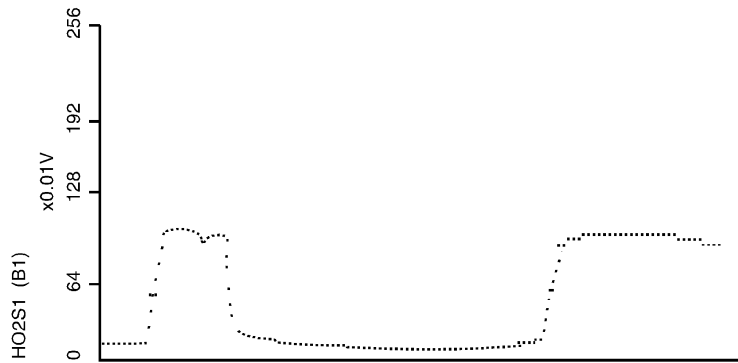
Major Sensor Reference Graph in Data Monitor Mode (Cont'd)



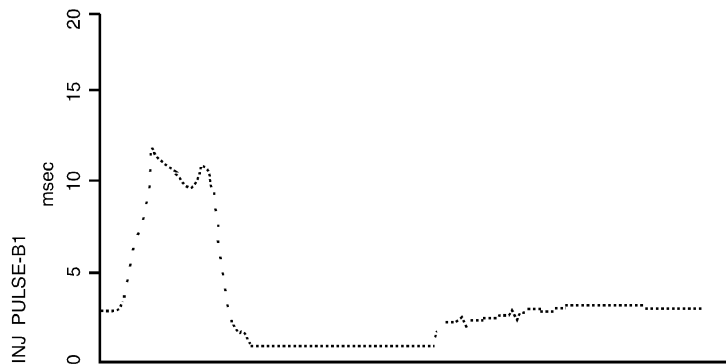
- "THRTL POS SEN" should increase while depressing the accelerator pedal and should decrease while releasing it.



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



- "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.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

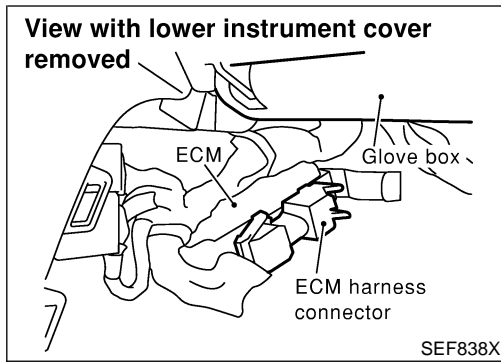
SEF242YA

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value

NCEC0044

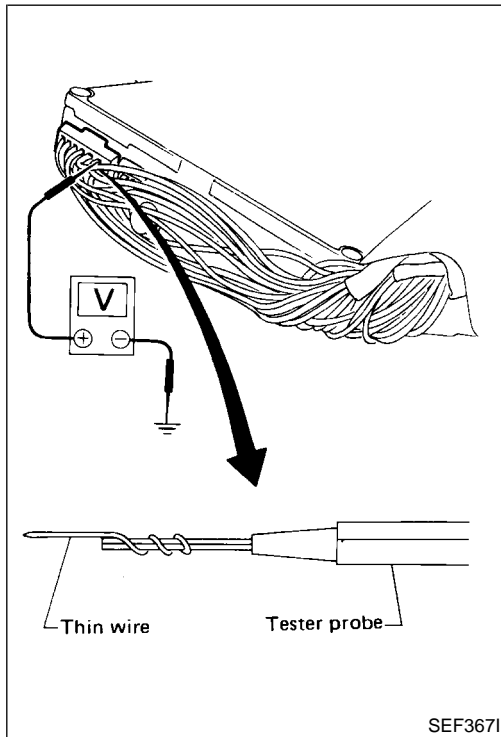
NCEC0044S01



ECM Terminals and Reference Value

PREPARATION

- ECM is located behind the center console. For this inspection:
 - Remove the front passenger center console panel.
 - 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.


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.

ECM HARNESS CONNECTOR TERMINAL LAYOUT

NCEC0044S02

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		39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76		111	112
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57		77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38												87	88	89	90	91	92	93	94	95		115	116



SEF970W

ECM INSPECTION TABLE

NCEC0044S03

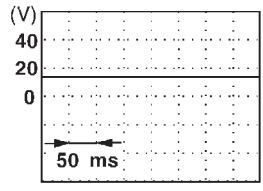
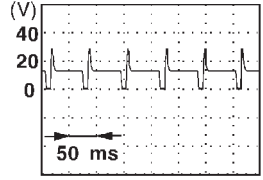
Specification data are reference values and are measured between each terminal and ground.

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.

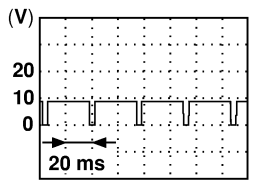
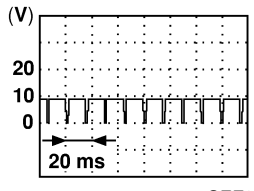
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
2	PU/R	Vacuum cut valve bypass valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)	GI MA
3	R/Y	Heated oxygen sensor 2 heater (rear)	[Engine is running] ● Engine speed is below 3,600 rpm. ● After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more.	0 - 1.0V	EM
			[Ignition switch "ON"] ● Engine stopped [Engine is running] ● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)	LC EC
4	OR	Heated oxygen sensor 1 heater (front)	[Engine is running] ● Engine speed is below 3,200 rpm.	0 - 1.0V	FE
			[Engine is running] ● Engine speed is above 3,200 rpm.	BATTERY VOLTAGE (11 - 14V)	CL
6 7 15 16	BR L R G	IACV-AAC valve	[Engine is running] ● Idle speed	0.1 - 14V	MT
8 9 17 18	SB W/B R/W G/R	EGR volume control valve	[Engine is running] ● Idle speed	0.1 - 14V	AT
10	Y/B	A/T signal No. 3	[Engine is running] ● Idle speed	0 - 1.0V	AX
12	LG	Cooling fan relay (High)	[Engine is running] ● Cooling fan is not operating	BATTERY VOLTAGE (11 - 14V)	SU
			[Engine is running] ● Cooling fan (High) is operating	0 - 0.6V	BR
13	L/Y	Cooling fan relay (Low)	[Engine is running] ● Cooling fan is not operating	BATTERY VOLTAGE (11 - 14V)	ST
			[Engine is running] ● Cooling fan is operating	0 - 0.6V	RS
14	P	EVAP canister purge volume control sole- noid valve	[Engine is running] ● Idle speed	BATTERY VOLTAGE (11 - 14V)  SEF994U	BT HA
			[Engine is running] ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine).	BATTERY VOLTAGE (11 - 14V)  SEF995U	SC EL IDX

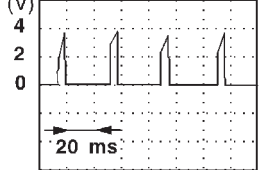
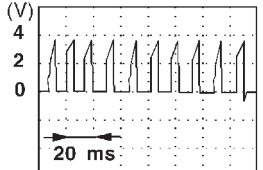
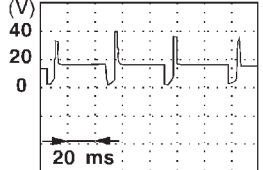
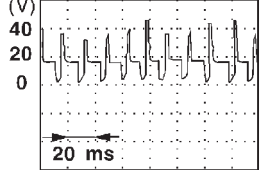
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
19	BR/W	A/T signal No. 5	[Engine is running] ● Idle speed	Approximately 8V
21	B/P	Fuel pump relay	[Ignition switch "ON"] ● For 5 seconds after turning ignition switch "ON"	0 - 1V
			[Engine is running] ● More than 5 seconds after turning ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)
22	OR/L	Malfunction indicator lamp	[Ignition switch "ON"]	0 - 1.0V
			[Engine is running] ● Idle speed	BATTERY VOLTAGE (11 - 14V)
23	L/W	Air conditioner relay	[Engine is running] ● Both A/C switch and blower switch are "ON" (Compressor operates)	0 - 0.6V
			[Engine is running] ● A/C switch is "OFF"	BATTERY VOLTAGE (11 - 14V)
31	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)
32	L	Tachometer	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 8.2V  SEF928X
			[Engine is running] ● Engine speed is 2,000 rpm	Approximately 8.2V  SEF929X

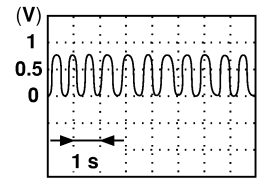
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
35	W/B	Ignition signal	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0.3V 	GI MA EM LC
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	Approximately 0.5V 	EC FE CL
36	G	Ignition check	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 13V 	MT AT AX
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	Approximately 13V 	SU BR ST
40	Y	Throttle position switch (Closed position)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Accelerator pedal fully released 	BATTERY VOLTAGE (11 - 14V)	RS
			[Engine is running] <ul style="list-style-type: none"> ● Accelerator pedal depressed 	Approximately 0V	BT
41	B/Y	Start signal	[Ignition switch "ON"]	Approximately 0V	HA
			[Ignition switch "START"]	9 - 14V	
42	G/OR	PNP switch	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position is "Neutral position" (M/T models) ● Gear position is "P" or "N" (A/T models) 	Approximately 0V	SC
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Except the above gear position 	BATTERY VOLTAGE (11 - 14V)	EL
43	B/R	Ignition switch	[Ignition switch "OFF"]	0V	IDX
			[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)	

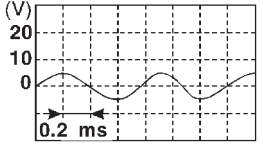
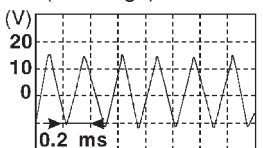
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
44	L/B	Air conditioner switch	[Engine is running] ● Both A/C switch and blower switch are "ON"	Approximately 0V
			[Engine is running] ● A/C switch is "OFF"	BATTERY VOLTAGE (11 - 14V)
46	SB	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
48	B	ECM ground	[Engine is running] ● Idle speed	Engine ground
50	R	Electrical load signal	[Ignition switch "ON"] ● Lighting switch "2ND" and/or rear window defog- ger switch "ON"	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"] ● Lighting switch and rear window defogger switch "OFF"	0V
54	Y/R	A/T signal No. 1	[Engine is running] ● Idle speed	Approximately 0 - 1.0V
55	Y/G	A/T signal No. 2	[Engine is running] ● Idle speed	Approximately 0 - 1.0V
56	G/Y	A/T signal No. 4	[Engine is running] ● Idle speed	Approximately 0 - 1.0V
57	B	ECM ground	[Engine is running] ● Idle speed	Engine ground
58	B	Sensor's ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
61	L	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.3 - 1.7V
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm	1.8 - 2.4V
62	W	Heated oxygen sensor 1 (front)	[Engine is running] ● Warm-up condition ● Engine speed is 2,000 rpm	0 - Approximately 1.0V (Periodically change) 
63	W	Heated oxygen sensor 2 (rear)	[Engine is running] ● Warm-up condition ● Engine speed is 2,000 rpm	0 - Approximately 1.0V
64	R/Y	Intake air temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with intake air temperature.

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

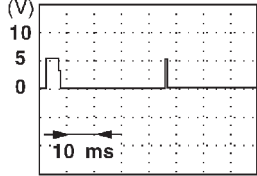
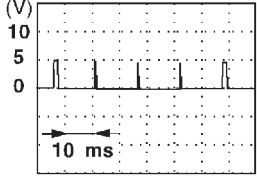
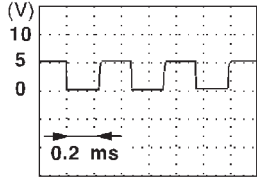
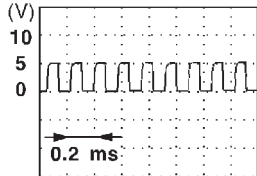
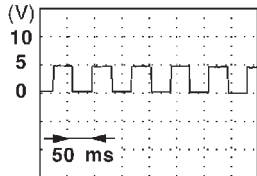
ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
65	W	Crankshaft position sensor (OBD)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	3 - 5V (AC range) 	GI MA EM
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	6 - 9V (AC range) 	LC EC FE
67	W/L	Power supply for ECM (Back-up)	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)	CL
70	BR/Y	Engine coolant temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with engine coolant temperature.	MT
71	GY	Throttle position sensor signal output	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Accelerator pedal fully released 	Approximately 0.4V	AT
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully depressed 	Approximately 4V	AX
72	R/B	EGR temperature sensor	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Less than 4.5V	SU
			[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● EGR system is operating 	0 - 1.5V	BR
73	G	Mass air flow sensor ground	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0V	ST
74	R/L	Refrigerant pressure sensor	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Both A/C switch and blower switch are "ON" (Compressor operates) 	0.36 - 3.88V	RS BT

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

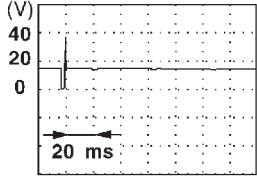
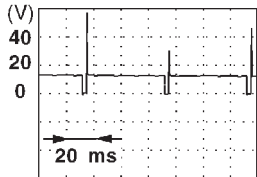
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
75	L	Camshaft position sensor (Reference signal)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	<p>0.1 - 0.4V</p>  <p style="text-align: right;">SEF006W</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Engine speed is 2,000 rpm 	<p>0.1 - 0.4V</p>  <p style="text-align: right;">SEF007W</p>
81	W	Knock sensor	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Idle speed 	Approximately 2.5V
82	LG/R	Fuel tank temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with fuel tank temperature.
83	G/R	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.
84	W	EVAP control system pressure sensor	[Ignition switch "ON"]	Approximately 3.4V
85	B/W	Camshaft position sensor (Position signal)	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	<p>Approximately 2.6V</p>  <p style="text-align: right;">SEF004W</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> • Engine speed is 2,000 rpm 	<p>Approximately 2.5V</p>  <p style="text-align: right;">SEF005W</p>
86	Y/G	Vehicle speed sensor	<p>[Engine is running]</p> <ul style="list-style-type: none"> • Lift up the vehicle • In 2nd gear position • Vehicle speed is 40 km/h (25 MPH) 	<p>0 - Approximately 4.2V</p>  <p style="text-align: right;">SEF003W</p>

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
90	B	Fuel level sensor ground	[Engine is running] ● Idle speed	Approximately 0V
91	PU	A/T check signal	[Ignition switch "ON"]	0 - Approximately 5V
92	Y	Throttle position sensor	[Engine is running] ● Warm-up condition ● Accelerator pedal fully released	0.15 - 0.85V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	3.5 - 4.7V
101 103 105 107	R/B	Injector No. 1	[Engine is running] ● Warm-up condition ● Idle speed	BATTERY VOLTAGE (11 - 14V)  SEF011W
	Y/B	Injector No. 2		
	G/B	Injector No. 3		
	L/B	Injector No. 4		
102	PU/W	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)  SEF012W
110 112	W W	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
111	P/L	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
115	L/B	DATA link connector	[Ignition switch "ON"] ● CONSULT-II or GST is disconnected.	Approximately 8V

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

TROUBLE DIAGNOSIS — SPECIFICATION VALUE

Description

Description

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. NCEC0666

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/B2 (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)

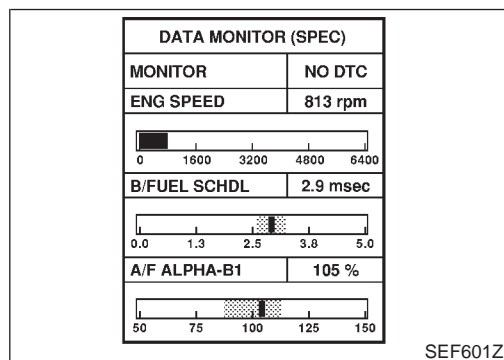
Testing Condition

- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 - 104.3 kPa (1.003 - 1.064 kg/cm², 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

NCEC0667

*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, lighting switch are “OFF”. Cooling fans are not operating. Steering wheel is straight ahead.



Inspection Procedure

NCEC0668

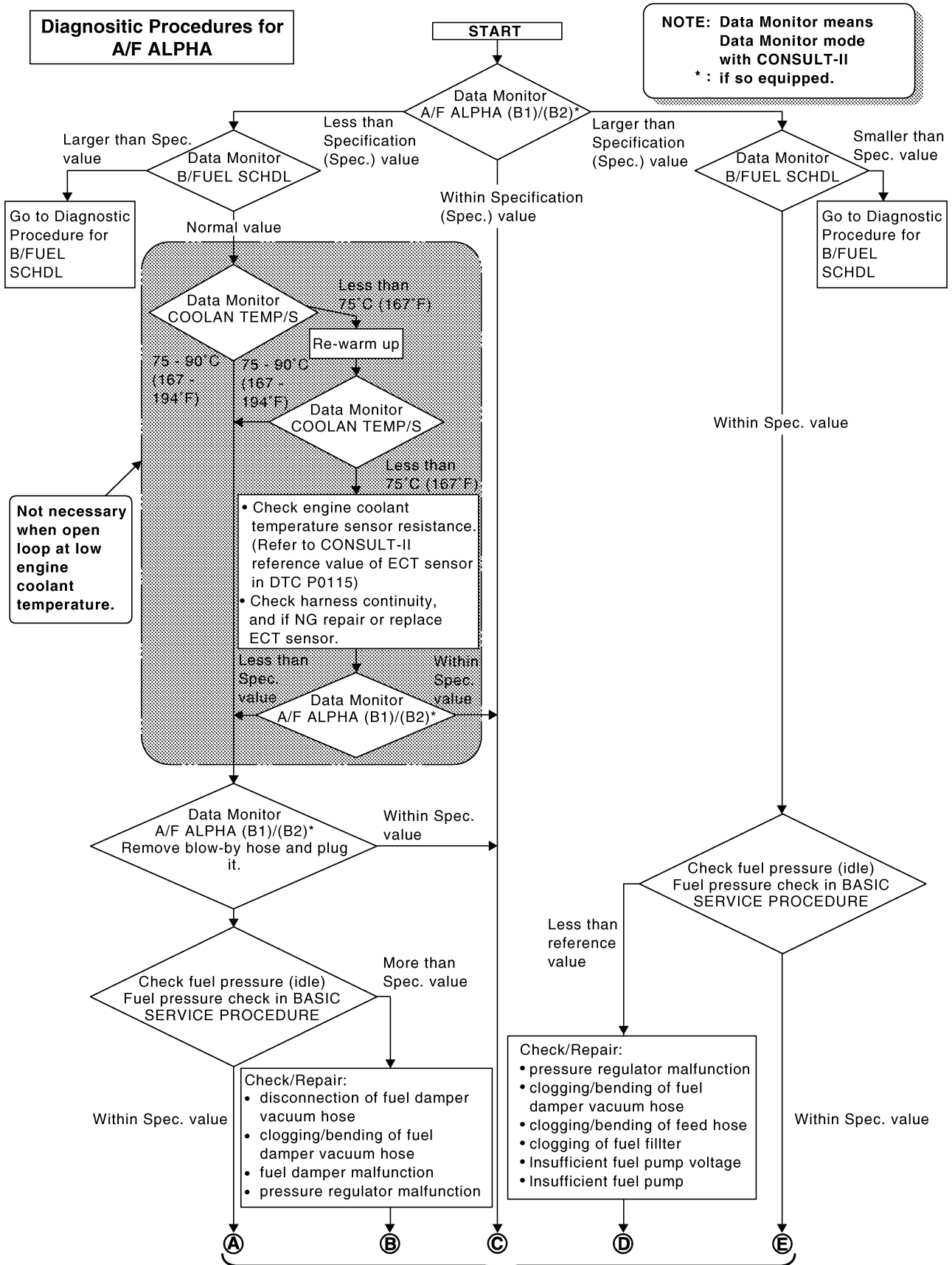
NOTE:

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

1. Perform “Basic Inspection”, EC-107.
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 “Diagnostic Procedure”, EC-143.

Diagnostic Procedure

NCEC0669



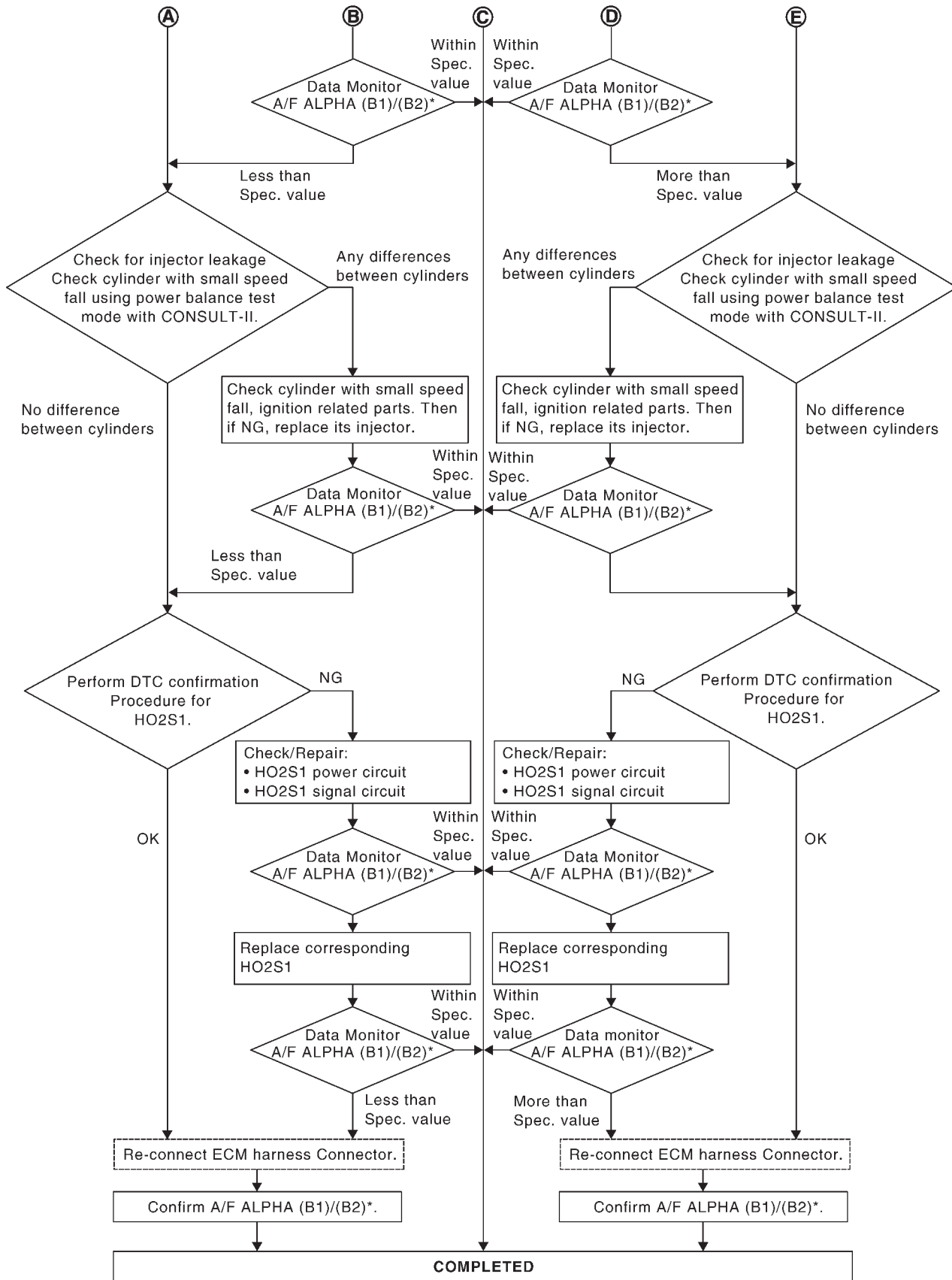
(Go to next page.)

SEF613ZA

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

TROUBLE DIAGNOSIS — SPECIFICATION VALUE

Diagnostic Procedure (Cont'd)

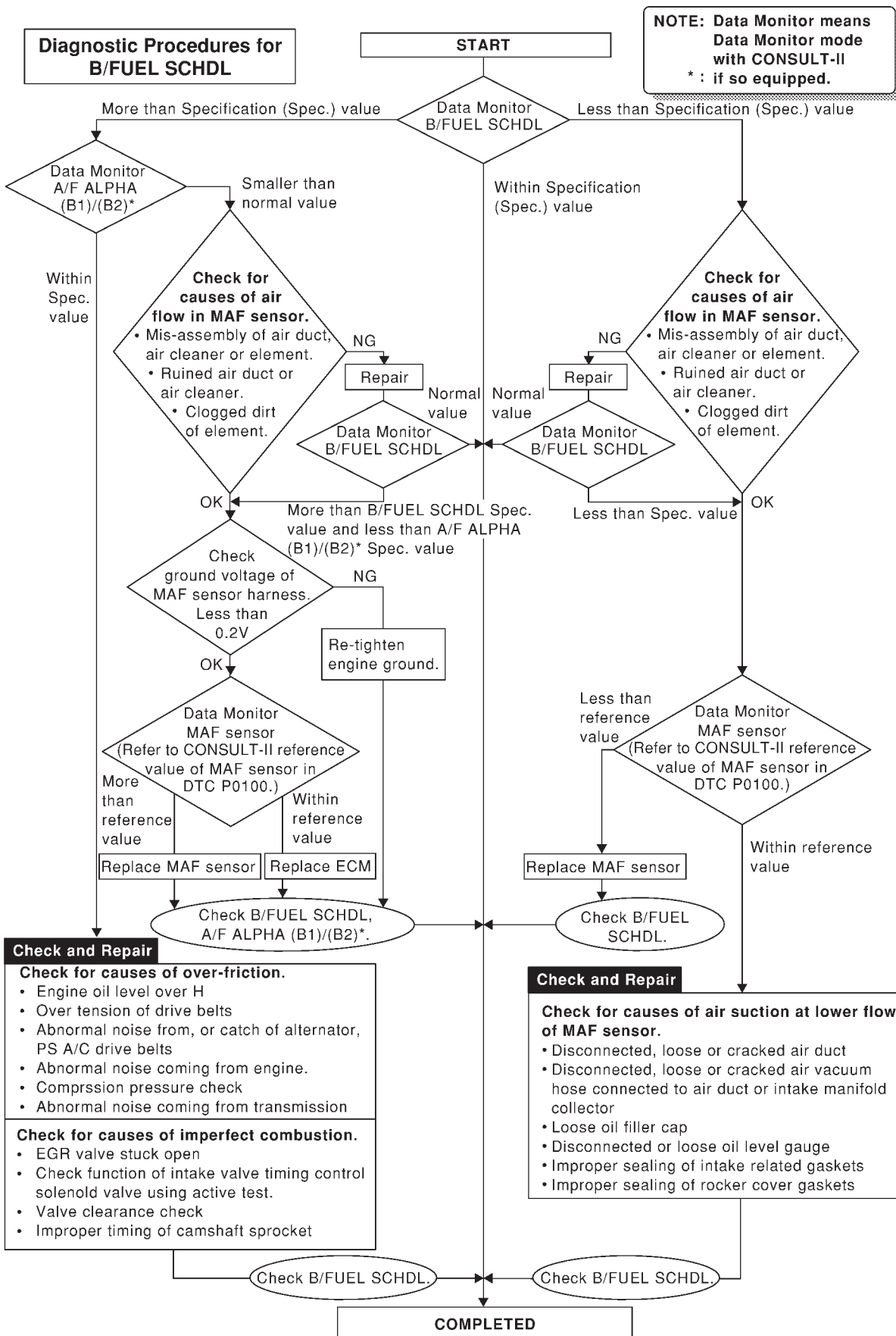


SEF768Z

TROUBLE DIAGNOSIS — SPECIFICATION VALUE

Diagnostic Procedure (Cont'd)

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX



SEF615Z

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

Description

Description

NCEC0045

Intermittent incidents (I/I) may occur. In many cases, the problem 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 problem area.

COMMON I/I REPORT SITUATIONS

NCEC0045S01

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 problem area.

Diagnostic Procedure

NCEC0046

1	INSPECTION START
Erase (1st trip) DTCs. Refer to "HOW TO ERASE EMISSION-RELATED INFORMATION", EC-79.	
▶	GO TO 2.

2	CHECK GROUND TERMINALS
Check ground terminals for corroding or loose connection. Refer to GI-30, "GROUND INSPECTION".	
OK or NG	
OK ▶	GO TO 3.
NG ▶	Repair or replace.

3	SEARCH FOR ELECTRICAL INCIDENT
Refer to GI-25, "Incident Simulation Tests".	
OK or NG	
OK ▶	GO TO 4.
NG ▶	Repair or replace.

4	CHECK CONNECTOR TERMINALS
Refer to GI-22, "How to Check Enlarged Contact Spring of Terminal".	
OK or NG	
OK ▶	INSPECTION END
NG ▶	Repair or replace connector.

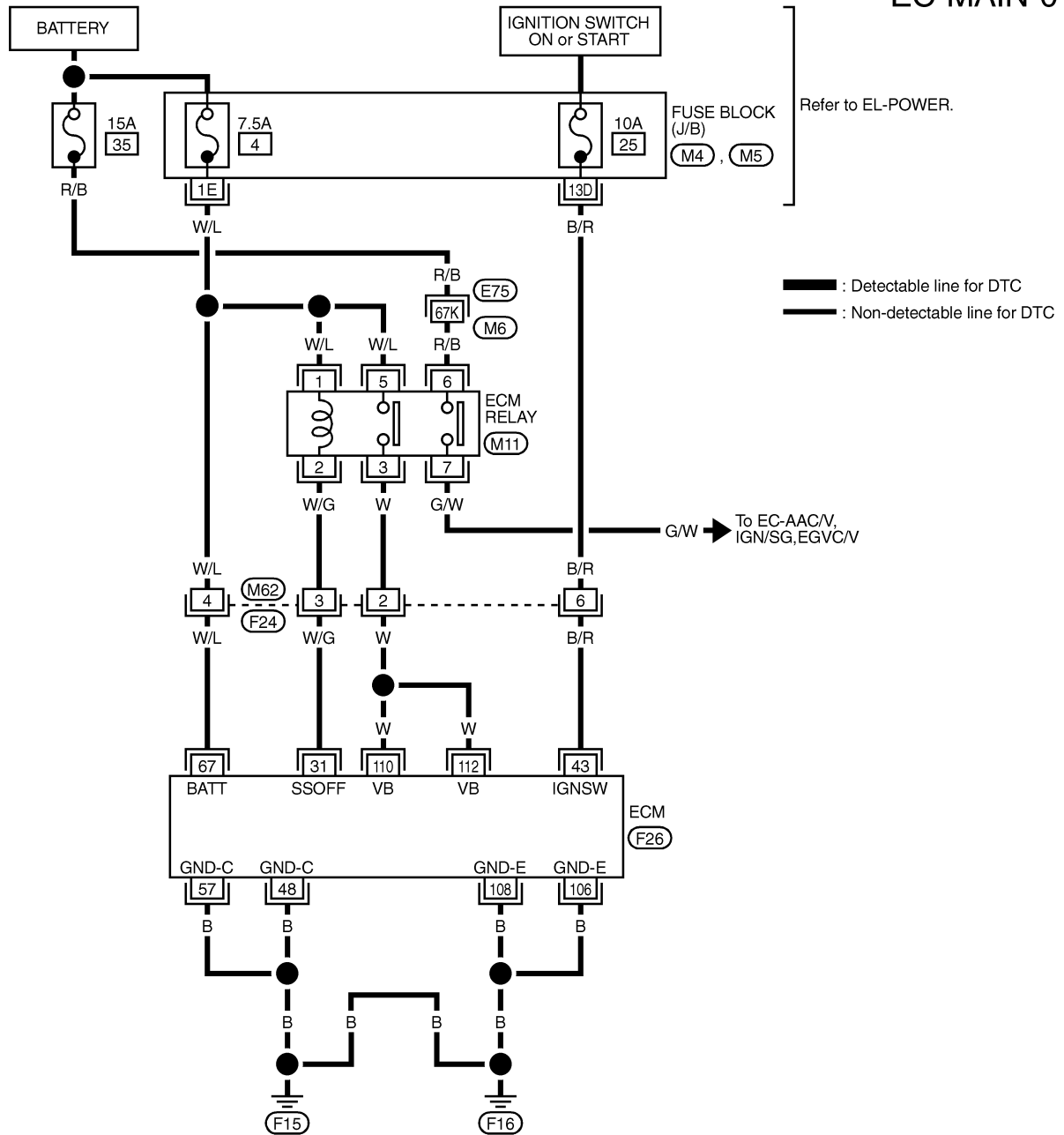
TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit

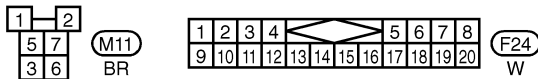
Main Power Supply and Ground Circuit WIRING DIAGRAM

NCEC0047

EC-MAIN-01

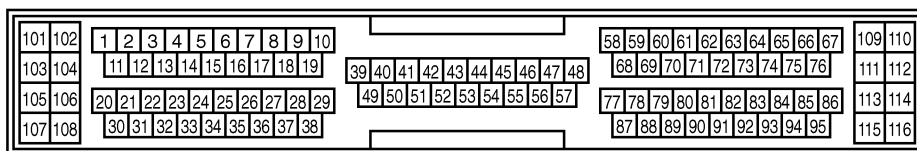


GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX



REFER TO THE FOLLOWING.

- (E75) -SUPER MULTIPLE JUNCTION (SMJ)
- (M4), (M5) -FUSE BLOCK-JUNCTION BOX (J/B)



TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

ECM TERMINALS AND REFERENCE VALUE

NCEC0048

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)
31	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For 5 seconds after turning ignition switch "OFF"	0 - 1V
			[Ignition switch "OFF"] ● 5 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
43	B/R	Ignition switch	[Ignition switch "OFF"]	0V
			[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
48	B	ECM ground	[Engine is running] ● Idle speed	Engine ground
57	B	ECM ground	[Engine is running] ● Idle speed	Engine ground
67	W/L	Power supply for ECM (Back-up)	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
106	B	ECM ground	[Engine is running] ● Idle speed	Engine ground
108	B	ECM ground	[Engine is running] ● Idle speed	Engine ground
110 112	W W	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

DIAGNOSTIC PROCEDURE

NCEC0049

1	INSPECTION START	
Start engine. Is engine running?		
Yes or No		
Yes	▶	GO TO 8.
No	▶	GO TO 2.

TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

2	CHECK ECM POWER SUPPLY CIRCUIT-I	
<p>1. Turn ignition switch "OFF" and then "ON". 2. Check voltage between ECM terminal 43 and ground with CONSULT-II or tester.</p>		
SEF291X		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

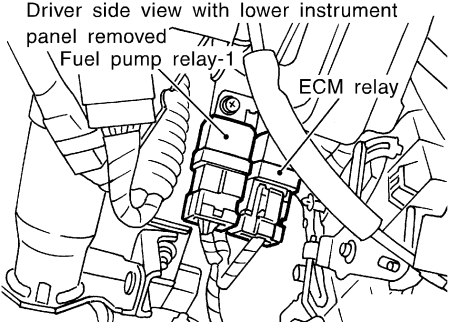
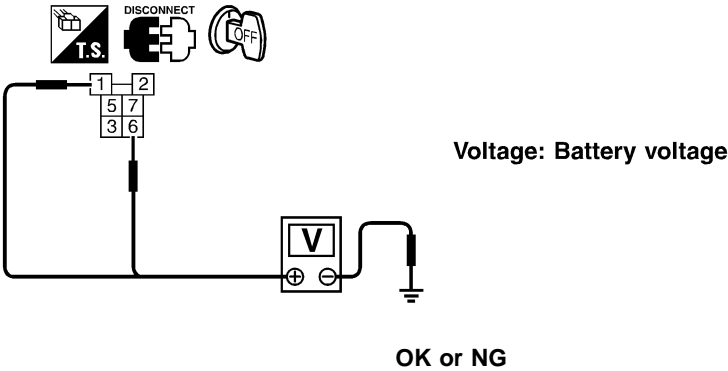
3	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M62, F24 ● Harness for open or short between ECM and 10A fuse 		
▶		Repair harness or connectors.

4	CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals 48, 57, 106, 108 and engine ground. Refer to WIRING DIAGRAM. Continuity should exist. 4. Also check harness for short to power.</p>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair open circuit or short to power in harness or connectors.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

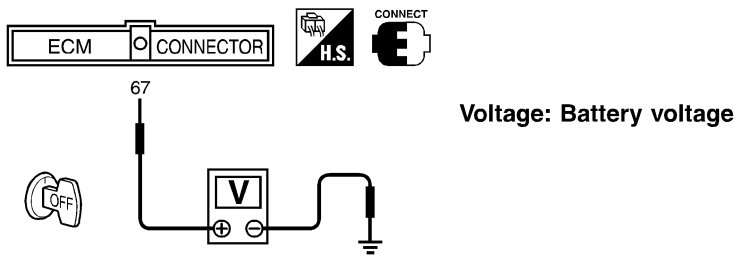
5	CHECK ECM POWER SUPPLY CIRCUIT-II
<p>1. Disconnect ECM relay.</p> <div style="text-align: center;">  <p>Driver side view with lower instrument panel removed Fuel pump relay-1 ECM relay</p> </div> <p style="text-align: right;">SEF185XA</p>	
<p>2. Check voltage between ECM relay terminals 1, 6 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> <p>OK or NG</p> </div> <p style="text-align: right;">SEF101Y</p>	
OK	▶ GO TO 7.
NG	▶ GO TO 6.

6	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● 15A fuse and 7.5A fuse ● Harness connectors E75, M6 ● 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.

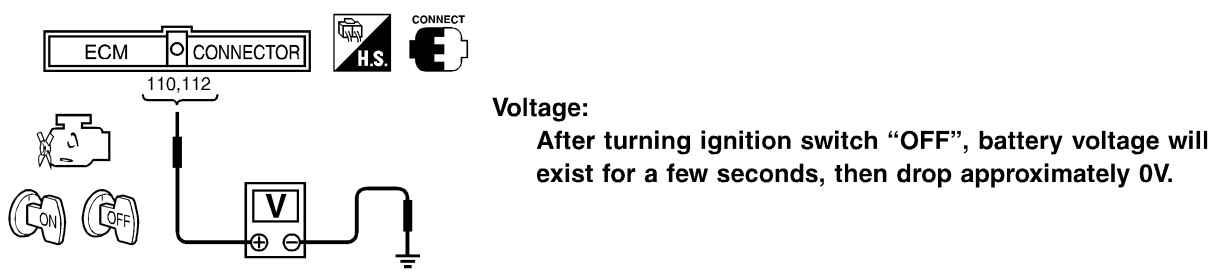
7	CHECK OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Check harness continuity between ECM terminal 31 and ECM relay terminal 2. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ Go to "IGNITION SIGNAL", EC-590.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

8	CHECK ECM POWER SUPPLY CIRCUIT-III	
<p>1. Stop engine. 2. Check voltage between ECM terminal 67 and ground with CONSULT-II or tester.</p>		
		
SEF293X		
OK or NG		
OK	▶	GO TO 10.
NG	▶	GO TO 9.

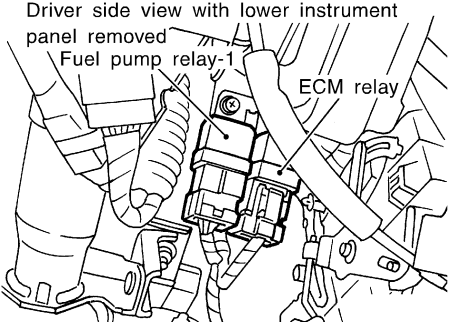
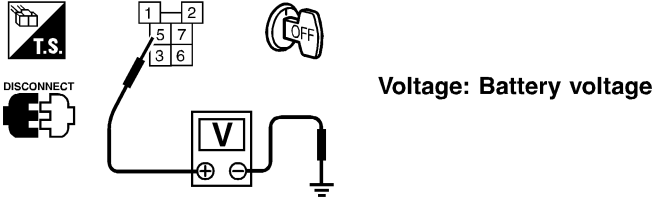
9	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M62, F24 ● Fuse block (J/B) connector M4, M5 ● 7.5A fuse ● Harness for open or short between ECM and 7.5A fuse 		
▶ Repair harness or connectors.		

10	CHECK ECM POWER SUPPLY CIRCUIT-IV	
<p>1. Turn ignition switch "ON" and then "OFF". 2. Check voltage between ECM terminals 110, 112 and ground with CONSULT-II or tester.</p>		
		
SEF294X		
OK or NG		
OK	▶	GO TO 16.
NG (Battery voltage does not exist.)	▶	GO TO 11.
NG (Battery voltage exists for more than a few seconds.)	▶	GO TO 13.

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

11	CHECK ECM POWER SUPPLY CIRCUIT-V
<p>1. Disconnect ECM relay.</p> <div style="text-align: center;">  <p>Driver side view with lower instrument panel removed Fuel pump relay-1 ECM relay</p> </div> <p style="text-align: right;">SEF185XA</p> <p>2. Check voltage between ECM relay terminal 5 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: right;">Voltage: Battery voltage</p> <p style="text-align: right;">SEF916Z</p> </div> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 13.
NG	▶ GO TO 12.

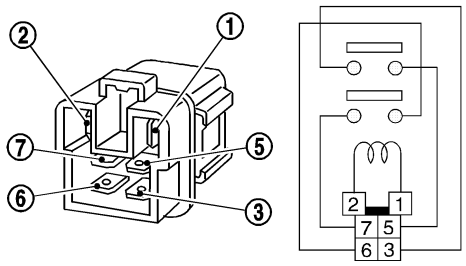
12	DETECT MALFUNCTIONING PART
Check harness for open or short between ECM relay and 7.5A fuse.	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

13	CHECK HARNESS CONTINUITY BETWEEN ECM RELAY AND ECM FOR OPEN AND SHORT
<p>1. Check harness continuity between ECM terminals 110, 112 and ECM relay terminal 3. Refer to WIRING DIAGRAM. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 15.
NG	▶ GO TO 14.

14	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M62, F24 ● Harness for open or short between ECM and ECM relay 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)

15	CHECK ECM RELAY	
<p>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.</p>		
		
<p>12V (1 - 2) applied: Continuity exists. No voltage applied: No continuity</p>		
OK or NG		
OK	▶	GO TO 16.
NG	▶	Replace ECM relay.

SEC202BC

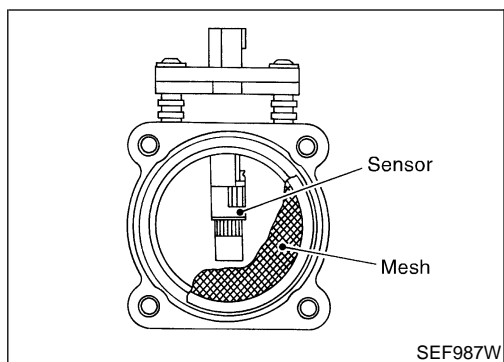
GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

16	CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals 48, 57, 106, 108 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p>		
<p>4. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 17.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

17	CHECK INTERMITTENT INCIDENT	
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p>		
▶		INSPECTION END

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

Component Description



Component Description

NCEC0050

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 wire that is supplied with electric current from the ECM. The temperature of the hot wire is controlled by the ECM a certain amount. The heat generated by the hot wire 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 wire as air flow increases. The ECM detects the air flow by means of this current change.

CONSULT-II Reference Value in Data Monitor Mode

NCEC0051

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS A/F SE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load Idle	1.3 - 1.7V
	2,500 rpm	1.8 - 2.4V
CAL/LD VALUE	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load Idle	20.0 - 35.5%
	2,500 rpm	17.0 - 30.0%
MASS AIRFLOW	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load Idle	2.5 - 5.0 g·m/s
	2,500 rpm	7.1 - 12.5 g·m/s

ECM Terminals and Reference Value

NCEC0052

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	L	Mass air flow sensor	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	1.3 - 1.7V
			[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,500 rpm 	1.8 - 2.4V
73	G	Mass air flow sensor ground	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0V

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

On Board Diagnosis Logic

On Board Diagnosis Logic

NCEC0053

DTC No.	Malfunction is detected when ...		Check Items (Possible Cause)
P0100	A)	An excessively high voltage from the sensor is sent to ECM when engine is not running.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Mass air flow sensor
	C)	A high voltage from the sensor is sent to ECM under light load driving condition.	
	B)	An excessively low voltage from the sensor is sent to ECM* when engine is running.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Intake air leaks ● Mass air flow sensor
	D)	A low voltage from the sensor is sent to ECM under heavy load driving condition.	
	E)	A voltage from the sensor exists constantly approx. 1.0V when engine is running.	

*: 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
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

DTC Confirmation Procedure

NCEC0054

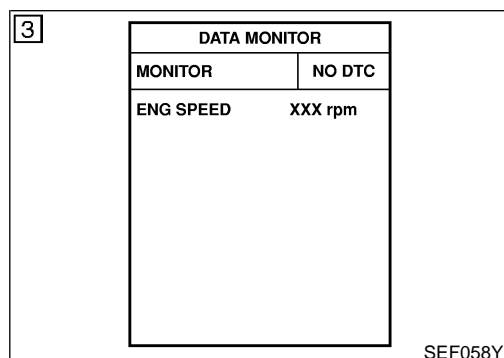
Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B and E". If there is no problem on "PROCEDURE FOR MALFUNCTION B and E", perform "PROCEDURE FOR MALFUNCTION C". If there is no problem on "PROCEDURE FOR MALFUNCTION C", perform "PROCEDURE FOR MALFUNCTION D".

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 A

NCEC0054S01

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 6 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-159.

With GST

Follow the procedure "With CONSULT-II" above.

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

DTC Confirmation Procedure (Cont'd)

3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION B AND E

NCEC0054S02

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 1st trip DTC is detected, go to "Diagnostic Procedure", EC-159.

With GST

Follow the procedure "With CONSULT-II" above.

NOTE:

If 1st trip DTC is confirmed after more than 5 seconds, there may be malfunction C.

4

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

SEF174Y

PROCEDURE FOR MALFUNCTION C

NCEC0054S03

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

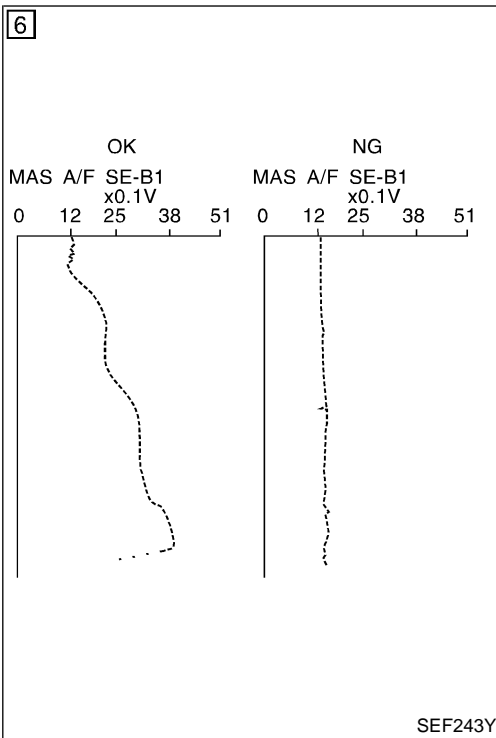
- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and warm it up to normal operating temperature.
- 4) Run engine for at least 10 seconds at idle speed.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-159.

With GST

Follow the procedure "With CONSULT-II" above.

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

DTC Confirmation Procedure (Cont'd)



7

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

SEF175Y

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
MAF	14.1gm/sec
THROTTLE POS	3%

SEF534P

PROCEDURE FOR MALFUNCTION D

NCEC0054S04

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 "Diagnostic Procedure", EC-159.
- 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 "Diagnostic Procedure", EC-159.
If OK, go to following step.
- 7) Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	More than 2,000 rpm
THRTL POS SEN	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 1st trip DTC is detected, go to "Diagnostic Procedure", EC-159.

Overall Function Check

NCEC0055

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.

PROCEDURE FOR MALFUNCTION D

NCEC0055S01

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 "Diagnostic Procedure", EC-159.

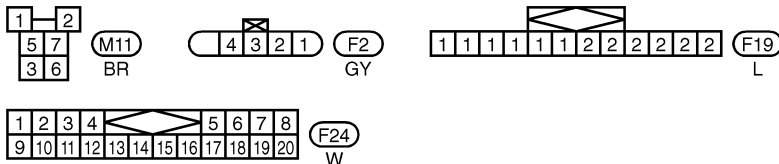
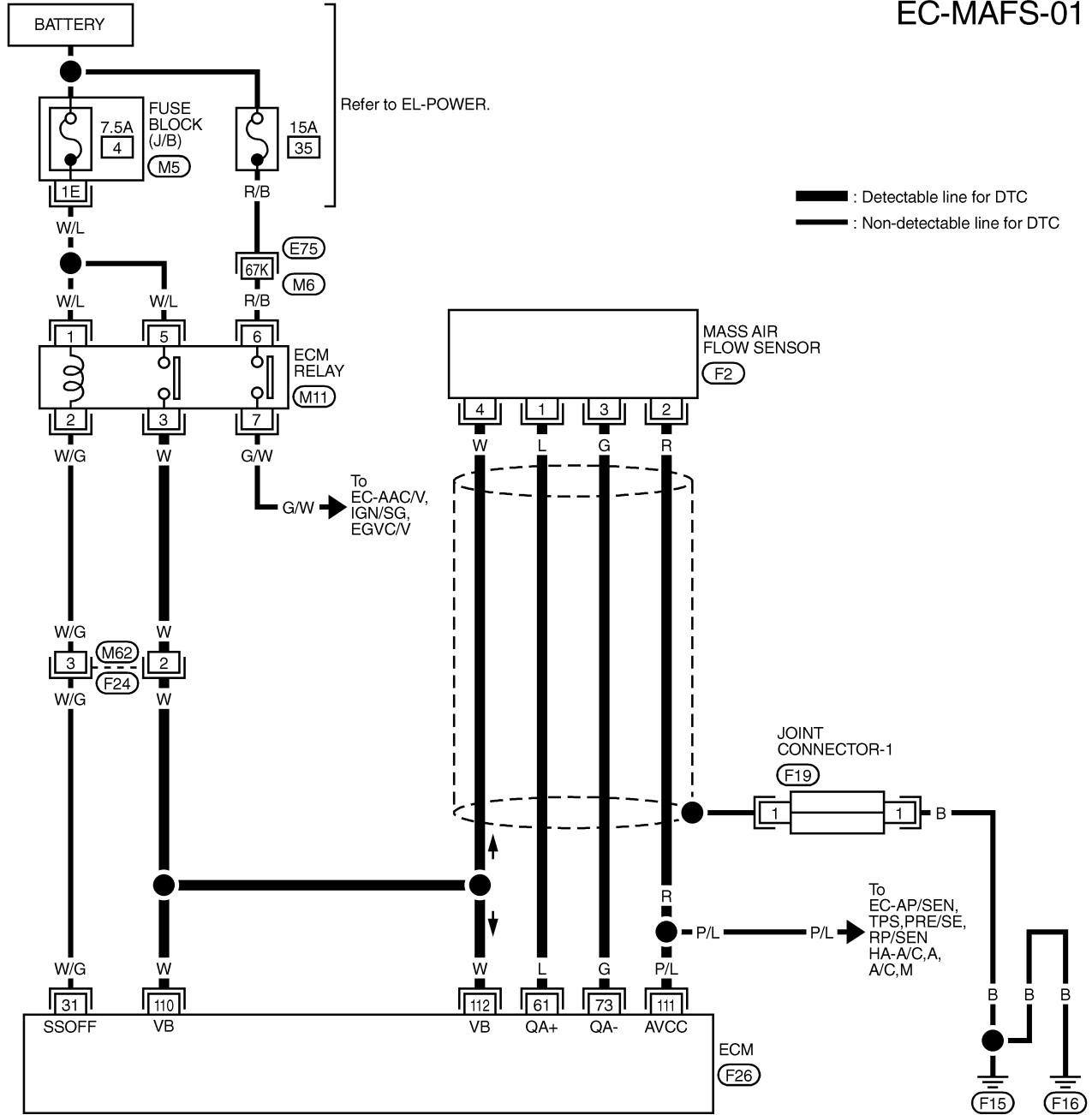
DTC P0100 MASS AIR FLOW SENSOR (MAFS)

Wiring Diagram

Wiring Diagram

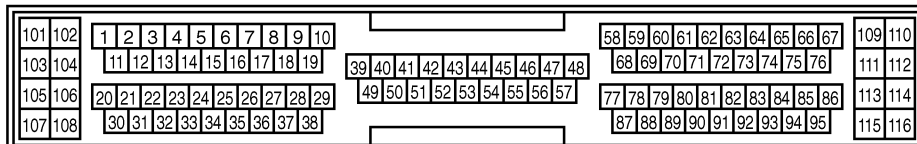
NCEC0056

EC-MAFS-01



REFER TO THE FOLLOWING.

- (E75) -SUPER MULTIPLE JUNCTION (SMJ)
- (M5) -FUSE BLOCK-JUNCTION BOX (J/B)



TEC697

Diagnostic Procedure

NCEC0057

1	INSPECTION START							
Which malfunction (A, B, C or D) is duplicated?								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">MALFUNCTION</th> <th style="text-align: center;">Type</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A and/or C</td> <td style="text-align: center;">I</td> </tr> <tr> <td style="text-align: center;">B, D and/or E</td> <td style="text-align: center;">II</td> </tr> </tbody> </table>			MALFUNCTION	Type	A and/or C	I	B, D and/or E	II
MALFUNCTION	Type							
A and/or C	I							
B, D and/or E	II							
MTBL0373								
Type I or Type II								
Type I	▶	GO TO 3.						
Type II	▶	GO TO 2.						

GI

MA

EM

LC

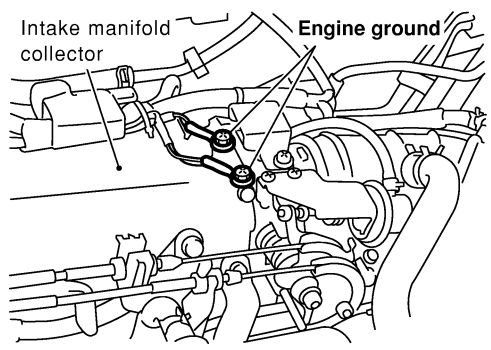
EC

2	CHECK INTAKE SYSTEM	
Check the followings for connection.		
<ul style="list-style-type: none"> ● Air duct ● Vacuum hoses ● Intake air passage between air duct to collector 		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Reconnect the parts.

FE

CL

MT

3	RETIGHTEN GROUND SCREWS	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws. 		
 <p style="text-align: center;">Intake manifold collector Engine ground</p>		
SEF839X		
		▶ GO TO 4.

AT

AX

SU

BR

ST

RS

BT

HA

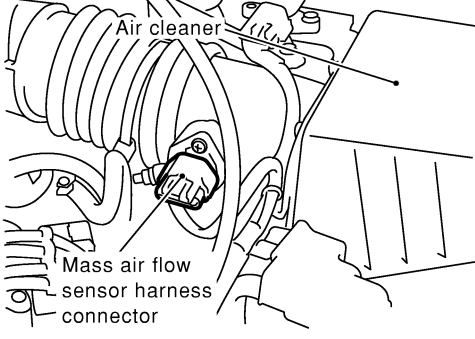
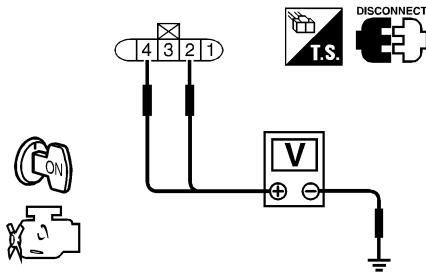
SC

EL

IDX

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

Diagnostic Procedure (Cont'd)

4	CHECK POWER SUPPLY								
<p>1. Disconnect mass air flow sensor harness connector.</p> <div style="text-align: center;">  <p style="margin-left: 100px;">Air cleaner</p> <p style="margin-left: 100px;">Mass air flow sensor harness connector</p> </div> <p style="text-align: right;">SEF840X</p> <p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between MAFS terminal 4 and ground with CONSULT-II or tester.</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 20px;">  </div> <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Terminal</th> <th style="width: 70%;">Voltage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Approximately 5</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">Battery voltage</td> </tr> </tbody> </table> </div> <p style="text-align: right;">SEF297X</p> <p style="text-align: center;">OK or NG</p>				Terminal	Voltage	2	Approximately 5	4	Battery voltage
Terminal	Voltage								
2	Approximately 5								
4	Battery voltage								
OK	▶	GO TO 6.							
NG	▶	GO TO 5.							

5	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M62, F24 ● 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 GROUND CIRCUIT		
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between MAFS terminal 3 and ECM terminal 73. Refer to Wiring Diagram.</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>			
OK	▶	GO TO 7.	
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

Diagnostic Procedure (Cont'd)

7	CHECK INPUT SIGNAL CIRCUIT
1. Check harness continuity between MAFS terminal 1 and ECM terminal 61. 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.

GI
MA
EM
LC

8	CHECK MASS AIR FLOW SENSOR
Refer to "Component Inspection", EC-162.	
OK or NG	
OK	▶ GO TO 9.
NG	▶ Replace mass air flow sensor.

EC
FE

9	CHECK SHIELD CIRCUIT
1. Turn ignition switch "OFF".	
2. Disconnect joint connector-1.	
3. Check the following.	
● Continuity between joint connector-1 terminal 1 and ground	
● Joint connector-1 (Refer to EL-274, "HARNESS LAYOUT".)	
Continuity should exist.	
4. Also check harness for short to power.	
5. Then reconnect joint connector-1.	
OK or NG	
OK	▶ GO TO 10.
NG	▶ Repair open circuit or short to power in harness or connectors.

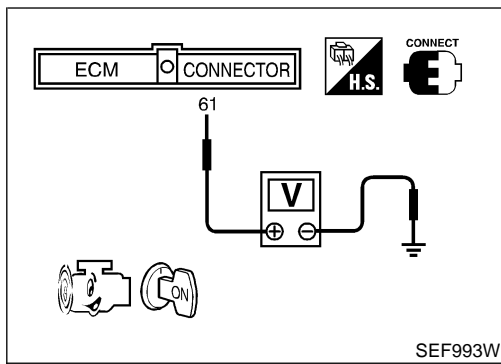
CL
MT
AT
AX
SU
BR

10	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
	▶ INSPECTION END

ST
RS
BT
HA
SC
EL
IDX

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

Component Inspection



Component Inspection

=NCEC0058

MASS AIR FLOW SENSOR

NCEC0058S01

1. Turn ignition switch "ON".
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 61 (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.)	1.3 - 1.7
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.8 - 2.4
Idle to about 4,000 rpm*	1.3 - 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, disconnect mass air flow sensor harness connector and connect it again. Repeat above check.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.

DTC P0105 ABSOLUTE PRESSURE SENSOR

Component Description

Component Description

The absolute pressure sensor is built into the ECM. The sensor detects ambient barometric pressure and sends the voltage signal to the micro computer. As the pressure increases, the voltage rises.

NCEC0059

GI

MA

EM

LC

On Board Diagnosis Logic

NCEC0060

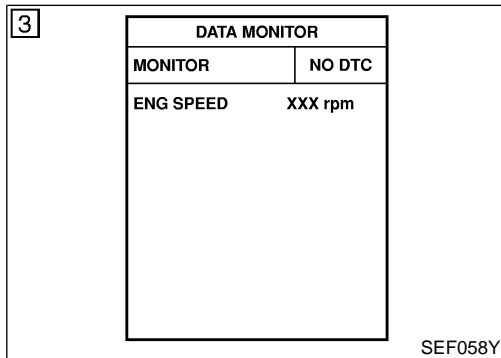
DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0105	An excessively low or high voltage from the sensor is sent to the micro computer.	<ul style="list-style-type: none"> ECM

EC

FE

CL

MT



DTC Confirmation Procedure

NCEC0061

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 6 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-164.

Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL



IDX

DTC P0105 ABSOLUTE PRESSURE SENSOR

Diagnostic Procedure

Diagnostic Procedure

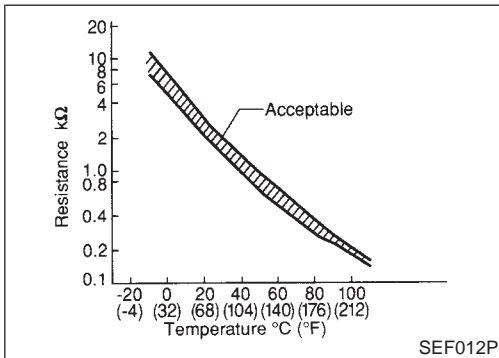
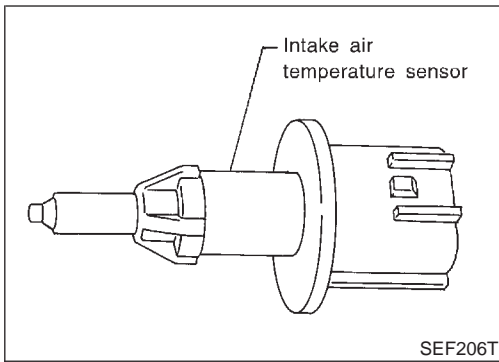
NCEC0670

1	INSPECTION START	
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select "SELF DIAG RESULTS" mode with CONSULT-II. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-163. 5. Is the 1st trip DTC P0105 displayed again? 		
<p> With GST</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select MODE 4 with GST. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-163. 5. Is the 1st trip DTC P0105 displayed again? 		
Yes or No		
Yes	▶	GO TO 2.
No	▶	INSPECTION END

2	REPLACE ECM	
<ol style="list-style-type: none"> 1. Replace ECM. 2. Perform initialization of IVIS (NATS) system and registration of all IVIS (NATS) ignition key IDs. Refer to "IVIS (INFINITI VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-81. 3. Perform "Idle Air Volume Learning", EC-65, Is the result CMPLT or INCMP? 		
CMPLT or INCMP		
CMPLT	▶	INSPECTION END
INCMP	▶	Follow the construction of "Idle Air Volume Learning".

DTC P0110 INTAKE AIR TEMPERATURE SENSOR

Component Description



Component Description

NCEC0066

The intake air temperature sensor is mounted to the air duct housing. 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
20 (68)	3.5	2.1 - 2.9
80 (176)	1.23	0.27 - 0.38

*: These data are reference values and are measured between ECM terminal 64 (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

NCEC0067

DTC No.	Malfunction is detected when ...		Check Items (Possible Cause)
P0110	A)	An excessively low or high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Intake air temperature sensor
	B)	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor.	

DTC Confirmation Procedure

NCEC0068

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip 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.

DTC P0110 INTAKE AIR TEMPERATURE SENSOR

DTC Confirmation Procedure (Cont'd)

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION A

NCEC0068S01

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 "Diagnostic Procedure", EC-168.

With GST

Follow the procedure "With CONSULT-II" above.

5	DATA MONITOR	
	MONITOR	NO DTC
	COOLAN TEMP/S	XXX °C
VHCL SPEED SE		XXX km/h

SEF176Y

PROCEDURE FOR MALFUNCTION B

NCEC0068S02

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 more than 70 km/h (43 MPH) for 105 consecutive seconds.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-168.

With GST

Follow the procedure "With CONSULT-II" above.

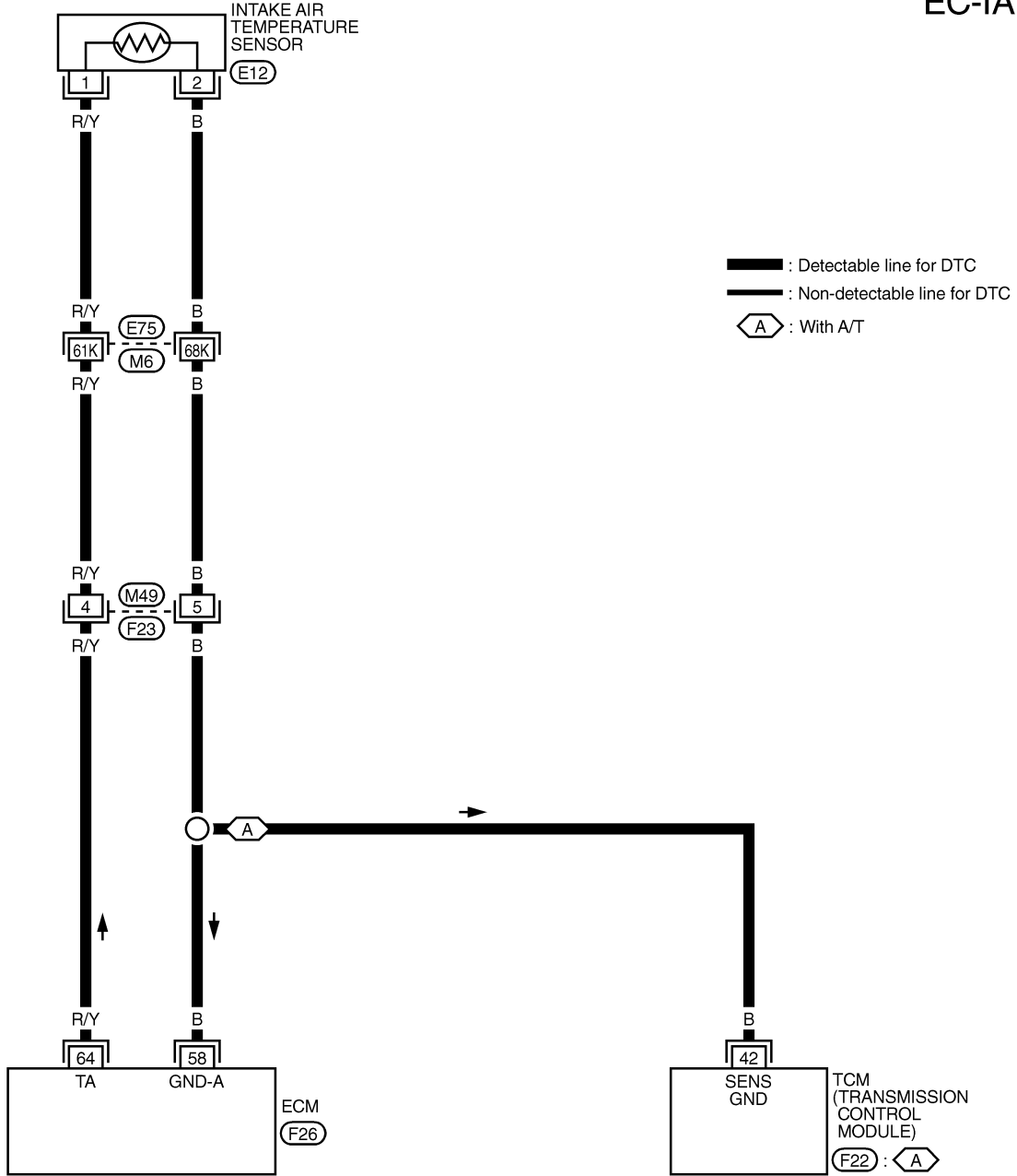
DTC P0110 INTAKE AIR TEMPERATURE SENSOR

Wiring Diagram

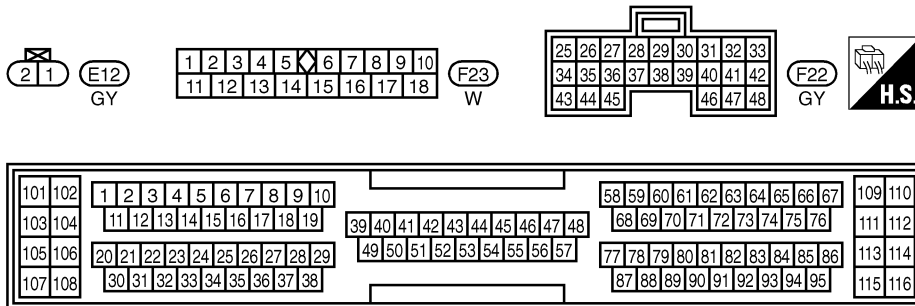
Wiring Diagram

NCEC0069

EC-IATS-01



GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX



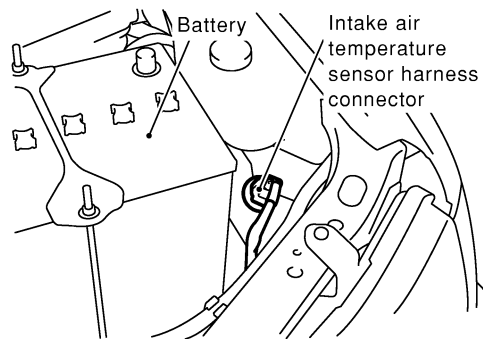
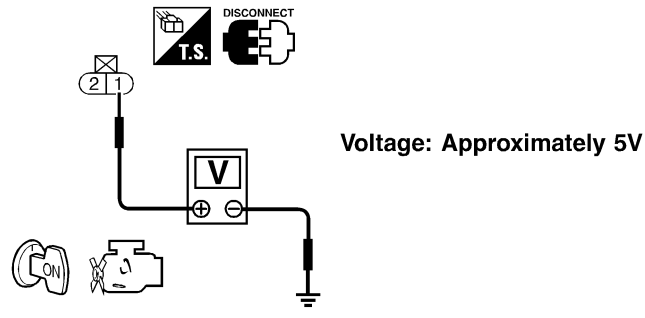
TEC699

DTC P0110 INTAKE AIR TEMPERATURE SENSOR

Diagnostic Procedure

Diagnostic Procedure

NCEC0070

1	CHECK POWER SUPPLY
<p>1. Turn ignition switch "OFF". 2. Disconnect intake air temperature sensor harness connector.</p>  <p style="text-align: right;">SEF842X</p> <p>3. Turn ignition switch "ON". 4. Check voltage between intake air temperature sensor terminal 1 and ground with CONSULT-II or tester.</p>  <p style="text-align: center;">Voltage: Approximately 5V</p> <p style="text-align: center;">OK or NG</p> <p style="text-align: right;">SEF301X</p>	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

2	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E75, M6 ● Harness connectors M49, F23 ● Harness for open or short between ECM and intake air temperature sensor 	
	▶ Repair harness or connectors.

DTC P0110 INTAKE AIR TEMPERATURE SENSOR

Diagnostic Procedure (Cont'd)

3	CHECK GROUND CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between terminal 2 and engine ground.</p> <div style="text-align: center;"> </div> <p style="text-align: right;">SEF204W</p> <p style="text-align: center;">Continuity should exist.</p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

GI

MA

EM

LC

EC

FE

CL

4	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E75, M6 ● Harness connectors M49, F23 ● Harness for open or short between ECM and intake air temperature sensor ● Harness for open or short between intake air temperature sensor and TCM (Transmission control module) 		
▶		Repair open circuit or short to power in harness or connectors.

MT

AT

AX

5	CHECK INTAKE AIR TEMPERATURE SENSOR	
<p>Refer to "Component Inspection", EC-170.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	Replace intake air temperature sensor.

SU

BR

ST

6	CHECK INTERMITTENT INCIDENT	
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p>		
▶		INSPECTION END

RS

BT

HA

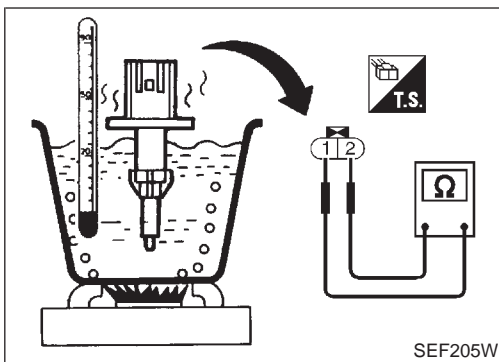
SC

EL

IDX

DTC P0110 INTAKE AIR TEMPERATURE SENSOR

Component Inspection

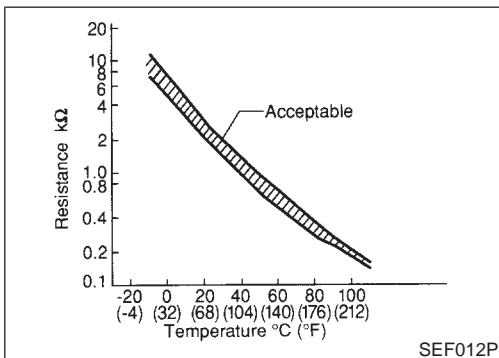


Component Inspection INTAKE AIR TEMPERATURE SENSOR

Check resistance as shown in the figure.

=NCEC0071

NCEC0071S01



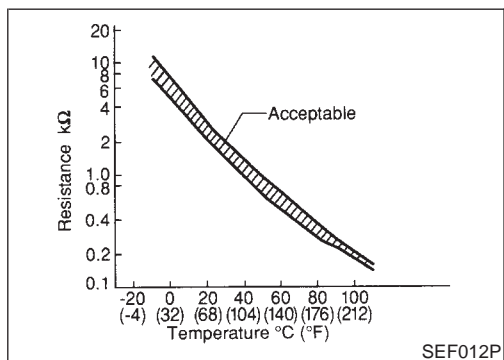
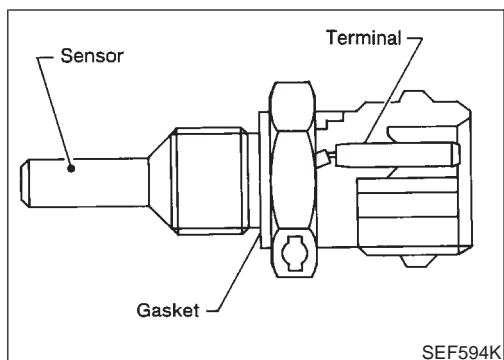
<Reference data>

Intake air temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
80 (176)	0.27 - 0.38

If NG, replace intake air temperature sensor.

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

Component Description



Component Description

NCEC0072

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.

GI
MA
EM
LC

<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

EC
FE
CL

*: These data are reference values and are measured between ECM terminal 70 (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.

MT
AT
AX

CONSULT-II Reference Value in Data Monitor Mode

NCEC0073

MONITOR ITEM	CONDITION	SPECIFICATION
COOLAN TEMP/S	● Engine: After warming up	More than 70°C (158°F)

RS

On Board Diagnosis Logic

NCEC0074

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0115	● An excessively high or low voltage from the sensor is sent to ECM.*	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Engine coolant temperature sensor

BT
HA
SC

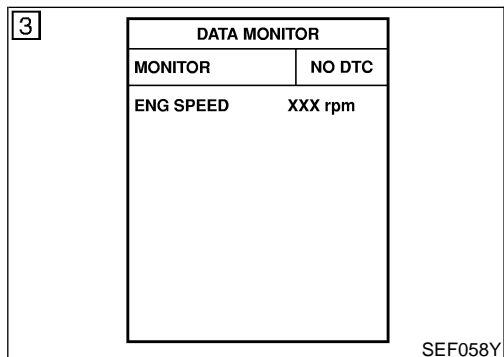
*: When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

EL
IDX

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

On Board Diagnosis Logic (Cont'd)

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

NCEC0075

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 "Diagnostic Procedure", EC-174.

Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

Wiring Diagram

Wiring Diagram

NCEC0076

EC-ECTS-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

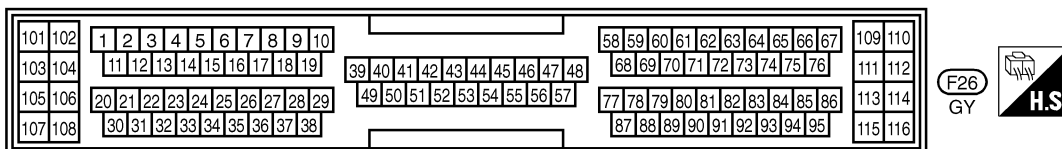
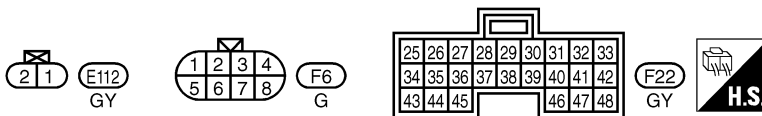
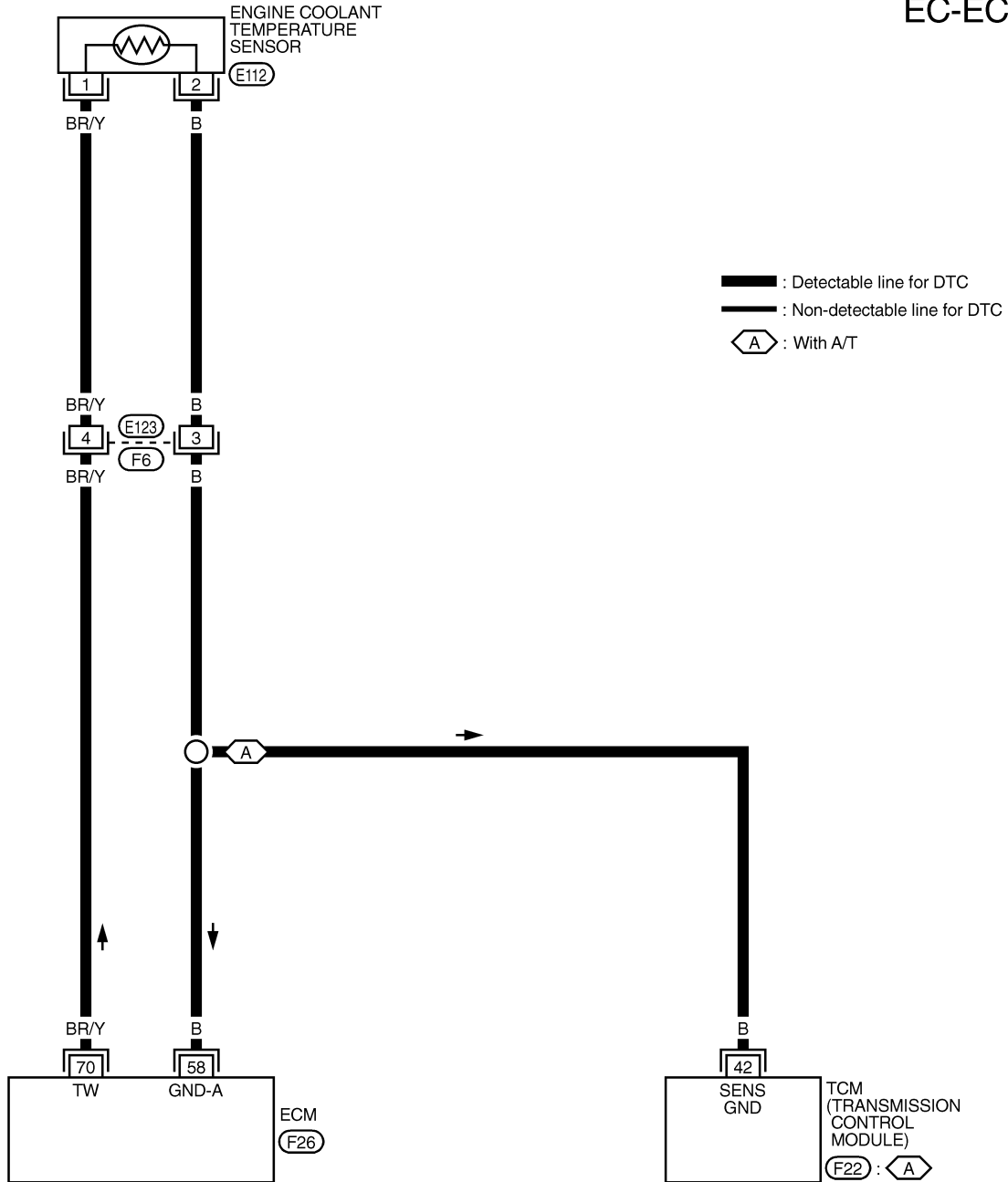
BT

HA

SC

EL

IDX



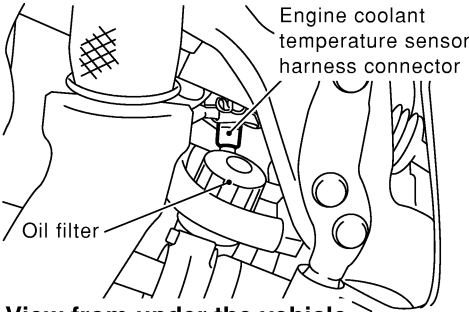
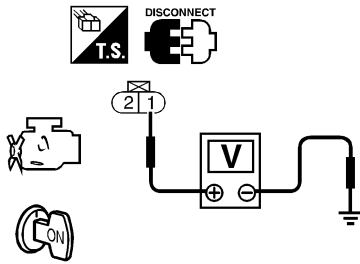
TEC700

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

Diagnostic Procedure

Diagnostic Procedure

NCEC0077

1	CHECK POWER SUPPLY		
<p>1. Turn ignition switch "OFF". 2. Disconnect engine coolant temperature sensor (ECTS) harness connector.</p> <div style="text-align: center;">  <p>Engine coolant temperature sensor harness connector</p> <p>Oil filter</p> <p>View from under the vehicle</p> </div> <p>3. Turn ignition switch "ON". 4. Check voltage between ECTS terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Approximately 5V</p> </div> <p style="text-align: right;">SEF843X</p>			
OK or NG			
OK	▶	GO TO 3.	
NG	▶	GO TO 2.	

2	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E123, F6 ● Harness for open or short between ECM and engine coolant temperature sensor 			
		▶	Repair harness or connectors.

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

Diagnostic Procedure (Cont'd)

3	CHECK GROUND CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between ECTS terminal 2 and engine ground.</p> <div style="text-align: center;"> </div> <p style="text-align: right;">SEF207W</p> <p>Continuity should exist.</p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E123, F6 ● Harness for open or short between ECM and engine coolant temperature sensor ● Harness for open or short between engine coolant temperature sensor and TCM (Transmission control module) 		
▶		Repair open circuit or short to power in harness or connectors.

5	CHECK ENGINE COOLANT TEMPERATURE SENSOR	
<p>Refer to "Component Inspection", EC-176.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	Replace engine coolant temperature sensor.

6	CHECK INTERMITTENT INCIDENT	
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p>		
▶		INSPECTION END

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

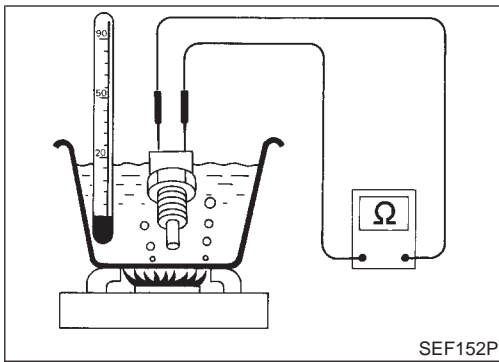
SC

EL

IDX

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

Component Inspection



Component Inspection

ENGINE COOLANT TEMPERATURE SENSOR

NCEC0078

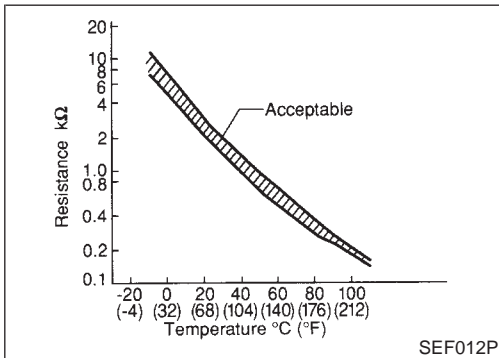
NCEC0078S01

Check resistance as shown in the figure.

<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

If NG, replace engine coolant temperature sensor.



DTC P0120 THROTTLE POSITION SENSOR

Component Description

Component Description

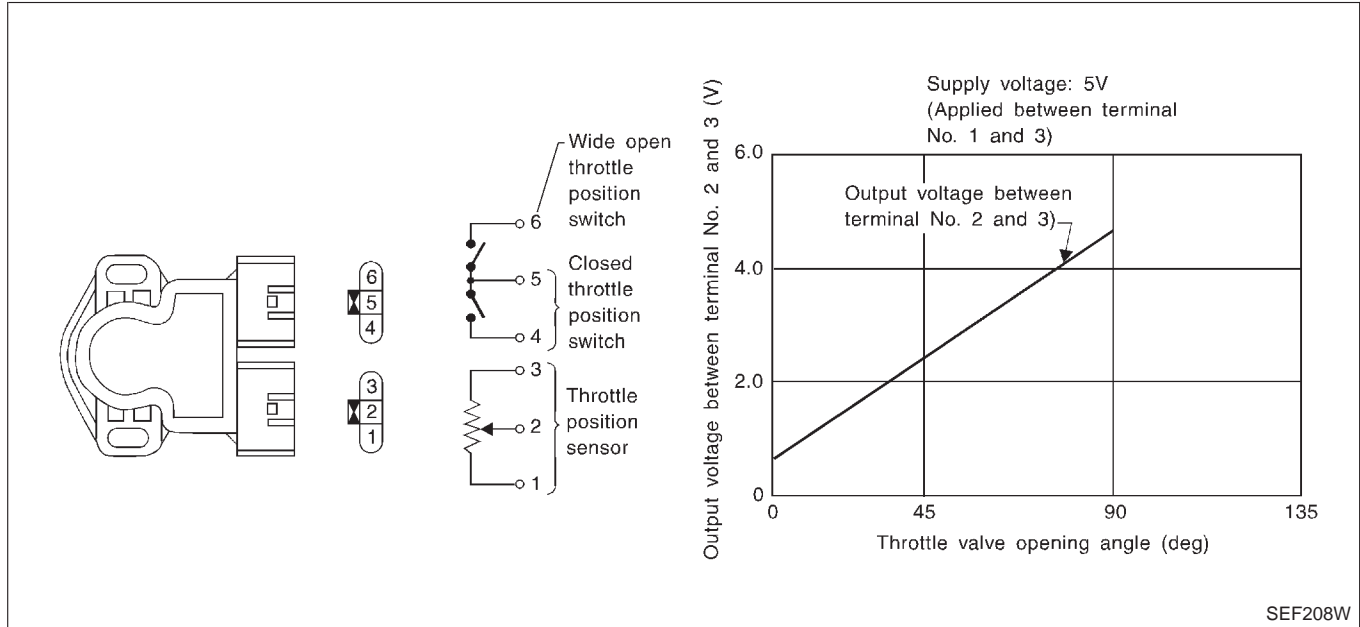
NCEC0079

NOTE:

If DTC P0120 is displayed with DTC P0510, first perform trouble diagnosis for DTC P0510, EC-445.

The throttle position sensor responds to the accelerator pedal movement. This sensor is a kind of potentiometer which transforms the throttle position into output voltage, and emits the voltage signal to the ECM. In addition, the sensor detects the opening and closing speed of the throttle valve and feeds the voltage signal to the ECM.

Idle position of the throttle valve is determined by the ECM receiving the signal from the throttle position sensor. This sensor controls engine operation such as fuel cut. On the other hand, the "Wide open and closed throttle position switch", which is built into the throttle position sensor unit, is not used for engine control.



SEF208W

CONSULT-II Reference Value in Data Monitor Mode

NCEC0080

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL POS SEN	<ul style="list-style-type: none"> Engine: After warming up, idle the engine Throttle valve: fully closed	0.15 - 0.85V
	<ul style="list-style-type: none"> Engine: After warming up Ignition switch: ON (Engine stopped) Throttle valve: fully opened	3.5 - 4.7V
ABSOL TH-P/S	<ul style="list-style-type: none"> Engine: After warming up, idle the engine Throttle valve: fully closed	0.0%
	<ul style="list-style-type: none"> Engine: After warming up Ignition switch: ON (Engine stopped) Throttle valve: fully opened	Approx. 88.0%

DTC P0120 THROTTLE POSITION SENSOR

ECM Terminals and Reference Value

ECM Terminals and Reference Value

=NCEC0081

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	Y	Throttle position sensor	[Ignition switch "ON"] ● Warm-up condition ● Accelerator pedal fully released	0.15 - 0.85V
			[Ignition switch "ON"] ● Accelerator pedal fully depressed	3.5 - 4.7V
111	P/L	Sensors' power supply	[Ignition switch "ON"]	Approximately 5V
58	B	Sensors' ground	[Engine is running] ● Idle speed	Approximately 0V

On Board Diagnosis Logic

NCEC0082

DTC No.	Malfunction is detected when ...		Check Items (Possible Cause)
P0120	A)	An excessively low or high voltage from the sensor is sent to ECM.*	<ul style="list-style-type: none"> ● Harness or connectors (The throttle position sensor circuit is open or shorted.) ● Throttle position sensor
	B)	A high voltage from the sensor is sent to ECM under light load driving condition.	<ul style="list-style-type: none"> ● Harness or connectors (The throttle position sensor circuit is open or shorted.) ● Throttle position sensor ● Fuel injector ● Camshaft position sensor ● Mass air flow sensor
	C)	A low voltage from the sensor is sent to ECM under heavy load driving condition.	<ul style="list-style-type: none"> ● Harness or connectors (The throttle position sensor circuit is open or shorted.) ● Intake air leaks ● Throttle position sensor

*: 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	
Throttle position sensor circuit	Throttle position will be determined based on the injected fuel amount and the engine speed. Therefore, acceleration will be poor.	
	Condition	Driving condition
	When engine is idling	Normal
	When accelerating	Poor acceleration

DTC Confirmation Procedure

NCEC0083

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

NCEC0083S01

CAUTION:

Always drive vehicle at a safe speed.

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 10V at idle.
- 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.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
VHCL SPEED SE	XXX km/h
P/N POSI SW	OFF

SEF065Y

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and maintain the following conditions for at least 5 consecutive seconds.

VHCL SPEED SE	More than 4 km/h (2 MPH)
Selector lever	Suitable position except "P" or "N" position

- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-184.

With GST

Follow the procedure "With CONSULT-II" above.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION B

NCEC0083S02

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 10 seconds. If idle speed is over 1,000 rpm, maintain the following conditions for at least 10 seconds to keep engine speed below 1,000 rpm.

DTC P0120 THROTTLE POSITION SENSOR

DTC Confirmation Procedure (Cont'd)

A/T model	Selector lever	Suitable position except "P" or "N" position
	Brake pedal	Depressed
	Vehicle speed	0 km/h (0 MPH)
M/T model	Selector lever	Suitable position except "N" (Higher gear position such as 3rd or 4th is better to keep low engine rpm.)
	Accelerator pedal	Released
	Vehicle speed	As slow as possible

- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-184.



With GST

Follow the procedure "With CONSULT-II" above.

DATA MONITOR	
MONITOR	NO DTC
THRTL POS SEN	XXX V
ABSOL TH-P/S	XXX %

SEF177Y

PROCEDURE FOR MALFUNCTION C

NCEC0083S03

CAUTION:

Always drive vehicle at a safe speed.

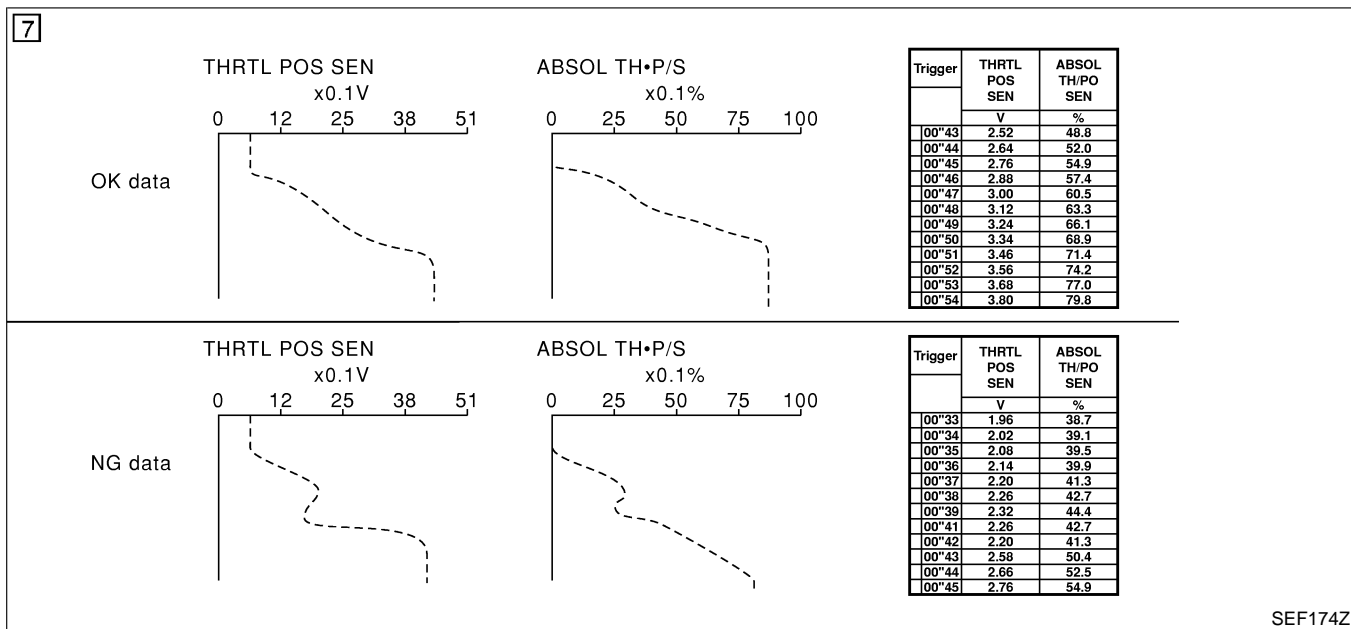


With CONSULT-II

- 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 "MANU TRIG" in "DATA MONITOR" mode with CONSULT-II.
 - 5) Select "THRTL POS SEN" and "ABSOL TH-P/S" in "DATA MONITOR" mode with CONSULT-II.
 - 6) Press RECORD on CONSULT-II SCREEN at the same time accelerator pedal is depressed.
 - 7) Print out the recorded graph and check the following:
 - The voltage rise is linear in response to accelerator pedal depression.
 - The voltage when accelerator pedal is fully depressed is approximately 4V.
- If NG, go to "Diagnostic Procedure", EC-184.
If OK, go to following step.

DTC P0120 THROTTLE POSITION SENSOR

DTC Confirmation Procedure (Cont'd)



9

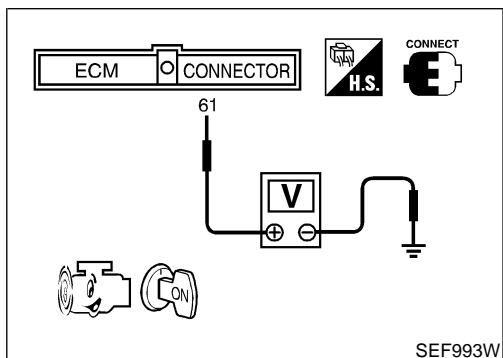
DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C

SEF178Y

- 8) Select "AUTO TRIG" in "DATA MONITOR" mode with CONSULT-II.
- 9) Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	More than 2,000 rpm
MAS A/F SE-B1	More than 3V
COOLAN TEMP/S	More than 70°C (158°F)
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

- 10) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-184.



With GST

- 1) Maintain the following conditions for at least 10 consecutive seconds.

Gear position	Suitable position
Engine speed	More than 2,000 rpm
Engine coolant temperature	More than 70°C (158°F)
Voltage between ECM terminal 61 (Mass air flow sensor signal) and ground	More than 3V

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P0120 THROTTLE POSITION SENSOR

DTC Confirmation Procedure (Cont'd)

- 2) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-184.

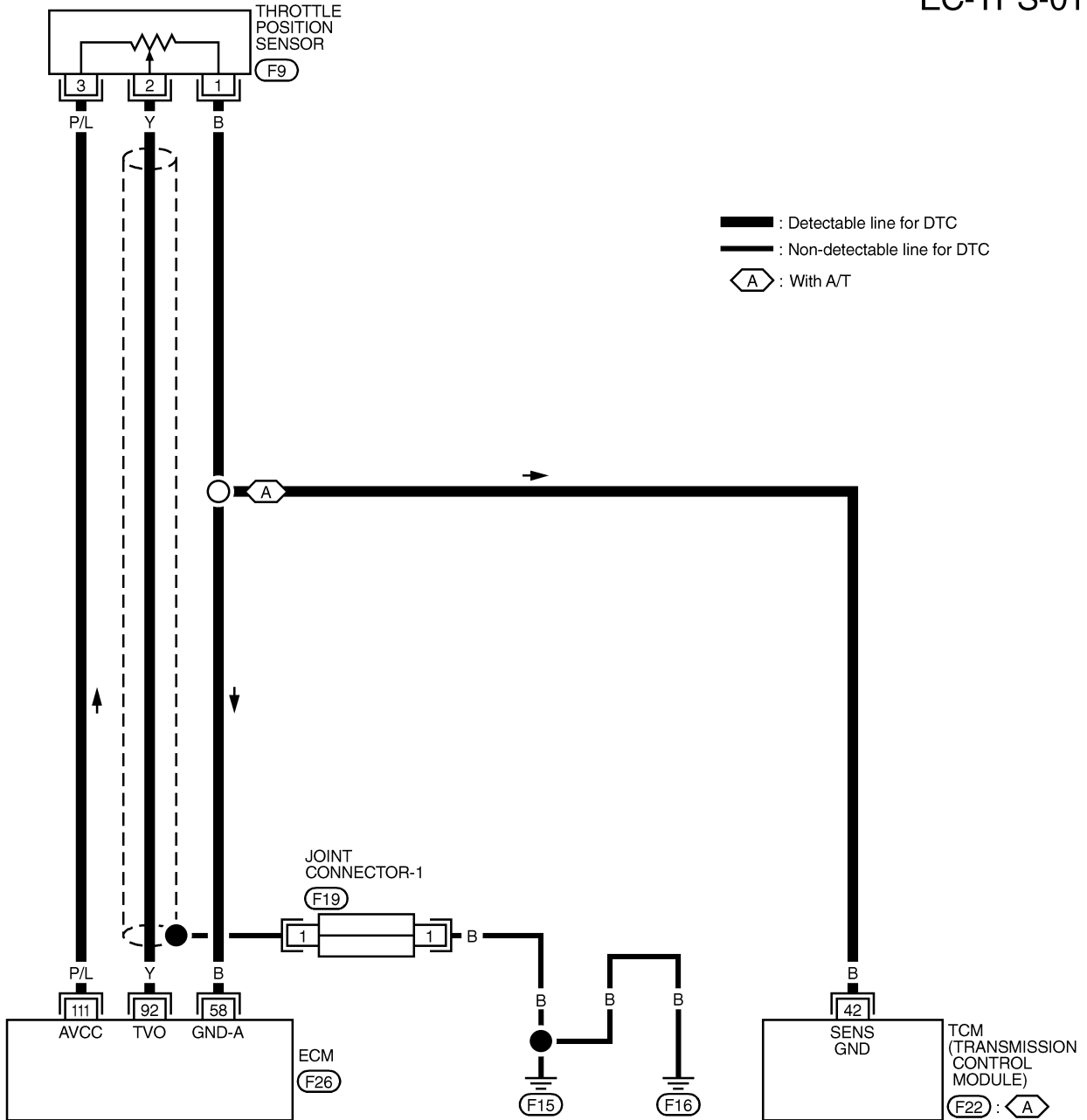
DTC P0120 THROTTLE POSITION SENSOR

Wiring Diagram

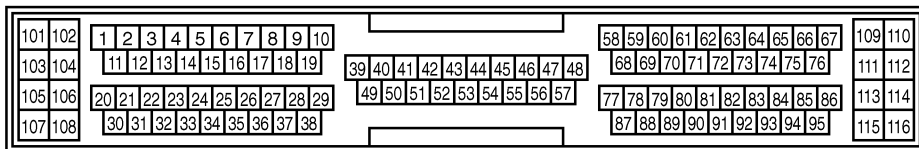
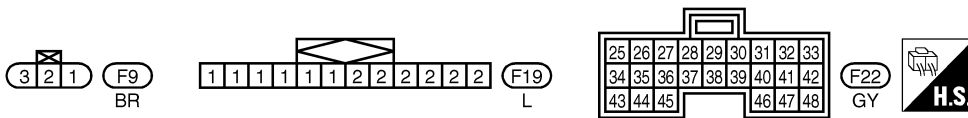
Wiring Diagram

NCEC0084

EC-TPS-01



- GI
- MA
- EM
- LC
- EC**
- FE
- CL
- MT
- AT
- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX



TEC701

DTC P0120 THROTTLE POSITION SENSOR

Diagnostic Procedure

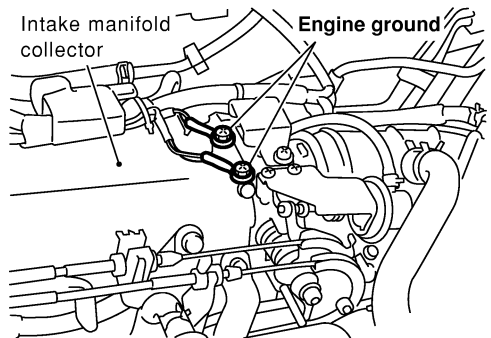
Diagnostic Procedure

NCEC0085

1	INSPECTION START								
Which malfunction A, B or C is duplicated?									
<table border="1"><thead><tr><th>MALFUNCTION</th><th>Type</th></tr></thead><tbody><tr><td>A</td><td>A</td></tr><tr><td>B</td><td>B</td></tr><tr><td>C</td><td>C</td></tr></tbody></table>		MALFUNCTION	Type	A	A	B	B	C	C
MALFUNCTION	Type								
A	A								
B	B								
C	C								
MTBL0066									
Type A, B or C									
Type A or B	▶ GO TO 4.								
Type C	▶ GO TO 2.								

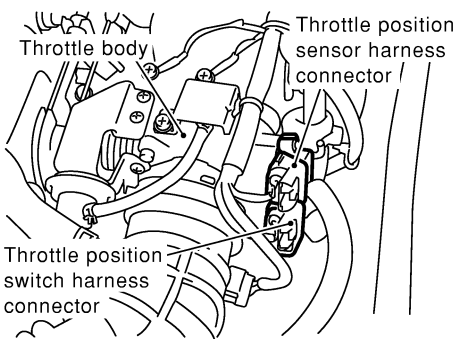
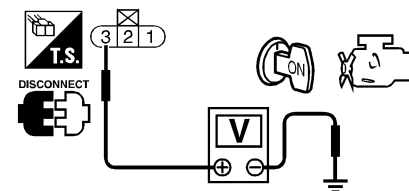
2	ADJUST THROTTLE POSITION SENSOR
Perform "Basic Inspection", EC-107.	
OK or NG	
OK	▶ GO TO 3.

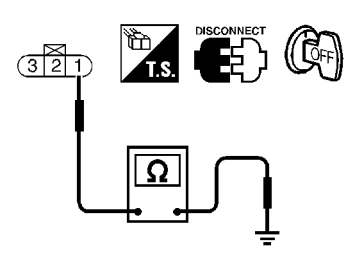
3	CHECK INTAKE SYSTEM
Check the followings for connection.	
<ul style="list-style-type: none">● Air duct● Vacuum hoses● Intake air passage between air duct to intake manifold collector	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Reconnect the parts.

4	RETIGHTEN GROUND SCREWS
1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.	
 <p>The diagram shows a cross-section of an engine compartment. Two screws are highlighted with circles and labeled: 'Intake manifold collector' and 'Engine ground'. The 'Intake manifold collector' screw is located on the left side of the intake manifold, and the 'Engine ground' screw is located on the right side of the engine block.</p>	
SEF839X	
	▶ GO TO 5.

DTC P0120 THROTTLE POSITION SENSOR

Diagnostic Procedure (Cont'd)

5	CHECK POWER SUPPLY		
		<p>1. Disconnect throttle position sensor harness connector.</p>  <p style="text-align: right;">Throttle position sensor harness connector</p> <p style="text-align: left;">Throttle position switch harness connector</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p>
		<p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between throttle position sensor terminal 3 and ground with CONSULT-II or tester.</p>	<p>SEF837X</p> <p>EC</p>
		 <p style="text-align: right;">Voltage: Approximately 5V</p>	<p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p>
		OK or NG	<p>SEF306X</p> <p>AX</p>
OK	▶	GO TO 6.	
NG	▶	Repair harness or connectors.	

6	CHECK GROUND CIRCUIT		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between throttle position sensor terminal 1 and engine ground.</p> 	<p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p>
		<p style="color: blue;">Continuity should exist.</p> <p>3. Also check harness for short to power.</p>	<p>HA</p> <p>SC</p>
		OK or NG	<p>SEF210W</p> <p>EL</p>
OK	▶	GO TO 8.	
NG	▶	GO TO 7.	

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0120 THROTTLE POSITION SENSOR

Diagnostic Procedure (Cont'd)

7	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness for open or short between ECM and throttle position sensor● Harness for open or short between throttle position sensor and TCM (Transmission control module)	
	▶ Repair open circuit or short to power in harness or connectors.

8	CHECK INPUT SIGNAL CIRCUIT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 92 and throttle 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	▶ GO TO 9.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

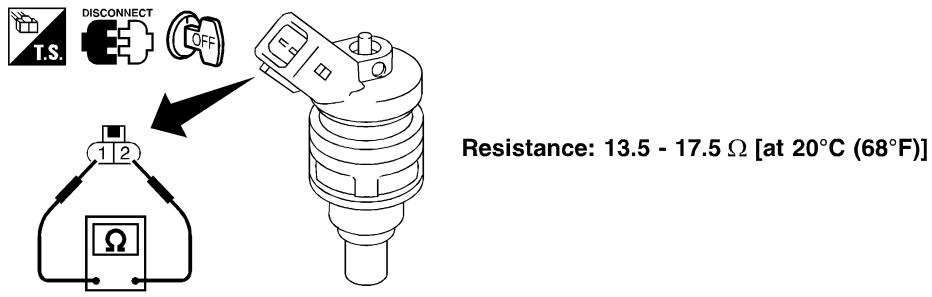
9	CHECK THROTTLE POSITION SENSOR
Refer to "Component Inspection", EC-188.	
OK or NG	
OK (Type B in step1)	▶ GO TO 10.
OK (Type A or C in step1)	▶ GO TO 13.
NG	▶ Replace throttle position sensor. To adjust it, perform "Basic Inspection", EC-107.

10	CHECK MASS AIR FLOW SENSOR
Refer to "Component Inspection", EC-162.	
OK or NG	
OK	▶ GO TO 11.
NG	▶ Replace mass air flow sensor.

11	CHECK CAMSHAFT POSITION SENSOR
Refer to "Component Inspection", EC-346.	
OK or NG	
OK	▶ GO TO 12.
NG	▶ Replace camshaft position sensor.

DTC P0120 THROTTLE POSITION SENSOR

Diagnostic Procedure (Cont'd)

12	CHECK FUEL INJECTOR	
<p>1. Disconnect injector harness connector. 2. Check resistance between terminals as shown in the figure.</p>		
		
SEF964XA		
OK or NG		
OK	▶	GO TO 13.
NG	▶	Replace fuel injector.

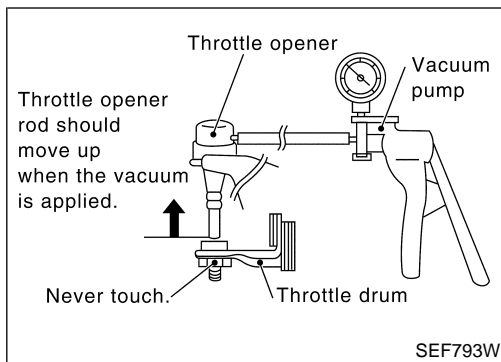
13	CHECK SHIELD CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect joint connector-1. 3. Check the following.</p> <ul style="list-style-type: none"> ● Continuity between joint connector-1 terminal 1 and ground Refer to Wiring Diagram. ● Joint connector-1 (Refer to EL-274, "HARNESS LAYOUT".) Continuity should exist. <p>4. Also check harness for short to power. 5. Then reconnect joint connector.</p>		
OK or NG		
OK	▶	GO TO 14.
NG	▶	Repair open circuit or short to power in harness or connectors.

14	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.		
▶		INSPECTION END

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P0120 THROTTLE POSITION SENSOR

Component Inspection



DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
THRTL POS SEN	XXX V

SEF179Y

Component Inspection THROTTLE POSITION SENSOR

NCEC0086

NCEC0086S01

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine (ignition switch OFF).
- 3) Remove the vacuum hose connected to the throttle opener.
- 4) Connect suitable vacuum hose to the vacuum pump and the opener.
- 5) Apply vacuum [more than -40.0 kPa (-300 mmHg, 11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.
- 6) Turn ignition switch ON.
- 7) Select "DATA MONITOR" mode with CONSULT-II.
- 8) Check voltage of "THRTL POS SEN" under the following conditions.

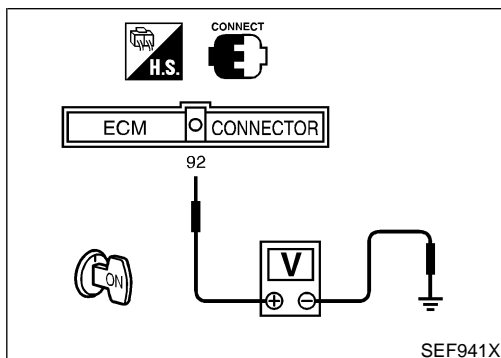
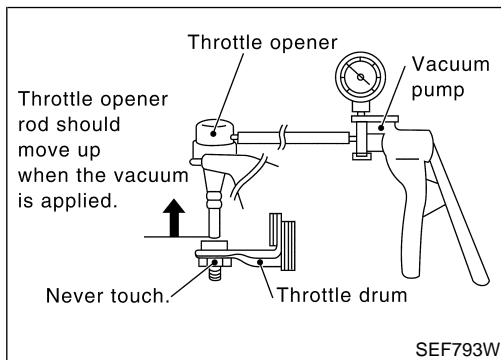
NOTE:

Voltage measurement must be made with throttle position sensor installed in vehicle.

Throttle valve conditions	Voltage V
Completely closed	0.15 - 0.85 (a)
Partially open	Between (a) and (b)
Completely open	3.5 - 4.7 (b)

If NG, adjust closed throttle position switch. Refer to "Basic Inspection", EC-179.

- 9) If it is impossible to adjust closed throttle position switch in "Basic Inspection", replace throttle position sensor.



Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine (ignition switch OFF).
- 3) Remove the vacuum hose connected to the throttle opener.
- 4) Connect suitable vacuum hose to the vacuum pump and the opener.
- 5) Apply vacuum [more than -40.0 kPa (-300 mmHg, 11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.
- 6) Turn ignition switch ON.
- 7) Check voltage between ECM terminal 92 (Throttle position sensor signal) and ground under the following conditions.

NOTE:

Voltage measurement must be made with throttle position sensor installed in vehicle.

Throttle valve conditions	Voltage V
Completely closed	0.15 - 0.85 (a)
Partially open	Between (a) and (b)
Completely open	3.5 - 4.7 (b)

DTC P0120 THROTTLE POSITION SENSOR

Component Inspection (Cont'd)

If NG, adjust closed throttle position switch. Refer to "Basic Inspection", EC-179.

- 8) If it is impossible to adjust closed throttle position switch in "Basic Inspection", replace throttle position sensor.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

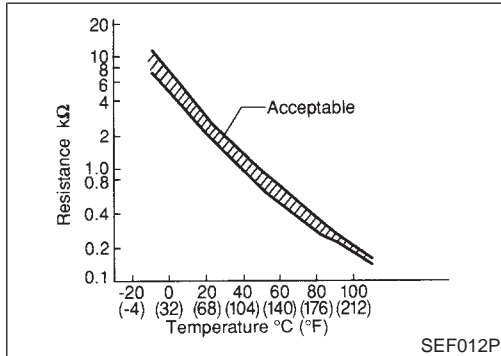
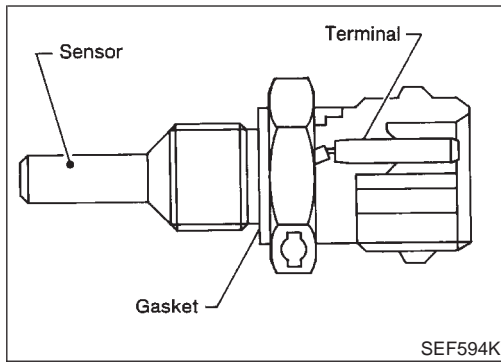
SC

EL

IDX

DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

Component Description



Component Description

NCEC0087

NOTE:

If DTC P0125 is displayed with P0115, first perform trouble diagnosis for DTC P0115, EC-171.

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 70 (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.

CONSULT-II Reference Value in Data Monitor Mode

NCEC0088

MONITOR ITEM	CONDITION	SPECIFICATION
COOLAN TEMP/S	● Engine: After warming up	More than 70°C (158°F)

On Board Diagnosis Logic

NCEC0089

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0125	<ul style="list-style-type: none"> ● Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine. ● Engine coolant temperature is insufficient for closed loop fuel control. 	<ul style="list-style-type: none"> ● Harness or connectors (High resistance in the circuit) ● Engine coolant temperature sensor ● Thermostat

DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

DTC Confirmation Procedure

=NCEC0090

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

SEF174Y

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 1st trip DTC is detected, go to "Diagnostic Procedure", EC-193.

Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

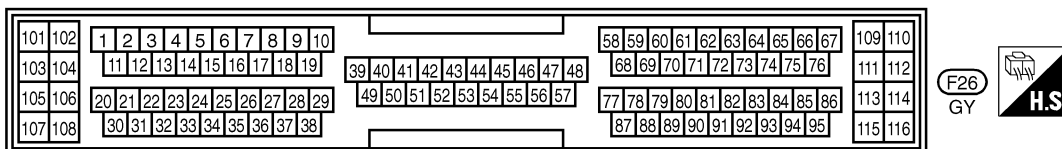
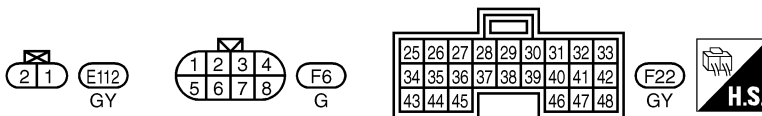
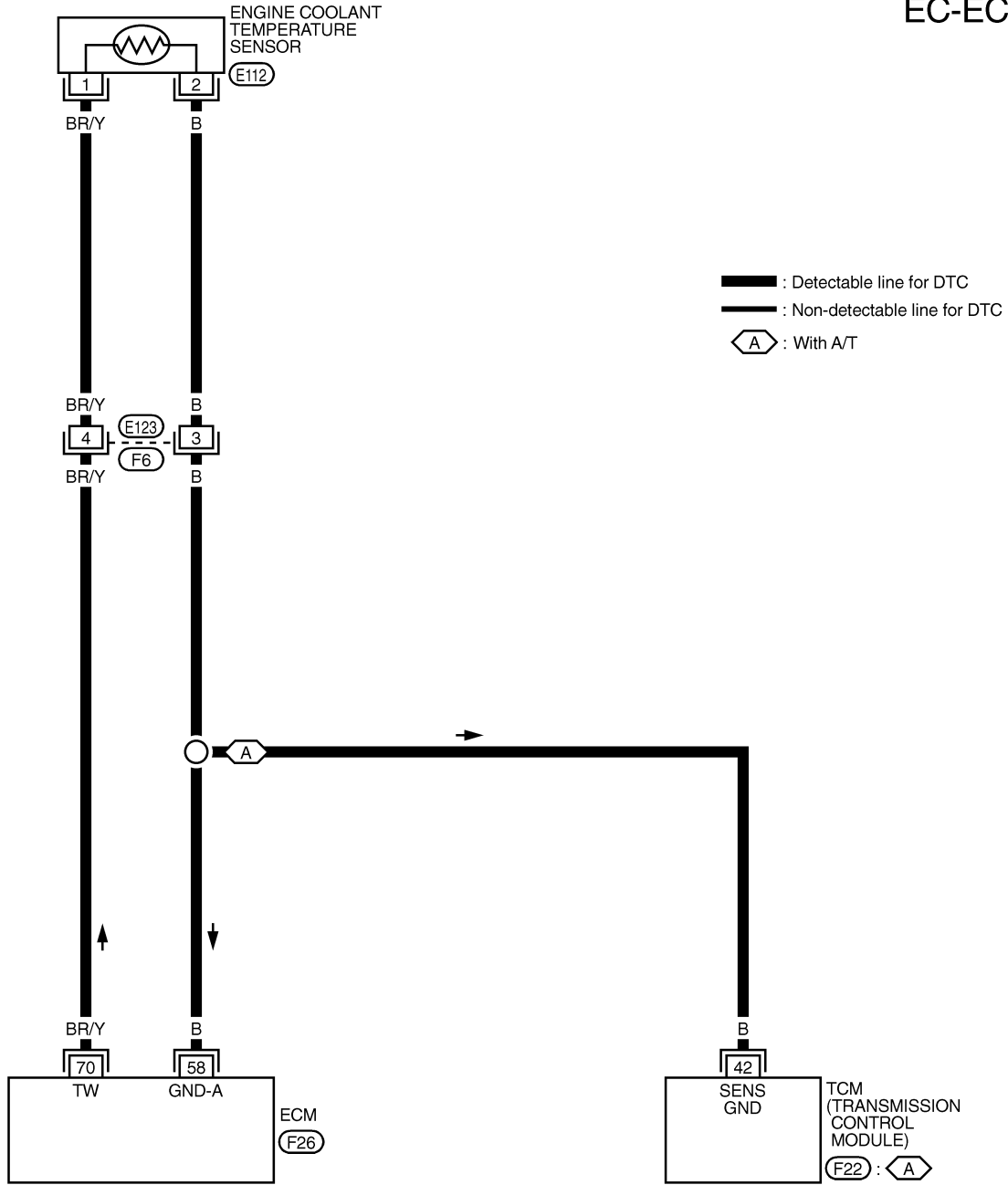
DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

Wiring Diagram

Wiring Diagram

NCEC0091

EC-ECTS-01



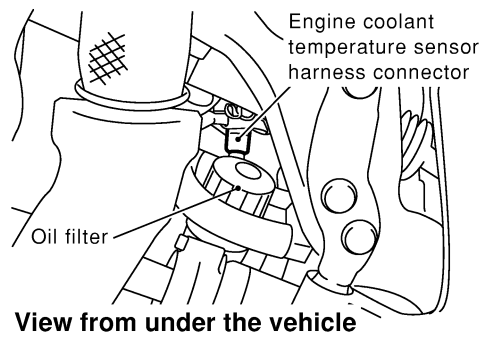
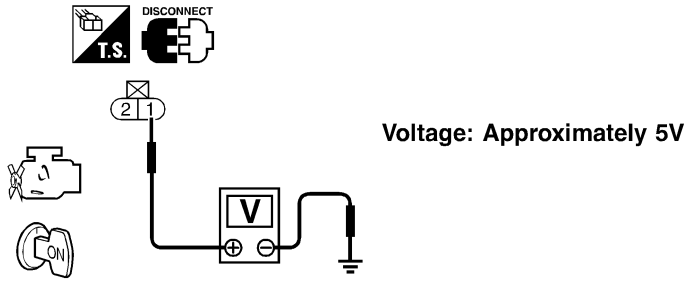
TEC700

DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

Diagnostic Procedure

Diagnostic Procedure

NCEC0092

1	CHECK POWER SUPPLY		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect engine coolant temperature sensor harness connector.</p> <div style="text-align: center;">  <p>View from under the vehicle</p> </div> <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between ECTS terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Approximately 5V</p> </div> <p style="text-align: center;">OK or NG</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>BR</p>
			<p>SEF843X</p> <p>SEF303X</p>
	OK	▶ GO TO 3.	
	NG	▶ GO TO 2.	

2	DETECT MALFUNCTIONING PART		
		<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E123, F6 ● Harness for open or short between ECM and engine coolant temperature sensor 	
		▶ Repair harness or connectors.	

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

Diagnostic Procedure (Cont'd)

3	CHECK GROUND CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between ECTS terminal 2 and engine ground.</p>		
<p>Continuity should exist.</p>		
<p>3. Also check harness for short to power.</p>		
<p>OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

SEF207W

4	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E123, F6 ● Harness for open or short between ECM and engine coolant temperature sensor ● Harness for open or short between engine coolant temperature sensor and TCM (Transmission control module) 		
▶		Repair open circuit or short to power in harness or connectors.

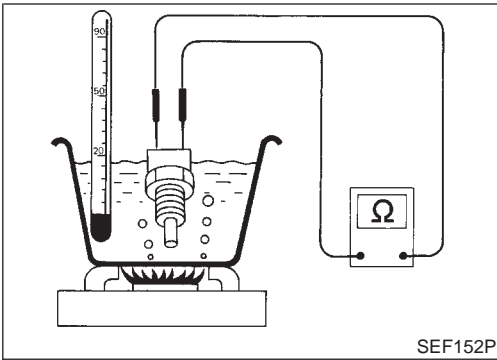
5	CHECK ENGINE COOLANT TEMPERATURE SENSOR	
<p>Refer to "Component Inspection", EC-195.</p>		
<p>OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	Replace engine coolant temperature sensor.

6	CHECK THERMOSTAT OPERATION	
<p>When the engine is cooled [lower than 82°C (180°F)], condition grasp lower radiator hose and confirm the engine coolant does not flow.</p>		
<p>OK or NG</p>		
OK	▶	GO TO 7.
NG	▶	Repair or replace thermostat. Refer to LC-12, "Thermostat".

7	CHECK INTERMITTENT INCIDENT	
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p>		
▶		INSPECTION END

DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

Component Inspection



Component Inspection

ENGINE COOLANT TEMPERATURE SENSOR

NCEC0093

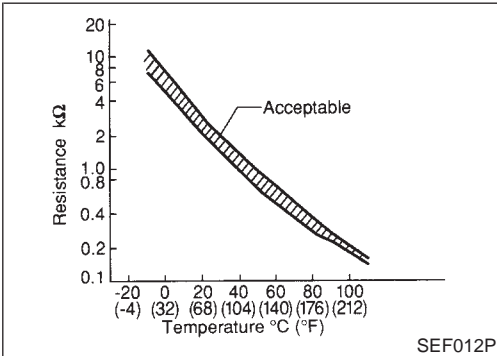
NCEC0093S01

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

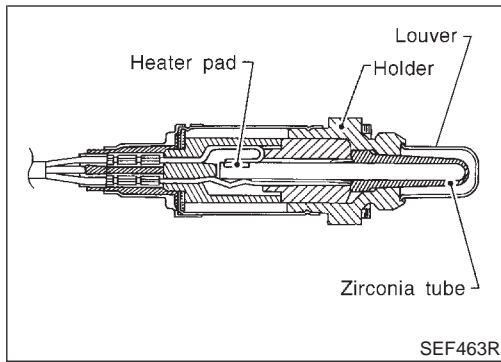
If NG, replace engine coolant temperature sensor.



- GI
- MA
- EM
- LC
- EC**
- FE
- CL
- MT
- AT
- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX

DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)

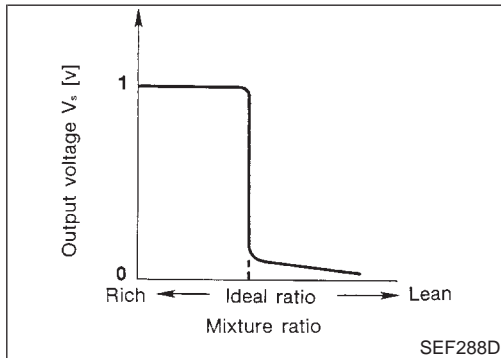
Component Description



Component Description

NCEC0094

The heated oxygen sensor 1 (front) 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 (front) 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 (front) 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

NCEC0095

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)			0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	<ul style="list-style-type: none"> Engine: After warming up 	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

ECM Terminals and Reference Value

NCEC0096

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

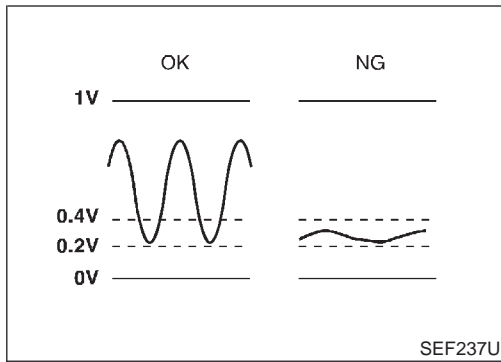
CAUTION:

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	W	Heated oxygen sensor 1 (front)	<p>[Engine is running]</p> <ul style="list-style-type: none"> After warming up to normal operating temperature and engine speed is 2,000 rpm 	<p>0 - Approximately 1.0V</p> <p>SEF059V</p>

DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)

On Board Diagnosis Logic



On Board Diagnosis Logic

Under the condition in which the heated oxygen sensor 1 (front) 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.

NCEC0097

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0130	<ul style="list-style-type: none"> The voltage from the sensor is constantly approx. 0.3V. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 1 (front)

5	HO2S1 (B1) P0130	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	THRTL POS SEN	XXX V

SEF643Y

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

- Start engine and warm it up to normal operating temperature.
- Select "HO2S1 (B1) P0130" of "HO2S1" in "DTC WORK SUPPORT" mode with CONSULT-II.
- Touch "START".
- Let it idle for at least 3.5 minutes.

NOTE:

Never raise engine speed above 3,200 rpm after this step. If the engine speed limit is exceeded, return to step 4.

- 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	1,500 - 3,200 rpm
Vehicle speed	More than 65 km/h (40 MPH)
B/FUEL SCHDL	2.4 - 11.0 msec
Selector lever	Suitable position

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- Make sure that "OK" is displayed after touching "SELF-DIAG

5	HO2S1 (B1) P0130	
	TESTING	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	THRTL POS SEN	XXX V

SEF644Y

5	HO2S1 (B1) P0130	
	COMPLETED	

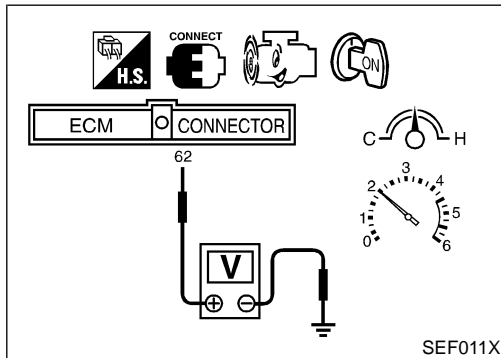
SEF645Y

DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)

DTC Confirmation Procedure (Cont'd)

RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-200.

During this test, P1148 may be displayed on CONSULT-II screen.



Overall Function Check

Use this procedure to check the overall function of the heated oxygen sensor 1 (front) circuit. During this check, a 1st trip DTC might not be confirmed. NCEC0099

With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
- 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 - 0.4V.
- 4) If NG, go to "Diagnostic Procedure", EC-200.

DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)

Wiring Diagram

Wiring Diagram

NCEC0100

EC-HO2S1-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

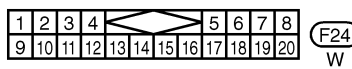
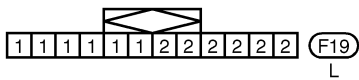
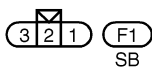
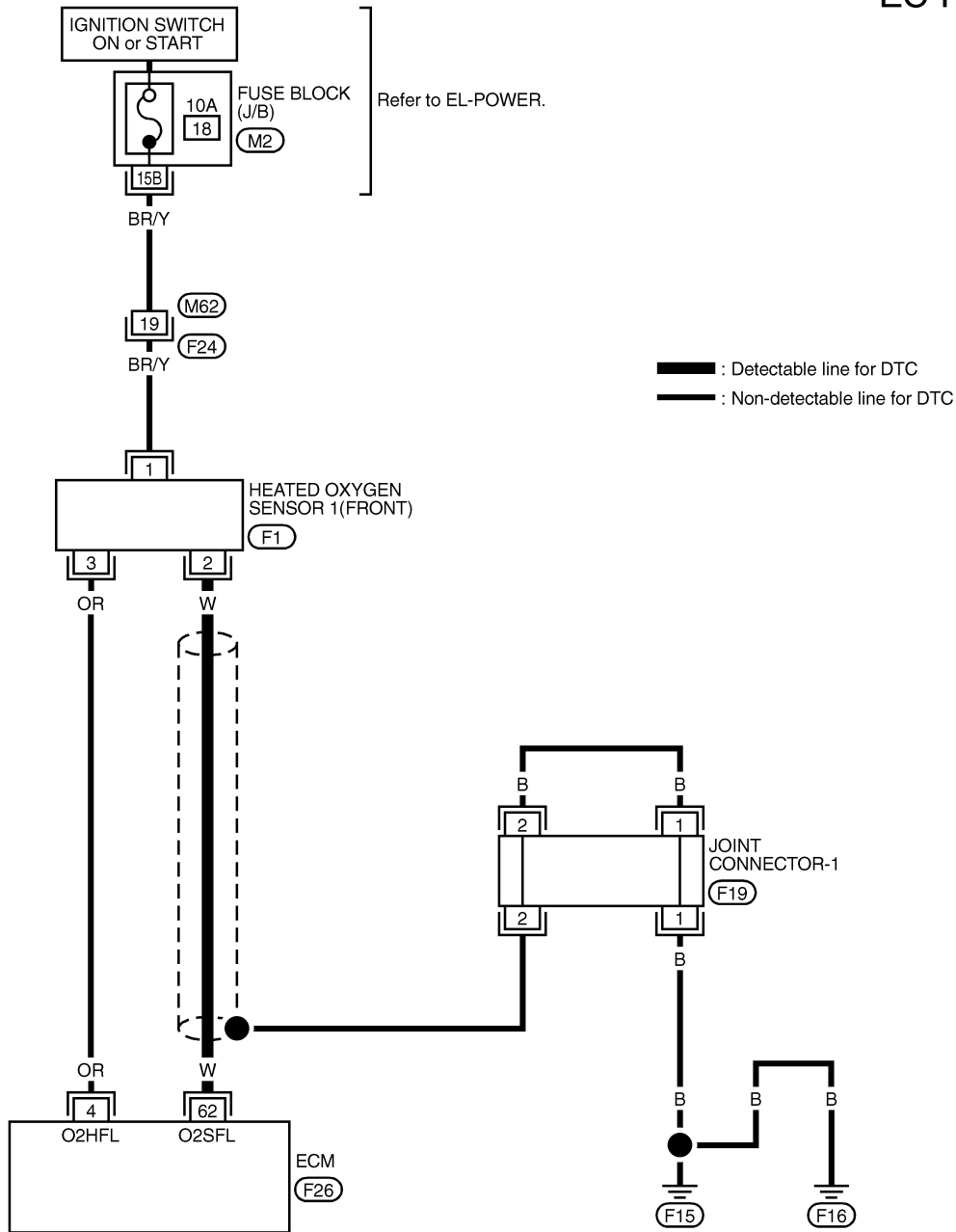
BT

HA

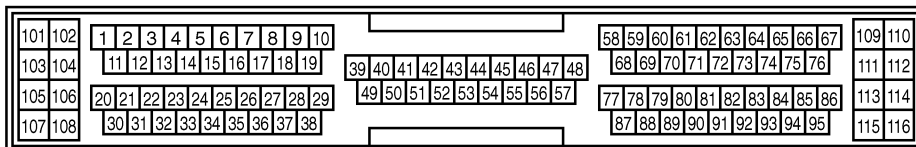
SC

EL

IDX



REFER TO THE FOLLOWING.
 M2 - FUSE BLOCK-JUNCTION BOX (J/B)



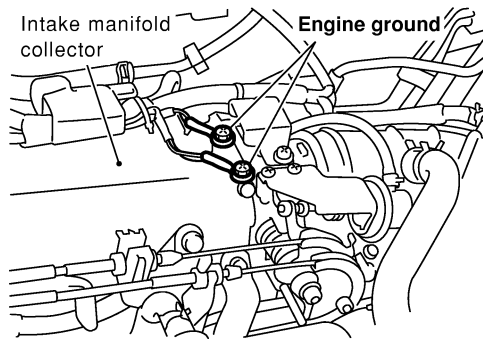
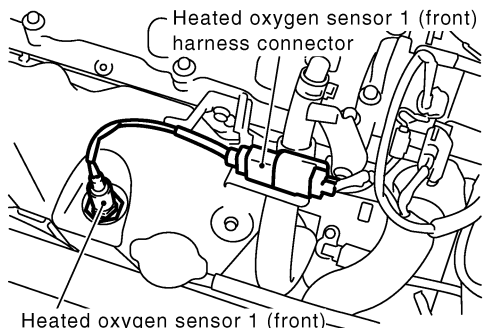
TEC837

DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)

Diagnostic Procedure

Diagnostic Procedure

NCEC0101

1	INSPECTION START
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: right;"> <p>Intake manifold collector</p> <p>Engine ground</p> </div> </div> <p style="text-align: right;">SEF839X</p> <p>3. Disconnect heated oxygen sensor 1 (front) harness connector.</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: right;"> <p>Heated oxygen sensor 1 (front) harness connector</p> <p>Heated oxygen sensor 1 (front)</p> </div> </div> <p style="text-align: right;">SEF917Z</p>	
<p>▶ GO TO 2.</p>	

2	CHECK INPUT SIGNAL CIRCUIT
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 62 and HO2S1 terminal 2. Refer to Wiring Diagram. Continuity should exist. 3. Check harness continuity between ECM terminal 62 (or HO2S1 terminal 2) and ground. Refer to Wiring Diagram. Continuity should not exist. 4. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK HEATED OXYGEN SENSOR 1 (FRONT)
<p>Refer to "Component Inspection", EC-202.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 4.
NG	▶ Replace heated oxygen sensor 1 (front).

DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)

Diagnostic Procedure (Cont'd)

4	CHECK SHIELD CIRCUIT
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect joint connector-1.</p> <p>3. Check the following.</p> <ul style="list-style-type: none">● Continuity between joint connector-1 terminal 2 and ground● Joint connector-1 (Refer to EL-274, "HARNES LAYOUT".) Continuity should exist. <p>4. Also check harness for short to power.</p> <p>5. Then reconnect joint connector.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 5.
NG	▶ Repair open circuit or short to power in harness or connectors.

5	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)

Component Inspection

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

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

Component Inspection HEATED OXYGEN SENSOR 1 (FRONT)

=NCEC0102

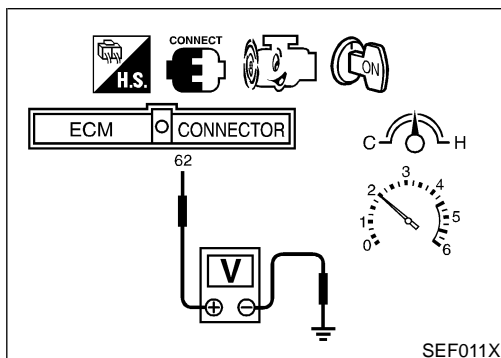
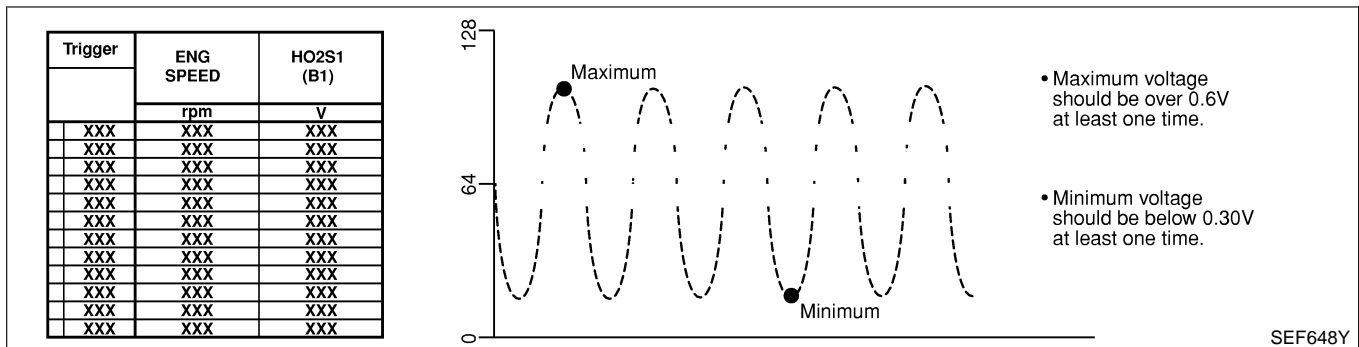
NCEC0102S01

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) 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 below:
 R = "HO2S1 MNTR (B1)", "RICH"
 L = "HO2S1 MNTR (B1)", "LEAN"
 - "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 62 [Heated oxygen sensor 1 (front) 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 five times within 10 seconds.
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 → 0 - 0.3V

DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)

Component Inspection (Cont'd)

- 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.

GI

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.

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

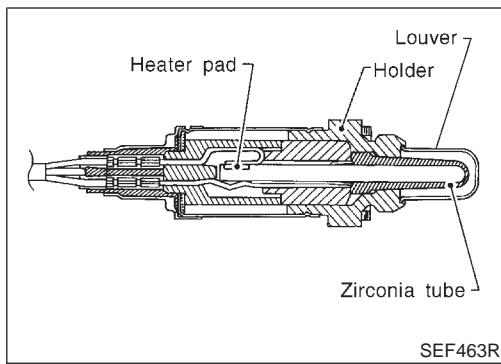
SC

EL

IDX

DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

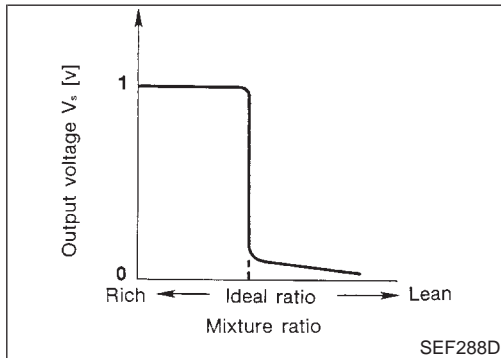
Component Description



Component Description

NCEC0103

The heated oxygen sensor 1 (front) 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 (front) 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 (front) 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

NCEC0104

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)			0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	<ul style="list-style-type: none"> Engine: After warming up 	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

ECM Terminals and Reference Value

NCEC0105

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

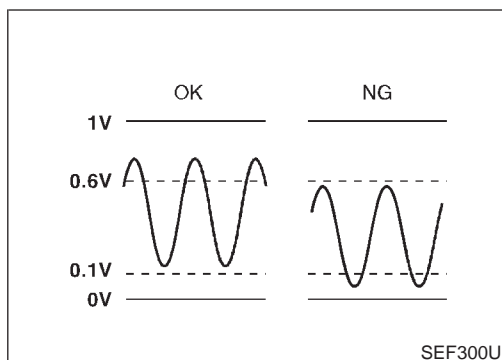
CAUTION:

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	W	Heated oxygen sensor 1 (front)	<p>[Engine is running]</p> <ul style="list-style-type: none"> After warming up to normal operating temperature and engine speed is 2,000 rpm 	<p>0 - Approximately 1.0V</p> <p>SEF059V</p>

DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

On Board Diagnosis Logic



On Board Diagnosis Logic

NCEC0106

To judge the malfunction, the output from the heated oxygen sensor 1 (front) 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.	Malfunction is detected when ...	Check Items (Possible Cause)
P0131	<ul style="list-style-type: none"> The maximum and minimum voltages from the sensor are not reached to the specified voltages. 	<ul style="list-style-type: none"> Heated oxygen sensor 1 (front) Heated oxygen sensor 1 heater (front) Fuel pressure Injectors Intake air leaks

6	HO2S1 (B1) P0131	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	THRTL POS SEN	XXX V

SEF649Y

6	HO2S1 (B1) P0131	
	TESTING	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	THRTL POS SEN	XXX V

SEF650Y

6	HO2S1 (B1) P0131	
	COMPLETED	

SEF651Y

DTC Confirmation Procedure

NCEC0107

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

- Start engine and warm it up to normal operating temperature.
- Stop engine and wait at least 10 seconds.
- Turn ignition switch “ON” and select “HO2S1 (B1) P0131” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
- Touch “START”.
- Start engine and let it idle for at least 3.5 minutes.

NOTE:

Never raise engine speed above 3,200 rpm after this step. If the engine speed limit is exceeded, return to step 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 50 seconds or more.)

ENG SPEED	1,900 - 3,100 rpm (A/T) 2,000 - 3,100 rpm (M/T)
Vehicle speed	Less than 120 km/h (75 MPH)
B/FUEL SCHDL	4.0 - 12.0 msec (A/T) 3.5 - 12.0 msec (M/T)
Selector lever	Suitable position

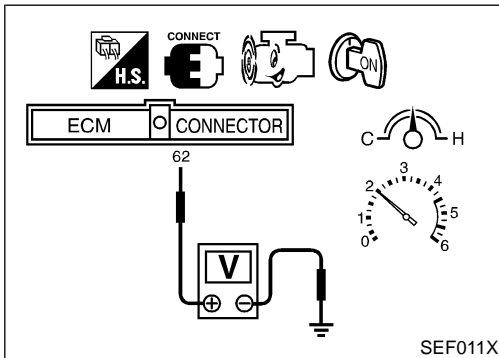
GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

DTC Confirmation Procedure (Cont'd)

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 "Diagnostic Procedure", EC-206.



Overall Function Check

Use this procedure to check the overall function of the heated oxygen sensor 1 (front) circuit. During this check, a 1st trip DTC might not be confirmed. NCEC0108

With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
- 3) Check 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 "Diagnostic Procedure", EC-206.

Diagnostic Procedure

NCEC0109

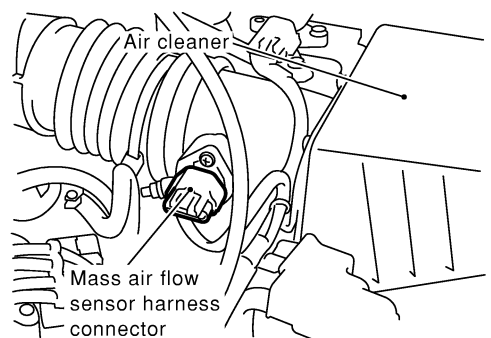
1	RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)
1. Turn ignition switch "OFF".	
2. Loosen and retighten heated oxygen sensor 1 (front).	
Tightening torque: 40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)	
▶	
GO TO 2.	

DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

Diagnostic Procedure (Cont'd)

2	CLEAR THE SELF-LEARNING DATA.								
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II. Clear the self-learning control coefficient by touching "CLEAR". 									
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2" style="padding: 2px;">WORK SUPPORT</th> </tr> <tr> <td style="padding: 2px;">SELF-LEARNING CONT</td> <td style="padding: 2px; text-align: center;">B1 100%</td> </tr> <tr> <td colspan="2" style="height: 100px;"></td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 2px;">CLEAR</td> </tr> </table>		WORK SUPPORT		SELF-LEARNING CONT	B1 100%			CLEAR	
WORK SUPPORT									
SELF-LEARNING CONT	B1 100%								
CLEAR									
SEF215Z									
<p>4. Run engine for at least 10 minutes at idle speed.</p> <p>Is the 1st trip DTC P0171 detected? Is it difficult to start engine?</p>									

GI
MA
EM
LC
EC

<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Turn ignition switch "OFF". Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed. 							
							
SEF840X							
<ol style="list-style-type: none"> Stop engine and reconnect mass air flow sensor harness connector. Make sure 1st trip DTC P0100 is displayed. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-79. Make sure DTC P0000 is displayed. Run engine for at least 10 minutes at idle speed. <p>Is the 1st trip DTC P0171 detected? Is it difficult to start engine?</p> <p style="text-align: center;">Yes or No</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; padding: 2px;">Yes</td> <td style="width: 5%; text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">Perform trouble diagnosis for DTC P0171. Refer to EC-272.</td> </tr> <tr> <td style="padding: 2px;">No</td> <td style="text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">GO TO 3.</td> </tr> </table>		Yes	▶	Perform trouble diagnosis for DTC P0171. Refer to EC-272.	No	▶	GO TO 3.
Yes	▶	Perform trouble diagnosis for DTC P0171. Refer to EC-272.					
No	▶	GO TO 3.					

FE
CL
MT
AT
AX
SU
BR
ST
RS
BT

3	CHECK HEATED OXYGEN SENSOR 1 HEATER (FRONT)	
Refer to "Component Inspection", EC-236.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Replace heated oxygen sensor 1 (front).

HA
SC
EL
IDX

DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

Diagnostic Procedure (Cont'd)

4	CHECK HEATED OXYGEN SENSOR 1 (FRONT)	
Refer to "Component Inspection", EC-208.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace heated oxygen sensor 1 (front).

5	CHECK SHIELD CIRCUIT	
1. Turn ignition switch "OFF". 2. Disconnect joint connector-1. 3. For circuit, refer to "DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)", EC-199. 4. Check the following. <ul style="list-style-type: none"> ● Continuity between joint connector-1 terminal 2 and ground ● Joint connector-1 (Refer to EL-274, "HARNESS LAYOUT".) Continuity should exist. 5. Also check harness for short to power. 6. Then reconnect joint connector-1.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Repair open circuit or short to power in harness or connectors.

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. Refer to "Wiring Diagram", EC-199, for circuit.		
		▶ INSPECTION END

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

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

Component Inspection HEATED OXYGEN SENSOR 1 (FRONT)

NCEC0110

NCEC0110S02

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) 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 below:
R = "HO2S1 MNTR (B1)", "RICH"
L = "HO2S1 MNTR (B1)", "LEAN"
 - "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.

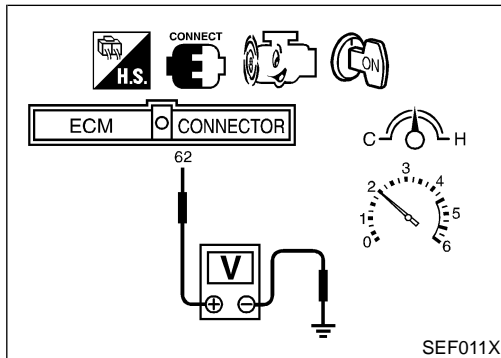
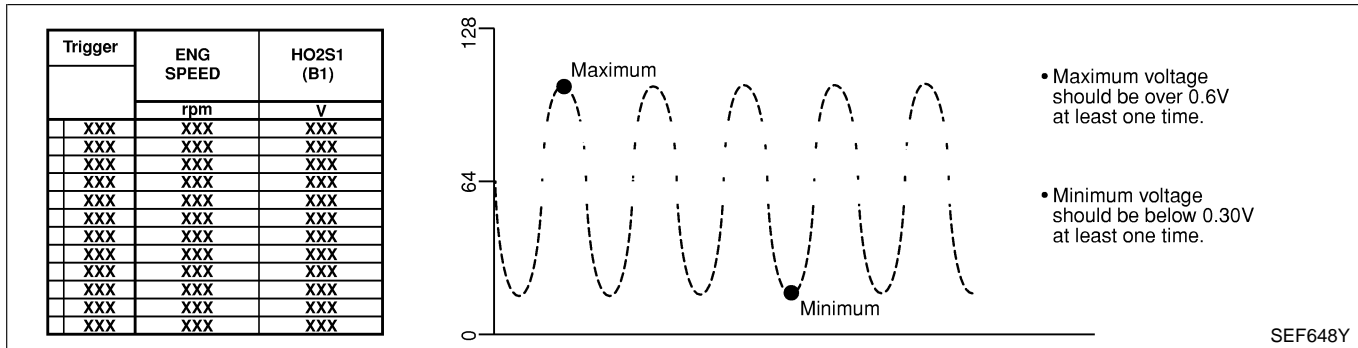
CAUTION:

- 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.

DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

Component Inspection (Cont'd)

- 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 62 [Heated oxygen sensor 1 (front) 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 five times within 10 seconds.

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 → 0 - 0.3V

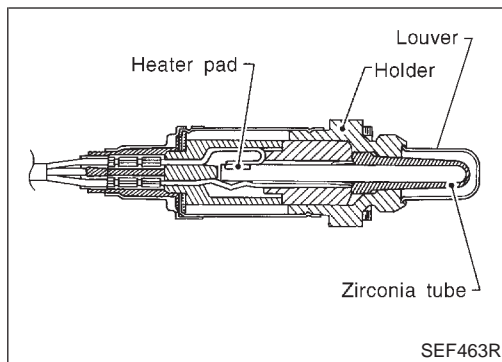
- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

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.

DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)

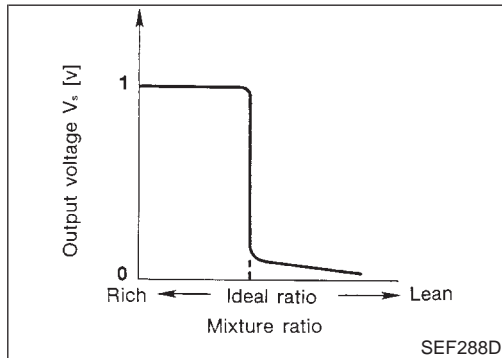
Component Description



Component Description

NCEC0111

The heated oxygen sensor 1 (front) 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 (front) 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 (front) 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

NCEC0112

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)			0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	<ul style="list-style-type: none"> Engine: After warming up 	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

ECM Terminals and Reference Value

NCEC0113

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

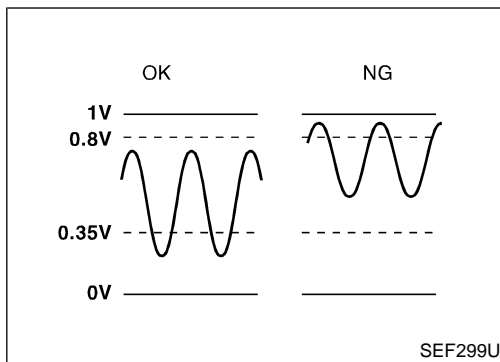
CAUTION:

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	W	Heated oxygen sensor 1 (front)	<p>[Engine is running]</p> <ul style="list-style-type: none"> After warming up to normal operating temperature and engine speed is 2,000 rpm 	<p>0 - Approximately 1.0V</p> <p>SEF059V</p>

DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)

On Board Diagnosis Logic



On Board Diagnosis Logic

NCEC0114

To judge the malfunction, the output from the heated oxygen sensor 1 (front) 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.	Malfunction is detected when ...	Check Items (Possible Cause)
P0132	<ul style="list-style-type: none"> The maximum and minimum voltages from the sensor are beyond the specified voltages. 	<ul style="list-style-type: none"> Heated oxygen sensor 1 (front) Heated oxygen sensor 1 heater (front) Fuel pressure Injectors

6 HO2S1 (B1) P0132

OUT OF CONDITION

MONITOR

ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
THRTL POS SEN	XXX V

SEF653Y

6 HO2S1 (B1) P0132

TESTING

MONITOR

ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
THRTL POS SEN	XXX V

SEF654Y

6 HO2S1 (B1) P0132

COMPLETED

SEF655Y

DTC Confirmation Procedure

NCEC0115

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

- Start engine and warm it up to normal operating temperature.
- Stop engine and wait at least 10 seconds.
- Turn ignition switch “ON” and select “HO2S1 (B1) P0132” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
- Touch “START”.
- Start engine and let it idle for at least 3.5 minutes.

NOTE:

Never raise engine speed above 3,200 rpm after this step. If the engine speed limit is exceeded, return to step 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 50 seconds or more.)

ENG SPEED	1,900 - 3,100 rpm (A/T) 2,000 - 3,100 rpm (M/T)
Vehicle speed	Less than 120 km/h (75 MPH)
B/FUEL SCHDL	4.0 - 12.0 msec (A/T) 3.5 - 12.0 msec (M/T)
Selector lever	Suitable position

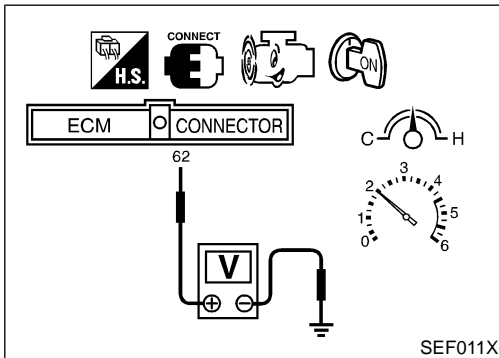
GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)

DTC Confirmation Procedure (Cont'd)

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 "Diagnostic Procedure", EC-213.



Overall Function Check

Use this procedure to check the overall function of the heated oxygen sensor 1 (front) circuit. During this check, a 1st trip DTC might not be confirmed. NCEC0116

With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
- 3) Check 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 "Diagnostic Procedure", EC-213.

DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)


Diagnostic Procedure

Diagnostic Procedure

=NCEC0117


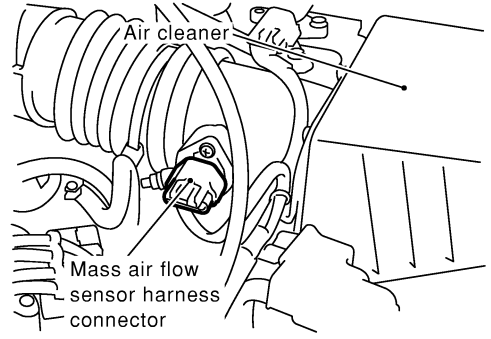
1	RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)
<ol style="list-style-type: none"> Turn ignition switch "OFF". Loosen and retighten heated oxygen sensor 1 (front). Tightening torque: 40 - 60 N·m (4.1 - 6.1 kg·m, 30 - 44 ft·lb) 	
▶	GO TO 2.

GI
MA
EM

2	CLEAR THE SELF-LEARNING DATA						
<p> With CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II. Clear the self-learning control coefficient by touching "CLEAR". 							
<table border="1"> <tr> <th colspan="2">WORK SUPPORT</th> </tr> <tr> <td>SELF-LEARNING CONT</td> <td>B1 100%</td> </tr> <tr> <td colspan="2" style="text-align: center;">CLEAR</td> </tr> </table>		WORK SUPPORT		SELF-LEARNING CONT	B1 100%	CLEAR	
WORK SUPPORT							
SELF-LEARNING CONT	B1 100%						
CLEAR							
<p>4. Run engine for at least 10 minutes at idle speed. Is the 1st trip DTC P0172 detected? Is it difficult to start engine?</p>							

LC
EC
FE
CL
MT
AT

SEF215Z

<p> Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Turn ignition switch "OFF". Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed. 	
	
<p>4. Stop engine and reconnect mass air flow sensor harness connector.</p> <p>5. Make sure 1st trip DTC P0100 is displayed.</p> <p>6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-79.</p> <p>7. Make sure DTC P0000 is displayed.</p> <p>8. Run engine for at least 10 minutes at idle speed. Is the 1st trip DTC P0172 detected? Is it difficult to start engine?</p> <p style="text-align: center;">Yes or No</p>	

SU
BR
ST
RS
BT
HA
SC
EL

SEF840X

Yes	▶	Perform trouble diagnosis for DTC P0172. Refer to EC-279.
No	▶	GO TO 3.

IDX

DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)

Diagnostic Procedure (Cont'd)

3	CHECK HARNESS CONNECTOR
1. Turn ignition switch "OFF". 2. Disconnect heated oxygen sensor 1 (front) 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 HEATED OXYGEN SENSOR 1 HEATER (FRONT)
Refer to "Component Inspection", EC-236.	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Replace heated oxygen sensor 1 (front).

5	CHECK HEATED OXYGEN SENSOR 1 (FRONT)
Refer to "Component Inspection", EC-215.	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Replace heated oxygen sensor 1 (front).

6	CHECK SHIELD CIRCUIT
1. Turn ignition switch "OFF". 2. Disconnect joint connector-1. 3. For circuit, refer to "DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT)", EC-199. 4. Check the following. <ul style="list-style-type: none">● Continuity between joint connector-1 terminal 2 and ground● Joint connector-1 (Refer to EL-274, "HARNESS LAYOUT".) Continuity should exist.	
5. Also check harness for short to power. 6. Then reconnect joint connector-1.	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Repair open circuit or short to power in harness or connectors.

7	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146. Refer to "Wiring Diagram", EC-199, for circuit.	
	▶ INSPECTION END

DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)

Component Inspection

NCEC0118

NCEC0118S02

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

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

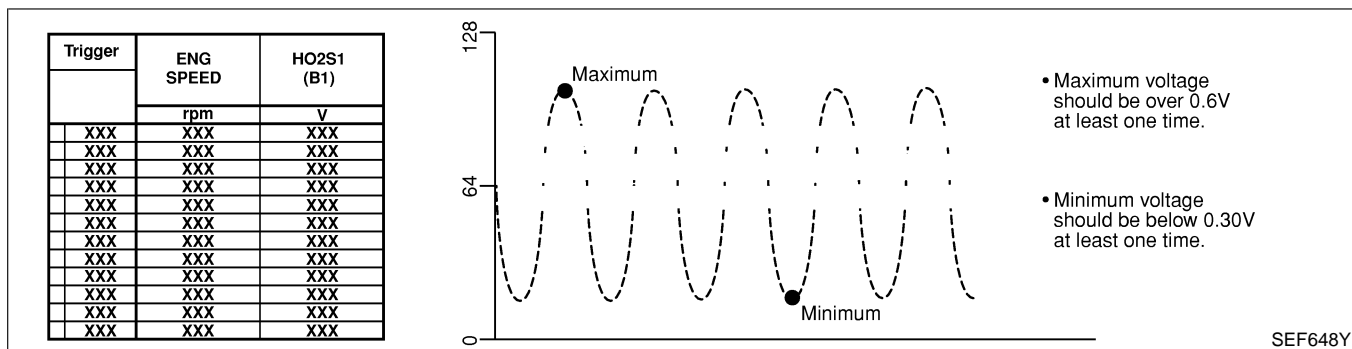
Component Inspection HEATED OXYGEN SENSOR 1 (FRONT)

④ With CONSULT-II

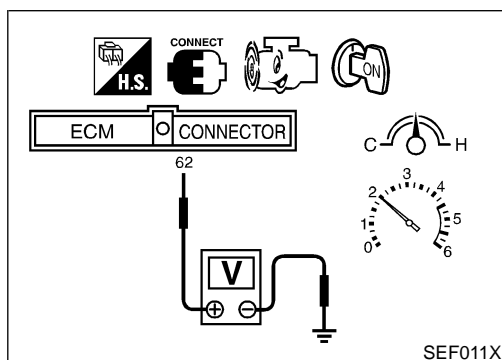
- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
 - "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 below:
 R = "HO2S1 MNTR (B1)", "RICH"
 L = "HO2S1 MNTR (B1)", "LEAN"
 - "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.



SEF648Y



SEF011X

⊗ Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) 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 when 10 seconds.
 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 → 0 - 0.3V

DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)

Component Inspection (Cont'd)

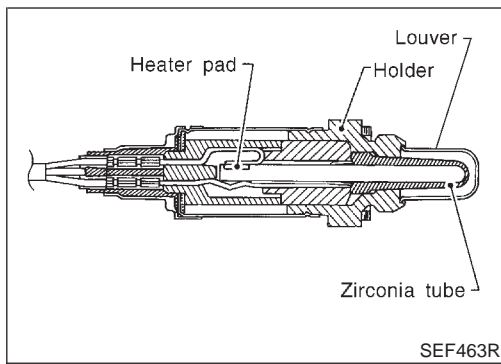
- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

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.

DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

Component Description

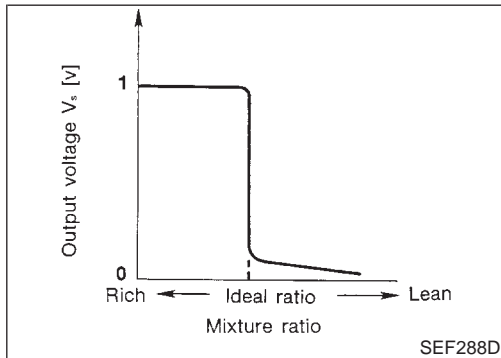


SEF463R

Component Description

NCEC0119

The heated oxygen sensor 1 (front) 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 (front) 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 (front) 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.



SEF288D

CONSULT-II Reference Value in Data Monitor Mode

NCEC0120

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S1 (B1)		0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	<ul style="list-style-type: none"> Engine: After warming up Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

ECM Terminals and Reference Value

NCEC0121

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

CAUTION:

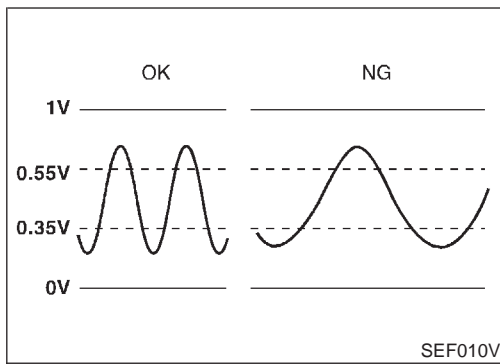
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI-NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
62	W	Heated oxygen sensor 1 (front)	[Engine is running] <ul style="list-style-type: none"> After warming up to normal operating temperature and engine speed is 2,000 rpm 	0 - Approximately 1.0V

SEF059V

DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

On Board Diagnosis Logic



On Board Diagnosis Logic

NCEC0122

To judge the malfunction of heated oxygen sensor 1 (front), this diagnosis measures response time of heated oxygen sensor 1 (front) signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and heated oxygen sensor 1 (front) temperature index. Judgment is based on whether the compensated time [heated oxygen sensor 1 (front) cycling time index] is inordinately long or not.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0133	<ul style="list-style-type: none"> The response of the voltage signal from the sensor takes more than the specified time. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 1 (front) Heated oxygen sensor 1 heater (front) Fuel pressure Injectors Intake air leaks Exhaust gas leaks PCV Mass air flow sensor

6

HO2S1 (B1) P0133	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
THRTL POS SEN	XXX V

SEF656Y

6

HO2S1 (B1) P0133	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
THRTL POS SEN	XXX V

SEF657Y

6

HO2S1 (B1) P0133	
COMPLETED	

SEF658Y

DTC Confirmation Procedure

NCEC0123

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

- Start engine and warm it up to normal operating temperature.
- Stop engine and wait at least 10 seconds.
- Turn ignition switch "ON" and select "HO2S1 (B1) P0133" of "HO2S1" in "DTC WORK SUPPORT" mode with CONSULT-II.
- Touch "START".
- Start engine and let it idle for at least 3.5 minutes.

NOTE:

Never raise engine speed above 3,200 rpm after this step. If the engine speed limit is exceeded, return to step 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 50 seconds.)

ENG SPEED	1,900 - 3,100 rpm (A/T) 2,000 - 3,100 rpm (M/T)
Vehicle speed	More than 80 km/h (50 MPH)
B/FUEL SCHDL	4.0 - 12.0 msec (A/T) 3.5 - 12.0 msec (M/T)
Selector lever	Suitable position

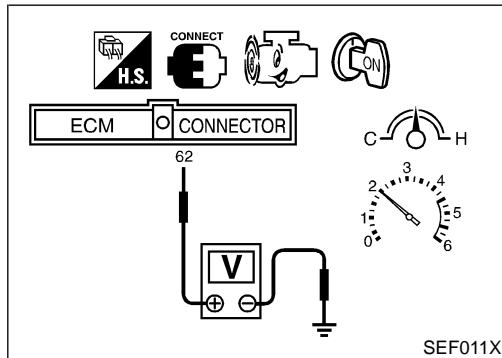
DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

DTC Confirmation Procedure (Cont'd)

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 "Diagnostic Procedure", EC-221.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX



Overall Function Check

Use this procedure to check the overall function of the heated oxygen sensor 1 (front) circuit. During this check, a 1st trip DTC might not be confirmed.

NCEC0124

With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) 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 five times within 10 seconds.
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 → 0 - 0.3V
- 4) If NG, go to "Diagnostic Procedure", EC-221.

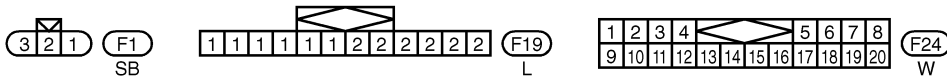
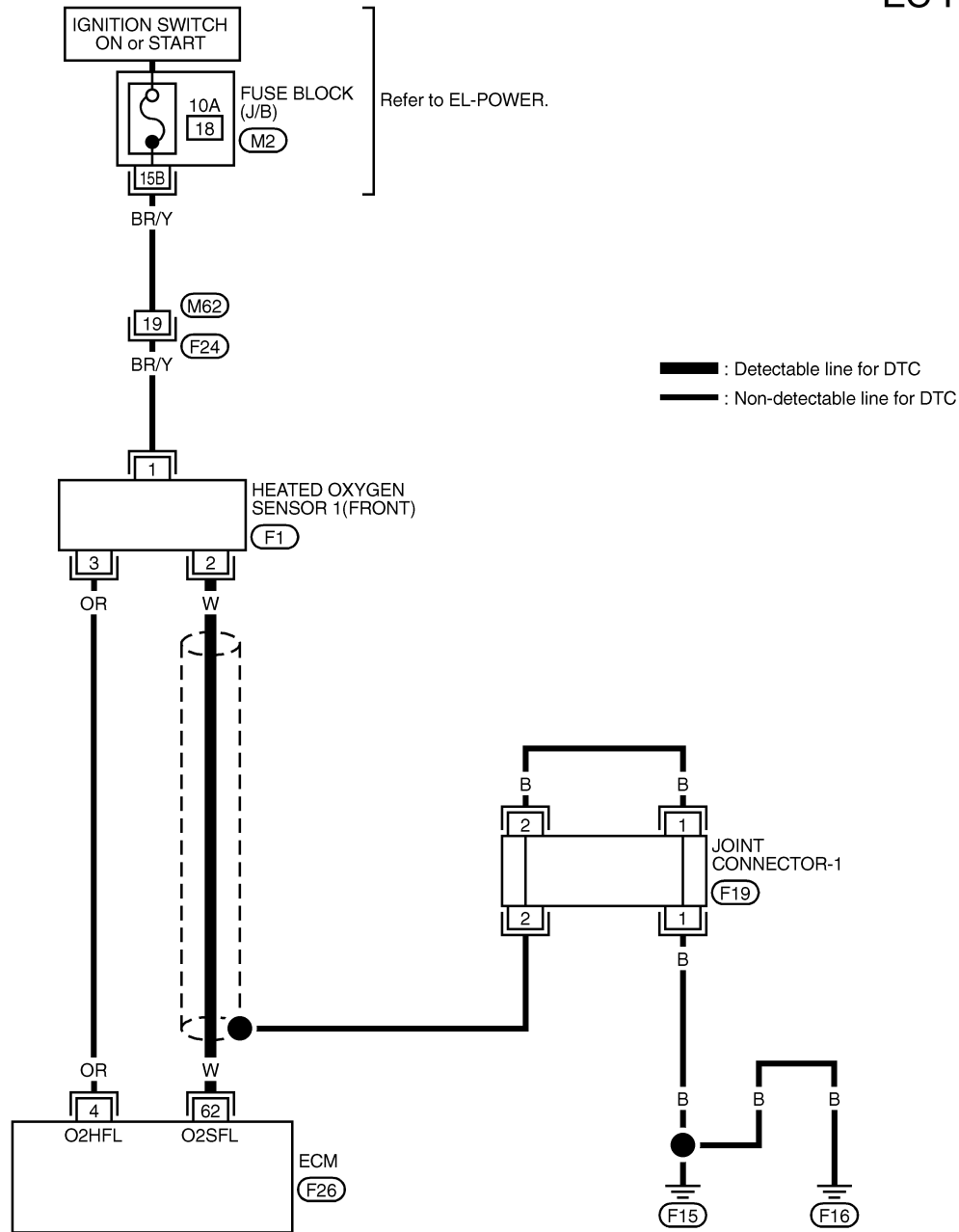
DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

Wiring Diagram

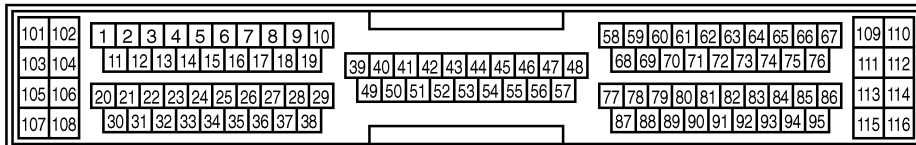
Wiring Diagram

NCEC0125

EC-HO2S1-01



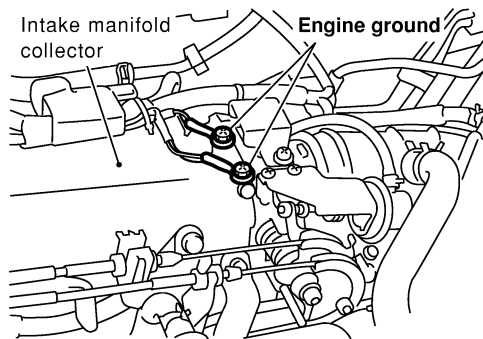
REFER TO THE FOLLOWING.
 (M2) - FUSE BLOCK-JUNCTION BOX (J/B)



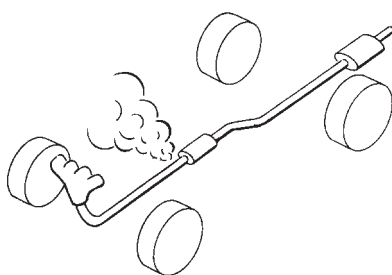
TEC837

Diagnostic Procedure

NCEC0126

1	RETIGHTEN GROUND SCREWS	<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF839X</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p> <p>FE</p> <p>CL</p>
▶		GO TO 2.	

2	RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)	<p>Loosen and retighten front heated oxygen sensor.</p> <p>Tightening torque: 40 - 60 N·m (4.1 - 6.1 kg·m, 30 - 44 ft·lb)</p>	<p>MT</p> <p>AT</p>
▶		GO TO 3.	

3	CHECK EXHAUST AIR LEAK	<p>1. Start engine and run it at idle. 2. Listen for an exhaust air leak before three way catalyst.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">OK or NG</p> <p style="text-align: right;">SEF099P</p>	<p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p>
▶		GO TO 4.	
▶		Repair or replace.	

4	CHECK FOR INTAKE AIR LEAK	<p>Listen for an intake air leak after the mass air flow sensor.</p> <p style="text-align: center;">OK or NG</p>	<p>HA</p> <p>SC</p> <p>EL</p>
▶		GO TO 5.	
▶		Repair or replace.	

IDX

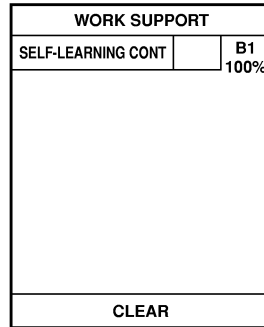
DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

Diagnostic Procedure (Cont'd)

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".



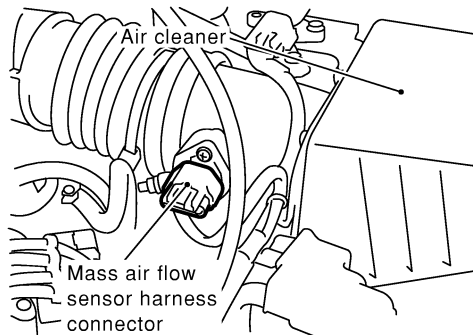
SEF215Z

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.



SEF840X

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-79.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

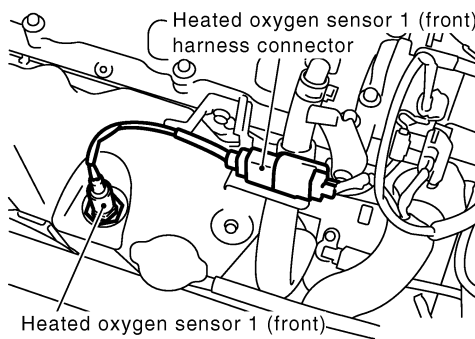
Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?

Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0171, P0172. Refer to EC-272, 279.
No	▶	GO TO 6.

DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

Diagnostic Procedure (Cont'd)

6	CHECK INPUT SIGNAL CIRCUIT								
		<p>1. Disconnect heated oxygen sensor 1 (front) harness connector and ECM harness connector.</p>  <p style="text-align: right;">SEF917Z</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p> <p>FE</p> <p>CL</p> <p>MT</p>						
		<p>2. Check harness continuity between ECM terminal 62 and HO2S1 terminal 2. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Check harness continuity between ECM terminal 62 (or HO2S1 terminal 2) and ground. Refer to Wiring Diagram. Continuity should not exist.</p> <p>4. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>							
		<table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td style="width: 75%;">GO TO 7.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>	OK	▶	GO TO 7.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	
OK	▶	GO TO 7.							
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.							

7	CHECK HEATED OXYGEN SENSOR 1 HEATER (FRONT)								
		Refer to "Component Inspection", EC-236. <p style="text-align: center;">OK or NG</p>	<p>AX</p>						
		<table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td style="width: 75%;">GO TO 8.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Replace heated oxygen sensor 1 (front).</td> </tr> </table>	OK	▶	GO TO 8.	NG	▶	Replace heated oxygen sensor 1 (front).	<p>SU</p>
OK	▶	GO TO 8.							
NG	▶	Replace heated oxygen sensor 1 (front).							

8	CHECK HEATED OXYGEN SENSOR 1 (FRONT)								
		Refer to "Component Inspection", EC-224. <p style="text-align: center;">OK or NG</p>	<p>BR</p> <p>ST</p>						
		<table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td style="width: 75%;">GO TO 9.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Replace heated oxygen sensor 1 (front).</td> </tr> </table>	OK	▶	GO TO 9.	NG	▶	Replace heated oxygen sensor 1 (front).	<p>RS</p>
OK	▶	GO TO 9.							
NG	▶	Replace heated oxygen sensor 1 (front).							

9	CHECK MASS AIR FLOW SENSOR								
		Refer to "Component Inspection", EC-162. <p style="text-align: center;">OK or NG</p>	<p>BT</p> <p>HA</p>						
		<table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td style="width: 75%;">GO TO 10.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Replace mass air flow sensor.</td> </tr> </table>	OK	▶	GO TO 10.	NG	▶	Replace mass air flow sensor.	<p>SC</p>
OK	▶	GO TO 10.							
NG	▶	Replace mass air flow sensor.							

10	CHECK PCV VALVE								
		Refer to "Positive Crankcase Ventilation", EC-49. <p style="text-align: center;">OK or NG</p>	<p>EL</p> <p>IDX</p>						
		<table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td style="width: 75%;">GO TO 11.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Repair or replace PCV valve.</td> </tr> </table>	OK	▶	GO TO 11.	NG	▶	Repair or replace PCV valve.	
OK	▶	GO TO 11.							
NG	▶	Repair or replace PCV valve.							

DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

Diagnostic Procedure (Cont'd)

11	CHECK SHIELD CIRCUIT	
1. Turn ignition switch "OFF". 2. Disconnect joint connector-1. 3. Check the following. <ul style="list-style-type: none"> ● Continuity between joint connector-1 terminal 2 and ground Refer to Wiring Diagram. ● Joint connector-1 (Refer to EL-274, "HARNESS LAYOUT".) Continuity should exist. 4. Also check harness for short to power. 5. Then reconnect joint connector.		
OK or NG		
OK	▶	GO TO 12.
NG	▶	Repair open circuit or short to power in harness or connectors.

12	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.		
▶		INSPECTION END

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

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

Component Inspection

HEATED OXYGEN SENSOR 1 (FRONT)

NCEC0127

NCEC0127S02

Ⓜ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
 - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" five times in 10 seconds.
5 times (cycles) are counted as shown below:
R = "HO2S1 MNTR (B1)", "RICH"
L = "HO2S1 MNTR (B1)", "LEAN"
 - "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.

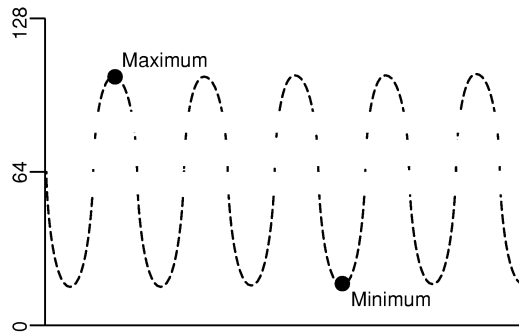
CAUTION:

- 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.

DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

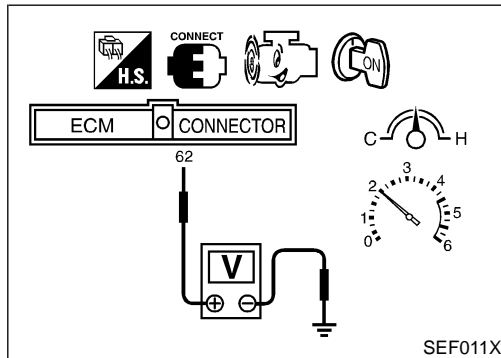
Component Inspection (Cont'd)

Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX



- Maximum voltage should be over 0.6V at least one time.
- Minimum voltage should be below 0.30V at least one time.

SEF648Y



Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) 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 five times within 10 seconds.
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 → 0 - 0.3V
 - 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.

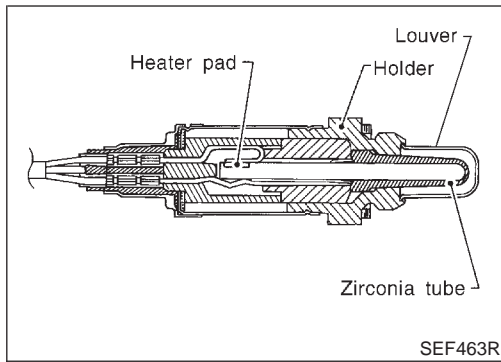
CAUTION:

- 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.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

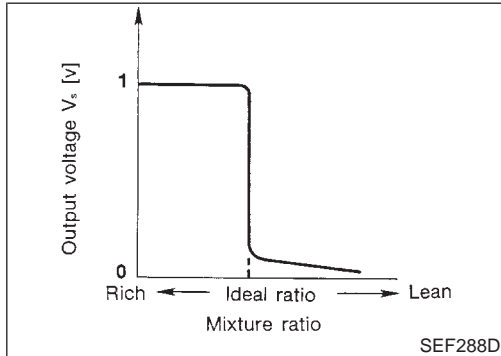
Component Description



Component Description

NCEC0128

The heated oxygen sensor 1 (front) 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 (front) 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 (front) 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

NCEC0129

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)			0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	<ul style="list-style-type: none"> Engine: After warming up 	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

ECM Terminals and Reference Value

NCEC0130

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

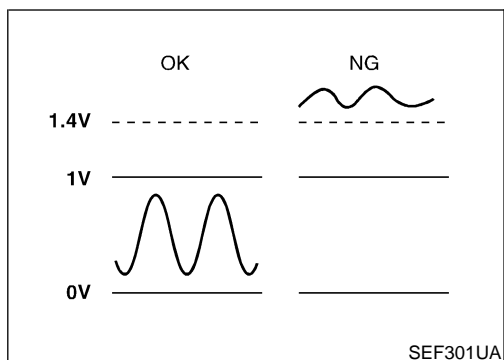
CAUTION:

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	W	Heated oxygen sensor 1 (front)	<p>[Engine is running]</p> <ul style="list-style-type: none"> After warming up to normal operating temperature and engine speed is 2,000 rpm 	<p>0 - Approximately 1.0V</p> <p>SEF059V</p>

DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

On Board Diagnosis Logic

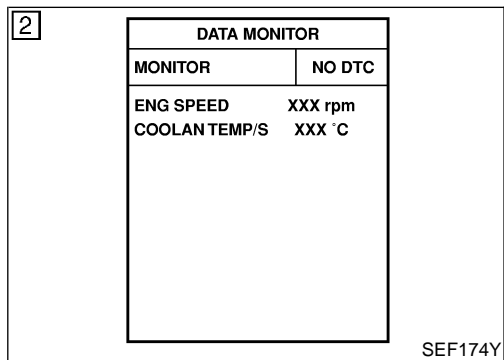


On Board Diagnosis Logic

NCEC0131

To judge the malfunction, the diagnosis checks that the heated oxygen sensor 1 (front) output is not inordinately high.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0134	<ul style="list-style-type: none"> An excessively high voltage from the sensor is sent to ECM. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 1 (front)



DTC Confirmation Procedure

NCEC0132

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 "Diagnostic Procedure", EC-229.

Ⓜ 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 "Diagnostic Procedure", EC-229.

- **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.**

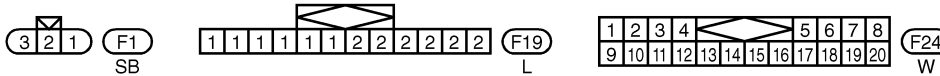
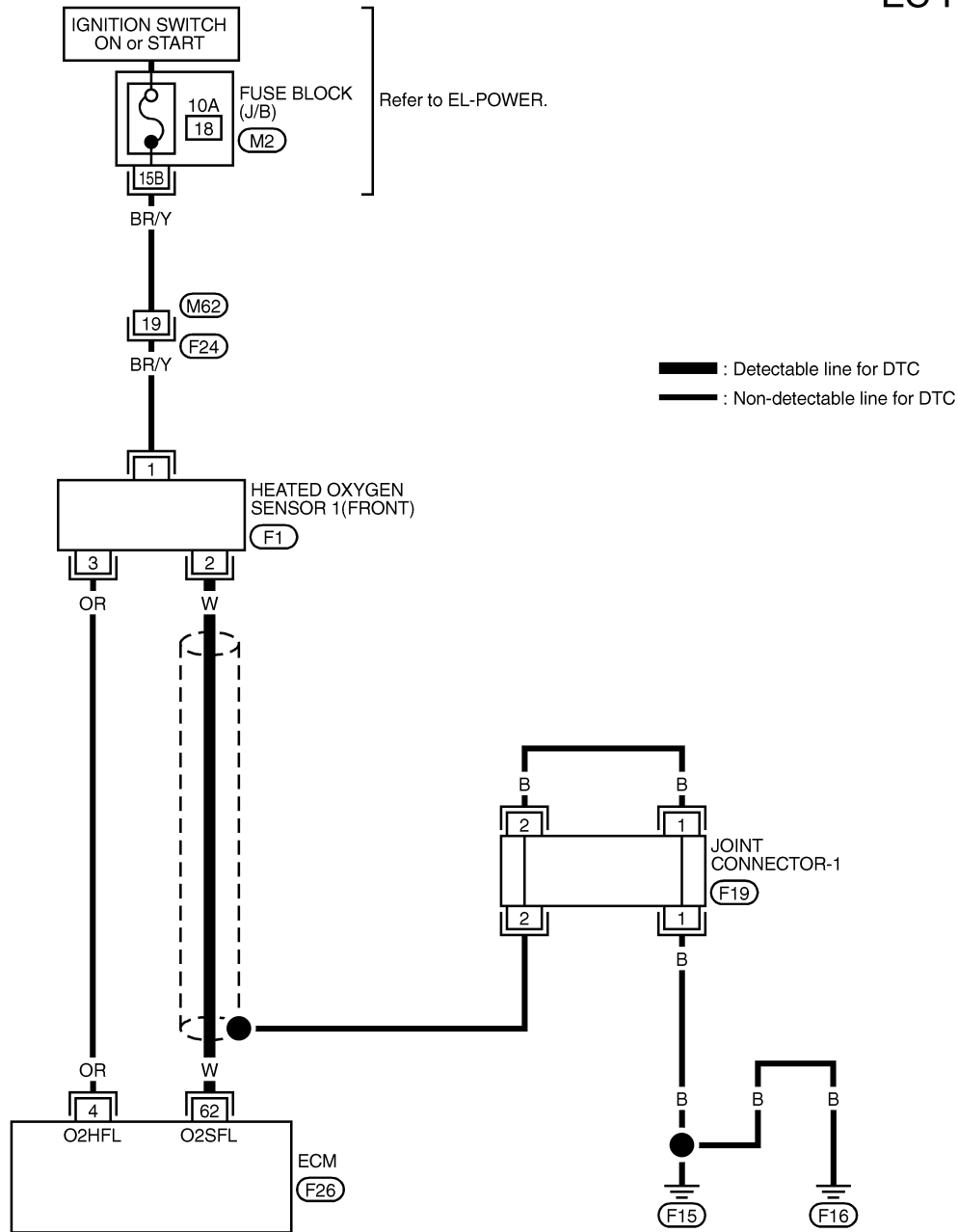
DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

Wiring Diagram

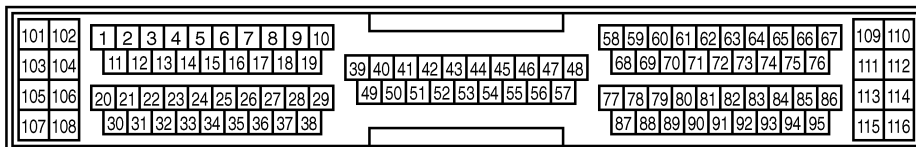
Wiring Diagram

NCEC0133

EC-HO2S1-01



REFER TO THE FOLLOWING.
 M2 - FUSE BLOCK-JUNCTION BOX (J/B)



TEC837

DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

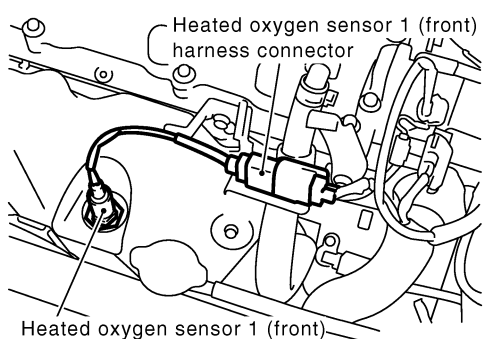
Diagnostic Procedure

Diagnostic Procedure

NCEC0134

1	RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)		
Loosen and retighten heated oxygen sensor 1 (front). Tightening torque: 40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)			
▶		GO TO 2.	

GI
MA
EM

2	CHECK INPUT SIGNAL CIRCUIT		
1. Disconnect heated oxygen sensor 1 (front) harness connector and ECM harness connector.			
			
SEF917Z			
2. Check harness continuity between ECM terminal 62 and HO2S1 terminal 2. Refer to Wiring Diagram. Continuity should exist.			
3. Check harness continuity between ECM terminal 62 (or HO2S1 terminal 2) and ground. Refer to Wiring Diagram. Continuity should not exist.			
4. Also check harness for 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.	

EC
FE
CL
MT
AT
AX
SU
BR

3	CHECK HARNESS CONNECTOR		
Check heated oxygen sensor 1 (front) harness connector for water. Water should not exist.			
OK or NG			
OK ▶		GO TO 4.	
NG ▶		Repair or replace harness connector.	

ST
RS
BT

4	CHECK HEATED OXYGEN SENSOR 1 (FRONT)		
Refer to "Component Inspection", EC-230.			
OK or NG			
OK ▶		GO TO 5.	
NG ▶		Replace heated oxygen sensor 1 (front).	

HA
SC
EL

IDX

DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

Diagnostic Procedure (Cont'd)

5	CHECK SHIELD CIRCUIT	
1. Turn ignition switch "OFF". 2. Disconnect joint connector-1. 3. Check the following. <ul style="list-style-type: none"> ● Continuity between joint connector-1 terminal 2 and ground Refer to Wiring Diagram. ● Joint connector-1 (Refer to EL-274, "HARNES LAYOUT".) Continuity should exist. 4. Also check harness for short to power. Then reconnect joint connector.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Repair open circuit or short to power in harness or connectors.

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.		
▶		INSPECTION END

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

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

Component Inspection

HEATED OXYGEN SENSOR 1 (FRONT)

NCEC0135

NCEC0135S01

Ⓜ With CONSULT-II

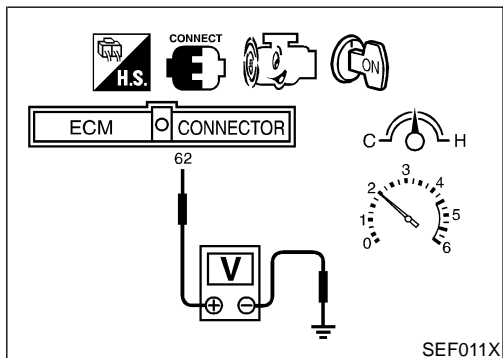
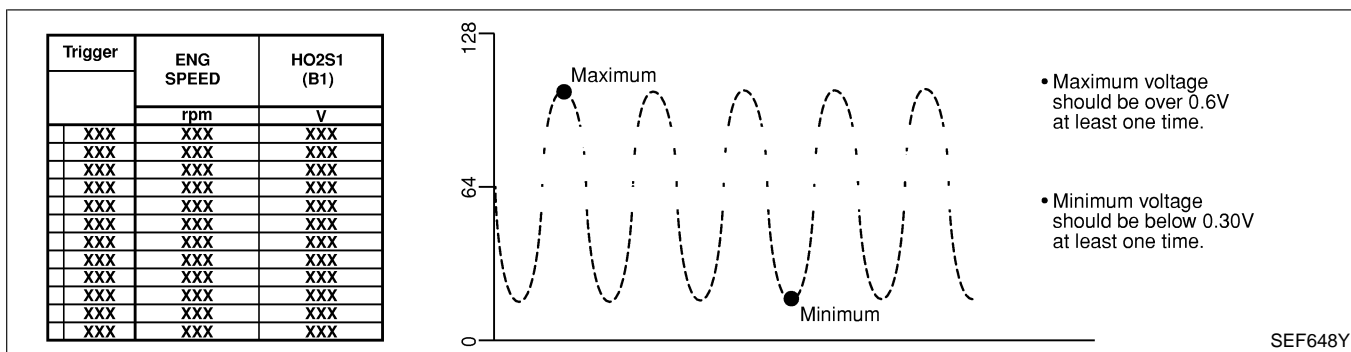
- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
 - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" five times in 10 seconds.
5 times (cycles) are counted as shown below:
R = "HO2S1 MNTR (B1)", "RICH"
L = "HO2S1 MNTR (B1)", "LEAN"
 - "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.

DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

Component Inspection (Cont'd)



⊗ Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) 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 five times within 10 seconds.
 - 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 → 0 - 0.3V
 - 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.

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.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0135 HEATED OXYGEN SENSOR 1 HEATER (FRONT)

Description

Description

NCEC0136

SYSTEM DESCRIPTION

NCEC0136S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	Heated oxygen sensor 1 heater (front) control	Heated oxygen sensor 1 heater (front)

The ECM performs ON/OFF control of the heated oxygen sensor 1 heater (front) corresponding to the engine operating condition.

OPERATION

NCEC0136S02

Engine speed	Front heated oxygen sensor heater
Above 3,200 rpm	OFF
Below 3,200 rpm	ON

CONSULT-II Reference Value in Data Monitor Mode

NCEC0137

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S1 HTR (B1)	● Engine speed: Below 3,200 rpm	ON
	● Engine speed: Above 3,200 rpm	OFF

ECM Terminals and Reference Value

NCEC0138

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	OR	Heated oxygen sensor 1 heater (front)	[Engine is running] ● Engine speed is below 3,200 rpm.	Approximately 0V
			[Engine is running] ● Engine speed is above 3,200 rpm.	BATTERY VOLTAGE (11 - 14V)

On Board Diagnosis Logic

NCEC0139

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0135	<ul style="list-style-type: none"> The current amperage in the heated oxygen sensor 1 heater (front) circuit is out of the normal range. [An improper voltage drop signal is sent to ECM through the heated oxygen sensor 1 heater (front).] 	<ul style="list-style-type: none"> Harness or connectors [The heated oxygen sensor 1 heater (front) circuit is open or shorted.] Heated oxygen sensor 1 heater (front)

DTC Confirmation Procedure

NCEC0140

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.

2

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

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 6 seconds at idle speed.
- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-235.

With GST

- 1) Start engine and run it for at least 6 seconds at idle speed.
 - 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) Select "MODE 3" with GST.
 - 5) If DTC is detected, go to "Diagnostic Procedure", EC-235.
- **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.**

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

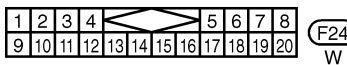
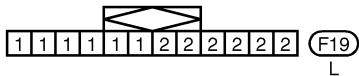
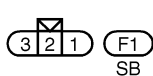
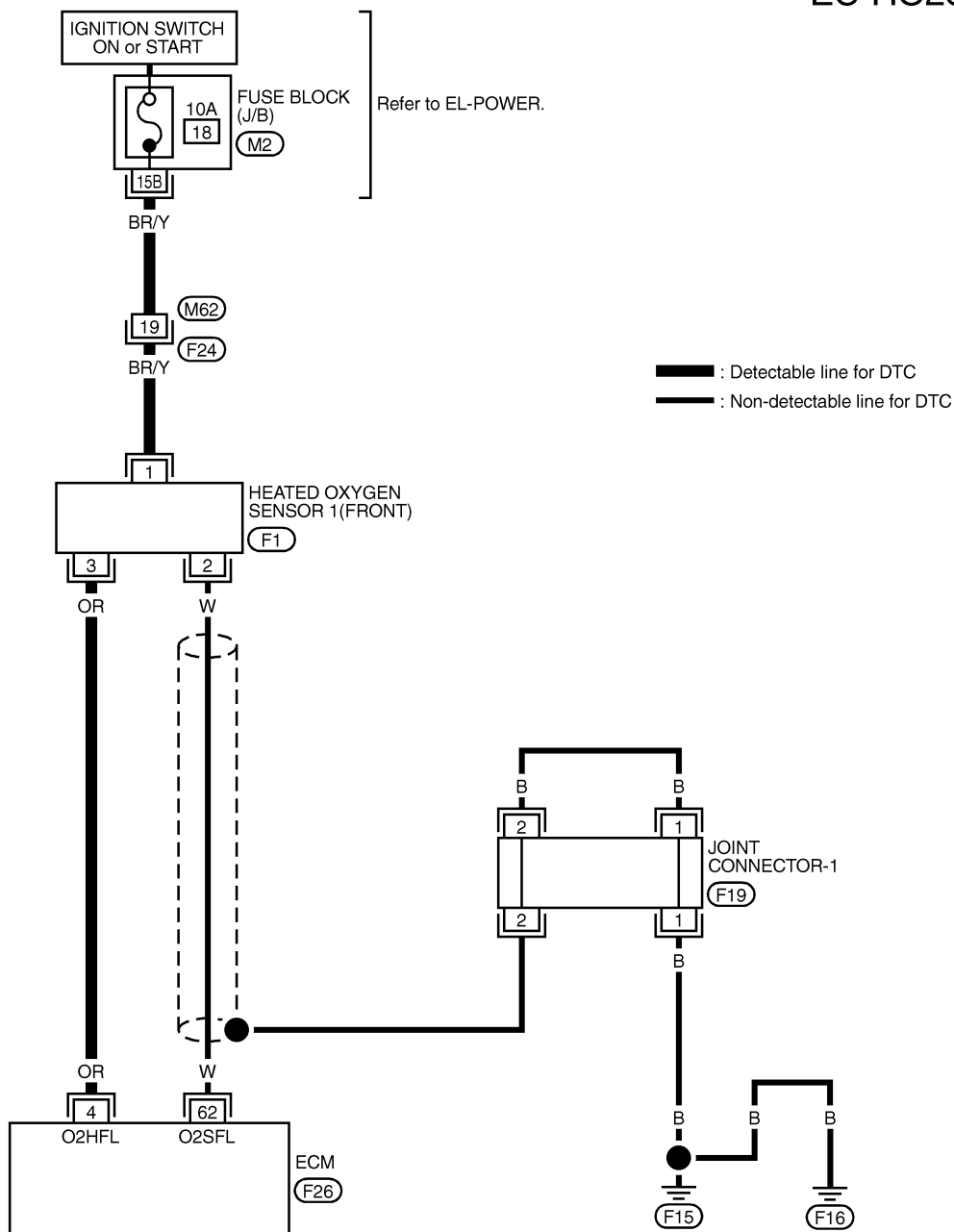
DTC P0135 HEATED OXYGEN SENSOR 1 HEATER (FRONT)

Wiring Diagram

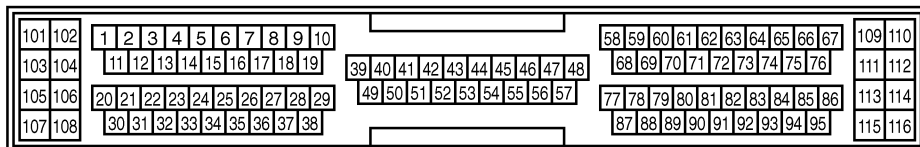
Wiring Diagram

NCEC0141

EC-HO2S1H-01



REFER TO THE FOLLOWING.
 M2 - FUSE BLOCK-JUNCTION BOX (J/B)



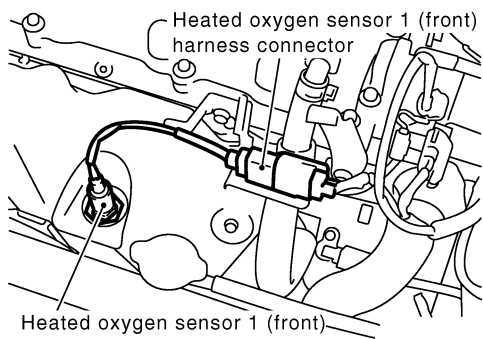
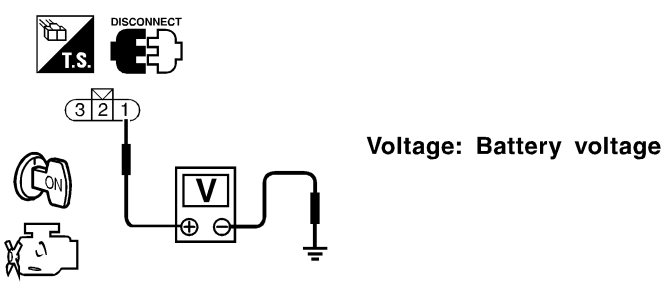
TEC838

DTC P0135 HEATED OXYGEN SENSOR 1 HEATER (FRONT)

Diagnostic Procedure

Diagnostic Procedure

NCEC0142

1	CHECK POWER SUPPLY		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 1 (front) harness connector.</p>  <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between HO2S1 terminal 1 and ground with CONSULT-II or tester.</p> 	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p>
	OK	▶	GO TO 3.
	NG	▶	GO TO 2.

SEF917Z

SEF934X

2	DETECT MALFUNCTIONING PART		
		<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M62, F24 ● Fuse block (J/B) connector M2 ● 10A fuse ● Harness for open or short between heated oxygen sensor 1 (front) and fuse 	
		▶	Repair harness or connectors.

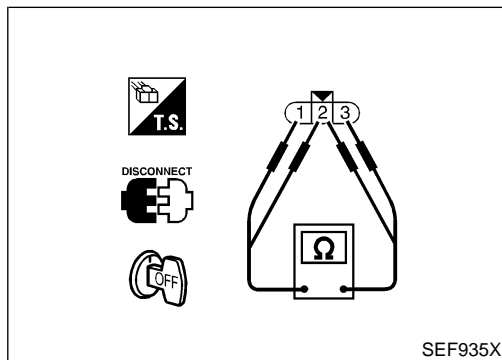
3	CHECK OUTPUT SIGNAL CIRCUIT		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between HO2S1 terminal 3 and ECM terminal 4. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
	OK	▶	GO TO 4.
	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0135 HEATED OXYGEN SENSOR 1 HEATER (FRONT)

Diagnostic Procedure (Cont'd)

4	CHECK HEATED OXYGEN SENSOR 1 HEATER (FRONT)
Refer to "Component Inspection", EC-236.	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Replace heated oxygen sensor 1 (front).

5	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
	▶ INSPECTION END



Component Inspection

HEATED OXYGEN SENSOR 1 HEATER (FRONT)

NCEC0143

NCEC0143S01

Check resistance between terminals 3 and 1.

Resistance: 2.3 - 4.3Ω at 25°C (77°F)

Check continuity between terminals 2 and 1, 3 and 2.

Continuity should not exist.

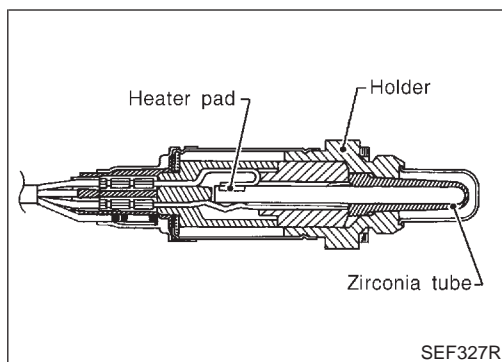
If NG, replace the heated oxygen sensor 1 (front).

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.

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

Component Description



Component Description

NCEC0144

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2 (rear).

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 (rear) is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NCEC0145

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> Engine: After warming up 	Revving engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ↔ RICH

ECM Terminals and Reference Value

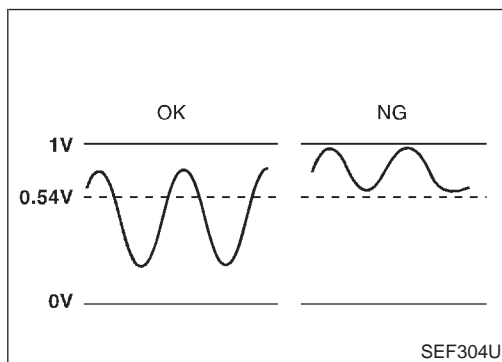
NCEC0146

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	W	Heated oxygen sensor 2 (rear)	[Engine is running] <ul style="list-style-type: none"> After warming up to normal operating temperature and engine speed is 2,000 rpm 	0 - Approximately 1.0V



On Board Diagnosis Logic

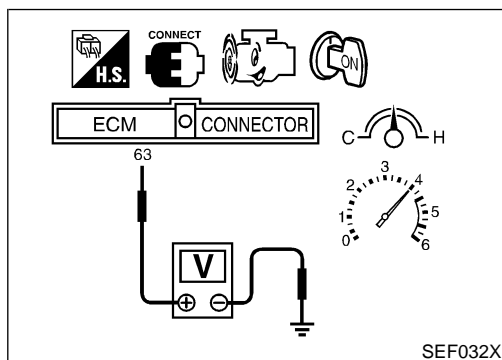
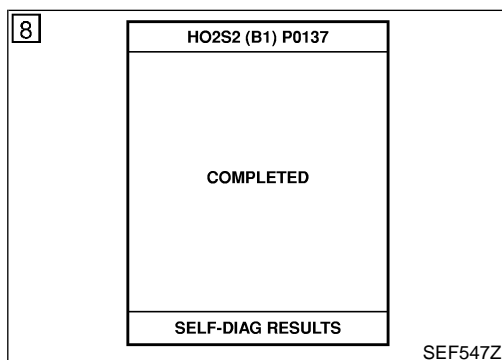
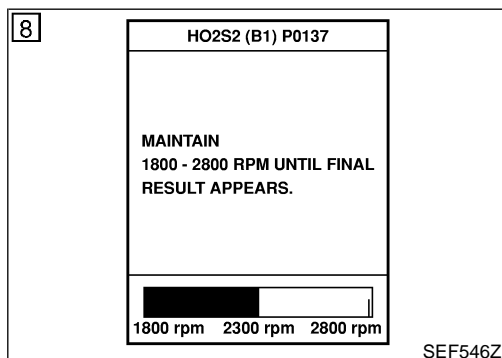
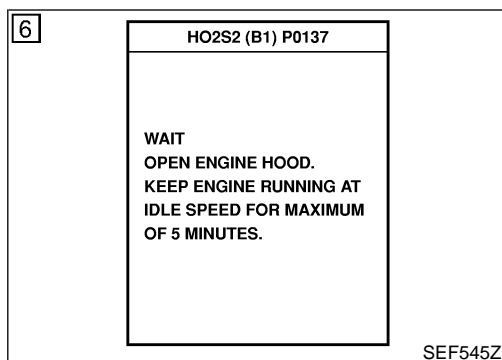
NCEC0147

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2 (rear), ECM monitors whether the minimum voltage of the sensor is sufficiently low during various driving conditions such as fuel-cut.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0137	<ul style="list-style-type: none"> The minimum voltage from the sensor does not reach the specified voltage. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 2 (rear) Fuel pressure Injectors

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

DTC Confirmation Procedure



DTC Confirmation Procedure

NCEC0148

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) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S2 (B1) P0137" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to "Diagnostic Procedure", EC-240.

If "CANNOT BE DIAGNOSED" is displayed, perform the following.

- a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
- b) Turn ignition switch "ON".
- c) Select "DATA MONITOR" mode with CONSULT-II.
- d) Start engine.
- e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NCEC0149

Use this procedure to check the overall function of the heated oxygen sensor 2 (rear) circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving engine 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 0.54V at least once during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
- 5) Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should be below 0.54V at least once during this procedure.
- 6) If NG, go to "Diagnostic Procedure", EC-240.

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

Wiring Diagram

Wiring Diagram

NCEC0150

EC-HO2S2-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

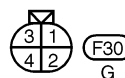
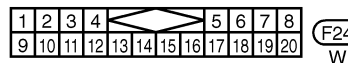
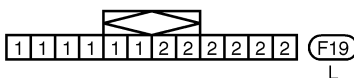
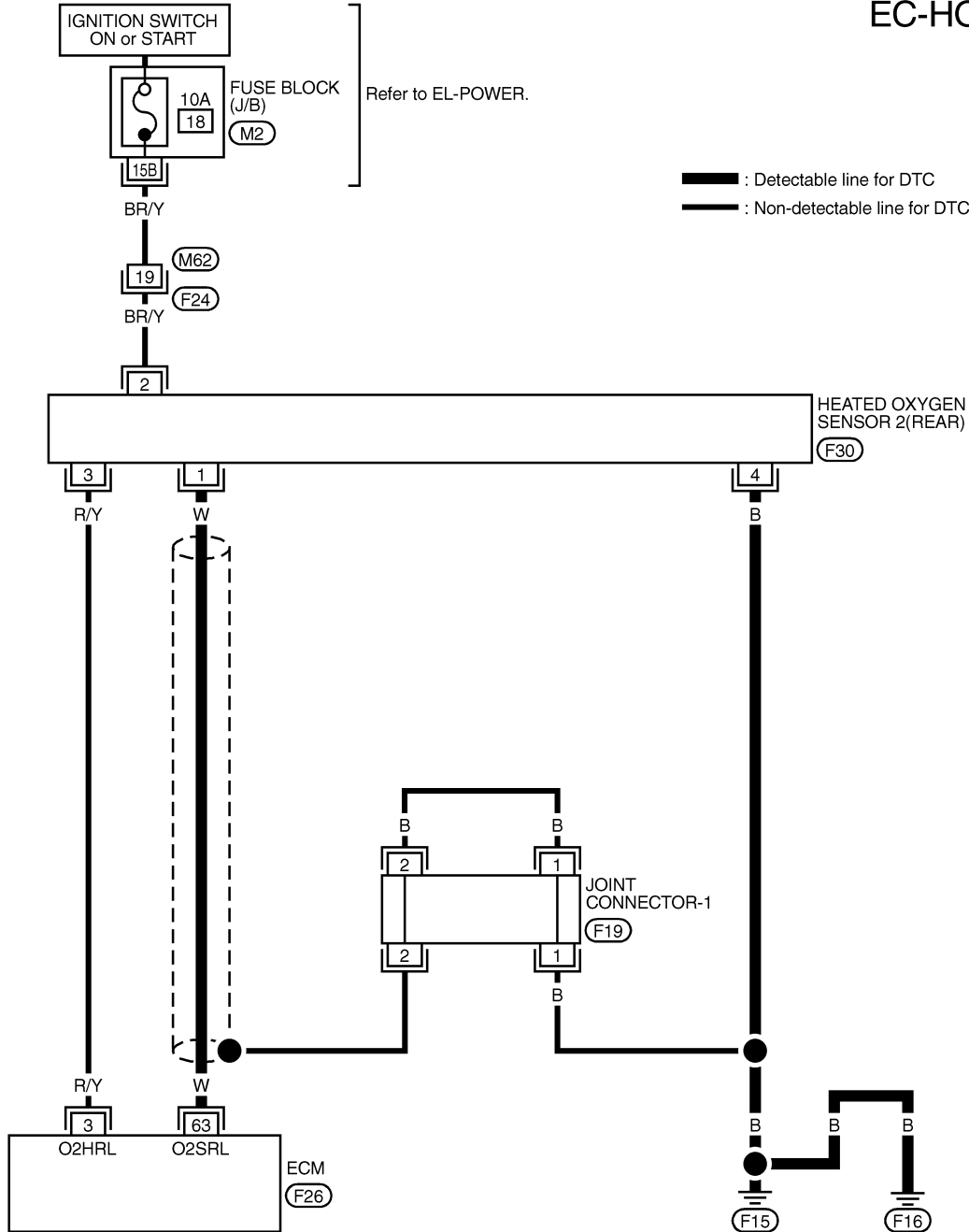
BT

HA

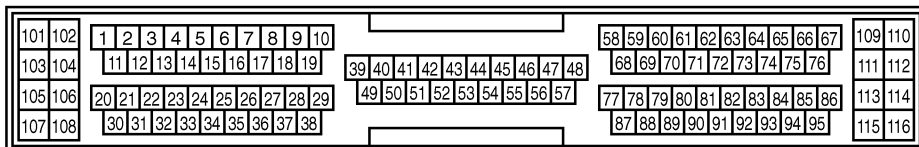
SC

EL

IDX



REFER TO THE FOLLOWING.
 M2 - FUSE BLOCK-JUNCTION BOX (J/B)



TEC839

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

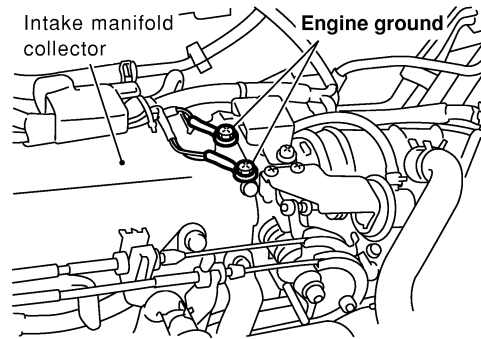
Diagnostic Procedure

Diagnostic Procedure

NCEC0151

1 RETIGHTEN GROUND SCREWS

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



SEF839X



GO TO 2.

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

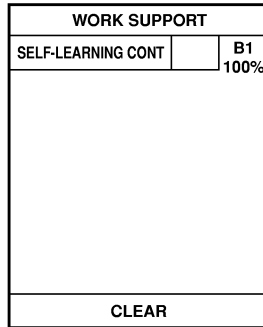
Diagnostic Procedure (Cont'd)

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

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".

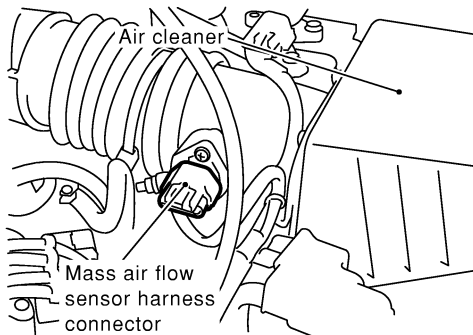


SEF215Z

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.



SEF840X

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-79.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

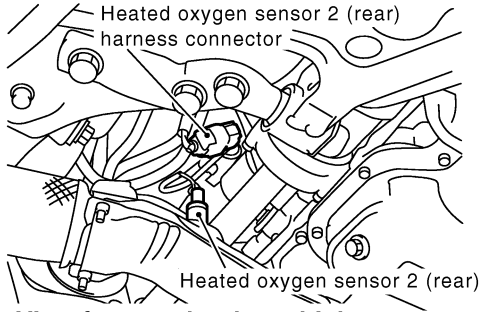
Is the 1st trip DTC P0172 detected? Is it difficult to start engine?

Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0172. Refer to EC-279.
No	▶	GO TO 3.

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

Diagnostic Procedure (Cont'd)

3	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 2 (rear) harness connector and ECM harness connector.</p> <div style="text-align: center;">  <p style="text-align: center;">View from under the vehicle</p> </div> <p style="text-align: right;">SEF918Z</p>		
<p>3. Check harness continuity between ECM terminal 63 and HO2S2 terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Check harness continuity between ECM terminal 63 (or HO2S2 terminal 1) and ground. Refer to Wiring Diagram. Continuity should not exist.</p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK		▶ GO TO 4.
NG		▶ Repair open circuit or short to ground or short to power in harness or connectors.

4	CHECK GROUND CIRCUIT	
<p>1. Check harness continuity between HO2S2 terminal 4 and body ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK		▶ GO TO 5.
NG		▶ Repair open circuit or short to power in harness or connectors.

5	CHECK HEATED OXYGEN SENSOR 2 (REAR)	
<p>Refer to "Component Inspection", EC-243.</p> <p style="text-align: center;">OK or NG</p>		
OK		▶ GO TO 6.
NG		▶ Replace heated oxygen sensor 2 (rear).

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

Diagnostic Procedure (Cont'd)

6	CHECK SHIELD CIRCUIT	
	1. Turn ignition switch "OFF". 2. Disconnect joint connector-1. 3. Check the following. <ul style="list-style-type: none"> ● Continuity between joint connector-1 terminal 2 and ground Refer to Wiring Diagram. ● Joint connector-1 (Refer to EL-274, "HARNESS LAYOUT".) Continuity should exist. 4. Also check harness for short to power. 5. Then reconnect joint connector-1.	
	OK or NG	
OK	▶	GO TO 7.
NG	▶	Repair open circuit or short to power in harness or connectors.

GI
MA
EM
LC
EC

7	CHECK INTERMITTENT INCIDENT	
	Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
	▶	INSPECTION END

FE
CL
MT

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

Component Inspection HEATED OXYGEN SENSOR 2 (REAR)

NCEC0152
NCEC0152S01

AT
AX
SU
BR

Ⓜ With CONSULT-II

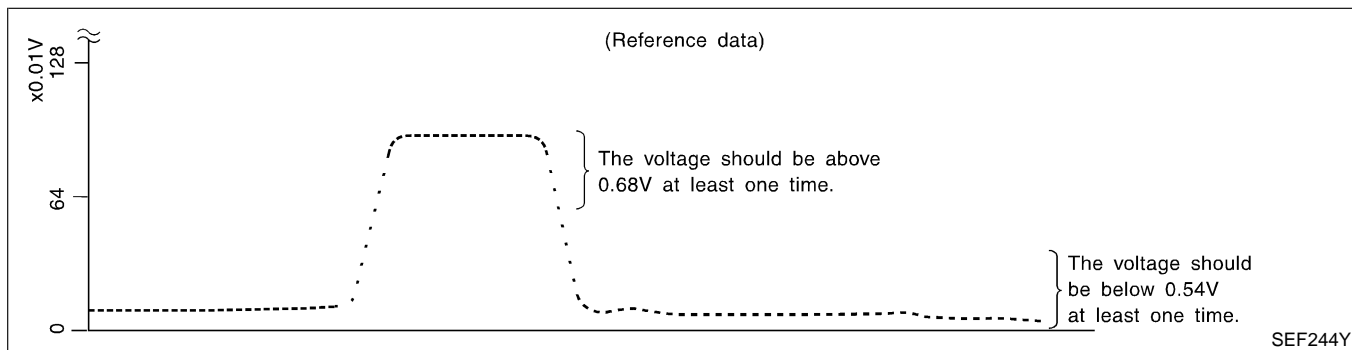
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%. "HO2S2 (B1)" should be below 0.54V 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.

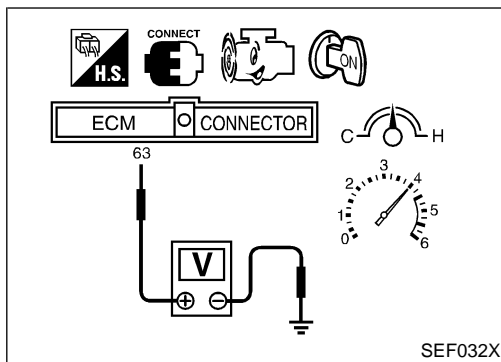
RS
BT
HA



SC
EL
IDX

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

Component Inspection (Cont'd)



⊗ Without CONSULT-II

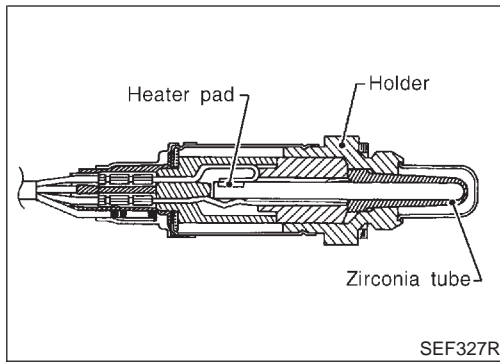
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.68V at least once.
If the voltage is above 0.68V at step 4, step 5 is not necessary.
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should be below 0.54V at least once.

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.

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

Component Description



Component Description

NCEC0153

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2 (rear).

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 (rear) is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NCEC0154

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 (B1)	● Engine: After warming up	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)	Revsing engine from idle to 3,000 rpm	LEAN ↔ RICH

ECM Terminals and Reference Value

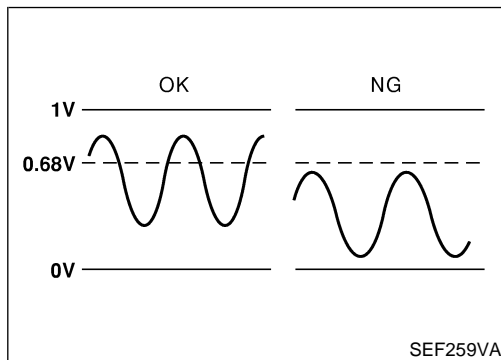
NCEC0155

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	W	Heated oxygen sensor 2 (rear)	[Engine is running] ● After warming up to normal operating temperature and engine speed is 2,000 rpm	0 - Approximately 1.0V



On Board Diagnosis Logic

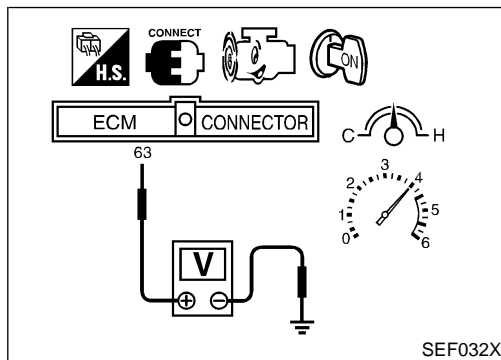
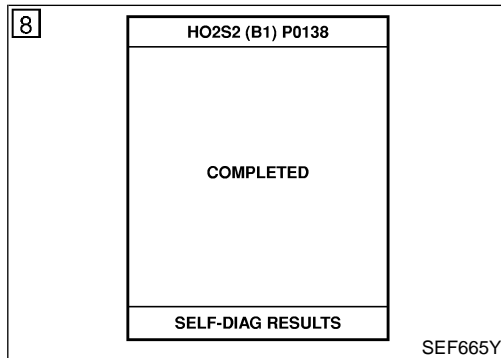
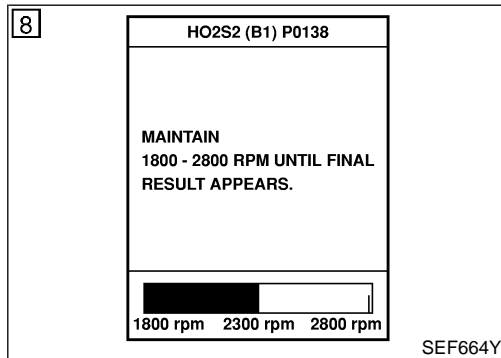
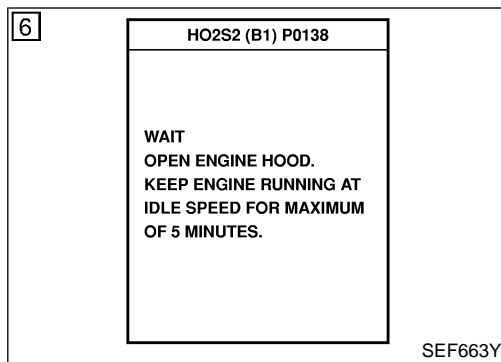
NCEC0156

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2 (rear), ECM monitors whether the maximum voltage of the sensor is sufficiently high during various driving conditions such as fuel-cut.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0138	● The maximum voltage from the sensor does not reach the specified voltage.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 2 (rear) ● Fuel pressure ● Injectors ● Intake air leaks

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

DTC Confirmation Procedure



DTC Confirmation Procedure

NCEC0157

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) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S2 (B1) P0138" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".
If NG is displayed, refer to "Diagnostic Procedure", EC-248.
If "CANNOT BE DIAGNOSED" is displayed, perform the following.
 - a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
 - b) Turn ignition switch "ON".
 - c) Select "DATA MONITOR" mode with CONSULT-II.
 - d) Start engine.
 - e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NCEC0158

Use this procedure to check the overall function of the heated oxygen sensor 2 (rear) circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving engine 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 0.68V at least once during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
- 5) Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should be above 0.68V at least once during this procedure.
- 6) If NG, go to "Diagnostic Procedure", EC-248.

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

Wiring Diagram

Wiring Diagram

NCEC0159

EC-HO2S2-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

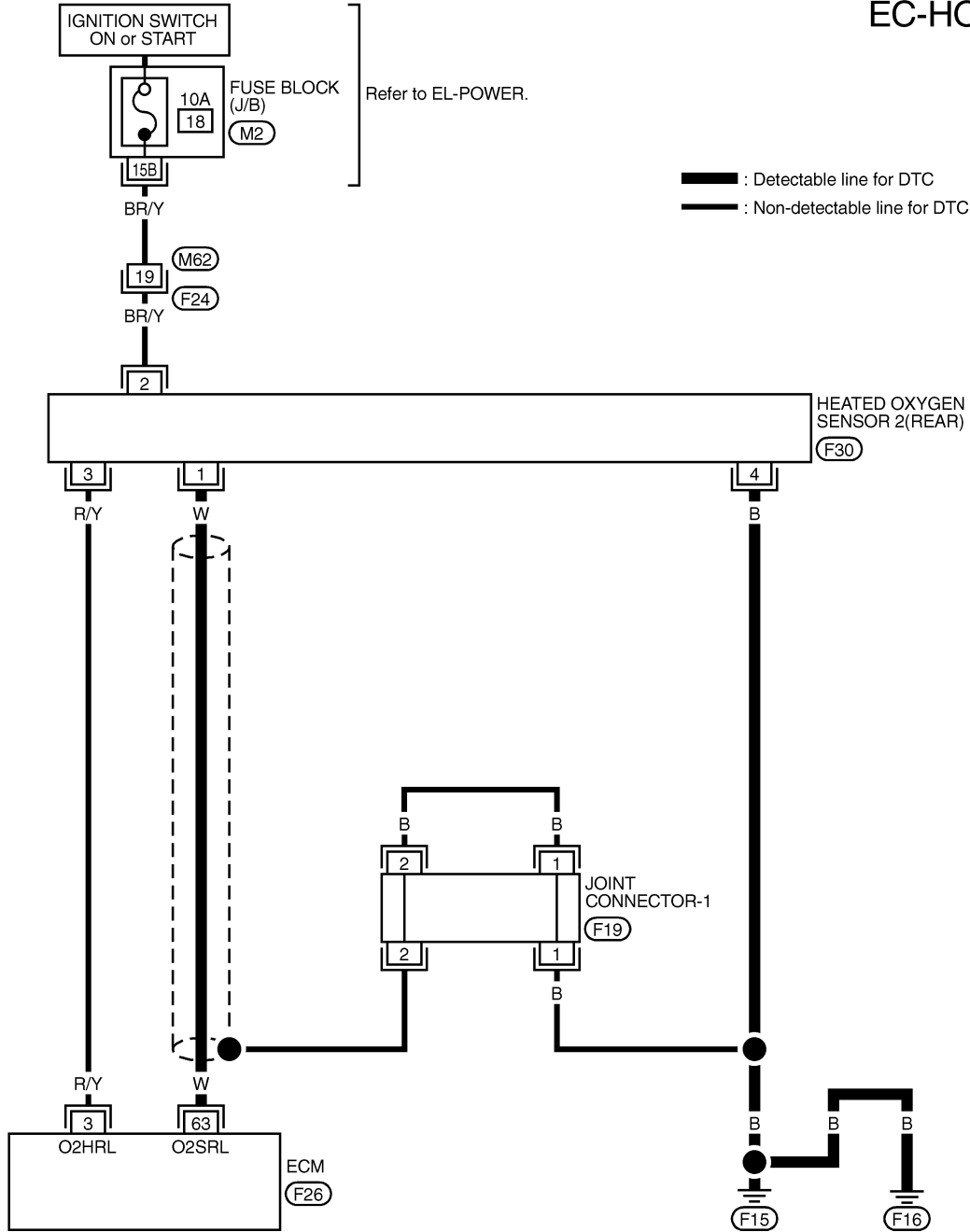
BT

HA

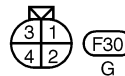
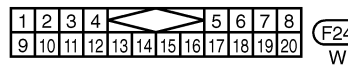
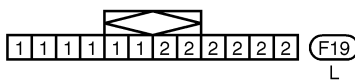
SC

EL

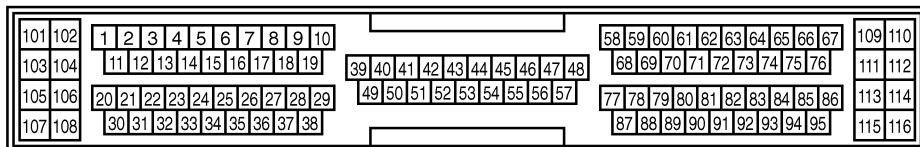
IDX



— : Detectable line for DTC
 - - - : Non-detectable line for DTC



REFER TO THE FOLLOWING.
 (M2) - FUSE BLOCK-JUNCTION BOX (J/B)



TEC839

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

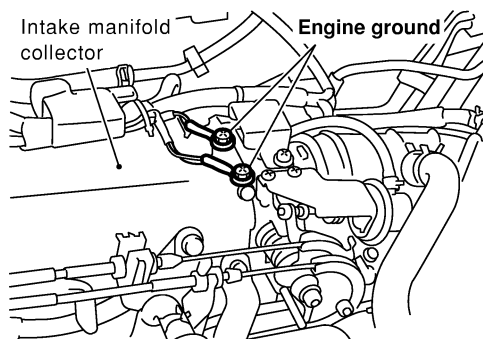
Diagnostic Procedure

Diagnostic Procedure

NCEC0160

1 RETIGHTEN GROUND SCREWS

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



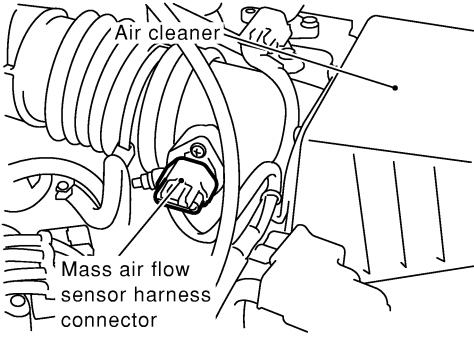
SEF839X



GO TO 2.

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

Diagnostic Procedure (Cont'd)

2	CLEAR THE SELF-LEARNING DATA							
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II. Clear the self-learning control coefficient by touching "CLEAR". 								
<table border="1"> <tr> <th colspan="2">WORK SUPPORT</th> </tr> <tr> <td>SELF-LEARNING CONT</td> <td>B1 100%</td> </tr> <tr> <td colspan="2" style="text-align: center;">CLEAR</td> </tr> </table>			WORK SUPPORT		SELF-LEARNING CONT	B1 100%	CLEAR	
WORK SUPPORT								
SELF-LEARNING CONT	B1 100%							
CLEAR								
<p>4. Run engine for at least 10 minutes at idle speed.</p> <p>Is the 1st trip DTC P0171 detected? Is it difficult to start engine?</p>								
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Turn ignition switch "OFF". Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed. 								
								
<p>4. Stop engine and reconnect mass air flow sensor harness connector.</p> <p>5. Make sure 1st trip DTC P0100 is displayed.</p> <p>6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-79.</p> <p>7. Make sure DTC P0000 is displayed.</p> <p>8. Run engine for at least 10 minutes at idle speed.</p> <p>Is the 1st trip DTC P0171 detected? Is it difficult to start engine?</p>								
Yes or No								
Yes	▶	Perform trouble diagnosis for DTC P0171. Refer to EC-272.						
No	▶	GO TO 3.						

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

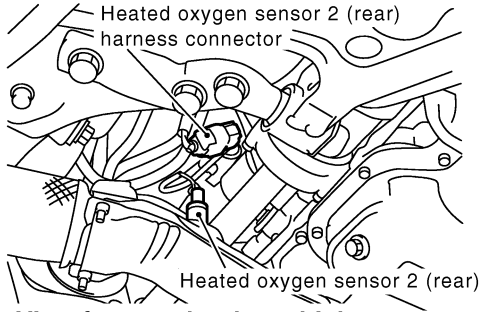
SC

EL

IDX

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

Diagnostic Procedure (Cont'd)

3	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 2 (rear) harness connector and ECM harness connector.</p> <div style="text-align: center;">  <p style="text-align: center;">View from under the vehicle</p> </div> <p style="text-align: right;">SEF918Z</p>		
<p>3. Check harness continuity between ECM terminal 63 and HO2S2 terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Check harness continuity between ECM terminal 63 (or HO2S2 terminal 1) and ground. Refer to Wiring Diagram. Continuity should not exist.</p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK		▶ GO TO 4.
NG		▶ Repair open circuit or short to ground or short to power in harness or connectors.

4	CHECK GROUND CIRCUIT	
<p>1. Check harness continuity between HO2S2 terminal 4 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK		▶ GO TO 5.
NG		▶ Repair open circuit or short to power in harness or connectors.

5	CHECK HEATED OXYGEN SENSOR 2 (REAR)	
<p>Refer to "Component Inspection", EC-251.</p> <p style="text-align: center;">OK or NG</p>		
OK		▶ GO TO 6.
NG		▶ Replace heated oxygen sensor 2 (rear).

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

Diagnostic Procedure (Cont'd)

6	CHECK SHIELD CIRCUIT	
	1. Turn ignition switch "OFF". 2. Disconnect joint connector-1. 3. Check the following. <ul style="list-style-type: none"> ● Continuity between joint connector-1 terminal 2 and ground Refer to Wiring Diagram. ● Joint connector-1 (Refer to EL-274, "HARNESS LAYOUT".) Continuity should exist. 4. Also check harness for short to power. 5. Then reconnect joint connector-1.	
	OK or NG	
OK	▶	GO TO 7.
NG	▶	Repair open circuit or short to power in harness or connectors.

GI
MA
EM
LC
EC

7	CHECK INTERMITTENT INCIDENT	
	Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
	▶	INSPECTION END

FE
CL
MT

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

Component Inspection HEATED OXYGEN SENSOR 2 (REAR)

NCEC0161
NCEC0161S01

Ⓜ With CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes..
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

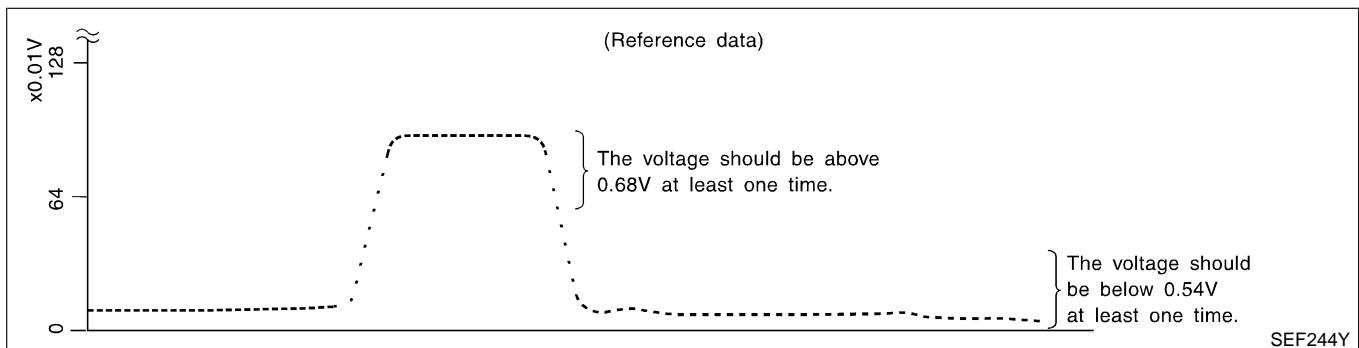
"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.

"HO2S2 (B1)" should be below 0.54V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

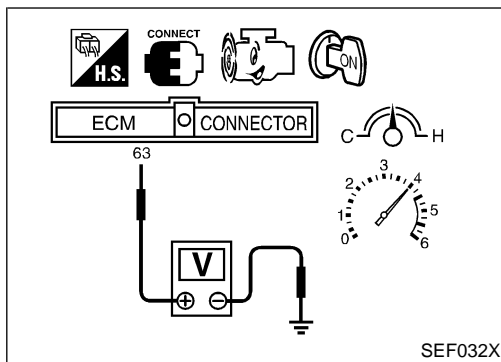
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved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

AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX



DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

Component Inspection (Cont'd)



⊗ Without CONSULT-II

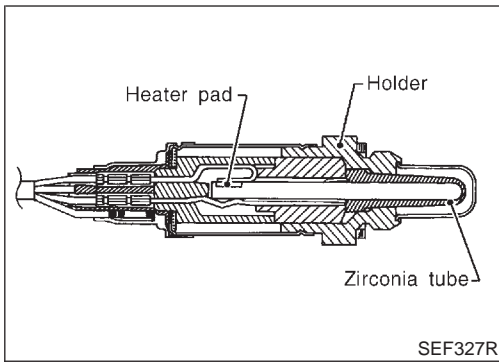
- 1) Start engine and drive vehicle at a speed of 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.68V at least once.
If the voltage is above 0.68V at step 4, step 5 is not necessary.
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should be below 0.54V at least once.

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.

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

Component Description



Component Description

NCEC0162

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2 (rear).

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 (rear) is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NCEC0163

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> Engine: After warming up Revving engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)		LEAN ↔ RICH

ECM Terminals and Reference Value

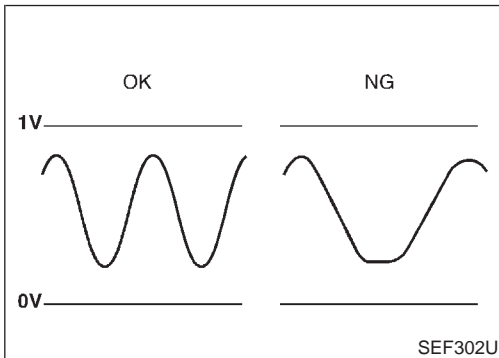
NCEC0164

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)
63	W	Heated oxygen sensor 2 (rear)	[Engine is running] <ul style="list-style-type: none"> After warming up to normal operating temperature and revving engine from idle to 2,000 rpm 	0 - Approximately 1.0V



On Board Diagnosis Logic

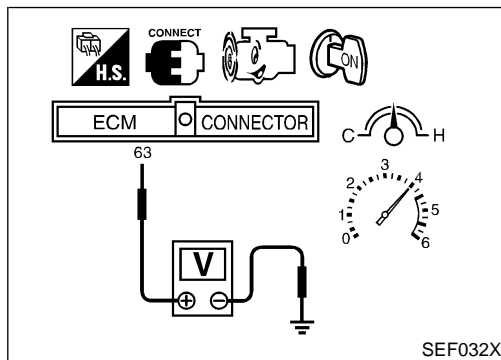
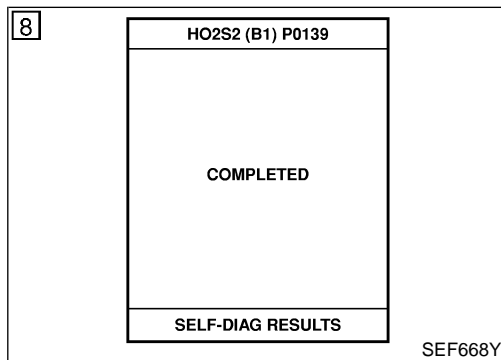
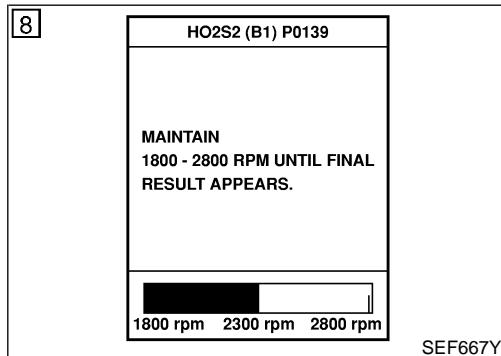
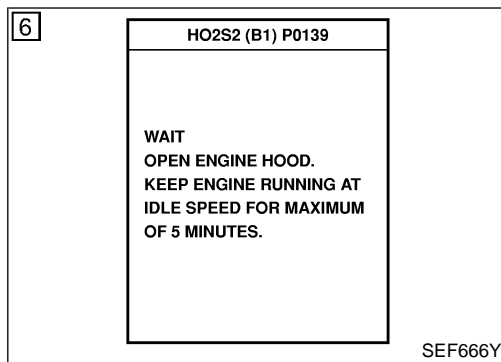
NCEC0165

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2 (rear), ECM monitors whether the switching response of the sensor's voltage is faster than specified during various driving conditions such as fuel-cut.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0139	<ul style="list-style-type: none"> It takes more than the specified time for the sensor to respond between rich and lean. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 2 (rear) Fuel pressure Injectors Intake air leaks

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

DTC Confirmation Procedure



DTC Confirmation Procedure

NCEC0166

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) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S2 (B1) P0139" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".
If NG is displayed, refer to "Diagnostic Procedure", EC-256.
If "CANNOT BE DIAGNOSED" is displayed, perform the following.
 - a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
 - b) Turn ignition switch "ON".
 - c) Select "DATA MONITOR" mode with CONSULT-II.
 - d) Start engine.
 - e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NCEC0167

Use this procedure to check the overall function of the heated oxygen sensor 2 (rear) circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) 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 change at more than 0.06V for 1 second during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
- 5) Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should change at more than 0.06V for 1 second during this procedure.
- 6) If NG, go to "Diagnostic Procedure", EC-256.

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

Wiring Diagram

Wiring Diagram

NCEC0168

EC-HO2S2-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

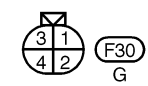
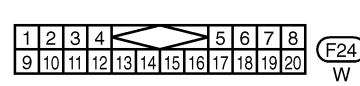
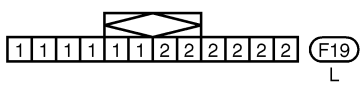
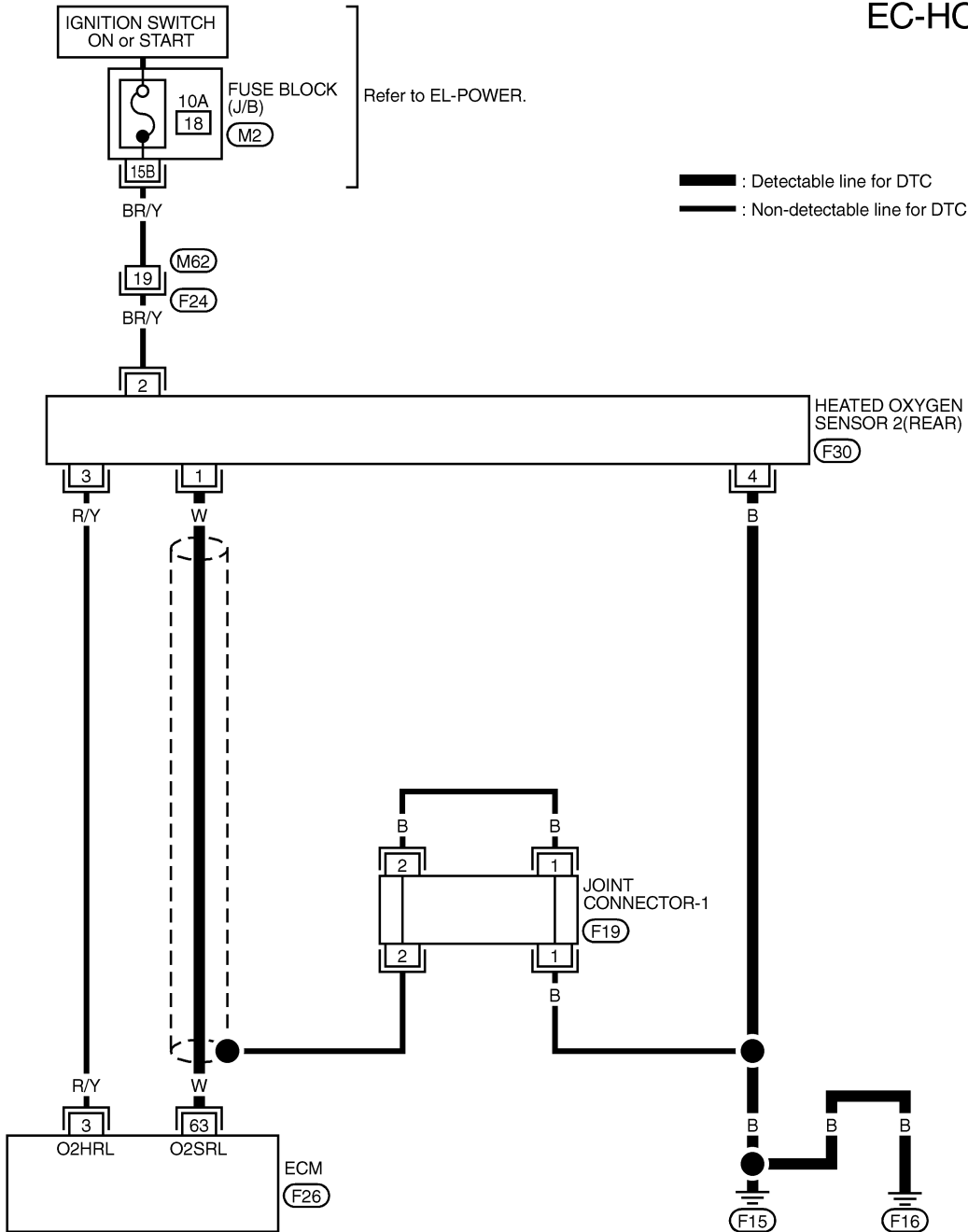
BT

HA

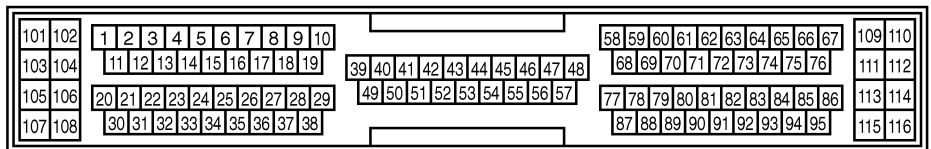
SC

EL

IDX



REFER TO THE FOLLOWING.
 M2 - FUSE BLOCK-JUNCTION BOX (J/B)



DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

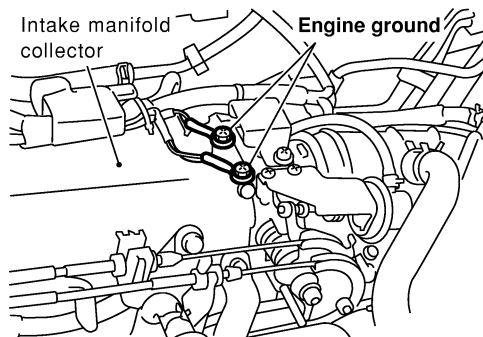
Diagnostic Procedure

Diagnostic Procedure

NCEC0169

1 RETIGHTEN GROUND SCREWS

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



SEF839X



GO TO 2.

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

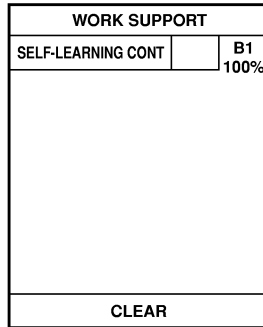
Diagnostic Procedure (Cont'd)

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

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".



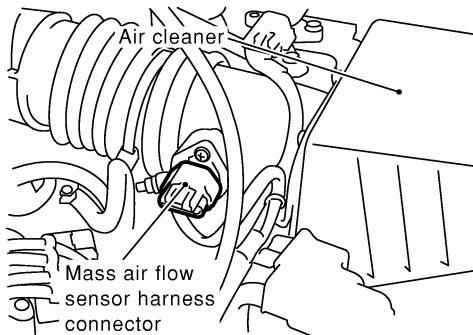
SEF215Z

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.



SEF840X

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-79.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

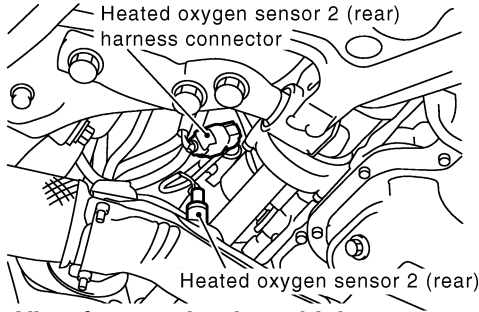
Is the 1st trip DTC P0172 detected? Is it difficult to start engine?

Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0172. Refer to EC-279.
No	▶	GO TO 3.

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

Diagnostic Procedure (Cont'd)

3		CHECK INPUT SIGNAL CIRCUIT
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 2 (rear) harness connector and ECM harness connector.</p> <div style="text-align: center;"><p>Heated oxygen sensor 2 (rear) harness connector</p><p>Heated oxygen sensor 2 (rear)</p><p>View from under the vehicle</p></div> <p style="text-align: right;">SEF918Z</p>		
<p>3. Check harness continuity between ECM terminal 63 and HO2S2 terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Check harness continuity between ECM terminal 63 (or HO2S2 terminal 1) and ground. Refer to Wiring Diagram. Continuity should not exist.</p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

4		CHECK GROUND CIRCUIT
<p>1. Check harness continuity between HO2S2 terminal 4 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	Repair open circuit or short to power in harness or connectors.

5		CHECK HEATED OXYGEN SENSOR 2 (REAR)
<p>Refer to "Component Inspection", EC-259.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	Replace heated oxygen sensor 2 (rear).

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

Diagnostic Procedure (Cont'd)

6	CHECK SHIELD CIRCUIT	
	1. Turn ignition switch "OFF". 2. Disconnect joint connector-1. 3. Check the following. <ul style="list-style-type: none"> ● Continuity between joint connector-1 terminal 2 and ground Refer to Wiring Diagram. ● Joint connector-1 (Refer to EL-274, "HARNESS LAYOUT".) Continuity should exist. 4. Also check harness for short to power. 5. Then reconnect joint connector-1.	
	OK or NG	
OK	▶	GO TO 7.
NG	▶	Repair open circuit or short to power in harness or connectors.

GI
MA
EM
LC
EC

7	CHECK INTERMITTENT INCIDENT	
	Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
	▶	INSPECTION END

FE
CL
MT

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

Component Inspection HEATED OXYGEN SENSOR 2 (REAR)

NCEC0170
NCEC0170S01

Ⓜ With CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

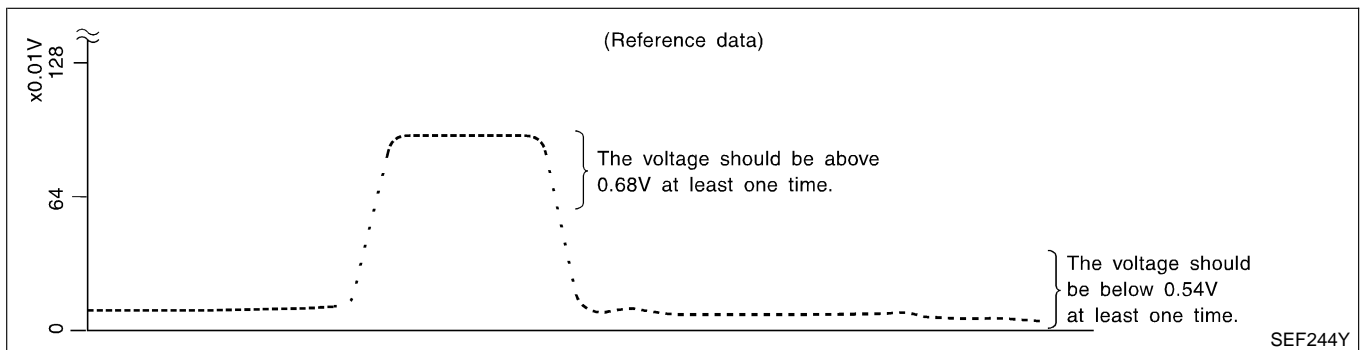
"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.

"HO2S2 (B1)" should be below 0.54V 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.

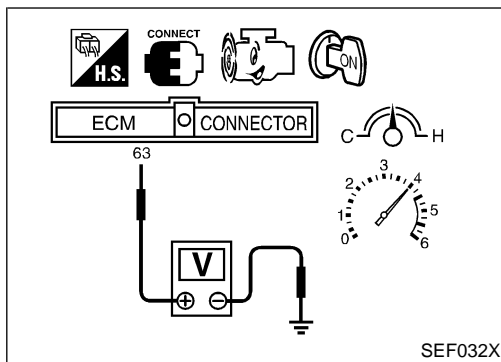
AT
AX
SU
BR
ST
RS
BT
HA



SC
EL
IDX

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

Component Inspection (Cont'd)



⊗ Without CONSULT-II

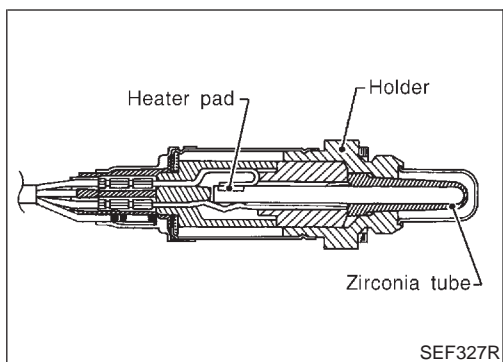
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.68V at least once.
If the voltage is above 0.68V at step 4, step 5 is not necessary.
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should be below 0.54V at least once.

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.

DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

Component Description



Component Description

NCEC0171

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2 (rear).

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 (rear) is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NCEC0172

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> Engine: After warming up Revving engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)		LEAN ↔ RICH

ECM Terminals and Reference Value

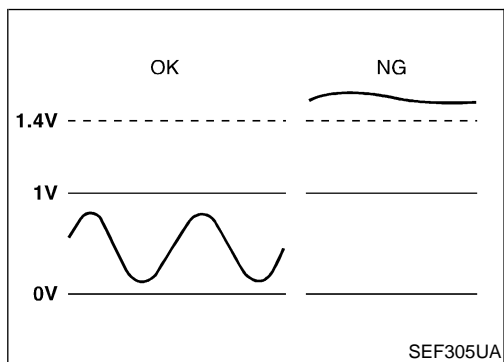
NCEC0173

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)
63	W	Heated oxygen sensor 2 (rear)	[Engine is running] <ul style="list-style-type: none"> After warming up to normal operating temperature and revving engine from idle to 2,000 rpm 	0 - Approximately 1.0V



On Board Diagnosis Logic

NCEC0174

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2 (rear), ECM monitors whether or not the voltage is too high during various driving conditions such as fuel-cut.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0140	<ul style="list-style-type: none"> An excessively high voltage from the sensor is sent to ECM. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 2 (rear)

DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

DTC Confirmation Procedure

5	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 Confirmation Procedure

NCEC0175

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

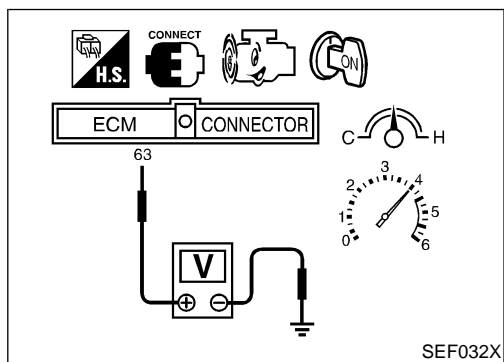
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 3) Stop vehicle with engine running.
- 4) Let engine idle for 1 minute.
- 5) Maintain the following conditions for at least 5 consecutive seconds.

ENG SPEED	1,400 - 3,400 rpm
VHCL SPEED SE	64 - 120 km/h (40 - 75 MPH)
B/FUEL SCHDL	0.5 - 3.9 msec
COOLAN TEMP/S	More than 70°C (158°F)
Selector lever	Suitable position

- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-264.



Overall Function Check

NCEC0176

Use this procedure to check the overall function of the heated oxygen sensor 2 (rear) circuit. During this check, a 1st trip DTC might not be confirmed.

Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage after 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 1.4V during this procedure.
- 5) If NG, go to "Diagnostic Procedure", EC-264.

DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

Wiring Diagram

Wiring Diagram

NCEC0177

EC-HO2S2-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

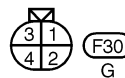
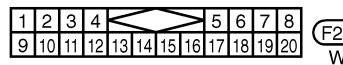
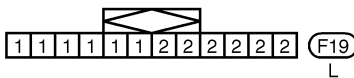
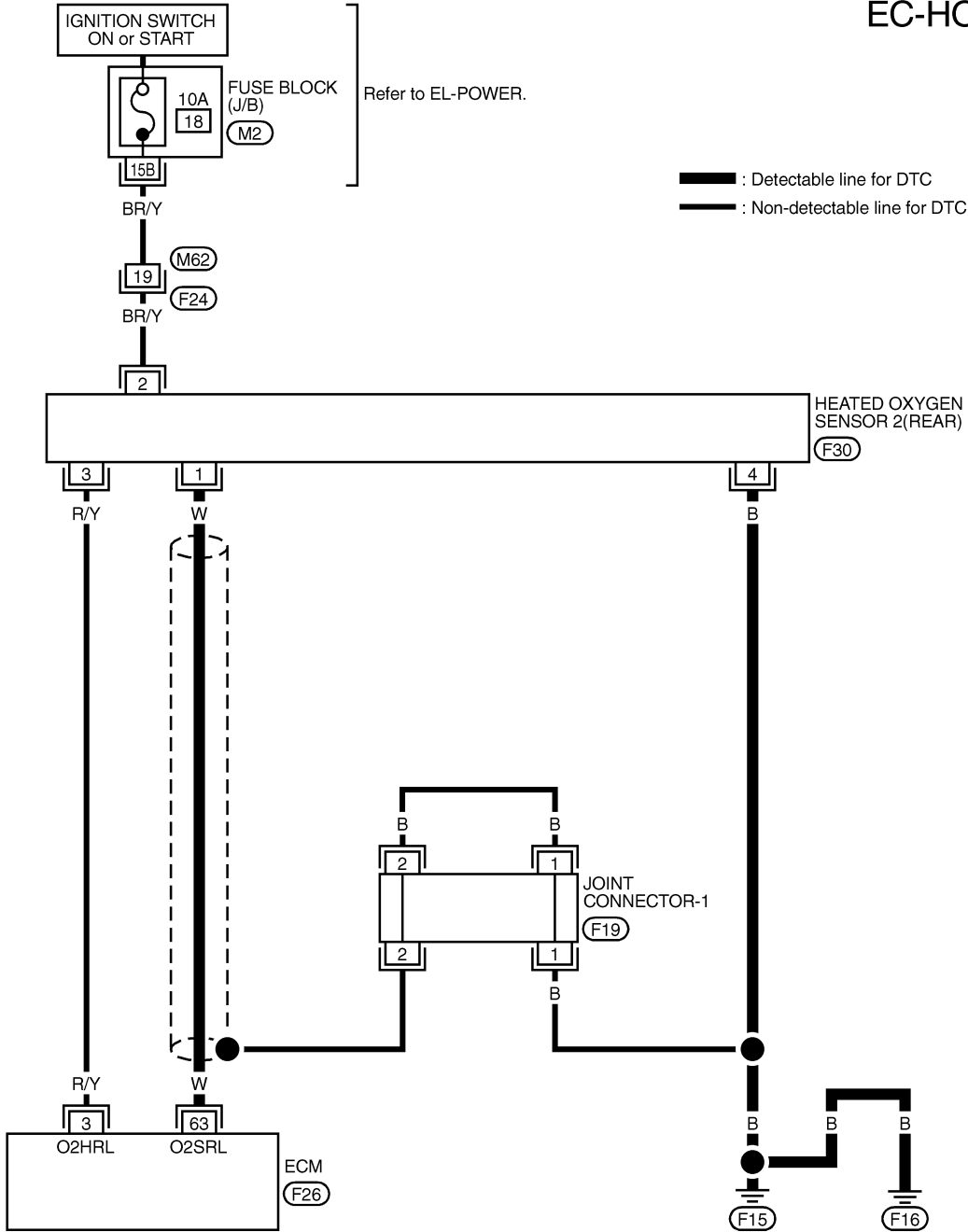
BT

HA

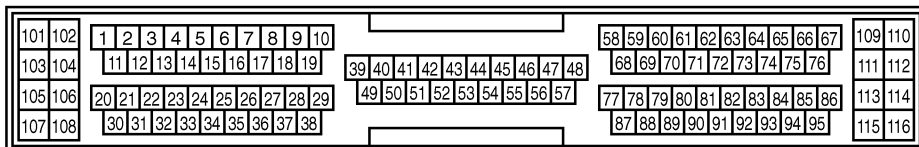
SC

EL

IDX



REFER TO THE FOLLOWING.
 (M2) - FUSE BLOCK-JUNCTION BOX (J/B)

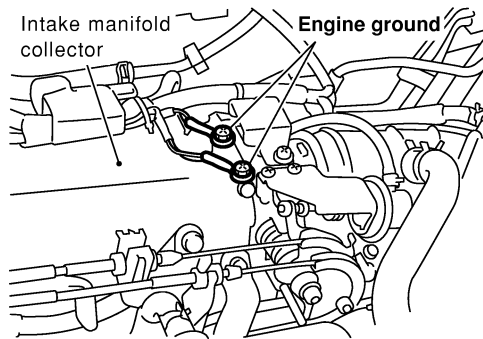


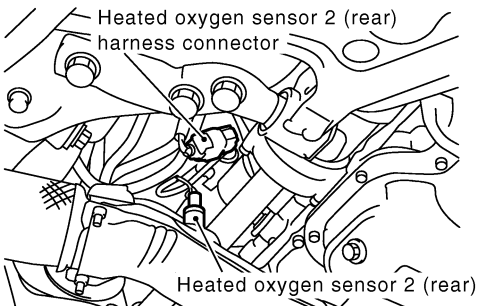
DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

Diagnostic Procedure

Diagnostic Procedure

NCEC0178

1	RETIGHTEN GROUND SCREWS
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws. 	
 <p>The diagram shows a top-down view of an engine compartment. Two ground screws are highlighted with circles and lines pointing to them. One is labeled 'Intake manifold collector' and the other is labeled 'Engine ground'.</p>	
SEF839X	
▶ GO TO 2.	

2	CHECK INPUT SIGNAL CIRCUIT
<ol style="list-style-type: none"> 1. Disconnect heated oxygen sensor 2 (rear) harness connector and ECM harness connector. 	
 <p>The diagram shows a view from underneath the vehicle. A heated oxygen sensor 2 (rear) harness connector is shown connected to the sensor. Labels include 'Heated oxygen sensor 2 (rear) harness connector' and 'Heated oxygen sensor 2 (rear)'. Below the diagram is the text 'View from under the vehicle'.</p>	
SEF918Z	
<ol style="list-style-type: none"> 2. Check harness continuity between ECM terminal 63 and HO2S2 terminal 1. Refer to Wiring Diagram. Continuity should exist. 3. Check harness continuity between ECM terminal 63 (or HO2S2 terminal 1) and ground. Refer to Wiring Diagram. Continuity should not 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 GROUND CIRCUIT
<ol style="list-style-type: none"> 1. Check harness continuity between HO2S2 terminal 4 and engine ground. Refer to Wiring Diagram. Continuity should exist. 2. 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.

DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

Diagnostic Procedure (Cont'd)

4	CHECK HARNESS CONNECTOR	
Check heated oxygen sensor 2 (rear) harness connector for water. Water should not exist.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair or replace harness connector.

5	CHECK HEATED OXYGEN SENSOR 2 (REAR)	
Refer to "Component Inspection", EC-265.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace heated oxygen sensor 2 (rear).

6	CHECK SHIELD CIRCUIT	
1. Turn ignition switch "OFF". 2. Disconnect joint connector-1. 3. Check the following. <ul style="list-style-type: none"> ● Continuity between joint connector-1 terminal 2 and ground Refer to Wiring Diagram. ● Joint connector-1 (Refer to EL-274, "HARNESS LAYOUT".) Continuity should exist. 4. Also check harness for short to power. 5. Then reconnect joint connector-1.		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair open circuit or short to power in harness or connectors.

7	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.		
		INSPECTION END

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

Component Inspection HEATED OXYGEN SENSOR 2 (REAR)

NCEC0179

NCEC0179S01

Ⓜ With CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

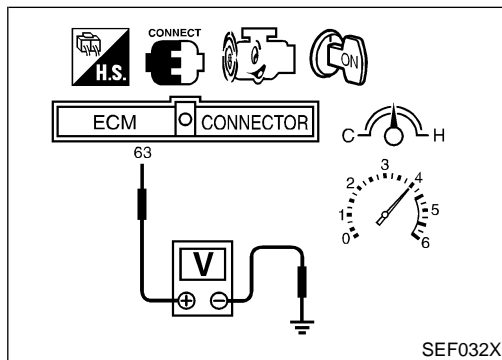
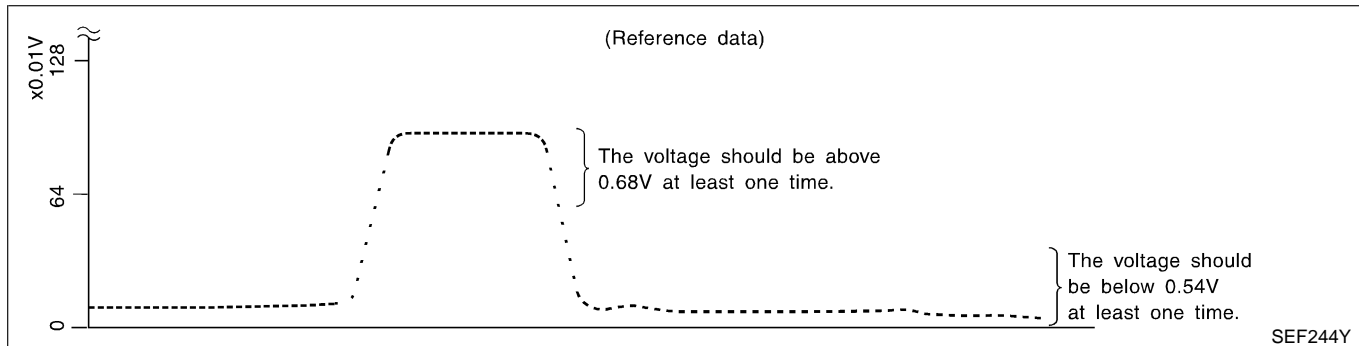
Component Inspection (Cont'd)

“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.

“HO2S2 (B1)” should be below 0.54V 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 drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) 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 0.68V at least once.
If the voltage is above 0.68V at step 4, step 5 is not necessary.
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with “OD” OFF (A/T).
The voltage should be below 0.54V at least once.

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.

DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

Description

Description

NCEC0180

SYSTEM DESCRIPTION

NCEC0180S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	Heated oxygen sensor 2 heater (rear) control	Heated oxygen sensor 2 heater (rear)

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater (rear) corresponding to the engine speed.

OPERATION

NCEC0180S02

Engine speed rpm	Heated oxygen sensor 2 heater (rear)
Above 3,600	OFF
Below 3,600	ON

CONSULT-II Reference Value in Data Monitor Mode

NCEC0181

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 HTR (B1)	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Engine speed: Above 3,600 rpm 	OFF
	<ul style="list-style-type: none"> Engine speed: Below 3,600 rpm [After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more] 	ON

ECM Terminals and Reference Value

NCEC0182

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/Y	Heated oxygen sensor 2 heater (rear)	[Engine is running] <ul style="list-style-type: none"> Engine speed is below 3,600 rpm After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more 	0 - 1.0V
			[Ignition switch "ON"] <ul style="list-style-type: none"> Engine stopped [Engine is running] <ul style="list-style-type: none"> Engine speed is above 3,600 rpm 	BATTERY VOLTAGE (11 - 14V)

On Board Diagnosis Logic

NCEC0183

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0141	<ul style="list-style-type: none"> The current amperage in the heated oxygen sensor 2 heater (rear) circuit is out of the normal range. [An improper voltage drop signal is sent to ECM through the heated oxygen sensor 2 heater (rear).] 	<ul style="list-style-type: none"> Harness or connectors [The heated oxygen sensor 2 heater (rear) circuit is open or shorted.] Heated oxygen sensor 2 heater (rear)

DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

DTC Confirmation Procedure

DTC Confirmation Procedure

NCEC0184

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 in between 10.5V and 16V at idle.

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

SEF175Y

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 3) Stop vehicle and let engine idle for at least 6 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-270.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle and let engine idle for at least 6 seconds.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 5) Stop vehicle and let engine idle for at least 6 seconds.
- 6) Select "MODE 3" with GST.
- 7) If DTC is detected, go to "Diagnostic Procedure", EC-270.

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 P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

Wiring Diagram

Wiring Diagram

NCEC0185

EC-HO2S2H-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

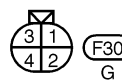
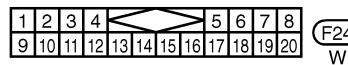
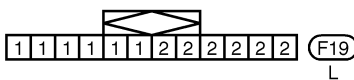
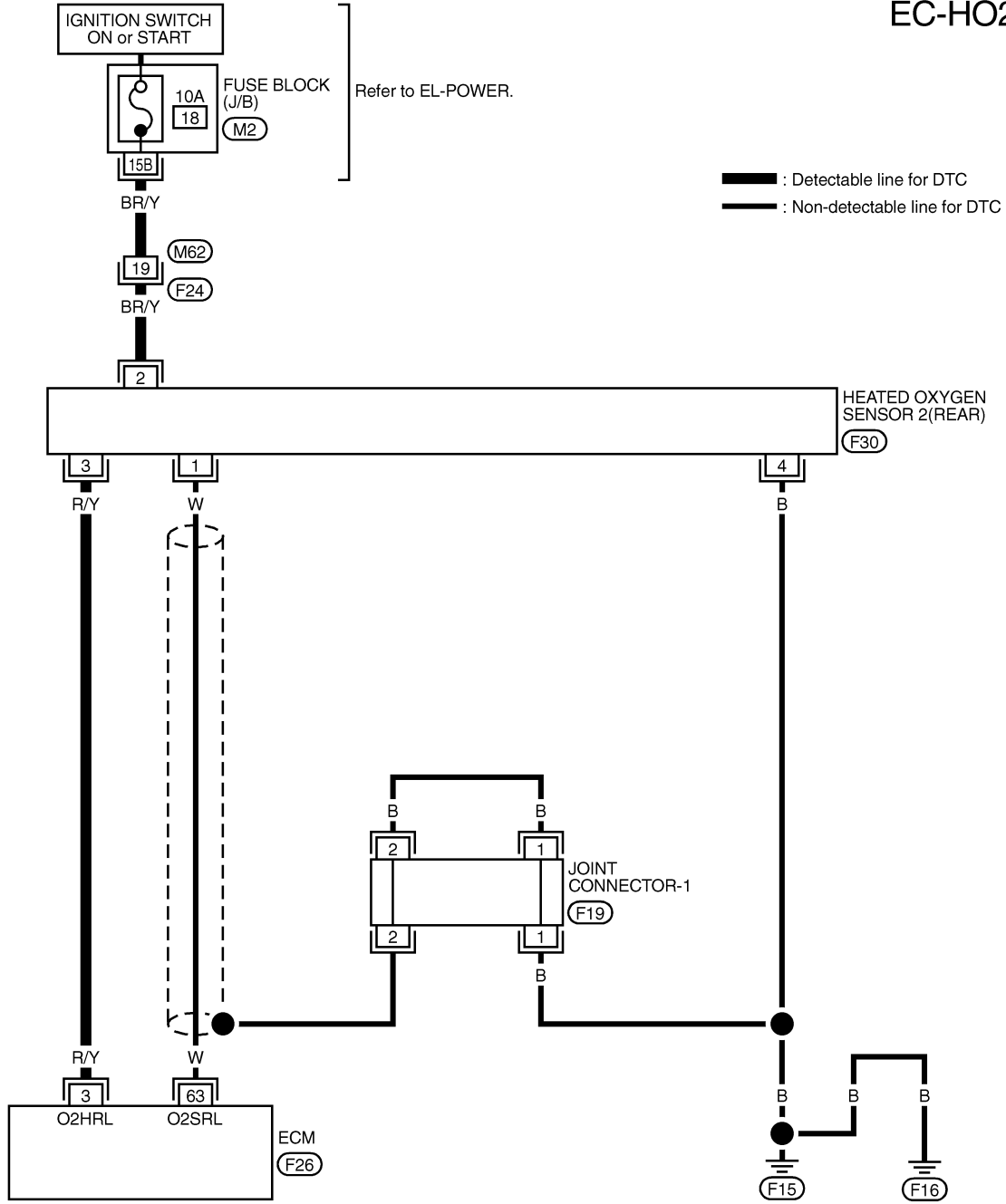
BT

HA

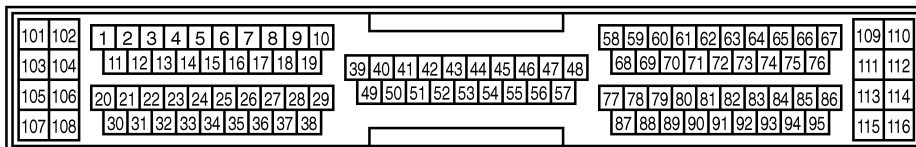
SC

EL

IDX



REFER TO THE FOLLOWING.
 (M2) - FUSE BLOCK-JUNCTION BOX (J/B)



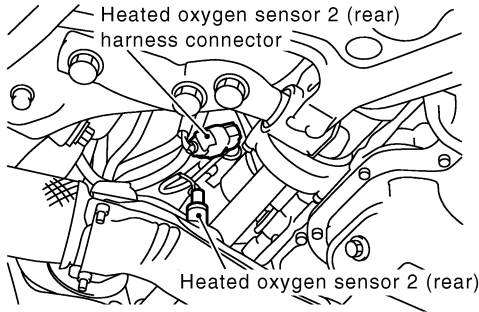
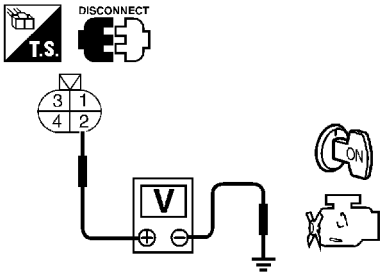
TEC840

DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

Diagnostic Procedure

Diagnostic Procedure

NCEC0186

1	CHECK POWER SUPPLY
<p>1. Turn ignition switch "OFF". 2. Disconnect heated oxygen sensor 2 (rear) harness connector.</p> <div style="text-align: center;">  <p>Heated oxygen sensor 2 (rear) harness connector</p> <p>Heated oxygen sensor 2 (rear)</p> <p>View from under the vehicle</p> </div> <p>3. Turn ignition switch "ON". 4. Check voltage between HO2S2 terminal 2 and ground.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> <p>OK or NG</p> </div>	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

SEF918Z

SEF218W

2	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M62, F24 ● Fuse block (J/B) connector M2 ● 10A fuse ● Harness for open or short between heated oxygen sensor 2 (rear) and fuse 	
▶	Repair harness or connectors.

3	CHECK OUTPUT SIGNAL CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between HO2S2 terminal 3 and ECM terminal 3. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 4.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

Diagnostic Procedure (Cont'd)

4	CHECK HEATED OXYGEN SENSOR 2 HEATER (REAR)	
Refer to "Component Inspection", EC-271.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace heated oxygen sensor 2 (rear).

5	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.		
	▶	INSPECTION END

GI
MA
EM
LC
EC

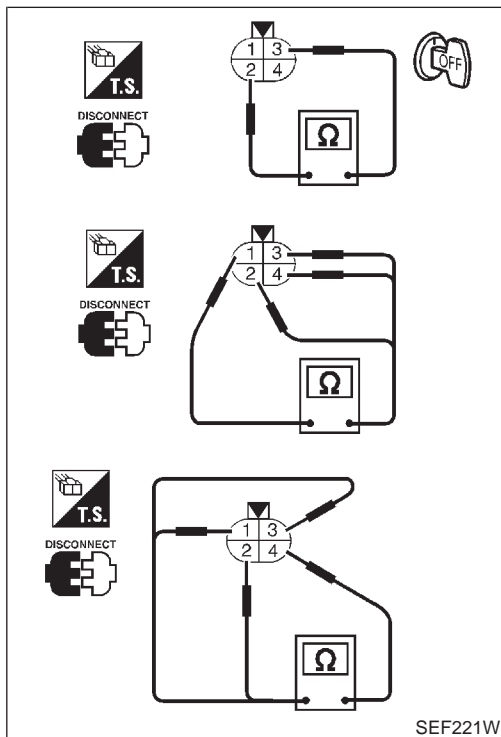
FE
CL
MT

AT
AX
SU

BR
ST

RS
BT
HA

SC
EL
IDX



Component Inspection

HEATED OXYGEN SENSOR 2 HEATER (REAR)

NCEC0187
NCEC0187S01

Check the following.

- Check resistance between terminals 2 and 3.
Resistance: 2.3 - 4.3Ω at 25°C (77°F)
- Check continuity.

Terminal No.	Continuity
1 and 2, 3, 4	No
4 and 1, 2, 3	

If NG, replace the heated oxygen sensor 2 (rear).

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.

DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

On Board Diagnosis Logic

On Board Diagnosis Logic

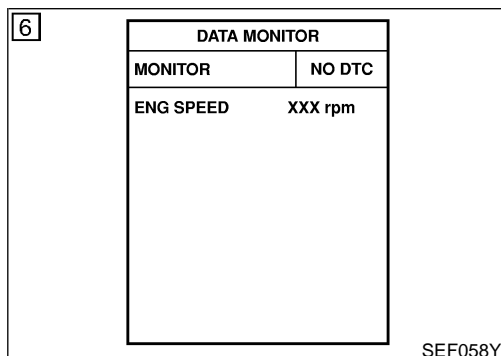
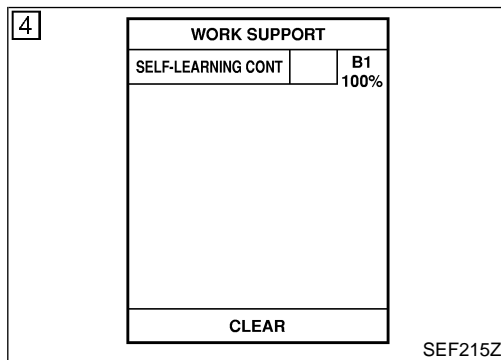
NCEC0188

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 (front). 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 sensor 1 (front)	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection & mixture ratio control	Injectors

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0171	<ul style="list-style-type: none"> Fuel injection system does not operate properly. The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.) 	<ul style="list-style-type: none"> Intake air leaks Heated oxygen sensor 1 (front) Injectors Exhaust gas leaks Incorrect fuel pressure Lack of fuel Mass air flow sensor Incorrect PCV hose connection



DTC Confirmation Procedure

NCEC0189

NOTE:

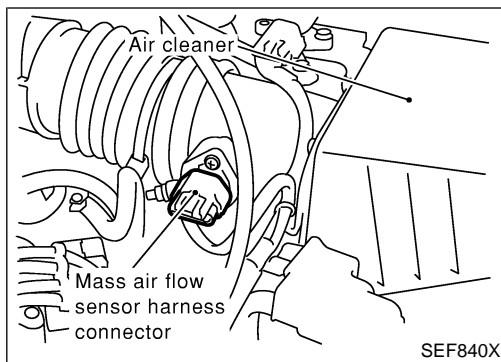
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

④ With CONSULT-II

- 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 "Diagnostic Procedure", EC-275.
- 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 "Diagnostic Procedure", EC-275. If engine does not start, visually check for exhaust and intake air leak.

DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

DTC Confirmation Procedure (Cont'd)



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 1st trip DTC P0100 is detected.
- 6) Select "MODE 4" with GST and erase the 1st trip DTC P0100.
- 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 "Diagnostic Procedure", EC-275.
- 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 "Diagnostic Procedure", EC-275. If engine does not start, visually check for exhaust and intake air leak.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

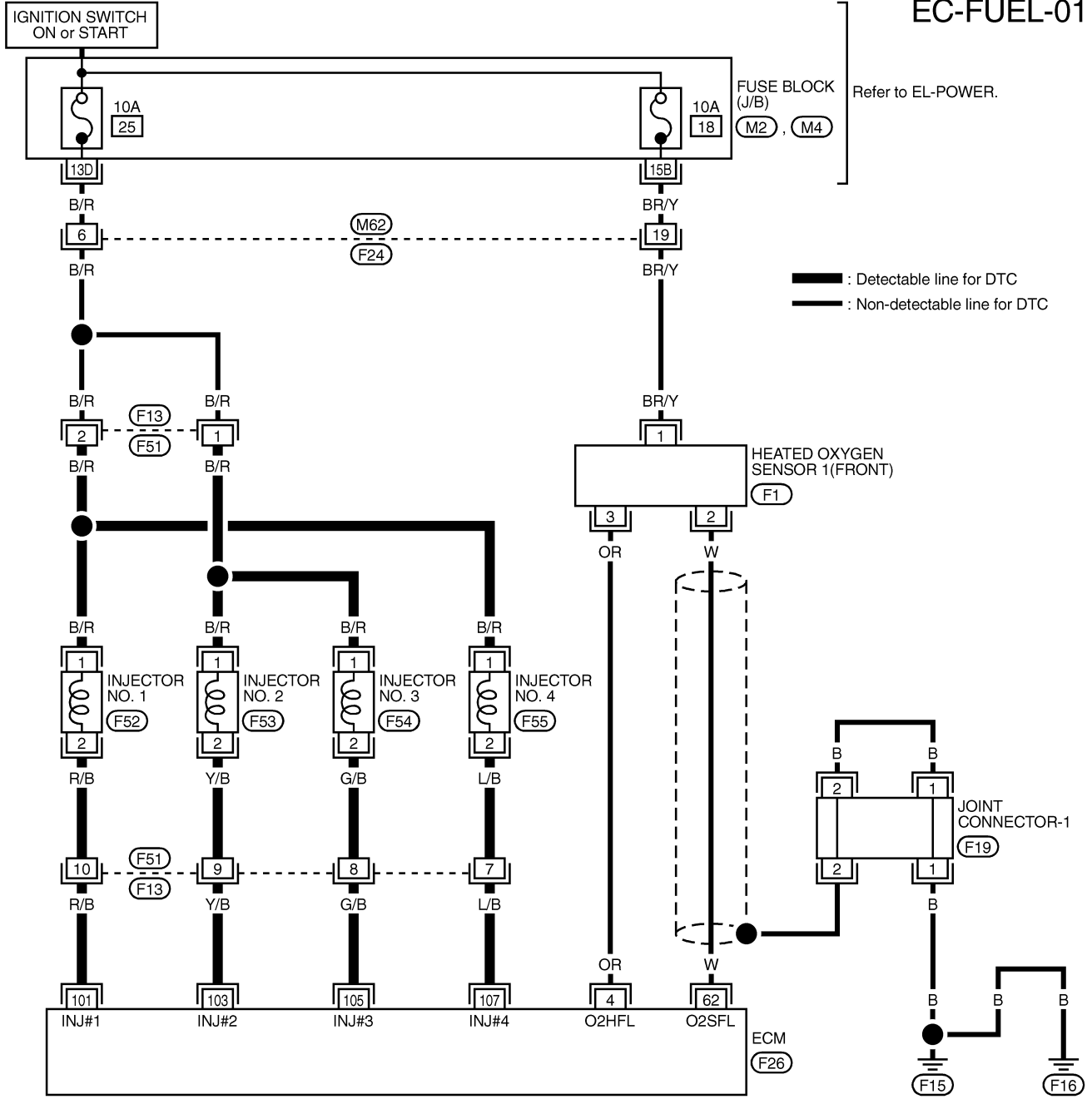
DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

Wiring Diagram

Wiring Diagram

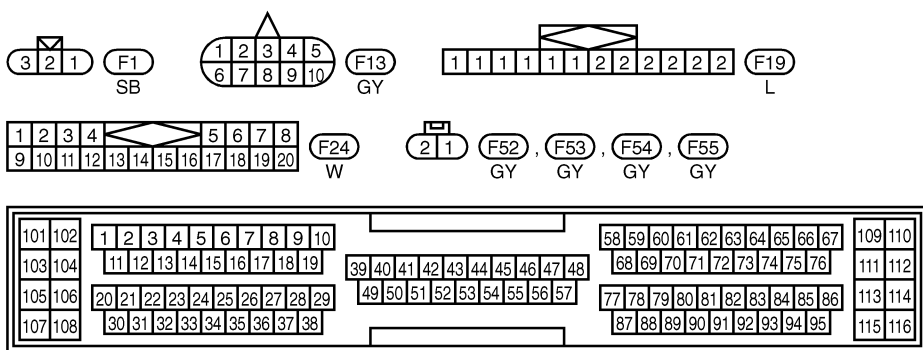
NCEC0190

EC-FUEL-01



: Detectable line for DTC
 : Non-detectable line for DTC

REFER TO THE FOLLOWING.
 (M2), (M4) - FUSE BLOCK-JUNCTION BOX (J/B)

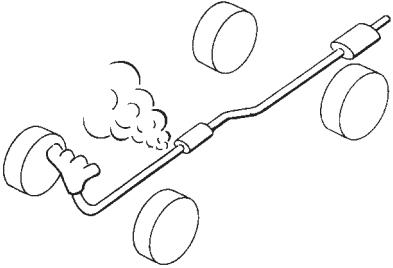


DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

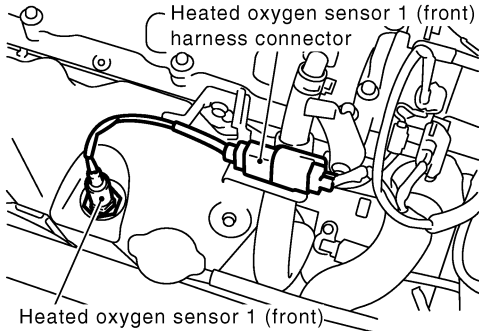
Diagnostic Procedure

Diagnostic Procedure

NCEC0191

1	CHECK EXHAUST AIR LEAK	
<p>1. Start engine and run it at idle. 2. Listen for an exhaust air leak before three way catalyst.</p>		
		
SEF099P		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair or replace.

2	CHECK FOR INTAKE AIR LEAK AND PCV HOSE	
<p>1. Listen for an intake air leak after the mass air flow sensor. 2. Check PCV hose connection.</p>		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Repair or replace.

3	CHECK HEATED OXYGEN SENSOR 1 (FRONT) CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect heated oxygen sensor 1 (front) harness connector and ECM harness connector.</p>		
		
SEF917Z		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.



GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

Diagnostic Procedure (Cont'd)

4	CHECK FUEL PRESSURE	
<p>1. Release fuel pressure to zero. Refer to EC-50.</p> <p>2. Install fuel pressure gauge and check fuel pressure.</p> <p style="margin-left: 20px;">At idling:</p> <p style="margin-left: 40px;">When fuel pressure regulator valve vacuum hose is connected. 235 kPa (2.4 kg/cm², 34 psi)</p> <p style="margin-left: 40px;">When fuel pressure regulator valve vacuum hose is disconnected. 294 kPa (3.0 kg/cm², 43 psi)</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Fuel pump and circuit (Refer to EC-605.) ● Fuel pressure regulator (Refer to EC-51.) ● Fuel lines. Refer to MA-16, "Checking Fuel Lines". ● Fuel filter for clogging 		
	▶	Repair or replace.

6	CHECK MASS AIR FLOW SENSOR	
<p> With CONSULT-II</p> <p>1. Install all removed parts.</p> <p>2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.</p> <p style="margin-left: 20px;">at idling: 2.5 - 5.0 g-m/sec</p> <p style="margin-left: 20px;">at 2,500 rpm: 7.1 - 12.5 g-m/sec</p>		
<p> With GST</p> <p>1. Install all removed parts.</p> <p>2. Check mass air flow sensor signal in MODE 1 with GST.</p> <p style="margin-left: 20px;">at idling: 2.5 - 5.0 g-m/sec</p> <p style="margin-left: 20px;">at 2,500 rpm: 7.1 - 12.5 g-m/sec</p> <p style="text-align: center;">OK or NG</p>		
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-154.

DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

Diagnostic Procedure (Cont'd)

7 CHECK FUNCTION OF INJECTORS

With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.

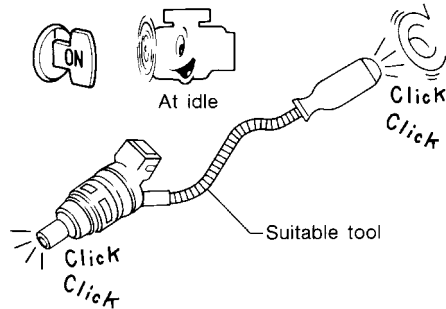
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
IACV-AAC/V	XXX step

SEF190Y

3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.



MEC703B

Clicking noise should be heard.

OK or NG

OK ► GO TO 8.

NG ► Perform trouble diagnosis for "INJECTORS", EC-596.

8 REMOVE INJECTOR

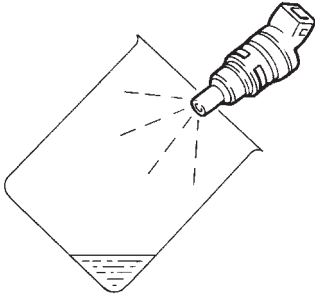
1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch "OFF".
3. Remove injector with fuel tube assembly. Refer to EC-51.
Keep fuel hose and all injectors connected to injector gallery. The injector harness connectors should remain connected.

► GO TO 9.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

Diagnostic Procedure (Cont'd)

9	CHECK INJECTOR
<p>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.</p>	
	
<p>Fuel should be sprayed evenly for each cylinder.</p>	
<p>SEF595Q</p>	
<p>OK or NG</p>	
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 "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
	▶ INSPECTION END

DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

On Board Diagnosis Logic

On Board Diagnosis Logic

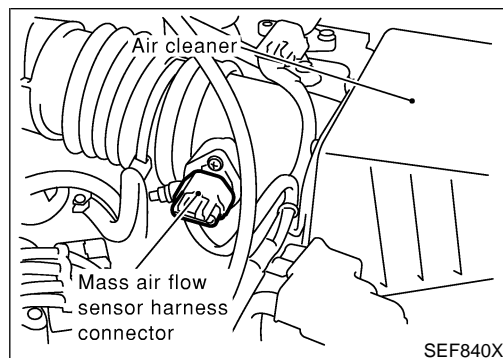
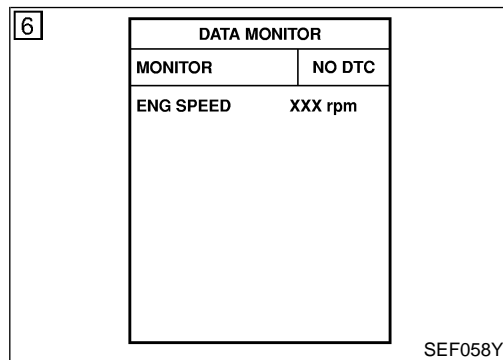
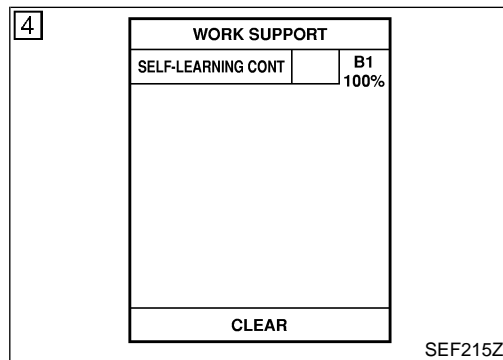
NCEC0192

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 (front). 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 sensor 1 (front)	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection & mixture ratio control	Injectors

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0172	<ul style="list-style-type: none"> Fuel injection system does not operate properly. The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.) 	<ul style="list-style-type: none"> Heated oxygen sensor 1 (front) Injectors Exhaust gas leaks Incorrect fuel pressure Mass air flow sensor



DTC Confirmation Procedure

NCEC0193

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 "Diagnostic Procedure", EC-282.
- 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 "Diagnostic Procedure", EC-282. 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.
- Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 3 seconds at idle speed.
- Stop engine and reconnect mass air flow sensor harness connector.
- Select "MODE 7" with GST. Make sure 1st trip DTC P0100 is detected.
- Select "MODE 4" with GST and erase the 1st trip DTC P0100.

DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

DTC Confirmation Procedure (Cont'd)

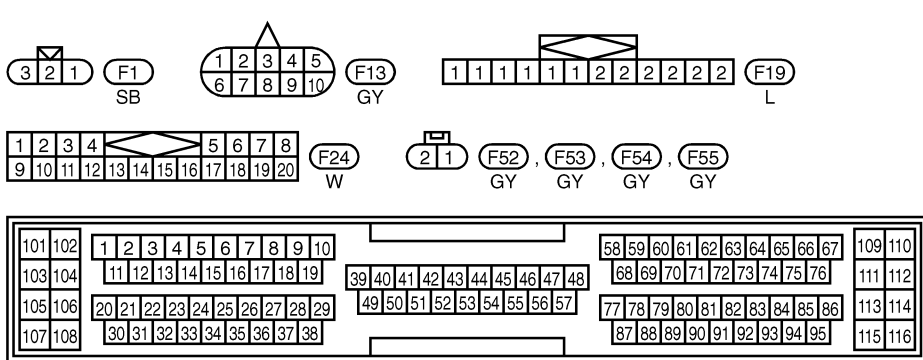
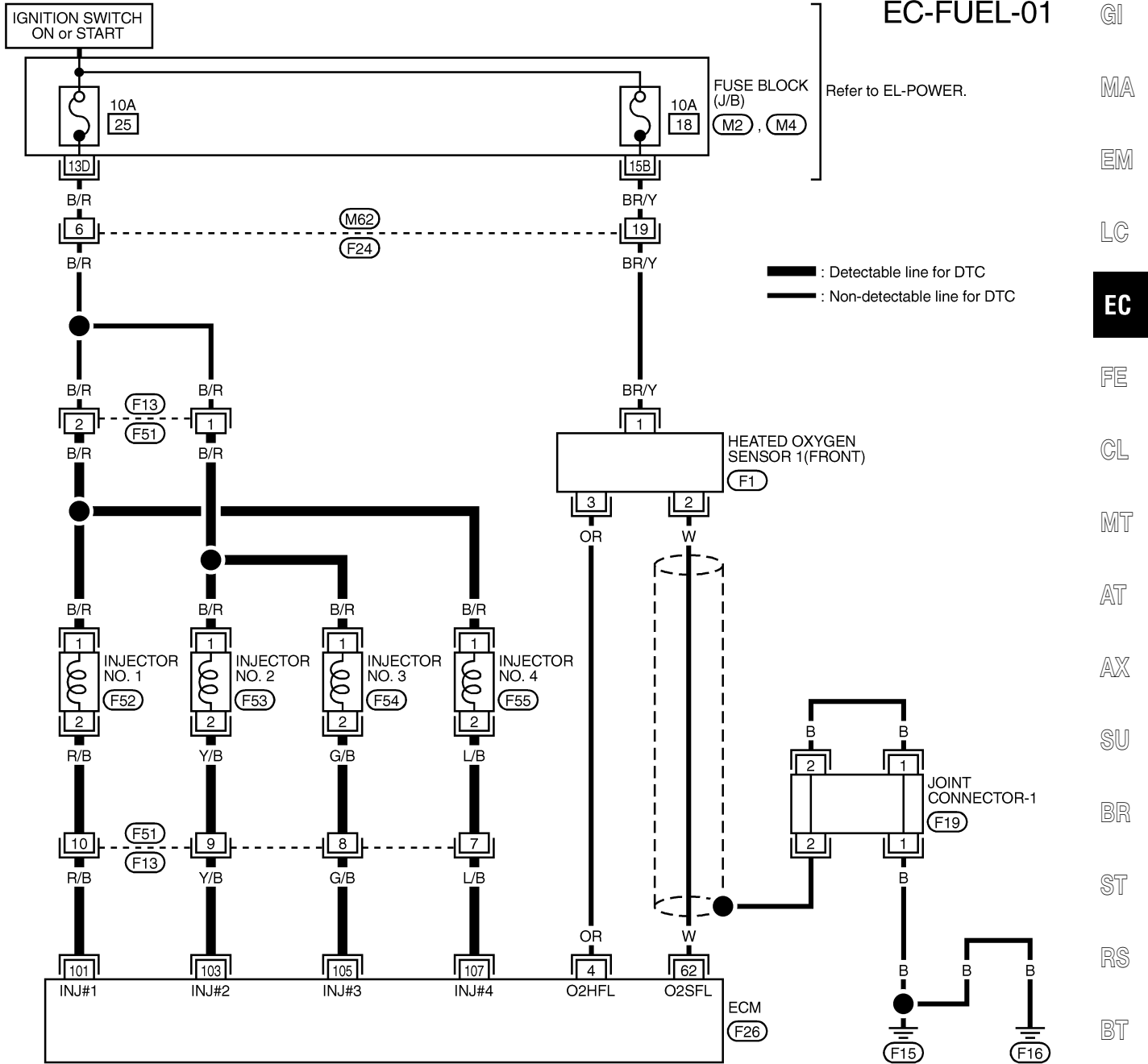
- 7) Start engine again and run it for at least 10 minutes at idle speed.
- 8) Select "MODE 7" with GST. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-282.
- 9) If it is difficult to start engine at step 8, the fuel injection system has a malfunction.
- 10) Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-282. If engine does not start, remove ignition plugs and check for fouling, etc.

DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

Wiring Diagram

Wiring Diagram

NCEC0194



REFER TO THE FOLLOWING.
M2, M4 - FUSE BLOCK-JUNCTION BOX (J/B)

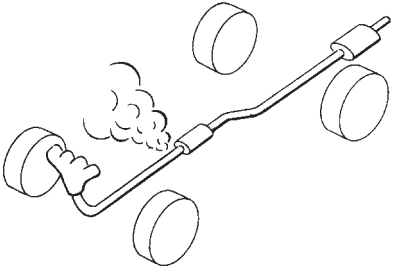
- GI
- MA
- EM
- LC
- EC**
- FE
- CL
- MT
- AT
- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX

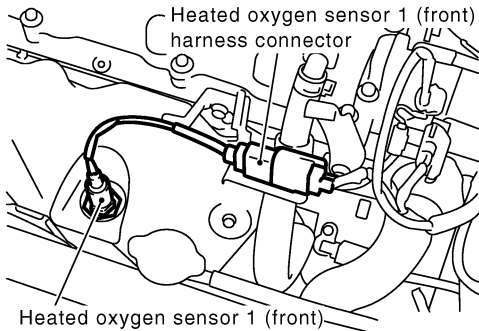
DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

Diagnostic Procedure

Diagnostic Procedure

NCEC0195

1	CHECK FOR EXHAUST AIR LEAK
<ol style="list-style-type: none">1. Start engine and run it at idle.2. Listen for an exhaust air leak before the three way catalyst.  <p style="text-align: right;">SEF099P</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 2.
NG	▶ Repair or replace.

2	CHECK HEATED OXYGEN SENSOR 1 (FRONT) CIRCUIT
<ol style="list-style-type: none">1. Turn ignition switch "OFF".2. Disconnect heated oxygen sensor 1 (front) harness connector and ECM harness connector.  <p style="text-align: right;">SEF917Z</p> <ol style="list-style-type: none">3. Check harness continuity between ECM terminal 62 and HO2S1 terminal 2. Refer to Wiring Diagram. Continuity should exist.4. Check harness continuity between ECM terminal 62 (or HO2S1 terminal 2) and ground. Refer to Wiring Diagram. Continuity should not exist.5. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)



Diagnostic Procedure (Cont'd)

3	CHECK FUEL PRESSURE
<p>1. Release fuel pressure to zero. Refer to EC-50.</p> <p>2. Install fuel pressure gauge and check fuel pressure.</p> <p>At idling:</p> <p>When fuel pressure regulator valve vacuum hose is connected. Approximately 235 kPa (2.4 kg/cm², 34 psi)</p> <p>When fuel pressure regulator valve vacuum hose is disconnected. Approximately 294 kPa (3.0 kg/cm², 43 psi)</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 5.
NG	▶ GO TO 4.

GI
MA
EM
LC
EC

4	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Fuel pump and circuit (Refer to EC-605.) ● Fuel pressure regulator (Refer to EC-51.) 	
	▶ Repair or replace.



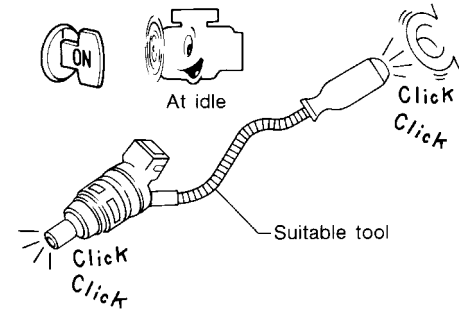
FE
CL

5	CHECK MASS AIR FLOW SENSOR
<p> With CONSULT-II</p> <p>1. Install all removed parts.</p> <p>2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.</p> <p style="padding-left: 20px;">at idling: 2.5 - 5.0 g-m/sec</p> <p style="padding-left: 20px;">at 2,500 rpm: 7.1 - 12.5 g-m/sec</p>	
<p> With GST</p> <p>1. Install all removed parts.</p> <p>2. Check mass air flow sensor signal in MODE 1 with GST.</p> <p style="padding-left: 20px;">at idling: 2.5 - 5.0 g-m/sec</p> <p style="padding-left: 20px;">at 2,500 rpm: 7.1 - 12.5 g-m/sec</p> <p style="text-align: center;">OK or NG</p>	
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-154.

MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

Diagnostic Procedure (Cont'd)

6	CHECK FUNCTION OF INJECTORS																
<p> With CONSULT-II</p> <ol style="list-style-type: none"> Start engine. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II. 																	
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>POWER BALANCE</td><td></td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>MAS A/F SE-B1</td><td>XXX V</td></tr> <tr><td>IACV-AAC/V</td><td>XXX step</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>		ACTIVE TEST		POWER BALANCE		MONITOR		ENG SPEED	XXX rpm	MAS A/F SE-B1	XXX V	IACV-AAC/V	XXX step				
ACTIVE TEST																	
POWER BALANCE																	
MONITOR																	
ENG SPEED	XXX rpm																
MAS A/F SE-B1	XXX V																
IACV-AAC/V	XXX step																
<p>3. Make sure that each circuit produces a momentary engine speed drop.</p>																	
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine. Listen to each injector operating sound. 																	
																	
<p>Clicking noise should be heard.</p> <p>OK or NG</p>																	
OK	▶	GO TO 7.															
NG	▶	Perform trouble diagnosis for "INJECTORS", EC-597.															

SEF190Y

MEC703B

7	REMOVE INJECTOR
<ol style="list-style-type: none"> Confirm that the engine is cooled down and there are no fire hazards near the vehicle. Turn ignition switch "OFF". Remove injector assembly. Refer to EC-51. Keep fuel hose and all injectors connected to injector gallery. 	
<p>▶ GO TO 8.</p>	

8	CHECK INJECTOR	
<ol style="list-style-type: none"> Disconnect all injector harness connectors. Disconnect all ignition wires. Prepare pans or saucers under each injectors. Crank engine for about 3 seconds. Make sure fuel does not drip from injector. 		
<p>OK or NG</p>		
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 (RICH SIDE)

Diagnostic Procedure (Cont'd)

9	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

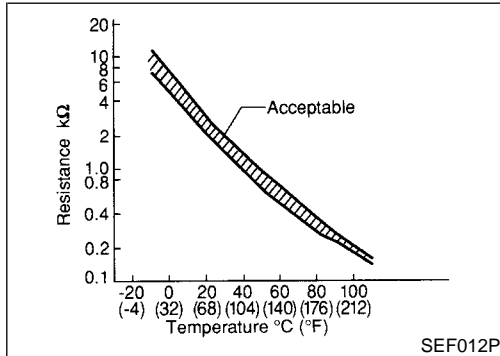
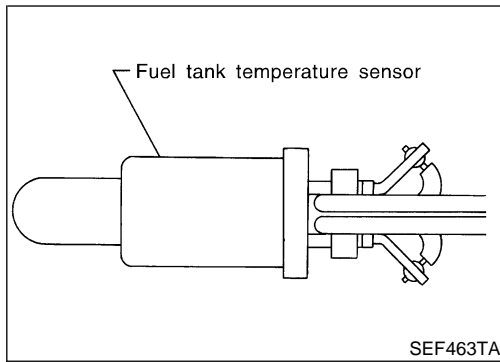
SC

EL

IDX

DTC P0180 FUEL TANK TEMPERATURE SENSOR

Component Description



Component Description

NCEC0196

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 82 (Fuel tank temperature sensor) and ground.

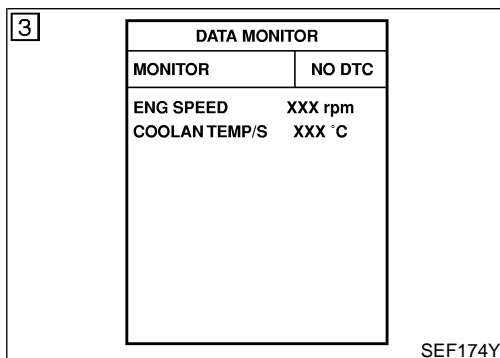
CAUTION:

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

NCEC0197

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0180	<ul style="list-style-type: none"> An excessively high or low voltage is sent to ECM. Rationally incorrect voltage 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"> Harness or connectors (The sensor circuit is open or shorted.) Fuel tank temperature sensor



DTC Confirmation Procedure

NCEC0198

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) Wait at least 10 seconds.

If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-289.

DTC P0180 FUEL TANK TEMPERATURE SENSOR

DTC Confirmation Procedure (Cont'd)

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. GI
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). MA
- 6) Wait at least 10 seconds.
- 7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-289. EM

LC



With GST

Follow the procedure "With CONSULT-II" above.

EC

FE

GL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

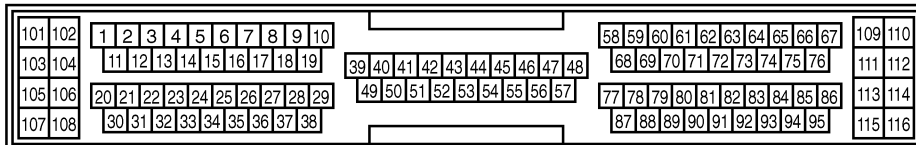
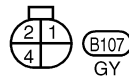
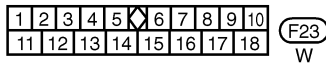
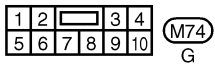
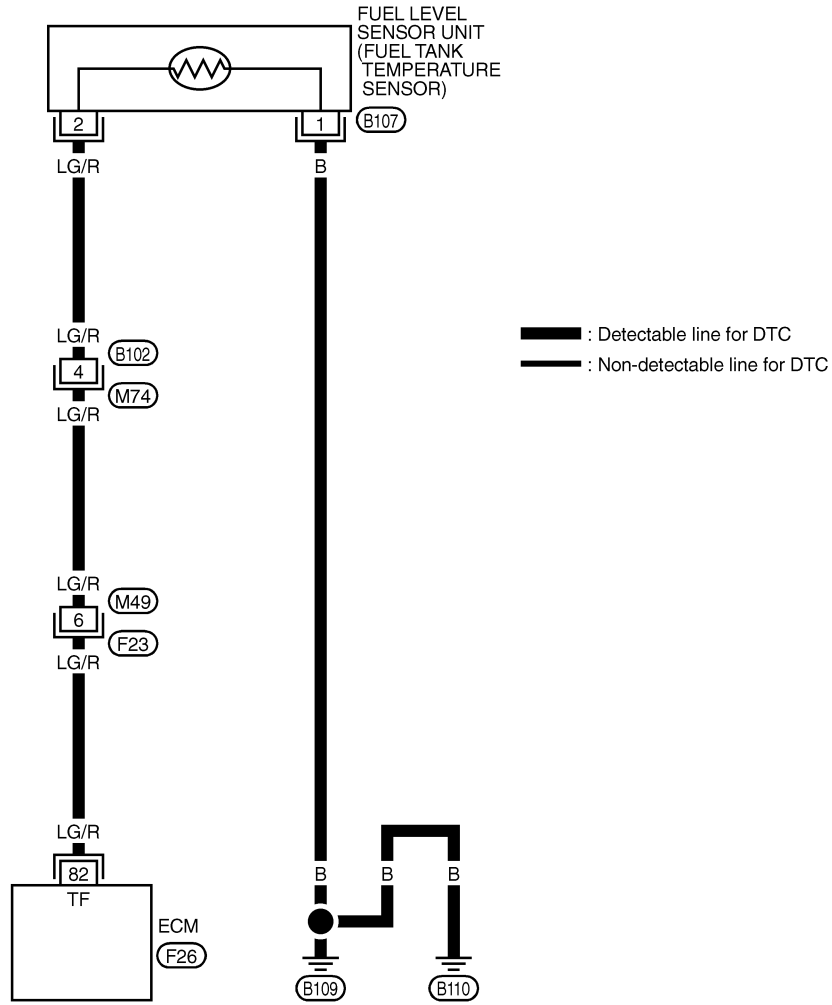
DTC P0180 FUEL TANK TEMPERATURE SENSOR

Wiring Diagram

Wiring Diagram

NCEC0199

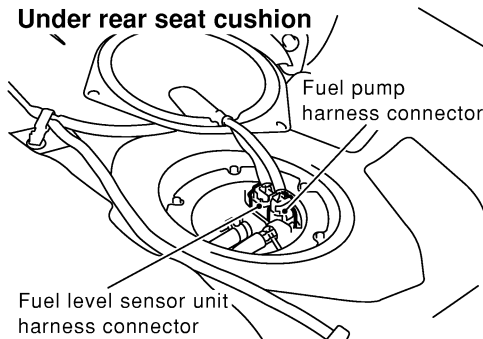
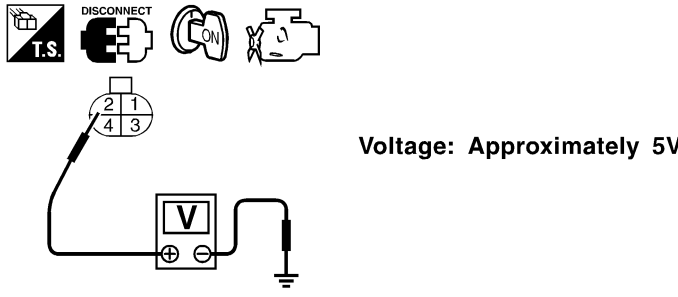
EC-TFTS-01



TEC707

Diagnostic Procedure

NCEC0200

1	CHECK POWER SUPPLY		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect fuel level sensor unit harness connector.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between fuel level sensor unit terminal 2 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Approximately 5V</p> </div> <p style="text-align: center;">OK or NG</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SEF299WA</p> <p>SEF936X</p>
	OK	▶ GO TO 3.	
	NG	▶ GO TO 2.	

2	DETECT MALFUNCTIONING PART		
		<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors B102, M74 ● Harness connectors M49, F23 ● Harness for open or short between ECM and fuel level sensor unit <p style="text-align: right;">▶ Repair harness or connector.</p>	

3	CHECK GROUND CIRCUIT		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between fuel level sensor unit terminal 1 and body ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	
	OK	▶ GO TO 4.	
	NG	▶ Repair open circuit or short to power in harness or connectors.	

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

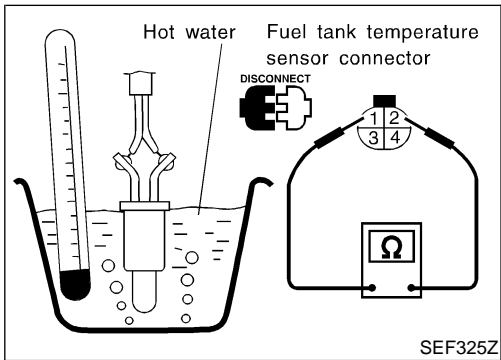
IDX

DTC P0180 FUEL TANK TEMPERATURE SENSOR

Diagnostic Procedure (Cont'd)

4	CHECK FUEL TANK TEMPERATURE SENSOR	
Refer to "Component Inspection", EC-290.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace fuel tank temperature sensor.

5	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.		
	▶	INSPECTION END



Component Inspection

FUEL TANK TEMPERATURE SENSOR

NCEC0201

NCEC0201S01

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 tank temperature sensor.

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

System Description

System Description

NCEC0505

NCEC0505S01

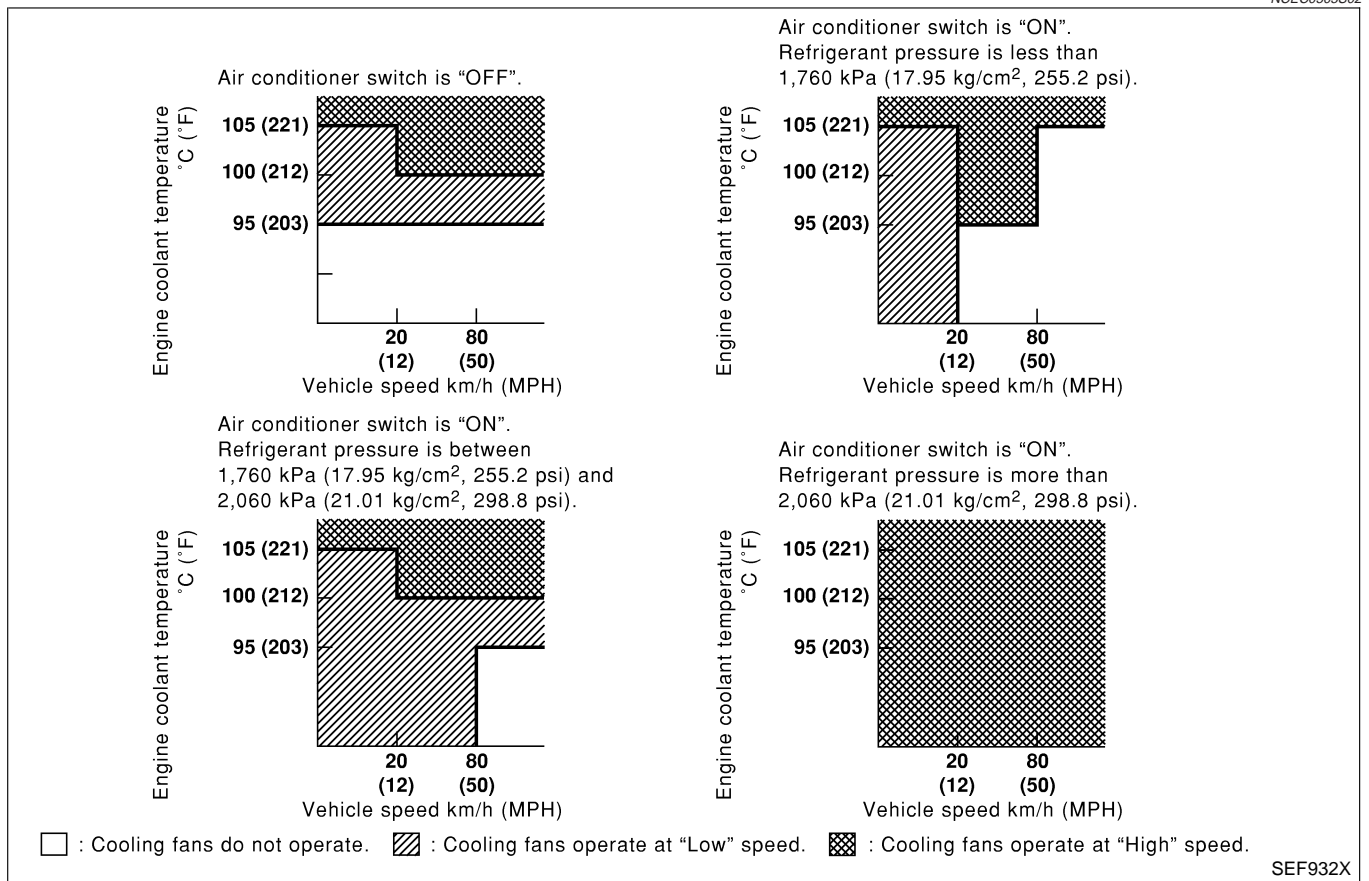
COOLING FAN CONTROL

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

NCEC0505S02



CONSULT-II Reference Value in Data Monitor Mode

NCEC0506

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)

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION		SPECIFICATION
COOLING FAN	<ul style="list-style-type: none"> After warming up engine, 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

ECM Terminals and Reference Value

NCEC0643

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	LG	Cooling fan relay (High)	[Engine is running] ● Cooling fan is not operating	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Cooling fan (High) is operating	0 - 0.6V
13	L/Y	Cooling fan relay (Low)	[Engine is running] ● Cooling fan is not operating	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Cooling fan is operating	0 - 0.6V

On Board Diagnosis Logic

NCEC0507

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.

Malfunction is detected when engine coolant temperature is excessively high under normal engine speed.

Possible Cause

NCEC0508

- Harness or connectors (The cooling fan circuit is open or shorted)
- Cooling fan
- Thermostat
- Improper ignition timing
- Engine coolant temperature sensor
- Blocked radiator
- Blocked front end (Improper fitting of nose mask)

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Possible Cause (Cont'd)

- Crushed vehicle frontal area (Vehicle frontal is collided but not repaired)
- Blocked air passage by improper installation of front fog lamp or fog lamps.
- Improper mixture ratio of coolant
- Damaged bumper

For more information, refer to "MAIN 12 CAUSES OF OVERHEATING", EC-321.

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to MA-14, "Changing Engine Coolant". Also, replace the engine oil. Refer to MA-18, "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-12, "Anti-freeze Coolant Mixture Ratio".
- 2) After refilling coolant, run engine to ensure that no water-flow noise is emitted.

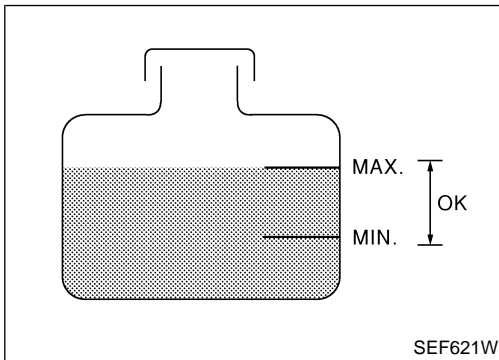
Overall Function Check

Use this procedure to check the overall function of the 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 "Diagnostic Procedure", EC-298 (A/T models) or EC-309 (M/T models).
 - If the coolant mixture ratio is out of the range of 45 to 55%, replace the coolant in the following procedure MA-14, "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-12, "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 "Diagnostic Procedure", EC-298 (A/T models) or EC-309 (M/T models). After repair, go to the next step.
 - 3) Start engine and let it idle.

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Overall Function Check (Cont'd)

- 4) Make sure that A/C switch is "OFF" and air conditioner is not operating. If NG, check air conditioner circuit. Refer to HA-23 or HA-140, "TROUBLE DIAGNOSES". After repair, go to the next step.
- 5) Perform "ENG COOLANT TEMP" in "ACTIVE TEST" mode with CONSULT-II.
 - a) Set "ENG COOLANT TEMP" to 95°C (203°F) and make sure that cooling fan operates at low speed.
If NG, go to "Diagnostic Procedure", EC-298 (A/T models) or EC-309 (M/T models).
 - b) Set "ENG COOLANT TEMP" to 105°C (221°F) and make sure that cooling fan operates at high speed. If NG, go to "Diagnostic Procedure", EC-298. 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 "Diagnostic Procedure", EC-298 (A/T models) or EC-309 (M/T models). 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 step 7 of "Diagnostic Procedure", EC-298 (A/T models) or EC-309 (M/T models).
If NG, replace ECT sensor and go to the next step.
- 9) Check ignition timing. Refer to basic inspection, EC-107.
Make sure that ignition timing is 15°±2° at idle.
If NG, adjust ignition timing and then recheck.

WITH GST

- 1) Check the coolant level and mixture ratio (using coolant tester) in the reservoir tank and radiator. NCEC0509S02
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 "Diagnostic Procedure", EC-298 (A/T models) or EC-309 (M/T models).
 - If the coolant mixture ratio is out of the range of 45 to 55%, replace the coolant in the following procedure MA-14, "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-12, "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 "Diagnostic Procedure", EC-298 (A/T models) or EC-309 (M/T models). After repair, go to the next step.
- 3) Start engine and let it idle.

EC-294

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Overall Function Check (Cont'd)

- 4) Make sure that A/C switch is "OFF" and air conditioner is not operating. If NG, check air conditioner circuit. Refer to HA-23 or HA-140, "TROUBLE DIAGNOSES". After repair, go to the next step. GI
- 5) Turn ignition switch "OFF" MA
- 6) Disconnect engine coolant temperature sensor harness connector. EM
- 7) Connect 150Ω resistor to engine coolant temperature sensor. EM
- 8) Start engine and make sure that cooling fan operates.
Be careful not to overheat engine.
If NG, go to "Diagnostic Procedure", EC-298 (A/T models) or EC-309 (M/T models). After repair, go to the next step. LC
- 9) Check for blocked coolant passage. EC
- 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 "Diagnostic Procedure", EC-298 (A/T models) or EC-309 (M/T models). After repair, go to the next step. FE
- Be extremely careful not to touch any moving or adjacent parts.** CL
- 10) Check for blocked radiator air passage. MT
- a) When market fog lamps have been installed, check for damaged fans and clogging in the condenser and radiator. AT
- b) Check the front end for clogging caused by insects or debris. AT
- c) Check for improper fitting of front-end cover, damaged radiator grille or bumper, damaged vehicle front. AX
- If NG, take appropriate action and then go to the next step.
- 11) Check function of ECT sensor. SU
- Refer to step 6 of "Diagnostic Procedure", EC-298 (A/T models) or EC-309 (M/T models).
If NG, replace ECT sensor and go to the next step.
- 12) Check ignition timing. Refer to basic inspection, EC-107. BR
- Make sure that ignition timing is $15^{\circ} \pm 2^{\circ}$ at idle.
If NG, adjust ignition timing and then recheck. ST

ST

RS

BT

HA

SC

EL

IDX

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Wiring Diagram

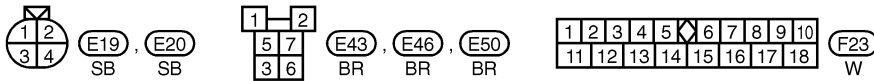
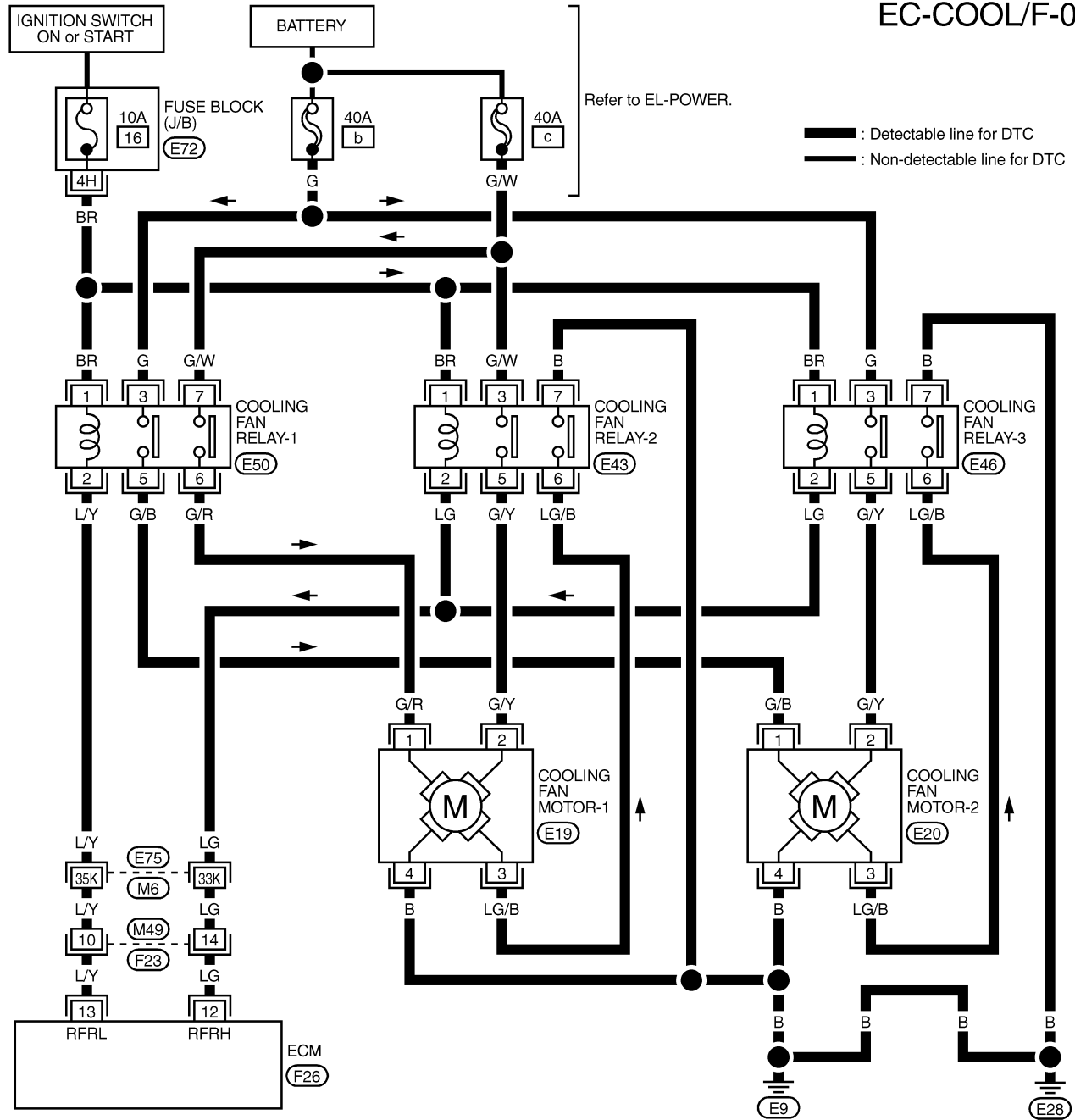
Wiring Diagram

NCEC0510

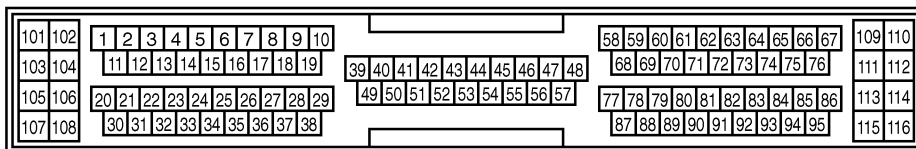
NCEC0510S01

A/T MODELS

EC-COOL/F-01



REFER TO THE FOLLOWING.
 (E75) -SUPER MULTIPLE JUNCTION (SMJ)
 (E72) -FUSE BLOCK-JUNCTION BOX (J/B)



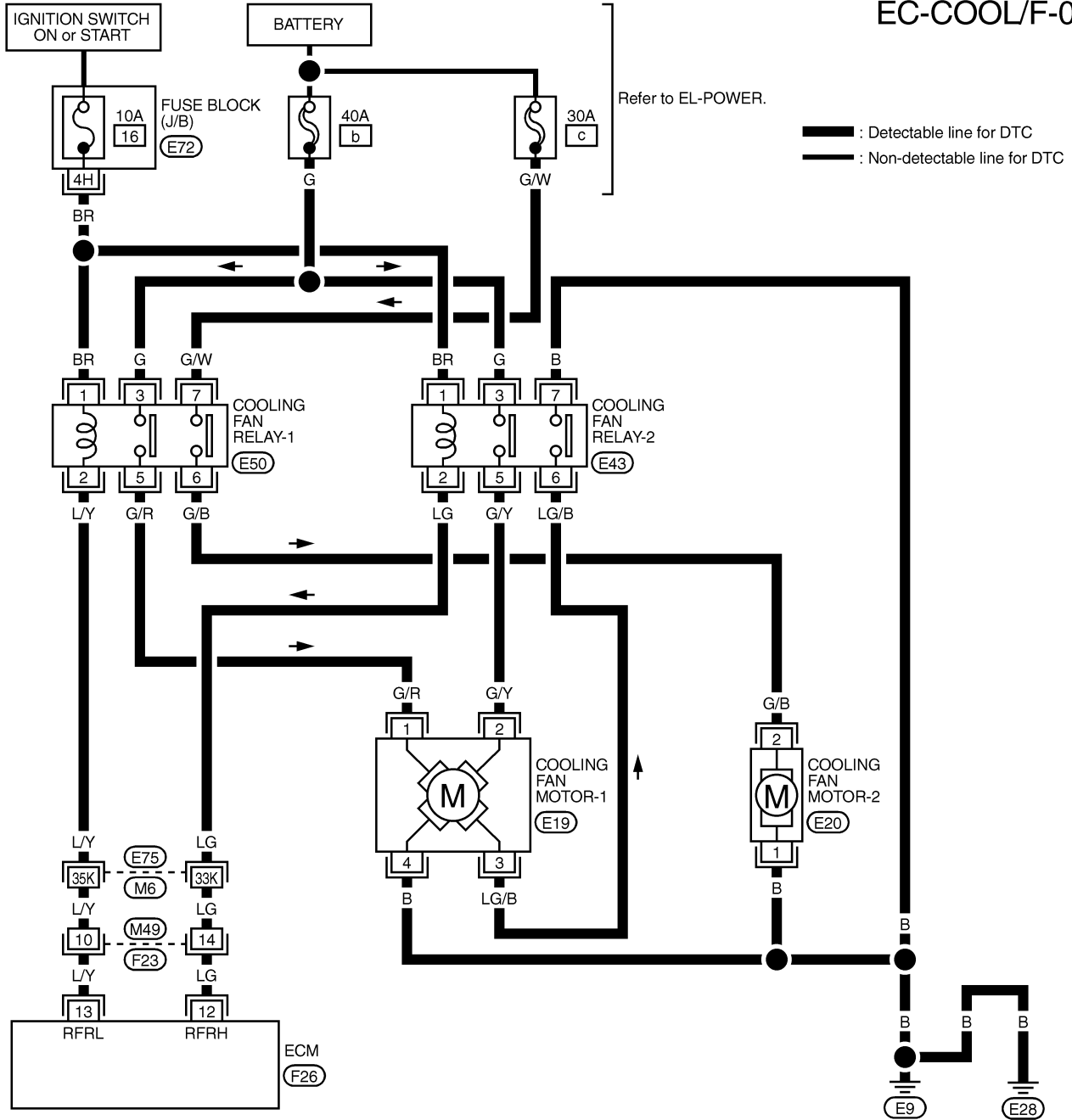
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Wiring Diagram (Cont'd)

M/T MODELS

NCEC0510S02

EC-COOL/F-02

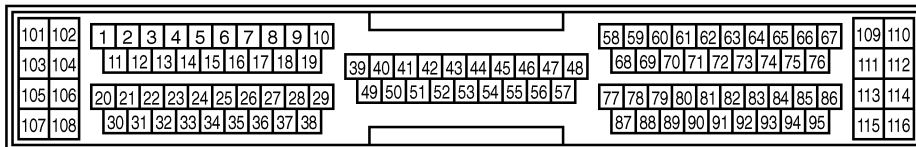


Refer to EL-POWER.
 — : Detectable line for DTC
 — : Non-detectable line for DTC

- GI
- MA
- EM
- LC
- EC**
- FE
- CL
- MT
- AT
- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX



REFER TO THE FOLLOWING.
 (E75) -SUPER MULTIPLE JUNCTION (SMJ)
 (E72) -FUSE BLOCK-JUNCTION BOX (J/B)



TEC827


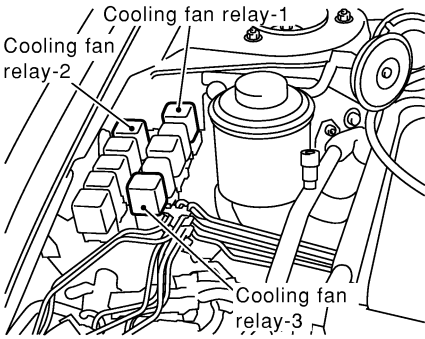
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (A/T Models)

Diagnostic Procedure (A/T Models)

NCEC0511

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																									
<p> With CONSULT-II</p> <p>1. Disconnect cooling fan relays-2 and -3.</p> <div style="text-align: center;">  </div> <p>2. Turn ignition switch "ON".</p> <p>3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.</p> <div style="text-align: center;"> <table border="1"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>LOW</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> </div> <p>4. Make sure that cooling fans-1 and -2 operate at low speed.</p> <p style="text-align: center;">OK or NG</p>			ACTIVE TEST		COOLING FAN	LOW	MONITOR		COOLAN TEMP/S	XXX °C																
ACTIVE TEST																										
COOLING FAN	LOW																									
MONITOR																										
COOLAN TEMP/S	XXX °C																									
OK	▶	GO TO 3.																								
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-304.)																								

SEF857X

SEF784Z

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (A/T Models) (Cont'd)

3	CHECK COOLING FAN HIGH SPEED OPERATION																								
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect cooling fan relays-2 and -3. 3. Disconnect cooling fan relay-1. 4. Turn ignition switch "ON". 5. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II. 																									
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>HIGH</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>		ACTIVE TEST		COOLING FAN	HIGH	MONITOR		COOLAN TEMP/S	XXX °C																
ACTIVE TEST																									
COOLING FAN	HIGH																								
MONITOR																									
COOLAN TEMP/S	XXX °C																								
SEF785Z																									
<p>6. Make sure that cooling fans-1 and -2 operate at higher speed than low speed.</p> <p style="text-align: center;">OK or NG</p>																									
OK	▶	GO TO 6.																							
NG	▶	Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-307.)																							

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

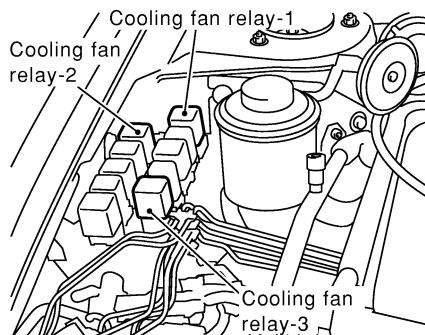
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (A/T Models) (Cont'd)

4 CHECK COOLING FAN LOW SPEED OPERATION

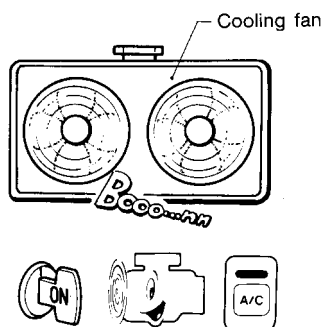
⊗ Without CONSULT-II

1. Disconnect cooling fan relays-2 and -3.



SEF857X

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.



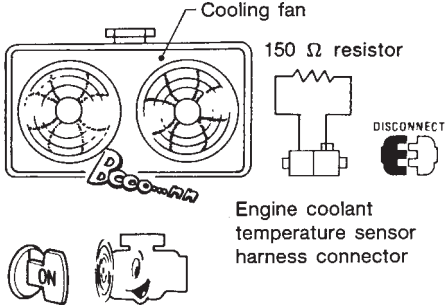
SEC163BA

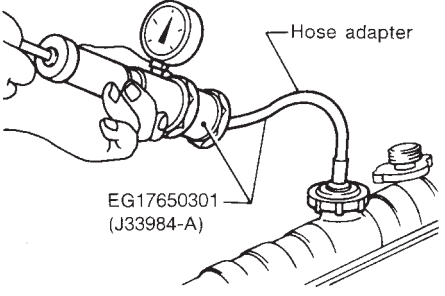
OK or NG

OK	▶	GO TO 5.
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-304.)

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (A/T Models) (Cont'd)

5	CHECK COOLING FAN HIGH SPEED OPERATION
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect cooling fan relays-2 and -3. 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 fans-1 and -2 operate at higher speed than low speed. 	
	
MEF613EA	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-307.)

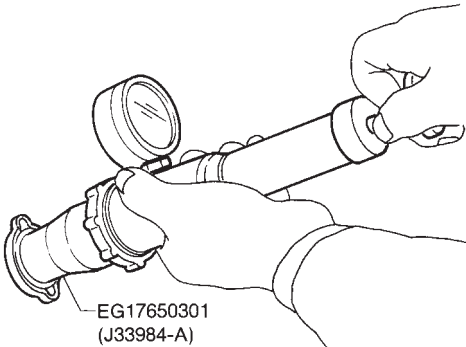
6	CHECK COOLING SYSTEM FOR LEAK
<p>Apply pressure to the cooling system with a tester, and check if the pressure drops.</p> <p style="color: blue;">Testing pressure: 157 kPa (1.6 kg/cm², 23 psi)</p> <p style="color: red;">CAUTION: Higher than the specified pressure may cause radiator damage.</p>	
	
SLC754A	
Pressure should not drop.	
OK or NG	
OK	▶ GO TO 8.
NG	▶ GO TO 7.

7	DETECT MALFUNCTIONING PART
<p>Check the following for leak.</p> <ul style="list-style-type: none"> ● Hose ● Radiator ● Water pump (Refer to LC-10, "Water Pump".) 	
▶ Repair or replace.	

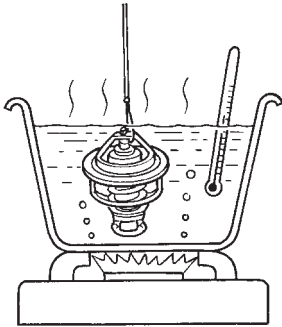
GI
 MA
 EM
 LC
 EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (A/T Models) (Cont'd)

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/cm², 9 - 14 psi)	
OK or NG	
OK	▶ GO TO 9.
NG	▶ Replace radiator cap.

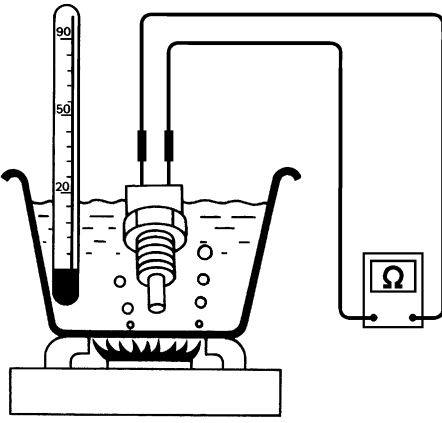
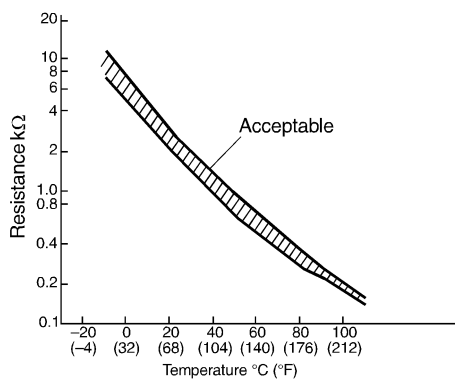
SLC755A

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: 82°C (180°F) [standard] Valve lift: More than 8 mm/95°C (0.31 in/203°F)	
4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to LC-12, "Thermostat".	
OK or NG	
OK	▶ GO TO 10.
NG	▶ Replace thermostat

SLC343

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (A/T Models) (Cont'd)

10	CHECK ENGINE COOLANT TEMPERATURE SENSOR								
<p>1. Remove engine coolant temperature sensor. 2. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.</p>									
	<p><Reference data></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Temperature °C (°F)</th> <th>Resistance kΩ</th> </tr> </thead> <tbody> <tr> <td>20 (68)</td> <td>2.1 - 2.9</td> </tr> <tr> <td>50 (122)</td> <td>0.68 - 1.00</td> </tr> <tr> <td>90 (194)</td> <td>0.236 - 0.260</td> </tr> </tbody> </table>	Temperature °C (°F)	Resistance kΩ	20 (68)	2.1 - 2.9	50 (122)	0.68 - 1.00	90 (194)	0.236 - 0.260
Temperature °C (°F)	Resistance kΩ								
20 (68)	2.1 - 2.9								
50 (122)	0.68 - 1.00								
90 (194)	0.236 - 0.260								
									
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 "MAIN 12 CAUSES OF OVERHEATING", EC-321.	
▶	INSPECTION END

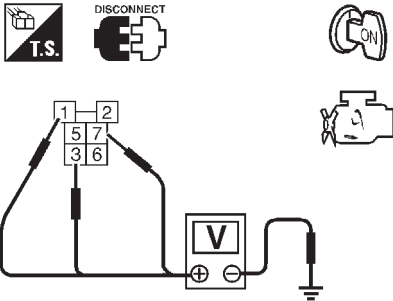
GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (A/T Models) (Cont'd)

PROCEDURE A

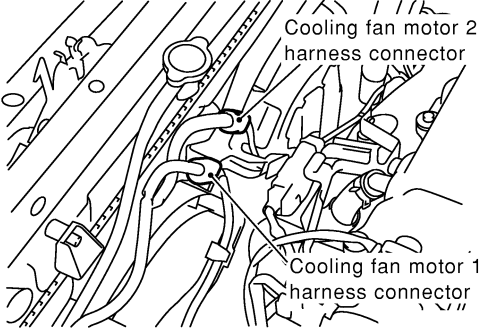
=NCEC0511S01

1	CHECK COOLING FAN POWER SUPPLY CIRCUIT
<p>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, 7 and ground with CONSULT-II or tester.</p> <div style="text-align: center;"></div> <p>Voltage: Battery voltage</p> <p style="text-align: right;">SEF727W</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

2	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none">● 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.

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (A/T Models) (Cont'd)

3	CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.</p>		
		
SEF854X		
<p>3. Check harness continuity between cooling fan relay-1 terminal 6 and cooling fan motor-1 terminal 1, cooling fan motor-1 terminal 4 and body ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p>5. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-2 terminal 1, cooling fan motor-2 terminal 4 and body ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>6. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

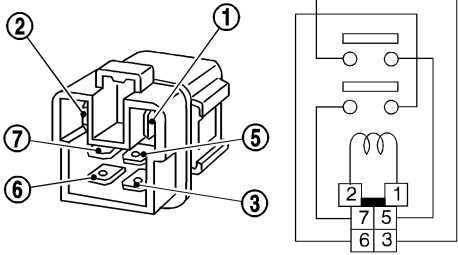
4	CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 13 and cooling fan relay-1 terminal 2. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

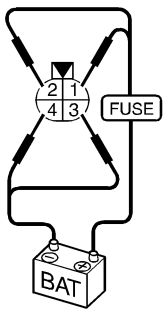

5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E75, M6 ● Harness connectors M49, F23 ● Harness for open or short between cooling fan relay-1 and ECM 		
OK or NG		
	▶	Repair open circuit or short to ground or short to power in harness or connectors.

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (A/T Models) (Cont'd)

6	CHECK COOLING FAN RELAY-1								
Check continuity between cooling fan relay-1 terminals 3 and 5, 6 and 7 under the following conditions.									
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">Conditions</th> <th style="width: 30%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No current supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>		Conditions	Continuity	12V direct current supply between terminals 1 and 2	Yes	No current supply	No
Conditions	Continuity								
12V direct current supply between terminals 1 and 2	Yes								
No current supply	No								
SEF591X									
OK or NG									
OK	▶	GO TO 7.							
NG	▶	Replace cooling fan relay.							

7	CHECK COOLING FAN MOTORS-1 AND -2															
Supply battery voltage between the following terminals and check operation.																
		 <p>Cooling fan motor -1 or -2 harness connector</p>														
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Cooling fan motor -1 or -2</td> <td>Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> <tr> <td>High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> </tbody> </table>			Speed	Terminals		(+)	(-)	Cooling fan motor -1 or -2	Low	1	4	High	1, 2	3, 4
	Speed	Terminals														
		(+)	(-)													
Cooling fan motor -1 or -2	Low	1	4													
	High	1, 2	3, 4													
SEF937X																
OK or NG																
OK	▶	GO TO 8.														
NG	▶	Replace cooling fan motors.														

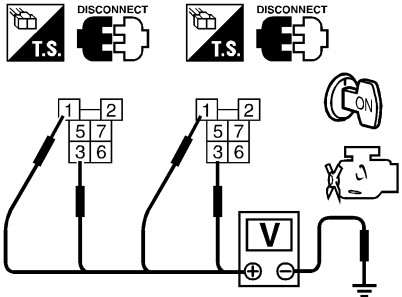
8	CHECK INTERMITTENT INCIDENT		
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.			
		INSPECTION END	

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (A/T Models) (Cont'd)

PROCEDURE B

=NCEC0511S02

1	CHECK COOLING FAN POWER SUPPLY CIRCUIT		
<ol style="list-style-type: none"> 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. 			
			
OK or NG			
OK		▶	GO TO 3.
NG		▶	GO TO 2.

GI

MA

EM

LC

EC

FE

SEF593X

CL

MT

2	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● 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 link 			
		▶	Repair harness or connectors.

AT

AX

3	CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT		
<ol style="list-style-type: none"> 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-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 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.

SU

BR

ST

RS

BT

HA

4	CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT		
<ol style="list-style-type: none"> 1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 12 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.

SC

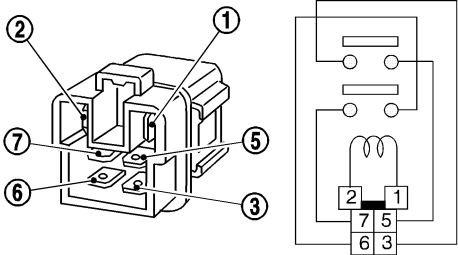
EL

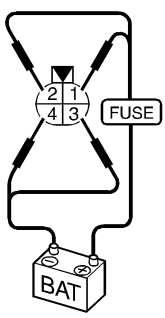


IDX

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (A/T Models) (Cont'd)

5	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness connectors E75, M6 ● Harness connectors M49, F23 ● Harness for open or short between cooling fan relays-2 and -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						
Check continuity between cooling fan relay-2, -3 terminals 3 and 5, 6 and 7 under the following conditions.							
							
<table border="1" style="margin-left: auto; margin-right: 0;"> <thead> <tr> <th style="width: 70%;">Conditions</th> <th style="width: 30%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No current supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>		Conditions	Continuity	12V direct current supply between terminals 1 and 2	Yes	No current supply	No
Conditions	Continuity						
12V direct current supply between terminals 1 and 2	Yes						
No current supply	No						
SEF591X							
OK or NG							
OK	▶ GO TO 7.						
NG	▶ Replace cooling fan relays.						

7	CHECK COOLING FAN MOTORS-1 AND -2													
Supply battery voltage between the following terminals and check operation.														
														
 														
Cooling fan motor -1 or -2 harness connector														
<table border="1" style="margin-left: auto; margin-right: 0;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2" style="vertical-align: middle;">Cooling fan motor -1 or -2</td> <td style="text-align: center;">Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> </tbody> </table>			Speed	Terminals		(+)	(-)	Cooling fan motor -1 or -2	Low	1	4	High	1, 2	3, 4
	Speed			Terminals										
		(+)	(-)											
Cooling fan motor -1 or -2	Low	1	4											
	High	1, 2	3, 4											
SEF937X														
OK or NG														
OK	▶ GO TO 8.													
NG	▶ Replace cooling fan motors.													

8	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION


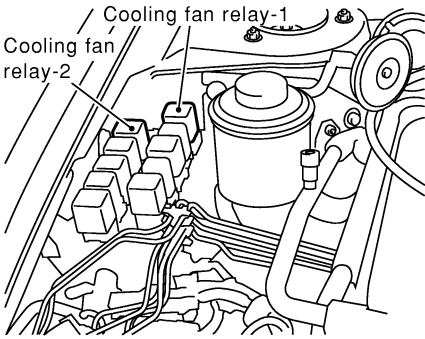
Diagnostic Procedure (M/T Models)

Diagnostic Procedure (M/T Models)

NCEC0672

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 4.

GI
MA
EM

2	CHECK COOLING FAN LOW SPEED OPERATION																									
<p> With CONSULT-II</p> <p>1. Disconnect cooling fan relay-2.</p> <div style="text-align: center;">  </div> <p>2. Turn ignition switch "ON".</p> <p>3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>LOW</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> <p>4. Make sure that cooling fans-1 and -2 operate at low speed.</p> <p style="text-align: center;">OK or NG</p>			ACTIVE TEST		COOLING FAN	LOW	MONITOR		COOLAN TEMP/S	XXX °C																
ACTIVE TEST																										
COOLING FAN	LOW																									
MONITOR																										
COOLAN TEMP/S	XXX °C																									
OK	▶	GO TO 3.																								
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-315.)																								

LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS

SEC573C

SEF784Z

BT

HA

SC

EL

IDX

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (M/T Models) (Cont'd)

3		CHECK COOLING FAN HIGH SPEED OPERATION																						
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none">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.																								
<table border="1"><thead><tr><th colspan="2">ACTIVE TEST</th></tr><tr><th>COOLING FAN</th><th>HIGH</th></tr><tr><th colspan="2">MONITOR</th></tr><tr><th>COOLAN TEMP/S</th><th>XXX °C</th></tr></thead><tbody><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr></tbody></table>			ACTIVE TEST		COOLING FAN	HIGH	MONITOR		COOLAN TEMP/S	XXX °C														
ACTIVE TEST																								
COOLING FAN	HIGH																							
MONITOR																								
COOLAN TEMP/S	XXX °C																							
SEF785Z																								
5. Make sure that cooling fan-1 operate at higher speed than low speed and cooling fan-2 operate at low speed.																								
OK or NG																								
OK	▶	GO TO 6.																						
NG	▶	Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-319.)																						

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

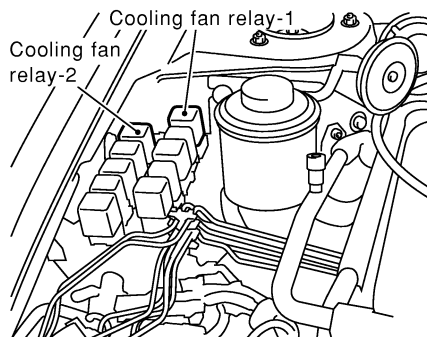
Diagnostic Procedure (M/T Models) (Cont'd)

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

4 CHECK COOLING FAN LOW SPEED OPERATION

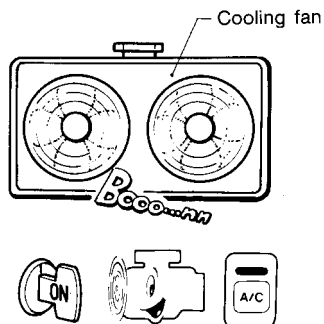
⊗ Without CONSULT-II

1. Disconnect cooling fan relay-2.



SEC573C

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.



SEC163BA

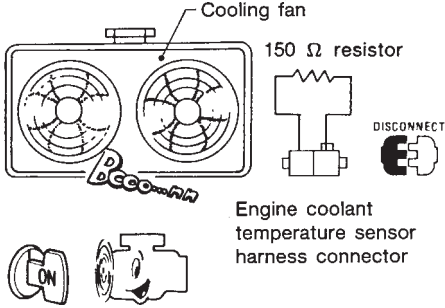
OK or NG

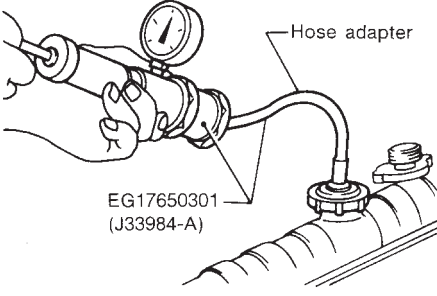
OK ► GO TO 5.

NG ► Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-315.)

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (M/T Models) (Cont'd)

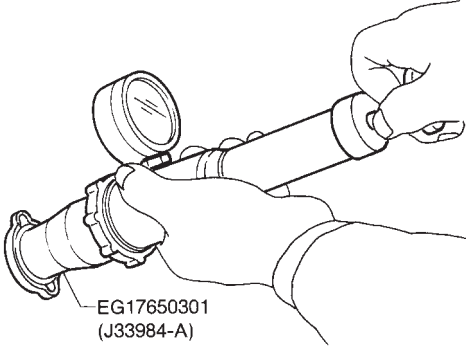
5	CHECK COOLING FAN HIGH SPEED OPERATION	
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> Turn ignition switch "OFF". Reconnect cooling fan relay-2. Turn air conditioner switch and blower fan switch "OFF". Disconnect engine coolant temperature sensor harness connector. Connect 150Ω resistor to engine coolant temperature sensor harness connector. Restart engine and make sure that cooling fan-1 operate at higher speed than low speed and cooling fan-2 operate at low speed. 		
		
MEF613EA		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-319.)

6	CHECK COOLING SYSTEM FOR LEAK	
<p>Apply pressure to the cooling system with a tester, and check if the pressure drops.</p> <p>Testing pressure: 157 kPa (1.6 kg/cm², 23 psi)</p> <p>CAUTION: Higher than the specified pressure may cause radiator damage.</p>		
		
SLC754A		
Pressure should not drop.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	GO TO 7.

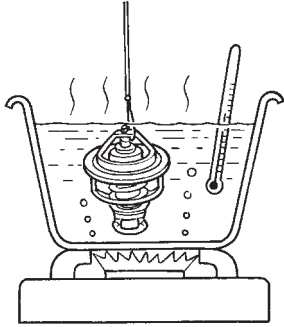
7	DETECT MALFUNCTIONING PART	
<p>Check the following for leak.</p> <ul style="list-style-type: none"> Hose Radiator Water pump (Refer to LC-10, "Water Pump".) 		
▶ Repair or replace.		

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (M/T Models) (Cont'd)

8	CHECK RADIATOR CAP	
<p>Apply pressure to cap with a tester and check radiator cap relief pressure.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SLC755A</p> <p>Radiator cap relief pressure: 59 - 98 kPa (0.6 - 1.0 kg/cm², 9 - 14 psi)</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 9.
NG	▶	Replace radiator cap.

GI
MA
EM
LC
EC

9	CHECK THERMOSTAT	
<ol style="list-style-type: none"> 1. Remove thermostat. 2. Check valve seating condition at normal room temperatures. It should seat tightly. 3. Check valve opening temperature and valve lift. <div style="text-align: center;">  </div> <p style="text-align: right;">SLC343</p> <p>Valve opening temperature: 82°C (180°F) [standard]</p> <p>Valve lift: More than 8 mm/95°C (0.31 in/203°F)</p> <ol style="list-style-type: none"> 4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to LC-12, "Thermostat". <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 10.
NG	▶	Replace thermostat

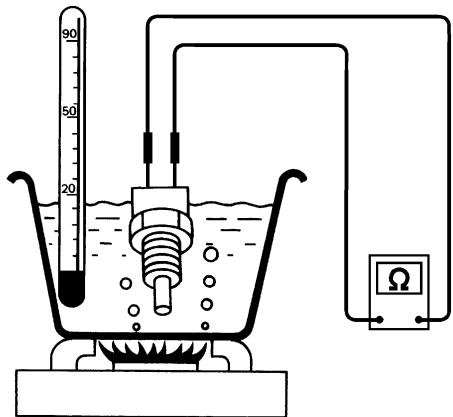
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (M/T Models) (Cont'd)

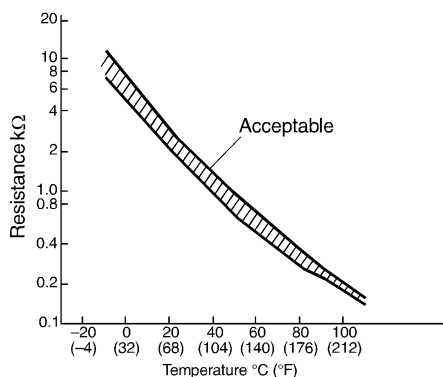
10 CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Remove engine coolant temperature sensor.
2. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<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



SEF304X

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 "MAIN 12 CAUSES OF OVERHEATING", EC-321.

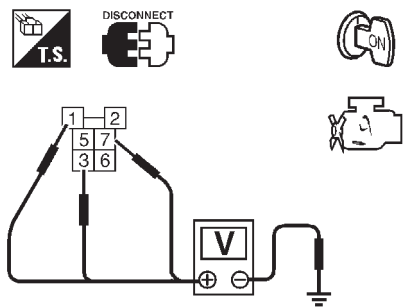
▶ **INSPECTION END**

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (M/T Models) (Cont'd)

PROCEDURE A

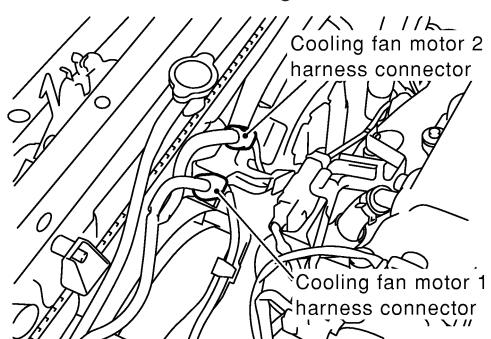
=NCEC0672S01

1	CHECK COOLING FAN POWER SUPPLY CIRCUIT	<p>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, 7 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: right;">SEF727W</p> <p style="text-align: center;">OK or NG</p>	GI MA EM LC EC FE CL MT
OK	▶	GO TO 3.	
NG	▶	GO TO 2.	

2	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● 10A fuse ● 40A fusible link ● 30A fusible link ● Harness for open or short between cooling fan relay-1 and fuse ● Harness for open or short between cooling fan relay-1 and battery 	AT AX SU BR ST RS BT HA SC EL IDX
	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (M/T Models) (Cont'd)

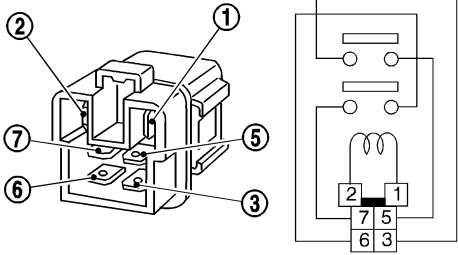
3	CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector. 		
		
SEF854X		
<ol style="list-style-type: none"> 3. Check harness continuity between 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 6 and cooling fan motor-2 terminal 2, cooling fan motor-2 terminal 1 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.

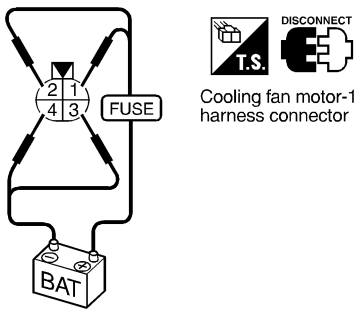
4	CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<ol style="list-style-type: none"> 1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 13 and cooling fan relay-1 terminal 2. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power. 		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

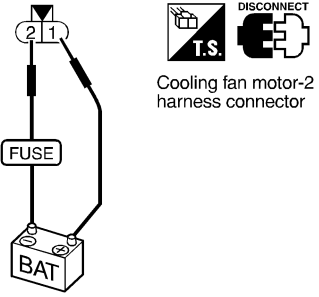
5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E75, M6 ● Harness connectors M49, F23 ● Harness for open or short between cooling fan relay-1 and ECM 		
▶		
Repair open circuit or short to ground or short to power in harness or connectors.		

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (M/T Models) (Cont'd)

6	CHECK COOLING FAN RELAY-1							
<p>Check continuity between cooling fan relay-1 terminals 3 and 5, 6 and 7 under the following conditions.</p>								
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">Conditions</th> <th style="width: 30%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No current supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>	Conditions	Continuity	12V direct current supply between terminals 1 and 2	Yes	No current supply	No
Conditions	Continuity							
12V direct current supply between terminals 1 and 2	Yes							
No current supply	No							
OK or NG		SEF591X						
OK	▶	GO TO 7.						
NG	▶	Replace cooling fan relay.						

7	CHECK COOLING FAN MOTOR-1														
<p>Supply battery voltage between the following terminals and check operation.</p>															
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Cooling fan motor-1</td> <td>Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> <tr> <td>High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> </tbody> </table>		Speed	Terminals		(+)	(-)	Cooling fan motor-1	Low	1	4	High	1, 2	3, 4
	Speed	Terminals													
		(+)	(-)												
Cooling fan motor-1	Low	1	4												
	High	1, 2	3, 4												
OK or NG		SEF937XA													
OK	▶	GO TO 8.													
NG	▶	Replace cooling fan motor-1.													

8	CHECK COOLING FAN MOTOR-2									
<p>Supply battery voltage between the following terminals and check operation.</p>										
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td>Cooling fan motor-2</td> <td style="text-align: center;">2</td> <td style="text-align: center;">1</td> </tr> </tbody> </table>		Terminals		(+)	(-)	Cooling fan motor-2	2	1
	Terminals									
	(+)	(-)								
Cooling fan motor-2	2	1								
OK or NG		SEC574C								
OK	▶	GO TO 9.								
NG	▶	Replace cooling fan motor-2.								

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (M/T Models) (Cont'd)

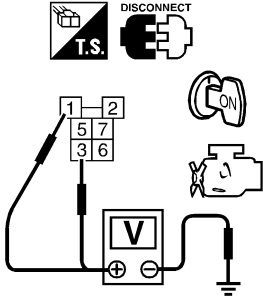
9	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

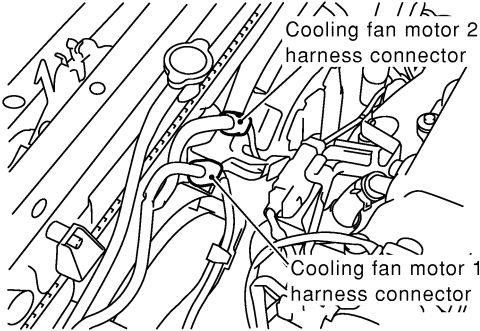
Diagnostic Procedure (M/T Models) (Cont'd)

PROCEDURE B

=NCEC0672S02

1	CHECK COOLING FAN POWER SUPPLY CIRCUIT	<p>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.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> </div> <p style="text-align: right;">SEC577C</p> <p style="text-align: center;">OK or NG</p>	GI MA EM LC EC FE CL MT
OK	▶	GO TO 3.	
NG	▶	GO TO 2.	

2	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● 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 	AT AX SU
	▶	Repair harness or connectors.	

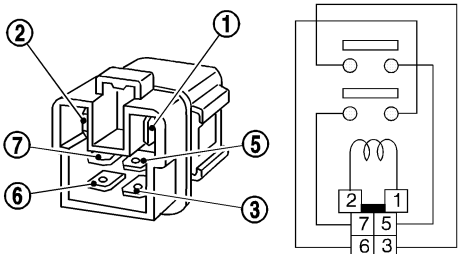
3	CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT	<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan motor-1 harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF854X</p> <p>3. Check harness continuity between cooling fan relay-2 terminal 5 and 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 body ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	BR ST RS BT HA SC EL IDX
OK	▶	GO TO 4.	
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

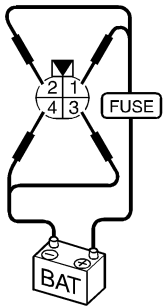

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (M/T Models) (Cont'd)

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. 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. <ul style="list-style-type: none"> ● Harness connectors E75, M6 ● Harness connectors M49, F23 ● 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							
Check continuity between cooling fan relay-2 terminals 3 and 5, 6 and 7 under the following conditions.								
<div style="display: flex; align-items: center; justify-content: space-around;">  <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Conditions</th> <th style="width: 40%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No current supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table> </div>			Conditions	Continuity	12V direct current supply between terminals 1 and 2	Yes	No current supply	No
Conditions	Continuity							
12V direct current supply between terminals 1 and 2	Yes							
No current supply	No							
SEF591X								
OK or NG								
OK	▶	GO TO 7.						
NG	▶	Replace cooling fan relay.						

7	CHECK COOLING FAN MOTOR-1														
Supply battery voltage between the following terminals and check operation.															
<div style="display: flex; align-items: center; justify-content: space-around;">  <div style="text-align: center;">  <p>Cooling fan motor-1 harness connector</p> </div> <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Cooling fan motor-1</td> <td>Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> <tr> <td>High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> </tbody> </table> </div>				Speed	Terminals		(+)	(-)	Cooling fan motor-1	Low	1	4	High	1, 2	3, 4
	Speed	Terminals													
		(+)	(-)												
Cooling fan motor-1	Low	1	4												
	High	1, 2	3, 4												
SEF937XA															
OK or NG															
OK	▶	GO TO 8.													
NG	▶	Replace cooling fan motor-1.													

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

Diagnostic Procedure (M/T Models) (Cont'd)

8	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
	INSPECTION END

GI
MA
EM
LC

Main 12 Causes of Overheating

NCEC0512

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> ● Blocked radiator ● Blocked condenser ● Blocked radiator grille ● Blocked bumper 	<ul style="list-style-type: none"> ● Visual 	No blocking	—
	2	<ul style="list-style-type: none"> ● Coolant mixture 	<ul style="list-style-type: none"> ● Coolant tester 	50 - 50% coolant mixture	See MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS".
	3	<ul style="list-style-type: none"> ● Coolant level 	<ul style="list-style-type: none"> ● Visual 	Coolant up to MAX level in reservoir tank and radiator filler neck	See MA-14, "Changing Engine Coolant".
	4	<ul style="list-style-type: none"> ● Radiator cap 	<ul style="list-style-type: none"> ● Pressure tester 	59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi) (Limit)	See LC-9, "System Check".
ON*2	5	<ul style="list-style-type: none"> ● Coolant leaks 	<ul style="list-style-type: none"> ● Visual 	No leaks	See LC-9, "System Check".
ON*2	6	<ul style="list-style-type: none"> ● Thermostat 	<ul style="list-style-type: none"> ● Touch the upper and lower radiator hoses 	Both hoses should be hot	See LC-12, "Thermostat" and LC-14, "Radiator".
ON*1	7	<ul style="list-style-type: none"> ● Cooling fan 	<ul style="list-style-type: none"> ● CONSULT-II 	Operating	See trouble diagnosis for DTC P0217 (EC-291).
OFF	8	<ul style="list-style-type: none"> ● Combustion gas leak 	<ul style="list-style-type: none"> ● Color checker chemical tester 4 Gas analyzer 	Negative	—
ON*3	9	<ul style="list-style-type: none"> ● Coolant temperature gauge 	<ul style="list-style-type: none"> ● Visual 	Gauge less than 3/4 when driving	—
		<ul style="list-style-type: none"> ● Coolant overflow to reservoir tank 	<ul style="list-style-type: none"> ● Visual 	No overflow during driving and idling	See MA-14, "Changing Engine Coolant".
OFF*4	10	<ul style="list-style-type: none"> ● Coolant return from reservoir tank to radiator 	<ul style="list-style-type: none"> ● Visual 	Should be initial level in reservoir tank	See MA-13, "ENGINE MAINTENANCE".
OFF	11	<ul style="list-style-type: none"> ● Cylinder head 	<ul style="list-style-type: none"> ● Straight gauge feeler gauge 	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-36, "Inspection".
	12	<ul style="list-style-type: none"> ● Cylinder block and pistons 	<ul style="list-style-type: none"> ● Visual 	No scuffing on cylinder walls or piston	See EM-56, "Inspection".

EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

*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 LC-15, "OVERHEATING CAUSE ANALYSIS".

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

On Board Diagnosis Logic

On Board Diagnosis Logic

NCEC0202

When a misfire occurs, engine speed will fluctuate (vary). If the engine speed fluctuates enough to cause the CKP sensor to vary, ECM can detect a misfire.

Sensor	Input Signal to ECM	ECM function
Crankshaft position sensor (OBD)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

1. 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 (OBD) 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.

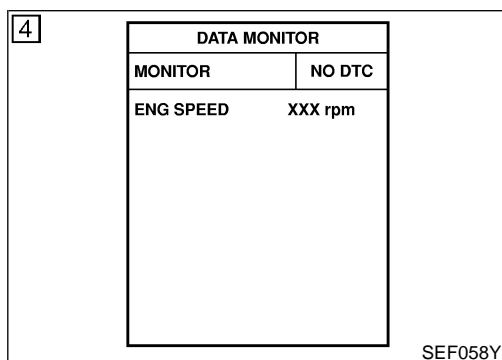
If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.

2. 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 CKP sensor (OBD) signal every 1,000 engine revolutions.

A misfire malfunction can be detected on any one cylinder or on-multiple cylinders.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0300	<ul style="list-style-type: none"> Multiple cylinders misfire. 	<ul style="list-style-type: none"> Improper spark plug Insufficient compression Incorrect fuel pressure EGR volume control valve The injector circuit is open or shorted Injectors Intake air leak The ignition secondary circuit is open or shorted Lack of fuel Drive plate/Flywheel Heated oxygen sensor 1 (front) Incorrect distributor roter Incorrect PCV hose connection
P0301	<ul style="list-style-type: none"> No. 1 cylinder misfires. 	
P0302	<ul style="list-style-type: none"> No. 2 cylinder misfires. 	
P0303	<ul style="list-style-type: none"> No. 3 cylinder misfires. 	
P0304	<ul style="list-style-type: none"> No. 4 cylinder misfires. 	



DTC Confirmation Procedure

NCEC0203

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.

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

DTC Confirmation Procedure (Cont'd)

- 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 "Diagnostic Procedure", EC-323.

 **With GST**

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

NCEC0204

1	CHECK FOR INTAKE AIR LEAK AND PCV HOSE	
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	CHECK EGR FUNCTION	
Perform DTC Confirmation Procedure for DTC P1402 EGR FUNCTION (OPEN). Refer to EC-505.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair EGR system.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA



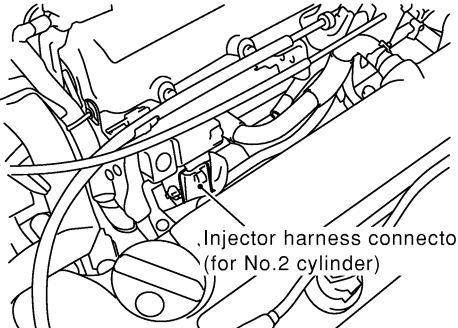
SC

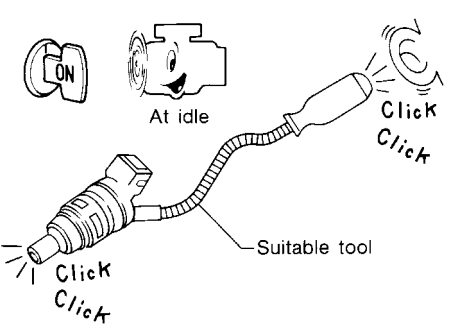
EL

IDX

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

Diagnostic Procedure (Cont'd)

4	PERFORM POWER BALANCE TEST																
<p> With CONSULT-II 1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.</p>																	
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>POWER BALANCE</td><td></td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>MAS A/F SE-B1</td><td>XXX V</td></tr> <tr><td>IACV-AAC/V</td><td>XXX step</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>		ACTIVE TEST		POWER BALANCE		MONITOR		ENG SPEED	XXX rpm	MAS A/F SE-B1	XXX V	IACV-AAC/V	XXX step				
ACTIVE TEST																	
POWER BALANCE																	
MONITOR																	
ENG SPEED	XXX rpm																
MAS A/F SE-B1	XXX V																
IACV-AAC/V	XXX step																
SEF190Y																	
2. Is there any cylinder which does not produce a momentary engine speed drop?																	
<p> 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?</p>																	
 <p style="text-align: center;">Injector harness connector (for No.2 cylinder)</p>																	
SEF846X																	
Yes or No																	
Yes	▶ GO TO 5.																
No	▶ GO TO 8.																

5	CHECK INJECTOR
Does each injector make an operating sound at idle?	
	
MEC703B	
Yes or No	
Yes	▶ GO TO 6.
No	▶ Check injector(s) and circuit(s). Refer to EC-596.

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

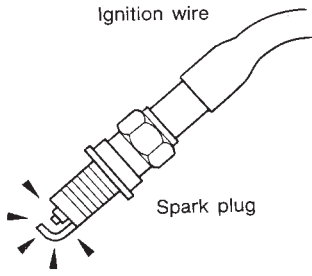
Diagnostic Procedure (Cont'd)

6	CHECK IGNITION SIGNAL CIRCUIT	
Refer to "Diagnostic Procedure", EC-592.		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace malfunctioning parts.

GI

MA

EM

7	CHECK IGNITION SPARK	
<ol style="list-style-type: none"> 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. 		
		
SEF282G		
OK or NG		
OK	▶	GO TO 9.
NG	▶	GO TO 8.

LC

EC

FE

CL

MT

AT

AX

SU

8	CHECK IGNITION WIRES	
Refer to "Component Inspection", EC-328.		
OK or NG		
OK	▶	Check distributor rotor head for incorrect parts. Check ignition coil, power transistor and their circuits. Refer to EC-590.
NG	▶	Replace.

BR

ST

RS

BT

HA

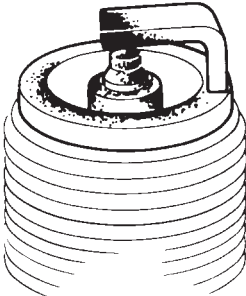
SC

EL

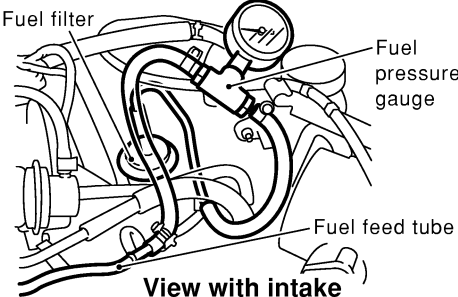
IDX

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

Diagnostic Procedure (Cont'd)

9	CHECK SPARK PLUGS	
Remove the spark plugs and check for fouling, etc.		
		
SEF156I		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Repair or replace spark plug(s) with standard type one(s). For spark plug type, refer to MA-13, "ENGINE MAINTENANCE".

10	CHECK COMPRESSION PRESSURE	
Refer to EM-13, "Measurement of Compression Pressure".		
<ul style="list-style-type: none"> ● Check compression pressure. 		
<p>Standard: 1,275 kPa (13.0 kg/cm², 185 psi)/300 rpm</p> <p>Minimum: 1,079 kPa (11.0 kg/cm², 156 psi)/300 rpm</p> <p>Difference between each cylinder: 98 kPa (1.0 kg/cm², 14 psi)/300 rpm</p>		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

11	CHECK FUEL PRESSURE	
<ol style="list-style-type: none"> 1. Install any parts removed. 2. Release fuel pressure to zero. Refer to EC-50. 3. Install fuel pressure gauge and check fuel pressure. 		
		
SEF826X		
At idle: Approx. 235 kPa (2.4 kg/cm², 34 psi)		
OK or NG		
OK	▶	GO TO 13.
NG	▶	GO TO 12.

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

Diagnostic Procedure (Cont'd)

12	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Fuel pump and circuit (Refer to EC-605.) ● Fuel pressure regulator (Refer to EC-51.) ● Fuel lines. Refer to MA-16, "Checking Fuel Lines". ● Fuel filter for clogging 		
▶		Repair or replace.

GI

MA

EM

13	CHECK IGNITION TIMING	
Perform "Basic Inspection", EC-107.		
OK or NG		
OK	▶	GO TO 14.
NG	▶	Adjust ignition timing.

LC

EC

FE

14	CHECK HEATED OXYGEN SENSOR 1 (FRONT)	
Refer to "Component Inspection", EC-202.		
OK or NG		
OK	▶	GO TO 15.
NG	▶	Replace heated oxygen sensor 1 (front).

CL

MT

AT

15	CHECK MASS AIR FLOW SENSOR	
ⓘ With CONSULT-II Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II. at idling: 2.5 - 5.0 g-m/sec at 2,500 rpm: 7.1 - 12.5 g-m/sec		
ⓘ With GST Check mass air flow sensor signal in MODE 1 with GST. at idling: 2.5 - 5.0 g-m/sec at 2,500 rpm: 7.1 - 12.5 g-m/sec		
OK or NG		
OK	▶	GO TO 17.
NG	▶	GO TO 16.

AX

SU

BR

ST

RS

16	CHECK CONNECTORS	
Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-154.		
OK or NG		
NG	▶	Repair or replace it.

BT

HA

SC

17	CHECK SYMPTOM MATRIX CHART	
Check items on the rough idle symptom in "Symptom Matrix Chart", EC-125.		
OK or NG		
OK	▶	GO TO 18.
NG	▶	Repair or replace.

EL

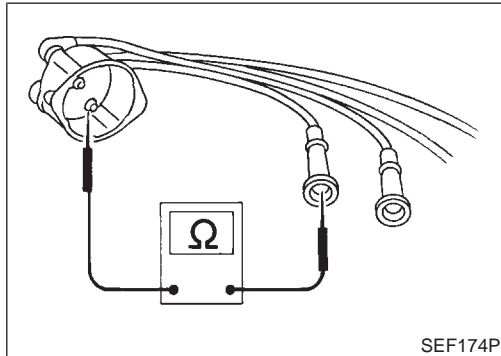
IDX

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

Diagnostic Procedure (Cont'd)

18	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-79.	
▶	GO TO 19.

19	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END



Component Inspection IGNITION WIRES

NCEC0205

NCEC0205S01

1. Inspect wires for cracks, damage, burned terminals and for improper fit.
2. Measure the resistance of wires to their distributor cap terminal. Move each wire while testing to check for intermittent breaks.

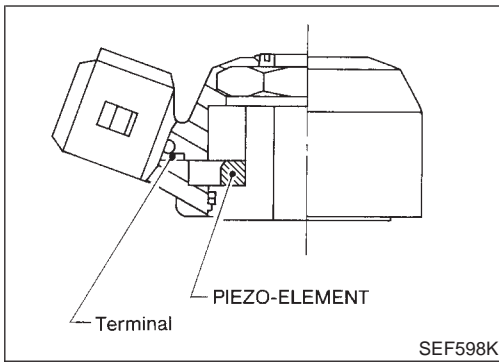
Resistance:

13.6 - 18.4 kΩ/m (4.15 - 5.61 kΩ/ft) at 25°C (77°F)

If the resistance exceeds the above specification, inspect ignition wire to distributor cap connection. Clean connection or replace the ignition wire with a new one.

DTC P0325 KNOCK SENSOR (KS)

Component Description



Component Description

NCEC0206

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. **Freeze frame data will not be stored in the ECM for the knock sensor. The MIL will not light for knock sensor malfunction. The knock sensor has one trip detection logic.**

GI
MA
EM
LC

ECM Terminals and Reference Value

NCEC0207

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.

EC
FE

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
81	W	Knock sensor	[Engine is running] ● Idle speed	Approximately 2.5V

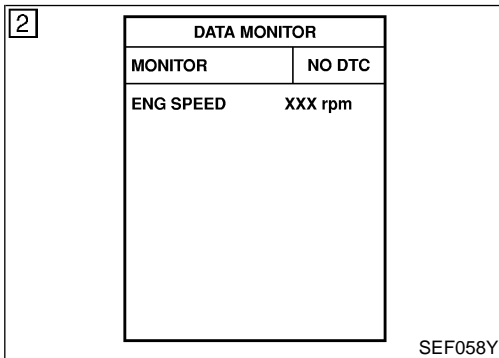
CL
MT

On Board Diagnosis Logic

NCEC0208

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0325	● An excessively low or high voltage from the knock sensor is sent to ECM.	● Harness or connectors (The knock sensor circuit is open or shorted.) ● Knock sensor

AT
AX
SU



DTC Confirmation Procedure

NCEC0209

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 10 seconds at idle speed.
- 3) If DTC is detected, go to "Diagnostic Procedure", EC-331.

Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

ST
RS
BT
HA
SC
EL
IDX

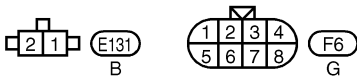
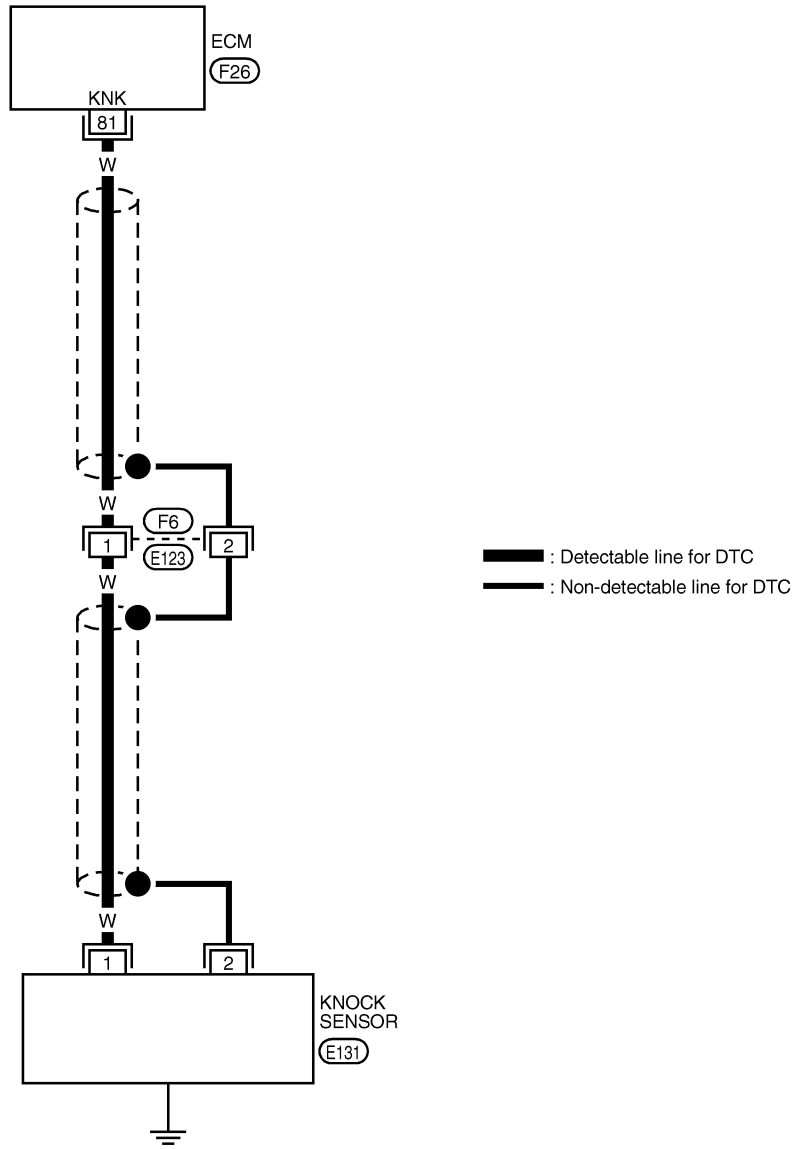
DTC P0325 KNOCK SENSOR (KS)

Wiring Diagram

Wiring Diagram

NCEC0210

EC-KS-01



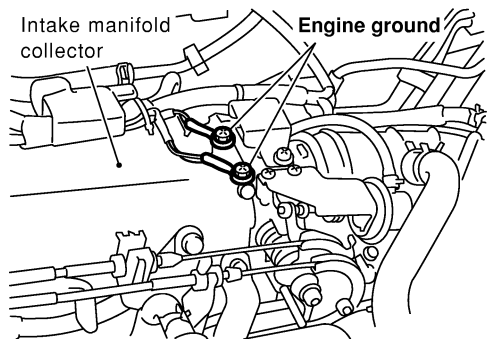
101	102	1	2	3	4	5	6	7	8	9	10					58	59	60	61	62	63	64	65	66	67	109	110						
103	104	11	12	13	14	15	16	17	18	19		39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57		77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38												87	88	89	90	91	92	93	94	95	115	116	

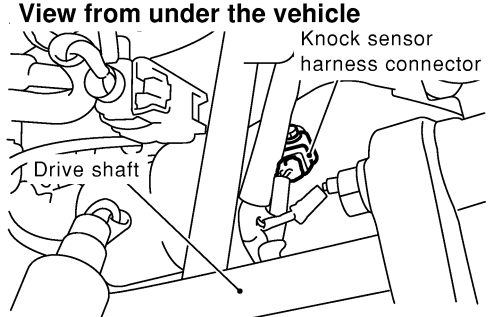


TEC708

Diagnostic Procedure

NCEC0211

1	RETIGHTEN GROUND SCREWS	<p>Loosen and retighten engine ground screws.</p>  <p style="text-align: right;">SEF839X</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p> <p>FE</p>
▶		GO TO 2.	

2	CHECK INPUT SIGNAL CIRCUIT-1	<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector and knock sensor harness connector.</p>  <p style="text-align: right;">SEF856X</p> <p>3. Check harness continuity between knock sensor terminal 1 and ECM terminal 81. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p>
▶		GO TO 4.	
▶		GO TO 3.	

3	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors F6, E123 ● Harness for open or short between knock sensor and ECM 	<p>BT</p> <p>HA</p> <p>SC</p>
▶		Repair open circuit or short to ground or short to power in harness or connectors.	

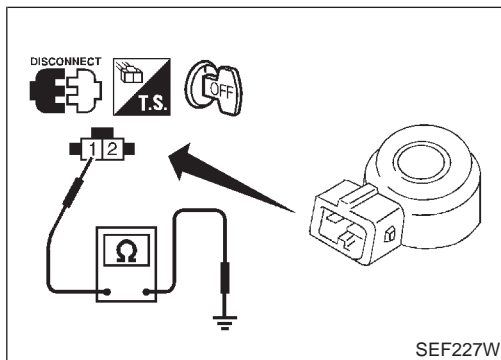
4	CHECK KNOCK SENSOR	<p>Knock sensor Refer to "Component Inspection", EC-332.</p> <p style="text-align: center;">OK or NG</p>	<p>EL</p> <p>IDX</p>
▶		GO TO 5.	
▶		Replace knock sensor.	

DTC P0325 KNOCK SENSOR (KS)

Diagnostic Procedure (Cont'd)

5		CHECK SHIELD CIRCUIT
1. Reconnect harness connectors disconnected. 2. Disconnect harness connectors F6, E123. 3. Check harness continuity between harness connector E123 terminal 2 and engine ground. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to power. 5. Then reconnect harness connectors.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Repair open circuit or short to power in harness or connectors.

6		CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.		
	▶	INSPECTION END



Component Inspection

KNOCK SENSOR

NCEC0212

- Use an ohmmeter which can measure more than 10 MΩ.
1. Disconnect knock sensor harness connector.
 2. Check resistance between terminal 1 and ground.

NCEC0212S01

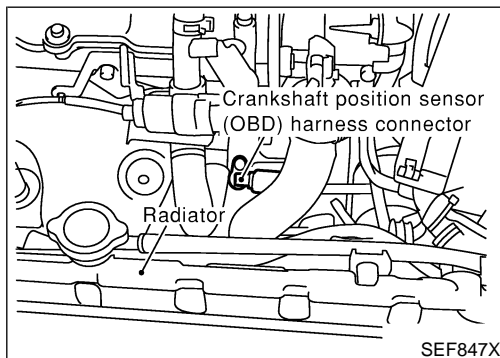
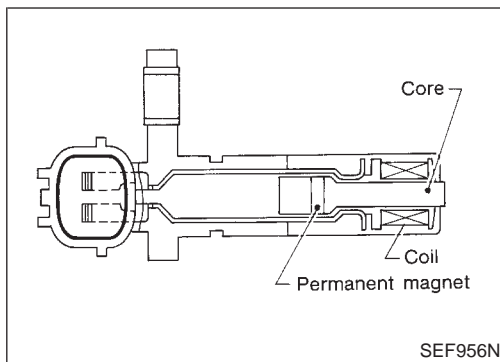
Resistance: 500 - 620 kΩ [at 20°C (68°F)]

CAUTION:

Discard any knock sensors that have been dropped or physically damaged. Use only new ones.

DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (OBD)

Component Description



Component Description

NCEC0213

The crankshaft position sensor (OBD) is located on the transaxle housing facing the gear teeth (cogs) of the flywheel or drive plate. It detects the fluctuation of the engine revolution.

The sensor consists of a permanent magnet, core and coil.

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.

This sensor is not directly used to control the engine system. It is used only for the on board diagnosis.

GI

MA

EM

LC

EC

FE

CL

MT

ECM Terminals and Reference Value

NCEC0214

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.

AT

AX

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (AC Voltage)
65	W	Crankshaft position sensor (OBD)	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>3 - 5V</p> <p>SEF721W</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	<p>6 - 9V</p> <p>SEF722W</p>

SU

BR

ST

RS

BT

HA

SC

On Board Diagnosis Logic

NCEC0215

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0335	<ul style="list-style-type: none"> ● The proper pulse signal from the crankshaft position sensor (OBD) is not sent to ECM while the engine is running at the specified engine speed. 	<ul style="list-style-type: none"> ● Harness or connectors (The crankshaft position sensor (OBD) circuit is open.) ● Crankshaft position sensor (OBD)

EL

IDX

DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (OBD)

DTC Confirmation Procedure

2	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

DTC Confirmation Procedure

NCEC0216

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 run it for at least 10 seconds at idle speed.
- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-336.

With GST

Follow the procedure "With CONSULT-II" above.

DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (OBD)

Wiring Diagram

Wiring Diagram

NCEC0217

EC-CKPS-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

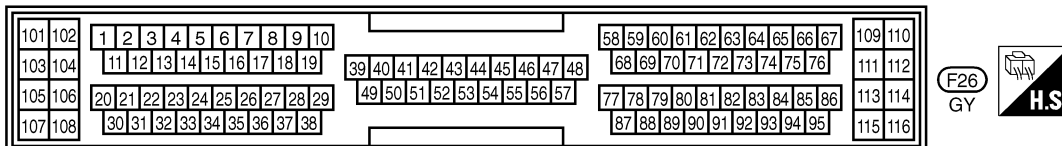
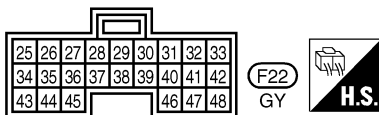
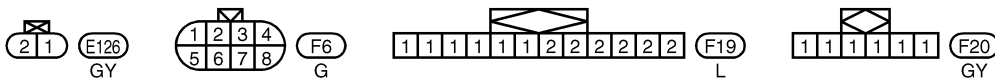
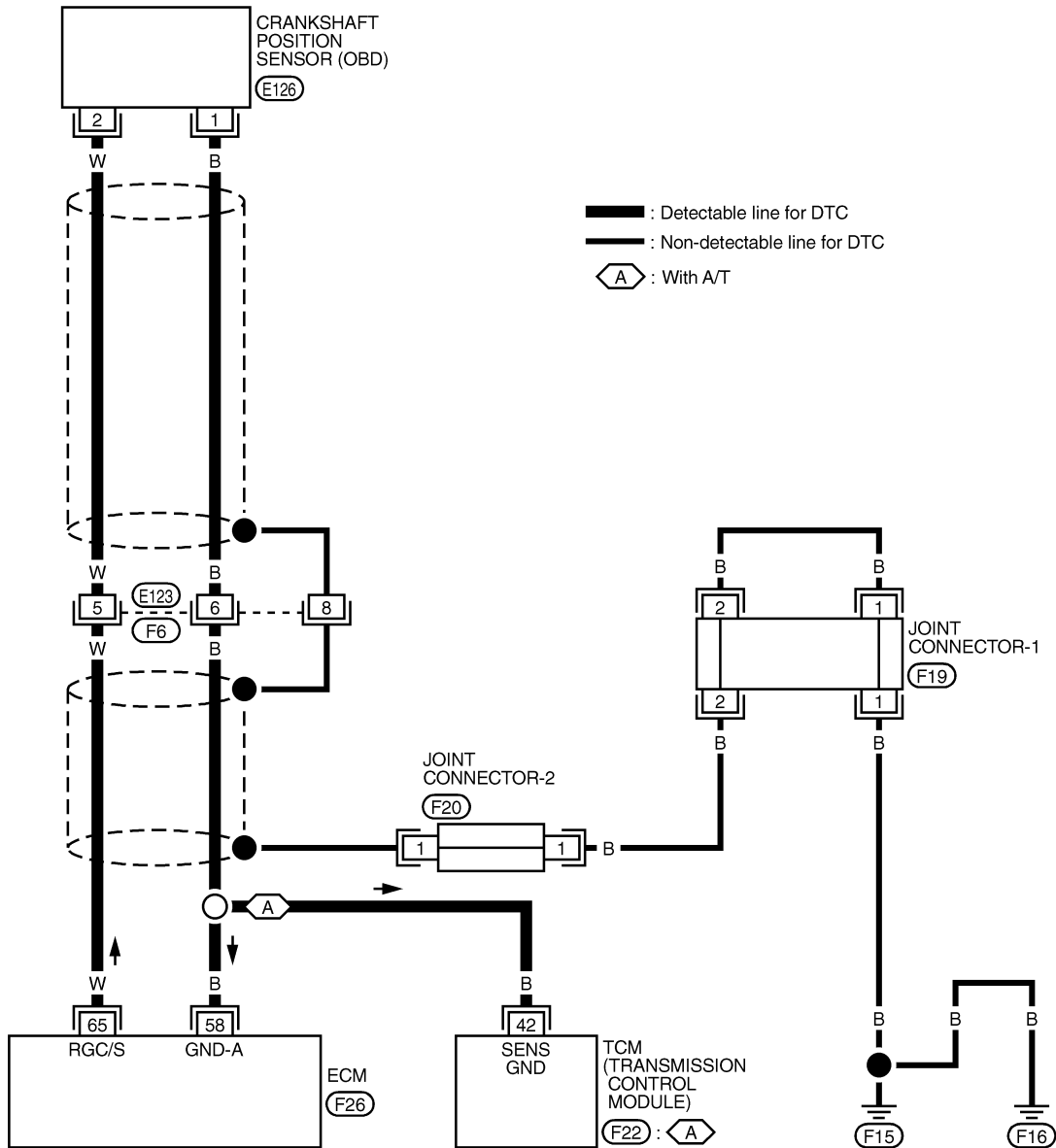
BT

HA

SC

EL

IDX



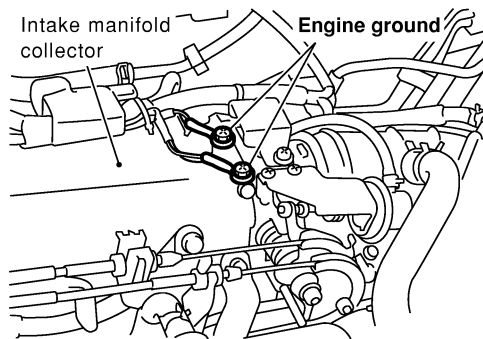
TEC709

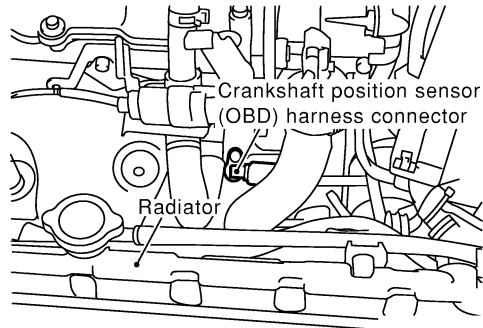
DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (OBD)

Diagnostic Procedure

Diagnostic Procedure

NCEC0218

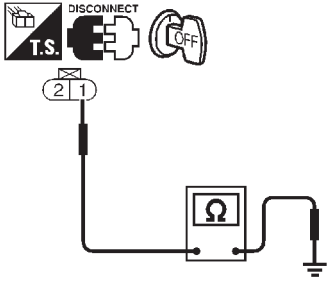
1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>	
 <p>The diagram shows a cross-section of an engine with various components. Two ground screws are highlighted with circles and arrows. One is labeled 'Intake manifold collector' and the other is labeled 'Engine ground'.</p>	
SEF839X	
▶	GO TO 2.

2	CHECK INPUT SIGNAL CIRCUIT
<p>1. Disconnect crankshaft position sensor (OBD) and ECM harness connectors.</p>	
 <p>The diagram shows a cross-section of an engine with various components. A crankshaft position sensor is highlighted with a circle and arrow, labeled 'Crankshaft position sensor (OBD) harness connector'. A radiator is also highlighted with a circle and arrow, labeled 'Radiator'.</p>	
SEF847X	
<p>2. Check continuity between ECM terminal 65 and CKPS (OBD) terminal 2. Refer to Wiring Diagram. Continuity should exist.</p>	
<p>3. Also check harness for short to ground and short to power.</p>	
OK or NG	
OK	▶ GO TO 4.
NG	▶ GO TO 3.

3	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none">● Harness connectors F6, E123● Harness for open or short between crankshaft position sensor (OBD) and ECM	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (OBD)

Diagnostic Procedure (Cont'd)

4	CHECK GROUND CIRCUIT	
<p>1. Reconnect ECM harness connector. 2. Check harness continuity between CKPS (OBD) terminal 1 and engine ground.</p>		
		
SEF229W		
<p>Continuity should exist.</p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

GI

MA

EM

LC

EC

FE

CL

5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors F6, E123 ● Harness for open or short between crankshaft position sensor (OBD) and ECM ● Harness for open or short between crankshaft position sensor (OBD) and TCM (Transmission control module) 		
▶		Repair open circuit or short to power in harness or connectors.

MT

AT

AX

6	CHECK SHIELD CIRCUIT	
<p>1. Disconnect harness connectors F6, E123. 2. Check harness continuity between harness connector F6 terminal 8 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to power. 4. Then reconnect harness connectors.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 8.
NG	▶	GO TO 7.

SU

BR

ST

RS

7	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors F6, E123 ● Joint connector-1 and -2 (Refer to EL-274, "HARNESS LAYOUT".) ● Harness for open or short between harness connector F6 and Engine ground 		
▶		Repair open circuit or short to power in harness or connectors.

BT

HA

SC

8	CHECK CRANKSHAFT POSITION SENSOR (OBD)	
<p>Refer to "Component Inspection", EC-338.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 9.
NG	▶	Replace crankshaft position sensor (OBD).

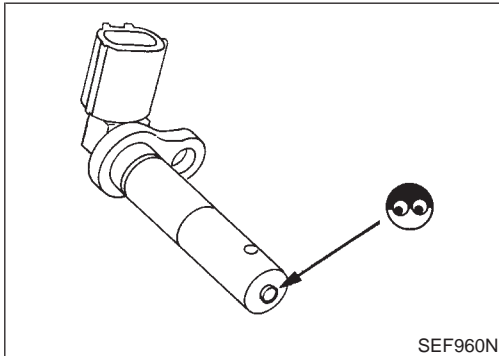
EL

IDX

DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (OBD)

Diagnostic Procedure (Cont'd)

9	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END



Component Inspection CRANKSHAFT POSITION SENSOR (OBD)

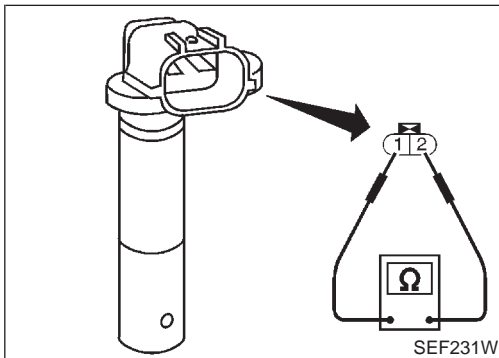
NCEC0219

NCEC0219S01

1. Disconnect crankshaft position sensor (OBD) 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.

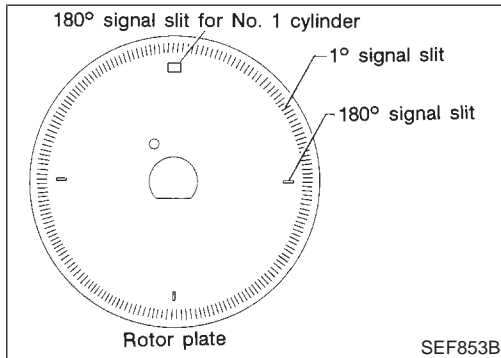
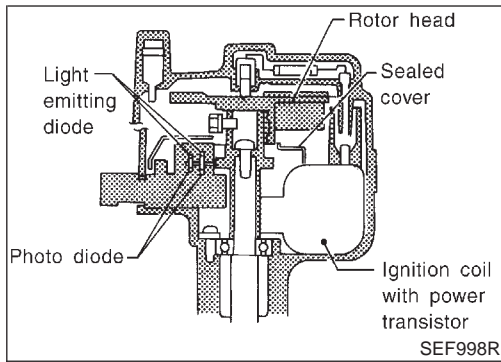
Resistance: 166 - 204 Ω [at 20°C (68°F)]

If NG, replace crankshaft position sensor (OBD).



DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

Component Description



Component Description

NCEC0220

The camshaft position sensor is a basic component of the engine control system. It monitors engine speed and piston position. These input signals to the engine control system are used to control fuel injection, ignition timing and other functions.

The camshaft position sensor has a rotor plate and a wave-forming circuit. The rotor plate has 360 slits for a 1° (POS) signal and 4 slits for a 180° (REF) signal. The wave-forming circuit consists of Light Emitting Diodes (LED) and photo diodes.

The rotor plate is positioned between the LED and the photo diode. The LED transmits light to the photo diode. As the rotor plate turns, the slits cut the light to generate rough-shaped pulses. These pulses are converted into on-off signals by the wave-forming circuit and sent to the ECM.

The distributor is not repairable and must be replaced as an assembly except distributor cap and rotor head.

GI

MA

EM

LC

EC

FE

CL

MT

ECM Terminals and Reference Value

NCEC0221

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.

AT

AX

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
75	L	Camshaft position sensor (Reference signal)	[Engine is running] ● Warm-up condition ● Idle speed	0.1 - 0.4V SEF006W
			[Engine is running] ● Engine speed is 2,000 rpm	0.1 - 0.4V SEF007W

SU

BR

ST

RS

BT

HA

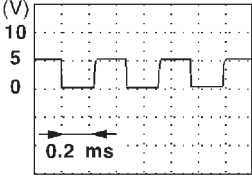
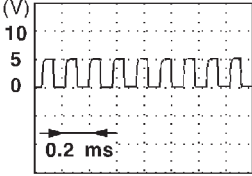
SC

EL

IDX

DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

ECM Terminals and Reference Value (Cont'd)

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
85	B/W	Camshaft position sensor (Position signal)	[Engine is running] <ul style="list-style-type: none"> • Warm-up condition • Idle speed 	Approximately 2.6V  SEF004W
			[Engine is running] <ul style="list-style-type: none"> • Engine speed is 2,000 rpm 	Approximately 2.5V  SEF005W

On Board Diagnosis Logic

NCEC0222

DTC No.	Malfunction is detected when ...		Check Items (Possible Cause)
P0340	A)	Either 1° or 180° signal is not sent to ECM for the first few seconds during engine cranking.	<ul style="list-style-type: none"> • Harness or connectors (The camshaft position sensor circuit is open or shorted.) • Camshaft position sensor • Starter motor (Refer to SC-10, "STARTING SYSTEM".) • Starting system circuit (Refer to SC-10, "STARTING SYSTEM".) • Dead (Weak) battery
	B)	Either 1° or 180° signal is not sent to ECM often enough while the engine speed is higher than the specified engine speed.	
	C)	The relation between 1° and 180° signal is not in the normal range during the specified engine speed.	

DTC Confirmation Procedure

NCEC0223

Perform "Procedure for malfunction A" first. If DTC cannot be confirmed, perform "Procedure for malfunction B and 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.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V.

2	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION A

NCEC0223S01

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Crank engine for at least 2 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-343.

With GST

Follow the procedure "With CONSULT-II" above.

DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

DTC Confirmation Procedure (Cont'd)

3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION B AND C

NCEC0223S02

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and run it for at least 2 seconds at idle speed.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-343.

With GST

Follow the procedure "With CONSULT-II" above.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

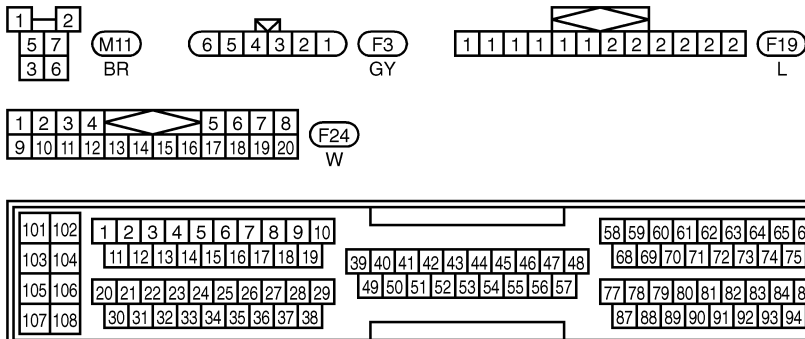
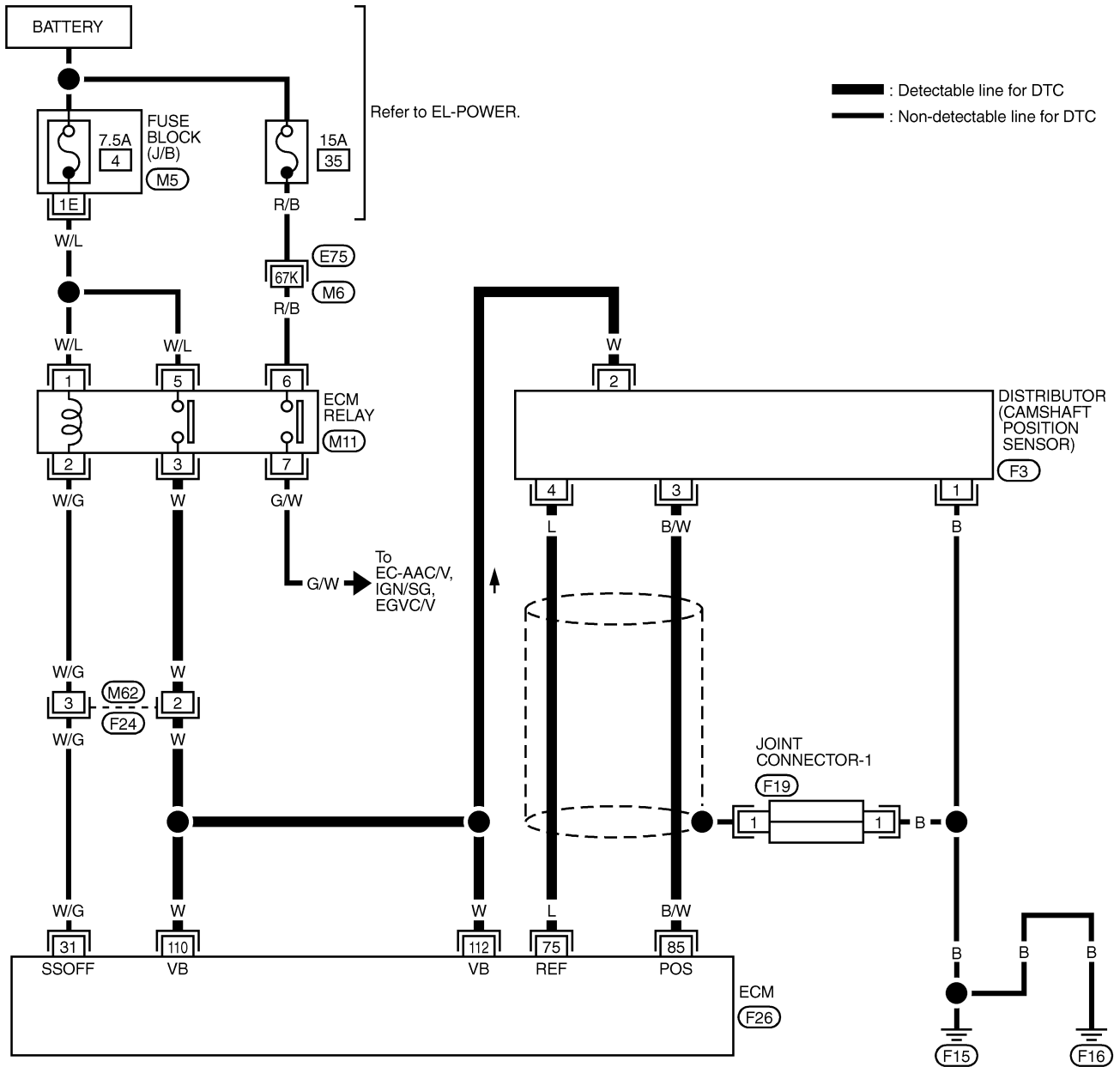
DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

Wiring Diagram

Wiring Diagram

NCEC0224

EC-CMPS-01



REFER TO THE FOLLOWING.

(E75) -SUPER MULTIPLE JUNCTION (SMJ)

(M5) -FUSE BLOCK-JUNCTION BOX (J/B)

(F26) GY



TEC828

DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

Diagnostic Procedure

Diagnostic Procedure

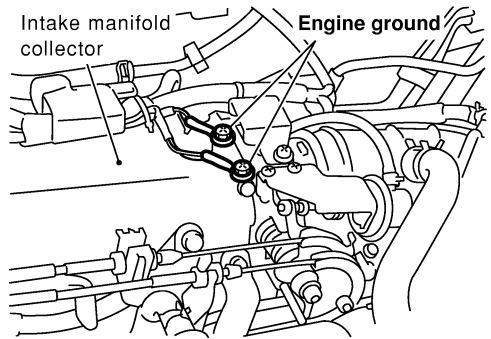
NCEC0225

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-10, "STARTING SYSTEM".)

GI

MA

EM

2	RETIGHTEN GROUND SCREWS
1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.	
 <p>The diagram shows a cross-section of an engine with various components. Two specific ground screws are highlighted with arrows and labels: 'Intake manifold collector' and 'Engine ground'. The 'Intake manifold collector' is located on the left side of the engine, and the 'Engine ground' is located on the right side. The diagram is a technical line drawing showing the internal components of the engine and the location of these ground screws.</p>	
SEF839X	
▶	GO TO 3.

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

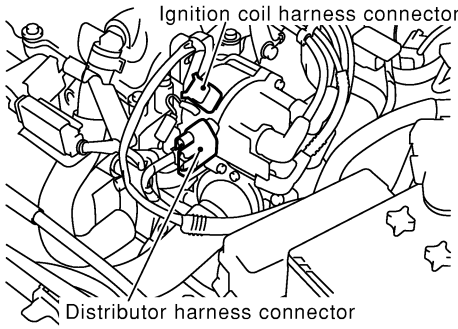
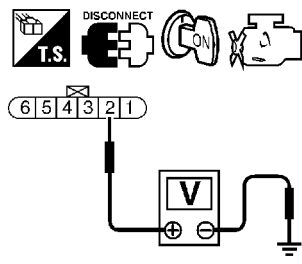
SC

EL

IDX

DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

Diagnostic Procedure (Cont'd)

3	CHECK POWER SUPPLY		
<p>1. Disconnect distributor harness connector.</p> <div style="text-align: center;">  <p style="margin-left: 100px;">Ignition coil harness connector</p> <p style="margin-left: 100px;">Distributor harness connector</p> </div> <p style="text-align: right;">SEF848X</p> <p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between distributor terminal 2 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF232W</p> <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>			
OK		▶	GO TO 5.
NG		▶	GO TO 4.

4	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M62, F24 ● Harness for open or short between distributor and ECM relay ● Harness for open or short between distributor and ECM 			
		▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK INPUT SIGNAL CIRCUIT		
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between distributor terminal 3 and ECM terminal 85, distributor terminal 4 and ECM terminal 75. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>			
OK		▶	GO TO 6.
NG		▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

Diagnostic Procedure (Cont'd)

6	CHECK GROUND CIRCUIT								
		<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Check harness continuity between distributor terminal 1 and engine ground. 	GI MA EM LC						
			EC						
		<p>Continuity should exist.</p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	FE						
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td style="width: 75%;">GO TO 7.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to power in harness or connectors.</td> </tr> </table>	OK	▶	GO TO 7.	NG	▶	Repair open circuit or short to power in harness or connectors.	CL
OK	▶	GO TO 7.							
NG	▶	Repair open circuit or short to power in harness or connectors.							

SEF234W

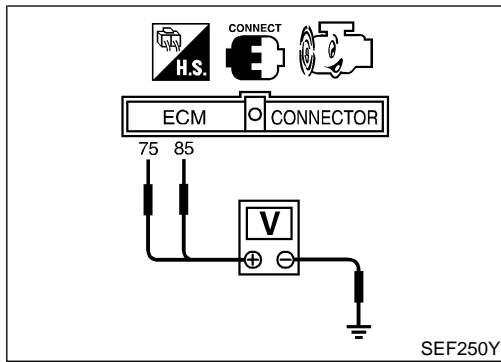
7	CHECK CAMSHAFT POSITION SENSOR								
		Refer to "Component Inspection", EC-346.	MT						
		OK or NG	AT						
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td style="width: 75%;">GO TO 8.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Replace camshaft position sensor.</td> </tr> </table>	OK	▶	GO TO 8.	NG	▶	Replace camshaft position sensor.	AX
OK	▶	GO TO 8.							
NG	▶	Replace camshaft position sensor.							

8	CHECK SHIELD CIRCUIT								
		<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect joint connector-1. 3. Check the following. <ul style="list-style-type: none"> ● Continuity between joint connector-1 terminal 1 and ground Refer to Wiring Diagram. ● Joint connector-1 (Refer to EL-274, "HARNES LAYOUT".) Continuity should exist. 4. Also check harness for short to power. 5. Then reconnect joint connector-1. 	SU BR ST RS						
		OK or NG	BT						
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td style="width: 75%;">GO TO 9.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to power in harness or connectors.</td> </tr> </table>	OK	▶	GO TO 9.	NG	▶	Repair open circuit or short to power in harness or connectors.	HA
OK	▶	GO TO 9.							
NG	▶	Repair open circuit or short to power in harness or connectors.							

9	CHECK INTERMITTENT INCIDENT		
		Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	SC
		INSPECTION END	EL IDX

DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

Component Inspection



Component Inspection CAMSHAFT POSITION SENSOR

=NCEC0226

NCEC0226S01

1. Start engine and warm it up to normal operating temperature.
2. Check voltage between ECM terminals 75, 85 and engine ground under the following conditions.

Terminal 75 and engine ground

Condition	Idle	2,000 rpm
Voltage	0.1 - 0.4V	0.1 - 0.4V
Pulse signal	<p>SEF006W</p>	<p>SEF007W</p>

Terminal 85 and engine ground

Condition	Idle	2,000 rpm
Voltage	Approximately 2.5V	Approximately 2.4V
Pulse signal	<p>SEF004W</p>	<p>SEF005W</p>

If NG, replace distributor assembly with camshaft position sensor.

DTC P0400 EGR FUNCTION (CLOSE)

Description

Description SYSTEM DESCRIPTION

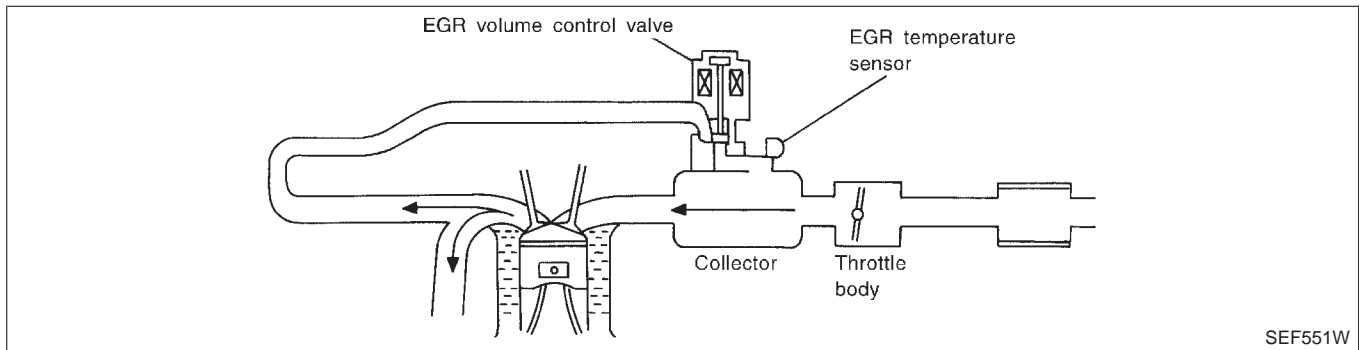
NCEC0513

NCEC0513S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	EGR volume control	EGR volume control valve
Vehicle speed sensor	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Battery	Battery voltage		
Mass air flow sensor	Amount of intake air		
Air conditioner switch	Air conditioner operation		
Power steering oil pressure switch	Power steering load signal		
Electrical load	Electrical load signal		
PNP switch	Park/Neutral position signal		
TCM (Transmission Control Module)	Gear position, shifting signal		

This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR by-pass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. The EGR volume control valve remains close under the following conditions.

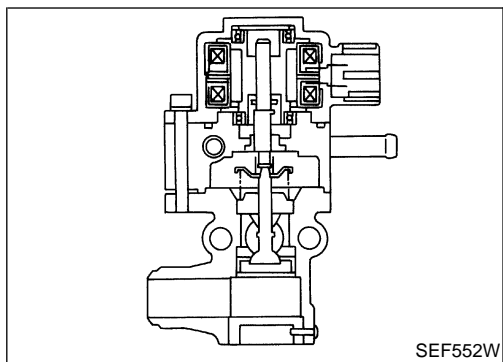
- Engine stopped
- Engine starting
- Engine idling
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Wide open throttle
- Low battery voltage



SEF551W

DTC P0400 EGR FUNCTION (CLOSE)

Description (Cont'd)



COMPONENT DESCRIPTION

EGR volume control valve

NCEC0513S02

NCEC0513S0201

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor 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, changing the flow rate. When no change in the flow rate 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

NCEC0514

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
EGR TEMP SEN	● Engine: After warming up		Less than 4.5V
EGR VOL CON/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load 	Idle	0 step
		Revsing engine up to 3,000 rpm quickly	10 - 55 step

ECM Terminals and Reference Value

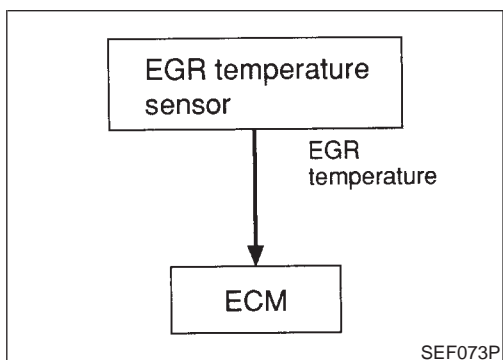
NCEC0644

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)
8 9 17 18	SB W/B R/W G/R	EGR volume control valve	[Engine is running] ● Idle speed	0.1 - 14V
58	B	Sensor's ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
72	R/B	EGR temperature sensor	[Engine is running] ● Warm-up condition ● Idle speed	Less than 4.5V
			[Engine is running] ● Warm-up condition ● EGR system is operating	0 - 1.5V



On Board Diagnosis Logic

NCEC0515

If the absence of EGR flow is detected by EGR temperature sensor under the condition that calls for EGR, a low-flow malfunction is diagnosed.

Malfunction is detected when no EGR flow is detected under condition that calls for EGR.

Possible Cause

NCEC0516

- Harness or connectors (EGR volume control valve circuit is open or shorted.)
- EGR volume control valve stuck closed
- Dead (Weak) battery
- EGR passage clogged
- EGR temperature sensor and circuit
- Exhaust gas leaks

GI
MA
EM
LC

5	EGR SYSTEM P0400					
	OUT OF CONDITION					
	MONITOR					
	<table border="1"> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td>B/FUEL SCHDL</td> <td>XXX msec</td> </tr> </table>	ENG SPEED	XXX rpm	THRTL POS SEN	XXX V	B/FUEL SCHDL
ENG SPEED	XXX rpm					
THRTL POS SEN	XXX V					
B/FUEL SCHDL	XXX msec					

SEF191Y

8	EGR SYSTEM P0400					
	TESTING					
	MONITOR					
	<table border="1"> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td>B/FUEL SCHDL</td> <td>XXX msec</td> </tr> </table>	ENG SPEED	XXX rpm	THRTL POS SEN	XXX V	B/FUEL SCHDL
ENG SPEED	XXX rpm					
THRTL POS SEN	XXX V					
B/FUEL SCHDL	XXX msec					

SEF192Y

8	EGR SYSTEM P0400
	COMPLETED

SEF235Y

DTC Confirmation Procedure

NCEC0517

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.
- P0400 will not be displayed at “SELF-DIAG RESULTS” mode with CONSULT-II even though DTC work support test result is NG.

EC
FE
CL
MT

TESTING CONDITION:

- Before performing the following procedure, confirm battery voltage is more than 10V at idle, then stop engine immediately.
- For best results, perform the test at a temperature of 5°C (41°F) or higher.

AT
AX

WITH CONSULT-II

NCEC0517S01

- 1) Turn ignition switch “OFF” and wait at least 10 seconds.
- 2) Turn ignition switch “ON”
- 3) Check “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-II.
Confirm COOLAN TEMP/S value is within the range listed below.
COOLAN TEMP/S: Less than 40°C (104°F)
If the value is out of range, park the vehicle in a cool place and allow the engine temperature to stabilize. Do not attempt to lower the engine coolant temperature with a fan or means other than ambient air. Doing so may produce an inaccurate diagnostic result.
- 4) Start engine and let it idle monitoring “COOLAN TEMP/S” value. When the “COOLAN TEMP/S” value reaches 70°C (158°F), immediately go to the next step.
- 5) Select “EGR SYSTEM P0400” of “EGR SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
- 6) Touch “START”.
- 7) Accelerate vehicle to a speed of 40 km/h (25 MPH) once and then stop vehicle with engine running.
If “COMPLETED” appears on CONSULT-II screen, go to step 10.
If “COMPLETED” does not appear on CONSULT-II screen, go to the following step.
- 8) Check the output voltage of “THRTL POS SEN” (at closed throttle position) and note it.
- 9) When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions

SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0400 EGR FUNCTION (CLOSE)

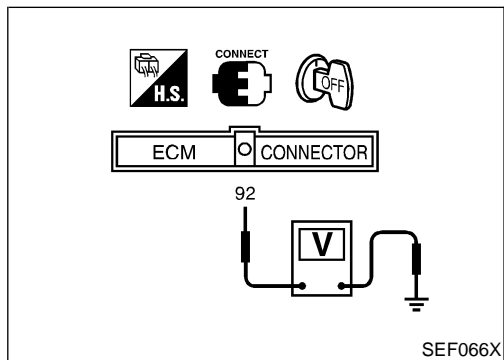
DTC Confirmation Procedure (Cont'd)

until "TESTING" changes to "COMPLETED". (It will take approximately 30 seconds or more.)

ENG SPEED	1,800 - 2,800 rpm
Vehicle speed	More than 10 km/h (6 MPH)
B/FUEL SCHDL	5.0 - 8.5 msec
THRTL POS SEN	$(X + 0.05) - (X + 0.87) V$ X = Voltage value measured at step 8
Selector lever	Suitable position

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- 10) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-352.



WITH GST

NCE0517S02

- 1) Turn ignition switch "OFF" and wait at least 10 seconds.
 - 2) Turn ignition switch "ON".
 - 3) Check engine coolant temperature in MODE 1 with GST.
Engine coolant temperature: Less than 40°C (104°F)
If the value is out of range, park the vehicle in a cool place and allow the engine temperature to stabilize. Do not attempt to lower the coolant temperature with a fan or means other than ambient air. Doing so may produce an inaccurate diagnostic result.
 - 4) Start engine and let it idle monitoring the value of "COOLAN TEMP/S". When the engine coolant temperature reaches 70°C (158°F), immediately go to the next step.
 - 5) Maintain the following conditions for at least 1 minute.
Engine speed: 1,800 - 2,800 rpm
Vehicle speed: More than 10 km/h (6 MPH)
Voltage between ECM terminal 92 and ground: 0.86 - 2.0V
Selector lever: Suitable position
 - 6) Stop vehicle.
 - 7) Turn ignition switch "OFF" and wait at least 10 seconds, then turn "ON".
 - 8) Repeat step 3 to 5.
 - 9) Select "MODE 3" with GST.
 - 10) If DTC is detected, go to "Diagnostic Procedure", EC-352.
- **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 P0400 EGR FUNCTION (CLOSE)

Wiring Diagram

Wiring Diagram

NCEC0518

EC-EGRC1-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

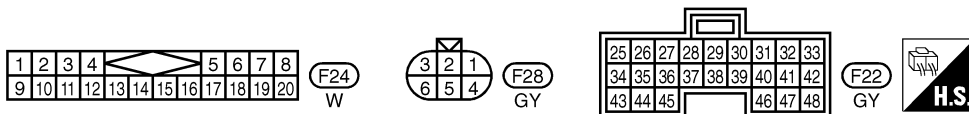
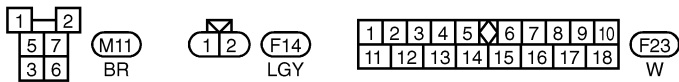
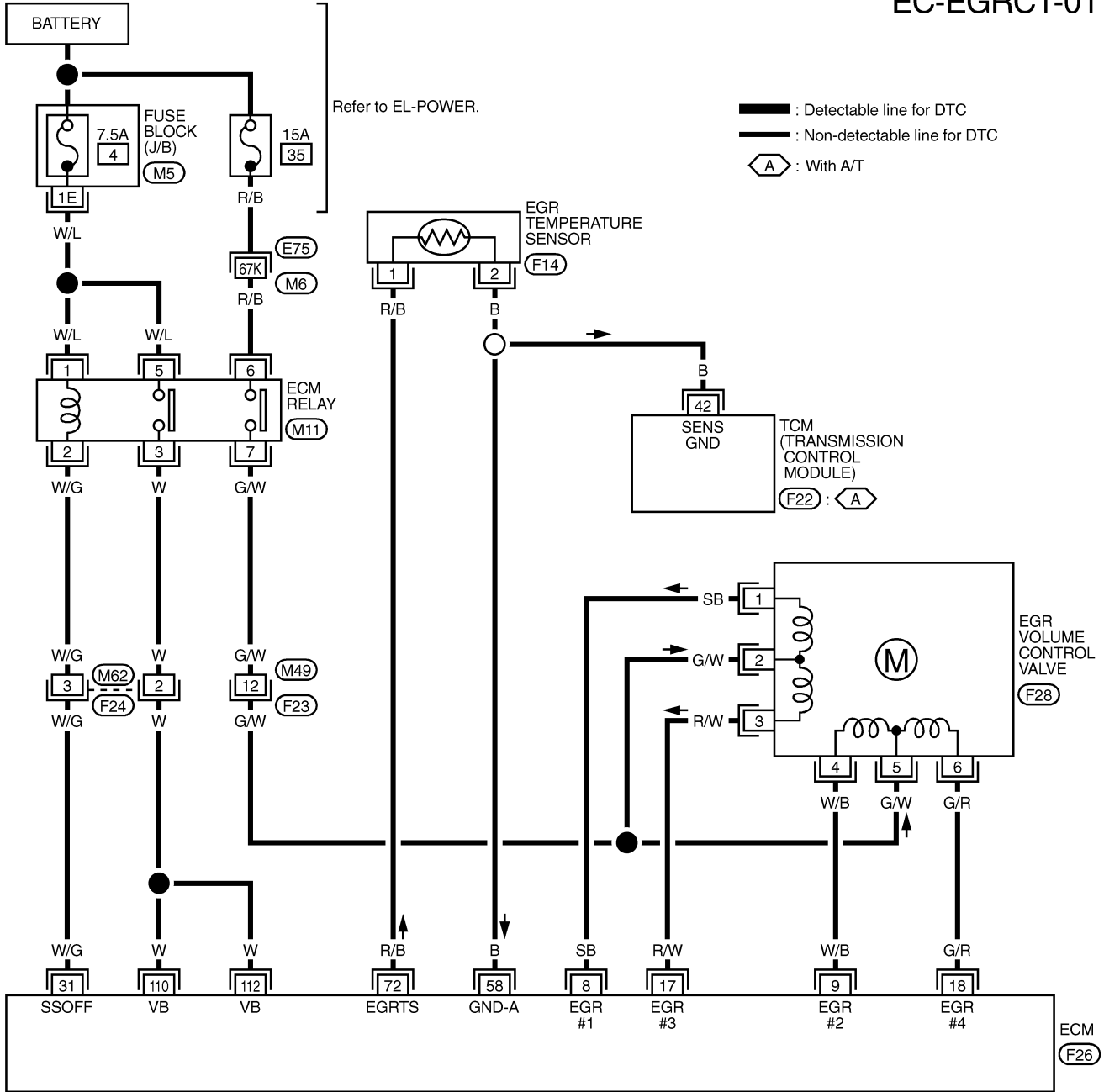
BT

HA

SC

EL

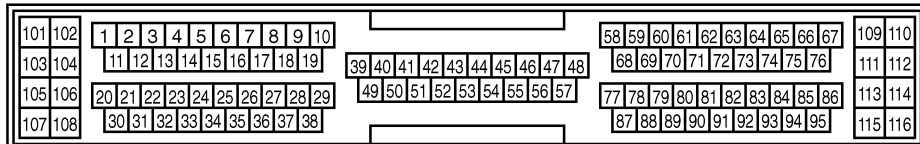
IDX



REFER TO THE FOLLOWING.

(E75) -SUPER MULTIPLE JUNCTION (SMJ)

(M5) -FUSE BLOCK-JUNCTION BOX (J/B)



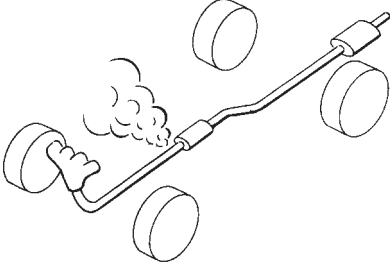
TEC836

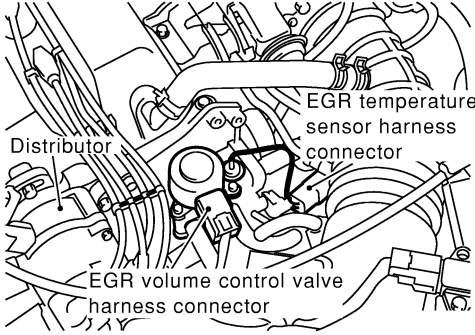
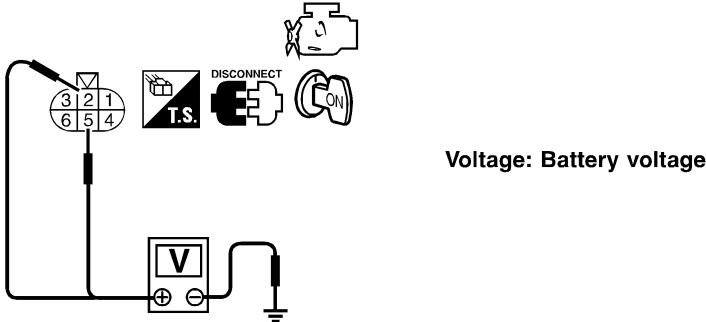
DTC P0400 EGR FUNCTION (CLOSE)

Diagnostic Procedure

Diagnostic Procedure

NCEC0519

1	CHECK EXHAUST SYSTEM		
<ol style="list-style-type: none"> 1. Start engine. 2. Check exhaust pipes and muffler for leaks. 			
			
SEF099P			
OK or NG			
OK	▶	GO TO 2.	
NG	▶	Repair or replace exhaust system.	

2	CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT		
<ol style="list-style-type: none"> 1. Disconnect EGR volume control valve harness connector. 			
			
SEF849X			
<ol style="list-style-type: none"> 2. Turn ignition switch "ON". 3. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester. 			
			
SEF327X			
OK or NG			
OK	▶	GO TO 4.	
NG	▶	GO TO 3.	

DTC P0400 EGR FUNCTION (CLOSE)

Diagnostic Procedure (Cont'd)

3	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness connectors F23, M49 ● Harness for open or short between ECM relay and EGR volume control valve 	
▶	Repair harness or connectors.

GI

MA

4	CHECK EGR VOLUME 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 EGR volume control valve terminals as follows. Refer to Wiring Diagram.											
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 50%;">ECM terminal</th> <th style="width: 50%;">EGR volume control valve</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">8</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">9</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">17</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">18</td> <td style="text-align: center;">6</td> </tr> </tbody> </table>		ECM terminal	EGR volume control valve	8	1	9	4	17	3	18	6
ECM terminal	EGR volume control valve										
8	1										
9	4										
17	3										
18	6										
MTBL0389											
<p style="color: blue;">Continuity should exist.</p> 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.										

EM

LC

EC

FE

CL

MT

AT

5	CHECK EGR PASSAGE
Check EGR passage for clogging and cracks.	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Repair or replace EGR passage.

AX

SU

BR

ST

RS

BT

HA

SC

EL

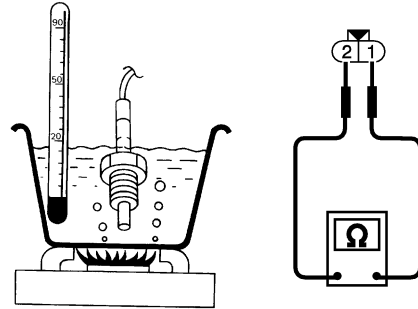
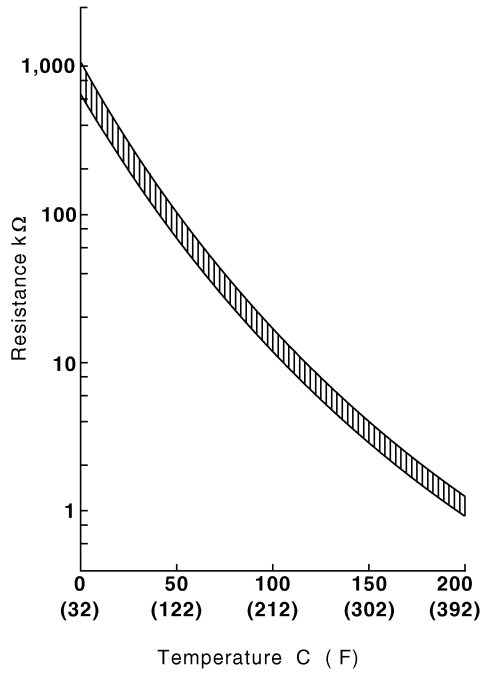
IDX

DTC P0400 EGR FUNCTION (CLOSE)

Diagnostic Procedure (Cont'd)

6 CHECK EGR TEMPERATURE SENSOR AND CIRCUIT

1. Remove EGR temperature sensor.
2. Check resistance between EGR temperature sensor terminals 1 and 2 under the following conditions.



<Reference data>

EGR temperature C (F)	Voltage V	Resistance MΩ
0 (32)	4.56	0.73 - 0.89
50 (122)	2.25	0.074 - 0.082
100 (212)	0.59	0.012 - 0.014

SEF919Z

OK or NG

- | | | |
|----|---|---------------------------------|
| OK | ▶ | GO TO 7. |
| NG | ▶ | Replace EGR temperature sensor. |

DTC P0400 EGR FUNCTION (CLOSE)

Diagnostic Procedure (Cont'd)

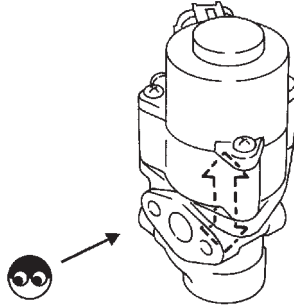
7	CHECK EGR VOLUME CONTROL VALVE-I		
<p>Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.</p>			
		<p>Resistance: 20.9 - 23.1 Ω [At 20°C (68°F)]</p>	
OK or NG		SEF588X	
OK (With CONSULT-II)	▶	GO TO 8.	
OK (Without CONSULT-II)	▶	GO TO 9.	
NG	▶	Replace EGR volume control valve.	

8	CHECK EGR VOLUME CONTROL VALVE-II																														
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch "ON". 4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. 5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps. 																															
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>EGR VOL CONT/V</th> <th>20 step</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>		ACTIVE TEST		EGR VOL CONT/V	20 step	MONITOR		ENG SPEED	XXX rpm																						
ACTIVE TEST																															
EGR VOL CONT/V	20 step																														
MONITOR																															
ENG SPEED	XXX rpm																														
OK or NG		SEF067Y																													
OK	▶	GO TO 10.																													
NG	▶	Replace EGR volume control valve.																													

GI
 MA
 EM
 LC
 EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P0400 EGR FUNCTION (CLOSE)

Diagnostic Procedure (Cont'd)

9	CHECK EGR VOLUME CONTROL VALVE-II
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none">1. Remove EGR volume control valve.2. Reconnect ECM harness connector and EGR volume control valve harness connector.3. Turn ignition switch "ON" and "OFF".4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position.	
	
OK or NG	
OK	▶ GO TO 10.
NG	▶ Replace EGR volume control valve.

SEF560W

10	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
	▶ INSPECTION END

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

Description

Description SYSTEM DESCRIPTION

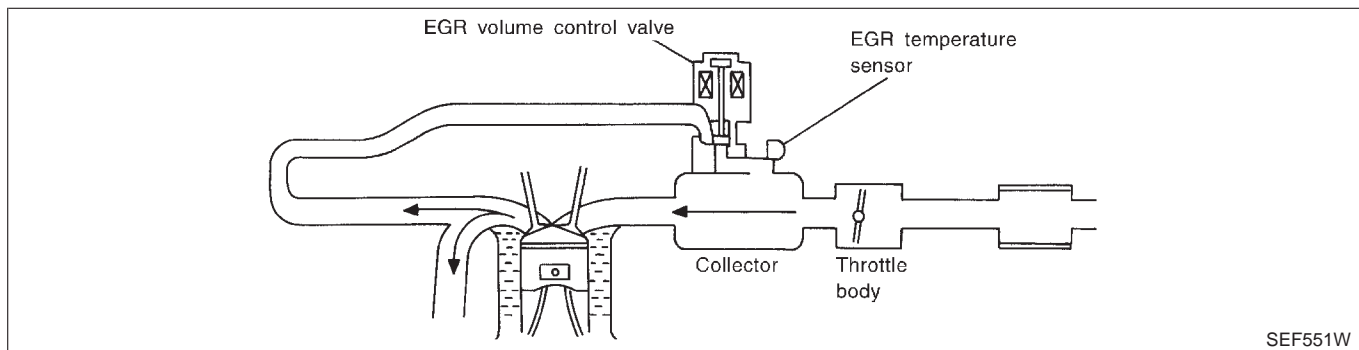
NCEC0520

NCEC0520S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	EGR volume control	EGR volume control valve
Vehicle speed sensor	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Battery	Battery voltage		
Mass air flow sensor	Amount of intake air		
Air conditioner switch	Air conditioner operation		
Power steering oil pressure switch	Power steering load signal		
Electrical load	Electrical load signal		
PNP switch	Park/Neutral position signal		
TCM (Transmission Control Module)	Gear position, shifting signal		

This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR by-pass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. The EGR volume control valve remains close under the following conditions.

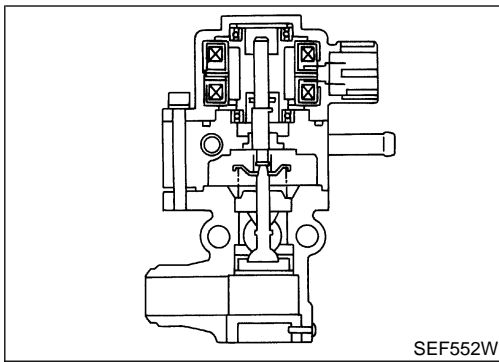
- Engine stopped
- Engine starting
- Engine idling
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Wide open throttle
- Low battery voltage



SEF551W

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

Description (Cont'd)



COMPONENT DESCRIPTION

NCEC0520S02

EGR volume control valve

NCEC0520S0201

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor 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, changing the flow rate. When no change in the flow rate 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

NCEC0521

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
EGR VOL CON/V	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load 	Idle	0 step
		Revvng engine up to 3,000 rpm quickly	10 - 55 step

ECM Terminals and Reference Value

NCEC0645

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 9 17 18	SB W/B R/W G/R	EGR volume control valve	[Engine is running] <ul style="list-style-type: none"> Idle speed 	0.1 - 14V

On Board Diagnosis Logic

NCEC0522

Malfunction is detected when an improper voltage signal is sent to ECM through the valve.

FAIL-SAFE MODE

NCEC0522S01

When the ECM enters the fail-safe mode, the MIL illuminates.

Detected items	Engine operating condition in fail-safe mode
EGR volume control valve circuit	Engine speed will not rise more than 2,800 rpm due to the fuel cut.

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

Possible Cause

Possible Cause

NCEC0523

- Harness or connectors
(EGR volume control valve circuit is open or shorted.)
- EGR volume control valve

GI

MA

EM

LC

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

SEF174Y

DTC Confirmation Procedure

NCEC0524

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

NCEC0524S01

- 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) Rev engine from idle to 2,000 rpm 10 times.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-361.

EC

FE

CL

MT

AT

AX

Ⓜ WITH GST

NCEC0524S02

Follow the procedure "With CONSULT-II" above.

SU

BR

ST

RS

BT

HA

SC

EL

IDX

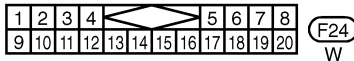
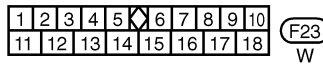
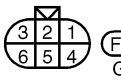
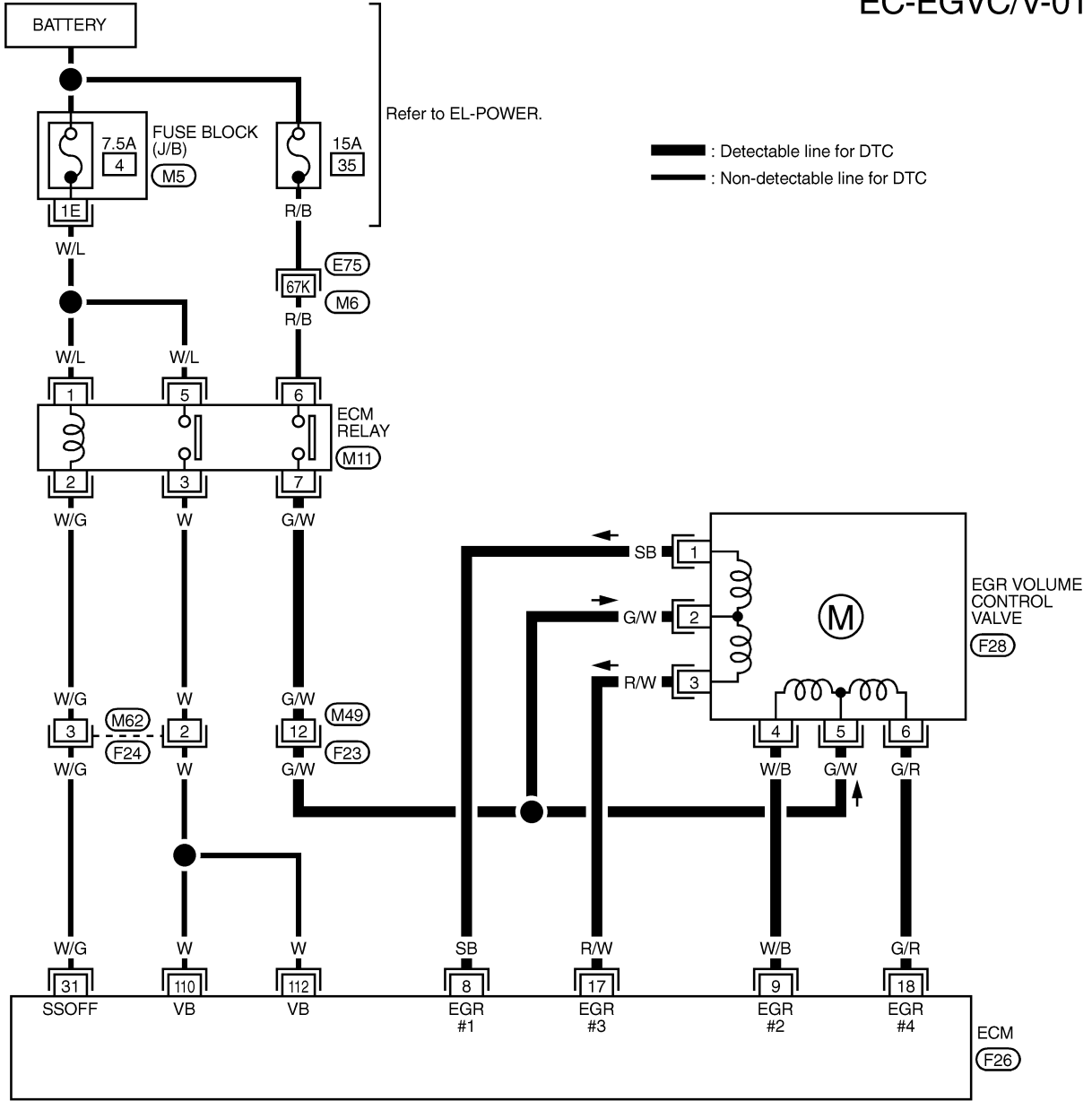
DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

Wiring Diagram

Wiring Diagram

=NCEC0525

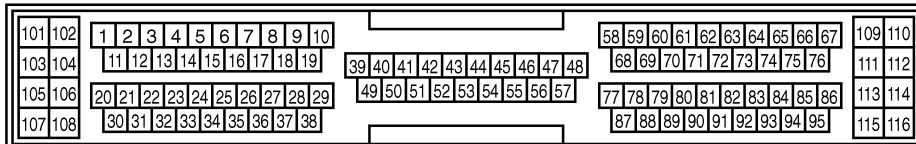
EC-EGVC/V-01



REFER TO THE FOLLOWING.

(E75) -SUPER MULTIPLE JUNCTION (SMJ)

(M5) -FUSE BLOCK-JUNCTION BOX (J/B)



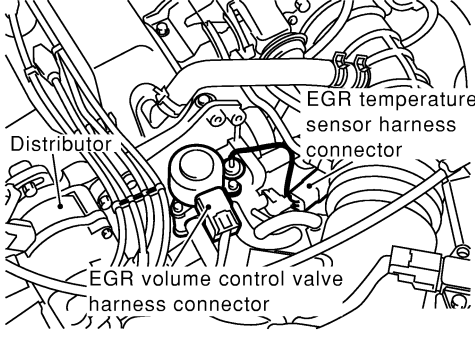
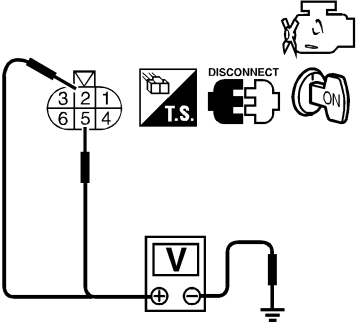
TEC835

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

Diagnostic Procedure

Diagnostic Procedure

NCEC0526

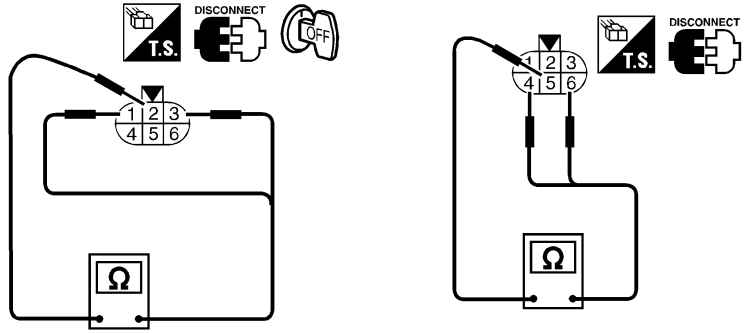
1	CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT		
		<p>1. Disconnect EGR volume control valve harness connector.</p>  <p style="text-align: right;">SEF849X</p> <p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.</p>  <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p> <p style="text-align: right;">SEF327X</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p>
OK	▶	GO TO 3.	SU
NG	▶	GO TO 2.	BR

2	DETECT MALFUNCTIONING PART		
		<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors F23, M49 ● Harness for open or short between ECM relay and EGR volume control valve 	<p>ST</p> <p>RS</p>
		▶ Repair harness or connectors.	<p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)


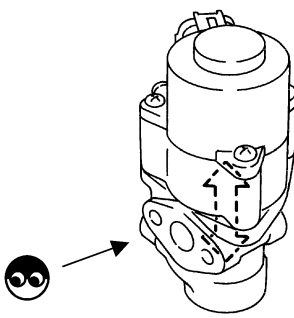
Diagnostic Procedure (Cont'd)

3	CHECK EGR VOLUME CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT										
<p>1. Turn ignition switch "OFF". 2. disconnect ECM harness connector. 3. Check harness continuity between ECM terminals and EGR volume control valve terminals as follows. Refer to Wiring Diagram.</p>											
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">ECM terminal</th> <th style="padding: 5px;">EGR volume control valve</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">8</td> <td style="text-align: center; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; padding: 5px;">9</td> <td style="text-align: center; padding: 5px;">4</td> </tr> <tr> <td style="text-align: center; padding: 5px;">17</td> <td style="text-align: center; padding: 5px;">3</td> </tr> <tr> <td style="text-align: center; padding: 5px;">18</td> <td style="text-align: center; padding: 5px;">6</td> </tr> </tbody> </table>		ECM terminal	EGR volume control valve	8	1	9	4	17	3	18	6
ECM terminal	EGR volume control valve										
8	1										
9	4										
17	3										
18	6										
MTBL0389											
<p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>											
OK	▶ GO TO 4.										
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.										


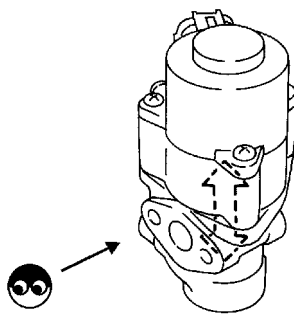
4	CHECK EGR VOLUME CONTROL VALVE-I
<p>Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.</p>	
	
<p>Resistance: 20.9 - 23.1 Ω [At 20°C (68°F)]</p>	
SEF588X	
OK or NG	
OK (With CONSULT-II)	▶ GO TO 5.
OK (Without CONSULT-II)	▶ GO TO 6.
NG	▶ Replace EGR volume control valve.

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

Diagnostic Procedure (Cont'd)

5	CHECK EGR VOLUME CONTROL VALVE-II																									
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch "ON". 4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. 5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps. 																										
<table border="1" style="margin-right: 20px;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>EGR VOL CONT/V</th> <th>20 step</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>  <p style="text-align: right;">SEF067Y</p>			ACTIVE TEST		EGR VOL CONT/V	20 step	MONITOR		ENG SPEED	XXX rpm																
ACTIVE TEST																										
EGR VOL CONT/V	20 step																									
MONITOR																										
ENG SPEED	XXX rpm																									
OK or NG																										
OK	▶	GO TO 7.																								
NG	▶	Replace EGR volume control valve.																								

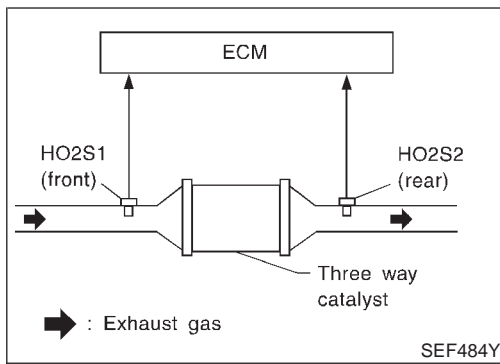
GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

6	CHECK EGR VOLUME CONTROL VALVE-II	
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch "ON" and "OFF". 4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position. 		
 <p style="text-align: right;">SEF560W</p>		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace EGR volume control valve.

7	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.		
▶		INSPECTION END

DTC P0420 THREE WAY CATALYST FUNCTION

On Board Diagnosis Logic



On Board Diagnosis Logic

NCEC0240

The ECM monitors the switching frequency ratio of heated oxygen sensor 1 (front) and 2 (rear). A three way catalyst with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2 (rear). As oxygen storage capacity decreases, the heated oxygen sensor 2 (rear) switching frequency will increase. When the frequency ratio of heated oxygen sensor 1 (front) and 2 (rear) approaches a specified limit value, the three way catalyst malfunction is diagnosed.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0420	<ul style="list-style-type: none"> • Three way catalyst does not operate properly. • Three way catalyst does not have enough oxygen storage capacity. 	<ul style="list-style-type: none"> • Three way catalyst • Exhaust tube • Intake air leaks • Injectors • Injector leaks • Spark plug • Improper ignition timing

SRT WORK SUPPORT	
CATALYST	INCOMP
EVAP SYSTEM	INCOMP
O2 SEN HEATER	CMPLT
O2 SENSOR	INCOMP
EGR SYSTEM	INCOMP
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
HO2S1 (B1)	XXX V

SEF671Y

DTC Confirmation Procedure

NCEC0241

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

NCEC0241S01

TESTING CONDITION:

- Open engine hood before conducting the following procedure.
- Do not hold engine speed for more than the specified minutes below.
 - 1) Turn ignition switch "ON".
 - 2) Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-II.
 - 3) Start engine.
 - 4) Rev engine up to 3,000±500 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.
 - 5) Wait 5 seconds at idle.
 - 6) Rev engine up to 2,500±500 rpm and maintain it until "INCOMP" 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.
 - 7) Select "SELF-DIAG RESULTS" mode with CONSULT-II.
 - 8) Confirm that the 1st trip DTC is not detected.
If the 1st trip DTC is detected, go to "Diagnostic Procedure", EC-365.

SRT WORK SUPPORT	
CATALYST	CMPLT
EVAP SYSTEM	INCOMP
O2 SEN HEATER	CMPLT
O2 SENSOR	INCOMP
EGR SYSTEM	INCOMP
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
HO2S1 (B1)	XXX V

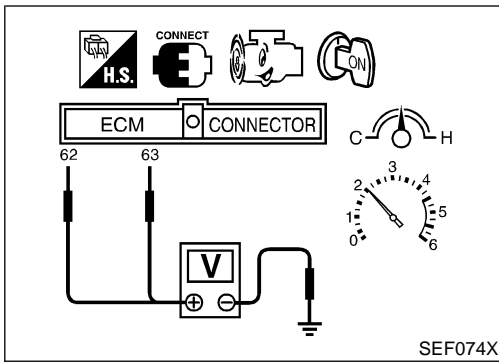
SEF672Y

SELF DIAG RESULTS	
DTC RESULTS	TIME
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	

SEF560X

DTC P0420 THREE WAY CATALYST FUNCTION

Overall Function Check



Overall Function Check

NCEC0242

Use this procedure to check the overall function of the three way catalyst. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeters probes between ECM terminals 62 [Heated oxygen sensor 1 (front) signal], 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Keep engine speed at 2,000 rpm constant under no load.
- 5) Make sure that the voltage switching frequency (high & low) between ECM terminal 63 and engine ground is much less than that of ECM terminal 62 and engine ground.

Switching frequency ratio = A/B

A: Heated oxygen sensor 2 (rear) voltage switching frequency

B: Heated oxygen sensor 1 (front) 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.

NOTE:

If the voltage at terminal 62 does not switch periodically more than 5 times within 10 seconds at step 4, perform trouble diagnosis for DTC P0133 first. (See EC-217.)

Diagnostic Procedure

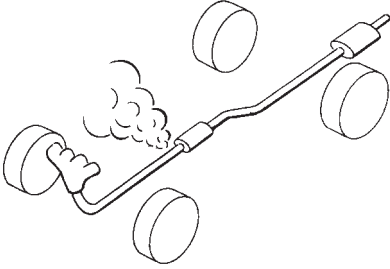
NCEC0243

1	CHECK EXHAUST SYSTEM	
Visually check exhaust tubes and muffler for dent.		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair or replace.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

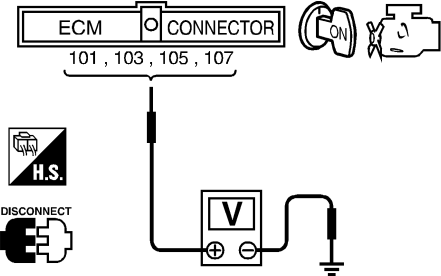
DTC P0420 THREE WAY CATALYST FUNCTION

Diagnostic Procedure (Cont'd)

2	CHECK EXHAUST AIR LEAK	
<ol style="list-style-type: none"> 1. Start engine and run it at idle. 2. Listen for an exhaust air leak before the three way catalyst. 		
		
SEF099P		
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.

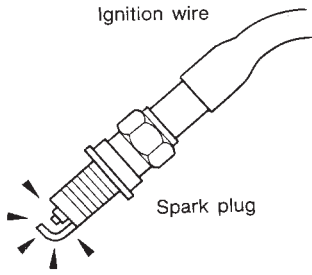
4	CHECK IGNITION TIMING	
Check for ignition timing. Refer to "BASIC INSPECTION", EC-107.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Adjust ignition timing.

5	CHECK INJECTORS	
<ol style="list-style-type: none"> 1. Refer to Wiring Diagram for Injectors, EC-597. 2. Stop engine and then turn ignition switch "ON". 3. Check voltage between ECM terminals 101, 103, 105 and 107 and ground with CONSULT-II or tester. 		
		
SEF075X		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Perform "Diagnostic Procedure" INJECTOR, EC-598.

Battery voltage should exist.

DTC P0420 THREE WAY CATALYST FUNCTION

Diagnostic Procedure (Cont'd)

6	CHECK IGNITION SPARK	
<ol style="list-style-type: none"> 1. Disconnect ignition wire from spark plug. 2. Connect a known good spark plug to the ignition wire. 3. Place end of spark plug against a suitable ground and crank engine. 4. Check for spark. 		
		
SEF282G		
OK or NG		
OK	▶	GO TO 8.
NG	▶	GO TO 7.

7	CHECK IGNITION WIRES	
Refer to "Component Inspection", EC-328.		
OK or NG		
OK	▶	Check ignition coil, power transistor and their circuits. Refer to EC-590.
NG	▶	Replace.

8	CHECK INJECTOR	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Remove injector assembly. Refer to EC-51. Keep fuel hose and all injectors connected to injector gallery. 3. Disconnect distributor harness connector. 4. Turn ignition switch "ON". Make sure fuel does not drip from injector. 		
OK or NG		
OK (Does not drip)	▶	GO TO 9.
NG (Drips)	▶	Replace the injector(s) from which fuel is dripping.

9	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.		
Trouble is fixed	▶	INSPECTION END
Trouble is not fixed	▶	Replace three way catalyst.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

On Board Diagnosis Logic

On Board Diagnosis Logic

NCEC0527

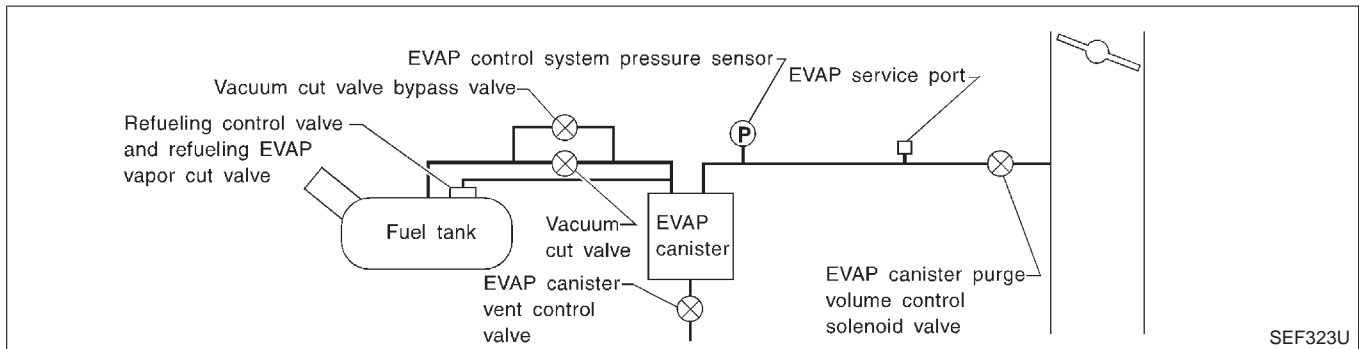
NOTE:

If DTC P0440 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-549.)

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.



Malfunction is detected when EVAP control system has a leak, EVAP control system does not operate properly.

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.

Possible Cause

NCEC0528

- Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Fuel filler cap remains open or fails to close.
- Foreign matter caught in fuel filler cap.
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.
- Foreign matter caught in EVAP canister vent control valve.
- EVAP canister or fuel tank leaks
- EVAP purge line (pipe and rubber tube) leaks

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Possible Cause (Cont'd)

- EVAP purge line rubber tube bent.
- Blocked or bent rubber tube to EVAP control system pressure sensor
- Loose or disconnected rubber tube
- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve and the circuit
- Fuel tank temperature sensor
- O-ring of EVAP canister vent control valve is missing or damaged.
- Water separator
- EVAP canister is saturated with water.
- EVAP control system pressure sensor
- Fuel level sensor and the circuit
- Refueling control valve
- ORVR system leaks

GI

MA

EM

LC

EC

FE

CL

MT

EVAP SML LEAK P0440/P1440
<p>1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS. -FUEL LEVEL: 1/4-3/4 -AMBIENT TEMP: 0-30 C(32-86F) -OPEN ENGINE HOOD. 2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC. THEN RESTART. 3)TOUCH START.</p>
SEF565X

DTC Confirmation Procedure

NCEC0529

CAUTION:

Never remove fuel filler cap during the DTC confirmation procedure.

NOTE:

- If DTC P0440 or P1440 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-549.)
- 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.
- Always perform test at a temperature of 0 to 30°C (32 to 86°F).

WITH CONSULT-II

NCEC0529S01

- 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 P0440/P1440” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
 Follow the instruction displayed.

5	EVAP SML LEAK P0440/P1440
	WAIT 2 TO 10 MINUTES. KEEP ENGINE RUNNING AT IDLE SPEED.
	SEF566X

5	EVAP SML LEAK P0440/P1440
	OK
	SELF-DIAG RESULTS
	NO DTC DETECTED. FURTHER TESTING MAY BE REQUIRED.
	SEF567X

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

DTC Confirmation Procedure (Cont'd)

NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to "Basic Inspection", EC-107.

- 6) Make sure that "OK" is displayed.
If "NG" is displayed, refer to "Diagnostic Procedure", EC-370.

 **WITH GST**

NCEC0529S02

NOTE:

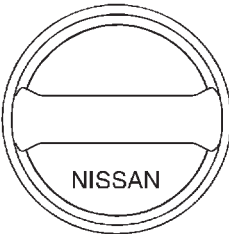
Be sure to read the explanation of "Driving Pattern" on EC-74 before driving vehicle.

- 1) Start engine.
- 2) Drive vehicle according to "Driving Pattern", EC-74.
- 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-74.
- 8) Stop vehicle.
- 9) Select "MODE 3" with GST.
 - If P0440 or P1440 is displayed on the screen, go to "Diagnostic Procedure", EC-370.
 - If P1447 is displayed on the screen, go to "Diagnostic Procedure" for DTC P1447, EC-540.
 - If P0440, P1440 and P1447 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

NCEC0530

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.

SEF915U

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

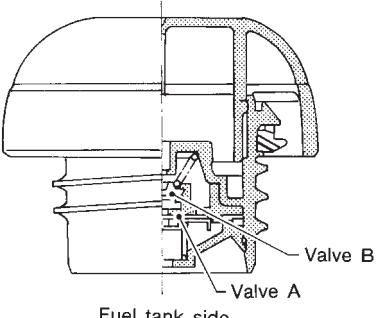
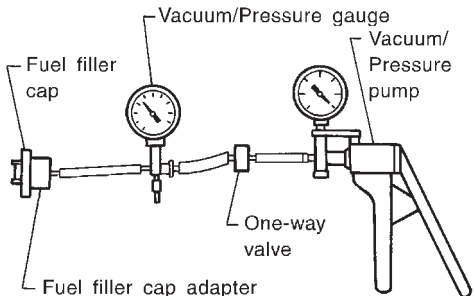
Diagnostic Procedure (Cont'd)

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	▶	<ul style="list-style-type: none"> ● Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. ● Retighten until ratcheting sound is heard.

GI
MA
EM

3	CHECK FUEL FILLER CAP FUNCTION	
Check for air releasing sound while opening the fuel filler cap.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 4.

LC
EC

4	CHECK FUEL TANK VACUUM RELIEF VALVE	
<ol style="list-style-type: none"> 1. Wipe clean valve housing. 2. Check valve opening pressure and vacuum. 		
 <p style="text-align: center;">Fuel tank side</p>		
SEF427N		
		
SEF943S		
<p>Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)</p> <p>Vacuum: -6.0 to -3.4 kPa (-0.061 to -0.035 kg/cm², -0.87 to -0.48 psi)</p> <p>CAUTION: Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.</p>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace fuel filler cap with a genuine one.

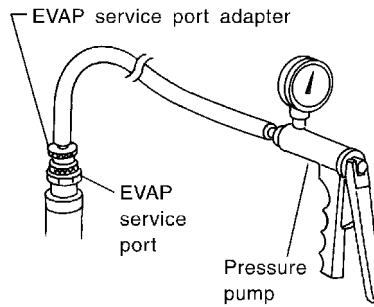
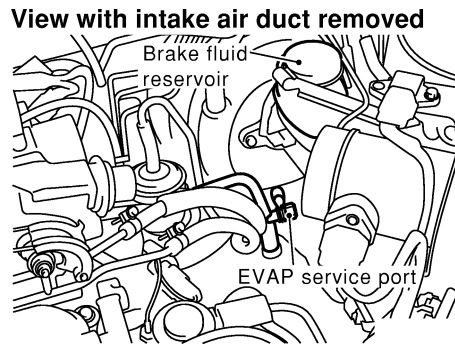
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Diagnostic Procedure (Cont'd)

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.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Diagnostic Procedure (Cont'd)

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

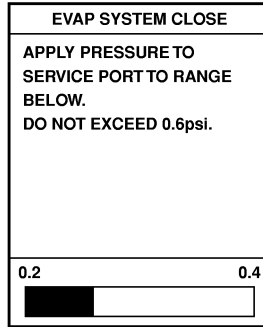
6 CHECK FOR EVAP LEAK

Ⓟ 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:

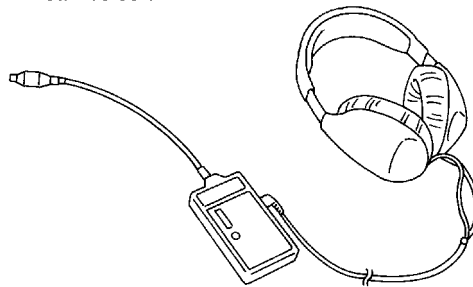
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-37.

Leak detector



SEF200U

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

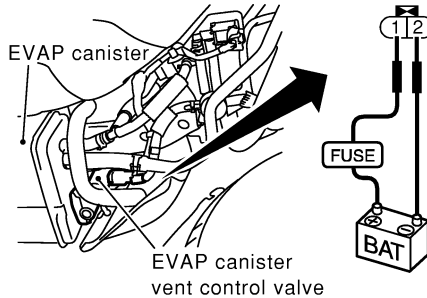
Diagnostic Procedure (Cont'd)

7 CHECK FOR EVAP LEAK

⊗ Without CONSULT-II

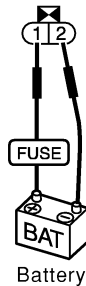
1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)

View from under the vehicle

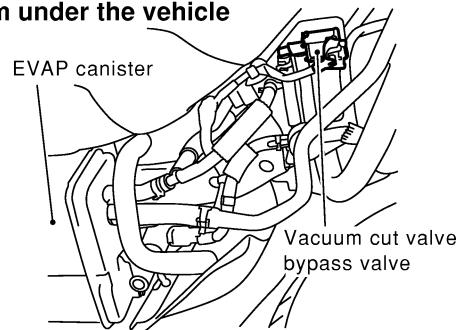


SEF323Z

3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



View from under the vehicle



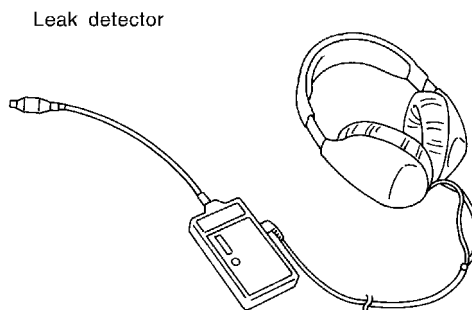
SEF869X

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/cm², 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 "EVAPORATIVE EMISSION LINE DRAWING", EC-37.



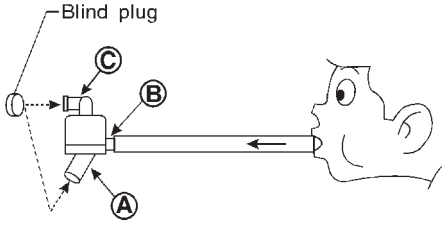
SEF200U

OK or NG

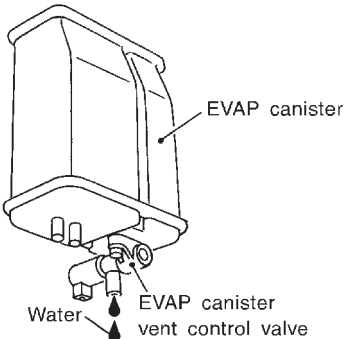
OK	▶	GO TO 8.
NG	▶	Repair or replace.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Diagnostic Procedure (Cont'd)

8	CHECK WATER SEPARATOR								
		<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 	GI MA EM LC EC FE CL MT						
		 <p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>	SEF829T FE CL MT						
		<ol style="list-style-type: none"> 5. In case of NG in items 2 - 4, replace the parts. <p>NOTE:</p> <ul style="list-style-type: none"> • Do not disassemble water separator. <p style="text-align: center;">OK or NG</p>							
		<table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 9.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Replace water separator.</td> </tr> </table>	OK	▶	GO TO 9.	NG	▶	Replace water separator.	AT AX SU BR
OK	▶	GO TO 9.							
NG	▶	Replace water separator.							

9	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT								
		Refer to "DTC Confirmation Procedure", EC-384.							
		OK or NG							
		<table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 10.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair or replace EVAP canister vent control valve and O-ring or harness/connector.</td> </tr> </table>	OK	▶	GO TO 10.	NG	▶	Repair or replace EVAP canister vent control valve and O-ring or harness/connector.	AT AX SU BR
OK	▶	GO TO 10.							
NG	▶	Repair or replace EVAP canister vent control valve and O-ring or harness/connector.							


10	CHECK IF EVAP CANISTER SATURATED WITH WATER											
		<ol style="list-style-type: none"> 1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Does water drain from the EVAP canister? 										
		 <p style="text-align: right;">EVAP canister</p> <p style="text-align: center;">Water EVAP canister vent control valve</p>	ST RS BT HA SC EL IDX									
		Yes or No	SEF596U									
		<table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">Yes</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 11.</td> </tr> <tr> <td>No (With CONSULT-II)</td> <td style="text-align: center;">▶</td> <td>GO TO 13.</td> </tr> <tr> <td>No (Without CONSULT-II)</td> <td style="text-align: center;">▶</td> <td>GO TO 14.</td> </tr> </table>	Yes	▶	GO TO 11.	No (With CONSULT-II)	▶	GO TO 13.	No (Without CONSULT-II)	▶	GO TO 14.	
Yes	▶	GO TO 11.										
No (With CONSULT-II)	▶	GO TO 13.										
No (Without CONSULT-II)	▶	GO TO 14.										


DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Diagnostic Procedure (Cont'd)

11	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 13.
OK (Without CONSULT-II)	▶	GO TO 14.
NG	▶	GO TO 12.

12	DETECT MALFUNCTIONING PART	
Check the following.		
<ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 		
	▶	Repair hose or replace EVAP canister.


13	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																					
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 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. 																						
<table border="1" style="margin: auto;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td>XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V						
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
HO2S1 MNTR (B1)	LEAN																					
THRTL POS SEN	XXX V																					
Vacuum should exist.																						
SEF595Y																						
OK or NG																						
OK	▶	GO TO 16.																				
NG	▶	GO TO 15.																				

14	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION	
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 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 18.
NG	▶	GO TO 15.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Diagnostic Procedure (Cont'd)

15	CHECK VACUUM HOSE
Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-27.	
OK or NG	
OK (With CONSULT-II) ▶	GO TO 16.
OK (Without CONSULT-II) ▶	GO TO 17.
NG ▶	Repair or reconnect the hose.

16	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																				
<p> With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																					
<table border="1" style="margin: auto;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td>XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>		ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V						
ACTIVE TEST																					
PURG VOL CONT/V	XXX %																				
MONITOR																					
ENG SPEED	XXX rpm																				
A/F ALPHA-B1	XXX %																				
HO2S1 MNTR (B1)	LEAN																				
THRTL POS SEN	XXX V																				
SEF801Y																					
OK or NG																					
OK ▶	GO TO 18.																				
NG ▶	GO TO 17.																				

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

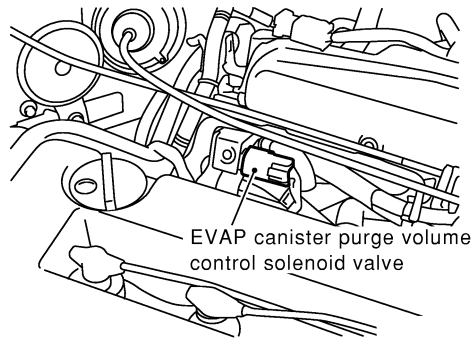
DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Diagnostic Procedure (Cont'd)

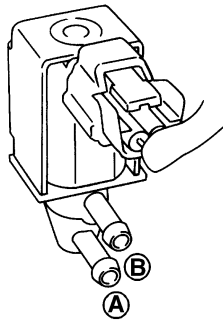
17 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEF851X

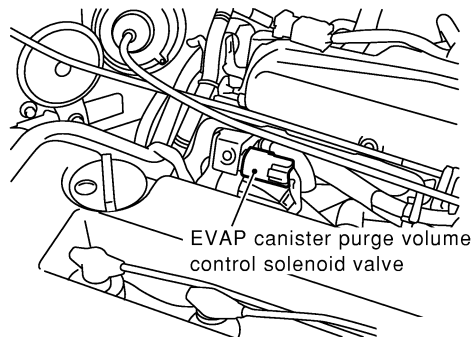


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

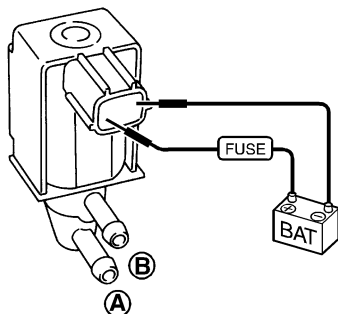
SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEF851X



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

OK or NG

OK ► GO TO 18.

NG ► Replace EVAP canister purge volume control solenoid valve.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

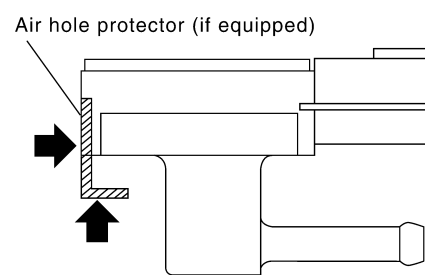
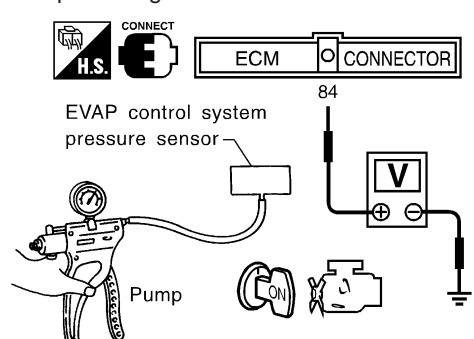
Diagnostic Procedure (Cont'd)

18	CHECK FUEL TANK TEMPERATURE SENSOR	
1. Remove fuel level sensor unit. 2. Check fuel tank temperature sensor. Refer to EC-290, "Component Inspection".		
OK or NG		
OK	▶	GO TO 19.
NG	▶	Replace fuel level sensor unit.

GI

MA

EM

19	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR	
1. Remove EVAP control system pressure sensor with its harness connector connected. CAUTION: <ul style="list-style-type: none"> ● Never apply force to the air hole protector of the sensor if equipped. 		
		
SEF799W		
2. Remove hose from EVAP control system pressure sensor. 3. Turn ignition switch "ON". 4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure. CAUTION: <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure. 5. Check input voltage between ECM terminal 84 and ground.		
		
SEF342X		
CAUTION: <ul style="list-style-type: none"> ● Discard and EVAP control system pressure 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. 		
OK or NG		
OK	▶	GO TO 20.
NG	▶	Replace EVAP control system pressure sensor.

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

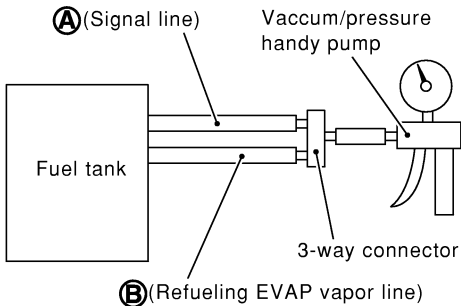
Diagnostic Procedure (Cont'd)

20	CHECK EVAP PURGE LINE
Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to "Evaporative Emission System", EC-33.	
OK or NG	
OK	▶ GO TO 21.
NG	▶ Repair or reconnect the hose.

21	CLEAN EVAP PURGE LINE
Clean EVAP purge line (pipe and rubber tube) using air blower.	
	▶ GO TO 22.

22	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 "ON BOARD REFUELING VAPOR RECOVERY (ORVR)", EC-39.	
OK or NG	
OK	▶ GO TO 23.
NG	▶ Repair or replace hoses and tubes.

23	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 24.
NG	▶ Repair or replace hoses, tubes or filler neck tube.

24	CHECK REFUELING CONTROL VALVE
<ol style="list-style-type: none">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.	
 <p>The diagram illustrates the setup for testing the refueling control valve. A fuel tank is connected to a signal line (A) and a refueling EVAP vapor line (B). A vacuum/pressure handy pump is connected to a 3-way connector, which is attached to both lines (A and B) to apply pressure or vacuum.</p>	
SEF968X	
OK or NG	
OK	▶ GO TO 25.
NG	▶ Replace refueling control valve with fuel tank.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

Diagnostic Procedure (Cont'd)

25	CHECK FUEL LEVEL SENSOR
Refer to EL-97, "Fuel Level Sensor Unit Check".	
OK or NG	
OK	▶ GO TO 26.
NG	▶ Replace fuel level sensor unit.

GI

MA

EM

26	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
	▶ INSPECTION END

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

Description

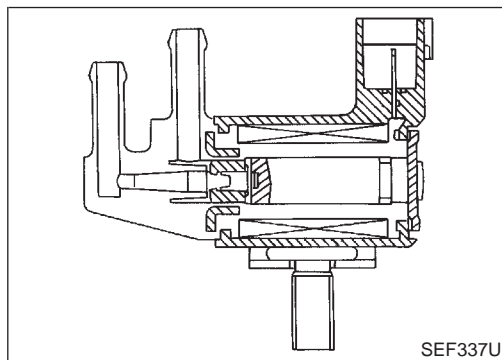
Description SYSTEM DESCRIPTION

NCEC0531

NCEC0531S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	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		
Throttle position switch	Closed throttle position		
Heated oxygen sensor 1 (front)	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
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

NCEC0531S02

The EVAP canister purge volume control solenoid valve uses an 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

NCEC0532

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
PURG VOL C/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch "OFF" ● Shift lever: "N" ● No-load 	Idle (Vehicle stopped)
		2,000 rpm
		0%
		—

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

ECM Terminals and Reference Value

ECM Terminals and Reference Value

NCEC0646

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	P	EVAP canister purge volume control solenoid valve	<p>[Engine is running]</p> <ul style="list-style-type: none"> Idle speed 	<p>BATTERY VOLTAGE (11 - 14V)</p> <p>SEF994U</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> Engine speed is about 2,000 rpm (More than 100 seconds after starting engine) 	<p>BATTERY VOLTAGE (11 - 14V)</p> <p>SEF995U</p>

On Board Diagnosis Logic

NCEC0533

Malfunction is detected when an improper voltage signal is sent to ECM through the valve.

Possible Cause

NCEC0534

- Harness or connectors (The valve circuit is open or shorted.)
- EVAP canister purge volume control solenoid valve

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

DTC Confirmation Procedure

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

DTC Confirmation Procedure

NCEC0535

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

NCEC0535S01

- 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 "Diagnostic Procedure", EC-386.

WITH GST

NCEC0535S02

Follow the procedure "WITH CONSULT-II" above.

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

Wiring Diagram

Wiring Diagram

NCEC0536

EC-PGC/V-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

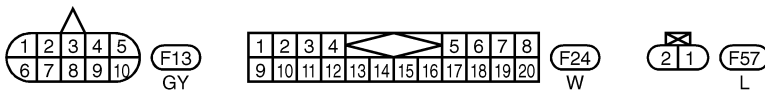
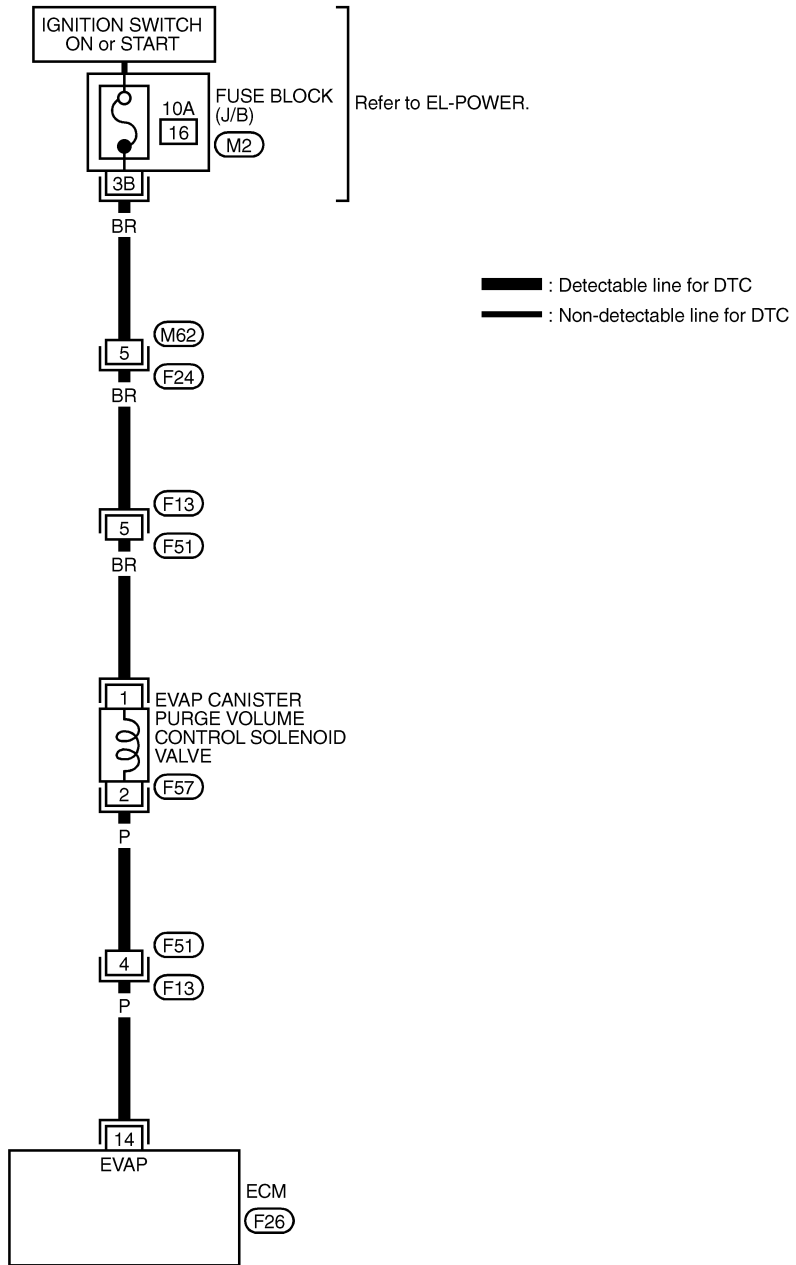
BT

HA

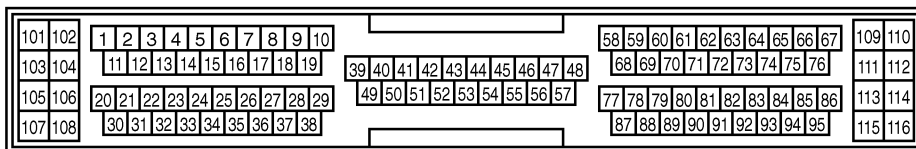
SC

EL

IDX



REFER TO THE FOLLOWING.
 (M2) - FUSE BLOCK-JUNCTION BOX (J/B)



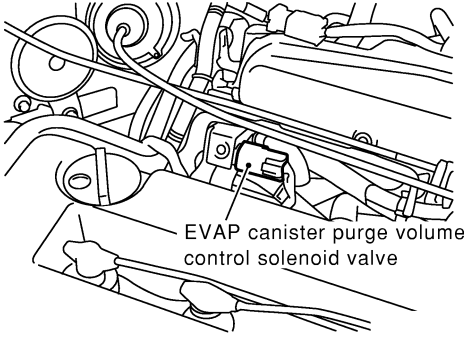
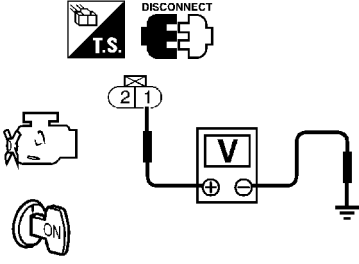
TEC711

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

Diagnostic Procedure

Diagnostic Procedure

NCEC0537

1	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.</p> <div style="text-align: center;">  <p>EVAP canister purge volume control solenoid valve</p> </div> <p style="text-align: right;">SEF851X</p> <p>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.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF206W</p> <p>Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors F13, F51 ● Harness connectors F24, M62 ● Fuse block (J/B) connector M2 ● 10A fuse ● Harness for open or short between EVAP canister purge volume control solenoid valve and fuse 		
▶		Repair harness or connectors.

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

Diagnostic Procedure (Cont'd)

3	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between ECM terminal 14 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK (With CONSULT-II)	▶	GO TO 5.
OK (Without CONSULT-II)	▶	GO TO 6.
NG	▶	GO TO 4.

GI
MA
EM
LC
EC

4	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors F13, F51 ● Harness for open or short between EVAP canister purge volume control solenoid valve and ECM 		
		▶ Repair open circuit or short to ground and short to power in harness or connectors.


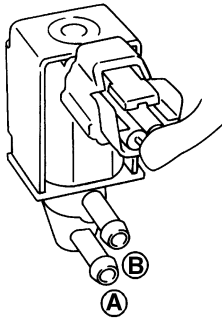

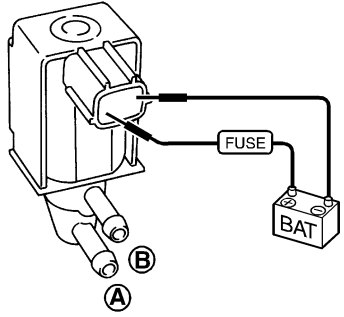
FE
CL
MT

5	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																					
<p> With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>PURG VOL CONT/V</td> <td>XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V						
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
HO2S1 MNTR (B1)	LEAN																					
THRTL POS SEN	XXX V																					
SEF801Y																						
OK or NG																						
OK	▶	GO TO 7.																				
NG	▶	GO TO 6.																				

AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

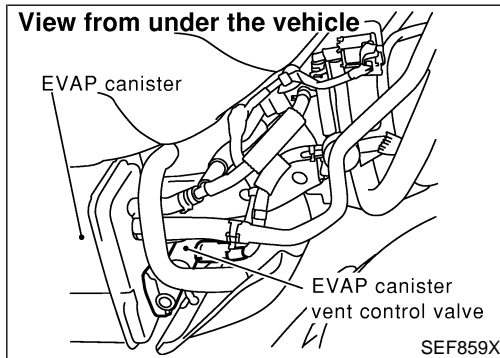
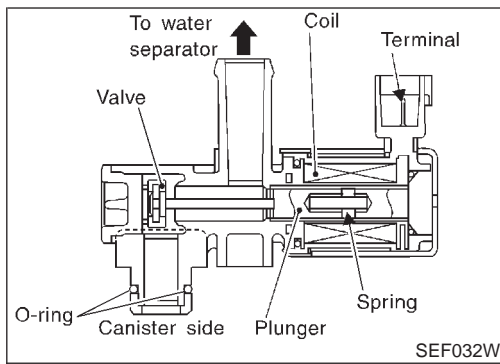
Diagnostic Procedure (Cont'd)

6	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	
<p> With CONSULT-II Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>		
		
SEF334X		
<p> Without CONSULT-II Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>		
		
SEF335X		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

7	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.		
▶		INSPECTION END

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

Component Description



Component Description

NCEC0538

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.

GI

MA

EM

LC

EC

FE

CL

MT

CONSULT-II Reference Value in Data Monitor Mode

NCEC0539

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

AX

SU

ECM Terminals and Reference Value

NCEC0647

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.

BR

ST

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
102	PU/W	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

RS

BT

HA

On Board Diagnosis Logic

NCEC0540

Malfunction is detected when an improper voltage signal is sent to ECM through EVAP canister vent control valve.

SC

EL

IDX

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

Possible Cause

Possible Cause

NCEC0541

- Harness or connectors
(The valve circuit is open or shorted.)
- EVAP canister vent control valve

DTC Confirmation Procedure

NCEC0542

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.

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

WITH CONSULT-II

NCEC0542S01

- 1) Turn ignition switch "ON".
- 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 "Diagnostic Procedure", EC-392.

WITH GST

NCEC0542S02

Follow the procedure "WITH CONSULT-II" above.

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

Wiring Diagram

Wiring Diagram

NCEC0543

EC-VENT/V-01 GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

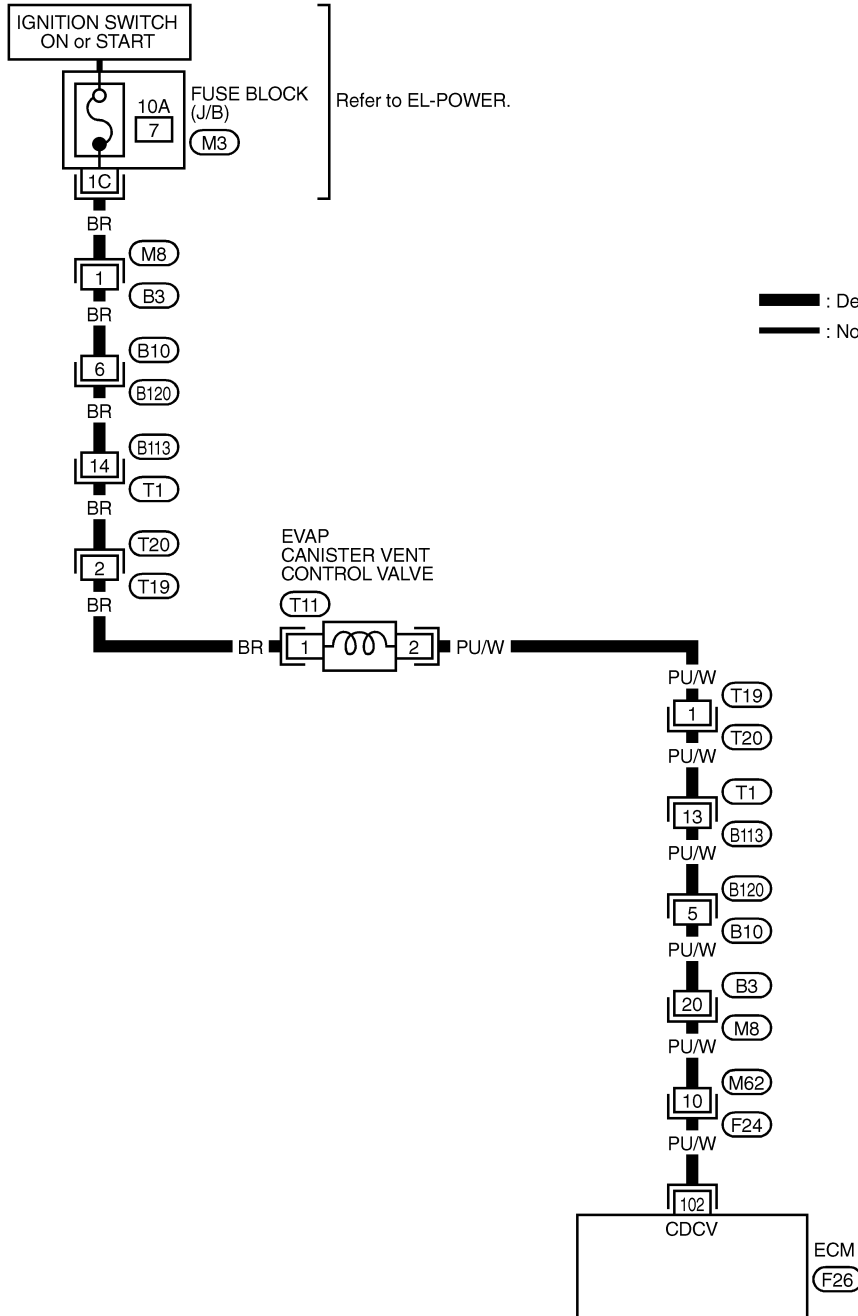
BT

HA

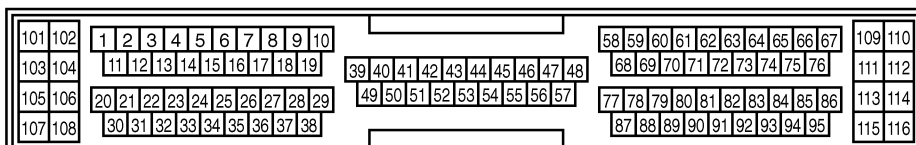
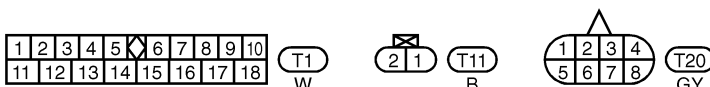
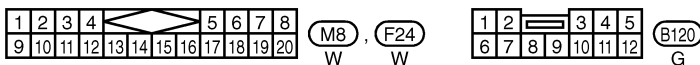
SC

EL

IDX



: Detectable line for DTC
 : Non-detectable line for DTC



REFER TO THE FOLLOWING.
 (M3) - FUSE BLOCK-JUNCTION BOX (J/B)



TEC712


DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

Diagnostic Procedure

Diagnostic Procedure

NCEC0544

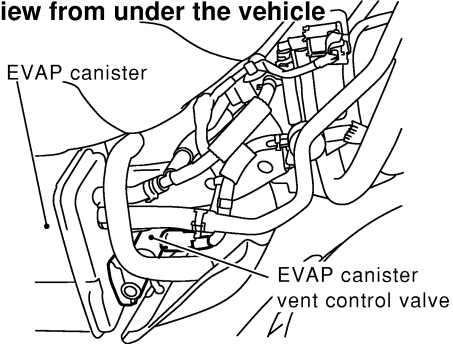
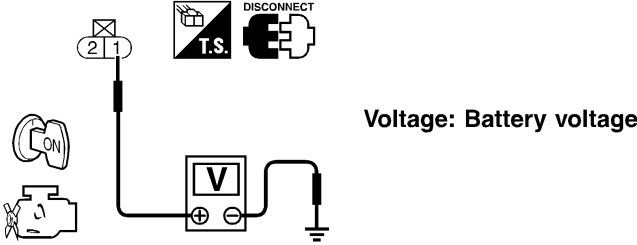
1	INSPECTION START	
1. Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT																					
<p> With CONSULT-II</p> <p>1. Turn ignition switch "OFF" and then turn "ON".</p> <p>2. Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-II.</p> <p>3. Touch "ON/OFF" on CONSULT-II screen.</p>																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td style="text-align: center;">VENT CONTROL/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 (B1)</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td style="text-align: center;">THRTL POS SEN</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>			ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 (B1)	XXX V	THRTL POS SEN	XXX V						
ACTIVE TEST																						
VENT CONTROL/V	OFF																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
HO2S1 (B1)	XXX V																					
THRTL POS SEN	XXX V																					
<p>4. Check for operating sound of the valve. Clicking noise should be heard.</p> <p style="text-align: center;">OK or NG</p>																						
OK	▶	GO TO 7.																				
NG	▶	GO TO 3.																				

SEF802Y

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

Diagnostic Procedure (Cont'd)

3	CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT						
<p>1. Turn ignition switch "OFF". 2. Disconnect EVAP canister vent control valve harness connector.</p> <p style="text-align: center;">View from under the vehicle</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF859X</p> <p>3. Turn ignition switch "ON". 4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: center;">SEF336X</p> </div> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 5.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 4.</td> </tr> </table>		OK	▶	GO TO 5.	NG	▶	GO TO 4.
OK	▶	GO TO 5.					
NG	▶	GO TO 4.					

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

4	DETECT MALFUNCTIONING PART			
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors T19, T20 ● Harness connectors B113, T1 ● Harness connectors B10, B120 ● Harness connectors B3, M8 ● Fuse block (J/B) connector M3 ● 10A fuse ● Harness for open or short between EVAP canister vent control valve and fuse <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;"></td> <td style="width: 5%; text-align: center;">▶</td> <td>Repair harness or connectors.</td> </tr> </table>			▶	Repair harness or connectors.
	▶	Repair harness or connectors.		

5	CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT						
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 102 and EVAP canister vent control valve terminal 2. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 7.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 6.</td> </tr> </table>		OK	▶	GO TO 7.	NG	▶	GO TO 6.
OK	▶	GO TO 7.					
NG	▶	GO TO 6.					

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

Diagnostic Procedure (Cont'd)

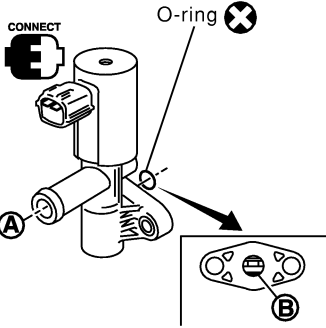
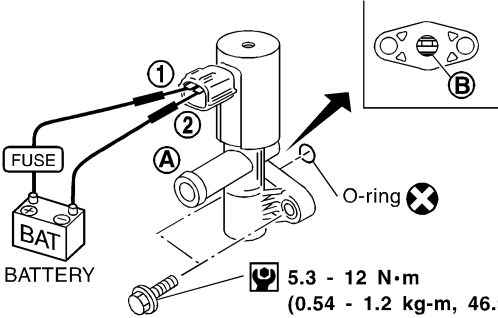
6	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors T19, T20 ● Harness connectors B113, T1 ● Harness connectors B10, B120 ● Harness connectors B3, M8 ● Harness connectors F24, M62 ● Harness for open or short between EVAP canister vent control valve and ECM 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK RUBBER TUBE FOR CLOGGING
<p>1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.</p>	
OK or NG	
OK	▶ GO TO 8.
NG	▶ Clean the rubber tube using an air blower.

8	CHECK EVAP CANISTER VENT CONTROL VALVE-I
<p>1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.</p>	
SEF337X	
OK or NG	
OK	▶ GO TO 9.
NG	▶ Replace EVAP canister vent control valve.

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

Diagnostic Procedure (Cont'd)

9	CHECK EVAP CANISTER VENT CONTROL VALVE-II																										
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Reconnect harness connectors disconnected. 2. Turn ignition switch "ON". 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time. 																											
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 30%;">  </div> <div style="width: 30%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">VENT CONTROL/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2" style="text-align: center;">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 (B1)</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td style="text-align: center;">THRTL POS SEN</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> </div> <div style="width: 35%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition VENT CONTROL/V</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">ON</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">OFF</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table> <p style="text-align: center;">Operation takes less than 1 second.</p> </div> </div>		ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 (B1)	XXX V	THRTL POS SEN	XXX V							Condition VENT CONTROL/V	Air passage continuity between A and B	ON	No	OFF	Yes
ACTIVE TEST																											
VENT CONTROL/V	OFF																										
MONITOR																											
ENG SPEED	XXX rpm																										
A/F ALPHA-B1	XXX %																										
HO2S1 (B1)	XXX V																										
THRTL POS SEN	XXX V																										
Condition VENT CONTROL/V	Air passage continuity between A and B																										
ON	No																										
OFF	Yes																										
SEF803Y																											
<p>⊗ Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>																											
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 40%;">  </div> <div style="width: 55%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">OFF</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table> <p style="text-align: center;">Operation takes less than 1 second.</p> </div> </div>		Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	No	OFF	Yes																				
Condition	Air passage continuity between A and B																										
12V direct current supply between terminals 1 and 2	No																										
OFF	Yes																										
SEF339X																											
Make sure new O-ring is installed properly.																											
OK or NG																											
OK	▶	GO TO 11.																									
NG	▶	GO TO 10.																									

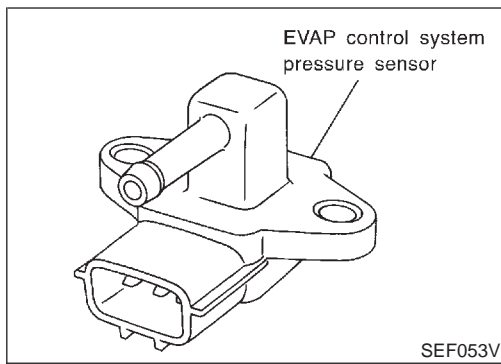
10	CHECK EVAP CANISTER VENT CONTROL VALVE-III	
<ol style="list-style-type: none"> 1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform Test No. 9 again. 		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Replace EVAP canister vent control valve.

11	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.		
	▶	INSPECTION END

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

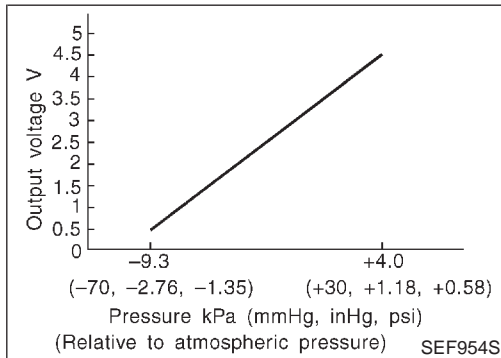
Component Description



Component Description

NCEC0545

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

NCEC0546

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 3.4V

ECM Terminals and Reference Value

NCEC0648

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	Sensor's ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
84	W	EVAP control system pressure sensor	[Ignition switch "ON"]	Approximately 3.4V
111	P/L	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

On Board Diagnosis Logic

On Board Diagnosis Logic

Malfunction is detected when an improper voltage signal from EVAP control system pressure sensor is sent to ECM.

NCEC0547

GI

MA

EM

LC

Possible Cause

NCEC0548

- Harness or connectors (The EVAP control system pressure sensor circuit is open or shorted.)
- Rubber hose to EVAP control system pressure sensor is clogged, vent, kinked, disconnected or improper connection.
- EVAP control system pressure sensor
- EVAP canister vent control valve
- EVAP canister purge volume control solenoid valve
- EVAP canister
- Rubber hose from EVAP canister vent control valve to water separator

EC

FE

CL

MT

AT

AX

SU

BR

DTC Confirmation Procedure

NCEC0549

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.

ST

RS

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

BT

HA

6	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C
	FUEL T/TMP SE	XXX °C

SEF194Y

WITH CONSULT-II

NCEC0549S01

- 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 "Diagnostic Procedure", EC-400.

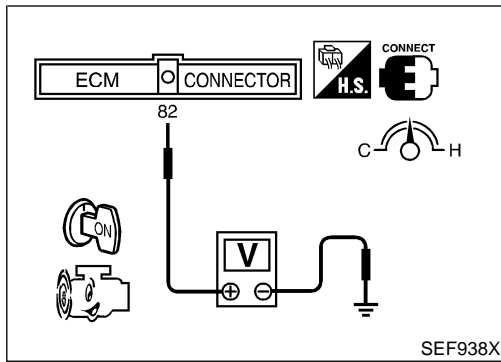
SC

EL

IDX

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

DTC Confirmation Procedure (Cont'd)



WITH GST

NCEC0549S02

- 1) Start engine and warm it up to normal operating temperature.
- 2) Check that voltage between ECM terminal 82 (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 "Diagnostic Procedure", EC-400.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Wiring Diagram

Wiring Diagram

NCEC0550

EC-PRE/SE-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

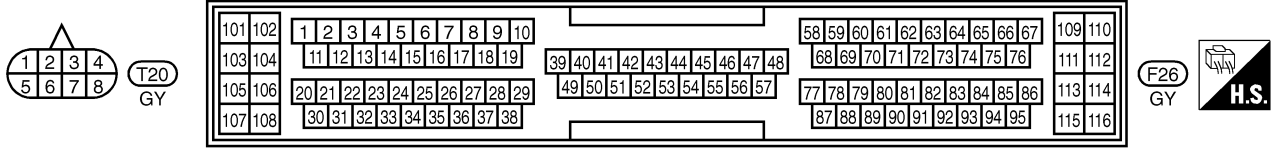
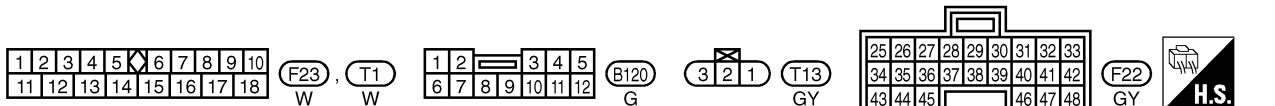
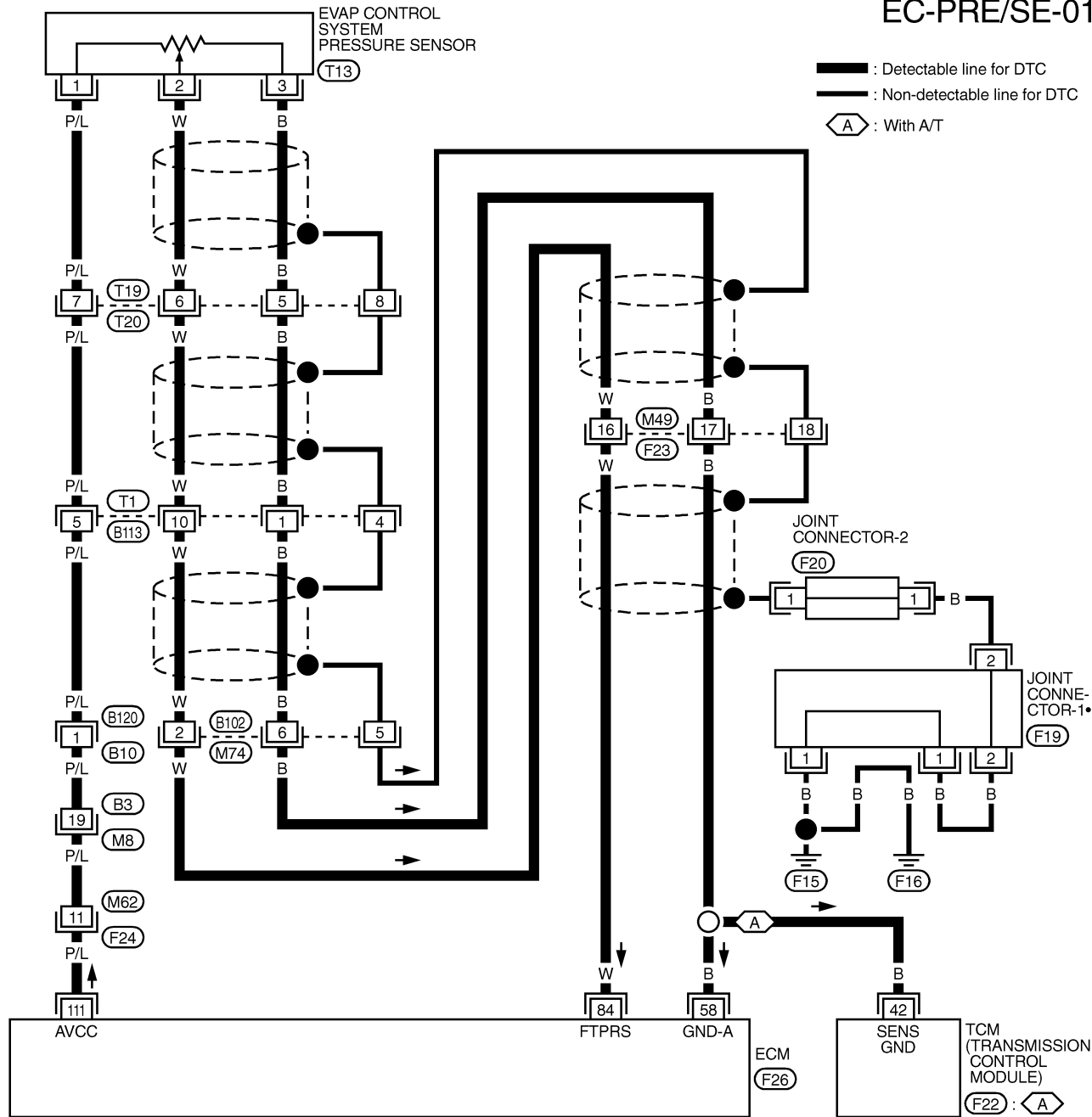
BT

HA

SC

EL

IDX



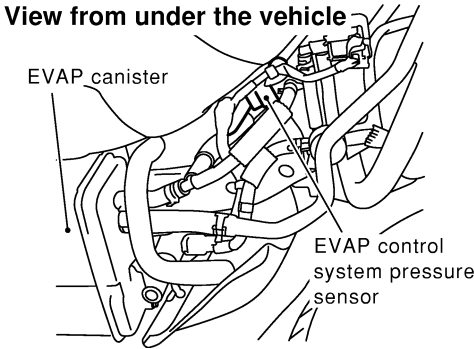
TEC713

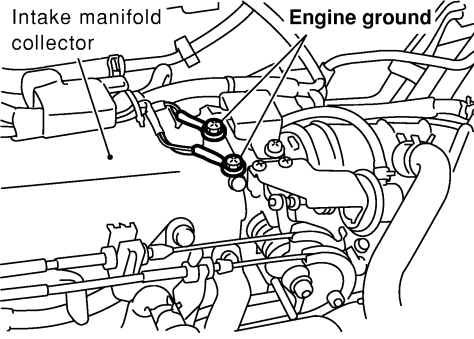
DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Diagnostic Procedure

Diagnostic Procedure

NCEC0551

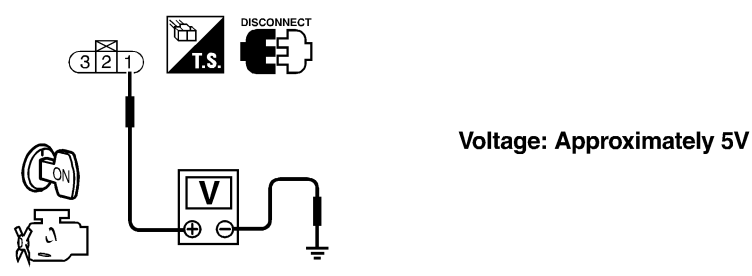
1	CHECK RUBBER TUBE
<p>1. Turn ignition switch "OFF". 2. Check rubber tube connected to the EVAP control system pressure sensor for clogging, vent, kink, disconnection or improper connection.</p> <p style="text-align: center;">View from under the vehicle</p>  <p style="text-align: right;">SEF860X</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 2.
NG	▶ Reconnect, repair or replace.

2	RETIGHTEN GROUND SCREWS
<p>Loosen and retighten engine ground screws.</p>  <p style="text-align: right;">SEF839X</p>	
▶ GO TO 3.	

3	CHECK CONNECTOR
<p>1. Disconnect EVAP control system pressure sensor harness connector. 2. Check sensor harness connector for water. Water should not exist.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 4.
NG	▶ Repair or replace harness connector.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

4	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "ON". 2. Check voltage between EVAP control system pressure sensor terminal 1 and ground with CONSULT-II or tester.</p>		
 <p>Voltage: Approximately 5V</p>		
SEF341X		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

GI
MA
EM
LC
EC

5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors T19, T20 ● Harness connectors B113, T1 ● Harness connectors B10, B120 ● Harness connectors B3, M8 ● Harness connectors F24, M62 ● Harness for open or short between EVAP control system pressure sensor and ECM 		
▶ Repair harness or connectors.		

FE
CL
MT
AT
AX

6	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
<p>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 power.</p>		
OK or NG		
OK	▶	GO TO 8.
NG	▶	GO TO 7.

SU
BR
ST
RS

7	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors T19, T20 ● Harness connectors B113, T1 ● Harness connectors B102, M74 ● Harness connectors F23, M49 ● 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 (Transmission Control Module) 		
▶ Repair open circuit or short to power in harness or connectors.		

BT
HA
SC
EL
IDX

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

8	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 84 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.</p> <p style="text-align: center;">OK or NG</p>		
OK (With CONSULT-II) ▶		GO TO 10.
OK (Without CONSULT-II) ▶		GO TO 11.
NG ▶		GO TO 9.

9	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors T19, T20 ● Harness connectors B113, T1 ● Harness connectors B102, M74 ● Harness connectors F23, M49 ● 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.

10	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																					
<p>Ⓜ With CONSULT-II</p> <p>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.</p>																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td>XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V						
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
HO2S1 MNTR (B1)	LEAN																					
THRTL POS SEN	XXX V																					
OK or NG																						
OK ▶		GO TO 12.																				
NG ▶		GO TO 11.																				

SEF801Y

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

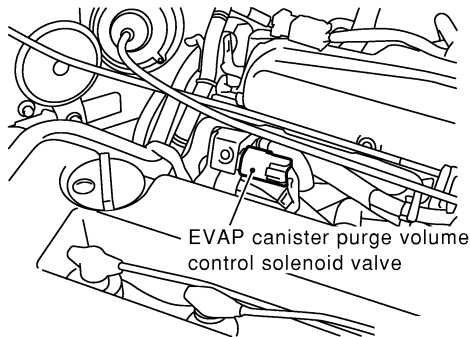
Diagnostic Procedure (Cont'd)

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

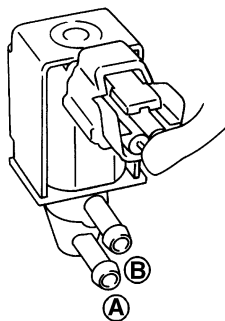
11 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Ⓟ With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEF851X

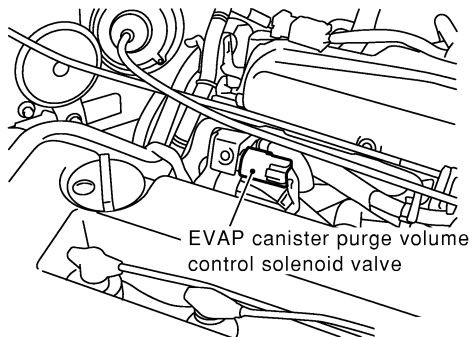


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

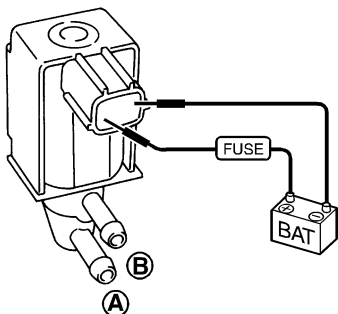
SEF334X

ⓧ Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEF851X



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

OK or NG

OK ► GO TO 12.

NG ► Replace EVAP canister purge volume control solenoid valve.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

12	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 13.
NG	▶ Clean the rubber tube using an air blower.

13	CHECK EVAP CANISTER VENT CONTROL VALVE-I
1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.	
<p style="text-align: right;">SEF337X</p>	
OK or NG	
OK	▶ GO TO 14.
NG	▶ Replace EVAP canister vent control valve.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

14	CHECK EVAP CANISTER VENT CONTROL VALVE																										
<p> With CONSULT-II</p> <p>1. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.</p> <p>2. Check air passage continuity and operation delay time under the following conditions.</p>																											
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">VENT CONTROL/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2" style="text-align: center;">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 (B1)</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td style="text-align: center;">THRTL POS SEN</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 (B1)	XXX V	THRTL POS SEN	XXX V					<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition VENT CONTROL/V</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">ON</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">OFF</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table> <p>Operation takes less than 1 second.</p>	Condition VENT CONTROL/V	Air passage continuity between A and B	ON	No	OFF	Yes
ACTIVE TEST																											
VENT CONTROL/V	OFF																										
MONITOR																											
ENG SPEED	XXX rpm																										
A/F ALPHA-B1	XXX %																										
HO2S1 (B1)	XXX V																										
THRTL POS SEN	XXX V																										
Condition VENT CONTROL/V	Air passage continuity between A and B																										
ON	No																										
OFF	Yes																										
SEF803Y																											
<p> Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>																											
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">OFF</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table> <p>Operation takes less than 1 second.</p>	Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	No	OFF	Yes	SEF339X																		
Condition	Air passage continuity between A and B																										
12V direct current supply between terminals 1 and 2	No																										
OFF	Yes																										
<p>Make sure new O-ring is installed properly.</p> <p style="text-align: center;">OK or NG</p>																											
OK	▶	GO TO 16.																									
NG	▶	GO TO 15.																									

15	CHECK EVAP CANISTER VENT CONTROL VALVE-III		
<p>1. Clean the air passage (portion A to B) of EVAP canister vent control valve using an air blower.</p> <p>2. Perform Test No. 14 again.</p>			
OK or NG			
OK	▶	GO TO 16.	
NG	▶	Replace EVAP canister vent control valve.	

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

16	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR						
<p>1. Remove EVAP control system pressure sensor with its harness connector connected.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Never apply force to the air hole protector of the sensor if equipped. 							
SEF799W							
<p>2. Remove hose from EVAP control system pressure sensor.</p> <p>3. Turn ignition switch "ON".</p> <p>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure. <p>5. Check input voltage between ECM terminal 84 and ground.</p>							
<div style="display: flex; align-items: flex-start;"> <div style="flex: 1;"> </div> <div style="flex: 1; margin-left: 20px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Pressure (Relative to atmospheric pressure)</th> <th style="text-align: center;">Voltage V</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0 kPa (0 mmHg, 0 inHg)</td> <td style="text-align: center;">3.0 - 3.6</td> </tr> <tr> <td style="text-align: center;">-9.3 kPa (-70 mmHg, -2.76 inHg)</td> <td style="text-align: center;">0.4 - 0.6</td> </tr> </tbody> </table> </div> </div>		Pressure (Relative to atmospheric pressure)	Voltage V	0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6	-9.3 kPa (-70 mmHg , -2.76 inHg)	0.4 - 0.6
Pressure (Relative to atmospheric pressure)	Voltage V						
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6						
-9.3 kPa (-70 mmHg , -2.76 inHg)	0.4 - 0.6						
SEF342X							
<p>CAUTION:</p> <ul style="list-style-type: none"> ● Discard and EVAP control system pressure 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. <p style="text-align: center;">OK or NG</p>							
OK	▶ GO TO 17.						
NG	▶ Replace EVAP control system pressure sensor.						

17	CHECK RUBBER TUBE
<p>Check obstructed rubber tube connected to EVAP canister vent control valve.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 18.
NG	▶ Clean rubber tube using an air blower, repair or replace rubber tube.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

18	CHECK WATER SEPARATOR	
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 		
<p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>		
<p>5. In case of NG in items 2 - 4, replace the parts.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • Do not disassemble water separator. 		
SEF829T		
OK or NG		
OK	▶	GO TO 19.
NG	▶	Replace water separator.

19	CHECK IF EVAP CANISTER SATURATED WITH WATER	
<ol style="list-style-type: none"> 1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister. 		
<p>EVAP canister</p> <p>Water</p> <p>EVAP canister vent control valve</p>		
SEF596U		
Yes or No		
Yes	▶	GO TO 20.
No	▶	GO TO 22.

20	CHECK EVAP CANISTER	
<p>Weigh the EVAP canister with the EVAP canister vent control valve attached.</p> <p>The weight should be less than 1.8 kg (4.0 lb).</p>		
OK or NG		
OK	▶	GO TO 18.
NG	▶	GO TO 17.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

21	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● EVAP canister for damage● EVAP hose between EVAP canister and water separator for clogging or poor connection	
▶	Repair hose or replace EVAP canister.

22	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR SHIELD CIRCUIT FOR OPEN AND SHORT
1. Reconnect harness connectors disconnected. 2. Disconnect harness connectors T19, T20. 3. Check harness continuity between harness connector T20 terminal 8 and engine ground. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to power.	
OK or NG	
OK	▶ GO TO 24.
NG	▶ GO TO 23.

23	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness connectors T19, T20● Harness connectors B113, T1● Harness connectors B102, M74● Harness connectors F23, M49● Joint connector-1 and -2 Refer to EL-274, "HARNES LAYOUT". <ul style="list-style-type: none">● Harness for open or short between harness connector T20 and engine ground	
▶	Repair open circuit or short to power in harness or connectors.

24	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

On Board Diagnosis Logic

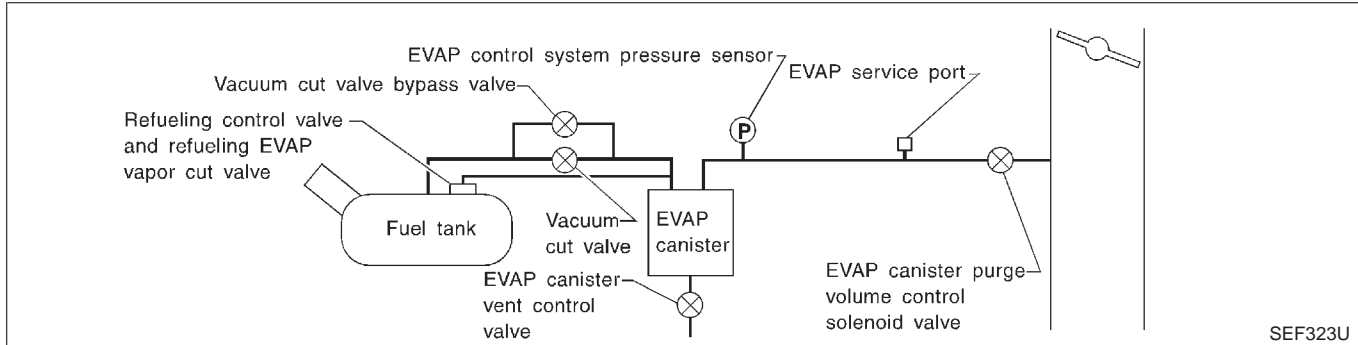
On Board Diagnosis Logic

NCEC0649

NOTE:

If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-549.)

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.



Malfunction is detected when EVAP control system has very large leaks such as when fuel filler cap has fallen off, EVAP control system does not operate properly.

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.

Possible Cause

NCEC0650

- Fuel filler cap remains open or fails to close.
- Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Foreign matter caught in fuel filler cap.
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.
- Foreign matter caught in EVAP canister vent control valve.
- EVAP canister or fuel tank leaks
- EVAP purge line (pipe and rubber tube) leaks
- EVAP purge line rubber tube bent.
- Blocked or bent rubber tube to EVAP control system pressure sensor
- Loose or disconnected rubber tube
- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve and the circuit
- Fuel tank temperature sensor
- O-ring of EVAP canister vent control valve is missing or damaged.
- EVAP control system pressure sensor

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

DTC Confirmation Procedure

6

EVAP SML LEAK P0440/P1440

1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS.
-FUEL LEVEL: 1/4-3/4
-AMBIENT TEMP: 0-30 C(32-86F)
-OPEN ENGINE HOOD.
2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC. THEN RESTART.
3)TOUCH START.

SEF565X

6

EVAP SML LEAK P0440/P1440

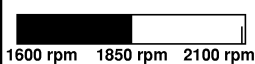
WAIT
2 TO 10 MINUTES.
KEEP ENGINE RUNNING AT IDLE SPEED.

SEF566X

6

EVAP SML LEAK P0440/P1440

MAINTAIN
1600 - 2100 RPM UNTIL FINAL RESULT APPEARS.
(APPROX. 3 MINUTES)



1600 rpm 1850 rpm 2100 rpm

SEF874X

6

EVAP SML LEAK P0440/P1440

OK

SELF-DIAG RESULTS

NO DTC DETECTED.
FURTHER TESTING
MAY BE REQUIRED.

SEF567X

DTC Confirmation Procedure

NCEC0651

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. (See EC-549.)
- 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

NCEC0651S01

- 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 P0440/P1440” 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 “Basic Inspection”, EC-107.

- 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 “Diagnostic Procedure”, EC-411.
If P0440 is displayed, perform “Diagnostic Procedure” for DTC P0440.

WITH GST

NCEC0651S02

NOTE:

Be sure to read the explanation of “Driving Pattern” on EC-74 before driving vehicle.

- 1) Start engine.
- 2) Drive vehicle according to “Driving Pattern”, EC-74.
- 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.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

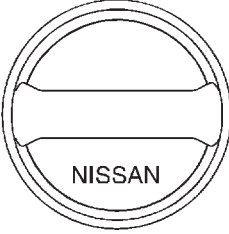
DTC Confirmation Procedure (Cont'd)

- 7) Drive vehicle again according to the "Driving Pattern", EC-74.
- 8) Stop vehicle.
- 9) Select "MODE 3" with GST.
 - If P0455 is displayed on the screen, go to "Diagnostic Procedure", EC-411.
 - If P0440 or P1440 is displayed on the screen, go to "Diagnostic Procedure", for DTC P0440, EC-370.
 - If P1447 is displayed on the screen, go to "Diagnostic Procedure" for DTC P1447, EC-540.
 - If P0440, P0455, P1440 and P1447 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.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

Diagnostic Procedure

NCEC0652

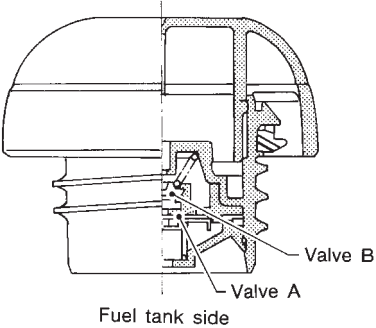
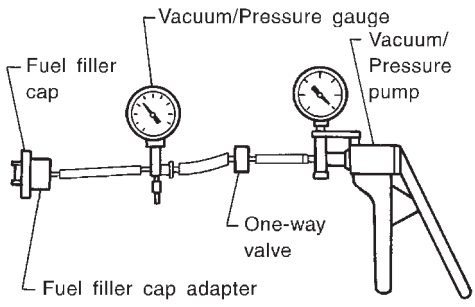
1	CHECK FUEL FILLER CAP DESIGN	
1. Turn ignition switch "OFF". 2. Check for genuine NISSAN fuel filler cap design.		
		
SEF915U		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Replace with genuine NISSAN fuel filler cap.

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	▶	<ul style="list-style-type: none"> ● Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. ● Retighten until ratcheting sound is heard.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

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
<ol style="list-style-type: none"> 1. Wipe clean valve housing. 2. Check valve opening pressure and vacuum. 	
 <p style="text-align: center;">Fuel tank side</p>	
SEF427N	
	
SEF943S	
<p>Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)</p> <p>Vacuum: -6.0 to -3.4 kPa (-0.061 to -0.035 kg/cm², -0.87 to -0.49 psi)</p> <p>CAUTION: Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.</p> <p style="text-align: center;">OK or NG</p>	
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 "Evaporative Emission System", EC-33.	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Repair or reconnect the hose.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

6	CLEAN EVAP PURGE LINE	
	Clean EVAP purge line (pipe and rubber tube) using air blower.	
	▶	GO TO 7.

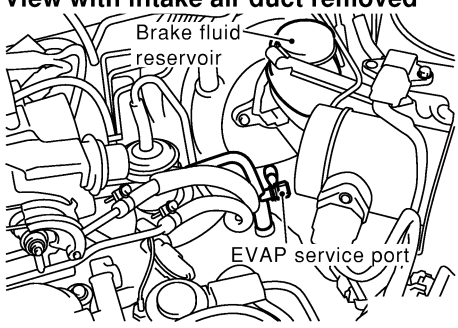
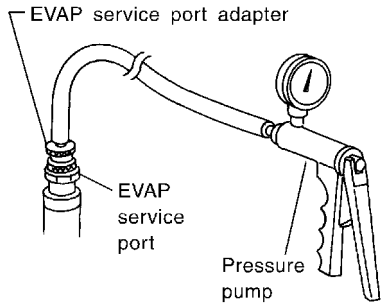
GI

7	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT	
	Refer to "DTC Confirmation Procedure", EC-390.	
	OK or NG	
OK	▶	GO TO 8.
NG	▶	Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

MA

EM

LC

8	INSTALL THE PRESSURE PUMP	
	To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.	
	<p>View with intake air duct removed</p> 	SEF850X
		SEF916U
	<p>NOTE: Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.</p>	
	Models with CONSULT-II ▶	GO TO 9.
	Models without CON-SULT-II ▶	GO TO 10.

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

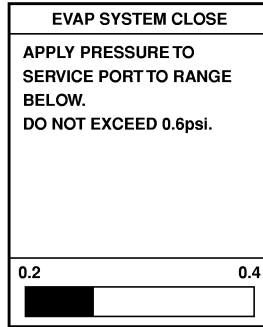
9 CHECK FOR EVAP LEAK

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:

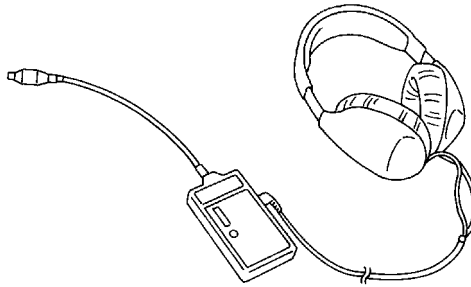
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-37.

Leak detector



SEF200U

OK or NG

OK (With CONSULT-II)	▶	GO TO 11.
OK (Without CONSULT-II)	▶	GO TO 12.
NG	▶	Repair or replace.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

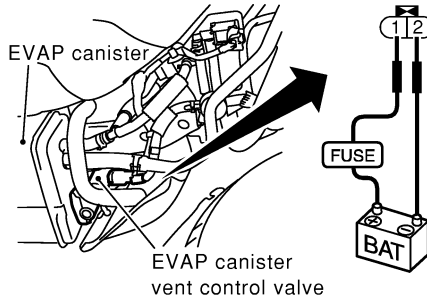
GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

10 CHECK FOR EVAP LEAK

⊗ Without CONSULT-II

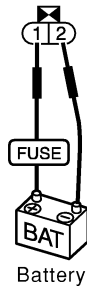
1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)

View from under the vehicle

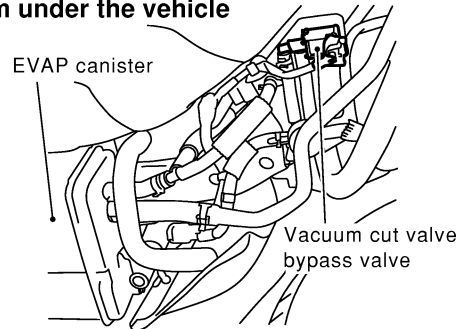


SEF323Z

3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



View from under the vehicle



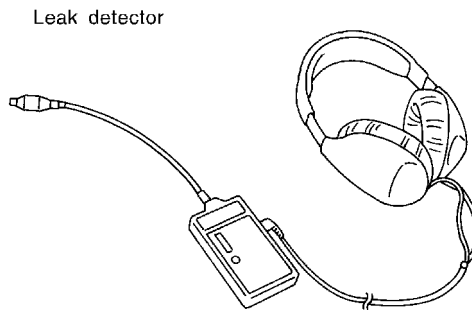
SEF869X

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/cm², 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 "EVAPORATIVE EMISSION LINE DRAWING", EC-37.



SEF200U

OK or NG

OK (With CONSULT-II)	▶	GO TO 11.
OK (Without CONSULT-II)	▶	GO TO 12.
NG	▶	Repair or replace.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

11	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																					
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 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. 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2" style="text-align: center;">ACTIVE TEST</th></tr> <tr><td style="text-align: center;">PURG VOL CONT/V</td><td style="text-align: center;">XXX %</td></tr> <tr><th colspan="2" style="text-align: center;">MONITOR</th></tr> <tr><td style="text-align: center;">ENG SPEED</td><td style="text-align: center;">XXX rpm</td></tr> <tr><td style="text-align: center;">A/F ALPHA-B1</td><td style="text-align: center;">XXX %</td></tr> <tr><td style="text-align: center;">HO2S1 MNTR (B1)</td><td style="text-align: center;">LEAN</td></tr> <tr><td style="text-align: center;">THRTL POS SEN</td><td style="text-align: center;">XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V						
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
HO2S1 MNTR (B1)	LEAN																					
THRTL POS SEN	XXX V																					
Vacuum should exist.																						
SEF595Y																						
OK or NG																						
OK	▶	GO TO 14.																				
NG	▶	GO TO 13.																				

12	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION	
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 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. <p style="color: blue; text-align: center;">Vacuum should exist.</p>		
OK or NG		
OK	▶	GO TO 15.
NG	▶	GO TO 13.

13	CHECK VACUUM HOSE	
<p>Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-27.</p>		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 14.
OK (Without CONSULT-II)	▶	GO TO 15.
NG	▶	Repair or reconnect the hose.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

14	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																					
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> Start engine. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening. 																						
<table border="1" style="margin: auto;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>PURG VOL CONT/V</td><td>XXX %</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XXX %</td></tr> <tr><td>HO2S1 MNTR (B1)</td><td>LEAN</td></tr> <tr><td>THRTL POS SEN</td><td>XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V						
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
HO2S1 MNTR (B1)	LEAN																					
THRTL POS SEN	XXX V																					
SEF801Y																						
OK or NG																						
OK	▶	GO TO 16.																				
NG	▶	GO TO 15.																				

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

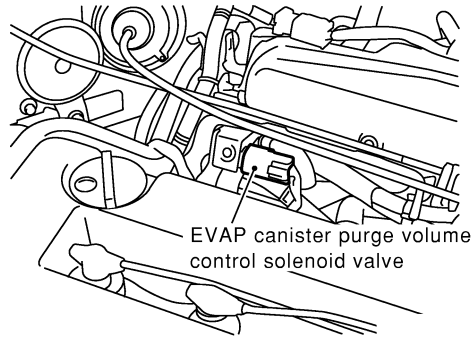
DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

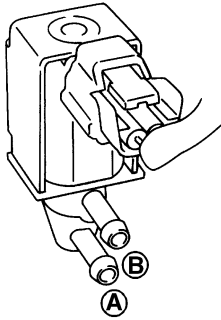
15 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEF851X

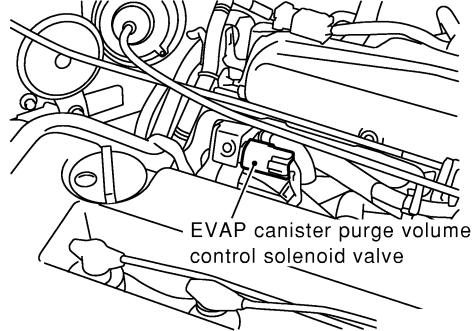


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

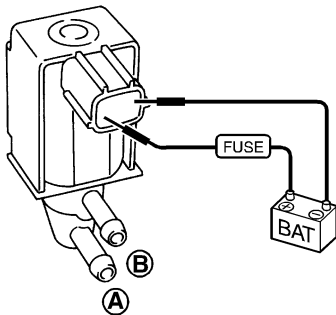
SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEF851X



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

OK or NG

OK ► GO TO 16.

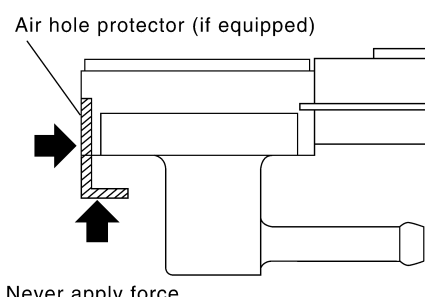
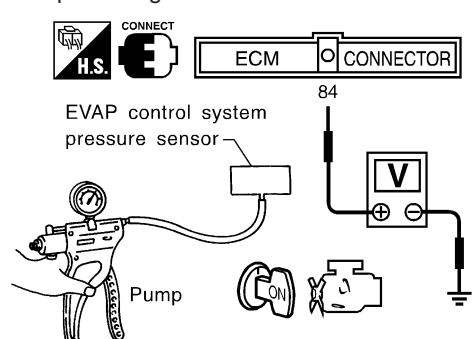
NG ► Replace EVAP canister purge volume control solenoid valve.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

Diagnostic Procedure (Cont'd)

16	CHECK FUEL TANK TEMPERATURE SENSOR
1. Remove fuel level sensor unit. 2. Check fuel tank temperature sensor. Refer to EC-290, "Component Inspection".	
OK or NG	
OK	▶ GO TO 17.
NG	▶ Replace fuel level sensor unit.

GI
MA
EM

17	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR
1. Remove EVAP control system pressure sensor with its harness connector connected. CAUTION: <ul style="list-style-type: none"> ● Never apply force to the air hole protector of the sensor if equipped. 	
	
SEF799W	
2. Remove hose from EVAP control system pressure sensor. 3. Turn ignition switch "ON". 4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure. CAUTION: <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure. 	
5. Check input voltage between ECM terminal 84 and ground.	
	
SEF342X	
CAUTION: <ul style="list-style-type: none"> ● Discard and EVAP control system pressure 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. 	
OK or NG	
OK	▶ GO TO 18.
NG	▶ Replace EVAP control system pressure sensor.

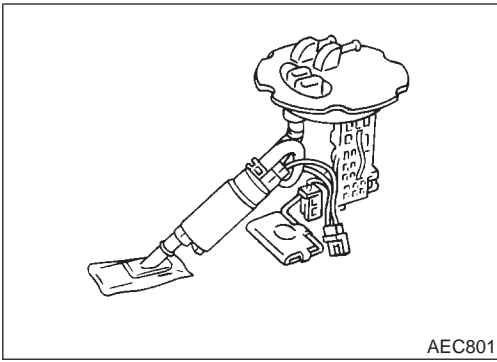
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL

18	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶ INSPECTION END	

IDX

DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

Component Description



Component Description

NCEC0552

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.

ECM Terminals and Reference Value

NCEC0653

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)
83	G/R	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.
90	B	Fuel level sensor ground	[Engine is running] ● Idle speed	Approximately 0V

On Board Diagnostic Logic

NCEC0553

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.

Malfunction is detected when even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM.

Possible Cause

NCEC0554

- Fuel level sensor circuit
(The fuel level sensor circuit is open or shorted.)
- Fuel level sensor

DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

DTC Confirmation Procedure

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

DTC Confirmation Procedure

NCEC0555

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

NCEC0555S01

- 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 "Diagnostic Procedure", EC-423.

WITH GST

NCEC0555S02

Follow the procedure "WITH CONSULT-II" above.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

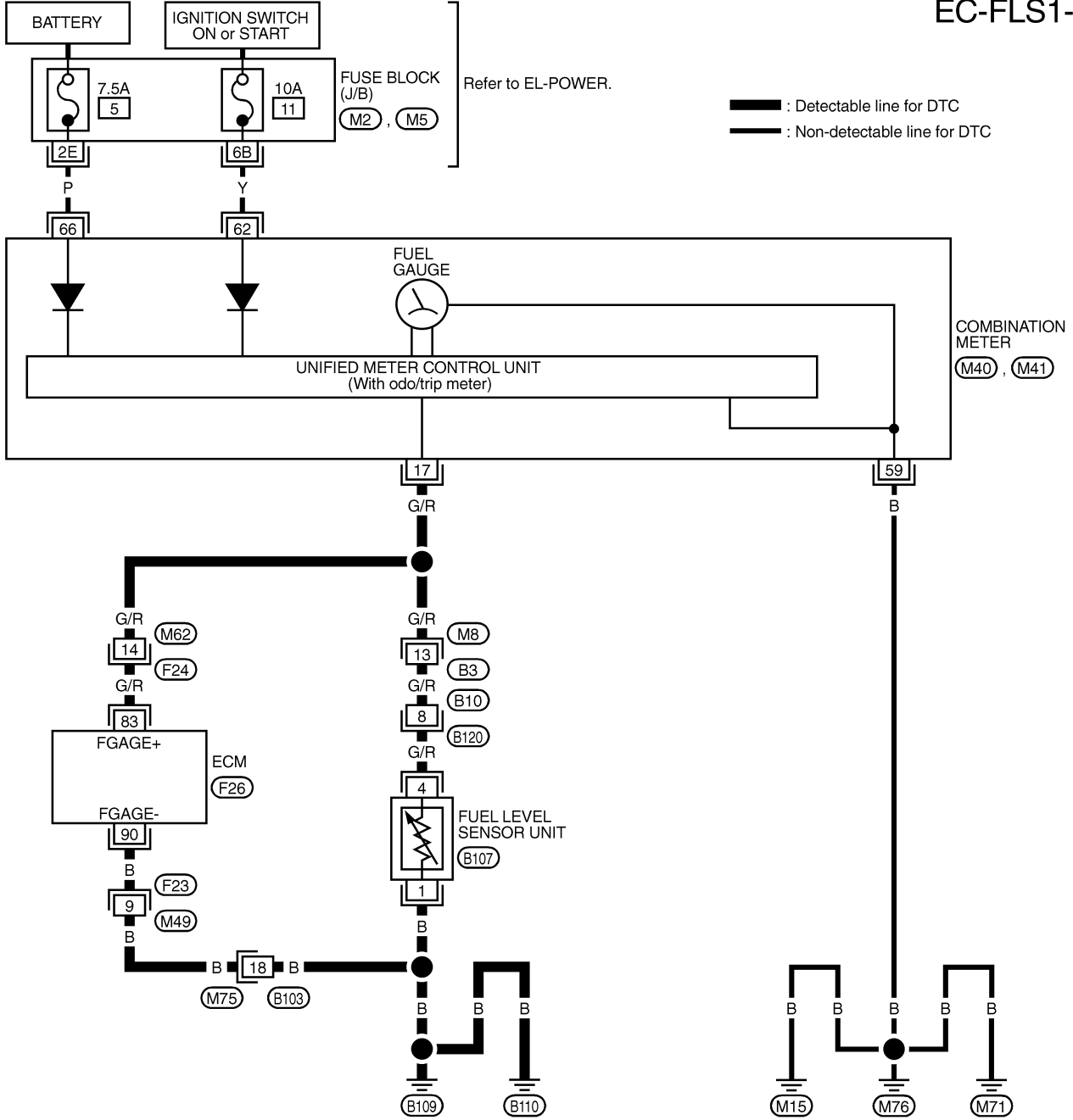
DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

Wiring Diagram

Wiring Diagram

NCEC0556

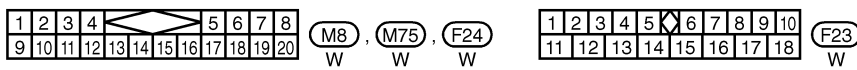
EC-FLS1-01



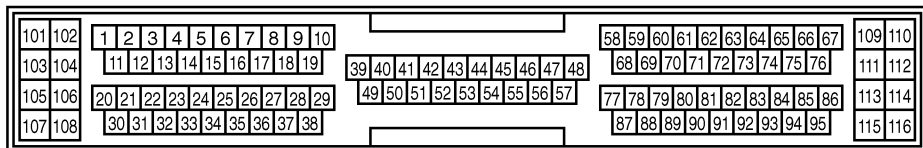
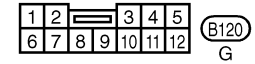
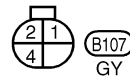
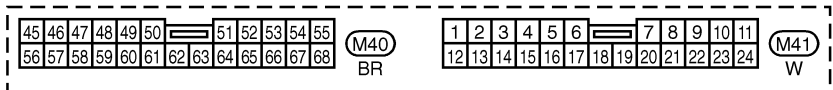
— : Detectable line for DTC
— : Non-detectable line for DTC

Refer to EL-POWER.

COMBINATION METER
 (M40), (M41)



REFER TO THE FOLLOWING.
 (M2), (M5) - FUSE BLOCK-JUNCTION BOX (J/B)



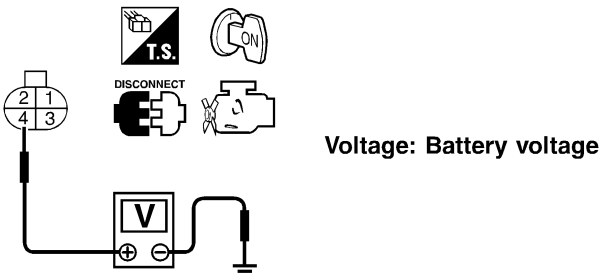
TEC829

DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

Diagnostic Procedure

Diagnostic Procedure

=NCEC0557

1	CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect fuel level sensor until and fuel pump harness connector. 3. Turn ignition switch "ON". 4. Check voltage between fuel level sensor unit terminal 4 and ground with CONSULT-II or a tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> </div> <p style="text-align: right;">SEF939XA</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.
2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M8, B3 ● Harness connectors B10, B120 ● Harness for open or short between combination meter and fuel level sensor unit 		
▶		Repair or replace harness or connectors.
3	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between fuel level sensor unit terminal 1 and body ground. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
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	
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 83 and fuel level sensor unit terminal 4, ECM terminal 90 and fuel level sensor unit terminal 1. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

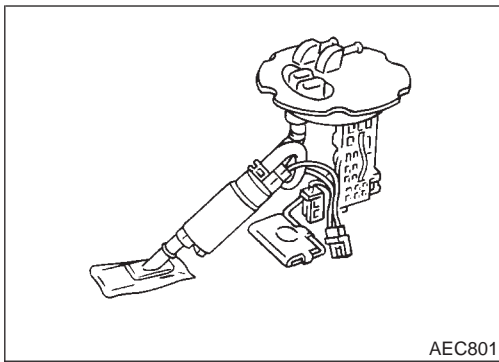
DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

Diagnostic Procedure (Cont'd)

5	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness connectors B103, M75● Harness connectors F23, M49● Harness connectors M8, B3● Harness connectors B10, B120● Harness connectors M62, F24● Harness for open or short between ECM and fuel level sensor	
	▶ Repair open circuit or short to ground or short to power in harness or connectors.
6	CHECK FUEL LEVEL SENSOR
Refer to EL-97, "Fuel Level Sensor Unit Check".	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Replace fuel level sensor unit.
7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
	▶ INSPECTION END

DTC P0461 FUEL LEVEL SENSOR FUNCTION

Component Description



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. =NCEC0558

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

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. NCEC0559

Malfunction is detected when 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.

Possible Cause

- Harness or connectors (The level sensor circuit is open or shorted.)
- Fuel level sensor

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. NCEC0561

WARNING:

When performing following procedure, be sure to observe the handling of the fuel. Refer to FE-5, "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 "Fuel Pressure Release", EC-50.
- 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.

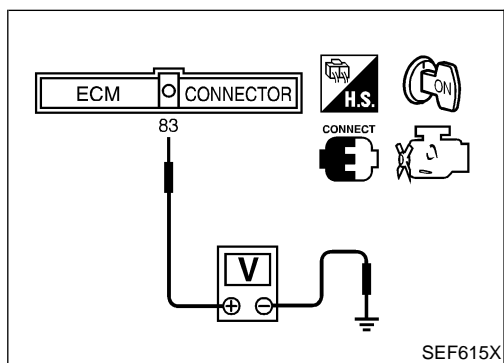
DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

DTC P0461 FUEL LEVEL SENSOR FUNCTION

Overall Function Check (Cont'd)

- 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 EL-97, "FUEL LEVEL SENSOR UNIT CHECK".



WITH GST

NCEC0561S02

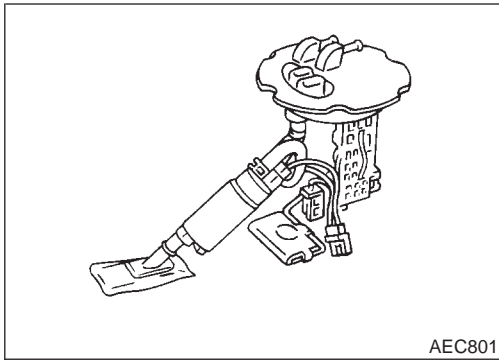
NOTE:

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 "Fuel Pressure Release", EC-50.
- 3) Remove the fuel feed hose on the fuel level sensor.
- 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 83 (fuel level sensor signal) and ground.
- 7) Turn ignition switch "ON".
- 8) Check voltage between ECM terminal 83 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 83 and ground changes more than 0.03V during step 8 - 10.
If NG, check component of fuel level sensor, refer to EL-97, "FUEL LEVEL SENSOR UNIT CHECK".

DTC P0464 FUEL LEVEL SENSOR CIRCUIT

Component Description



Component Description

NCEC0562

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.

GI

MA

EM

LC

ECM Terminals and Reference Value

NCEC0654

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.

EC

FE

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
83	G/R	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.
90	B	Fuel level sensor ground	[Engine is running] ● Idle speed	Approximately 0V

CL

MT

AT

AX

SU

BR

On Board Diagnostic Logic

NCEC0563

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.

Malfunction is detected when an excessively low or high voltage is sent from the sensor is sent to ECM.

ST

RS

BT

HA

Possible Cause

NCEC0564

- Fuel level sensor circuit
(The fuel level sensor circuit is open or shorted.)
- Fuel level sensor

SC

EL

IDX

DTC P0464 FUEL LEVEL SENSOR CIRCUIT

DTC Confirmation Procedure

DTC Confirmation Procedure

NCEC0565

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".

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

WITH CONSULT-II

NCEC0565S01

- 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 "Diagnostic Procedure", EC-430.

WITH GST

NCEC0565S02

Follow the procedure "WITH CONSULT-II" above.

DTC P0464 FUEL LEVEL SENSOR CIRCUIT

Wiring Diagram

Wiring Diagram

NCEC0566

EC-FLS2-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

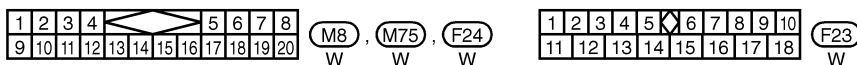
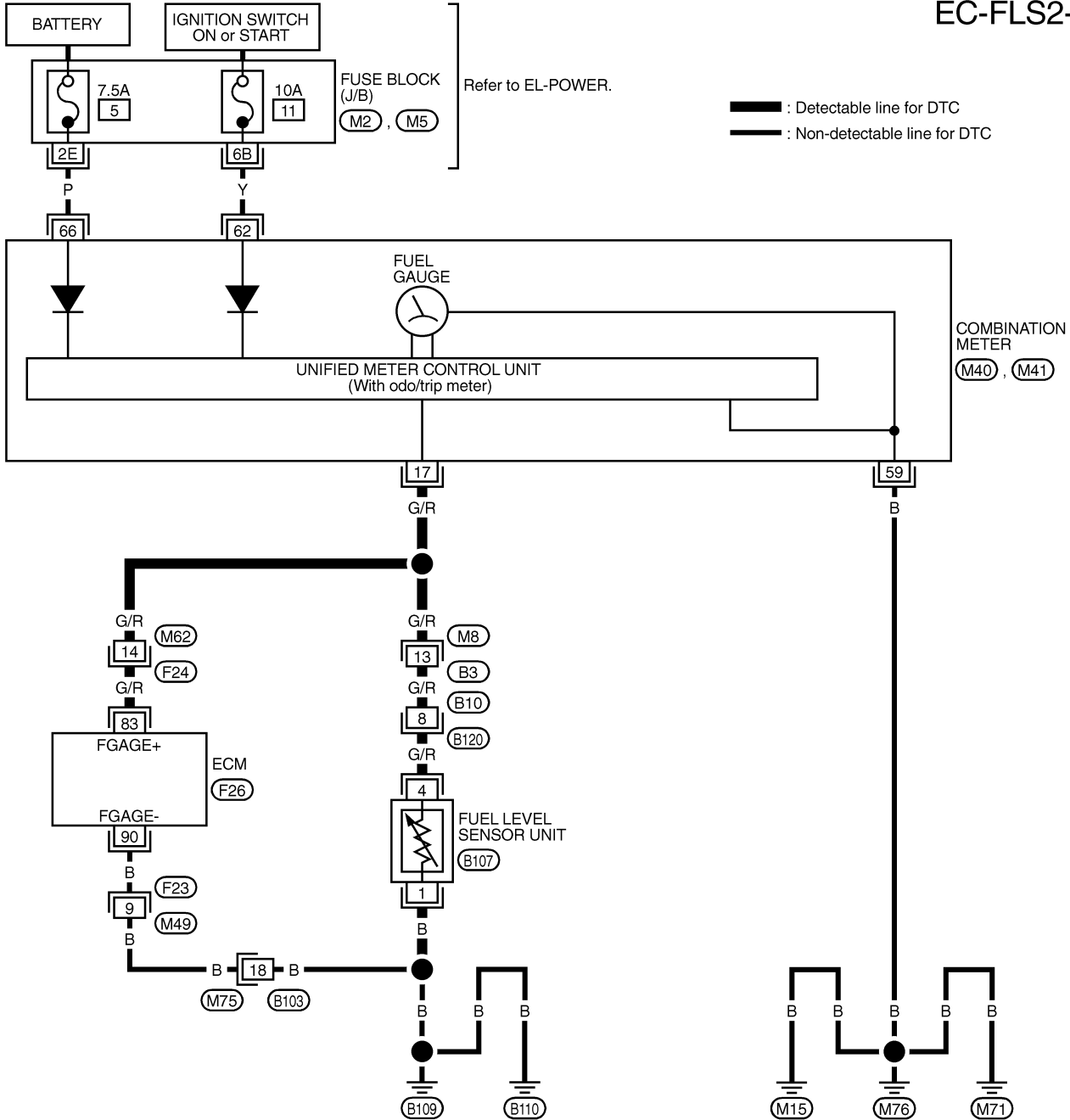
BT

HA

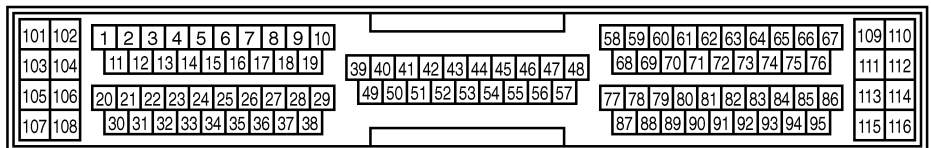
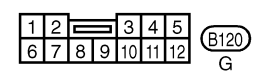
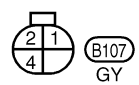
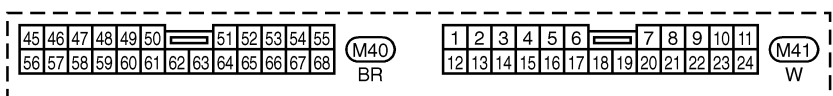
SC

EL

IDX



REFER TO THE FOLLOWING.
 (M2), (M5) - FUSE BLOCK-JUNCTION BOX (J/B)



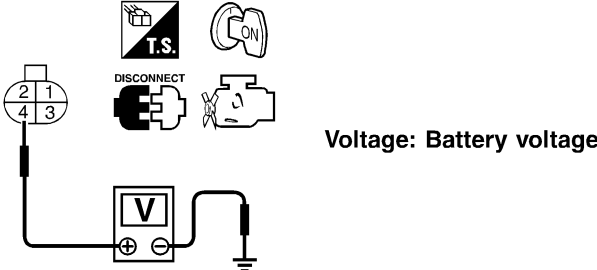
TEC830

DTC P0464 FUEL LEVEL SENSOR CIRCUIT

Diagnostic Procedure

Diagnostic Procedure

=NCEC0567

1	CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT	
<ol style="list-style-type: none"> Turn ignition switch "OFF". Disconnect fuel level sensor until and fuel pump harness connector. Turn ignition switch "ON". Check voltage between fuel level sensor unit terminal 4 and ground with CONSULT-II or tester. 		
		
SEF939XA		
OK or NG		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M8, B3 ● Harness connectors B10, B120 ● Harness for open or short between combination meter and fuel level sensor unit 		
▶ Repair or replace harness or connectors.		

3	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
<ol style="list-style-type: none"> Turn ignition switch "OFF". Check harness continuity between fuel level sensor unit terminal 1 and body ground. Refer to Wiring Diagram. Continuity should exist. 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	
<ol style="list-style-type: none"> Disconnect ECM harness connector. Check harness continuity between ECM terminal 83 and fuel level sensor unit terminal 4. Refer to Wiring Diagram. Continuity should exist. Also check harness for short to ground and short to power. 		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

DTC P0464 FUEL LEVEL SENSOR CIRCUIT

Diagnostic Procedure (Cont'd)

5	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness connectors M62, F24● Harness connectors M8, B3● Harness connectors B10, B120● Harness for open or short between ECM and fuel level sensor	
	▶ Repair open circuit or short to ground or short to power in harness on connectors.

GI

MA

EM

6	CHECK FUEL LEVEL SENSOR
Refer to EL-97, "Fuel Level Sensor Unit Check".	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Replace fuel level sensor unit.

LC

EC

FE

7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
	▶ INSPECTION END

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

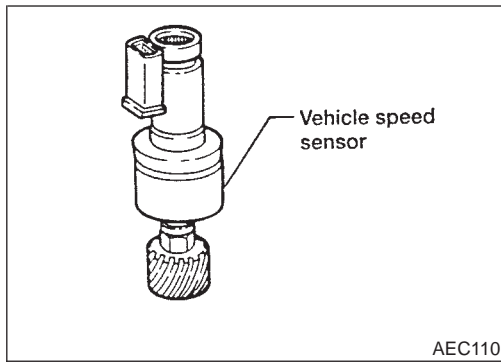
SC

EL

IDX

DTC P0500 VEHICLE SPEED SENSOR (VSS)

Component Description



Component Description

NCEC0272

The vehicle speed sensor is installed in the transaxle. It contains a pulse generator which provides a vehicle speed signal to the speedometer. The speedometer then sends a signal to the ECM.

ECM Terminals and Reference Value

NCEC0273

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)
86	Y/G	Vehicle speed sensor	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Lift up the vehicle ● In 2nd gear position ● Vehicle speed is 40 km/h (25 MPH) 	<p>0 - Approximately 4.2V</p> <p>SEF003W</p>

On Board Diagnosis Logic

NCEC0274

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0500	<ul style="list-style-type: none"> ● 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"> ● Harness or connector (The vehicle speed sensor circuit is open or shorted.) ● Vehicle speed sensor

DTC Confirmation Procedure

NCEC0275

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 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.

DTC P0500 VEHICLE SPEED SENSOR (VSS)

DTC Confirmation Procedure (Cont'd)

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

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 "Diagnostic Procedure", EC-435. 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 10 consecutive seconds.

ENG SPEED	1,650 - 3,000 rpm (A/T) 1,900 - 3,900 rpm (M/T)
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	4.8 - 12.0 msec (A/T) 4.5 - 10.5 msec (M/T)
Selector lever	Suitable position
PW/ST SIGNAL	OFF

- 7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-435.

Overall Function Check

Use this procedure to check the overall function of the EVAP canister vent control valve 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 "Diagnostic Procedure", EC-435.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

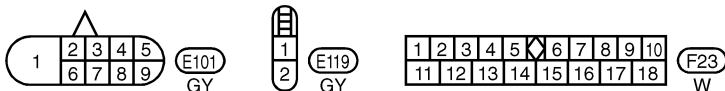
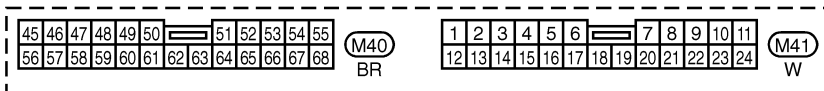
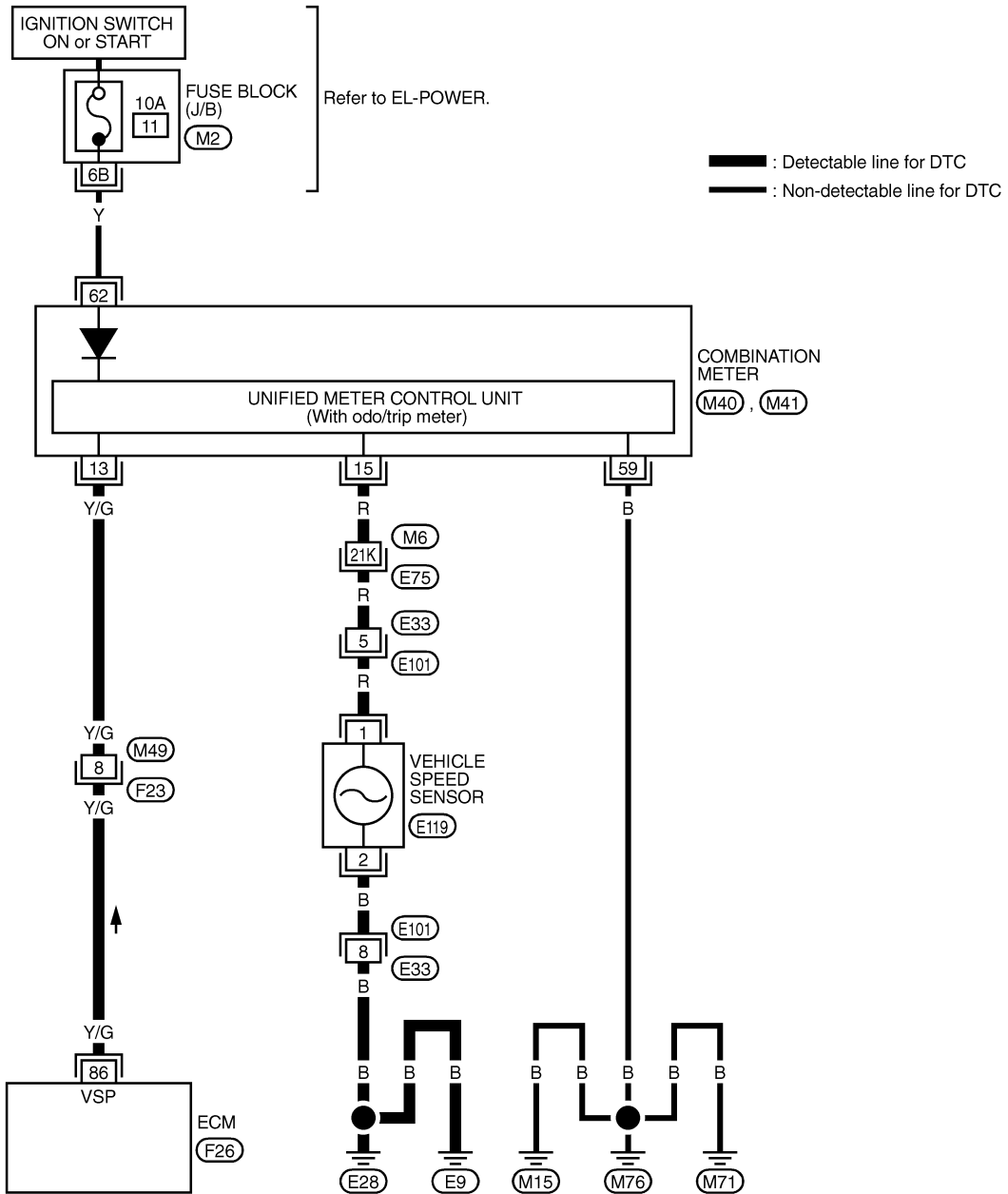
DTC P0500 VEHICLE SPEED SENSOR (VSS)

Wiring Diagram

Wiring Diagram

NCEC0277

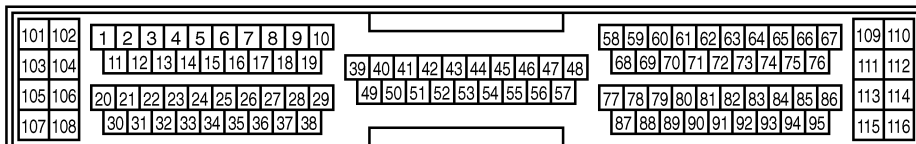
EC-VSS-01



REFER TO THE FOLLOWING.

(E75) -SUPER MULTIPLE JUNCTION (SMJ)

(M2) -FUSE BLOCK-JUNCTION BOX (J/B)



TEC831

DTC P0500 VEHICLE SPEED SENSOR (VSS)

Diagnostic Procedure

Diagnostic Procedure

NCEC0278

1	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector and combination meter harness connector.</p> <p>3. Check harness continuity between ECM terminal 86 and combination meter terminal 13. Refer to Wiring Diagram.</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

GI

MA

EM

LC

EC

2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors F23, M49 ● 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.

FE

CL

3	CHECK SPEEDOMETER FUNCTION	
<p>Make sure that speedometer functions properly.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

MT

AT

AX

4	CHECK SPEEDOMETER CIRCUIT FOR OPEN AND SHORT	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M6, E75 ● Harness connectors E33, E101 ● Harness for open or short between combination meter and vehicle speed sensor <p style="text-align: center;">OK or NG</p>		
OK	▶	Check combination meter and vehicle speed sensor. Refer to EL-84, "METERS AND GAUGES".
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

SU

BR

ST

RS

5	CHECK INTERMITTENT INCIDENT	
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p>		
▶		INSPECTION END

BT

HA

SC

EL

IDX

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

Description

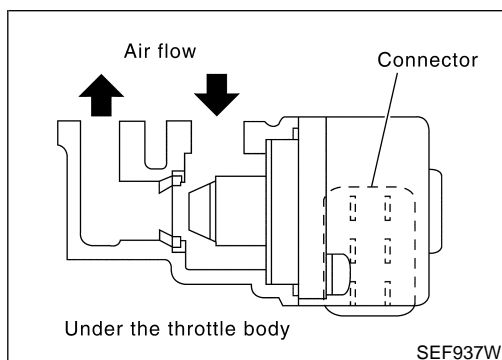
Description SYSTEM DESCRIPTION

NCEC0279

NCEC0279S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	Idle air control	IACV-AAC 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		
Park/neutral position (PNP) switch	Park/neutral position		
Air conditioner switch	Air conditioner operation		
Power steering oil pressure switch	Power steering load signal		
Battery	Battery voltage		
Vehicle speed sensor	Vehicle speed		
Intake air temperature sensor	Intake air temperature		

This system automatically controls engine idle speed to a specified level. Idle speed is controlled through fine adjustment of the amount of air which by-passes the throttle valve via IACV-AAC valve. The IACV-AAC valve changes the opening of the air by-pass passage to control the amount of auxiliary air. This valve is actuated by a step motor built into the valve, which moves the valve in the axial direction in steps corresponding to the ECM output signals. One step of IACV-AAC valve movement causes the respective opening of the air by-pass passage. (i.e. when the step advances, the opening is enlarged.) The opening of the valve is varied to allow for optimum control of the engine idling speed. The camshaft position sensor detects the actual engine speed and sends a signal to the ECM. The ECM then controls the step position of the IACV-AAC valve so that engine speed coincides with the target value memorized in 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 warm up, deceleration, and engine load (air conditioner, power steering and cooling fan operation).



COMPONENT DESCRIPTION

NCEC0279S02

IACV-AAC Valve

NCEC0279S0202

The IACV-AAC valve is operated by a step motor for centralized control of auxiliary air supply. This motor has four winding phases and is actuated by the output signals of ECM which turns ON and OFF two windings each in sequence. Each time the IACV-AAC valve opens or closes to change the auxiliary air quantity, the ECM sends a pulse signal to the step motor. When no change in the auxiliary air quantity 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.

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

CONSULT-II Reference Value in Data Monitor Mode

CONSULT-II Reference Value in Data Monitor Mode

NCEC0280

MONITOR ITEM	CONDITION		SPECIFICATION
IACV-AAC/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle	5 - 20 steps
		2,000 rpm	—

ECM Terminals and Reference Value

NCEC0281

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)
6 7 15 16	BR L R G	IACV-AAC valve	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	0.1 - 14V

On Board Diagnosis Logic

NCEC0282

DTC No.	Malfunction is detected when ...		Check Items (Possible Cause)
P0505	A)	The IACV-AAC valve does not operate properly.	<ul style="list-style-type: none"> ● Harness or connectors (The IACV-AAC valve circuit is open.) ● IACV-AAC valve
	B)	The IACV-AAC valve does not operate properly.	<ul style="list-style-type: none"> ● Harness or connectors (The IACV-AAC valve circuit is shorted.) ● Air control valve (Power steering) ● IACV-AAC valve ● Intake air leak ● PCV system

DTC Confirmation Procedure

NCEC0283

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.
- Perform "Procedure for malfunction A" first. If 1st trip DTC cannot be confirmed, perform "Procedure for malfunction B".
- If the target idle speed is out of the specified value, perform "Idle Air Volume Learning", EC-65, before conducting "DTC Confirmation Procedure". For the target idle speed,

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

DTC Confirmation Procedure (Cont'd)

refer to the “Service Data and Specifications (SDS)”, EC-632.

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION A

NCEC0283S01

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) Start engine and let it idle.
- 4) Keep engine speed at 2,500 rpm for three seconds, then let it idle for three seconds.
- 5) Perform step 4 once more.
- 6) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-440.

With GST

Follow the procedure “With CONSULT-II” above.

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

SEF174Y

PROCEDURE FOR MALFUNCTION B

NCEC0283S02

TESTING CONDITION:

- Before performing the following procedure, make sure 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 “Diagnostic Procedure”, EC-440.

With GST

Follow the procedure “With CONSULT-II” above.

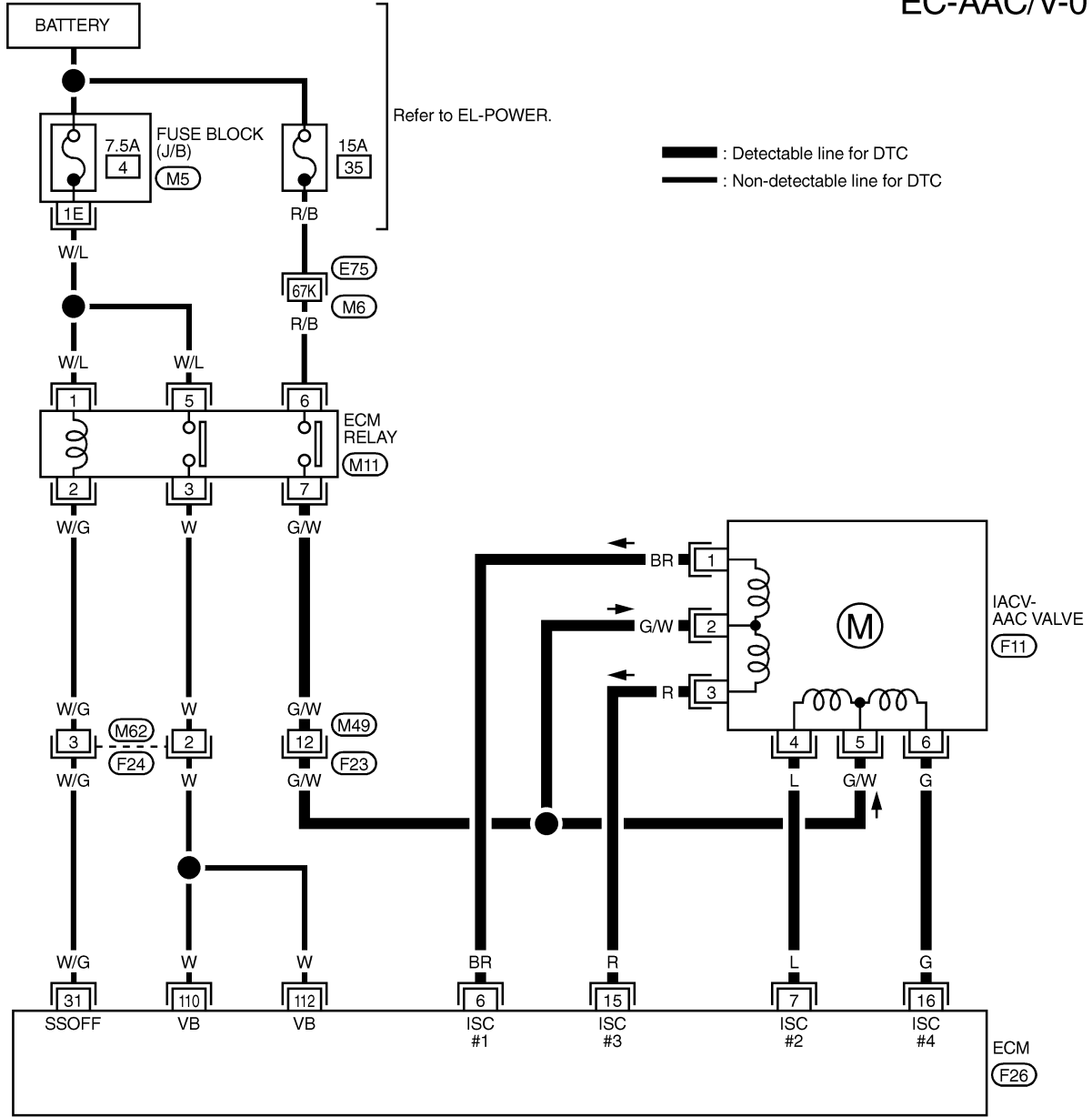
DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

Wiring Diagram

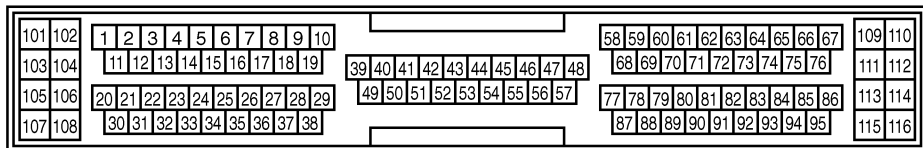
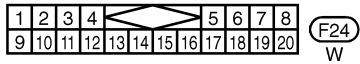
Wiring Diagram

NCEC0284

EC-AAC/V-01



GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX



REFER TO THE FOLLOWING.
 (E75) -SUPER MULTIPLE JUNCTION (SMJ)
 (M5) -FUSE BLOCK-JUNCTION BOX (J/B)

TEC715

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

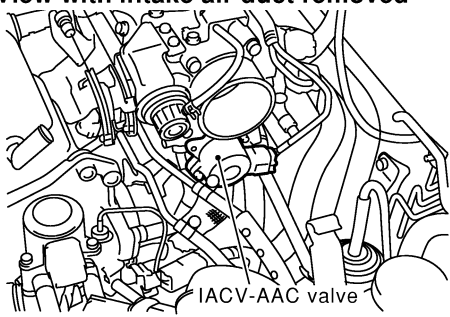
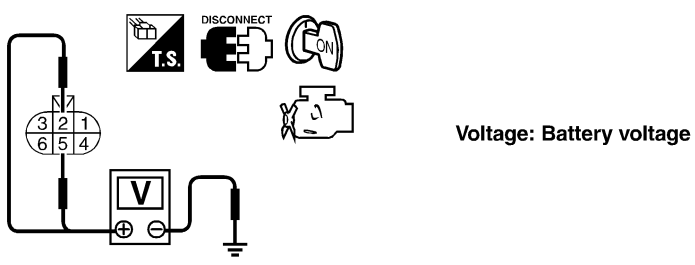
Diagnostic Procedure

Diagnostic Procedure

NCEC0285

1	CHECK PCV HOSE CONNECTION	
Confirm 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 behind the mass air flow sensor.		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Discover air leak location and repair.

3	CHECK IACV-AAC VALVE POWER SUPPLY CIRCUIT	
1. Stop engine. 2. Disconnect IACV-AAC valve harness connector.		
<p>View with intake air duct removed</p>  <p style="text-align: right;">IACV-AAC valve</p>		
SEF852X		
3. Turn ignition switch "ON". 4. Check voltage between IACV-AAC valve terminals 2, 5 and ground with CONSULT-II or tester.		
 <p style="text-align: right;">Voltage: Battery voltage</p>		
SEF343X		
OK or NG		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

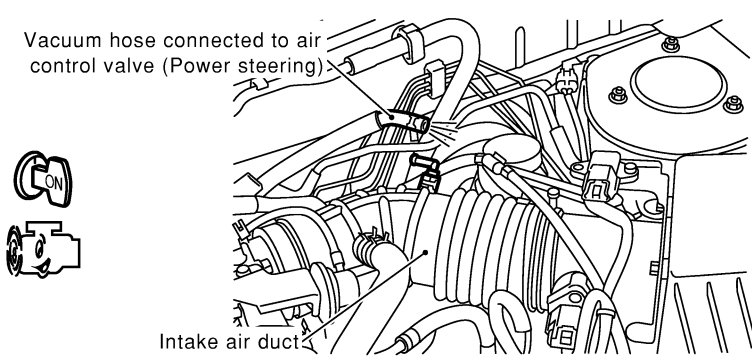
4	DETECT MALFUNCTIONING PART	
Check the following.		
<ul style="list-style-type: none"> ● Harness connectors M49, F23 ● Harness for open or short between IACV-AAC valve and ECM relay 		
▶		
Repair harness or connectors.		

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

Diagnostic Procedure (Cont'd)

5	CHECK IACV-AAC VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT											
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals and IACV-AAC valve terminals as follows. Refer to Wiring Diagram. 												
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">ECM terminal</th> <th style="padding: 5px;">IACV-AAC valve terminal</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">6</td> <td style="text-align: center; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; padding: 5px;">7</td> <td style="text-align: center; padding: 5px;">4</td> </tr> <tr> <td style="text-align: center; padding: 5px;">15</td> <td style="text-align: center; padding: 5px;">3</td> </tr> <tr> <td style="text-align: center; padding: 5px;">16</td> <td style="text-align: center; padding: 5px;">6</td> </tr> </tbody> </table>			ECM terminal	IACV-AAC valve terminal	6	1	7	4	15	3	16	6
ECM terminal	IACV-AAC valve terminal											
6	1											
7	4											
15	3											
16	6											
MTBL0390												
<p style="color: blue; margin-left: 20px;">Continuity should exist.</p> <ol style="list-style-type: none"> 4. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>												
OK	▶	GO TO 6.										
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.										

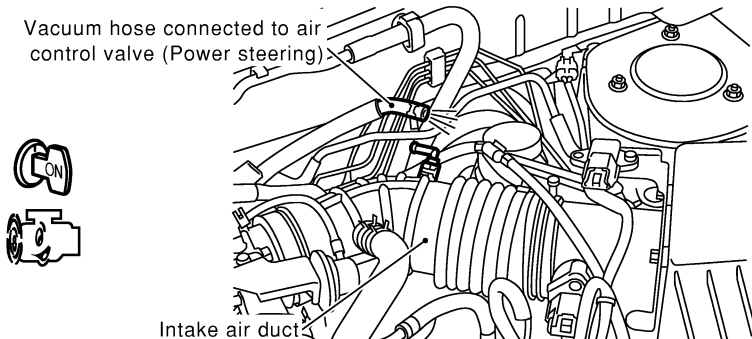
GI
MA
EM
LC
EC

6	CHECK AIR CONTROL VALVE (POWER STEERING) OPERATION-I	
<ol style="list-style-type: none"> 1. Reconnect ECM harness connector and IACV-AAC valve harness connector. 2. Disconnect vacuum hose connected to air control valve (Power steering) at intake air duct. 3. Start engine and let it idle. 4. Check vacuum hose for vacuum existence. 		
		
SEF969X		
<p style="color: blue; margin-left: 20px;">Vacuum slightly exists or does not exist.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 7.
NG	▶	Replace air control valve (Power steering).

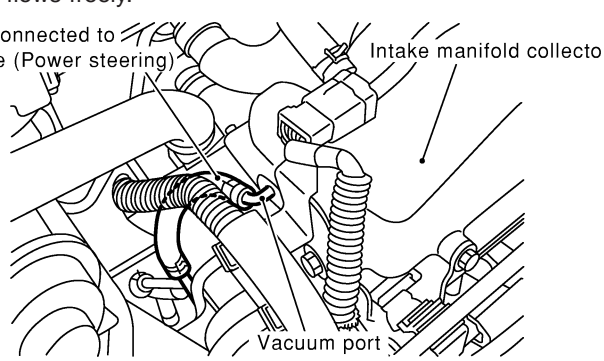
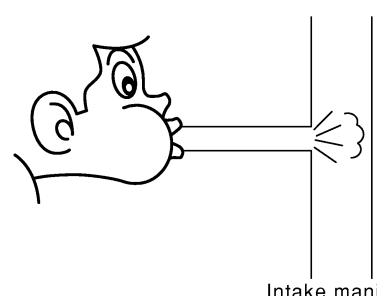
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

Diagnostic Procedure (Cont'd)

7	CHECK AIR CONTROL VALVE (POWER STEERING) OPERATION-II	
<p>Check vacuum hose for vacuum existence when steering wheel is turned.</p> <p>Vacuum hose connected to air control valve (Power steering)</p>  <p>Intake air duct</p>		
<p>Vacuum should exist.</p> <p>OK or NG</p>		
OK	▶	GO TO 10.
NG	▶	GO TO 8.

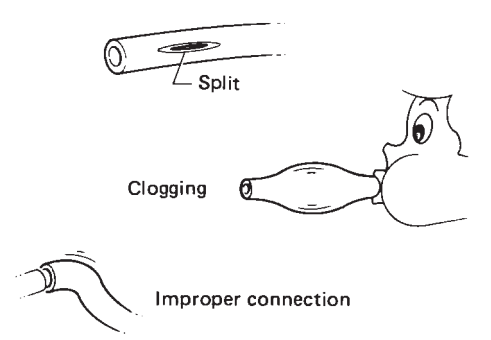
SEF969X

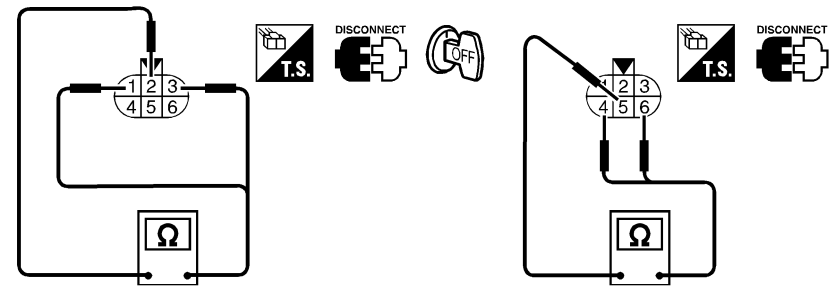
8	CHECK VACUUM PORT	
<ol style="list-style-type: none"> 1. Stop engine. 2. Disconnect vacuum hose connected to air control valve (Power steering) at the vacuum port. 3. Blow air into vacuum port. 4. Check that air flows freely. <p>Vacuum hose connected to air control valve (Power steering)</p>  <p>Intake manifold collector</p> <p>Vacuum port</p>  <p>Intake manifold</p>		
<p>OK or NG</p>		
OK	▶	GO TO 9.
NG	▶	Repair or clean vacuum port.

SEF970X

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

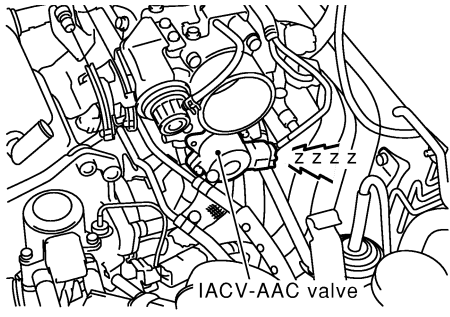
Diagnostic Procedure (Cont'd)

9	CHECK VACUUM HOSES AND TUBES	<ol style="list-style-type: none"> 1. Disconnect vacuum hoses between air control valve (Power steering) and vacuum port, air control valve (Power steering) and intake air duct. 2. Check the hoses and tubes for cracks, clogging, improper connection or disconnection. 	GI MA EM LC EC FE CL
			SEF109L
OK or NG			
OK	▶	GO TO 10.	
NG	▶	Repair hoses or tubes.	

10	CHECK IACV-AAC VALVE-I	<ol style="list-style-type: none"> 1. Disconnect IACV-AAC valve harness connector. 2. Check resistance between IACV-AAC valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6. 	MT AT AX SU BR ST RS	
			Resistance: 20 - 24 Ω [at 20°C (68°F)]	SEF214Z
OK or NG				
OK	▶	GO TO 11.		
NG	▶	GO TO 12.		

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

Diagnostic Procedure (Cont'd)

11	CHECK IACV-AAC VALVE-II	
<ol style="list-style-type: none"> 1. Reconnect IACV-AAC valve harness connector and ECM harness connector. 2. Turn ignition switch "ON" and "OFF", and ensure the IACV-AAC valve makes operating sound according to the ignition switch position. 		
<p>View with intake air duct removed</p> 		
SEF853X		
OK or NG		
OK	▶	GO TO 13.
NG	▶	GO TO 12.

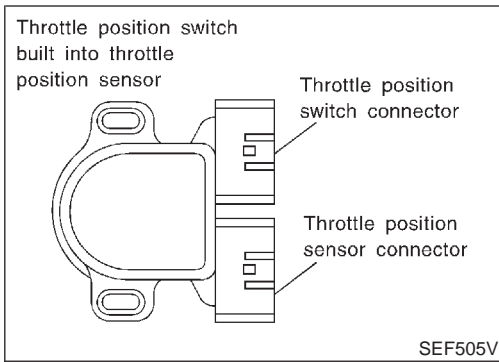
12	REPLACE IACV-AAC VALVE	
<ol style="list-style-type: none"> 1. Replace IACV-AAC valve assembly. 2. Perform "Idle Air Volume Learning", EC-65. <p style="color: blue;">Is the result CMPLT or INCMP?</p>		
CMPLT or INCMP		
CMPLT	▶	INSPECTION END
INCMP	▶	Follow the construction of "Idle Air Volume Learning".

13	CHECK TARGET IDLE SPEED	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect all harness connectors and vacuum hoses. 3. Start engine and warm it up to normal operating temperature. 4. Also warm up transmission to normal operating temperature. <ul style="list-style-type: none"> ● 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. 5. Stop vehicle with engine running. 6. Check target idle speed. <ul style="list-style-type: none"> M/T: 800±50 rpm A/T: 800±50 rpm (in "P" or "N" position) 		
OK or NG		
OK	▶	GO TO 14.
NG	▶	Perform "Idle Air Volume Learning", EC-65.

14	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.		
▶ INSPECTION END		

DTC P0510 CLOSED THROTTLE POSITION SWITCH

Component Description



Component Description

NCEC0287

A closed throttle position switch and wide open throttle position switch are built into the throttle position sensor unit. The wide open throttle position switch is used only for A/T control. When the throttle valve is in the closed position, the closed throttle position switch sends a voltage signal to the ECM. The ECM only uses this signal to open or close the EVAP canister purge volume control solenoid valve when the throttle position sensor is malfunctioning.

CONSULT-II Reference Value in Data Monitor Mode

NCEC0655

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
CLSD THL/P SW	● Engine: After warming up, idle the engine	Throttle valve: Idle position
		Throttle valve: Slightly open

ECM Terminals and Reference Value

NCEC0288

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	Y	Throttle position switch (Closed position)	[Engine is running] ● Warm-up condition ● Accelerator pedal released	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Accelerator pedal depressed	Approximately 0V

On Board Diagnosis Logic

NCEC0289

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0510	● Battery voltage from the closed throttle position switch is sent to ECM with the throttle valve opened.	<ul style="list-style-type: none"> ● Harness or connectors (The closed throttle position switch circuit is shorted.) ● Closed throttle position switch ● Throttle position sensor

DTC P0510 CLOSED THROTTLE POSITION SWITCH

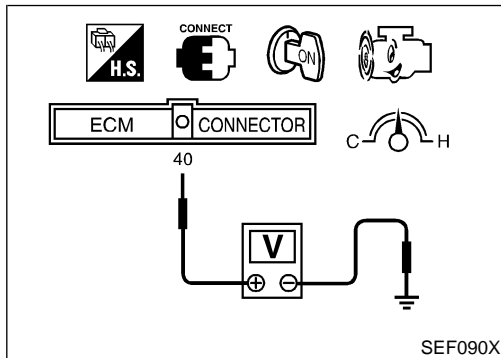
DTC Confirmation Procedure

4	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C
	CLSD THL/P SW	ON

SEF197Y

6	DATA MONITOR	
	MONITOR	NO DTC
	COOLAN TEMP/S	XXX °C
	VHCL SPEED SE	XXX km/h
	THRTL POS SEN	XXX V

SEF198Y



DTC Confirmation Procedure

NCEC0290

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) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF", wait at least 10 seconds and then start engine.
- 3) Select "CLSD THL/P SW" in "DATA MONITOR" mode.
- 4) Check the signal under the following conditions.

Condition	Signal indication
Throttle valve: Idle position	ON
Throttle valve: Slightly open	OFF

If the result is NG, go to "Diagnostic Procedure", EC-448.

If OK, go to following step.

- 5) Select "DATA MONITOR" mode with CONSULT-II.
- 6) Drive the vehicle for at least 5 consecutive seconds under the following condition.

THRTL POS SEN	More than 2.3V
VHCL SPEED SE	More than 4 km/h (2 MPH)
Selector lever	Suitable position
Driving location	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 "Diagnostic Procedure", EC-448.

Overall Function Check

NCEC0291

Use this procedure to check the overall function of the closed throttle position switch circuit. During this check, a 1st trip DTC might not be confirmed.

ⓧ Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Check the voltage between ECM terminal 40 (Closed throttle position switch signal) and ground under the following conditions.

Condition	Voltage
At idle	Battery voltage
At 2,000 rpm	Approximately 0V

- 3) If NG, go to "Diagnostic Procedure", EC-448.

DTC P0510 CLOSED THROTTLE POSITION SWITCH

Wiring Diagram

Wiring Diagram

NCEC0292

EC-TP/SW-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

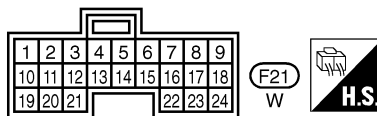
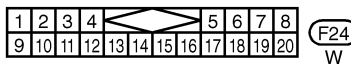
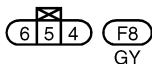
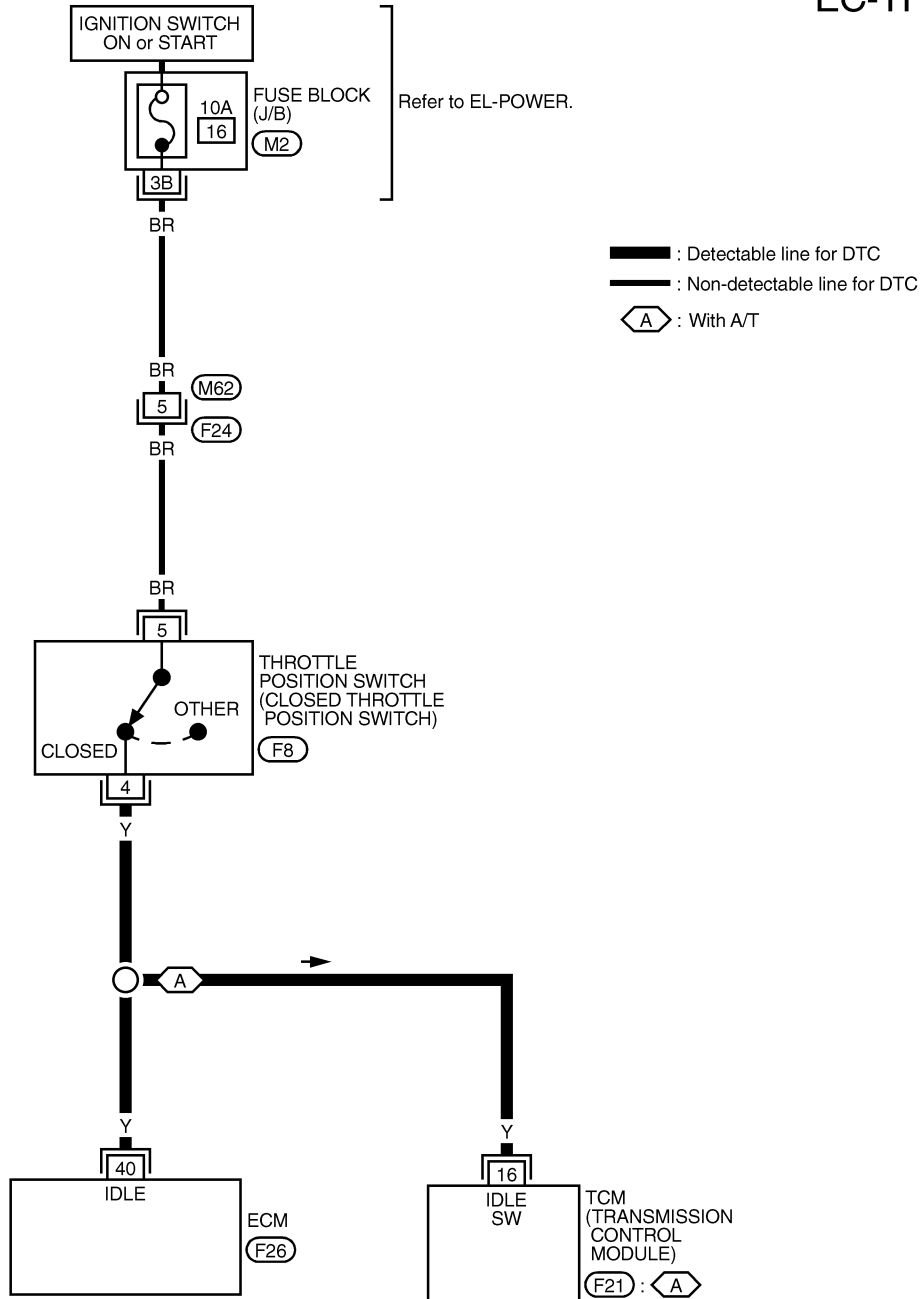
BT

HA

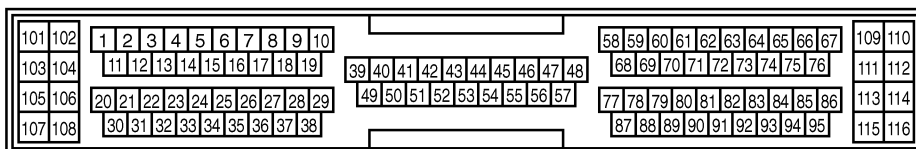
SC

EL

IDX



REFER TO THE FOLLOWING.
M2 - FUSE BLOCK-JUNCTION
BOX (J/B)



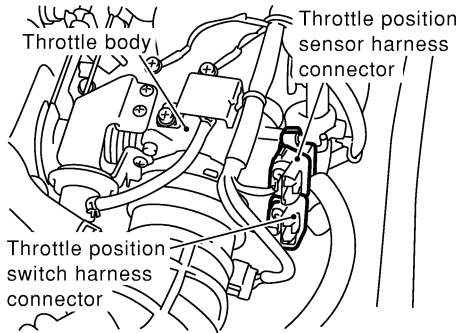
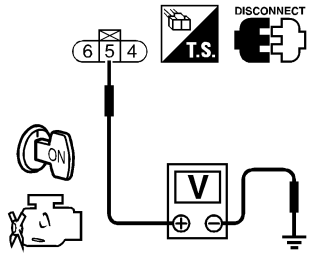
TEC716

DTC P0510 CLOSED THROTTLE POSITION SWITCH

Diagnostic Procedure

Diagnostic Procedure

NCEC0293

1	CHECK CLOSED THROTTLE POSITION SWITCH POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect throttle position switch harness connector.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch "ON". 4. Check voltage between throttle position switch terminal 5 and engine ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> </div> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

SEF837X

SEF346X

2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M62, F24 ● 10A fuse ● Harness for open or short between throttle position switch and fuse 		
▶		Repair harness or connectors.

3	CHECK CLOSED THROTTLE POSITION SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 40 and throttle position switch terminal 4. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

DTC P0510 CLOSED THROTTLE POSITION SWITCH

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness for open or short between ECM and throttle position switch ● Harness for open or short between throttle position switch and TCM (Transmission control module) 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

GI

MA

5	CHECK IGNITION TIMING AND ENGINE IDLE SPEED						
Check the following items. Refer to "Basic Inspection", EC-107.							
<table border="1"> <thead> <tr> <th>Items</th> <th>Specifications</th> </tr> </thead> <tbody> <tr> <td>Ignition timing</td> <td>15° ± 2° BTDC</td> </tr> <tr> <td>Idle speed</td> <td>M/T: 800 ± 50 rpm A/T: 800 ± 50 rpm (in "P" or "N" position)</td> </tr> </tbody> </table>		Items	Specifications	Ignition timing	15° ± 2° BTDC	Idle speed	M/T: 800 ± 50 rpm A/T: 800 ± 50 rpm (in "P" or "N" position)
Items	Specifications						
Ignition timing	15° ± 2° BTDC						
Idle speed	M/T: 800 ± 50 rpm A/T: 800 ± 50 rpm (in "P" or "N" position)						
MTBL0391							
Models with CONSULT-II ▶	GO TO 6.						
Models without CONSULT-II ▶	GO TO 7.						


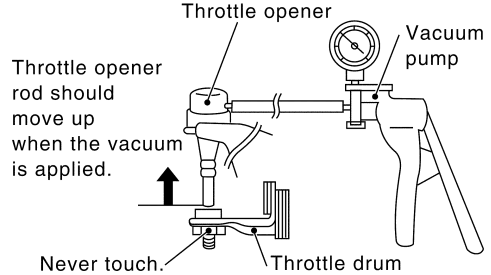
EM

LC

EC

FE

CL

6	CHECK THROTTLE POSITION SWITCH						
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Turn ignition switch "OFF". 3. Remove vacuum hose connected to throttle opener. 4. Connect suitable vacuum hose to vacuum pump and the throttle opener. 5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener. 							
							
SEF793W							
<ol style="list-style-type: none"> 6. Turn ignition switch "ON". 7. Select "DATA MONITOR" mode with CONSULT-II. 8. Check indication of "CLSD THL/P SW" under the following conditions. Measurement must be made with throttle position switch installed in vehicle. 							
<table border="1"> <thead> <tr> <th>Throttle valve conditions</th> <th>CLSD THL/P SW</th> </tr> </thead> <tbody> <tr> <td>Completely closed</td> <td>ON</td> </tr> <tr> <td>Partially open or completely open</td> <td>OFF</td> </tr> </tbody> </table>		Throttle valve conditions	CLSD THL/P SW	Completely closed	ON	Partially open or completely open	OFF
Throttle valve conditions	CLSD THL/P SW						
Completely closed	ON						
Partially open or completely open	OFF						
MTBL0355							
OK or NG							
OK (With CONSULT-II) ▶	GO TO 9.						
OK (Without CONSULT-II) ▶	GO TO 10.						
NG ▶	GO TO 8.						

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

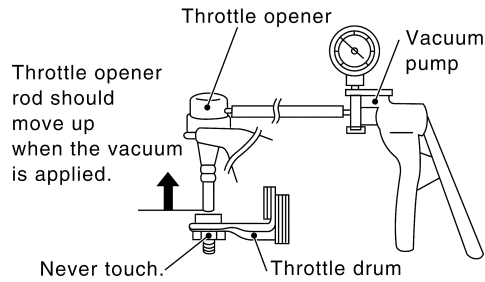
DTC P0510 CLOSED THROTTLE POSITION SWITCH

Diagnostic Procedure (Cont'd)

7 CHECK THROTTLE POSITION SWITCH

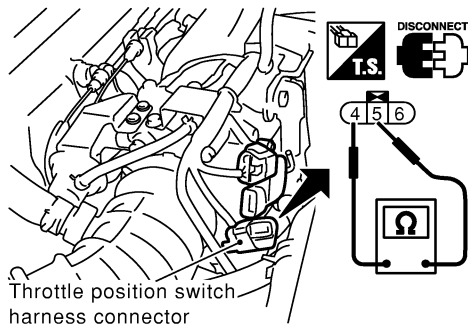
⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Remove vacuum hose connected to throttle opener.
4. Connect suitable vacuum hose to vacuum pump and the throttle opener.
5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

6. Disconnect closed throttle position switch harness connector.
7. Check continuity between closed throttle position switch terminals 4 and 5 under the following conditions. Resistance measurement must be made with throttle position switch installed in vehicle.



Throttle valve conditions	Continuity
Completely closed	Yes
Partially open or completely open	No

SEF940X

OK or NG

OK (With CONSULT-II)	▶	GO TO 9.
OK (Without CONSULT-II)	▶	GO TO 10.
NG	▶	GO TO 8.

DTC P0510 CLOSED THROTTLE POSITION SWITCH

Diagnostic Procedure (Cont'd)

8	ADJUST THROTTLE POSITION SWITCH									
Check the following items. Refer to "Basic Inspection", EC-107.										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Items</th> <th style="width: 50%;">Specifications</th> </tr> </thead> <tbody> <tr> <td>Ignition timing</td> <td>15°±2° BTDC</td> </tr> <tr> <td>Closed throttle position switch idle position adjustment</td> <td>Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF</td> </tr> <tr> <td>Target idle speed</td> <td>M/T: 800±50 A/T: 800±50 rpm (in "P" or "N" position)</td> </tr> </tbody> </table>			Items	Specifications	Ignition timing	15°±2° BTDC	Closed throttle position switch idle position adjustment	Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF	Target idle speed	M/T: 800±50 A/T: 800±50 rpm (in "P" or "N" position)
Items	Specifications									
Ignition timing	15°±2° BTDC									
Closed throttle position switch idle position adjustment	Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF									
Target idle speed	M/T: 800±50 A/T: 800±50 rpm (in "P" or "N" position)									
		MTBL0518								
Is it possible to adjust closed throttle position switch?										
Yes or No										
Yes (With CONSULT-II) ►		GO TO 9.								
Yes (Without CONSULT-II) ►		GO TO 10.								
No ►		Replace throttle position switch.								

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

9	CHECK THROTTLE POSITION SENSOR									
<p>With CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Stop engine (ignition switch OFF). Remove the vacuum hose connected to the throttle opener. Connect suitable vacuum hose to the vacuum pump and the opener. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener. 										
		SEF793W								
<ol style="list-style-type: none"> Turn ignition switch ON. Select "DATA MONITOR" mode with CONSULT-II. Check voltage of "THRTL POS SEN" under the following conditions. Voltage measurement must be made with throttle position sensor installed in vehicle. 										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Throttle valve conditions</th> <th style="width: 50%;">THRTL POS SEN</th> </tr> </thead> <tbody> <tr> <td>Completely closed (a)</td> <td>0.15 - 0.85V</td> </tr> <tr> <td>Partially open</td> <td>Between (a) and (b)</td> </tr> <tr> <td>Completely open (b)</td> <td>3.5 - 4.7V</td> </tr> </tbody> </table>			Throttle valve conditions	THRTL POS SEN	Completely closed (a)	0.15 - 0.85V	Partially open	Between (a) and (b)	Completely open (b)	3.5 - 4.7V
Throttle valve conditions	THRTL POS SEN									
Completely closed (a)	0.15 - 0.85V									
Partially open	Between (a) and (b)									
Completely open (b)	3.5 - 4.7V									
		MTBL0230								
OK or NG										
OK ►		GO TO 11.								
NG ►		Replace throttle position sensor.								

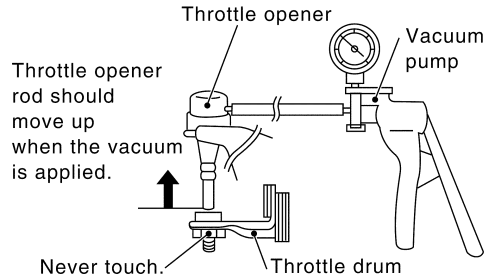
DTC P0510 CLOSED THROTTLE POSITION SWITCH

Diagnostic Procedure (Cont'd)

10 CHECK THROTTLE POSITION SENSOR

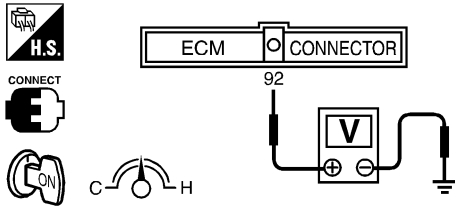
⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine (ignition switch OFF).
3. Remove the vacuum hose connected to the throttle opener.
4. Connect suitable vacuum hose to the vacuum pump and the opener.
5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

6. Turn ignition switch ON.
7. Check voltage between ECM terminal 92 (Throttle position sensor signal) and ground.
Voltage measurement must be made with throttle position sensor installed in vehicle.



Throttle valve conditions	Voltage
Completely closed (a)	0.15 - 0.85V
Partially open	Between (a) and (b)
Completely open (b)	3.5 - 4.7V

SEF526Z

OK or NG

OK	▶	GO TO 11.
NG	▶	Replace throttle position sensor.

11 CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.

▶ INSPECTION END

System Description

These circuit lines are used to control the smooth shifting up and down of A/T during the hard acceleration/ deceleration. Voltage signals are exchanged between ECM and TCM (Transmission control module). NCEC0494

ECM Terminals and Reference Value

Specification data are reference values and are measured between each terminal and ground. NCEC0495

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	Y/B	A/T signal No. 3	[Engine is running] ● Idle speed	0 - 1.0V
19	BR/W	A/T signal No. 5	[Engine is running] ● Idle speed	Approximately 8V
54	Y/R	A/T signal No. 1	[Engine is running] ● Idle speed	Approximately 0 - 1.0V
55	Y/G	A/T signal No. 2	[Engine is running] ● Idle speed	Approximately 0 - 1.0V
56	G/Y	A/T signal No. 4	[Engine is running] ● Idle speed	Approximately 0 - 1.0V

On Board Diagnosis Logic

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0600*	● ECM receives incorrect voltage from TCM (Transmission control module) continuously.	● Harness or connectors [The circuit between ECM and TCM (Transmission control module) is open or shorted.]

*: This DTC can be detected only by "DATA MONITOR (AUTO TRIG)" with CONSULT-II.

DATA MONITOR

MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

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.
- 4) If DTC is detected, go to "Diagnostic Procedure", EC-455.

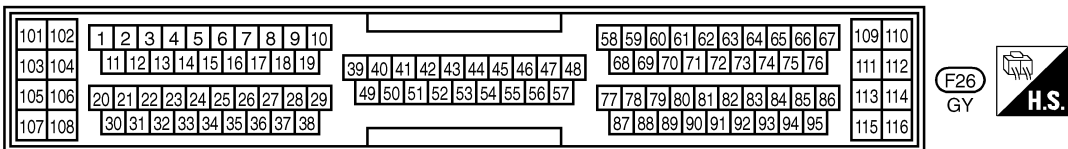
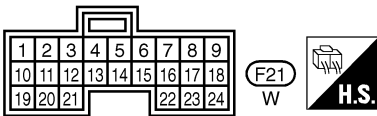
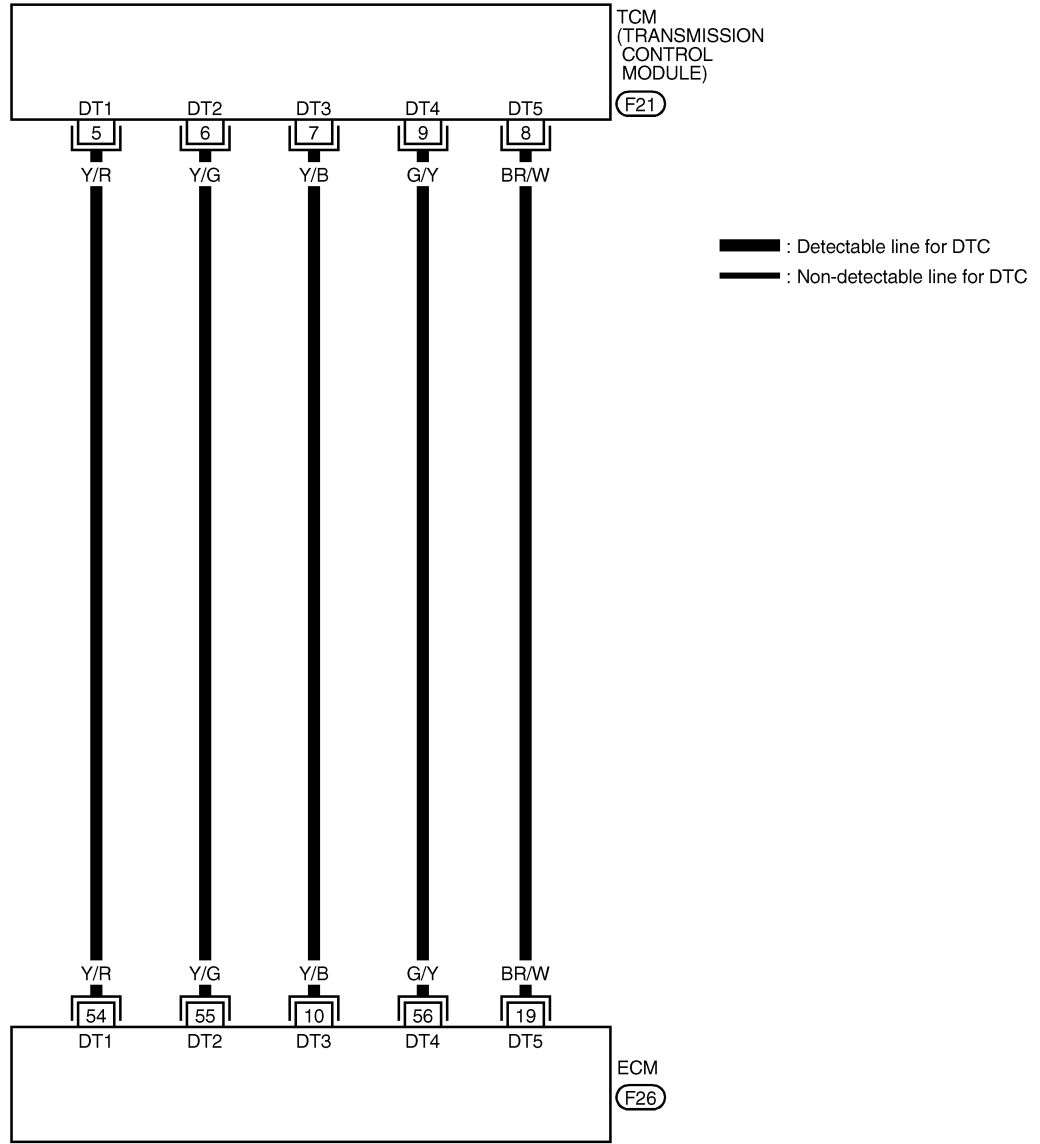
DTC P0600 A/T CONTROL

Wiring Diagram

Wiring Diagram

NCEC0499

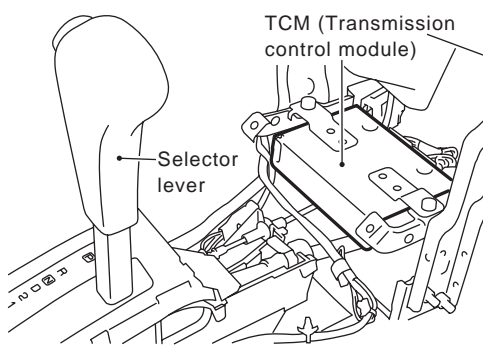
EC-AT/C-01



TEC717

Diagnostic Procedure

NCEC0500

1	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector and TCM (Transmission control module) harness connector.</p> <div style="text-align: center;">  <p>The diagram shows a selector lever on the left and a TCM (Transmission control module) harness connector on the right. Labels point to the 'Selector lever' and the 'TCM (Transmission control module)'. The TCM is a rectangular component with several electrical connectors.</p> </div> <p style="text-align: right;">SEF313W</p> <p>3. Check harness continuity between ECM terminal 10 and TCM terminal 7, ECM terminal 19 and TCM terminal 8, ECM terminal 54 and terminal 5, ECM terminal 55 and TCM terminal 6, ECM terminal 56 and TCM terminal 9. Refer to Wiring Diagram. Continuity should exist.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 2.
NG	▶	Repair harness or connectors.

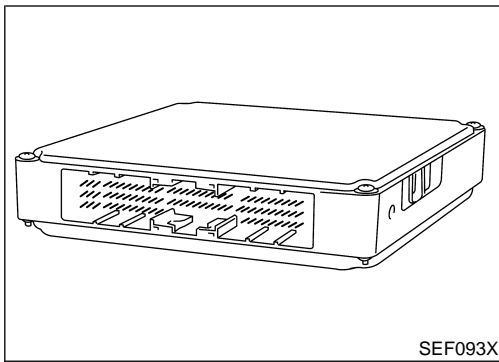
2	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Check harness continuity between ECM terminal 10 and ground, ECM terminal 19 and ground, ECM terminal 54 and ground, ECM terminal 55 and ground, ECM terminal 56 and ground. Refer to Wiring Diagram. Continuity should not exist.</p> <p>2. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	Repair short to ground or short to power in harness.

3	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.		
	▶	INSPECTION END

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P0605 ECM

Component Description



Component Description

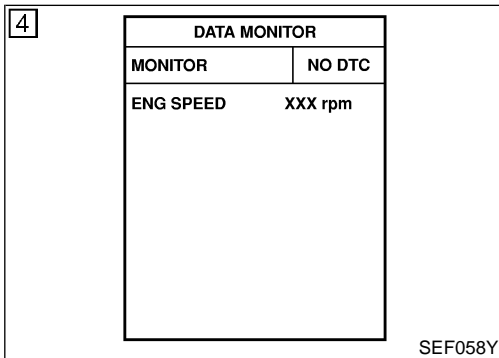
NCEC0295

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

NCEC0296

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0605	<ul style="list-style-type: none"> ECM calculation function is malfunctioning. 	<ul style="list-style-type: none"> ECM



DTC Confirmation Procedure

NCEC0297

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.
- 4) Run engine for at least 30 seconds at idle speed.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-457.

Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

NCEC0298

1	INSPECTION START	
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select "SELF DIAG RESULTS" mode with CONSULT-II. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-456. 5. Is the 1st trip DTC P0605 displayed again? 		
<p> With GST</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select MODE 4 with GST. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-456. 5. Is the 1st trip DTC P0605 displayed again? 		
Yes or No		
Yes	▶	GO TO 2.
No	▶	INSPECTION END

2	REPLACE ECM	
<ol style="list-style-type: none"> 1. Replace ECM. 2. Perform initialization of IVIS (NATS) system and registration of all IVIS (NATS) ignition key IDs. Refer to "IVIS (INFINITI VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-81. 3. Perform "Idle Air Volume Learning", EC-65. Is the result CMPLT or INCMP? 		
CMPLT or INCMP		
CMPLT	▶	INSPECTION END
INCMP	▶	Follow the construction of "Idle Air Volume Learning".

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P1126 THERMOSTAT FUNCTION

On Board Diagnosis Logic

NCEC0568

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 open stuck. Malfunction is detected when the engine coolant temperature does not reach to specified temperature even though the engine has run long enough.

Possible Cause

NCEC0569

- Thermostat function
- Leakage from sealing portion of thermostat
- Engine coolant temperature sensor

DTC Confirmation Procedure

NCEC0570

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

NCEC0570S01

- 1) Replace thermostat with new one. Refer to LC-12, “Thermostat”. 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 “Diagnostic Procedure”, EC-459.

Ⓜ WITH GST

NCEC0570S02

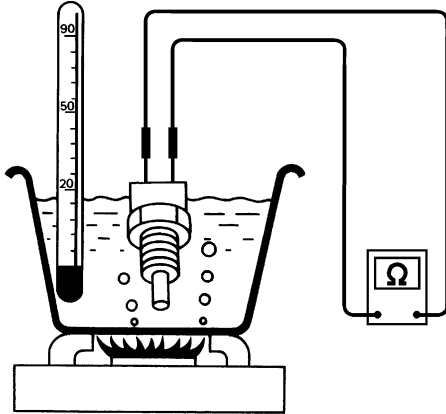
- 1) Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

NCEC0571

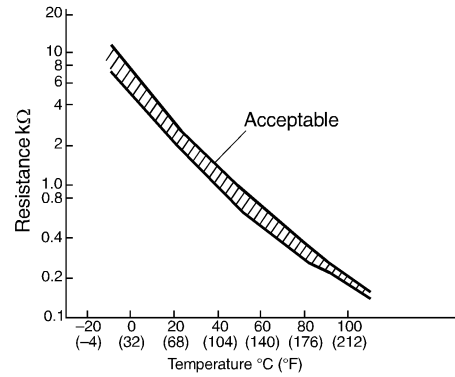
1 CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Remove engine coolant temperature sensor.
3. Check resistance between engine coolant temperature sensor terminals under the following conditions.



<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



SEF304X

OK or NG

- | | | |
|----|---|--|
| OK | ▶ | INSPECTION END |
| NG | ▶ | Replace engine coolant temperature sensor. |

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P1148 CLOSED LOOP CONTROL

On Board Diagnosis Logic

On Board Diagnosis Logic

NCEC0307

★ The closed loop control has the one trip detection logic.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1148	<ul style="list-style-type: none"> The closed loop control function does not operate even when vehicle is driving in the specified condition. 	<ul style="list-style-type: none"> The heated oxygen sensor 1 (front) circuit is open or shorted. Heated oxygen sensor 1 (front) Heated oxygen sensor 1 heater (front)

3	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

DTC Confirmation Procedure

NCEC0308

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 3,200 rpm during the "DTC Confirmation Procedure". If the engine speed limit is exceeded, retry the procedure from step 4.
- 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 "DATA MONITOR" mode with CONSULT-II.
- Hold engine speed at 2,000 rpm and check 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 result is NG, perform "Diagnosis Procedure", EC-461. If the result is OK, perform the following step.
- Let engine idle at least 4 minutes.
- Maintain the following condition at least 50 consecutive seconds.

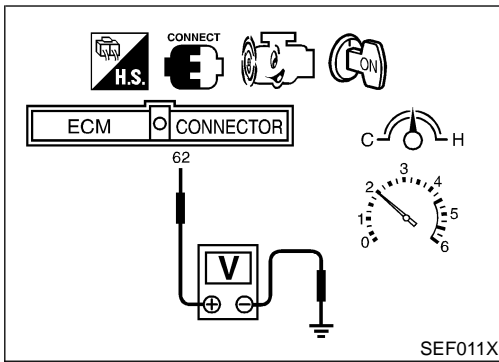
B/FUEL SCHDL	More than 2.4 msec
ENG SPEED	More than 1,500 rpm
Selector lever	Suitable position
VHCL SPEED SE	More than 71 km/h (44 MPH)

During this test, P0130 DTC may be displayed on CONSULT-II screen.

- If DTC is detected, go to "Diagnostic Procedure", EC-461.

DTC P1148 CLOSED LOOP CONTROL

Overall Function Check



Overall Function Check

NCEC0309

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.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) 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 “Diagnostic Procedure”, EC-461.

GI

MA

EM

LC

EC

FE

CL

MT

Diagnostic Procedure

Refer to “Diagnostic Procedure” for DTC P0133, EC-221.

NCEC0310

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

System Description

System Description

NCEC0433

COOLING FAN CONTROL

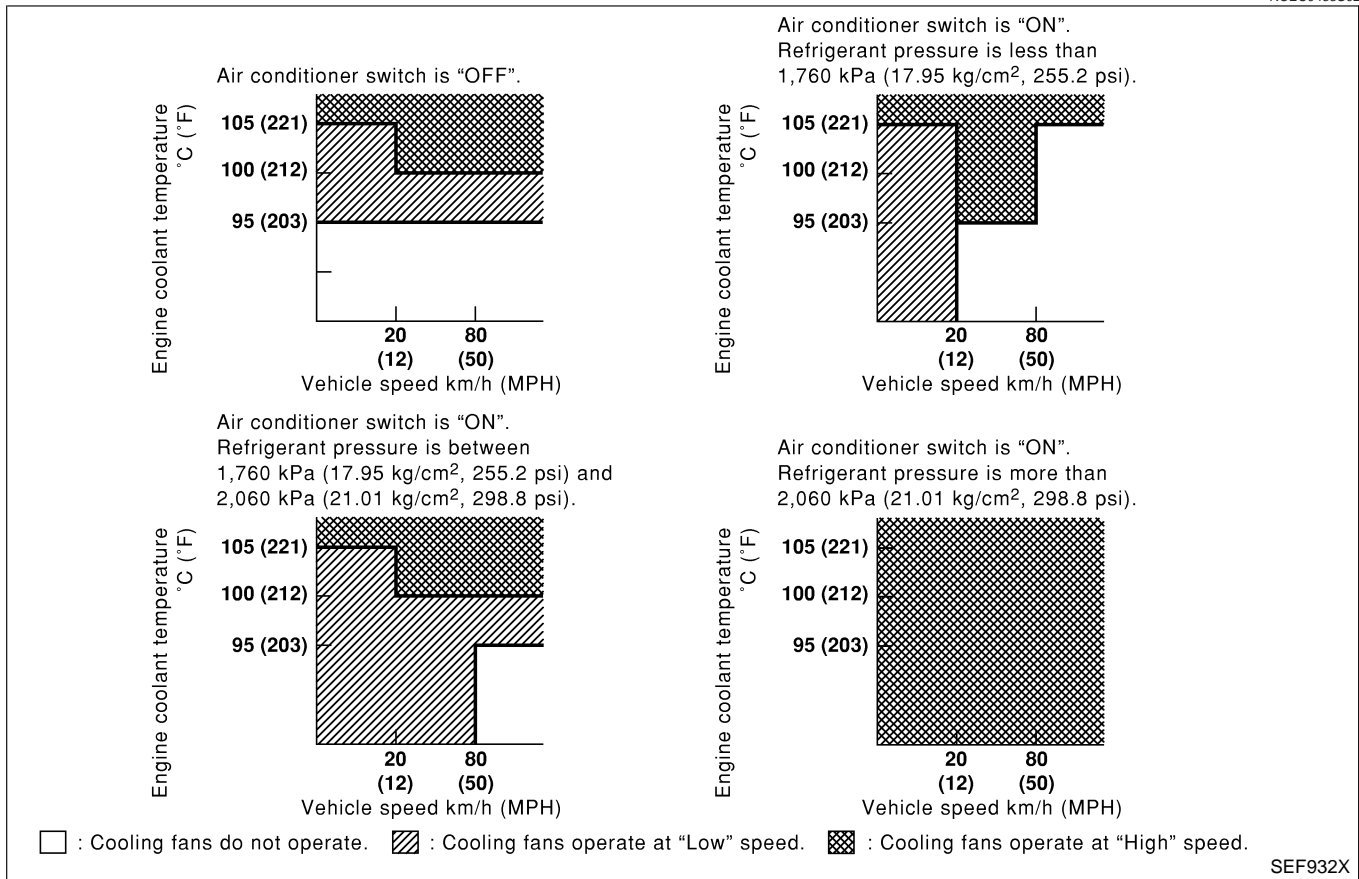
NCEC0433S01

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed sensor	Vehicle speed	ECM	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

NCEC0433S02



SEF932X

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

NCEC0486

MONITOR ITEM	CONDITION	SPECIFICATION
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF
		Air conditioner switch: ON (Compressor operates)

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION		SPECIFICATION	
COOLING FAN	<ul style="list-style-type: none"> After warming up engine, idle the engine. Air conditioner switch: OFF 	Engine coolant temperature is 94°C (201°F) or less	OFF	GI
		Engine coolant temperature is between 95°C (203°F) and 104°C (219°F)	LOW	MA
		Engine coolant temperature is 105°C (221°F) or more	HIGH	EM

ECM Terminals and Reference Value

NCEC0487

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	LG	Cooling fan relay (High)	[Engine is running] ● Cooling fan is not operating	BATTERY VOLTAGE (11 - 14V)	FE
			[Engine is running] ● Cooling fan (High) is operating	0 - 0.6V	CL
13	LY	Cooling fan relay (Low)	[Engine is running] ● Cooling fan is not operating	BATTERY VOLTAGE (11 - 14V)	MT
			[Engine is running] ● Cooling fan is operating	0 - 0.6V	AT

On Board Diagnosis Logic

NCEC0488

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.

Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)	
P1217	<ul style="list-style-type: none"> Cooling fan does not operate properly (Overheat). Cooling fan system does not operate properly (Overheat). Engine coolant was not added to the system using the proper filling method. 	<ul style="list-style-type: none"> Harness or connectors (The cooling fan circuit is open or shorted.) Cooling fan Radiator hose Radiator Radiator cap Water pump Thermostat <p>For more information, refer to "MAIN 12 CAUSES OF OVERHEATING", EC-490.</p>	RS BT HA SC

CAUTION:

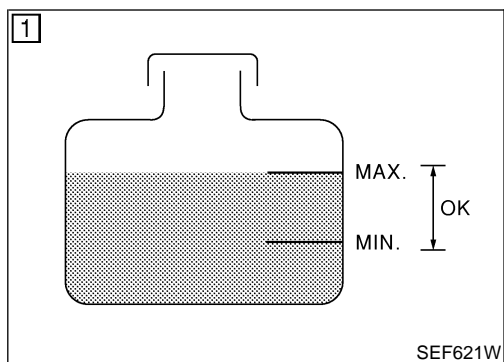
When a malfunction is indicated, be sure to replace the coolant. Refer to MA-14, "Changing Engine Coolant". Also, replace the engine oil. Refer to MA-18, "Changing Engine Oil".

- 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-12, "Anti-freeze Coolant Mixture Ratio".
- 2) After refilling coolant, run engine to ensure that no water-flow noise is emitted.

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Overall Function Check

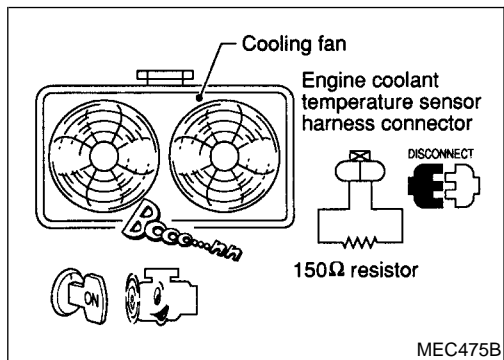
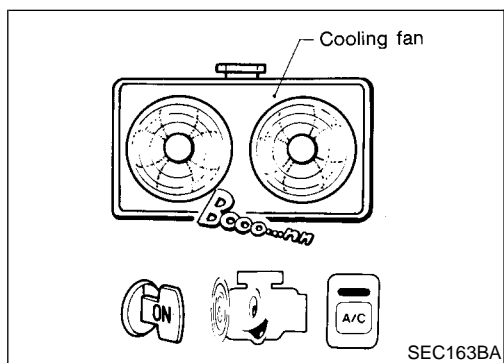
NCEC0489



4

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLAN TEMP/S	XXX °C

SEF111X



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 "Diagnostic Procedure", EC-467 (A/T models) or EC-478 (M/T models).
- 2) Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to "Diagnostic Procedure", EC-467 (A/T models) or EC-478 (M/T models).
- 3) Turn ignition switch "ON".
- 4) Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
- 5) If the results are NG, go to "Diagnostic Procedure", EC-467 (A/T models) or EC-478 (M/T models).

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 "Diagnostic Procedure", EC-467 (A/T models) or EC-478 (M/T models).
- 2) Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to "Diagnostic Procedure", EC-467 (A/T models) or EC-478 (M/T models).
- 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 "Diagnostic Procedure", EC-467 (A/T models) or EC-478 (M/T models).
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 "Diagnostic Procedure", EC-467 (A/T models) or EC-478 (M/T models).

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Wiring Diagram

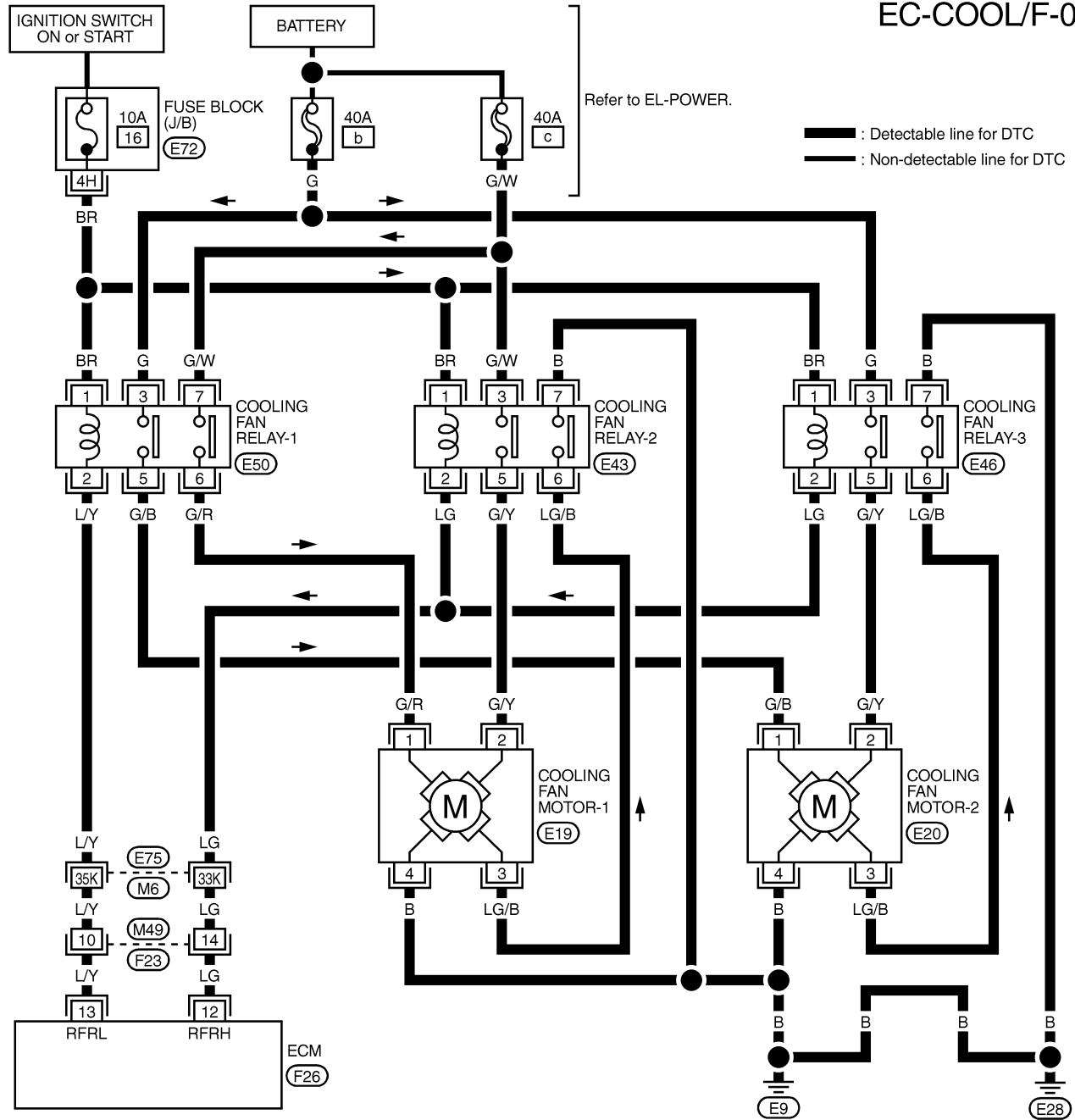
Wiring Diagram

NCEC0490

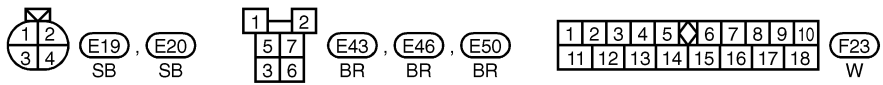
NCEC0490S03

A/T MODELS

EC-COOL/F-01



GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX



REFER TO THE FOLLOWING.

(E75) -SUPER MULTIPLE JUNCTION (SMJ)

(E72) -FUSE BLOCK-JUNCTION BOX (J/B)

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	39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38											87	88	89	90	91	92	93	94	95	115	116	



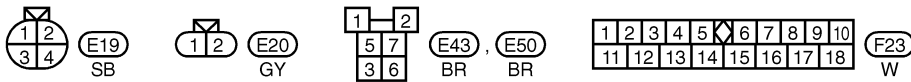
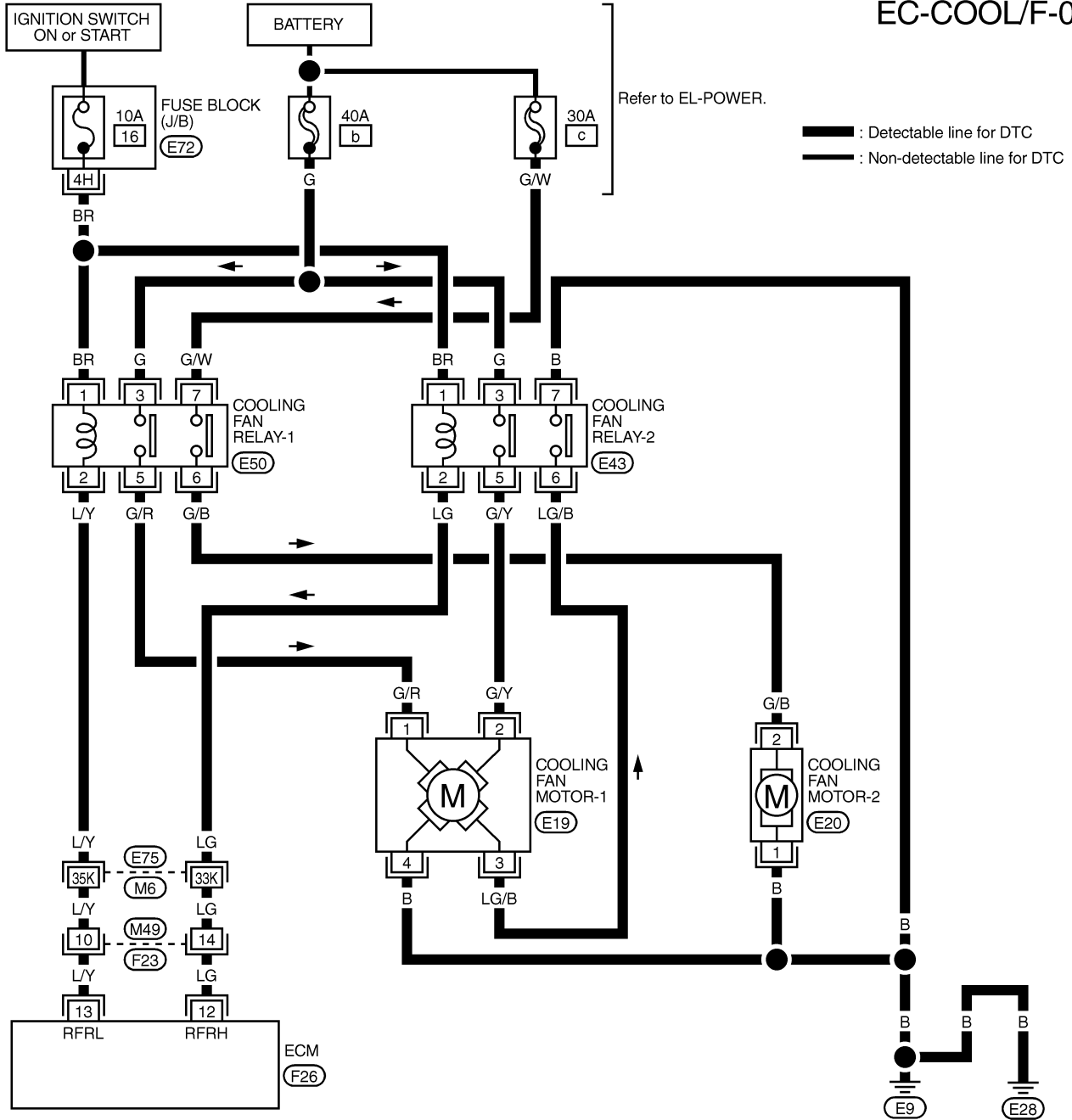
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Wiring Diagram (Cont'd)

NCEC0490S04

M/T MODELS

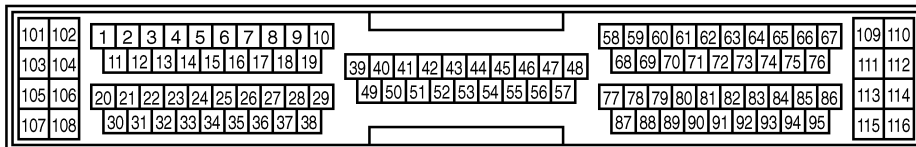
EC-COOL/F-02



REFER TO THE FOLLOWING.

(E75) -SUPER MULTIPLE JUNCTION (SMJ)

(E72) -FUSE BLOCK-JUNCTION BOX (J/B)



TEC827

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)


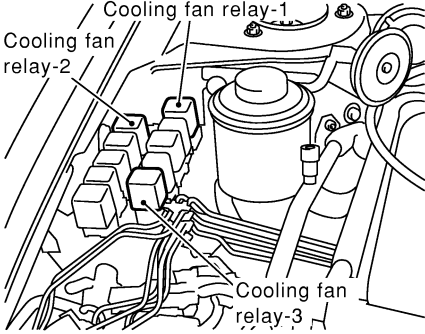
Diagnostic Procedure (A/T Models)

Diagnostic Procedure (A/T Models)

NCEC0673

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 4.

GI
MA
EM

2	CHECK COOLING FAN LOW SPEED OPERATION																									
<p> With CONSULT-II</p> <p>1. Disconnect cooling fan relays-2 and -3.</p> <div style="text-align: center;">  </div> <p>2. Turn ignition switch "ON".</p> <p>3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>LOW</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> <p>4. Make sure that cooling fans-1 and -2 operate at low speed.</p> <p style="text-align: center;">OK or NG</p>			ACTIVE TEST		COOLING FAN	LOW	MONITOR		COOLAN TEMP/S	XXX °C																
ACTIVE TEST																										
COOLING FAN	LOW																									
MONITOR																										
COOLAN TEMP/S	XXX °C																									
OK	▶	GO TO 3.																								
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-473.)																								

LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS

SEF857X
SEF784Z

BT
HA
SC
EL
IDX

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (A/T Models) (Cont'd)

3 CHECK COOLING FAN HIGH SPEED OPERATION

Ⓟ With CONSULT-II

1. Turn ignition switch "OFF".
2. Reconnect cooling fan relays-2 and -3.
3. Disconnect cooling fan relay-1.
4. Turn ignition switch "ON".
5. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.

ACTIVE TEST	
COOLING FAN	HIGH
MONITOR	
COOLAN TEMP/S	XXX °C

SEF785Z

6. Make sure that cooling fans-1 and -2 operate at higher speed than low speed.

OK or NG

OK	▶	GO TO 6.
NG	▶	Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-476.)

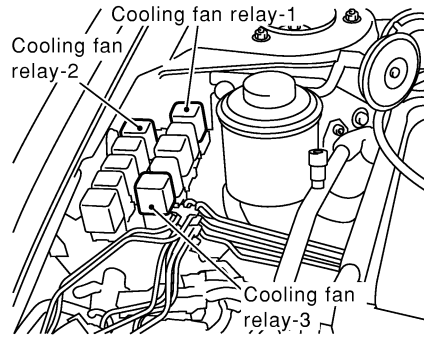
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (A/T Models) (Cont'd)

4 CHECK COOLING FAN LOW SPEED OPERATION

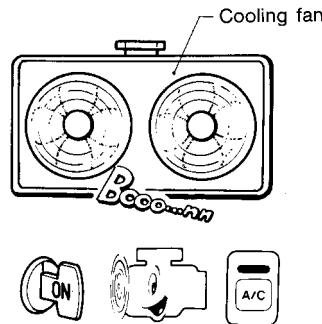
⊗ Without CONSULT-II

1. Disconnect cooling fan relays-2 and -3.



SEF857X

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.



SEC163BA

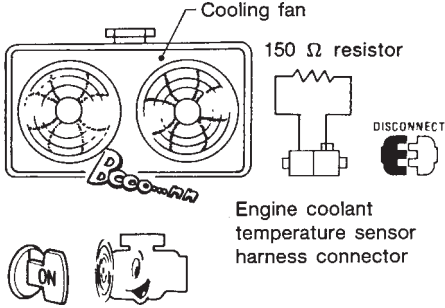
OK or NG

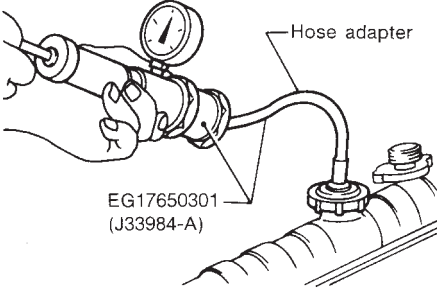
OK	▶	GO TO 5.
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-473.)

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (A/T Models) (Cont'd)

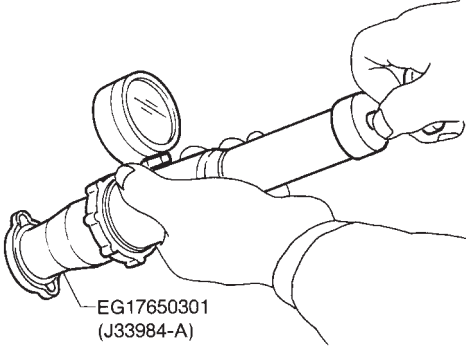
5	CHECK COOLING FAN HIGH SPEED OPERATION
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> Turn ignition switch "OFF". Reconnect cooling fan relays-2 and -3. Disconnect cooling fan relay-1. Turn air conditioner switch and blower fan switch "OFF". Disconnect engine coolant temperature sensor harness connector. Connect 150Ω resistor to engine coolant temperature sensor harness connector. Restart engine and make sure that cooling fans-1 and -2 operate at higher speed than low speed. 	
	
MEF613EA	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-476.)

6	CHECK COOLING SYSTEM FOR LEAK
<p>Apply pressure to the cooling system with a tester, and check if the pressure drops.</p> <p>Testing pressure: 157 kPa (1.6 kg/cm², 23 psi)</p> <p>CAUTION: Higher than the specified pressure may cause radiator damage.</p>	
	
SLC754A	
<p>Pressure should not drop.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 8.
NG	▶ GO TO 7.

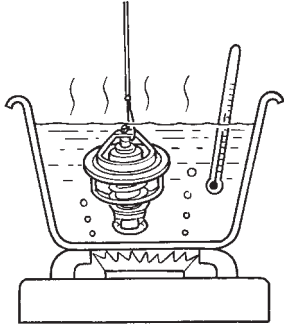
7	DETECT MALFUNCTIONING PART
<p>Check the following for leak.</p> <ul style="list-style-type: none"> Hose Radiator Water pump (Refer to LC-10, "Water Pump".) 	
▶ Repair or replace.	

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (A/T Models) (Cont'd)

8	CHECK RADIATOR CAP	
Apply pressure to cap with a tester and check radiator cap relief pressure.		
		
<p>Radiator cap relief pressure: 59 - 98 kPa (0.6 - 1.0 kg/cm², 9 - 14 psi)</p>		
SLC755A		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Replace radiator cap.

GI
 MA
 EM
 LC
EC

9	CHECK THERMOSTAT	
<ol style="list-style-type: none"> 1. Remove thermostat. 2. Check valve seating condition at normal room temperatures. It should seat tightly. 3. Check valve opening temperature and valve lift. 		
		
<p>Valve opening temperature: 82°C (180°F) [standard]</p> <p>Valve lift: More than 8 mm/95°C (0.31 in/203°F)</p>		
<ol style="list-style-type: none"> 4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to LC-12, "Thermostat". 		
SLC343		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Replace thermostat

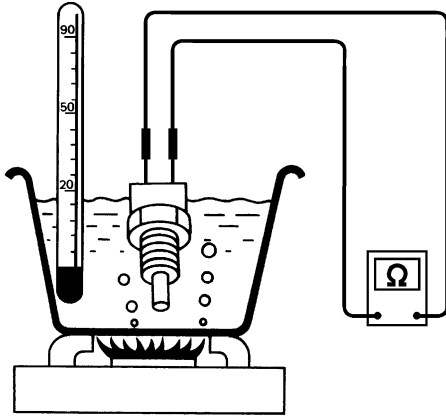
FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (A/T Models) (Cont'd)

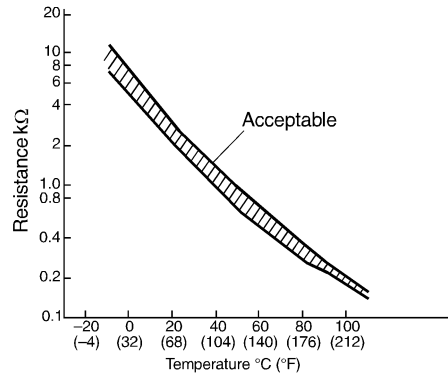
10 CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Remove engine coolant temperature sensor.
2. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<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



SEF304X

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 "MAIN 12 CAUSES OF OVERHEATING", EC-490.

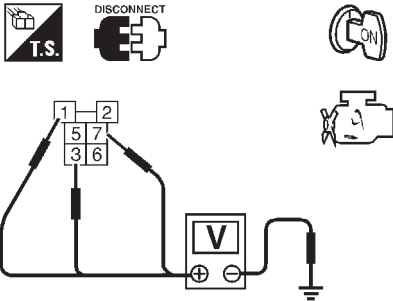
▶ INSPECTION END

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (A/T Models) (Cont'd)

PROCEDURE A

=NCEC0673S01

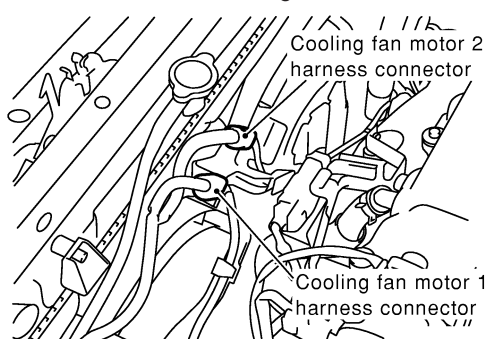
1	CHECK COOLING FAN POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan relay-1. 3. Turn ignition switch "ON". 4. Check voltage between cooling fan relay-1 terminals 1, 3, 7 and ground with CONSULT-II or tester.</p> <div style="text-align: center;"></div> <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: right;">SEF727W</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

2	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none">● 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.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (A/T Models) (Cont'd)

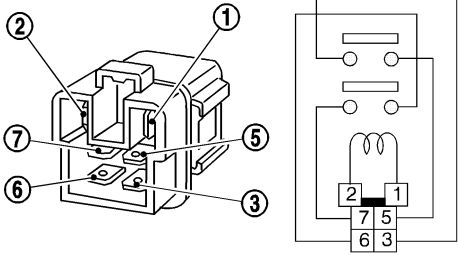
3	CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.</p>		
		
SEF854X		
<p>3. Check harness continuity between cooling fan relay-1 terminal 6 and cooling fan motor-1 terminal 1, cooling fan motor-1 terminal 4 and body ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p>5. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-2 terminal 1, cooling fan motor-2 terminal 4 and body ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>6. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

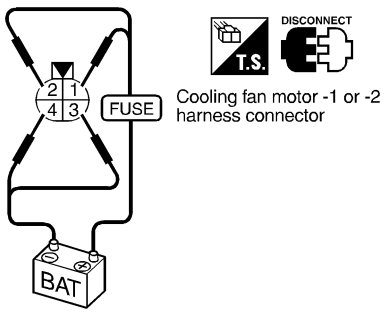
4	CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 13 and cooling fan relay-1 terminal 2. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E75, M6 ● Harness connectors M49, F23 ● Harness for open or short between cooling fan relay-1 and ECM 		
OK or NG		
	▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (A/T Models) (Cont'd)

6	CHECK COOLING FAN RELAY-1								
Check continuity between cooling fan relay-1 terminals 3 and 5, 6 and 7 under the following conditions.									
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">Conditions</th> <th style="width: 30%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No current supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>		Conditions	Continuity	12V direct current supply between terminals 1 and 2	Yes	No current supply	No
Conditions	Continuity								
12V direct current supply between terminals 1 and 2	Yes								
No current supply	No								
SEF591X			OK or NG						
OK	▶	GO TO 7.							
NG	▶	Replace cooling fan relay.							

7	CHECK COOLING FAN MOTORS-1 AND -2															
Supply battery voltage between the following terminals and check operation.																
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Cooling fan motor -1 or -2</td> <td>Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> <tr> <td>High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> </tbody> </table>			Speed	Terminals		(+)	(-)	Cooling fan motor -1 or -2	Low	1	4	High	1, 2	3, 4
	Speed	Terminals														
		(+)	(-)													
Cooling fan motor -1 or -2	Low	1	4													
	High	1, 2	3, 4													
SEF937X			OK or NG													
OK	▶	GO TO 8.														
NG	▶	Replace cooling fan motors.														

8	CHECK INTERMITTENT INCIDENT		
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.			
▶			INSPECTION END

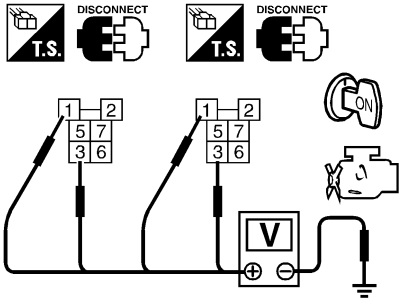
GI
 MA
 EM
 LC
 EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (A/T Models) (Cont'd)

PROCEDURE B

=NCEC0673S02

1	CHECK COOLING FAN POWER SUPPLY CIRCUIT
<ol style="list-style-type: none"> 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. 	
	
OK or NG	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

SEF593X

2	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● 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 link 	
▶	Repair harness or connectors.

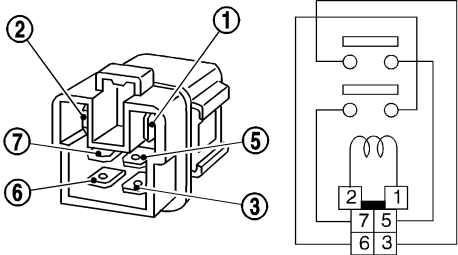
3	CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector. 3. Check harness continuity between cooling fan relay-2 terminal 5 and cooling fan motor-1 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 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.

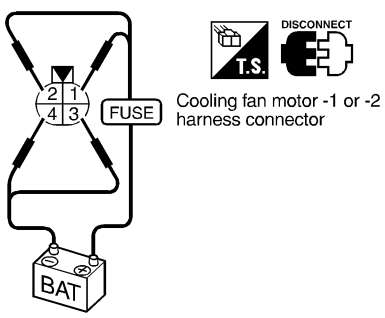
4	CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<ol style="list-style-type: none"> 1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 12 and cooling fan relay-2 terminal 2, cooling fan relay-3 terminal 2. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power. 	
OK or NG	
OK	▶ GO TO 6.
NG	▶ GO TO 5.

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (A/T Models) (Cont'd)

5	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness connectors E75, M6 ● Harness connectors M49, F23 ● Harness for open or short between cooling fan relays-2 and -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						
Check continuity between cooling fan relay-2, -3 terminals 3 and 5, 6 and 7 under the following conditions.							
							
<table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 70%;">Conditions</th> <th>Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No current supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>		Conditions	Continuity	12V direct current supply between terminals 1 and 2	Yes	No current supply	No
Conditions	Continuity						
12V direct current supply between terminals 1 and 2	Yes						
No current supply	No						
SEF591X							
OK or NG							
OK	▶ GO TO 7.						
NG	▶ Replace cooling fan relays.						

7	CHECK COOLING FAN MOTORS-1 AND -2													
Supply battery voltage between the following terminals and check operation.														
														
<table border="1" style="width: 100%;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Cooling fan motor -1 or -2</td> <td>Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> <tr> <td>High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> </tbody> </table>			Speed	Terminals		(+)	(-)	Cooling fan motor -1 or -2	Low	1	4	High	1, 2	3, 4
	Speed			Terminals										
		(+)	(-)											
Cooling fan motor -1 or -2	Low	1	4											
	High	1, 2	3, 4											
SEF937X														
OK or NG														
OK	▶ GO TO 8.													
NG	▶ Replace cooling fan motors.													

8	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX


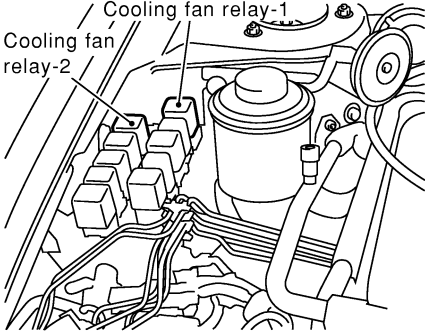
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (M/T Models)

Diagnostic Procedure (M/T Models)

NCEC0674

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																									
<p> With CONSULT-II</p> <p>1. Disconnect cooling fan relay-2.</p>																										
																										
<p>2. Turn ignition switch "ON".</p> <p>3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.</p>																										
<table border="1"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>LOW</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>			ACTIVE TEST		COOLING FAN	LOW	MONITOR		COOLAN TEMP/S	XXX °C																
ACTIVE TEST																										
COOLING FAN	LOW																									
MONITOR																										
COOLAN TEMP/S	XXX °C																									
<p>4. Make sure that cooling fans-1 and -2 operate at low speed.</p>																										
OK or NG																										
OK	▶	GO TO 3.																								
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-484.)																								

SEC573C

SEF784Z

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (M/T Models) (Cont'd)

3	CHECK COOLING FAN HIGH SPEED OPERATION																									
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 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. 																										
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>HIGH</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>			ACTIVE TEST		COOLING FAN	HIGH	MONITOR		COOLAN TEMP/S	XXX °C																
ACTIVE TEST																										
COOLING FAN	HIGH																									
MONITOR																										
COOLAN TEMP/S	XXX °C																									
SEF785Z																										
5. Make sure that cooling fan-1 operate at higher speed than low speed and cooling fan-2 operate at low speed.																										
OK or NG																										
OK	▶	GO TO 6.																								
NG	▶	Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-488.)																								

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

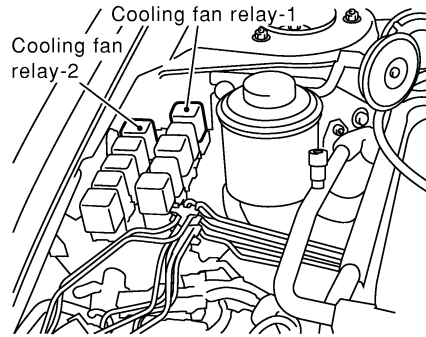
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (M/T Models) (Cont'd)

4 CHECK COOLING FAN LOW SPEED OPERATION

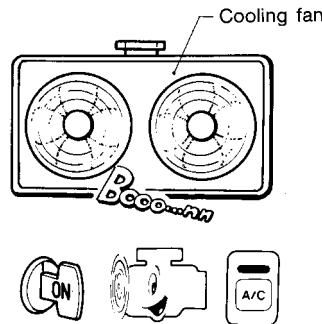
⊗ Without CONSULT-II

1. Disconnect cooling fan relay-2.



SEC573C

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.



SEC163BA

OK or NG

OK	▶	GO TO 5.
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-484.)

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (M/T Models) (Cont'd)

5	CHECK COOLING FAN HIGH SPEED OPERATION
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> Turn ignition switch "OFF". Reconnect cooling fan relay-2. Turn air conditioner switch and blower fan switch "OFF". Disconnect engine coolant temperature sensor harness connector. Connect 150Ω resistor to engine coolant temperature sensor harness connector. Restart engine and make sure that cooling fan-1 operate at higher speed than low speed and cooling fan-2 operate at low speed. 	
<p style="text-align: right;">MEF613EA</p>	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-488.)

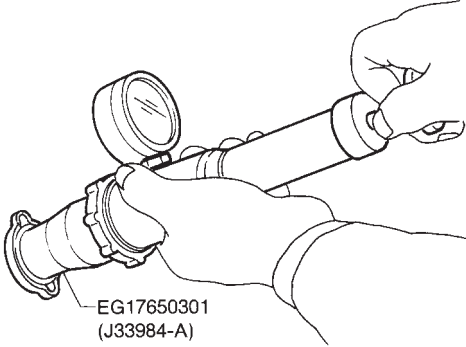
6	CHECK COOLING SYSTEM FOR LEAK
<p>Apply pressure to the cooling system with a tester, and check if the pressure drops.</p> <p style="color: blue;">Testing pressure: 157 kPa (1.6 kg/cm², 23 psi)</p> <p>CAUTION: Higher than the specified pressure may cause radiator damage.</p>	
<p style="text-align: right;">SLC754A</p>	
Pressure should not drop.	
OK or NG	
OK	▶ GO TO 8.
NG	▶ GO TO 7.

7	DETECT MALFUNCTIONING PART
<p>Check the following for leak.</p> <ul style="list-style-type: none"> Hose Radiator Water pump (Refer to LC-10, "Water Pump".) 	
▶ Repair or replace.	

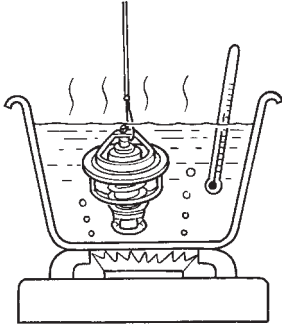
GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (M/T Models) (Cont'd)

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/cm², 9 - 14 psi)	
OK or NG	
OK	▶ GO TO 9.
NG	▶ Replace radiator cap.

SLC755A

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: 82°C (180°F) [standard] Valve lift: More than 8 mm/95°C (0.31 in/203°F)	
4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to LC-12, "Thermostat".	
OK or NG	
OK	▶ GO TO 10.
NG	▶ Replace thermostat

SLC343

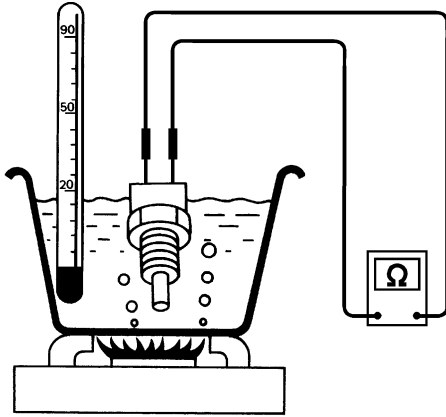
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (M/T Models) (Cont'd)

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

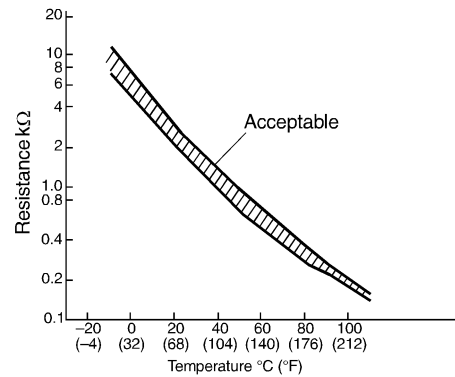
10 CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Remove engine coolant temperature sensor.
2. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<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



SEF304X

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 "MAIN 12 CAUSES OF OVERHEATING", EC-490.

▶ INSPECTION END

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

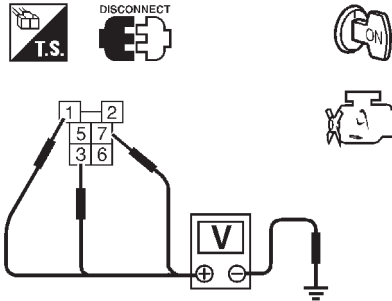
Diagnostic Procedure (M/T Models) (Cont'd)

PROCEDURE A

=NCEC0674S01

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, 7 and ground with CONSULT-II or tester.



Voltage: Battery voltage

SEF727W

OK or NG

- | | | |
|----|---|----------|
| OK | ▶ | GO TO 3. |
| NG | ▶ | GO TO 2. |

2 DETECT MALFUNCTIONING PART

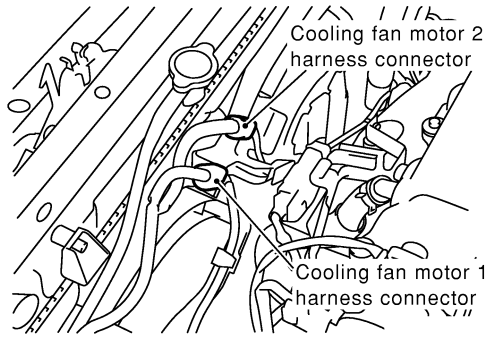
Check the following.

- 10A fuse
- 40A fusible link
- 30A fusible link
- 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.

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (M/T Models) (Cont'd)

3	CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.</p>		
		
SEF854X		
<p>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.</p> <p>4. Also check harness for short to ground and short to power.</p> <p>5. Check harness continuity between cooling fan relay-1 terminal 6 and cooling fan motor-2 terminal 2, cooling fan motor-2 terminal 1 and body ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>6. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

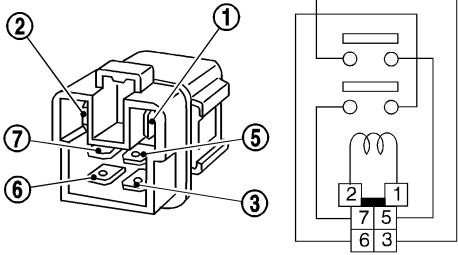
4	CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 13 and cooling fan relay-1 terminal 2. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

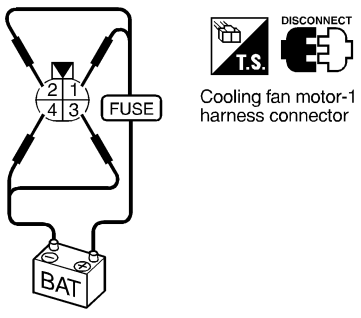
5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E75, M6 ● Harness connectors M49, F23 ● Harness for open or short between cooling fan relay-1 and ECM 		
	▶	Repair open circuit or short to ground or short to power in harness or connectors.

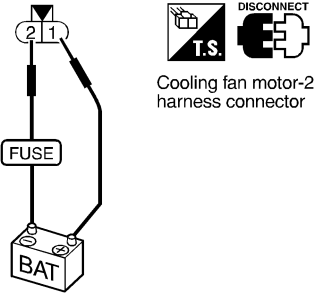
GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (M/T Models) (Cont'd)

6	CHECK COOLING FAN RELAY-1							
Check continuity between cooling fan relay-1 terminals 3 and 5, 6 and 7 under the following conditions.								
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Conditions</th> <th style="text-align: center;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No current supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>	Conditions	Continuity	12V direct current supply between terminals 1 and 2	Yes	No current supply	No
Conditions	Continuity							
12V direct current supply between terminals 1 and 2	Yes							
No current supply	No							
SEF591X								
OK or NG								
OK	▶	GO TO 7.						
NG	▶	Replace cooling fan relay.						

7	CHECK COOLING FAN MOTOR-1														
Supply battery voltage between the following terminals and check operation.															
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2" style="text-align: center;">Cooling fan motor-1</td> <td style="text-align: center;">Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> </tbody> </table>		Speed	Terminals		(+)	(-)	Cooling fan motor-1	Low	1	4	High	1, 2	3, 4
	Speed	Terminals													
		(+)	(-)												
Cooling fan motor-1	Low	1	4												
	High	1, 2	3, 4												
SEF937XA															
OK or NG															
OK	▶	GO TO 8.													
NG	▶	Replace cooling fan motor-1.													

8	CHECK COOLING FAN MOTOR-2									
Supply battery voltage between the following terminals and check operation.										
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Cooling fan motor-2</td> <td style="text-align: center;">2</td> <td style="text-align: center;">1</td> </tr> </tbody> </table>		Terminals		(+)	(-)	Cooling fan motor-2	2	1
	Terminals									
	(+)	(-)								
Cooling fan motor-2	2	1								
SEC574C										
OK or NG										
OK	▶	GO TO 9.								
NG	▶	Replace cooling fan motor-2,								

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (M/T Models) (Cont'd)

9	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

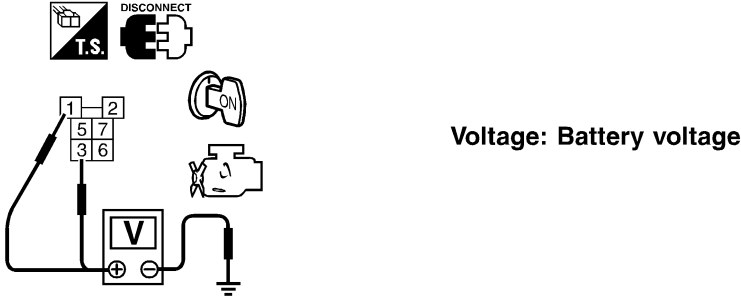
IDX

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (M/T Models) (Cont'd)

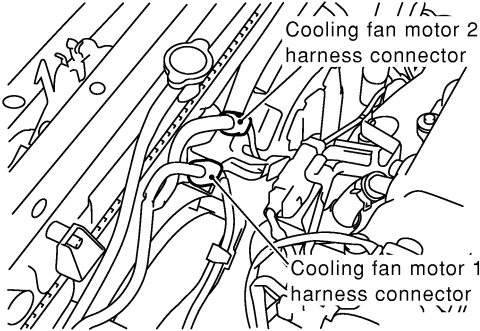
PROCEDURE B

=NCEC0674S02

1	CHECK COOLING FAN POWER SUPPLY CIRCUIT	
<ol style="list-style-type: none"> 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.

SEC577C

2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● 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.

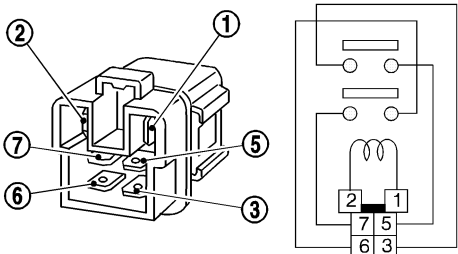
3	CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect cooling fan motor-1 harness connector. 		
		
SEF854X		
<ol style="list-style-type: none"> 3. Check harness continuity between cooling fan relay-2 terminal 5 and cooling 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 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 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

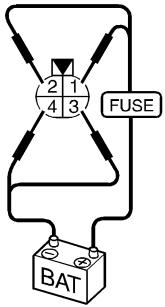

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (M/T Models) (Cont'd)

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. 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. <ul style="list-style-type: none"> ● Harness connectors E75, M6 ● Harness connectors M49, F23 ● 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							
Check continuity between cooling fan relay-2 terminals 3 and 5, 6 and 7 under the following conditions.								
<div style="display: flex; align-items: center; justify-content: space-around;">  <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Conditions</th> <th style="width: 40%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No current supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table> </div>			Conditions	Continuity	12V direct current supply between terminals 1 and 2	Yes	No current supply	No
Conditions	Continuity							
12V direct current supply between terminals 1 and 2	Yes							
No current supply	No							
SEF591X								
OK or NG								
OK	▶	GO TO 7.						
NG	▶	Replace cooling fan relay.						

7	CHECK COOLING FAN MOTOR-1														
Supply battery voltage between the following terminals and check operation.															
<div style="display: flex; align-items: center; justify-content: space-around;">  <div style="text-align: center;">  <p>Cooling fan motor-1 harness connector</p> </div> <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2" style="text-align: center;">Cooling fan motor-1</td> <td style="text-align: center;">Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> </tbody> </table> </div>				Speed	Terminals		(+)	(-)	Cooling fan motor-1	Low	1	4	High	1, 2	3, 4
	Speed	Terminals													
		(+)	(-)												
Cooling fan motor-1	Low	1	4												
	High	1, 2	3, 4												
SEF937XA															
OK or NG															
OK	▶	GO TO 8.													
NG	▶	Replace cooling fan motor-1.													

GI
 MA
 EM
 LC
 EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

Diagnostic Procedure (M/T Models) (Cont'd)

8	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
	INSPECTION END

Main 12 Causes of Overheating

NCEC0492

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> ● Blocked radiator ● Blocked condenser ● Blocked radiator grille ● Blocked bumper 	<ul style="list-style-type: none"> ● Visual 	No blocking	—
	2	<ul style="list-style-type: none"> ● Coolant mixture 	<ul style="list-style-type: none"> ● Coolant tester 	50 - 50% coolant mixture	See MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS".
	3	<ul style="list-style-type: none"> ● Coolant level 	<ul style="list-style-type: none"> ● Visual 	Coolant up to MAX level in reservoir tank and radiator filler neck	See MA-14, "Changing Engine Coolant".
	4	<ul style="list-style-type: none"> ● Radiator cap 	<ul style="list-style-type: none"> ● Pressure tester 	59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi) (Limit)	See LC-9, "System Check".
ON*2	5	<ul style="list-style-type: none"> ● Coolant leaks 	<ul style="list-style-type: none"> ● Visual 	No leaks	See LC-9, "System Check".
ON*2	6	<ul style="list-style-type: none"> ● Thermostat 	<ul style="list-style-type: none"> ● Touch the upper and lower radiator hoses 	Both hoses should be hot	See LC-12, "Thermostat", and LC-14, "Radiator".
ON*1	7	<ul style="list-style-type: none"> ● Cooling fan 	<ul style="list-style-type: none"> ● CONSULT-II 	Operating	See trouble diagnosis for DTC P1217 (EC-462).
OFF	8	<ul style="list-style-type: none"> ● Combustion gas leak 	<ul style="list-style-type: none"> ● Color checker chemical tester 4 Gas analyzer 	Negative	—
ON*3	9	<ul style="list-style-type: none"> ● Coolant temperature gauge 	<ul style="list-style-type: none"> ● Visual 	Gauge less than 3/4 when driving	—
		<ul style="list-style-type: none"> ● Coolant overflow to reservoir tank 	<ul style="list-style-type: none"> ● Visual 	No overflow during driving and idling	See MA-14, "Changing Engine Coolant".
OFF*4	10	<ul style="list-style-type: none"> ● Coolant return from reservoir tank to radiator 	<ul style="list-style-type: none"> ● Visual 	Should be initial level in reservoir tank	See MA-13, "ENGINE MAINTENANCE".
OFF	11	<ul style="list-style-type: none"> ● Cylinder head 	<ul style="list-style-type: none"> ● Straight gauge feeler gauge 	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-36, "Inspection".
	12	<ul style="list-style-type: none"> ● Cylinder block and pistons 	<ul style="list-style-type: none"> ● Visual 	No scuffing on cylinder walls or piston	See EM-56, "Inspection".

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

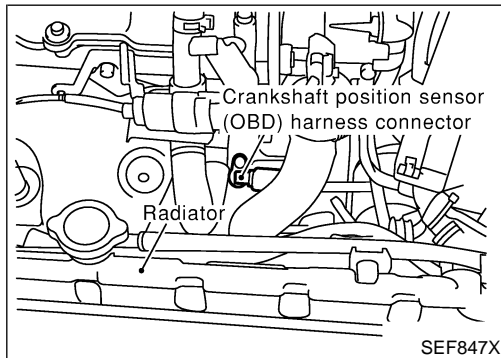
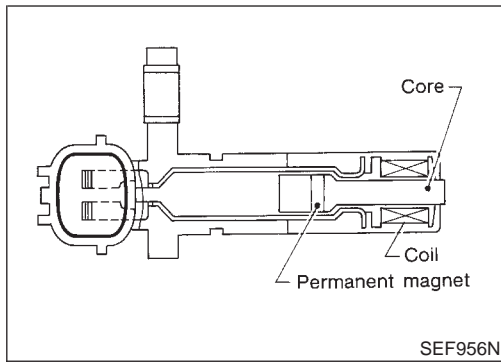
*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to LC-15, "OVERHEATING CAUSE ANALYSIS".

DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)

Component Description



Component Description

NCEC0327

The crankshaft position sensor (OBD) is located on the transmission housing facing the gear teeth (cogs) of the flywheel or drive plate. It detects the fluctuation of the engine revolution.

The sensor consists of a permanent magnet, core and coil.

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.

This sensor is not used to control the engine system.

It is used only for the on board diagnosis.

GI

MA

EM

LC

EC

FE

CL

MT

ECM Terminals and Reference Value

NCEC0328

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.

AT

AX

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (AC Voltage)
58	B	Sensors' ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
65	W	Crankshaft position sensor (OBD)	[Engine is running] ● Warm-up condition ● Idle speed	3 - 5V (AC range) SEF721W
			[Engine is running] ● Engine speed is 2,000 rpm	6 - 9V (AC range) SEF722W

SU

BR

ST

RS

BT

HA

SC

EL

On Board Diagnosis Logic

NCEC0329

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1336	● A chipping of the flywheel or drive plate gear tooth (cog) is detected by the ECM.	● Harness or connectors ● Crankshaft position sensor (OBD) ● Drive plate/Flywheel

IDX

DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)

DTC Confirmation Procedure

2

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

DTC Confirmation Procedure

NCEC0330

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 run it for at least 4 minutes at idle speed.
- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-494.

With GST

Follow the procedure "With CONSULT-II" above.

DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)

Wiring Diagram

Wiring Diagram

NCEC0331

EC-CKPS-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

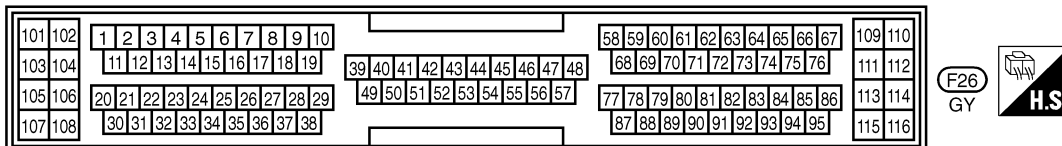
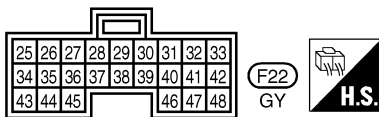
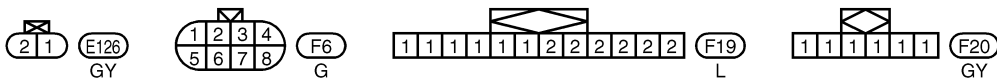
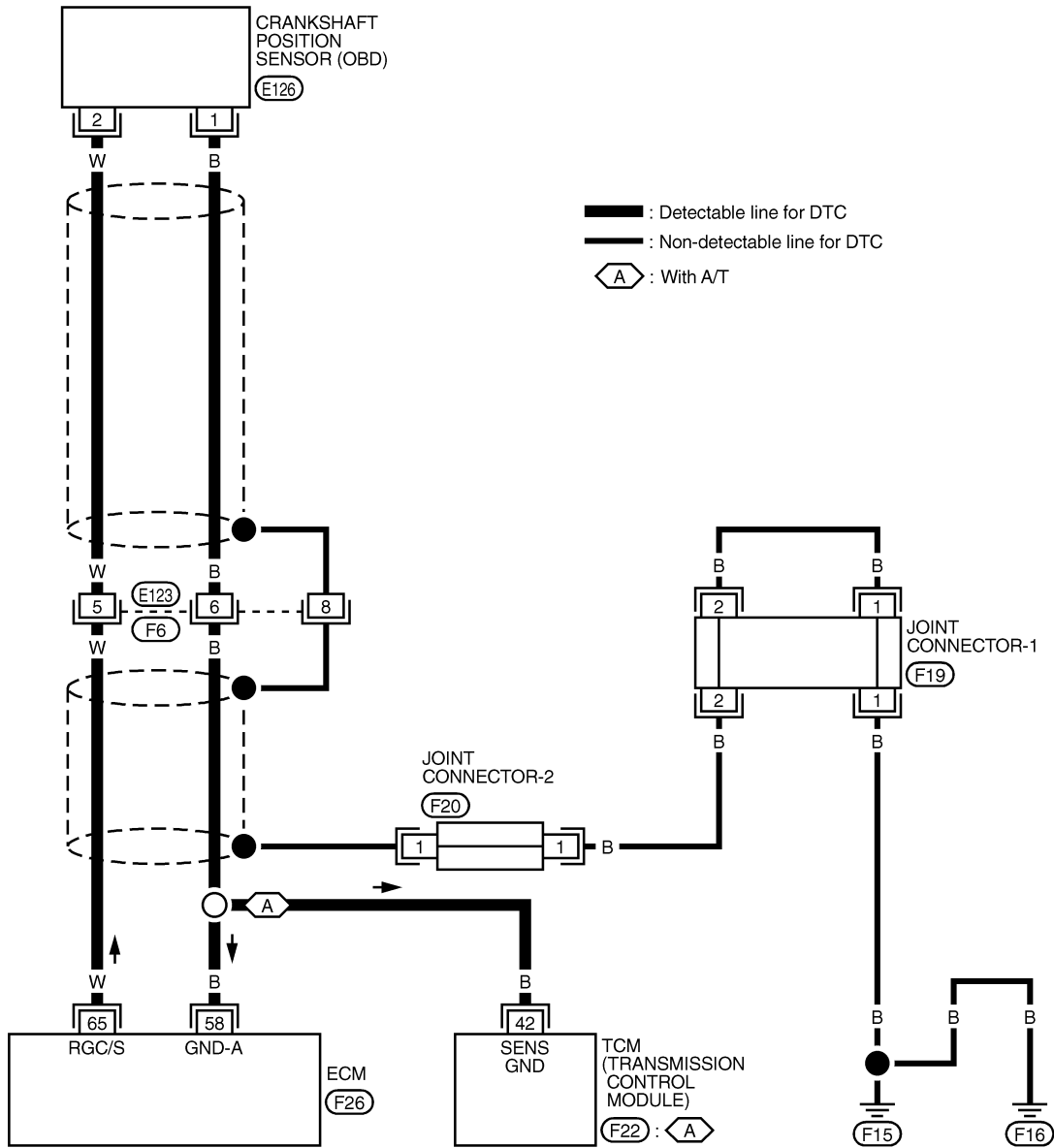
BT

HA

SC

EL

IDX



TEC709

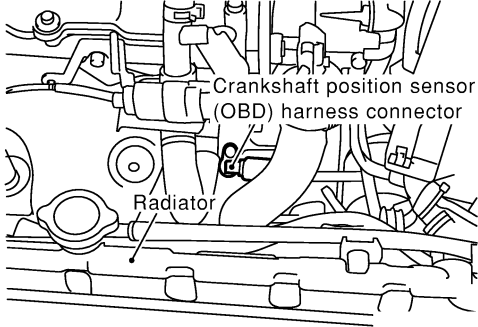
DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)

Diagnostic Procedure

Diagnostic Procedure

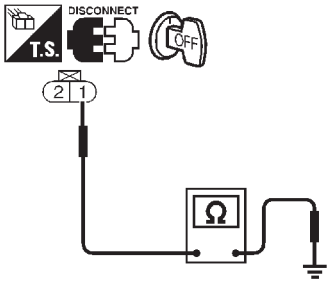
NCEC0332

1	RETIGHTEN GROUND SCREWS
1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.	
▶	GO TO 2.

2	CHECK INPUT SIGNAL CIRCUIT
1. Disconnect crankshaft position sensor (OBD) and ECM harness connectors.	
	
2. Check continuity between ECM terminal 65 and 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 4.
NG	▶ GO TO 3.

SEF847X

3	DETECT MALFUNCTIONING PART
Check the following.	
<ul style="list-style-type: none">● Harness connectors F6, E123● Harness for open or short between crankshaft position sensor (OBD) and ECM	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

4	CHECK GROUND CIRCUIT
1. Reconnect ECM harness connectors.	
2. Check harness continuity between CKPS (OBD) terminal 1 and engine ground.	
	
Continuity should exist.	
3. Also check harness for short to power.	
OK or NG	
OK	▶ GO TO 6.
NG	▶ GO TO 5.

SEF229W

DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)

Diagnostic Procedure (Cont'd)

5	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness connectors F6, E123 ● Harness for open or short between crankshaft position sensor (OBD) and ECM ● Harness for open or short between crankshaft position sensor (OBD) and TCM (Transmission control module) 	
▶ Repair open circuit or short to power in harness or connectors.	

GI
MA

6	CHECK SHIELD CIRCUIT
1. Disconnect harness connectors F6, E123. 2. Check harness continuity between harness connector F6 terminal 8 and engine ground. Refer to Wiring Diagram. Continuity should exist 3. Also check harness for short to power. 4. Then reconnect harness connectors.	
OK or NG	
OK	▶ GO TO 8.
NG	▶ GO TO 7.

EM
LC
EC

7	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness connectors F6, E123 ● Joint connector-1 (Refer to EL-274, "HARNESS LAYOUT".) ● Harness for open or short between harness connector F6 and engine ground 	
▶ Repair open circuit or short to ground or short to power in harness or connectors.	

FE
CL

8	CHECK IMPROPER INSTALLATION
Loosen and retighten the fixing bolt of the crankshaft position sensor (OBD). Then retest.	
Trouble is not fixed. ▶ GO TO 9.	

MT
AT
AX

9	CHECK CRANKSHAFT POSITION SENSOR (OBD)
Refer to "Component Inspection", EC-496.	
OK or NG	
OK	▶ GO TO 10.
NG	▶ Replace crankshaft position sensor (OBD).

SU
BR
ST

10	CHECK GEAR TOOTH
Visually check for chipping flywheel or drive plate gear tooth (cog).	
OK or NG	
OK	▶ GO TO 11.
NG	▶ Replace the flywheel or drive plate.

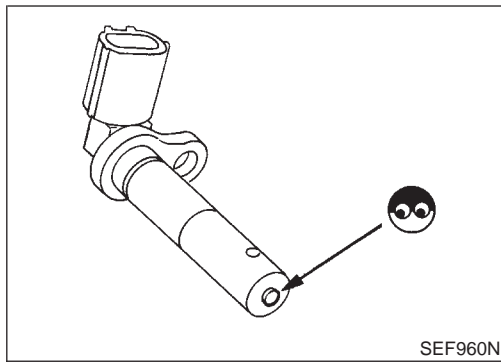
RS
BT
HA

11	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶ INSPECTION END	

SC
EL
IDX

DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)

Component Inspection



Component Inspection

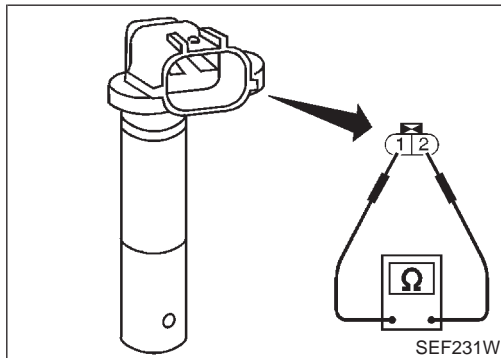
CRANKSHAFT POSITION SENSOR (OBD)

NCEC0333

NCEC0333S01

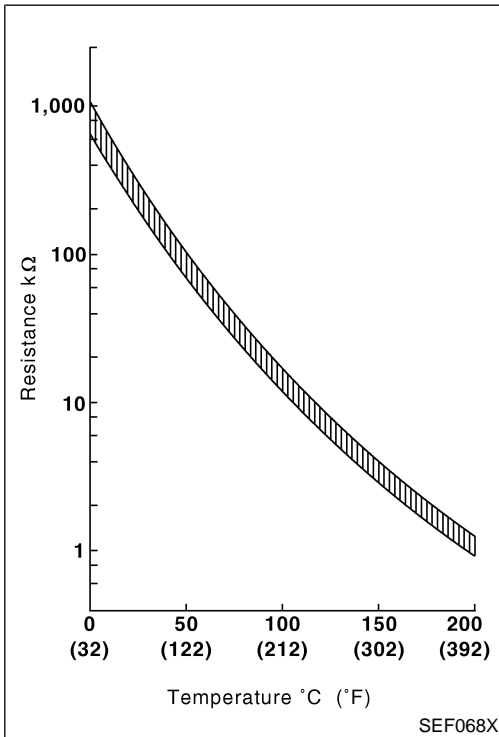
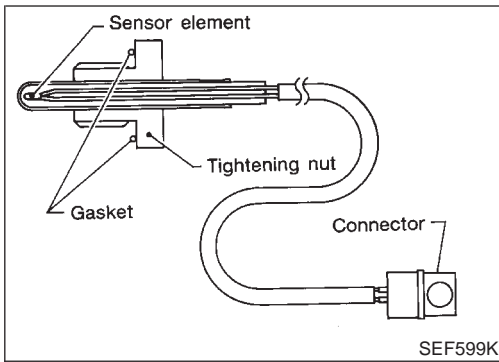
1. Disconnect crankshaft position sensor (OBD) harness connector.
2. Loosen the fixing bolt of the sensor.
3. Remove the sensor.
4. Visually check the sensor for chipping.
5. Check resistance as shown in the figure.

Resistance: 166 - 204 Ω [at 20°C (68°F)]



DTC P1401 EGR TEMPERATURE SENSOR

Component Description



Component Description

NCEC0572

The EGR temperature sensor detects temperature changes in the EGR passage way. When the EGR volume control valve opens, hot exhaust gases flow, and the temperature in the passage way changes. The EGR temperature sensor is a thermistor that modifies a voltage signal sent from the ECM. This modified signal then returns to the ECM as an input signal. As the temperature increases, EGR temperature sensor resistance decreases.

This sensor is not directly used to control the engine system. It is used only for the on board diagnosis.

<Reference data>

EGR temperature °C (°F)	Voltage* V	Resistance MΩ
0 (32)	4.56	0.73 - 0.89
50 (122)	2.25	0.074 - 0.082
100 (212)	0.59	0.012 - 0.014

*: These data are reference values and are measured between ECM terminal 72 (EGR temperature sensor) and ground.

When EGR system is operating.

Voltage: 0 - 1.5V

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

NCEC0573

Malfunction is detected when

(Malfunction A) an excessively low voltage from the EGR temperature sensor is sent to ECM even when engine coolant temperature is low.

(Malfunction B) an excessively high voltage from the EGR temperature sensor is sent to ECM even when engine coolant temperature is high.

Possible Cause

NCEC0574

MALFUNCTION A

- Harness or connectors (The EGR temperature sensor circuit is shorted.)
- EGR temperature sensor
- Malfunction of EGR function

MALFUNCTION B

NCEC0574S02

- Harness or connectors (The EGR temperature sensor circuit is open.)
- EGR temperature sensor

GI
MA
EM
LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

DTC P1401 EGR TEMPERATURE SENSOR

Possible Cause (Cont'd)

- Malfunction of EGR function

DTC Confirmation Procedure

Perform "PROCEDURE FOR MALFUNCTION A" first. If 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B".

NCEC0575

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

SEF174Y

PROCEDURE FOR MALFUNCTION A

NCEC0575S01

With CONSULT-II

NCEC0575S0101

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Verify that "COOLAN TEMP/S" is less than 50°C (122°F).
If the engine coolant temperature is above the range, cool the engine down.
- 4) Start engine and let it idle for at least 8 seconds.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-501.

With GST

NCEC0575S0102

Follow the procedure "With CONSULT-II" above.

DTC P1401 EGR TEMPERATURE SENSOR

DTC Confirmation Procedure (Cont'd)

NCEC0575S02

ACTIVE TEST	
EGR VOL CONT/V	50 step
MONITOR	
ENG SPEED	XXX rpm
EGR TEMP SEN	XXX V

SEF200Y

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

SEF201Y

PROCEDURE FOR MALFUNCTION B

CAUTION:

Always drive vehicle at a safe speed.

TESTING CONDITION:

Always perform the test at a temperature above -10°C (14°F).

With CONSULT-II

NCEC0575S0201

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.
- 3) Hold engine speed at 1,500 rpm.
- 4) Touch "Qu" and set the EGR volume control valve opening to 50 step and check EGR TEMP SEN.
EGR TEMP SEN should decrease to less than 1.0V.
If the check result is NG, go to "Diagnostic Procedure", EC-501.
If the check result is OK, go to the following step.
- 5) Turn ignition switch "OFF" and wait at least 10 seconds then turn "ON".
- 6) Check the output voltage of "THRTL POS SEN" (at closed throttle position) and note it.
- 7) Start engine and maintain the following conditions for at least 5 consecutive seconds.

ENG SPEED	1,800 - 2,800 rpm
VHCL SPEED SE	10 km/h (6 MPH) or more
B/FUEL SCHDL	5.0 - 8.5 msec
THRTL POS SEN	(X + 0.05) - (X - 0.87) V X = Voltage value measured at step 6
Selector lever	Suitable position

- 8) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-501.

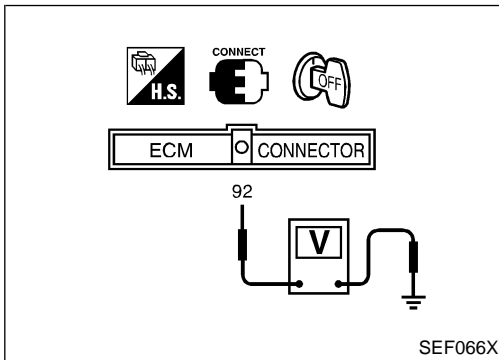
With GST

NCEC0575S0202

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds, then turn "ON".
- 3) Select "MODE 1" with GST and maintain the following conditions for at least 5 consecutive seconds.

Engine speed	1,800 - 2,800 rpm
Vehicle speed	10 km/h (6 MPH) or more
Voltage between ECM terminal 92 and ground	0.86 - 2.0V
Selector lever	Suitable position

- 4) Select "MODE 7" with GST.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-501.



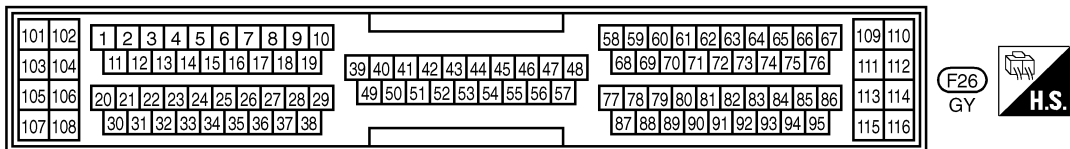
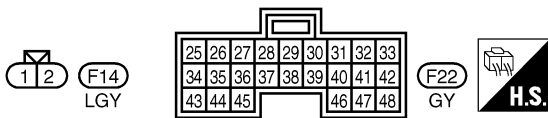
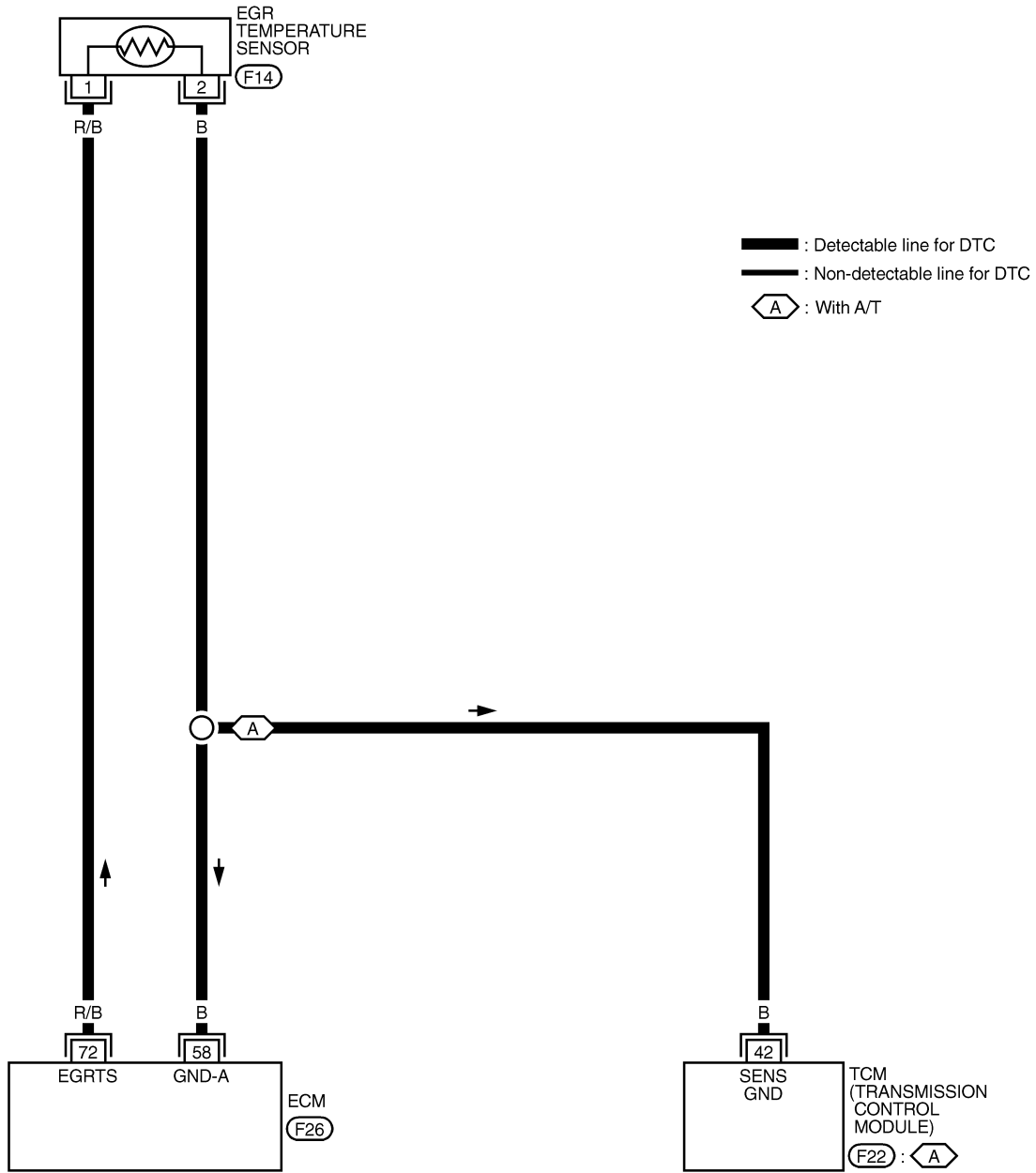
DTC P1401 EGR TEMPERATURE SENSOR

Wiring Diagram

Wiring Diagram

NCEC0576

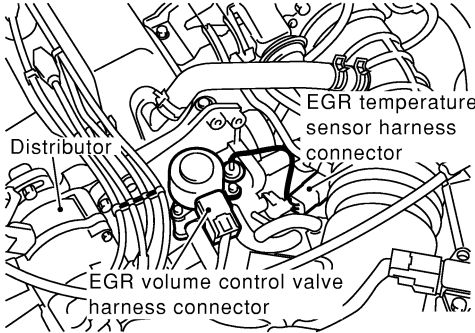
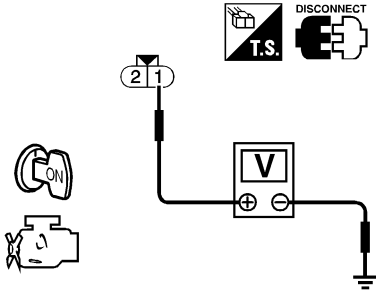
EC-EGR/TS-01



TEC719

Diagnostic Procedure

NCEC0577

1	CHECK EGR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT	<p>1. Turn ignition switch "OFF". 2. Disconnect EGR temperature sensor harness connector.</p> <div style="text-align: center;">  <p>Distributor EGR temperature sensor harness connector EGR volume control valve harness connector</p> </div> <p>3. Turn ignition switch "ON". 4. Check voltage between EGR temperature sensor terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Approximately 5V</p> <p>OK or NG</p> </div>	<p>GI MA EM LC EC FE CL MT AT AX SU BR</p>
OK	▶	GO TO 2.	
NG	▶	Repair or replace harness or connectors.	

2	CHECK EGR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	<p>1. Turn ignition switch "OFF". 2. Check harness continuity between EGR temperature sensor terminal 2 and engine ground. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>ST RS BT HA</p>
OK	▶	GO TO 4.	
NG	▶	GO TO 3.	

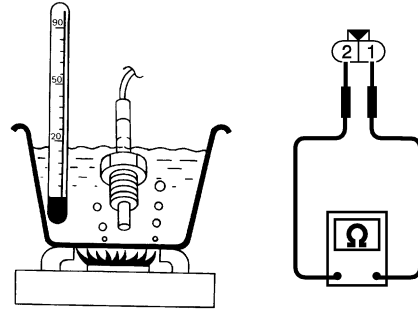
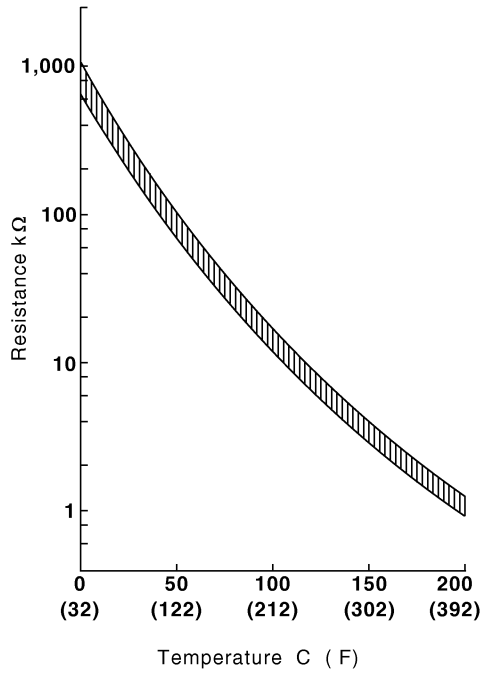
3	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness for open or short between ECM and EGR temperature sensor ● Harness for open or short between TCM (Transmission Control Module) and EGR temperature sensor 	<p>SC EL IDX</p>
	▶	Repair open circuit or short to power in harness or connector.	

DTC P1401 EGR TEMPERATURE SENSOR

Diagnostic Procedure (Cont'd)

4 CHECK EGR TEMPERATURE SENSOR

1. Remove EGR temperature sensor.
2. Check resistance between EGR temperature sensor terminals 1 and 2 under the following conditions.



<Reference data>

EGR temperature C (F)	Voltage V	Resistance MΩ
0 (32)	4.56	0.73 - 0.89
50 (122)	2.25	0.074 - 0.082
100 (212)	0.59	0.012 - 0.014

SEF919Z

OK or NG

OK	▶	GO TO 5.
NG	▶	Replace EGR temperature sensor.

DTC P1401 EGR TEMPERATURE SENSOR

Diagnostic Procedure (Cont'd)


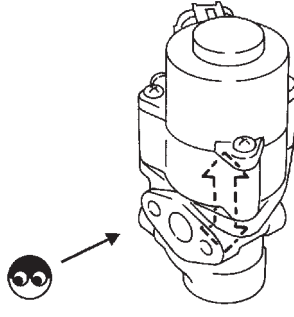
5	CHECK EGR VOLUME CONTROL VALVE-I		
<p>1. Disconnect EGR volume control valve. 2. Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.</p>			
		<p>Resistance: 20.9 - 23.1 Ω [At 20°C (68°F)]</p>	
SEF588X			
OK or NG			
OK (With CONSULT-II) ▶		GO TO 6.	
OK (Without CONSULT-II) ▶		GO TO 7.	
NG ▶		Replace EGR volume control valve.	

6	CHECK EGR VOLUME CONTROL VALVE-II																										
<p>With CONSULT-II</p> <p>1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch ON. 4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. 5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps.</p>																											
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">ACTIVE TEST</th> </tr> <tr> <th style="width: 70%;">EGR VOL CONT/V</th> <th style="width: 30%;">20 step</th> </tr> <tr> <th colspan="2" style="text-align: center;">MONITOR</th> </tr> <tr> <th style="width: 70%;">ENG SPEED</th> <th style="width: 30%;">XXX rpm</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>		ACTIVE TEST		EGR VOL CONT/V	20 step	MONITOR		ENG SPEED	XXX rpm																		
ACTIVE TEST																											
EGR VOL CONT/V	20 step																										
MONITOR																											
ENG SPEED	XXX rpm																										
SEF067Y																											
OK or NG																											
OK ▶		GO TO 8.																									
NG ▶		Replace EGR volume control valve.																									

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P1401 EGR TEMPERATURE SENSOR

Diagnostic Procedure (Cont'd)

7	CHECK EGR VOLUME CONTROL VALVE-II
<p> Without CONSULT-II</p> <ol style="list-style-type: none">1. Remove EGR volume control valve.2. Reconnect ECM harness connector and EGR volume control valve harness connector.3. Turn ignition switch ON and OFF.4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position. <div></div> <p>OK or NG</p> <p>SEF560W</p>	
OK	▶ GO TO 8.
NG	▶ Replace EGR volume control valve.

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END

DTC P1402 EGR FUNCTION (OPEN)

Description

Description SYSTEM DESCRIPTION

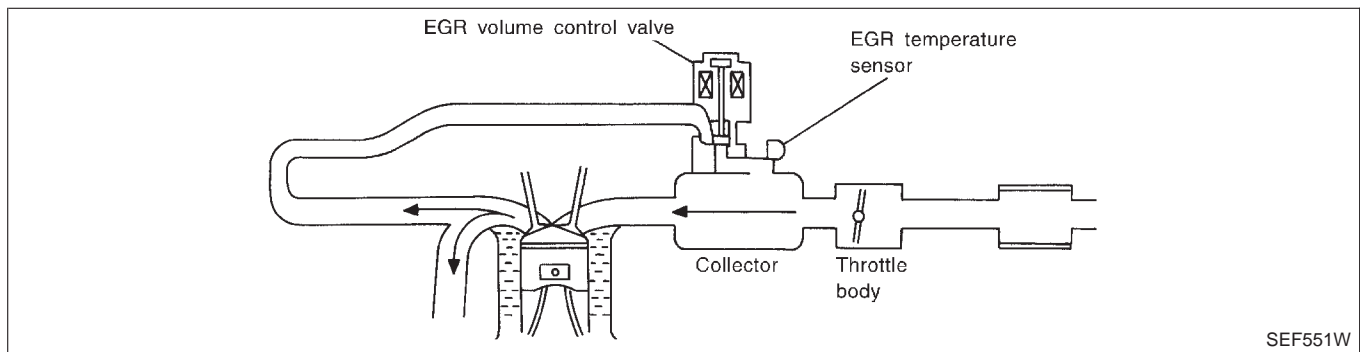
NCEC0578

NCEC0578S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	EGR volume control	EGR volume control valve
Vehicle speed sensor	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Battery	Battery voltage		
Mass air flow sensor	Amount of intake air		
Air conditioner switch	Air conditioner operation		
Power steering oil pressure switch	Power steering load signal		
Electrical load	Electrical load signal		
Park/Neutral position switch	Park/Neutral position		
TCM (Transmission Control Module)	Gear position, shifting signal		

This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR by-pass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. The EGR volume control valve remains close under the following conditions.

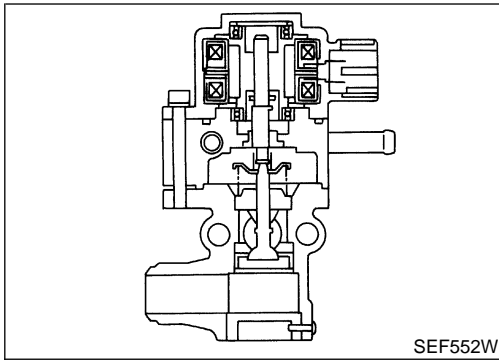
- Engine stopped
- Engine starting
- Engine idling
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Wide open throttle
- Low battery voltage



SEF551W

DTC P1402 EGR FUNCTION (OPEN)

Description (Cont'd)



COMPONENT DESCRIPTION

NCEC0578S02

EGR Volume Control Valve

NCEC0578S0201

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor 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, changing the flow rate. When no change in the flow rate 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

NCEC0579

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
EGR TEMP SEN	● Engine: After warming up		Less than 4.5V
EGR VOL CON/V	● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load	Idle	0 step
		Revsing engine up to 3,000 rpm quickly	10 - 55 step

ECM Terminals and Reference Value

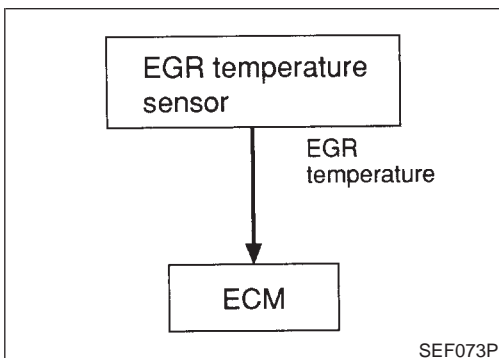
NCEC0656

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)
8 9 17 18	SB W/B R/W G/R	EGR volume control valve	[Engine is running] ● Idle speed	0.1 - 14V
58	B	Sensor's ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
72	R/B	EGR temperature sensor	[Engine is running] ● Warm-up condition ● Idle speed	Less than 4.5V
			[Engine is running] ● Warm-up condition ● EGR system is operating	0 - 1.5V



On Board Diagnosis Logic

NCEC0580

If the EGR temperature sensor detects EGR flow under the condition that does not call for EGR, a high-flow malfunction is diagnosed.

Malfunction is detected when EGR flow is detected under condition that does not call for EGR.

DTC P1402 EGR FUNCTION (OPEN)

On Board Diagnosis Logic (Cont'd)

NOTE:

Diagnosis for this DTC will occur when engine coolant temperature is below 50 to 60°C (122 to 140°F). Therefore, it will be better to turn ignition switch "ON" (start engine) at the engine coolant temperature below 30°C (86°F) when starting DTC confirmation procedure.

GI

MA

EM

LC

Possible Cause

- Harness or connectors (EGR volume control valve circuit is open or shorted.)
- EGR volume control valve leaking or stuck open
- EGR temperature sensor

NCEC0581

EC

FE

CL

MT

DATA MONITOR	
MONITOR	NO DTC
COOLAN TEMP/S	XXX °C
EGR TEMP SEN	XXX V

SEF202Y

DTC Confirmation Procedure

NCEC0582

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.

AT

AX

TESTING CONDITION:

- Always perform the test at a temperature above -10°C (14°F).
- Engine coolant temperature and EGR temperature must be verified in "DATA MONITOR" mode with CONSULT-II before starting DTC WORK SUPPORT test. If it is out of range below, the test cannot be conducted.

SU

BR

COOLAN TEMP/S: -10 to 50°C (14 to 122°F)*

EGR TEMP SEN: Less than 4.8V

ST

If the values are out of the ranges indicated above, park the vehicle in a cool place and allow the engine temperature to stabilize. Do not attempt to reduce the engine coolant temperature or EGR temperature with a fan or means other than ambient air. Doing so may produce an inaccurate diagnostic result.

RS

BT

EGR SYSTEM P1402	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
THRTL POS SEN	XXX V
B/FUEL SCHDL	XXX msec

SEF203Y

*: Although CONSULT-II screen displays "-10 to 40°C (14 to 104°F)" as a range of engine coolant temperature, ignore it.

HA

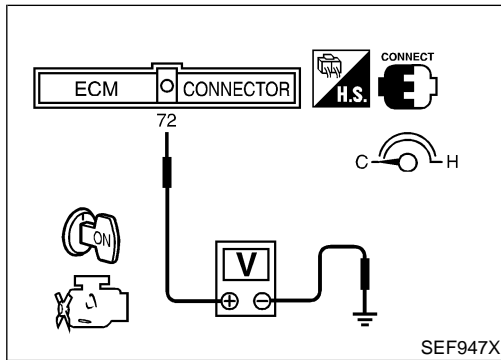
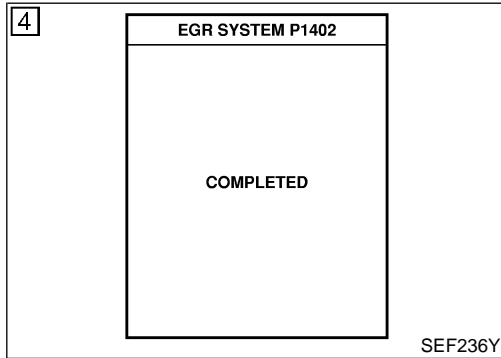
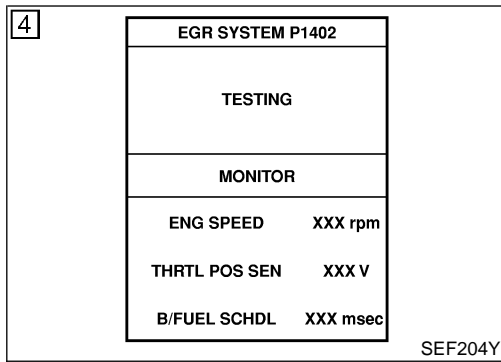
SC

EL

IDX

DTC P1402 EGR FUNCTION (OPEN)

DTC Confirmation Procedure (Cont'd)



CONSULT-II WITH CONSULT-II

NCEC0582S01

- 1) Turn ignition switch "OFF", and wait at least 10 seconds, and then turn "ON".
- 2) Select "EGR SYSTEM P1402" of "EGR SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 3) Touch "START".
- 4) Start engine and let it idle until "TESTING" on CONSULT-II screen is turned to "COMPLETED". (It will take 80 seconds or more.)
If "TESTING" is not displayed after 5 minutes, turn ignition "OFF" and cool the engine coolant temperature to the range of -10 to 50°C (14 to 122°F). Retry from step 1.
- 5) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-510.

GST WITH GST

NCEC0582S02

- 1) Turn ignition switch "ON" and select "MODE 1" with GST.
 - 2) Check that engine coolant temperature is within the range of -10 to 50°C (14 to 122°F).
 - 3) Check that voltage between ECM terminal 72 (EGR temperature sensor signal) and ground is less than 4.8V.
 - 4) Start engine and let it idle for at least 80 seconds.
 - 5) Stop engine.
 - 6) Perform from step 1 to 4.
 - 7) Select "MODE 3" with GST.
 - 8) If DTC is detected, go to "Diagnostic Procedure", EC-510.
- **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 P1402 EGR FUNCTION (OPEN)

Wiring Diagram

Wiring Diagram

NCEC0583

EC-EGRC1-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

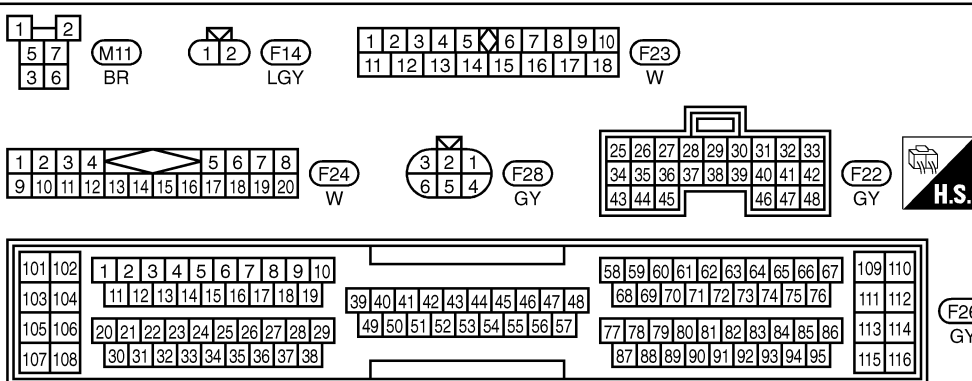
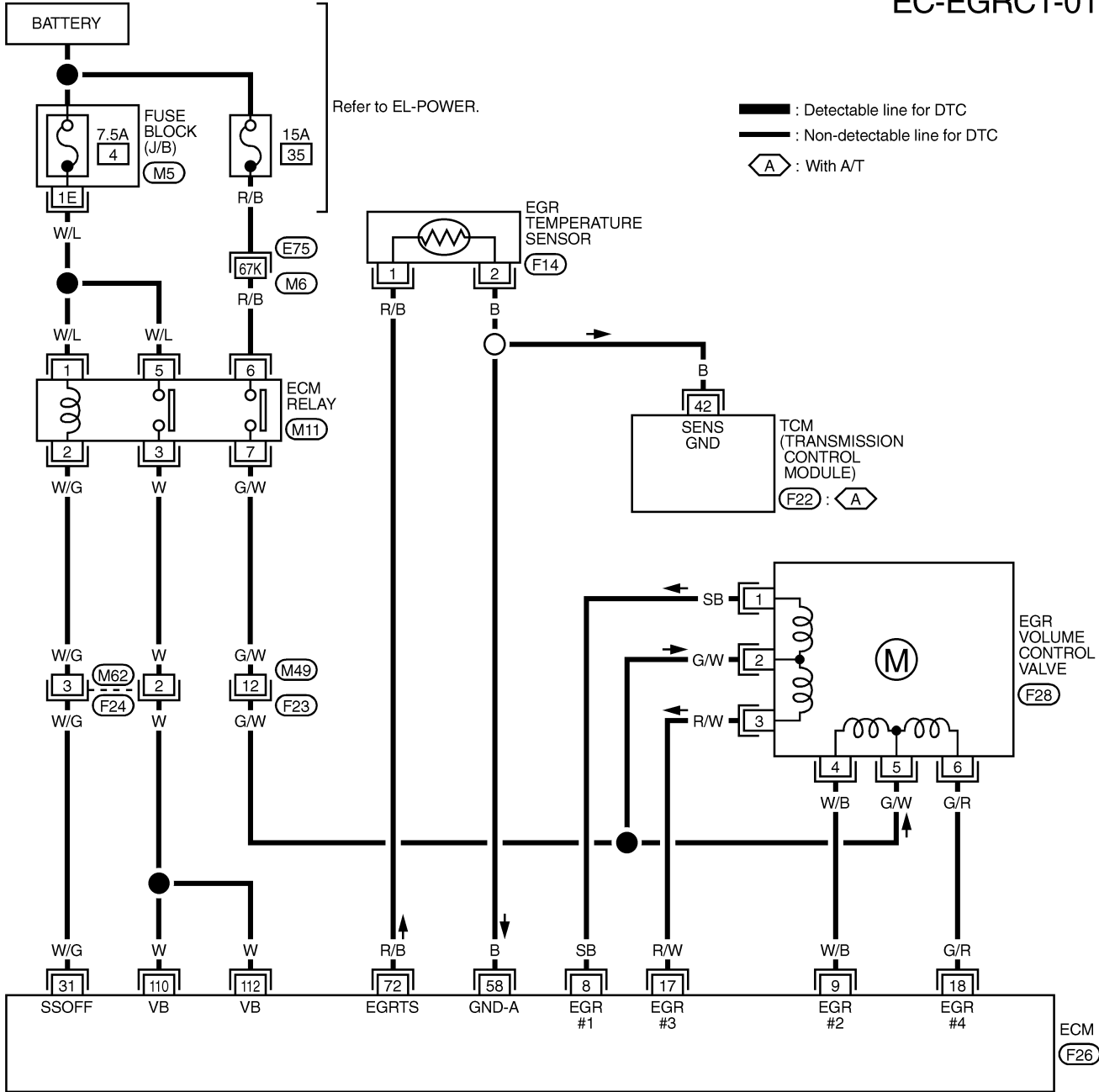
BT

HA

SC

EL

IDX



REFER TO THE FOLLOWING.
 (E75) -SUPER MULTIPLE JUNCTION (SMJ)
 (M5) -FUSE BLOCK-JUNCTION BOX (J/B)

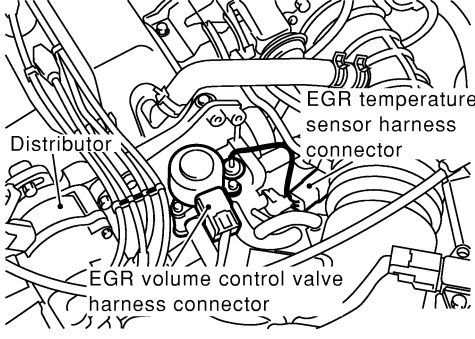
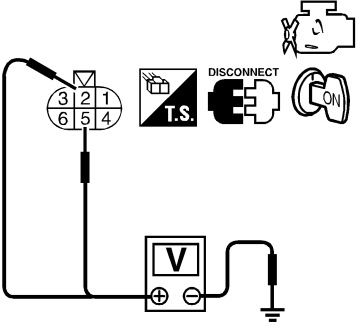
TEC836

DTC P1402 EGR FUNCTION (OPEN)

Diagnostic Procedure

Diagnostic Procedure

NCEC0584

1	CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT
<p>1. Disconnect EGR volume control valve harness connector.</p>  <p style="text-align: right;">SEF849X</p> <p>2. Turn ignition switch ON.</p> <p>3. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.</p>  <p style="text-align: right;">SEF327X</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

2	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors F23, M49 ● Harness for open or short between ECM relay and EGR volume control valve 	
▶	Repair harness or connectors.

DTC P1402 EGR FUNCTION (OPEN)

Diagnostic Procedure (Cont'd)

3	CHECK EGR VOLUME 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 EGR volume control valve terminals as follows. Refer to Wiring Diagram.												
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>ECM terminal</th> <th>EGR volume control valve</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">8</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">9</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">17</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">18</td> <td style="text-align: center;">6</td> </tr> </tbody> </table>			ECM terminal	EGR volume control valve	8	1	9	4	17	3	18	6
ECM terminal	EGR volume control valve											
8	1											
9	4											
17	3											
18	6											
MTBL0389												
<p style="color: blue;">Continuity should exist.</p> 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.										

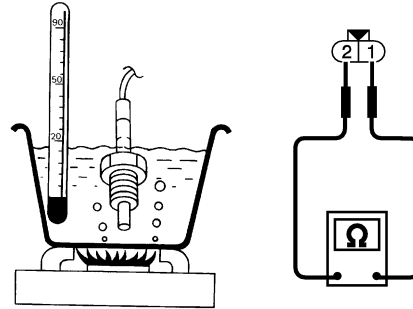
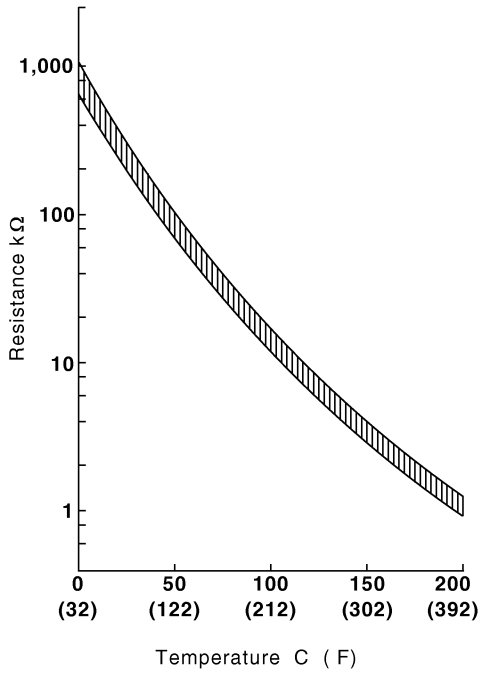
GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P1402 EGR FUNCTION (OPEN)

Diagnostic Procedure (Cont'd)

4 CHECK EGR TEMPERATURE SENSOR

1. Remove EGR temperature sensor.
2. Check resistance between EGR temperature sensor terminals 1 and 2 under the following conditions.



<Reference data>

EGR temperature C (F)	Voltage V	Resistance MΩ
0 (32)	4.56	0.73 - 0.89
50 (122)	2.25	0.074 - 0.082
100 (212)	0.59	0.012 - 0.014

SEF919Z

OK or NG

- | | | |
|----|---|---------------------------------|
| OK | ▶ | GO TO 5. |
| NG | ▶ | Replace EGR temperature sensor. |

DTC P1402 EGR FUNCTION (OPEN)

Diagnostic Procedure (Cont'd)


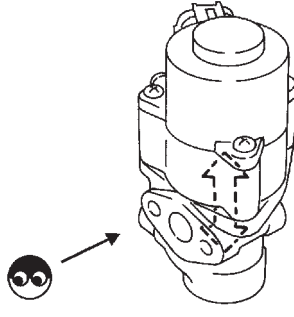
5	CHECK EGR VOLUME CONTROL VALVE-I	
<p>Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.</p>		
		<p>Resistance: 20.9 - 23.1 Ω [At 20°C (68°F)]</p>
OK or NG		SEF588X
OK (With CONSULT-II)	▶	GO TO 6.
OK (Without CONSULT-II)	▶	GO TO 7.
NG	▶	Replace EGR volume control valve.

6	CHECK EGR VOLUME CONTROL VALVE-II																													
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch "ON". 4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. 5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps. 																														
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>EGR VOL CONT/V</th> <th>20 step</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>		ACTIVE TEST		EGR VOL CONT/V	20 step	MONITOR		ENG SPEED	XXX rpm																					
ACTIVE TEST																														
EGR VOL CONT/V	20 step																													
MONITOR																														
ENG SPEED	XXX rpm																													
OK or NG		SEF067Y																												
OK	▶	GO TO 8.																												
NG	▶	Replace EGR volume control valve.																												

GI
 MA
 EM
 LC
 EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P1402 EGR FUNCTION (OPEN)

Diagnostic Procedure (Cont'd)

7	CHECK EGR VOLUME CONTROL VALVE-II
<p> Without CONSULT-II</p> <ol style="list-style-type: none">1. Remove EGR volume control valve.2. Reconnect ECM harness connector and EGR volume control valve harness connector.3. Turn ignition switch ON and OFF.4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position. <div></div> <p>OK or NG</p> <p>SEF560W</p>	
OK	▶ GO TO 8.
NG	▶ Replace EGR volume control valve.

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END

On Board Diagnosis Logic

NCEC0585

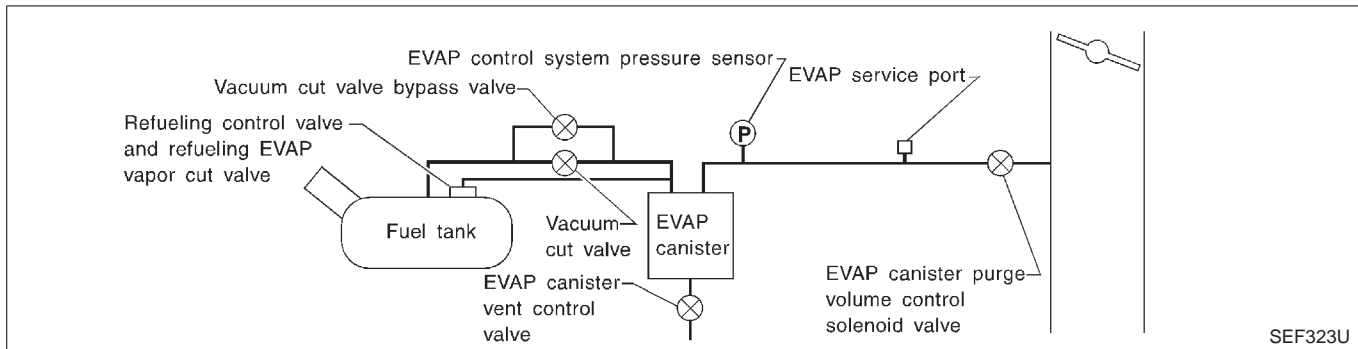
NOTE:

If DTC P1440 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-549.)

This diagnosis detects leaks in the EVAP purge line 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.



Malfunction is detected when EVAP control system has a leak, EVAP control system does not operate properly.

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.

Possible Cause

NCEC0586

- Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Fuel filler cap remains open or fails to close.
- Foreign matter caught in fuel filler cap.
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.
- Foreign matter caught in EVAP canister vent control valve.
- EVAP canister or fuel tank leaks
- EVAP purge line (pipe and rubber tube) leaks

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

DTC P1440 EVAP CONTROL SYSTEM (SMALL LEAK) (POSITIVE PRESSURE)

Possible Cause (Cont'd)

- EVAP purge line rubber tube bent.
- Blocked or bent rubber tube to EVAP control system pressure sensor
- Loose or disconnected rubber tube
- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve
- Fuel tank temperature sensor
- O-ring of EVAP canister vent control valve is missing or damaged.
- Water separator
- EVAP canister is saturated with water.
- Fuel level sensor and the circuit
- EVAP control system pressure sensor
- Refueling control valve
- ORVR system leaks

DTC Confirmation Procedure

Refer to “P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)”, EC-369. ^{NCEC0587}

Diagnostic Procedure

Refer to “P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)”, EC-370. ^{NCEC0588}

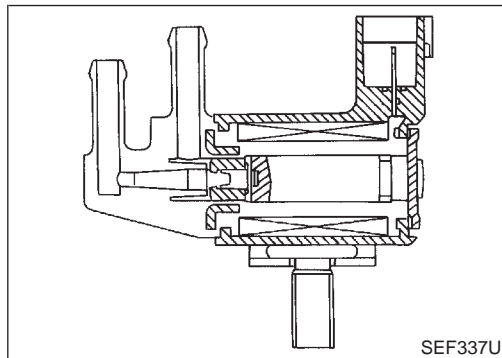
Description SYSTEM DESCRIPTION

NCEC0589

NCEC0589S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	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		
Throttle position switch	Closed throttle position		
Heated oxygen sensor 1 (front)	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
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

NCEC0589S02

The EVAP canister purge volume control solenoid valve uses an 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

NCEC0590

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
PURG VOL C/V	● Engine: After warming up ● Air conditioner switch "OFF" ● Shift lever: "N" ● No-load	Idle (Vehicle stopped)
		2,000 rpm
		0%
		—

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

ECM Terminals and Reference Value

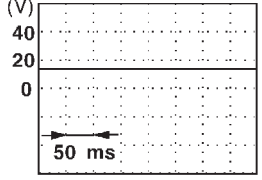
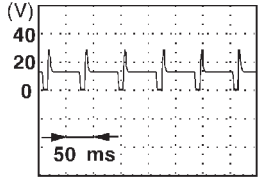
ECM Terminals and Reference Value

NCEC0657

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	P	EVAP canister purge volume control solenoid valve	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Idle speed 	<p>BATTERY VOLTAGE (11 - 14V)</p>  <p>SEF994U</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine) 	<p>BATTERY VOLTAGE (11 - 14V)</p>  <p>SEF995U</p>

On Board Diagnosis Logic

NCEC0591

Malfunction is detected when the canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed.

Possible Cause

NCEC0592

- EVAP control system pressure sensor
- EVAP canister purge volume control solenoid valve (The valve is stuck open.)
- EVAP canister vent control valve
- EVAP canister
- Hoses (Hoses are connected incorrectly or clogged.)

DTC Confirmation Procedure

NCEC0593

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.

6	PURG VOL CN/V P1444	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	THRTL POS SEN	XXX V
	B/FUEL SCHDL	XXX msec

SEF205Y

6	PURG VOL CN/V P1444	
	TESTING	
	MONITOR	
	ENG SPEED	XXX rpm
	THRTL POS SEN	XXX V
	B/FUEL SCHDL	XXX msec

SEF206Y

6	PURG VOL CN/V P1444	
	COMPLETED	

SEF237Y

WITH CONSULT-II

NCEC0593S01

- 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 "Diagnostic Procedure", EC-521.

WITH GST

NCEC0593S02

- 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 "Diagnostic Procedure", EC-521.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

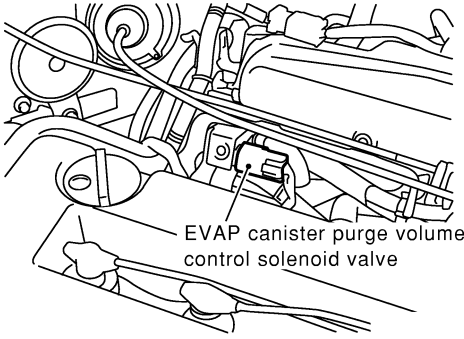
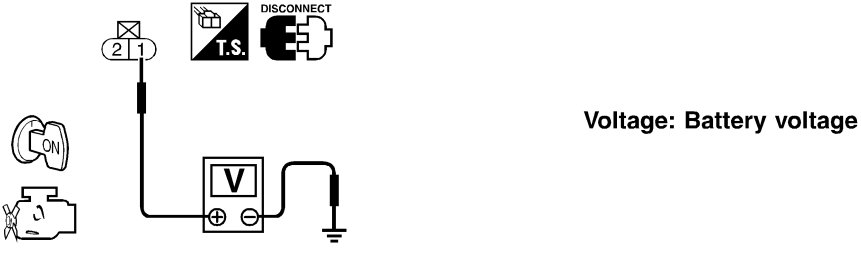
SC

EL

IDX

Diagnostic Procedure

NCEC0595

1	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.</p> <div style="text-align: center;">  <p>EVAP canister purge volume control solenoid valve</p> </div> <p style="text-align: right;">SEF851X</p> <p>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.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> </div> <p style="text-align: right;">SEF948X</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

2	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M62, F24 ● Harness connectors F13, F51 ● Fuse block (J/B) connector M2 ● 10A fuse ● Harness for open or short between EVAP canister purge volume control solenoid valve and fuse <p style="text-align: center;">▶ Repair harness or connectors.</p>	

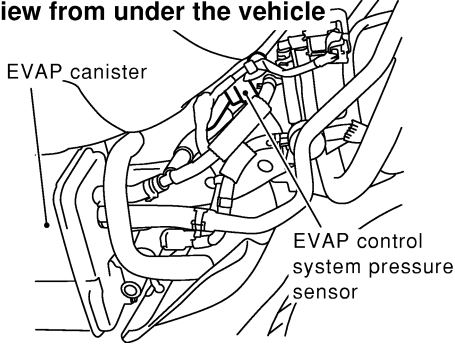
3	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 14 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 5.
NG	▶ GO TO 4.

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness connectors F13, F51● Harness for open or short between EVAP canister purge volume control solenoid valve and ECM	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.	
View from under the vehicle	
	
SEF860X	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Repair it.

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.

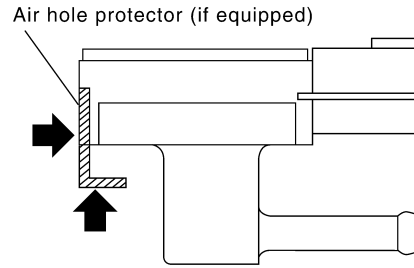
GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

7 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

- Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

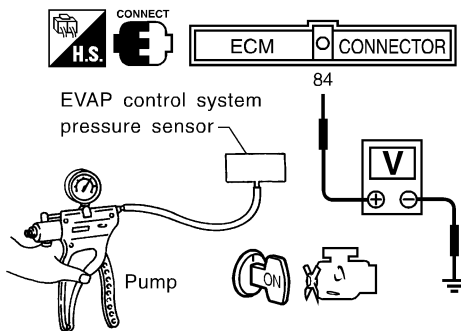
3. Turn ignition switch "ON".

4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 84 and ground.



Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

SEF342X

CAUTION:


- Discard and EVAP control system pressure 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.


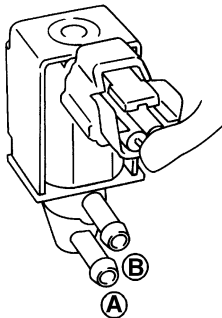
OK or NG


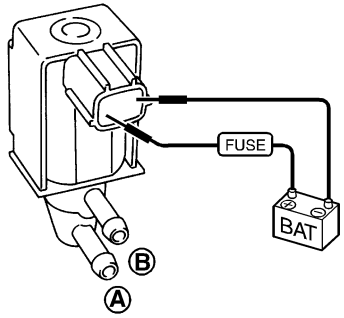
OK (With CONSULT-II)	▶	GO TO 8.
OK (Without CONSULT-II)	▶	GO TO 9.
NG	▶	Replace EVAP control system pressure sensor.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

8	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																					
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 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. 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>PURG VOL CONT/V</th> <th>XXX %</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">MONITOR</td> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V						
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
HO2S1 MNTR (B1)	LEAN																					
THRTL POS SEN	XXX V																					
SEF801Y																						
OK or NG																						
OK	▶	GO TO 10.																				
NG	▶	GO TO 9.																				

9	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE							
<p> With CONSULT-II</p> <p>Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>								
								
SEF334X								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th>Condition PURG VOL CONT/V value</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>100.0%</td> <td>Yes</td> </tr> <tr> <td>0.0%</td> <td>No</td> </tr> </tbody> </table>			Condition PURG VOL CONT/V value	Air passage continuity between A and B	100.0%	Yes	0.0%	No
Condition PURG VOL CONT/V value	Air passage continuity between A and B							
100.0%	Yes							
0.0%	No							

<p> Without CONSULT-II</p> <p>Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>		
		
SEF335X		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

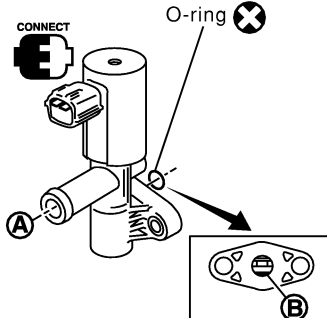
10	CHECK RUBBER TUBE FOR CLOGGING	
	1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.	
	OK or NG	
OK	▶	GO TO 11.
NG	▶	Clean the rubber tube using an air blower.

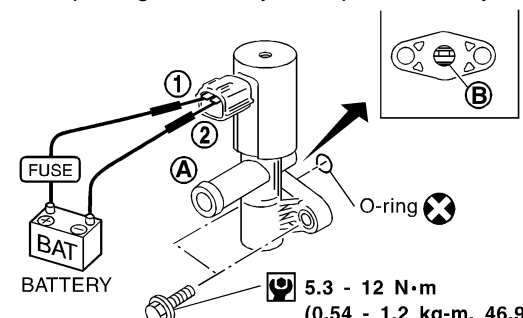
11	CHECK EVAP CANISTER VENT CONTROL VALVE-I	
	1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.	
	<p style="text-align: center;"> 5.3 - 12 N·m (0.54 - 1.2 kg-m, 46.9 - 104 in-lb) </p>	
	SEF337X	
	OK or NG	
OK	▶	GO TO 12.
NG	▶	Replace EVAP canister vent control valve.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

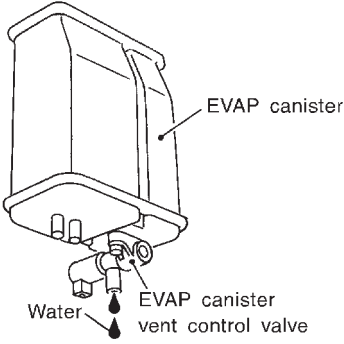
12	CHECK EVAP CANISTER VENT CONTROL VALVE-II																										
<p>④ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Reconnect harness connectors disconnected. 2. Turn ignition switch "ON". 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time. 																											
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 30%;">  </div> <div style="width: 30%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>VENT CONTROL/V</td> <td>OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 (B1)</td> <td>XXX V</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> </div> <div style="width: 35%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>ON</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p>Operation takes less than 1 second.</p> </div> </div>		ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 (B1)	XXX V	THRTL POS SEN	XXX V							Condition	Air passage continuity between A and B	ON	No	OFF	Yes
ACTIVE TEST																											
VENT CONTROL/V	OFF																										
MONITOR																											
ENG SPEED	XXX rpm																										
A/F ALPHA-B1	XXX %																										
HO2S1 (B1)	XXX V																										
THRTL POS SEN	XXX V																										
Condition	Air passage continuity between A and B																										
ON	No																										
OFF	Yes																										
SEF803Y																											

<p>⊗ Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>							
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 40%;">  </div> <div style="width: 55%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p>Operation takes less than 1 second.</p> </div> </div>		Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	No	OFF	Yes
Condition	Air passage continuity between A and B						
12V direct current supply between terminals 1 and 2	No						
OFF	Yes						
SEF339X							
Make sure new O-ring is installed properly.							
OK or NG							
OK	▶	GO TO 14.					
NG	▶	GO TO 13.					

13	CHECK EVAP CANISTER VENT CONTROL VALVE-III	
<ol style="list-style-type: none"> 1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform procedure 10 again. 		
OK or NG		
OK	▶	GO TO 14.
NG	▶	Replace EVAP canister vent control valve.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Diagnostic Procedure (Cont'd)

14	CHECK IF EVAP CANISTER SATURATED WITH WATER	
<p>1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister.</p>		
		
SEF596U		
Yes or No		
Yes	▶	GO TO 15.
No	▶	GO TO 18.

GI

MA

EM

LC

EC

FE

CL

15	CHECK EVAP CANISTER	
<p>Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).</p>		
OK or NG		
OK	▶	GO TO 17.
NG	▶	GO TO 16.

MT

AT

AX

16	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 		
▶		Repair hose or replace EVAP canister.

SU

BR

ST

RS

BT

HA

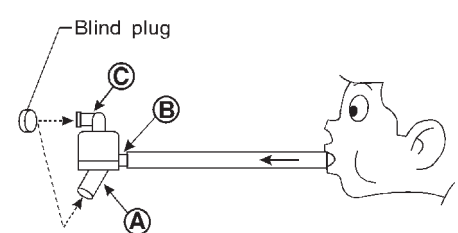
SC

EL

IDX

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

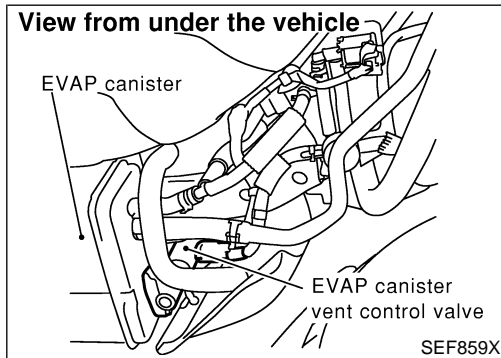
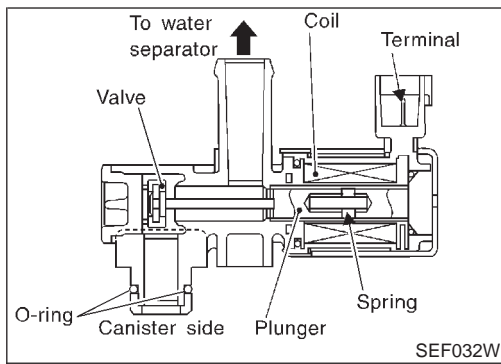
Diagnostic Procedure (Cont'd)

17	CHECK WATER SEPARATOR
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. <div style="text-align: center;">  <p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p> </div> <p style="text-align: right;">SEF829T</p> <ol style="list-style-type: none"> 5. In case of NG in items 2 - 4, replace the parts. <p>NOTE:</p> <ul style="list-style-type: none"> • Do not disassemble water separator. <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 18.
NG	▶ Clean or replace water separator.

18	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

Component Description



Component Description

NCEC0596

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.

GI
MA
EM
LC

EC

FE

CL

MT

CONSULT-II Reference Value in Data Monitor Mode

NCEC0597

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

AX

SU

ECM Terminals and Reference Value

NCEC0658

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	PU/W	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

BR

ST

RS

BT

HA

On Board Diagnosis Logic

NCEC0598

Malfunction is detected when EVAP canister vent control valve remains closed under specified driving conditions.

SC

EL

IDX

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

Possible Cause

Possible Cause

NCEC0599

- EVAP canister vent control valve
- EVAP control system pressure sensor and the circuit
- Blocked rubber tube to EVAP canister vent control valve
- Water separator
- EVAP canister is saturated with water.

4	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 Confirmation Procedure

NCEC0600

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

NCEC0600S01

- 1) Turn ignition switch “ON”.
- 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 “Diagnostic Procedure”, EC-532.

WITH GST

NCEC0600S02

Follow the procedure “WITH CONSULT-II” above.

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

Wiring Diagram

Wiring Diagram

NCEC0601

EC-VENT/V-01 GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

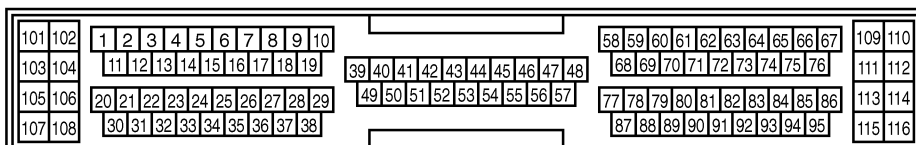
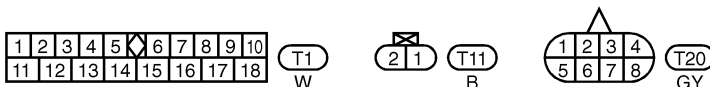
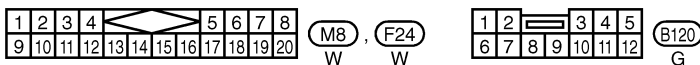
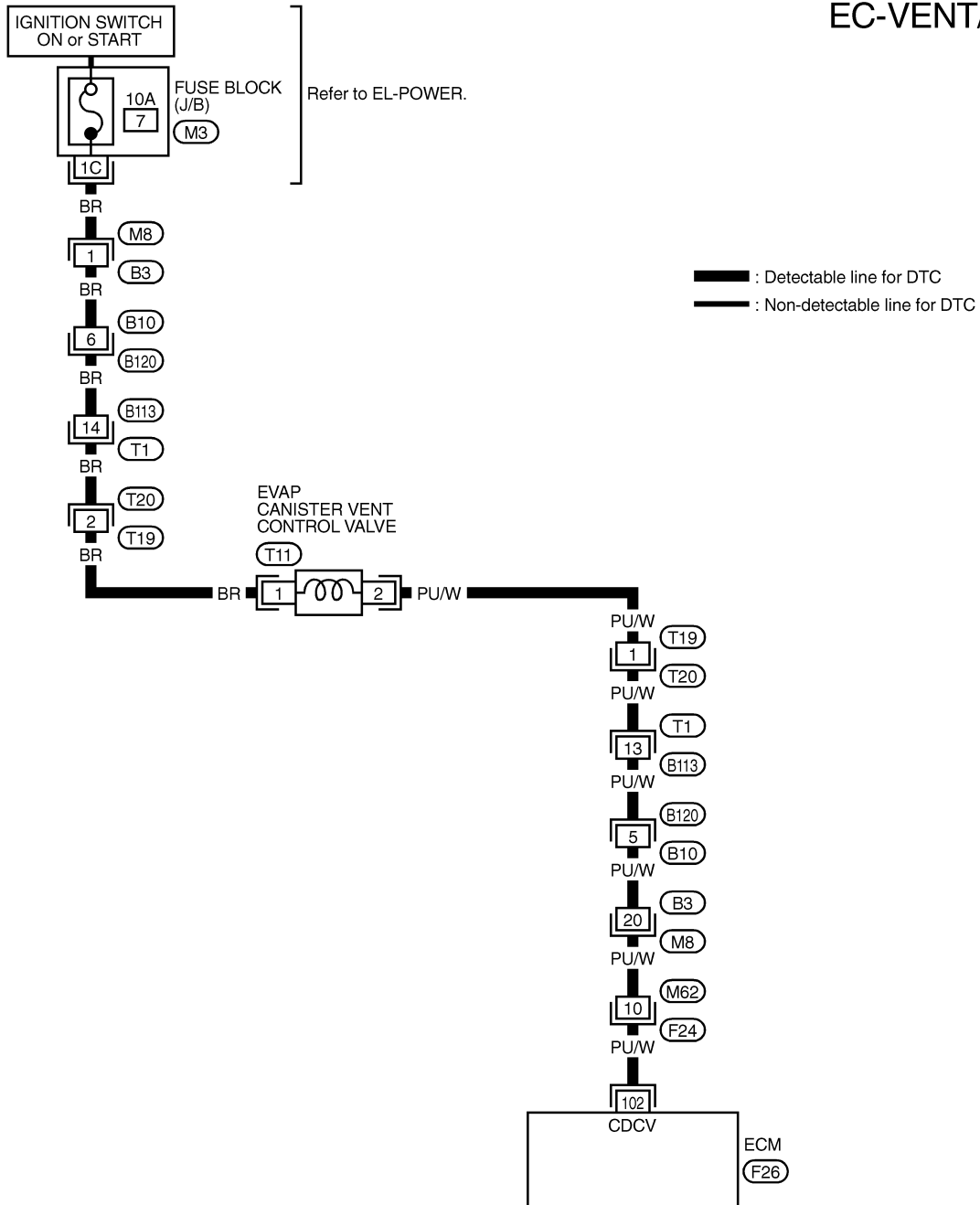
BT

HA

SC

EL

IDX



REFER TO THE FOLLOWING.
M3 - FUSE BLOCK-JUNCTION BOX (J/B)



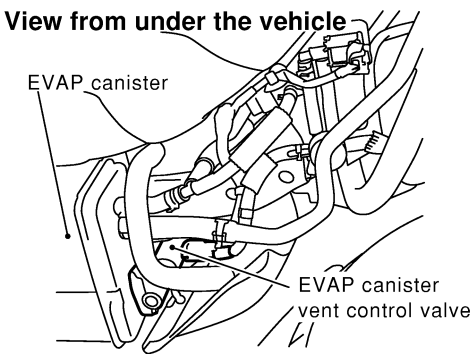
TEC712

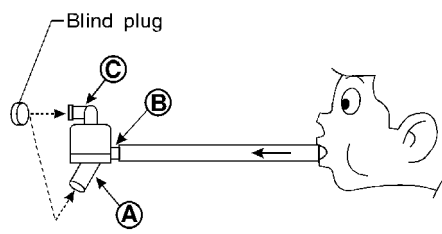
DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

Diagnostic Procedure

Diagnostic Procedure

NCEC0602

1	CHECK RUBBER TUBE
<p>1. Turn ignition switch "OFF". 2. Disconnect rubber tube connected to EVAP canister vent control valve. 3. Check the rubber tube for clogging.</p> <p style="text-align: center;">View from under the vehicle</p>  <p style="text-align: right;">SEF859X</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 2.
NG	▶ Clean rubber tube using an air blower.

2	CHECK WATER SEPARATOR
<p>1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged.</p>  <p style="text-align: center;">* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p> <p style="text-align: right;">SEF829T</p> <p>5. In case of NG in items 2 - 4, replace the parts.</p> <p>NOTE:</p> <ul style="list-style-type: none"> Do not disassemble water separator. <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ Clean or replace water separator.

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

Diagnostic Procedure (Cont'd)

3 CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.

SEF337X

OK or NG

OK	▶	GO TO 4.
NG	▶	Replace EVAP canister vent control valve.

GI
MA
EM
LC
EC

4 CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

1. Turn ignition switch ON.
2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
3. Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 (B1)	XXX V
THRTL POS SEN	XXX V

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

SEF803Y

FE
CL
MT
AT
AX
SU
BR
ST

Without CONSULT-II

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.

SEF339X

Make sure new O-ring is installed properly.

OK or NG

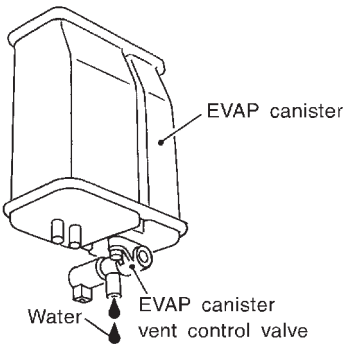
OK	▶	GO TO 6.
NG	▶	GO TO 5.

RS
BT
HA
SC
EL
IDX

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

Diagnostic Procedure (Cont'd)

5	CHECK EVAP CANISTER VENT CONTROL VALVE-III	
1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform the procedure 4 again.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace EVAP canister vent control valve.

6	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 7.
No	▶	GO TO 9.

SEF596U

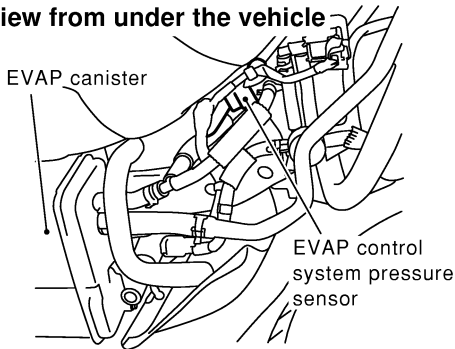
7	CHECK EVAP CANISTER	
Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).		
OK or NG		
OK	▶	GO TO 9.
NG	▶	GO TO 8.

8	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 		
		▶ Repair hose or replace EVAP canister.

9	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 10.
NG	▶	Repair it.

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

Diagnostic Procedure (Cont'd)

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR	
1. Disconnect EVAP control system pressure sensor harness connector.	<p style="text-align: center;">View from under the vehicle</p>  <p style="text-align: right;">SEF860X</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p>
2. Check connectors for water. Water should not exist.		
OK	▶	FE
NG	▶	CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

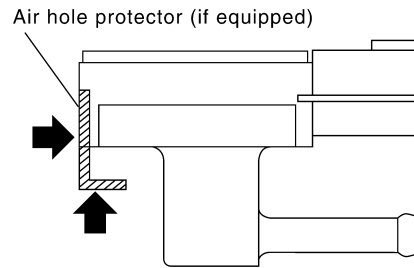
Diagnostic Procedure (Cont'd)

11 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

- Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

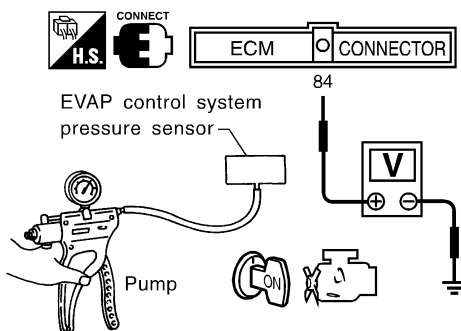
3. Turn ignition switch "ON".

4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -20 kPa (-150 mmHg , -5.91 inHg) or over 20 kPa (150 mmHg , 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 84 and ground.



Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

SEF342X

CAUTION:

- Discard and EVAP control system pressure 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.

OK or NG

OK	▶	GO TO 12.
NG	▶	Replace EVAP control system pressure sensor.

12 CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.

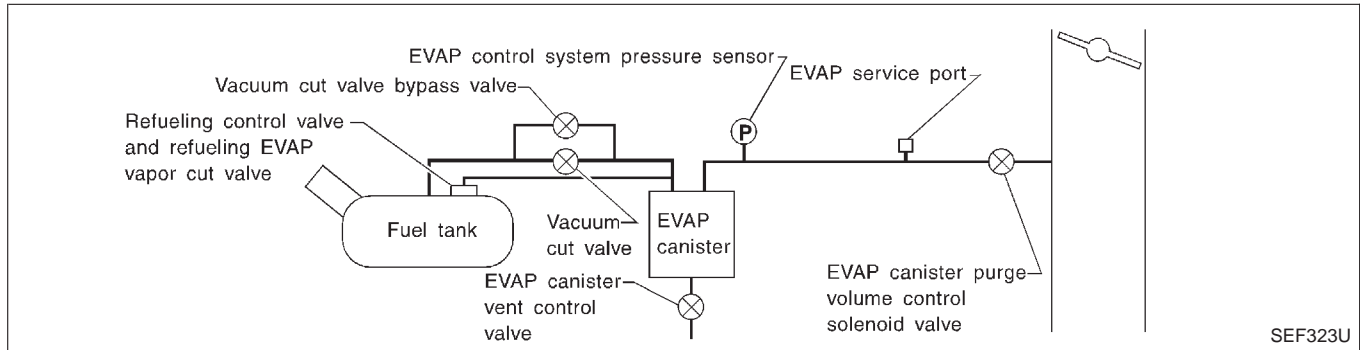
	▶	INSPECTION END
--	---	----------------

System Description

NCEC0603

NOTE:

If DTC P1447 is displayed with P0510, perform trouble diagnosis for DTC P0510 first. (See EC-445.)



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

NCEC0604

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a fault is determined.

Malfunction is detected when EVAP control system does not operate properly, EVAP control system has a leak between intake manifold and EVAP control system pressure sensor.

Possible Cause

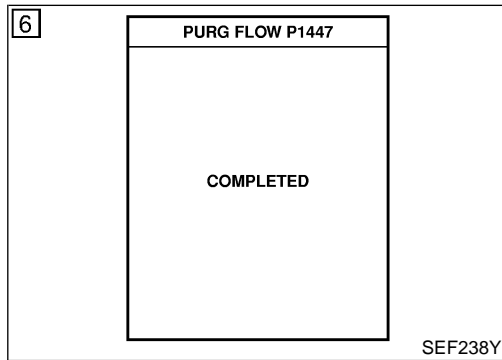
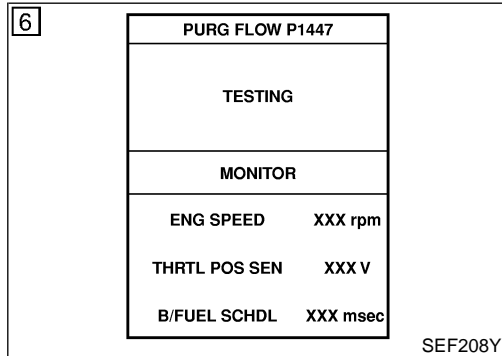
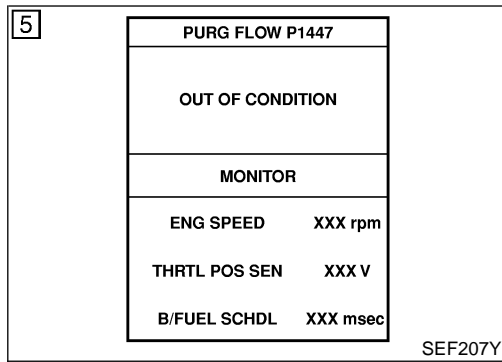
NCEC0605

- EVAP canister purge volume control solenoid valve stuck closed
- EVAP control system pressure sensor and the circuit
- Loose, disconnected or improper connection of rubber tube
- Blocked rubber tube
- Cracked EVAP canister
- EVAP canister purge volume control solenoid valve circuit
- Closed throttle position switch
- Blocked purge port
- EVAP canister vent control valve

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

DTC Confirmation Procedure



DTC Confirmation Procedure

NCEC0606

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°C (41°F) or more.

WITH CONSULT-II

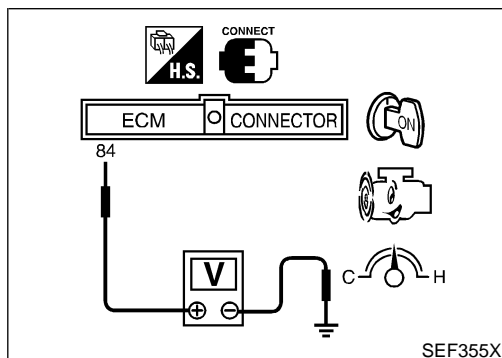
NCEC0606S01

- 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 P1447" 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 - 3,650 rpm
B/FUEL SCHDL	1.0 - 8.9 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 "Diagnostic Procedure", EC-540.



Overall Function Check

NCEC0607

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

NCEC0607S01

- 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.

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Overall Function Check (Cont'd)

- 5) Set voltmeter probes to ECM terminals 84 (EVAP control system pressure sensor signal) and ground.
- 6) Check EVAP control system pressure sensor value at idle speed and note it. GI
- 7) Establish and maintain the following conditions for at least 1 minute. MA

Air conditioner switch	ON	
Steering wheel	Fully turned	EM
Headlamp switch	ON	
Rear window defogger switch	ON	LC
Engine speed	Approx. 3,000 rpm	
Gear position	Any position other than "P", "N" or "R"	EC

- 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. FE
- 9) If NG, go to "Diagnostic Procedure", EC-540. CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

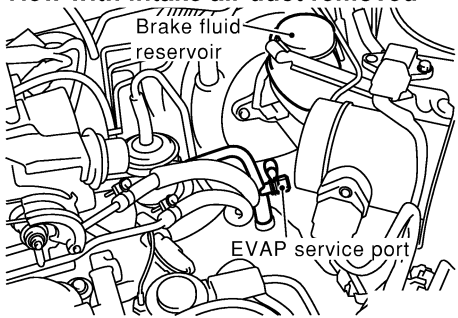
DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Diagnostic Procedure

Diagnostic Procedure

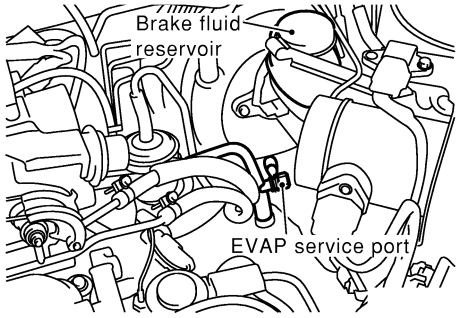
=NCEC0608

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																																	
(P) With CONSULT-II 1. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.																																		
View with intake air duct removed 																																		
SEF850X																																		
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.																																		
<table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">ACTIVE TEST</th> </tr> <tr> <th style="text-align: center;">PURG VOL CONT/V</th> <th style="text-align: center;">XXX %</th> </tr> <tr> <th colspan="2" style="text-align: center;">MONITOR</th> </tr> <tr> <th style="text-align: center;">ENG SPEED</th> <th style="text-align: center;">XXX rpm</th> </tr> <tr> <th style="text-align: center;">A/F ALPHA-B1</th> <th style="text-align: center;">XXX %</th> </tr> <tr> <th style="text-align: center;">HO2S1 MNTR (B1)</th> <th style="text-align: center;">LEAN</th> </tr> <tr> <th style="text-align: center;">THRTL POS SEN</th> <th style="text-align: center;">XXX V</th> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: center;">PURG VOL CONT/V</th> <th style="text-align: center;">VACUUM</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">100.0%</td> <td style="text-align: center;">Should exist</td> </tr> <tr> <td style="text-align: center;">0.0%</td> <td style="text-align: center;">Should not exist</td> </tr> </tbody> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V													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	XXX %																																	
HO2S1 MNTR (B1)	LEAN																																	
THRTL POS SEN	XXX V																																	
PURG VOL CONT/V	VACUUM																																	
100.0%	Should exist																																	
0.0%	Should not exist																																	
SEF804Y																																		
OK or NG																																		
OK	▶	GO TO 7.																																
NG	▶	GO TO 4.																																

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Diagnostic Procedure (Cont'd)

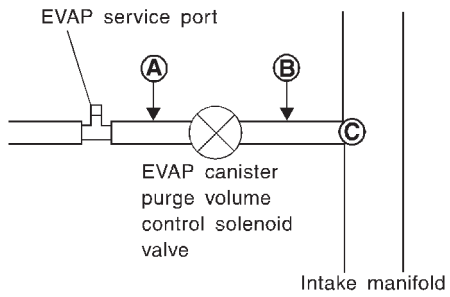
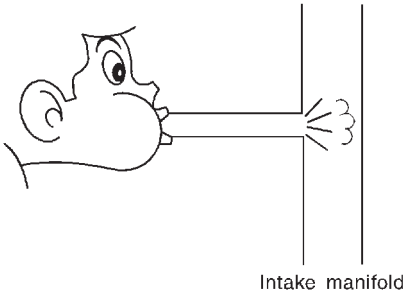
3	CHECK PURGE FLOW	<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine. 3. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge. <div style="text-align: center; margin: 10px 0;"> <p>View with intake air duct removed</p>  </div> <ol style="list-style-type: none"> 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. <p style="text-align: center; margin-top: 10px;">OK or NG</p>	GI MA EM LC EC FE CL MT AT
OK	▶	GO TO 7.	
NG	▶	GO TO 4.	

SEF850X

4	CHECK EVAP PURGE LINE	<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Check EVAP purge line for improper connection or disconnection. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-37. <p style="text-align: center; margin-top: 10px;">OK or NG</p>	AX SU BR ST RS BT HA SC EL IDX
OK	▶	GO TO 5.	
NG	▶	Repair it.	


DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Diagnostic Procedure (Cont'd)

5	CHECK EVAP PURGE HOSE AND PURGE PORT
<p>1. Disconnect purge hoses connected to EVAP service port A and EVAP canister purge volume control solenoid valve B.</p>	
	
<p>2. Blow air into each hose and EVAP purge port C.</p> <p>3. Check that air flows freely.</p>	
	
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.

SEF367U

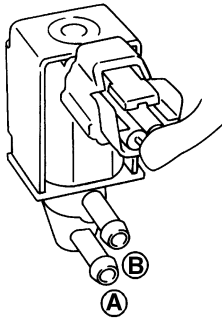
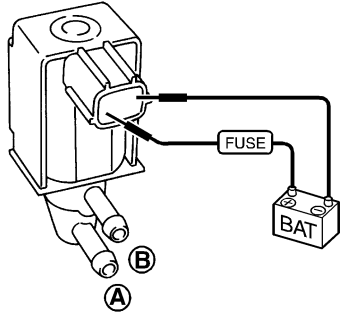
SEF368U

6	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																				
<p> With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																					
<table border="1" style="margin: auto;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td>XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>		ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V						
ACTIVE TEST																					
PURG VOL CONT/V	XXX %																				
MONITOR																					
ENG SPEED	XXX rpm																				
A/F ALPHA-B1	XXX %																				
HO2S1 MNTR (B1)	LEAN																				
THRTL POS SEN	XXX V																				
OK or NG																					
OK ▶	GO TO 8.																				
NG ▶	GO TO 7.																				

SEF801Y

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Diagnostic Procedure (Cont'd)

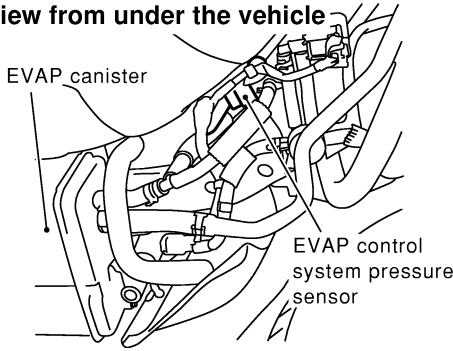
7	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE							
<p>Ⓟ With CONSULT-II Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>								
								
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Condition PURG VOL CONT/V value</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">100.0%</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: center;">0.0%</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>			Condition PURG VOL CONT/V value	Air passage continuity between A and B	100.0%	Yes	0.0%	No
Condition PURG VOL CONT/V value	Air passage continuity between A and B							
100.0%	Yes							
0.0%	No							
SEF334X								
<p>ⓧ Without CONSULT-II Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>								
								
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: center;">No supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>			Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	Yes	No supply	No
Condition	Air passage continuity between A and B							
12V direct current supply between terminals 1 and 2	Yes							
No supply	No							
SEF335X								
OK or NG								
OK	▶	GO TO 8.						
NG	▶	Replace EVAP canister purge volume control solenoid valve.						

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

8	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE	
<p>1. Turn ignition switch "OFF". 2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.</p>		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Repair it.

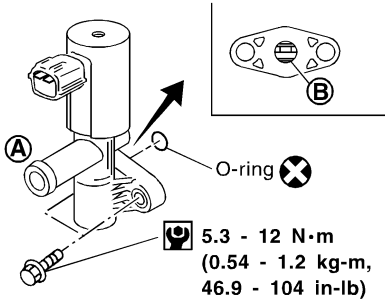
DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Diagnostic Procedure (Cont'd)

9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR	
<p>1. Disconnect EVAP control system pressure sensor harness connector.</p> <p style="text-align: center;">View from under the vehicle</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>EVAP canister</p> <p>EVAP control system pressure sensor</p> </div> <div style="text-align: right;">SEF860X</div> </div> <p>2. Check connectors for water. Water should not exist.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 10.
NG	▶	Replace EVAP control system pressure sensor.

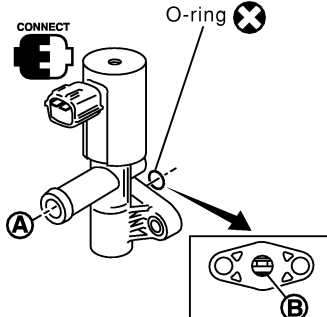
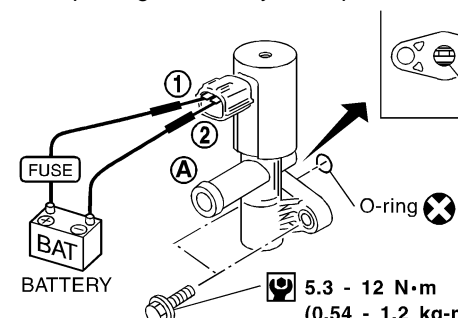
10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION	
<p>Refer to "DTC Confirmation Procedure" for DTC P0450, EC-397.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 11.
NG	▶	Replace EVAP control system pressure sensor.

11	CHECK RUBBER TUBE FOR CLOGGING	
<p>1. Disconnect rubber tube connected to EVAP canister vent control valve.</p> <p>2. Check the rubber tube for clogging.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 12.
NG	▶	Clean the rubber tube using an air blower.

12	CHECK EVAP CANISTER VENT CONTROL VALVE-I	
<p>1. Remove EVAP canister vent control valve from EVAP canister.</p> <p>2. Check portion B of EVAP canister vent control valve for being rusted.</p> <div style="display: flex; justify-content: center; align-items: center; margin-top: 20px;">  <div style="margin-left: 20px;"> <p>O-ring </p> <p> 5.3 - 12 N·m (0.54 - 1.2 kg-m, 46.9 - 104 in-lb)</p> </div> </div> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 13.
NG	▶	Replace EVAP canister vent control valve.

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Diagnostic Procedure (Cont'd)


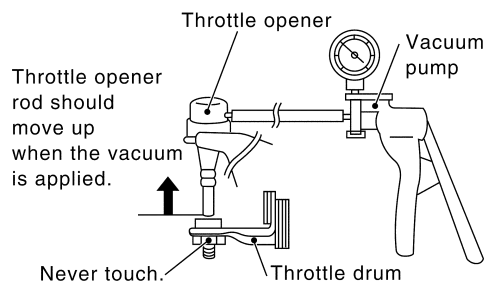
13	CHECK EVAP CANISTER VENT CONTROL VALVE-II																										
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Reconnect harness connectors disconnected. 2. Turn ignition switch "ON". 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time. 																											
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;">  </div> <div style="width: 30%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">VENT CONTROL/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2" style="text-align: center;">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 (B1)</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td style="text-align: center;">THRTL POS SEN</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> </div> <div style="width: 35%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition VENT CONTROL/V</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">ON</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">OFF</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table> <p style="text-align: center;">Operation takes less than 1 second.</p> </div> </div>		ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 (B1)	XXX V	THRTL POS SEN	XXX V							Condition VENT CONTROL/V	Air passage continuity between A and B	ON	No	OFF	Yes
ACTIVE TEST																											
VENT CONTROL/V	OFF																										
MONITOR																											
ENG SPEED	XXX rpm																										
A/F ALPHA-B1	XXX %																										
HO2S1 (B1)	XXX V																										
THRTL POS SEN	XXX V																										
Condition VENT CONTROL/V	Air passage continuity between A and B																										
ON	No																										
OFF	Yes																										
SEF803Y																											
<p>⊗ Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>																											
<div style="display: flex; justify-content: space-between;"> <div style="width: 40%;">  <p style="text-align: center;">5.3 - 12 N·m (0.54 - 1.2 kg-m, 46.9 - 104 in-lb)</p> </div> <div style="width: 55%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">OFF</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table> <p style="text-align: center;">Operation takes less than 1 second.</p> </div> </div>		Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	No	OFF	Yes																				
Condition	Air passage continuity between A and B																										
12V direct current supply between terminals 1 and 2	No																										
OFF	Yes																										
SEF339X																											
Make sure new O-ring is installed properly.																											
OK or NG																											
OK (With CONSULT-II)	▶ GO TO 15.																										
OK (Without CONSULT-II)	▶ GO TO 16.																										
NG	▶ GO TO 14.																										

14	CHECK EVAP CANISTER VENT CONTROL VALVE-III
<ol style="list-style-type: none"> 1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform Test No. 13 again. 	
OK or NG	
OK (With CONSULT-II)	▶ GO TO 15.
OK (Without CONSULT-II)	▶ GO TO 16.
NG	▶ Replace EVAP canister vent control valve.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Diagnostic Procedure (Cont'd)

15	CHECK THROTTLE POSITION SWITCH						
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Install all removed parts. 2. Start engine and warm it up to normal operating temperature. 3. Turn ignition switch "OFF". 4. Remove vacuum hose connected to throttle opener. 5. Connect suitable vacuum hose to vacuum pump and the throttle opener. 6. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener. 							
							
SEF793W							
<ol style="list-style-type: none"> 7. Turn ignition switch "ON". 8. Select "DATA MONITOR" mode with CONSULT-II. 9. Check indication of "CLSD THL/P SW" under the following conditions. Measurement must be made with throttle position switch installed in vehicle. 							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Throttle valve conditions</th> <th style="padding: 5px;">CLSD THL/P SW</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Completely closed</td> <td style="padding: 5px;">ON</td> </tr> <tr> <td style="padding: 5px;">Partially open or completely open</td> <td style="padding: 5px;">OFF</td> </tr> </tbody> </table>		Throttle valve conditions	CLSD THL/P SW	Completely closed	ON	Partially open or completely open	OFF
Throttle valve conditions	CLSD THL/P SW						
Completely closed	ON						
Partially open or completely open	OFF						
MTBL0355							
OK or NG							
OK	▶ GO TO 18.						
NG	▶ GO TO 17.						

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

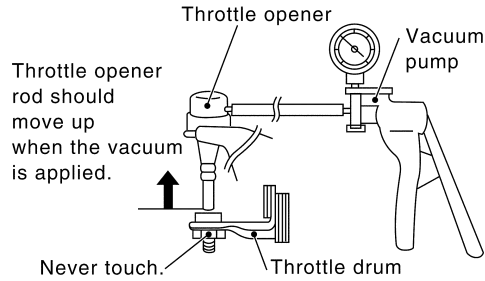
Diagnostic Procedure (Cont'd)

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

16 CHECK THROTTLE POSITION SWITCH

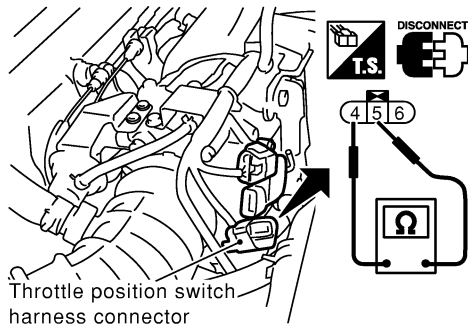
⊗ Without CONSULT-II

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF".
4. Remove vacuum hose connected to throttle opener.
5. Connect suitable vacuum hose to vacuum pump and the throttle opener.
6. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

7. Disconnect closed throttle position switch harness connector.
8. Check continuity between closed throttle position switch terminals 4 and 5 under the following conditions. Resistance measurement must be made with throttle position switch installed in vehicle.



Throttle valve conditions	Continuity
Completely closed	Yes
Partially open or completely open	No

SEF940X

OK or NG

- OK ► GO TO 18.
- NG ► GO TO 17.

17 ADJUST THROTTLE POSITION SWITCH

Check the following items. Refer to "Basic Inspection", EC-107.

Items	Specifications
Ignition timing	15°±2° BTDC
Closed throttle position switch idle position adjustment	Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF
Target idle speed	M/T: 800±50 A/T: 800±50 rpm (in "P" or "N" position)

MTBL0518

Is it possible to adjust closed throttle position switch?

Yes or No

- Yes ► GO TO 18.
- No ► Replace throttle position switch.

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

Diagnostic Procedure (Cont'd)

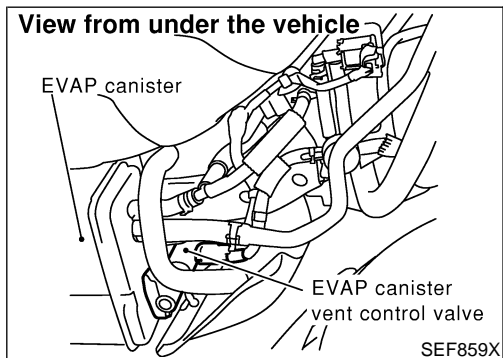
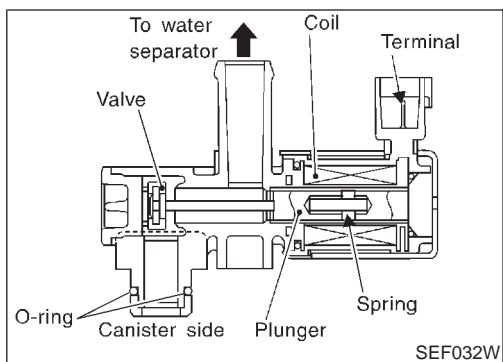
18	CHECK EVAP PURGE LINE
Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-37.	
OK or NG	
OK	▶ GO TO 19.
NG	▶ Replace it.

19	CLEAN EVAP PURGE LINE
Clean EVAP purge line (pipe and rubber tube) using air blower.	
	▶ GO TO 20.

20	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
	▶ INSPECTION END

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

Component Description



Component Description

NCEC0609

NOTE:

If DTC P1448 is displayed with P0440, 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.

GI

MA

EM

LC

EC

FE

CL

MT

CONSULT-II Reference Value in Data Monitor Mode

NCEC0610

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

AX

SU

ECM Terminals and Reference Value

NCEC0659

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.

BR

ST

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
102	PU/W	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

RS

BT

HA

On Board Diagnosis Logic

NCEC0611

Malfunction is detected when EVAP canister vent control valve remains opened under specified driving conditions.

EL

IDX

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

Possible Cause

Possible Cause

NCEC0612

- EVAP canister vent control valve
- EVAP control system pressure sensor and circuit
- Blocked rubber tube to EVAP canister vent control valve
- Water separator
- EVAP canister is saturated with water.
- Vacuum cut valve

DTC Confirmation Procedure

NCEC0613

NOTE:

- If DTC P1448 is displayed with P0440 or P1440, 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.

EVAP SML LEAK P0440/P1440

1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS.
 -FUEL LEVEL: 1/4-3/4
 -AMBIENT TEMP: 0-30 C(32-86F)
 -OPEN ENGINE HOOD.
 2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC. THEN RESTART.
 3)TOUCH START.

SEF565X

EVAP SML LEAK P0440/P1440

WAIT
2 TO 10 MINUTES.
KEEP ENGINE RUNNING
AT IDLE SPEED.

SEF566X

EVAP SML LEAK P0440/P1440

OK

SELF-DIAG RESULTS

NO DTC DETECTED.
FURTHER TESTING
MAY BE REQUIRED.

SEF567X

WITH CONSULT-II

NCEC0613S01

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).
- 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 P0440/P1440” 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 “Basic Inspection”, EC-107.
- 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 5 seconds, then turn “ON”.
- 8) Disconnect hose from water separator.
- 9) Select “VENT CONTROL/V” of “ACTIVE TEST” mode with CONSULT-II.
- 10) Touch “ON” and “OFF” alternately.

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

DTC Confirmation Procedure (Cont'd)

11	ACTIVE TEST	
	VENT CONTROL/V	OFF
	MONITOR	
	ENG SPEED	XXX rpm
	A/F ALPHA-B1	XXX %
	HO2S1 (B1)	XXX V
	THRTL POS SEN	XXX V

SEF805Y

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 "Diagnostic Procedure", EC-553.
If the result is OK, go to "Diagnostic Procedure" for DTC P0440, EC-370.

5.3 - 12 N·m
(0.54 - 1.2 kg-m,
46.9 - 104 in-lb)

AEC783A

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 water separator.
- 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 "Diagnostic Procedure", EC-553.
If the result is OK, go to "Diagnostic Procedure" for DTC P0440, EC-370.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

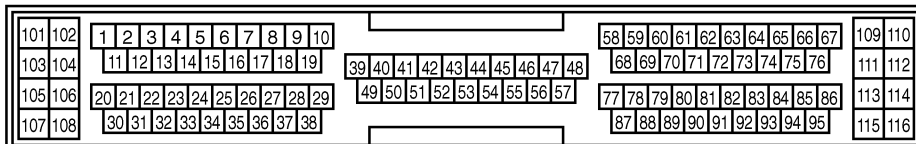
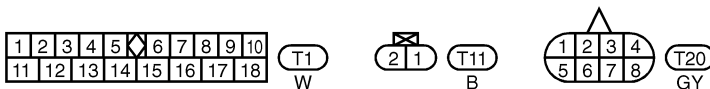
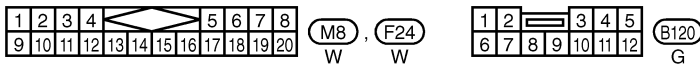
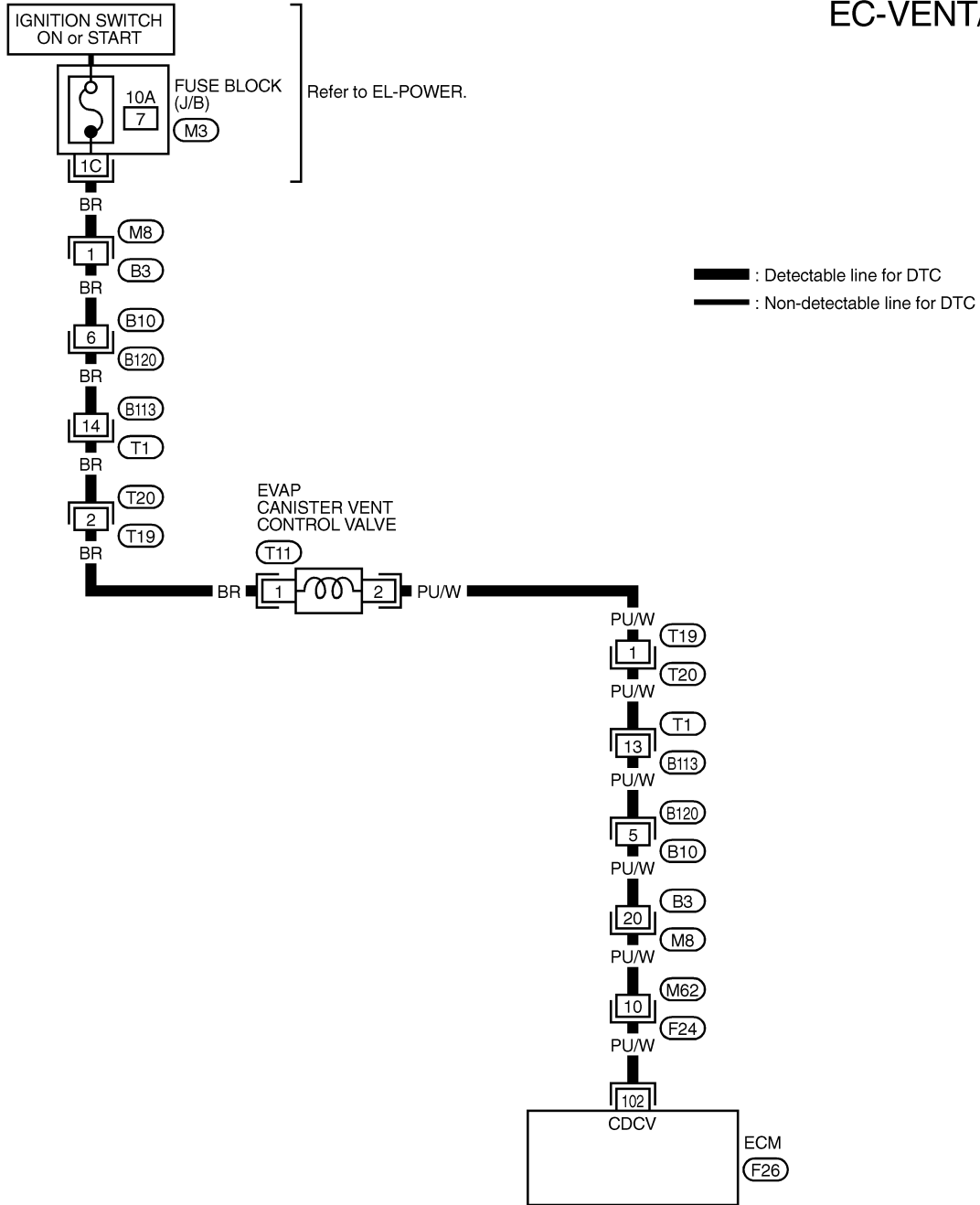
DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

Wiring Diagram

Wiring Diagram

NCEC0615

EC-VENT/V-01



REFER TO THE FOLLOWING.
 (M3) - FUSE BLOCK-JUNCTION BOX (J/B)

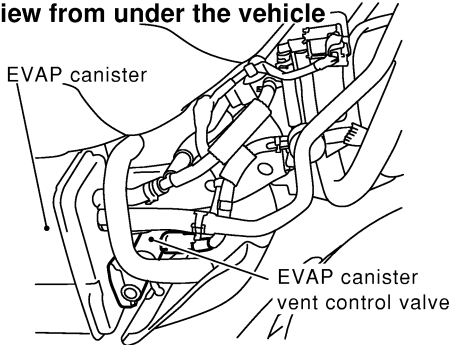
TEC712

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

Diagnostic Procedure

Diagnostic Procedure

NCEC0616

1	CHECK RUBBER TUBE		
<p>1. Turn ignition switch "OFF". 2. Disconnect rubber tube connected to EVAP canister vent control valve. 3. Check the rubber tube for clogging.</p> <p style="text-align: center;">View from under the vehicle</p>  <p style="text-align: right;">SEF859X</p>			
OK or NG			
OK	▶	GO TO 2.	
NG	▶	Clean rubber tube using an air blower.	

GI

MA

EM

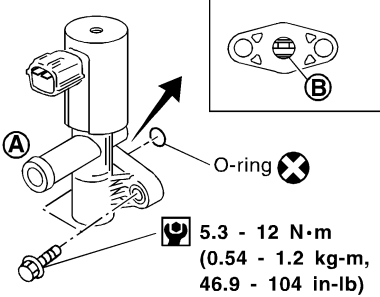
LC

EC

FE

CL

MT

2	CHECK EVAP CANISTER VENT CONTROL VALVE-I		
<p>1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.</p>  <p style="text-align: right;">SEF337X</p>			
OK or NG			
OK	▶	GO TO 3.	
NG	▶	Replace EVAP canister vent control valve.	

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

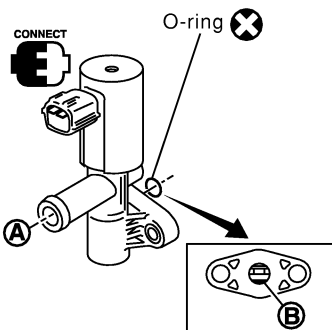
DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

Diagnostic Procedure (Cont'd)

3 CHECK EVAP CANISTER VENT CONTROL VALVE-II

 With CONSULT-II

1. Turn ignition switch ON.
2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
3. Check air passage continuity and operation delay time.



ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 (B1)	XXX V
THRTL POS SEN	XXX V

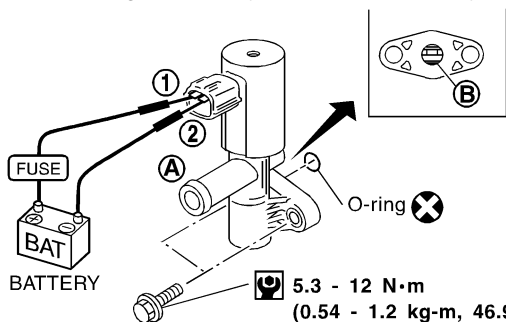
Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

SEF803Y

 Without CONSULT-II

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.

SEF339X

Make sure new O-ring is installed properly.

OK or NG

OK ► GO TO 5.

NG ► GO TO 4.

4 CHECK EVAP CANISTER VENT CONTROL VALVE-III

1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower.
2. Perform Test No. 3 again.

OK or NG

OK ► GO TO 5.

NG ► Replace EVAP canister vent control valve.

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

Diagnostic Procedure (Cont'd)

5	CHECK VACUUM CUT VALVE		
		<ol style="list-style-type: none"> 1. Turn ignition switch OFF. 2. Remove vacuum cut valve. 3. Check vacuum cut valve as follows: 	GI MA EM LC EC FE CL MT AT
			SEF379Q
		<ol style="list-style-type: none"> a. Plug port C and D with fingers. b. Apply vacuum to port A and check that there is no suction from port B. c. Apply vacuum to port B and check that there is suction from port A. d. Blow air in port B and check that there is a resistance to flow out of port A. e. Open port C and D. f. Blow air in port A check that air flows freely out of port C. g. Blow air in port B check that air flows freely out of port D. 	
		OK or NG	
OK	▶	GO TO 6.	AX
NG	▶	Replace vacuum cut valve.	SU BR ST RS BT HA SC

6	CHECK IF EVAP CANISTER SATURATED WITH WATER		
		<ol style="list-style-type: none"> 1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister. 	SU BR ST RS BT HA SC
			SEF596U
		Yes or No	
Yes	▶	GO TO 7.	EL
No	▶	GO TO 9.	IDX

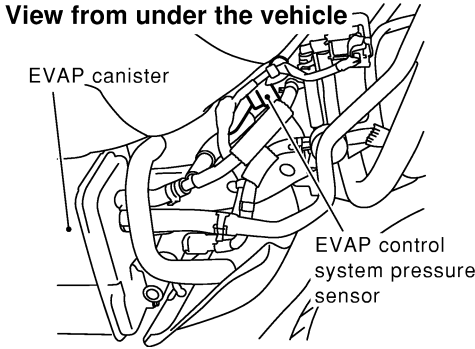
7	CHECK EVAP CANISTER		
		Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).	EL IDX
		OK or NG	
OK	▶	GO TO 9.	
NG	▶	GO TO 8.	

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

Diagnostic Procedure (Cont'd)

8	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 	
▶	Repair hose or replace EVAP canister.

9	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 10.
NG	▶ Repair it.

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR
1. Disconnect EVAP control system pressure sensor harness connector.	
View from under the vehicle 	
SEF860X	
2. Check connectors for water. Water should not exist.	
OK or NG	
OK	▶ GO TO 11.
NG	▶ Replace EVAP control system pressure sensor.

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

Diagnostic Procedure (Cont'd)

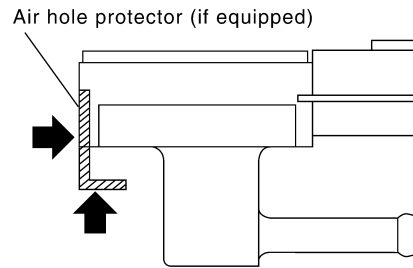
GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

11 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

- Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

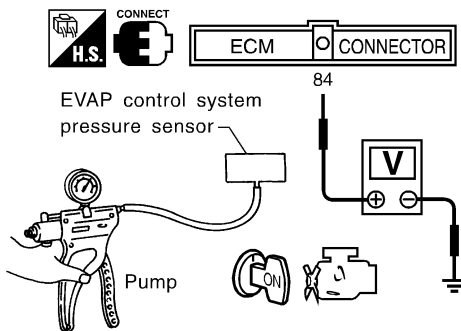
3. Turn ignition switch "ON".

4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 84 and ground.



Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

SEF342X

CAUTION:

- Discard and EVAP control system pressure 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.

OK or NG

OK ► GO TO 12.

NG ► Replace EVAP control system pressure sensor.

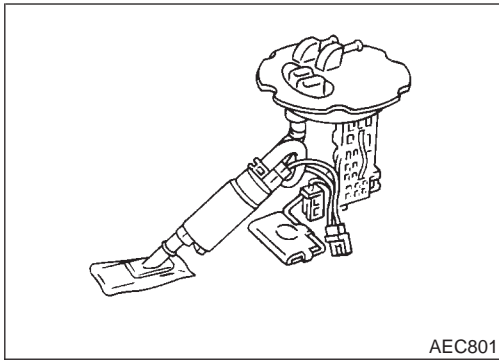
12 CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.

► INSPECTION END

DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

Component Description



Component Description

NCEC0617

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.

ECM Terminals and Reference Value

NCEC0660

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)
83	G/R	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.
90	B	Fuel level sensor ground	[Engine is running]	Approximately 0V

On Board Diagnostic Logic

NCEC0618

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. Malfunction is detected when a high voltage from the sensor is sent to ECM.

Possible Cause

NCEC0619

- Fuel level sensor circuit
(The fuel level sensor circuit is open or shorted.)

DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

DTC Confirmation Procedure

DTC Confirmation Procedure

NCEC0620

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.

GI

MA

EM

LC

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

WITH CONSULT-II

NCEC0620S01

- 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 "Diagnostic Procedure", EC-561.

EC

FE

WITH GST

NCEC0620S02

Follow the procedure "WITH CONSULT-II" above.

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

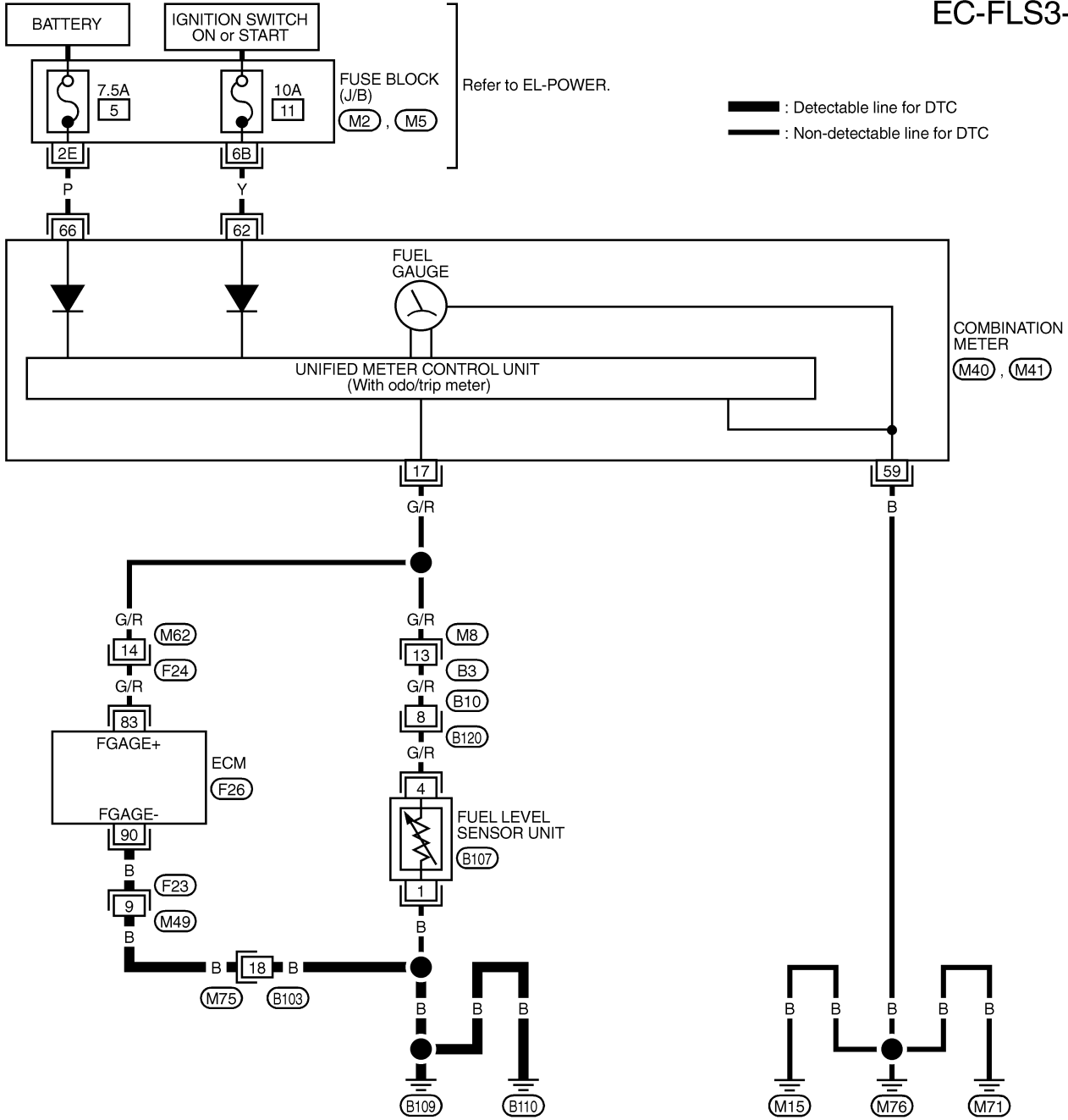
DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

Wiring Diagram

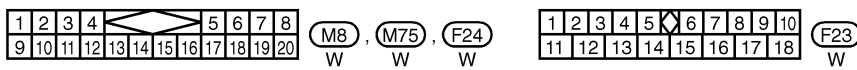
Wiring Diagram

NCEC0621

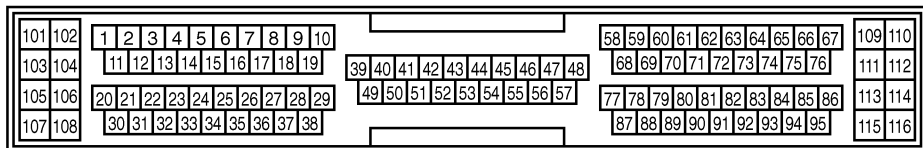
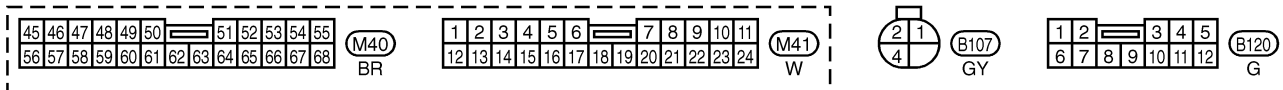
EC-FLS3-01



— : Detectable line for DTC
 — : Non-detectable line for DTC



REFER TO THE FOLLOWING.
 (M2), (M5) - FUSE BLOCK-JUNCTION BOX (J/B)



TEC832

DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

Diagnostic Procedure

Diagnostic Procedure

=NCEC0622

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 90 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.

GI
MA
EM
LC

2	DETECT MALFUNCTIONING PART
1. Check the following. <ul style="list-style-type: none">● Harness connectors F23, M49● Harness connectors M75, B103● Harness for open and short between ECM and body ground	
	▶ Replace open circuit or short to power in harness or connectors.

EC
FE
CL

3	CHECK FUEL LEVEL SENSOR
Refer to EL-97, "Fuel Level Sensor Unit Check".	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Replace fuel level sensor unit.

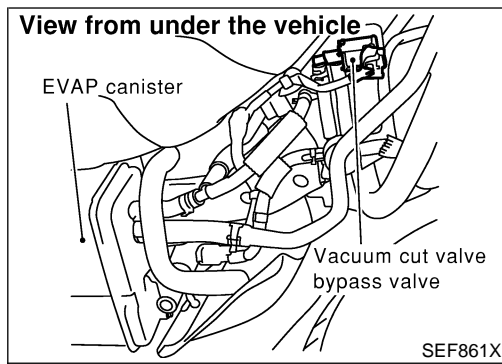
MT
AT
AX

4	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146	
OK or NG	
	▶ INSPECTION END

SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

Description



Description

COMPONENT DESCRIPTION

=NCEC0623

NCEC0623S01

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.

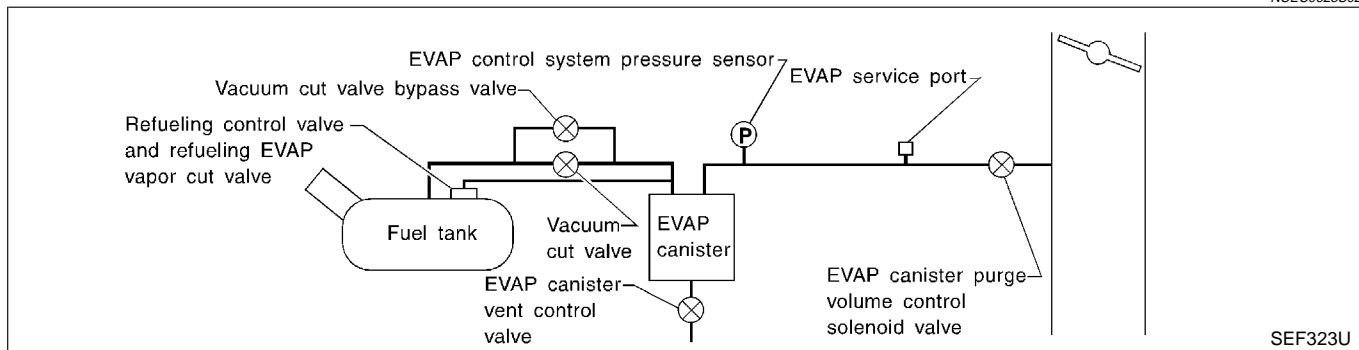
The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

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

NCEC0623S02



CONSULT-II Reference Value in Data Monitor Mode

NCEC0624

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPASS/V	● Ignition switch: ON	OFF

ECM Terminals and Reference Value

NCEC0661

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	PU/R	Vacuum cut valve bypass valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

On Board Diagnosis Logic

On Board Diagnosis Logic

Malfunction is detected when an improper voltage signal is sent to ECM through vacuum cut valve bypass valve.

NCEC0625

GI

MA

EM

LC

Possible Cause

- Harness or connectors
(The vacuum cut valve bypass valve circuit is open or shorted.)
- Vacuum cut valve bypass valve

NCEC0626

EC

FE

CL

MT

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 speed.

NCEC0627

AT

AX

SU

BR

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

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 "Diagnostic Procedure", EC-565.

NCEC0627S01

ST

RS

WITH GST

Follow the procedure "WITH CONSULT-II" above.

NCEC0627S02

BT

HA

SC

EL

IDX

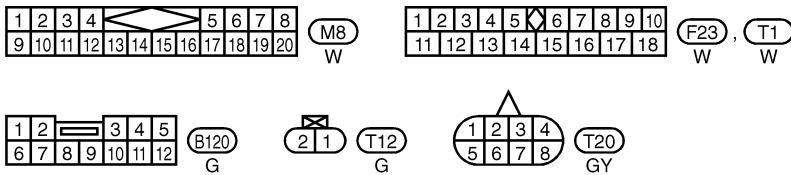
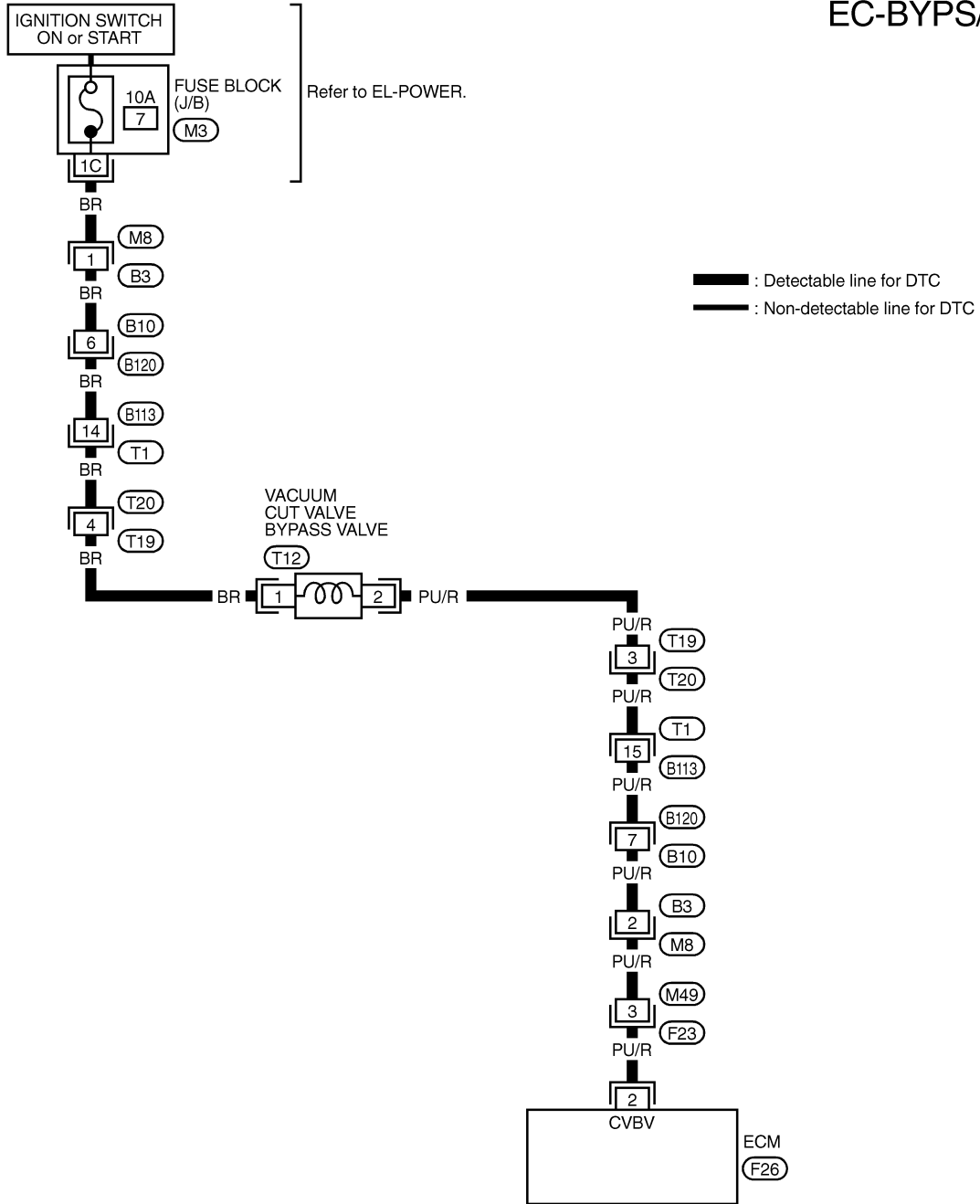
DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

Wiring Diagram

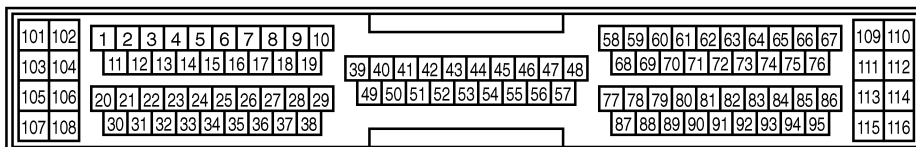
Wiring Diagram

NCEC0628

EC-BYPS/V-01



REFER TO THE FOLLOWING.
 M3 - FUSE BLOCK-JUNCTION BOX (J/B)



TEC720

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)


Diagnostic Procedure

Diagnostic Procedure

NCEC0629

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

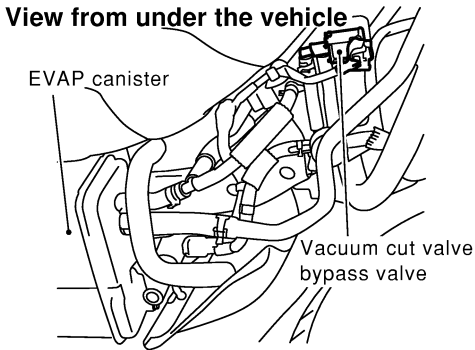
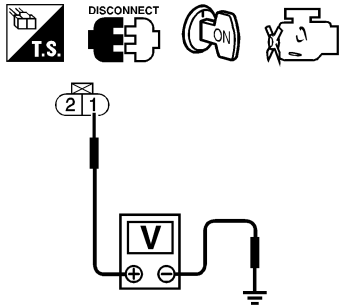
GI
MA
EM

2	CHECK VACUUM CUT VALVE BYPASS VALVE CIRCUIT																					
<p> With CONSULT-II</p> <ol style="list-style-type: none"> Turn ignition switch "OFF" and then "ON". Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II. Touch "ON/OFF" on CONSULT-II screen. 																						
<table border="1"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>VC/V BYPASS/V</th> <th>OFF</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> </thead> <tbody> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>RICH</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>			ACTIVE TEST		VC/V BYPASS/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	RICH	THRTL POS SEN	XXX V						
ACTIVE TEST																						
VC/V BYPASS/V	OFF																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
HO2S1 MNTR (B1)	RICH																					
THRTL POS SEN	XXX V																					
SEF806Y																						
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.																				

LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

Diagnostic Procedure (Cont'd)

3	CHECK VACUUM CUT VALVE BYPASS VALVE POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect vacuum cut valve bypass valve harness connector.</p> <p style="text-align: center;">View from under the vehicle</p>  <p style="text-align: right;">SEF861X</p> <p>3. Turn ignition switch "ON". 4. Check voltage between vacuum cut valve bypass valve terminal 1 and ground with CONSULT-II or tester.</p>  <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p> <p style="text-align: right;">SEF356X</p>	
OK	▶ GO TO 5.
NG	▶ GO TO 4.


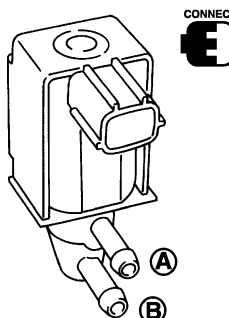
4	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M8, B3 ● Harness connectors B10, B120 ● Harness connectors B113, T1 ● Harness connectors T20, T19 ● Fuse block (J/B) connector M3 ● 10A fuse ● Harness for open or short between vacuum cut valve bypass valve and fuse 	
▶	Repair harness or connectors.


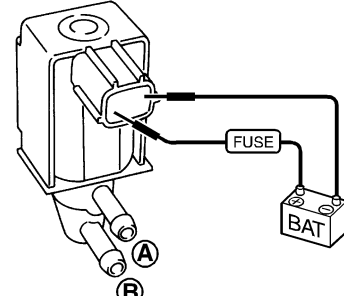
5	CHECK VACUUM CUT VALVE BYPASS VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 2 and vacuum cut valve bypass valve terminal 2. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 7.
NG	▶ GO TO 6.

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

Diagnostic Procedure (Cont'd)

6	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors T19, T20 ● Harness connectors T1, B113 ● Harness connectors B120, B10 ● Harness connectors B3, M8 ● Harness connectors M49, F23 ● 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																										
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Reconnect harness disconnected connectors. 2. Turn ignition switch ON. 3. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time under the following conditions. 																											
	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>VC/V BYPASS/V</td> <td>OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>RICH</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th>Condition VC/V BYPASS/V</th> <th>Air passage continuity between A and B</th> </tr> <tr> <td>ON</td> <td>Yes</td> </tr> <tr> <td>OFF</td> <td>No</td> </tr> </table> <p style="text-align: center;">Operation takes less than 1 second.</p>	ACTIVE TEST		VC/V BYPASS/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	RICH	THRTL POS SEN	XXX V							Condition VC/V BYPASS/V	Air passage continuity between A and B	ON	Yes	OFF	No
ACTIVE TEST																											
VC/V BYPASS/V	OFF																										
MONITOR																											
ENG SPEED	XXX rpm																										
A/F ALPHA-B1	XXX %																										
HO2S1 MNTR (B1)	RICH																										
THRTL POS SEN	XXX V																										
Condition VC/V BYPASS/V	Air passage continuity between A and B																										
ON	Yes																										
OFF	No																										
SEF807Y																											

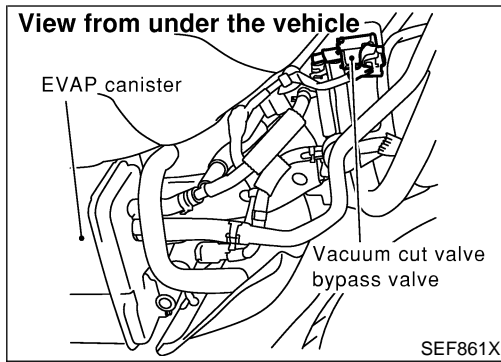
<p> Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>							
	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td>Yes</td> </tr> <tr> <td>No supply</td> <td>No</td> </tr> </table> <p style="text-align: center;">Operation takes less than 1 second.</p>	Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	Yes	No supply	No
Condition	Air passage continuity between A and B						
12V direct current supply between terminals 1 and 2	Yes						
No supply	No						
OK or NG							
OK	▶ GO TO 8.						
NG	▶ Replace vacuum cut valve bypass valve.						
SEF557Y							

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END

GI
 MA
 EM
 LC
 EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Description



Description

COMPONENT DESCRIPTION

NCEC0630

NCEC0630S01

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.

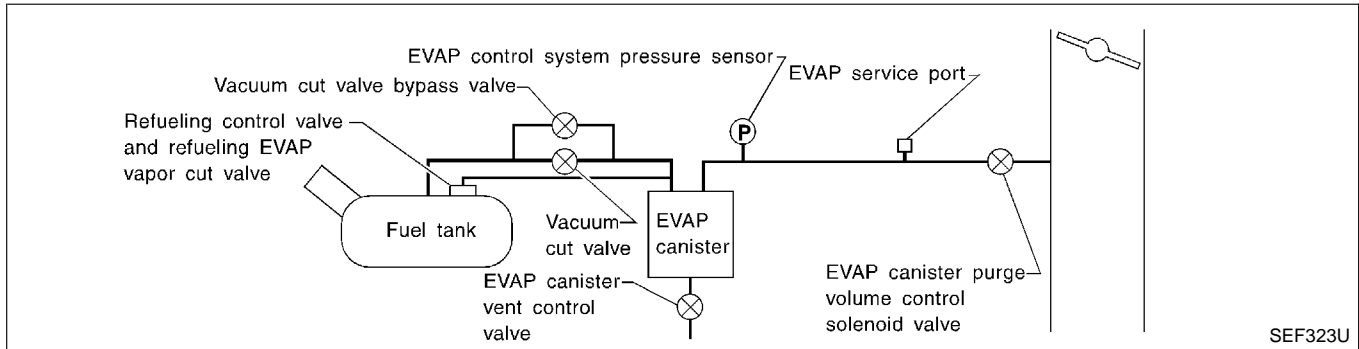
The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

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

NCEC0630S02



CONSULT-II Reference Value in Data Monitor Mode

NCEC0631

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPASS/V	● Ignition switch: ON	OFF

ECM Terminals and Reference Value

NCEC0662

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	PU/R	Vacuum cut valve bypass valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

On Board Diagnosis Logic

Malfunction is detected when vacuum cut valve bypass valve does not operate properly.

NCEC0632

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

Possible Cause

- Vacuum cut valve bypass valve
- Vacuum cut valve
- Bypass hoses for clogging
- EVAP control system pressure sensor and circuit
- EVAP canister vent control valve
- Hose between fuel tank and vacuum cut valve clogged
- Hose between vacuum cut valve and EVAP canister clogged
- EVAP canister
- EVAP purge port of fuel tank for clogging

NCEC0633

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).

NCEC0634

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.)

NCEC0634S01

7	VC CUT/V BP/V P1491	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	VHCL SPEED SE	XXX km/h
	B/FUEL SCHDL	XXX msec

SEF210Y

7	VC CUT/V BP/V P1491	
	TESTING	
	MONITOR	
	ENG SPEED	XXX rpm
	VHCL SPEED SE	XXX km/h
	B/FUEL SCHDL	XXX msec

SEF211Y

7	VC CUT/V BP/V P1491	
	COMPLETED	

SEF239Y

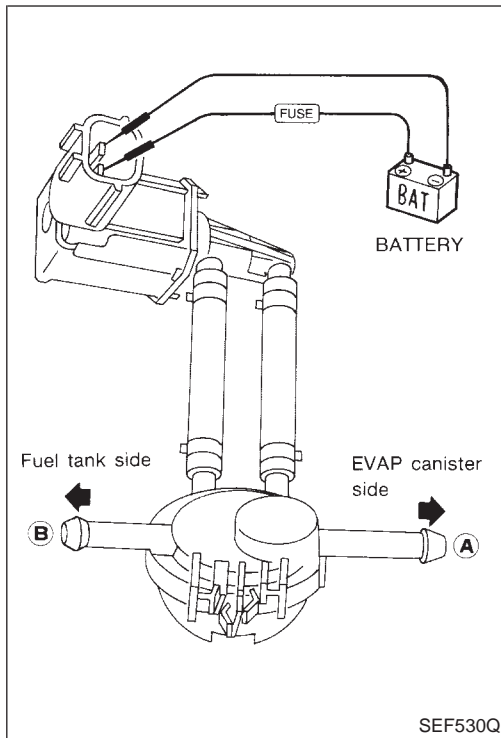
ENG SPEED	More than 1,000 rpm
Selector lever	Suitable position
Vehicle speed	More than 37 km/h (23 MPH)
B/FUEL SCHDL	1.0 – 8.9 msec

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 "Diagnostic Procedure", EC-572.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Overall Function Check



Overall Function Check

NCEC0635

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

NCEC0635S01

- 1) Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.
- 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 "Diagnostic Procedure", EC-572.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Wiring Diagram

Wiring Diagram

NCEC0636

EC-BYPS/V-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

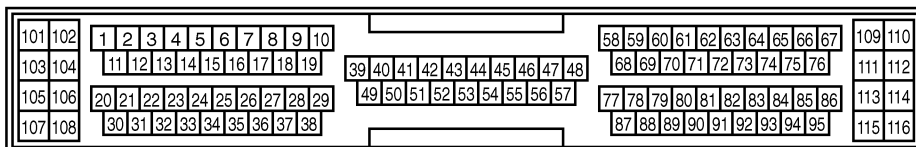
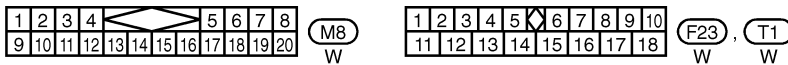
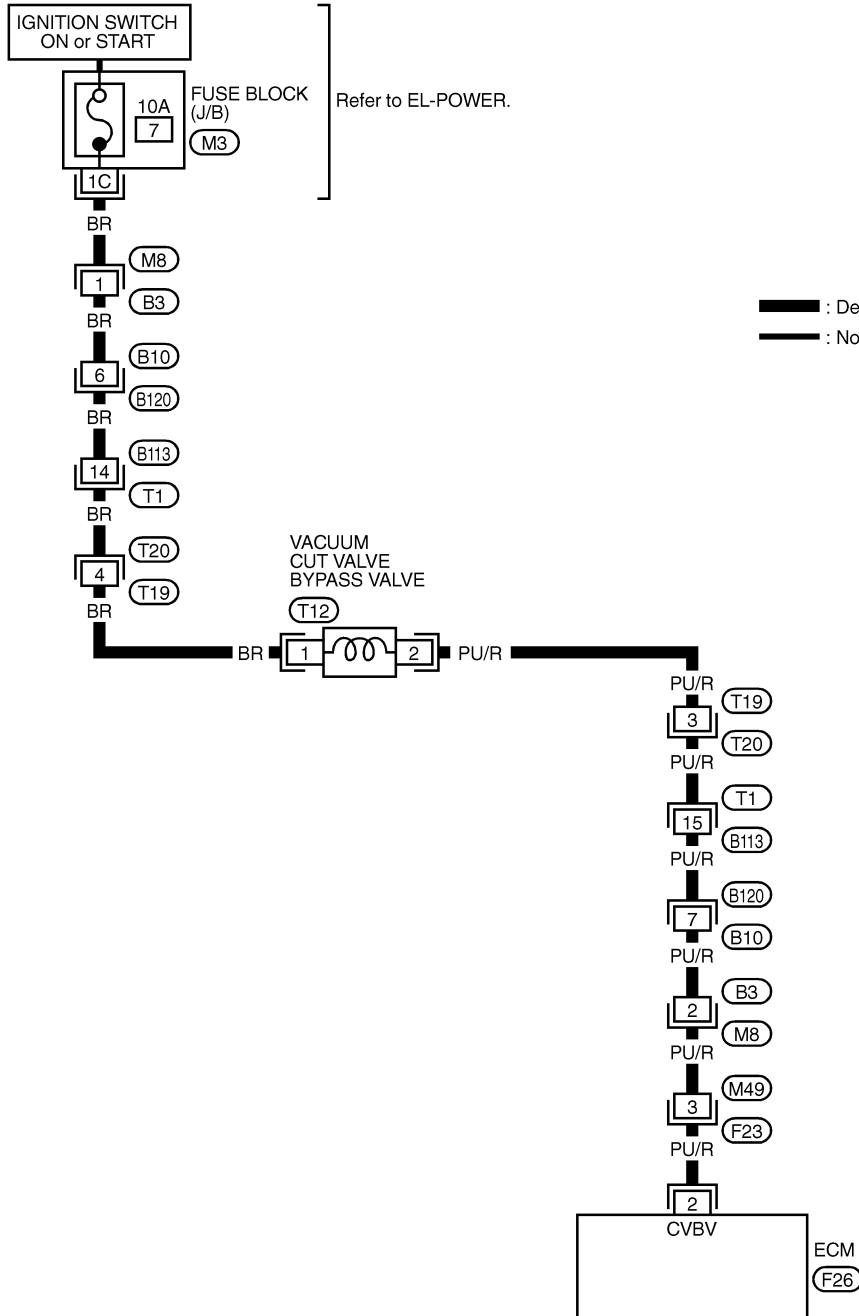
BT

HA

SC

EL

IDX



REFER TO THE FOLLOWING.
 M3 - FUSE BLOCK-JUNCTION BOX (J/B)

TEC720


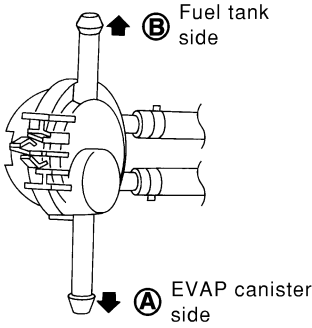
DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure

Diagnostic Procedure

NCEC0637

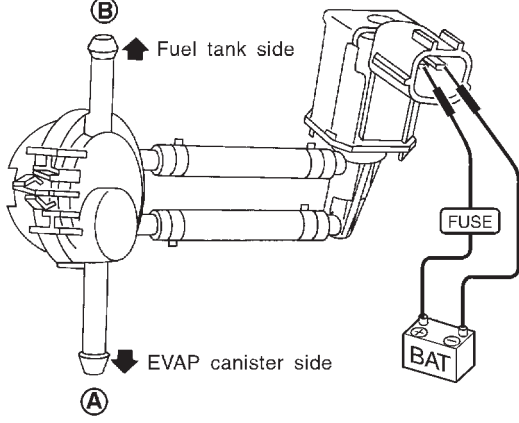
1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION																					
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 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. 																						
																						
<table border="1" style="margin-left: auto;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>VC/V BYPASS/V</td> <td>OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>RICH</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>			ACTIVE TEST		VC/V BYPASS/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	RICH	THRTL POS SEN	XXX V						
ACTIVE TEST																						
VC/V BYPASS/V	OFF																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
HO2S1 MNTR (B1)	RICH																					
THRTL POS SEN	XXX V																					
OK or NG																						
OK	▶	GO TO 4.																				
NG	▶	GO TO 5.																				

SEF808Y

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

3	CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly. 3. Apply vacuum to port B and check that there is no suction from port A. 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. 	
	
SEF914U	
OK or NG	
OK	▶ GO TO 4.
NG	▶ GO TO 7.

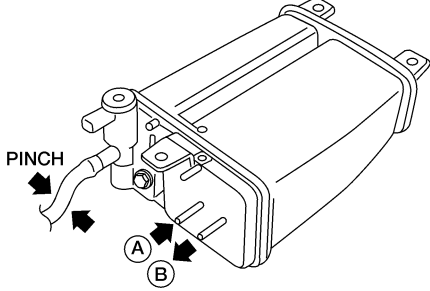
4	CHECK EVAP PURGE LINE
Check EVAP purge line between EVAP canister and fuel tank for clogging or disconnection.	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Repair it.

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.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

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 .		
		
AEC630A		
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.

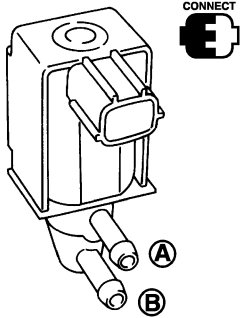
DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

8 CHECK VACUUM CUT VALVE BYPASS VALVE

With CONSULT-II

1. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode.
2. Check air passage continuity and operation delay time under the following conditions.



ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 MNTR (B1)	RICH
THRRTL POS SEN	XXX V

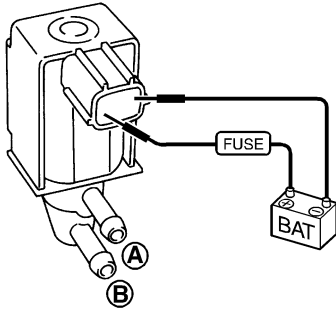
Condition VC/V BYPASS/V	Air passage continuity between A and B
ON	Yes
OFF	No

Operation takes less than 1 second.

SEF807Y

Without CONSULT-II

- 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	Yes
No supply	No

Operation takes less than 1 second.

SEF557Y

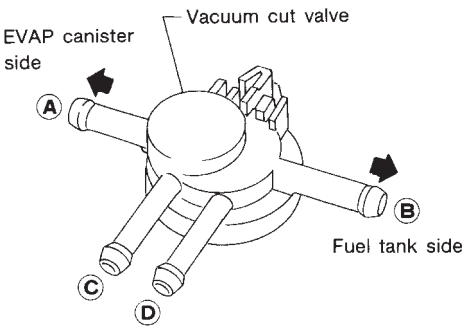
OK or NG

OK	▶	GO TO 9.
NG	▶	Replace vacuum cut valve bypass valve.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

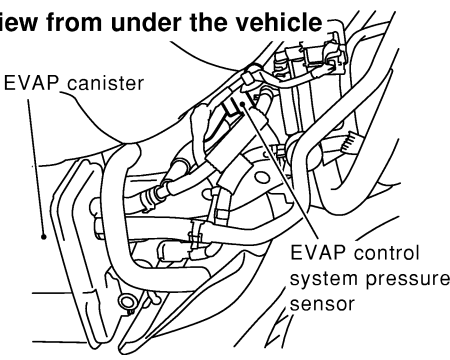
DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

9	CHECK VACUUM CUT VALVE
<p>Check vacuum cut valve as follows:</p> <div style="text-align: center;">  </div>	
<p>a. Plug port C and D with fingers. b. Apply vacuum to port A and check that there is no suction from port B. c. Apply vacuum to port B and check that there is suction from port A. d. Blow air in port B and check that there is a resistance to flow out of port A. e. Open port C and D. f. Blow air in port A check that air flows freely out of port C. g. Blow air in port B check that air flows freely out of port D.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 10.
NG	▶ Replace vacuum cut valve.

SEF379Q

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE
<p>1. Turn ignition switch "OFF". 2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 11.
NG	▶ Repair or replace.

11	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR
<p>1. Disconnect EVAP control system pressure sensor harness connector.</p> <div style="text-align: center;"> <p>View from under the vehicle</p>  </div>	
<p>2. Check connectors for water. Water should not exist.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 12.
NG	▶ Replace EVAP control system pressure sensor.

SEF860X

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

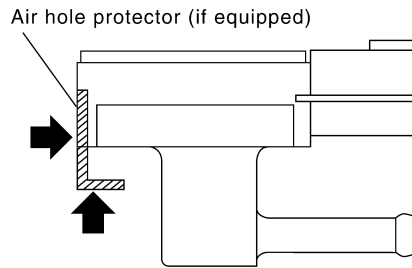
GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

12 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

- Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

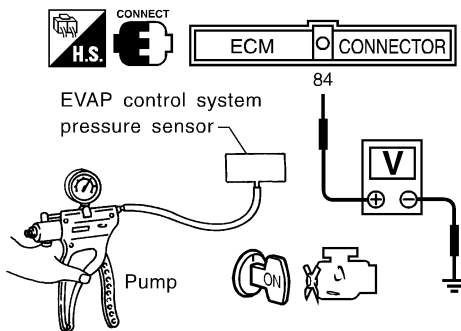
3. Turn ignition switch "ON".

4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 84 and ground.



Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

SEF342X

CAUTION:

- Discard and EVAP control system pressure 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.

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.

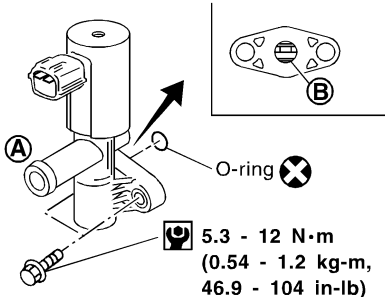
OK or NG


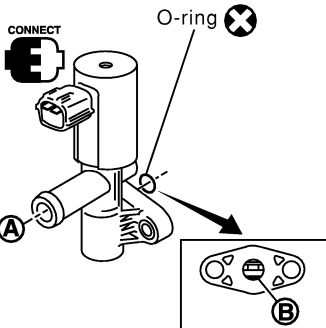
OK ► GO TO 14.


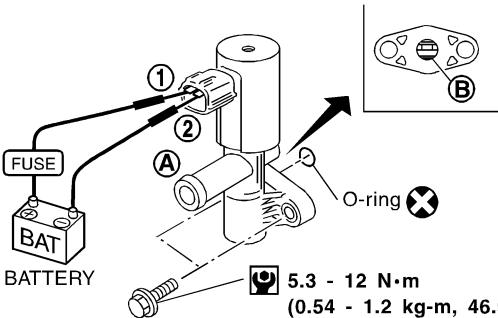
NG ► Clean the rubber tube using an air blower.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

14	CHECK EVAP CANISTER VENT CONTROL VALVE-I
<ol style="list-style-type: none"> 1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted. 	
	
SEF337X	
OK or NG	
OK	▶ GO TO 15.
NG	▶ Replace EVAP canister vent control valve.

15	CHECK EVAP CANISTER VENT CONTROL VALVE-II																				
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Reconnect harness disconnected connectors. 2. Turn ignition switch ON. 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time. 																					
																					
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>VENT CONTROL/V</td> <td>OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 (B1)</td> <td>XXX V</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>		ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 (B1)	XXX V	THRTL POS SEN	XXX V						
ACTIVE TEST																					
VENT CONTROL/V	OFF																				
MONITOR																					
ENG SPEED	XXX rpm																				
A/F ALPHA-B1	XXX %																				
HO2S1 (B1)	XXX V																				
THRTL POS SEN	XXX V																				
<table border="1" style="margin: auto;"> <thead> <tr> <th>Condition VENT CONTROL/V</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>ON</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p>Operation takes less than 1 second.</p>		Condition VENT CONTROL/V	Air passage continuity between A and B	ON	No	OFF	Yes														
Condition VENT CONTROL/V	Air passage continuity between A and B																				
ON	No																				
OFF	Yes																				
SEF803Y																					

<p> Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>							
							
<table border="1" style="margin: auto;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p>Operation takes less than 1 second.</p>		Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	No	OFF	Yes
Condition	Air passage continuity between A and B						
12V direct current supply between terminals 1 and 2	No						
OFF	Yes						
SEF339X							
Make sure new O-ring is installed properly.							
OK or NG							
OK	▶ GO TO 17.						
NG	▶ GO TO 16.						

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

Diagnostic Procedure (Cont'd)

16	CHECK EVAP CANISTER VENT CONTROL VALVE-III
1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform the Test No. 15 again.	
OK or NG	
OK	▶ GO TO 17.
NG	▶ Replace EVAP canister vent control valve.

17	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
	▶ INSPECTION END

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

DTC P1605 A/T DIAGNOSIS COMMUNICATION LINE

System Description

System Description

NCEC0418

The malfunction information related to A/T (Automatic Transaxle) is transferred through the line (circuit) from TCM (Transmission Control Module) to ECM. Therefore, be sure to erase the malfunction information such as DTC not only in TCM (Transmission Control Module) but also ECM after the A/T related repair.

ECM Terminals and Reference Value

NCEC0419

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

CAUTION:

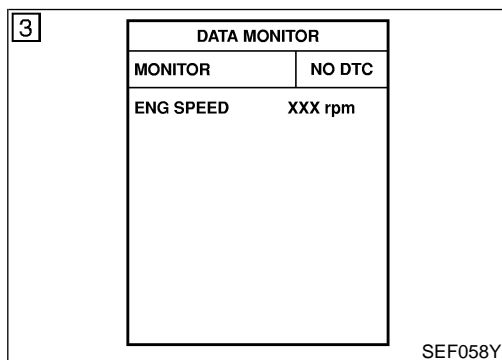
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	PU	A/T check signal	[Ignition switch "ON"]	0 - Approximately 5V

On Board Diagnosis Logic

NCEC0420

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1605	<ul style="list-style-type: none"> An incorrect signal from TCM (Transmission Control Module) is sent to ECM. 	<ul style="list-style-type: none"> Harness or connectors [The communication line circuit between ECM and TCM (Transmission Control Module) is open or shorted.] Dead (Weak) battery TCM (Transmission Control Module)



DTC Confirmation Procedure

NCEC0421

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

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT.
- 3) Start engine and let it idle for at least 40 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-582.

With GST

Follow the procedure "With CONSULT-II" above.

Wiring Diagram

NCEC0422

EC-ATDIAG-01 **GI**

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

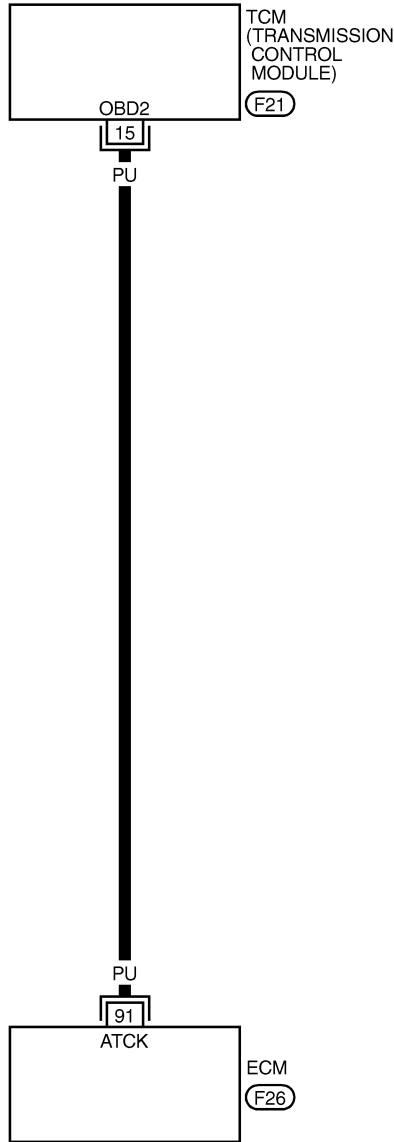
BT

HA

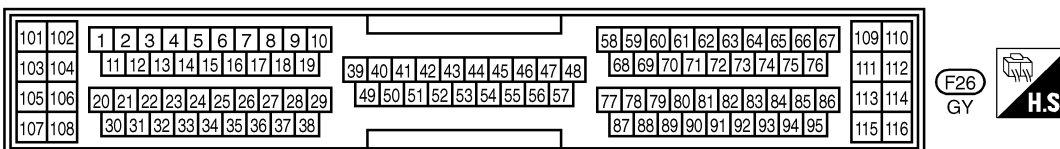
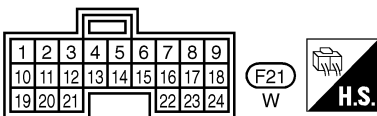
SC

EL

IDX



: Detectable line for DTC
 : Non-detectable line for DTC

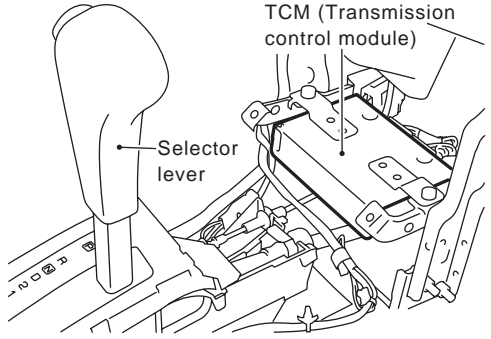


DTC P1605 A/T DIAGNOSIS COMMUNICATION LINE

Diagnostic Procedure

Diagnostic Procedure

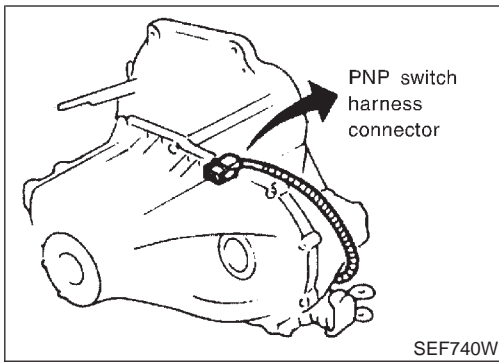
NCEC0423

1	CHECK INPUT SIGNAL CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector and TCM harness connector.</p>  <p>3. Check harness continuity between ECM terminal 91 and TCM terminal 15. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
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 "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END

SEF313W

DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

Component Description



Component Description

NCEC0424

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

NCEC0425

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
P/N POSI SW	● Ignition switch: ON	ON
	Except above	OFF

ECM Terminals and Reference Value

NCEC0426

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

CAUTION:

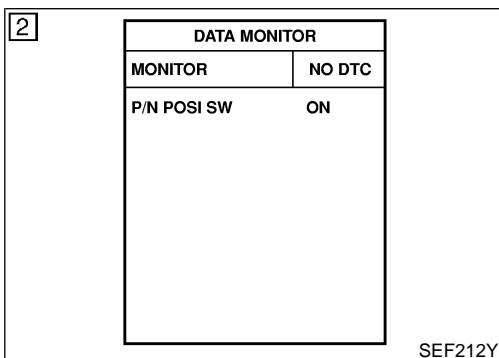
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMI- NAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
42	G/OR	PNP switch	[Ignition switch "ON"] ● Gear position is "Neutral position" (M/T models) ● Gear position is "N" or "P" (A/T models)	Approximately 0V
			[Ignition switch "ON"] ● Except the above gear position	BATTERY VOLTAGE (11 - 14V)

On Board Diagnosis Logic

NCEC0427

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1706	● The signal of the PNP switch is not changed in the process of engine starting and driving.	● Harness or connectors (The PNP switch circuit is open or shorted.) ● PNP switch



DTC Confirmation Procedure

NCEC0428

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".

DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

DTC Confirmation Procedure (Cont'd)

5	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

- 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.

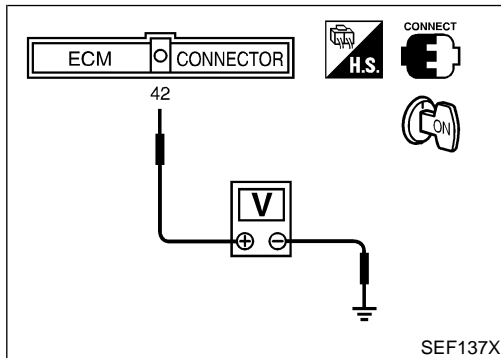
Position (Selector lever)	Known-good signal
"N" and "P" (A/T only) position	ON
Except the above position	OFF

If NG, go to "Diagnostic Procedure", EC-586.
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 50 consecutive seconds.

ENG SPEED	1,500 - 3,400 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	2.4 - 12 msec
VHCL SPEED SE	More than 64 km/h (40 MPH)
Selector lever	Suitable position

- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-586.



Overall Function Check

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

- 1) Turn ignition switch "ON".
- 2) Check voltage between ECM terminal 42 (PNP switch signal) and body 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	BATTERY VOLTAGE (11 - 14V)

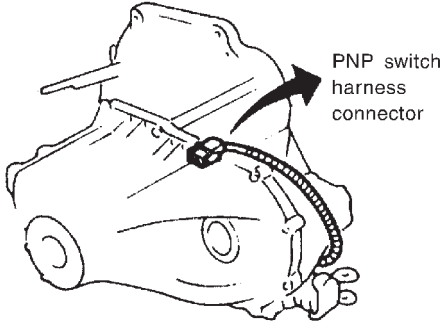
- 3) If NG, go to "Diagnostic Procedure", EC-586.

DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

Diagnostic Procedure For M/T Models

Diagnostic Procedure For M/T Models

NCEC0431

1	CHECK GROUND CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect PNP switch harness connector.</p> <div style="text-align: center;">  <p>PNP switch harness connector</p> </div> <p>3. Check harness continuity between PNP switch terminal 2 and body ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

SEF740W

2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E101, E33 ● Harness for open or short between PNP switch and body ground 		
▶		Repair open circuit or short to power in harness or connectors.

3	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 42 and PNP switch terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors F6, E123 ● Harness for open or short between ECM and PNP switch 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK PNP SWITCH	
<p>Refer to MT-10, "Position Switch Check".</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	Replace PNP switch.

DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

Diagnostic Procedure For M/T Models (Cont'd)

6	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

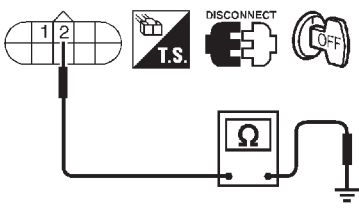
IDX

DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

Diagnostic Procedure For A/T Models

Diagnostic Procedure For A/T Models

=NCEC0432

1	CHECK GROUND CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect PNP switch harness connector. 3. Check continuity between PNP switch terminal 2 and ground with CONSULT-II or tester.</p>		
		
<p>Continuity should exist.</p> <p>4. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

SEF269W

2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E101, E33 ● Harness for open or short between PNP switch and body ground 		
▶		Repair open circuit or short to power in harness or connectors.

3	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 42 and PNP switch terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors F6, E123 ● Harness for open or short between PNP switch and ECM 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK PNP SWITCH	
<p>Refer to AT-110, "Diagnostic Procedure".</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	Replace PNP switch.

DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

Diagnostic Procedure For A/T Models (Cont'd)

6	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

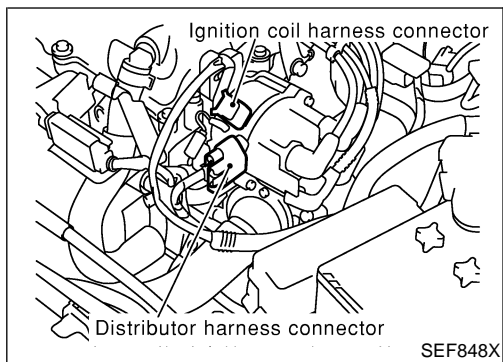
SC

EL

IDX

IGNITION SIGNAL

Component Description



Component Description

IGNITION COIL & POWER TRANSISTOR (BUILT INTO DISTRIBUTOR)

NCEC0319

NCEC0319S01

The ignition coil is built into distributor. The ignition signal from the ECM is sent to the power transistor. The power transistor switches on and off the ignition coil primary circuit. As the primary circuit is turned on and off, the proper high voltage is induced in the coil secondary circuit.

The distributor is not repairable and must be replaced as an assembly except distributor cap and rotor head.

CONSULT-II Reference Value in Data Monitor Mode

NCEC0320

MONITOR ITEM	CONDITION		SPECIFICATION
IGN TIMING	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: OFF Shift lever: "N" No-load 	Idle	15°±2° BTDC
		2,000 rpm	More than 25° BTDC

ECM Terminals and Reference Value

NCEC0321

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	W/B	Ignition signal	<p>[Engine is running]</p> <ul style="list-style-type: none"> Warm-up condition Idle speed 	<p>Approximately 0.3V</p> <p>SEF996V</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> Engine speed is 2,000 rpm 	<p>Approximately 0.5V</p> <p>SEF997V</p>

IGNITION SIGNAL

Wiring Diagram

Wiring Diagram

NCEC0324

EC-IGNSYS-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

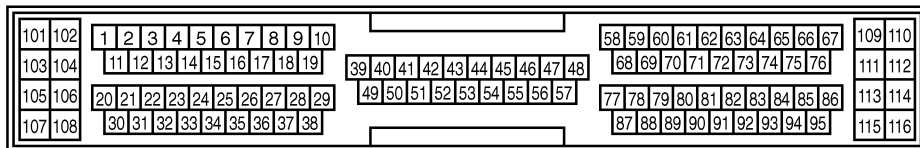
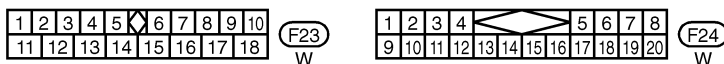
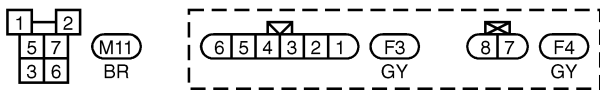
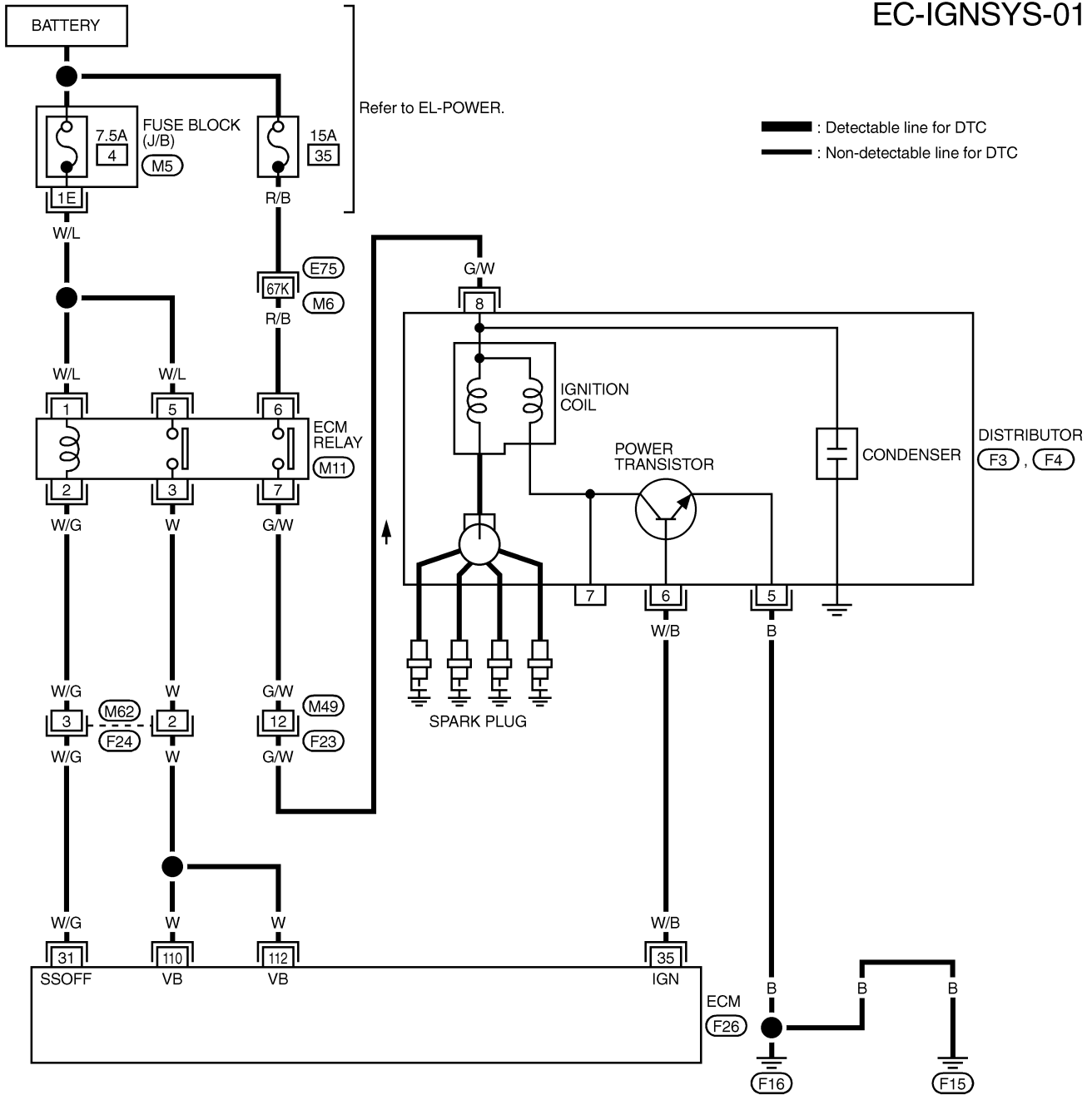
BT

HA

SC

EL

IDX



REFER TO THE FOLLOWING.
 (E75) -SUPER MULTIPLE JUNCTION (SMJ)
 (M5) -FUSE BLOCK-JUNCTION BOX (J/B)



IGNITION SIGNAL

Diagnostic Procedure

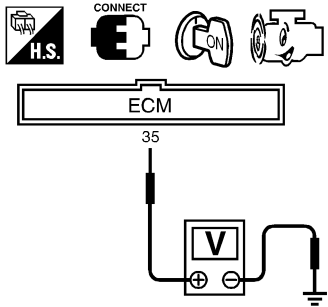
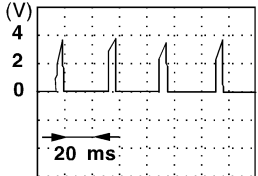
Diagnostic Procedure

NCEC0325

1	INSPECTION 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																					
<p> With CONSULT-II</p> <ol style="list-style-type: none"> Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II. Make sure that all circuits do not produce a momentary engine speed drop. 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>POWER BALANCE</th> <th></th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> </thead> <tbody> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>MAS AIF SE-B1</td> <td>XXX V</td> </tr> <tr> <td>IACV-AAC/V</td> <td>XXX step</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>			ACTIVE TEST		POWER BALANCE		MONITOR		ENG SPEED	XXX rpm	MAS AIF SE-B1	XXX V	IACV-AAC/V	XXX step								
ACTIVE TEST																						
POWER BALANCE																						
MONITOR																						
ENG SPEED	XXX rpm																					
MAS AIF SE-B1	XXX V																					
IACV-AAC/V	XXX step																					
OK or NG																						
OK ▶	INSPECTION END																					
NG ▶	GO TO 4.																					

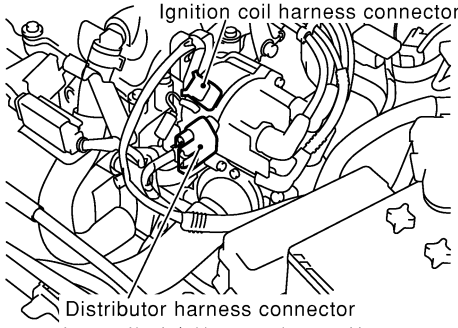
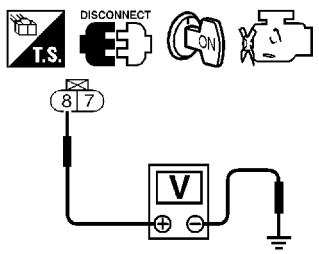
SEF070Y

3	CHECK OVERALL FUNCTION	
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> Let engine idle. Read the voltage signal between ECM terminal 35 and ground with an oscilloscope. Verify that the oscilloscope screen shows the signal wave as shown below. 		
		
		
OK or NG		
OK ▶	INSPECTION END	
NG ▶	GO TO 4.	

SEC578C

IGNITION SIGNAL

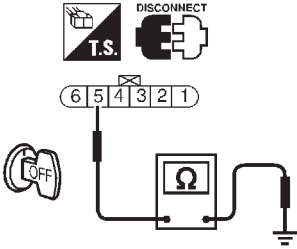
Diagnostic Procedure (Cont'd)

4	CHECK POWER SUPPLY								
		<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect ignition coil harness connector. 	GI MA EM LC						
		 <p style="text-align: center;">Ignition coil harness connector</p> <p style="text-align: center;">Distributor harness connector</p>	EC						
		<ol style="list-style-type: none"> 3. Turn ignition switch "ON". 4. Check voltage between terminal 8 and ground with CONSULT-II or tester. 	SEF848X FE						
			CL MT AT						
		<p>Voltage: Battery voltage</p> <p>OK or NG</p>	AX						
		<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td style="width: 70%;">GO TO 6.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 5.</td> </tr> </table>	OK	▶	GO TO 6.	NG	▶	GO TO 5.	SEF257W SU
OK	▶	GO TO 6.							
NG	▶	GO TO 5.							

5	DETECT MALFUNCTIONING PART		
		<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M49, F23 ● Harness connectors E75, M6 ● ECM relay ● 15A fuse ● Harness for open or short between ignition coil and fuse 	BR ST RS
		▶ Repair harness or connectors.	BT HA SC EL IDX

IGNITION SIGNAL

Diagnostic Procedure (Cont'd)

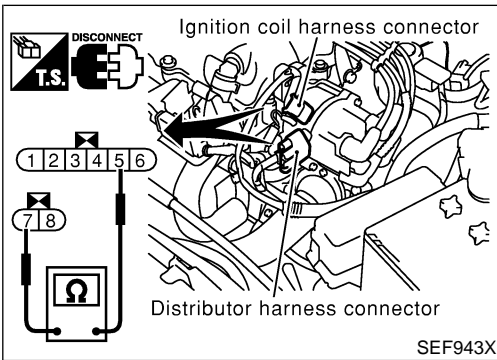
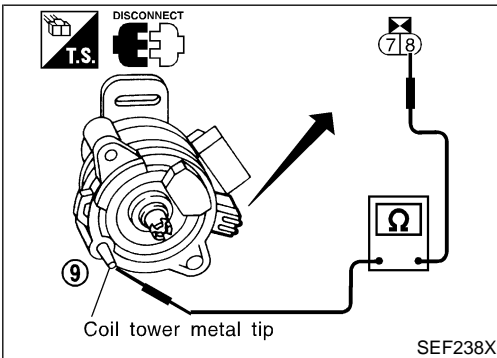
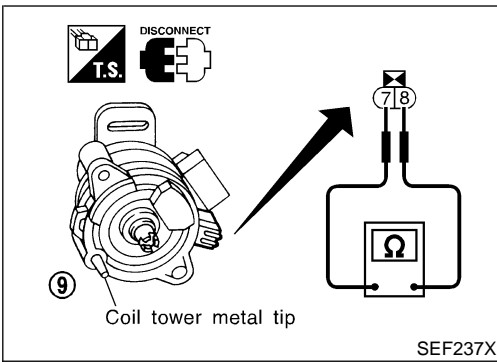
6	CHECK GROUND CIRCUIT	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect distributor harness connector. 3. Check harness continuity between terminal 5 and engine ground. 		
		
<p style="text-align: center;">Continuity should exist.</p>		
<ol style="list-style-type: none"> 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.

SEF258W

7	CHECK INPUT SIGNAL CIRCUIT-I	
<ol style="list-style-type: none"> 1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 35 and distributor terminal 6. Refer to Wiring Diagram. 		
<p style="text-align: center;">Continuity should exist.</p>		
<ol style="list-style-type: none"> 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 IGNITION COIL, POWER TRANSISTOR	
Refer to "Component Inspection", EC-595.		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Replace malfunctioning component(s).

9	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.		
▶		INSPECTION END



Component Inspection

=NCEC0326

IGNITION COIL

NCEC0326S01

1. Disconnect ignition coil harness connector.
2. Check resistance as shown in the figure.

GI

MA

EM

LC

3. For checking secondary coil, remove distributor cap.
4. Check resistance between ignition coil harness connector terminal 8 and coil tower metal tip 9 (secondary terminal) on the distributor head.

EC

Terminal	Resistance [at 25°C (77°F)]
7 - 8 (Primary coil)	Approximately 0.8Ω
8 - secondary terminal on distributor head (Secondary coil)	Approximately 16 kΩ

FE

CL

If NG, replace distributor.

MT

POWER TRANSISTOR

NCEC0326S02

1. Disconnect distributor harness connector.
2. Check power transistor resistance between terminals 5 and 7.

AT

Terminals	Resistance	Result
5 and 7	Except 0Ω	OK
	0Ω	NG

AX

SU

If NG, replace distributor.

BR

ST

RS

BT

HA

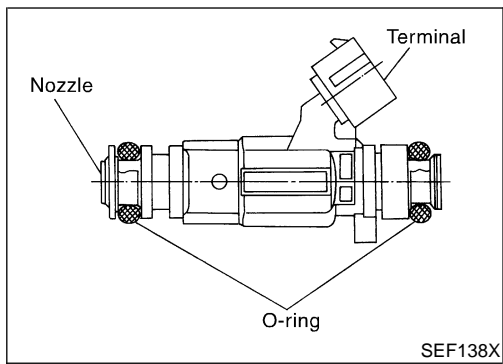
SC

EL

IDX

INJECTOR

Component Description



Component Description

NCEC0435

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

NCEC0436

MONITOR ITEM	CONDITION	SPECIFICATION
INJ PULSE-B1	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load Idle	2.4 - 3.2 msec
	2,000 rpm	1.9 - 2.8 msec
B/FUEL SCHDL	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load Idle	1.0 - 1.6 msec
	2,000 rpm	0.7 - 1.3 msec

ECM Terminals and Reference Value

NCEC0437

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)
101 103 105 107	R/B	Injector No. 1	[Engine is running] ● Warm-up condition ● Idle speed	BATTERY VOLTAGE (11 - 14V) SEF011W
	Y/B	Injector No. 2		
	G/B	Injector No. 3	[Engine is running] ● Warm-up condition ● Engine speed is 2,000 rpm	BATTERY VOLTAGE (11 - 14V) SEF012W
	L/B	Injector No. 4		

INJECTOR

Diagnostic Procedure

NCEC0438

1 CHECK OVERALL FUNCTION

 **With CONSULT-II**

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.

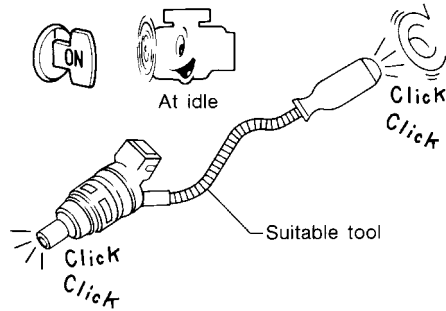
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
IACV-AAC/V	XXX step

SEF190Y

3. Make sure that each circuit produces a momentary engine speed drop.

 **Without CONSULT-II**

1. Start engine.
2. Listen to each injector operating sound.



MEC703B

Clicking noise should be heard.

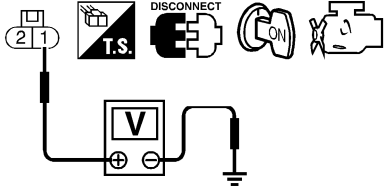
OK or NG

OK ► INSPECTION END

NG ► GO TO 2.

INJECTOR

Diagnostic Procedure (Cont'd)

2	CHECK POWER SUPPLY	<ol style="list-style-type: none"> 1. Stop engine. 2. Disconnect injector harness connector. 3. Turn ignition switch "ON". 4. Check voltage between injector terminal 1 and ground with CONSULT-II or tester. <div style="text-align: center; margin: 10px 0;">  <p>Voltage: Battery voltage</p> </div> <p style="text-align: right; margin-right: 20px;">SEF949X</p> <p style="text-align: center;">OK or NG</p>	GI MA EM LC EC FE
OK	▶	GO TO 4.	CL
NG	▶	GO TO 3.	MT

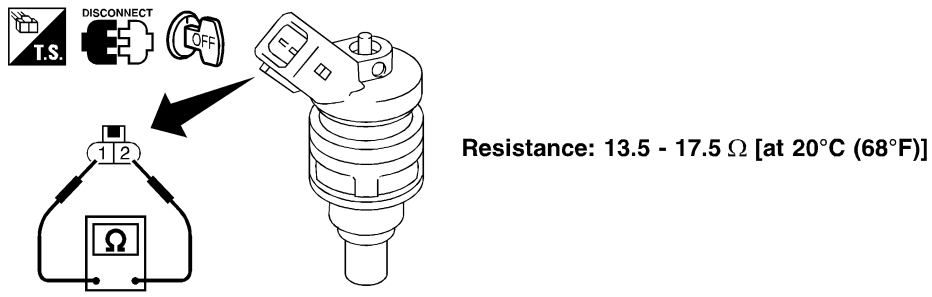
3	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● 10A fuse ● Harness connectors M62, F24 ● Harness connectors F13, F51 ● Harness for open or short between injector and fuse 	AT AX
	▶	Repair harness or connectors.	SU

4	CHECK OUTPUT SIGNAL CIRCUIT	<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between injector harness connector terminal 2 and ECM terminals 101, 103, 105, 107. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	BR ST RS
OK	▶	GO TO 6.	BT
NG	▶	GO TO 5.	HA

5	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors F51, F13 ● Harness for open or short between ECM and injector 	SC EL IDX
	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

INJECTOR

Diagnostic Procedure (Cont'd)

6	CHECK INJECTOR
1. Disconnect injector harness connector. 2. Check resistance between terminals as shown in the figure.	
 <p>Resistance: 13.5 - 17.5 Ω [at 20°C (68°F)]</p>	
SEF964XA	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Replace injector.

7	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
	▶ INSPECTION END

START SIGNAL

CONSULT-II Reference Value in Data Monitor Mode

CONSULT-II Reference Value in Data Monitor Mode

NCEC0441

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
START SIGNAL	● Ignition switch: ON → START → ON	OFF → ON → OFF

ECM Terminals and Reference Value

NCEC0442

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

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

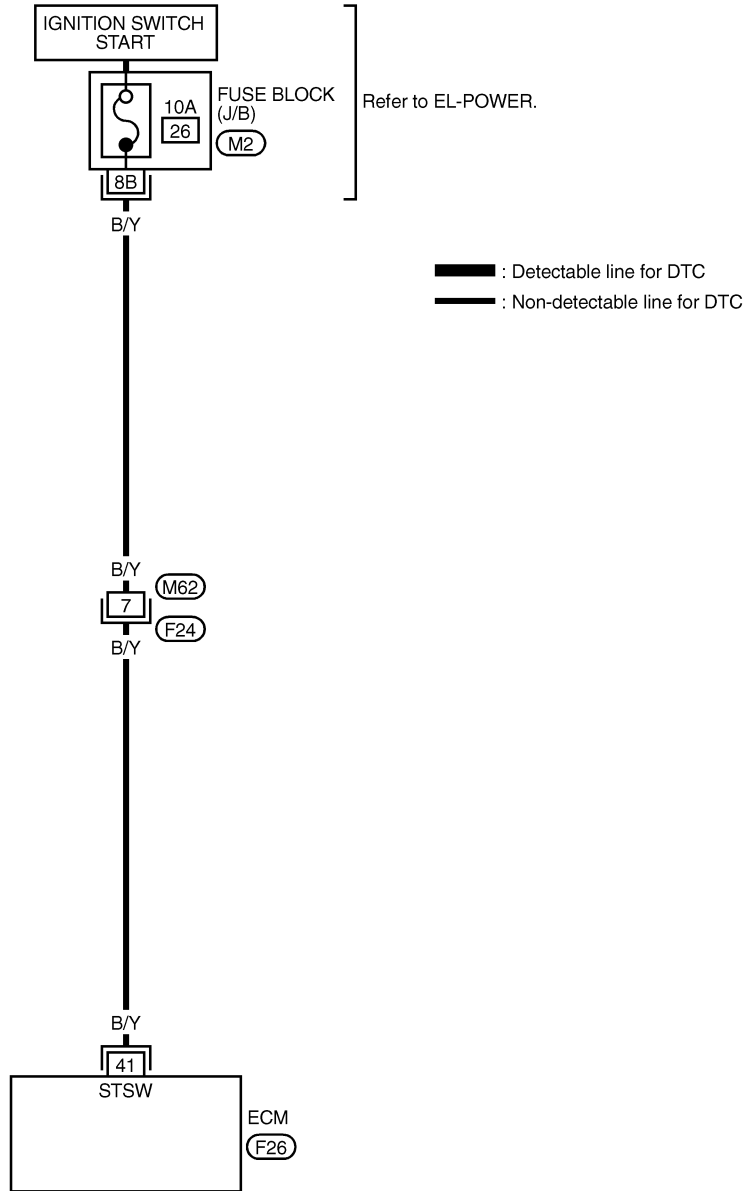
START SIGNAL

Wiring Diagram

Wiring Diagram

NCEC0440

EC-S/SIG-01



1	2	3	4	5	6	7	8				
9	10	11	12	13	14	15	16	17	18	19	20

(F24)
W

REFER TO THE FOLLOWING.

(M2) - FUSE BLOCK-JUNCTION BOX (J/B)

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	39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38	87	88	89	90	91	92	93	94	95	115	116											

(F26)
GY

H.S.

TEC725

START SIGNAL


Diagnostic Procedure

Diagnostic Procedure


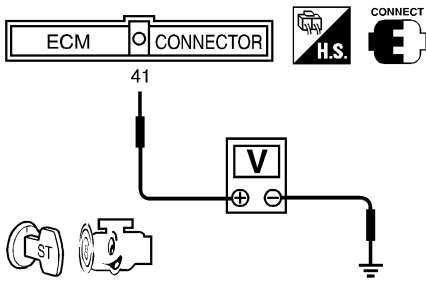
=NCEC0443

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

GI
MA
EM

2	CHECK OVERALL FUNCTION													
<p> With CONSULT-II</p> <p>1. Turn ignition switch "ON". 2. Check "START SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>														
<table border="1" style="display: inline-table; margin-right: 20px;"> <tr><th colspan="2">DATA MONITOR</th></tr> <tr><th>MONITOR</th><th>NO DTC</th></tr> <tr><td>START SIGNAL</td><td>OFF</td></tr> </table> <table border="1" style="display: inline-table;"> <tr><th>Condition</th><th>"START SIGNAL"</th></tr> <tr><td>Ignition switch "ON"</td><td>OFF</td></tr> <tr><td>Ignition switch "START"</td><td>ON</td></tr> </table>			DATA MONITOR		MONITOR	NO DTC	START SIGNAL	OFF	Condition	"START SIGNAL"	Ignition switch "ON"	OFF	Ignition switch "START"	ON
DATA MONITOR														
MONITOR	NO DTC													
START SIGNAL	OFF													
Condition	"START SIGNAL"													
Ignition switch "ON"	OFF													
Ignition switch "START"	ON													
SEF227Y														
OK or NG														
OK	▶	INSPECTION END												
NG	▶	GO TO 4.												

LC
EC
FE
CL
MT
AT

3	CHECK OVERALL FUNCTION							
<p> Without CONSULT-II</p> <p>1. Turn ignition switch to "START". 2. Check voltage between ECM terminal 41 and ground under the following conditions.</p>								
								
SEF142X								
<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><th>Condition</th><th>Voltage</th></tr> <tr><td>Ignition switch "START"</td><td>Battery voltage</td></tr> <tr><td>Except above</td><td>Approximately 0V</td></tr> </table>			Condition	Voltage	Ignition switch "START"	Battery voltage	Except above	Approximately 0V
Condition	Voltage							
Ignition switch "START"	Battery voltage							
Except above	Approximately 0V							
MTBL0143								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 4.						

SU
BR
ST
RS
BT
HA
SC
EL
IDX

START SIGNAL

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness connectors M62, F24● 10A fuse● Harness for open or short between ECM and fuse	
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 INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
	▶ INSPECTION END

FUEL PUMP

System Description

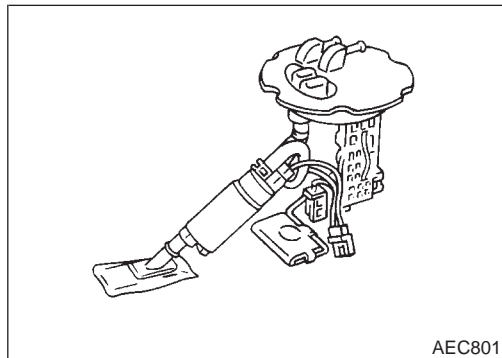
System Description

NCEC0444

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	ECM	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 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.

NCEC0501

CONSULT-II Reference Value in Data Monitor Mode

NCEC0445

MONITOR ITEM	CONDITION	SPECIFICATION
FUEL PUMP RLY	<ul style="list-style-type: none"> Ignition switch is turned to ON (Operates for 5 seconds) Engine running and cranking When engine is stopped (stops in 1.0 seconds) 	ON
	<ul style="list-style-type: none"> Except as shown above 	OFF

FUEL PUMP

ECM Terminals and Reference Value

ECM Terminals and Reference Value

=NCEC0446

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	B/P	Fuel pump relay	[Ignition switch "ON"] ● For 5 seconds after turning ignition switch "ON" [Engine is running]	0 - 1V
			[Ignition switch "ON"] ● More than 5 seconds after turning ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)

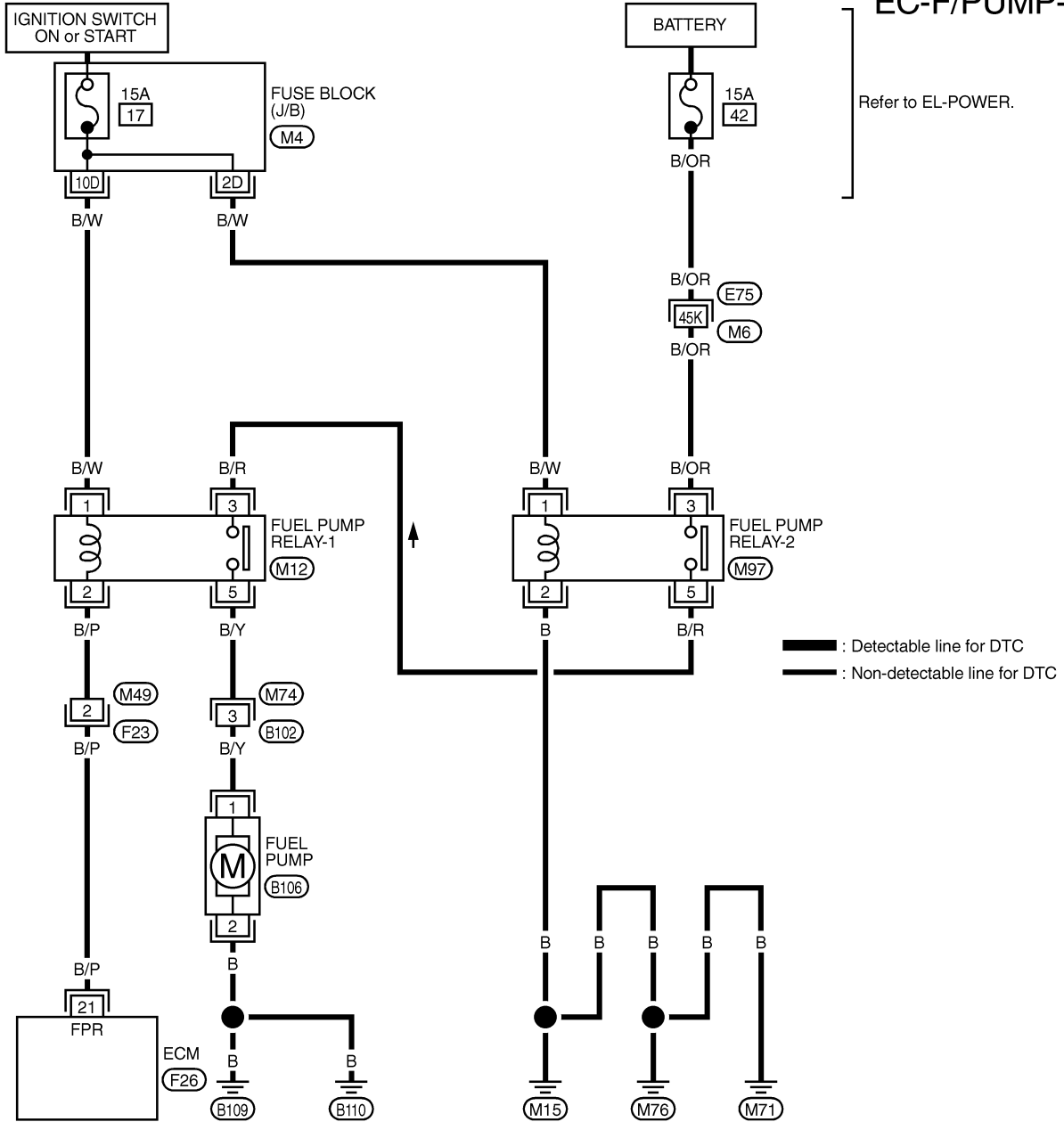
FUEL PUMP

Wiring Diagram

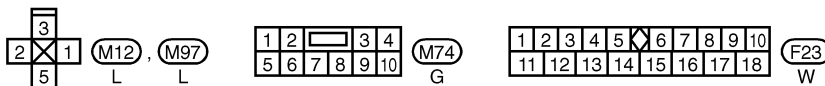
Wiring Diagram

NCEC0447

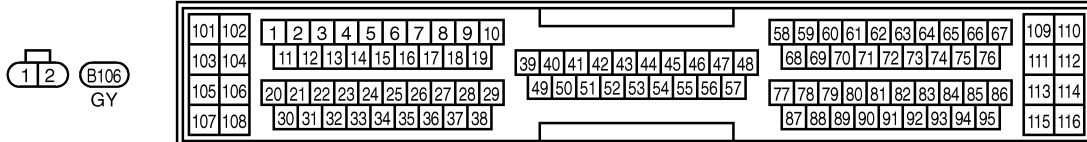
EC-F/PUMP-01



GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX



REFER TO THE FOLLOWING.
 (E75) -SUPER MULTIPLE JUNCTION (SMJ)
 (M4) -FUSE BLOCK-JUNCTION BOX (J/B)

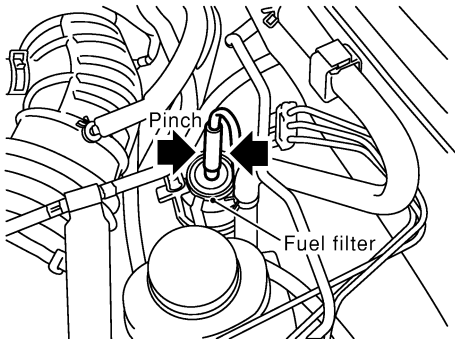


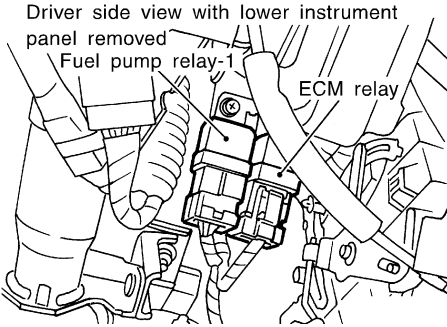
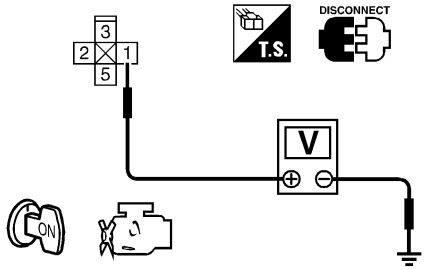
TEC726

FUEL PUMP

Diagnostic Procedure

NCEC0448

1	CHECK OVERALL FUNCTION	<p>1. Turn ignition switch "ON". 2. Pinch fuel feed hose with fingers.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF858X</p> <p>Fuel pressure pulsation should be felt on the fuel feed hose for 5 seconds after ignition switch is turned "ON".</p> <p style="text-align: center;">OK or NG</p>
OK	▶	INSPECTION END
NG	▶	GO TO 2.

2	CHECK POWER SUPPLY-I	<p>1. Turn ignition switch "OFF". 2. Disconnect fuel pump relay-1.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF185XA</p> <p>3. Turn ignition switch "ON". 4. Check voltage between fuel pump relay-1 terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: right;">Voltage: Battery voltage</p> <p style="text-align: right;">SEF950X</p> </div> <p style="text-align: center;">OK or NG</p>
OK	▶	GO TO 4.
NG	▶	GO TO 3.

FUEL PUMP

Diagnostic Procedure (Cont'd)

3	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● 15A fuse ● Harness for open or short between fuse and fuel pump relay-1 	
▶	Repair harness or connectors.

4	CHECK POWER SUPPLY-II
1. Check voltage between fuel pump relay-1 terminal 3 and ground with CONSULT-II or tester.	
SEF951X	
OK	▶ GO TO 9.
NG	▶ GO TO 5.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

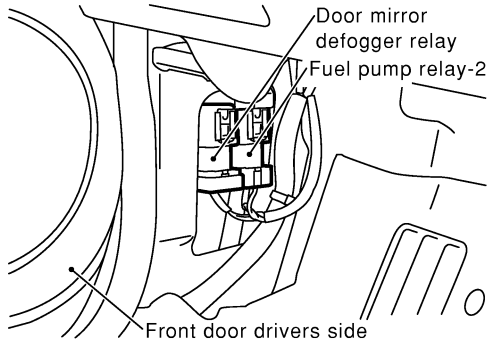
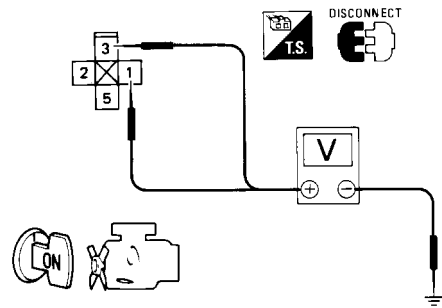
SC

EL

IDX

FUEL PUMP

Diagnostic Procedure (Cont'd)

5	CHECK POWER SUPPLY-III
<p>1. Turn ignition switch "OFF". 2. Disconnect fuel pump relay-2.</p>	
 <p style="text-align: right;">SEF291WA</p>	
<p>3. Check voltage between fuel pump relay-2 terminals 1, 3 and ground with CONSULT-II or tester.</p>	
 <p style="text-align: right;">SEF479P</p>	
Voltage: Battery voltage	
OK or NG	
OK	▶ GO TO 7.
NG	▶ GO TO 6.

6	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E75, M6 ● 15A fuse ● Harness for open or short between fuse and fuel pump relay-2 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK POWER SUPPLY-IV
<p>1. Check continuity between fuel pump relay-2 terminal 5 and fuel pump relay-1 terminal 3, fuel pump relay-2 terminal 2 and body ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p>	
OK or NG	
OK	▶ GO TO 8.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

FUEL PUMP

Diagnostic Procedure (Cont'd)

8	CHECK FUEL PUMP RELAY-2
Refer to "Component Inspection", EC-613.	
OK or NG	
OK	▶ GO TO 15.
NG	▶ Repair or replace fuel pump relay-2.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

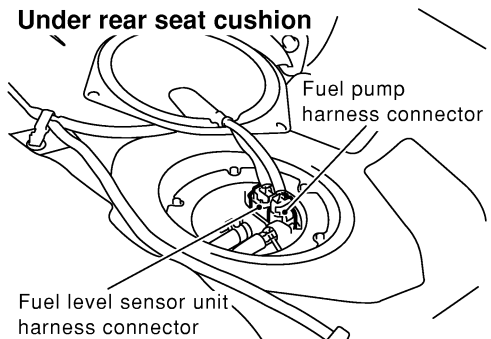
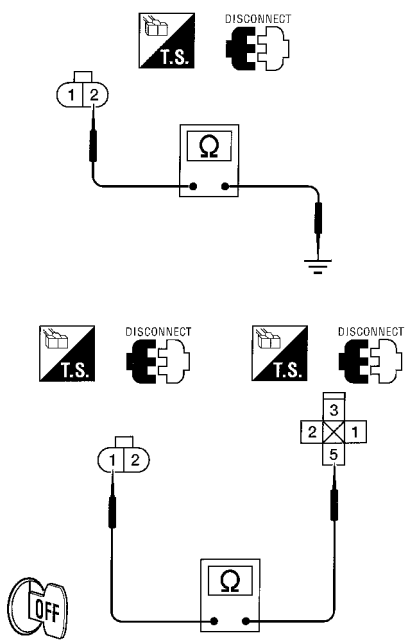
BT

HA

SC

EL

IDX

9	CHECK POWER GROUND CIRCUIT
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect fuel pump harness connector.</p>	
 <p style="text-align: right;">SEF299WA</p>	
<p>3. Check harness continuity between fuel pump terminal 2 and body ground, fuel pump terminal 1 and fuel pump relay-1 terminal 5.</p>	
	
<p>Continuity should exist.</p>	
<p>4. Also check harness for short to ground and short to power.</p>	
OK or NG	
OK	▶ GO TO 11.
NG	▶ GO TO 10.

AEC758

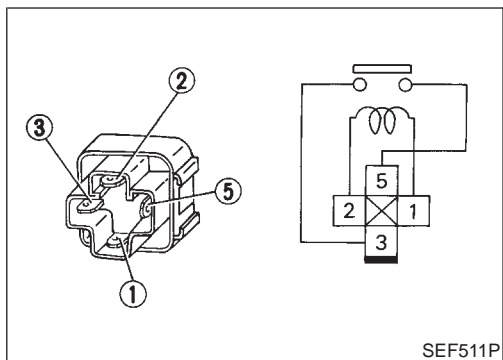
FUEL PUMP

Diagnostic Procedure (Cont'd)

10	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M74, B102 ● Harness for open or short between fuel pump and body ground ● Harness for open or short between fuel pump and fuel pump relay-1 	
	▶ Repair open circuit or short to ground or short to power in harness or connectors.
11	CHECK OUTPUT SIGNAL CIRCUIT
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 21 and fuel pump relay-1 connector terminal 2. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power.</p>	
OK or NG	
OK	▶ GO TO 13.
NG	▶ GO TO 12.
12	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M49, F23 ● Harness for open or short between ECM and fuel pump relay-1 	
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.
13	CHECK FUEL PUMP RELAY-1
<p>Refer to "Component Inspection", EC-613.</p>	
OK or NG	
OK	▶ GO TO 14.
NG	▶ Replace fuel pump relay-1.
14	CHECK FUEL PUMP
<p>Refer to "Component Inspection", EC-613.</p>	
OK or NG	
OK	▶ GO TO 15.
NG	▶ Replace fuel pump.
15	CHECK INTERMITTENT INCIDENT
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p>	
	▶ INSPECTION END

FUEL PUMP

Component Inspection



Component Inspection

=NCEC0449

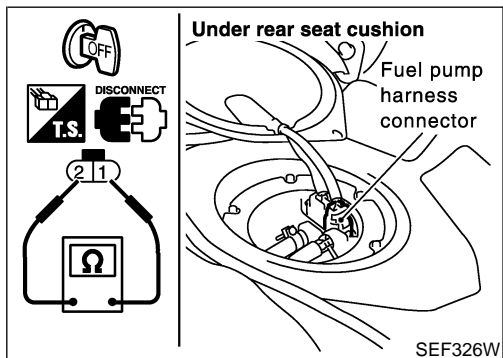
FUEL PUMP RELAY-1 AND -2

NCEC0449S01

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.



FUEL PUMP

NCEC0449S02

1. Disconnect fuel pump harness connector.
2. Check resistance between terminals 1 and 2.

Resistance: 0.2 - 5.0Ω [at 25°C (77°F)]

If NG, replace fuel pump.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

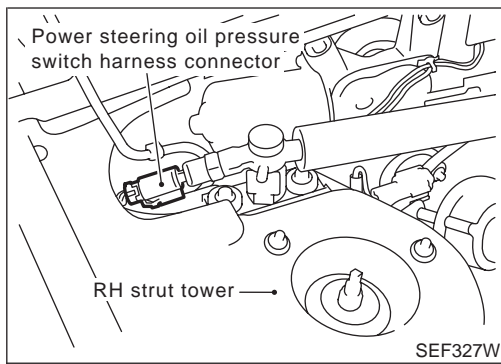
SC

EL

IDX

POWER STEERING OIL PRESSURE SWITCH

Component Description



Component Description

NCEC0451

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 adjusts the IACV-AAC valve to increase the idle speed and adjust for the increased load.

CONSULT-II Reference Value in Data Monitor Mode

NCEC0452

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PW/ST SIGNAL	<ul style="list-style-type: none"> Engine: After warming up, idle the engine 	Steering wheel in neutral position (forward direction)	OFF
		The steering wheel is fully turned	ON

ECM Terminals and Reference Value

NCEC0453

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	SB	Power steering oil pressure switch	[Engine is running] <ul style="list-style-type: none"> Steering wheel is fully turned 	Approximately 0V
			[Engine is running] <ul style="list-style-type: none"> Steering wheel is not turned 	Approximately 5V

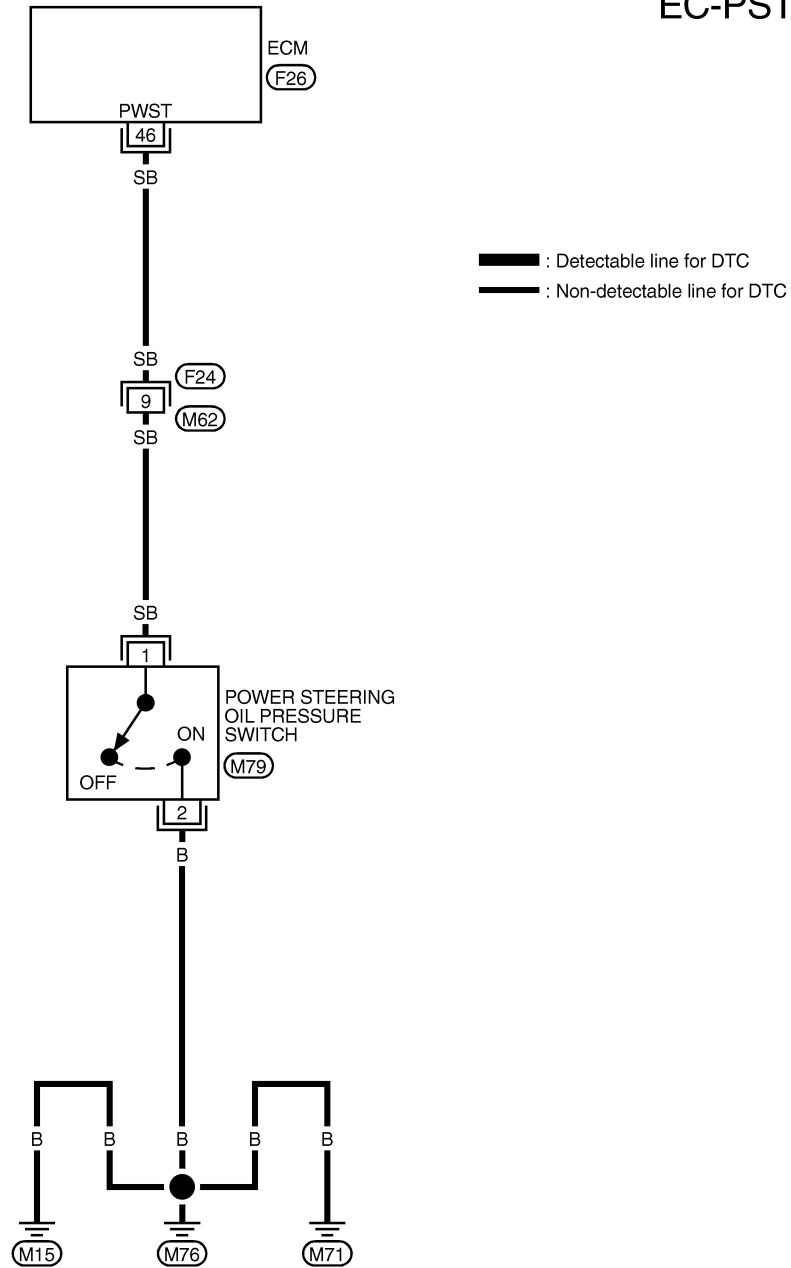
POWER STEERING OIL PRESSURE SWITCH

Wiring Diagram

Wiring Diagram

NCEC0450

EC-PST/SW-01



GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

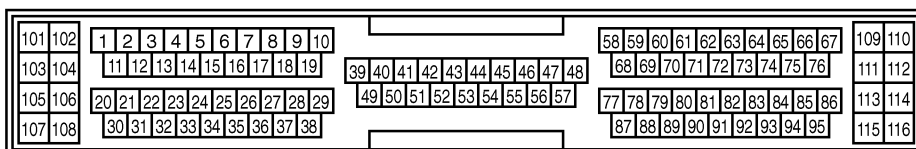
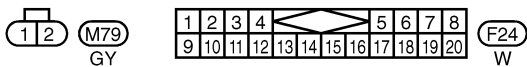
BT

HA

SC

EL

IDX



TEC727


POWER STEERING OIL PRESSURE SWITCH


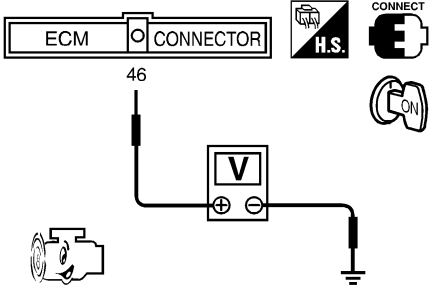
Diagnostic Procedure

Diagnostic Procedure

=NCEC0454

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK OVERALL FUNCTION							
<p> With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Check "PW/ST SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>								
<table border="1" style="margin: auto;"> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> <tr> <td>PW/ST SIGNAL</td> <td>OFF</td> </tr> </table>			DATA MONITOR		MONITOR	NO DTC	PW/ST SIGNAL	OFF
DATA MONITOR								
MONITOR	NO DTC							
PW/ST SIGNAL	OFF							
<table border="1" style="margin: auto;"> <tr> <td>Steering is in neutral position</td> <td>OFF</td> </tr> <tr> <td>Steering is turned</td> <td>ON</td> </tr> </table>			Steering is in neutral position	OFF	Steering is turned	ON		
Steering is in neutral position	OFF							
Steering is turned	ON							
SEF228Y								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 4.						

3	CHECK OVERALL FUNCTION							
<p> Without CONSULT-II</p> <p>1. Start engine.</p> <p>2. Check voltage between ECM terminal 46 and ground under the following conditions.</p>								
								
SEF148X								
<table border="1" style="margin: auto;"> <thead> <tr> <th>Condition</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>When steering wheel is turned quickly</td> <td>Approximately 0V</td> </tr> <tr> <td>Except above</td> <td>Approximately 5V</td> </tr> </tbody> </table>			Condition	Voltage	When steering wheel is turned quickly	Approximately 0V	Except above	Approximately 5V
Condition	Voltage							
When steering wheel is turned quickly	Approximately 0V							
Except above	Approximately 5V							
MTBL0142								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 4.						

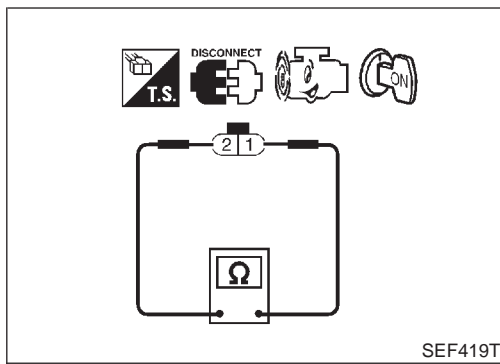
POWER STEERING OIL PRESSURE SWITCH

Diagnostic Procedure (Cont'd)

4	CHECK GROUND CIRCUIT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect power steering oil pressure switch harness connector.</p> <p>3. Check harness continuity between power steering oil pressure switch terminal 2 and engine ground.</p> <div style="text-align: center;"> </div> <p style="text-align: right;">AEC760</p> <p>Continuity should exist.</p> <p>4. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	GI MA EM LC EC FE CL MT AT AX SU BR ST RS BT HA SC EL IDX
OK	▶	GO TO 5.	
NG	▶	Repair open circuit or short to power in harness or connectors.	
5	CHECK INPUT SIGNAL CIRCUIT	<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 46 and terminal 1. Refer to Wiring Diagram.</p> <p>Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 7.	
NG	▶	GO TO 6.	
6	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors F24, M62 ● Harness for open or short between ECM and power steering oil pressure switch <p style="text-align: center;">OK or NG</p>	
	▶	Repair open circuit or short to ground or short to power in harness or connectors.	
7	CHECK POWER STEERING OIL PRESSURE SWITCH	<p>Refer to "Component Inspection", EC-618.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 8.	
NG	▶	Replace power steering oil pressure switch.	
8	CHECK INTERMITTENT INCIDENT	<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.</p> <p style="text-align: center;">OK or NG</p>	
	▶	INSPECTION END	

POWER STEERING OIL PRESSURE SWITCH

Component Inspection



Component Inspection

POWER STEERING OIL PRESSURE SWITCH

NCEC0455

NCEC0455S01

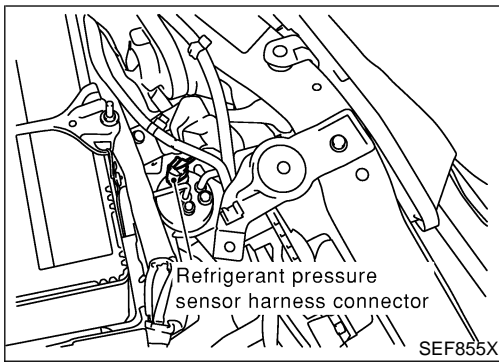
1. Disconnect power steering oil pressure switch harness connector then start engine.
2. Check continuity between terminals 1 and 2.

Conditions	Continuity
Steering wheel is being turned	Yes
Steering wheel is not being turned	No

If NG, replace power steering oil pressure switch.

REFRIGERANT PRESSURE SENSOR

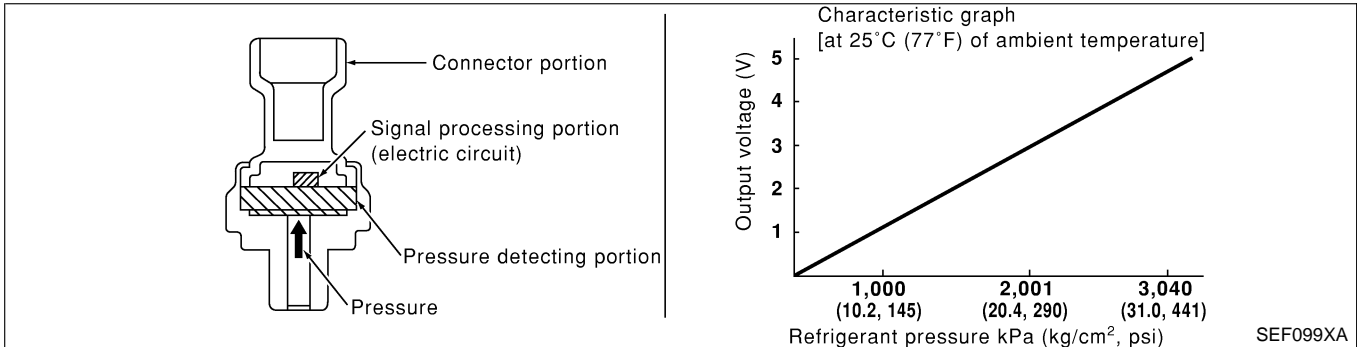
Description



Description

NCEC0638

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.



ECM Terminals and Reference Value

NCEC0663

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	Sensor's ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
74	R/L	Refrigerant pressure sensor	[Engine is running] ● Warm-up condition ● Both A/C switch and blower switch are "ON" (Compressor operates.)	0.36 - 3.88V
111	P/L	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

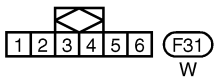
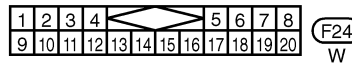
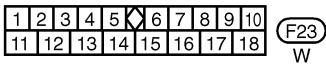
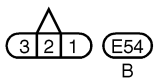
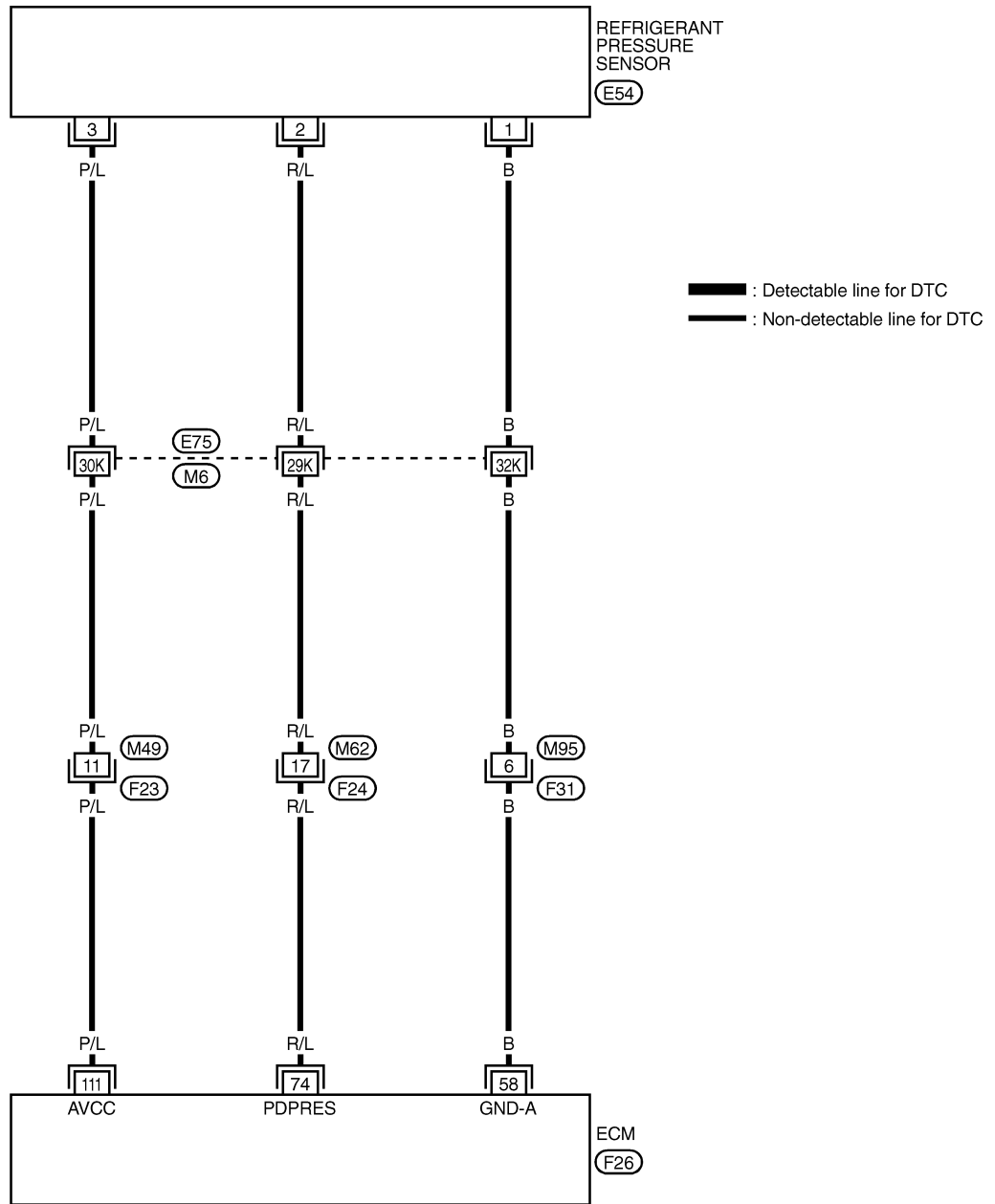
REFRIGERANT PRESSURE SENSOR

Wiring Diagram

Wiring Diagram

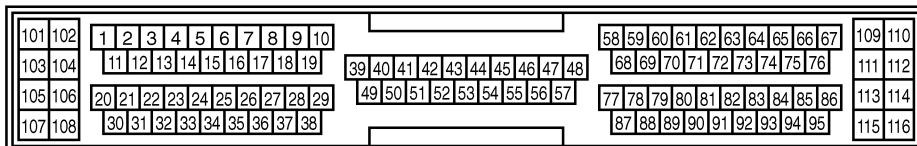
NCEC0639

EC-RP/SEN-01



REFER TO THE FOLLOWING.

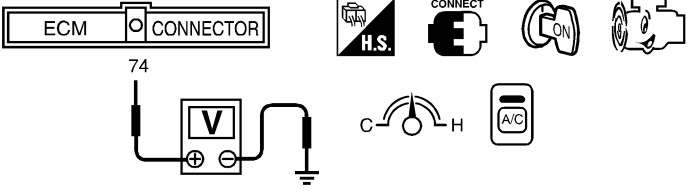
(E75) -SUPER MULTIPLE JUNCTION (SMJ)

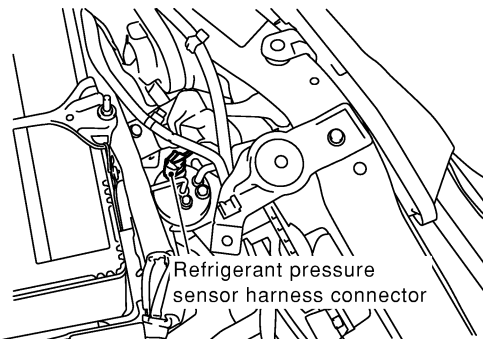
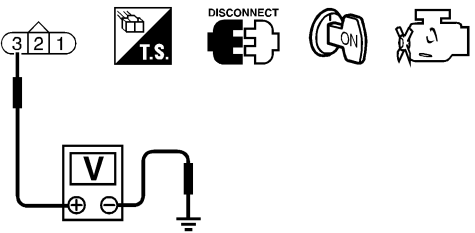


TEC733

Diagnostic Procedure

NCEC0640

1	CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION	GI MA EM LC EC FE
<p>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 74 and ground with CONSULT-II or tester.</p>		
 <div style="float: right; margin-top: 10px;">Voltage: 0.36 - 3.88V</div>		
SEF952X		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 2.

2	CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT	MT AT AX SU BR ST RS BT HA SC EL IDX
<p>1. Turn A/C switch and blower switch "OFF". 2. Stop engine. 3. Disconnect refrigerant pressure sensor harness connector.</p>		
		
SEF855X		
<p>4. Turn ignition switch "ON". 5. Check voltage between refrigerant pressure sensor terminal 3 and ground with CONSULT-II or tester.</p>		
 <div style="float: right; margin-top: 10px;">Voltage: Approximately 5V</div>		
SEF953X		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

REFRIGERANT PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

3	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness connectors E75, M6● Harness connectors M49, F23● 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. <ul style="list-style-type: none">● Harness connectors E75, M6● Harness connectors M95, F31● 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 74 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. <ul style="list-style-type: none">● Harness connectors E75, M6● Harness connectors M62, F24● 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 HA-79 or HA-181, "Refrigerant pressure sensor".	
OK or NG	
OK	▶ GO TO 9.
NG	▶ Replace refrigerant pressure sensor.

REFRIGERANT PRESSURE SENSOR

Diagnostic Procedure (Cont'd)

9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

ELECTRICAL LOAD SIGNAL

CONSULT-II Reference Value in Data Monitor Mode

CONSULT-II Reference Value in Data Monitor Mode

NCEC0664

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
LOAD SIGNAL	<ul style="list-style-type: none"> ● Ignition switch: ON 	Rear window defogger switch "ON" and/or lighting switch "2ND" ON
		Rear window defogger switch and lighting switch "OFF" OFF

ECM Terminals and Reference Value

NCEC0665

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)
50	R	Electric load signal	[Engine is running] <ul style="list-style-type: none"> ● Rear window defogger switch "ON" and/or lighting switch "2ND" 	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] <ul style="list-style-type: none"> ● Rear window defogger switch and lighting switch "OFF" 	Approximately 0V

ELECTRICAL LOAD SIGNAL

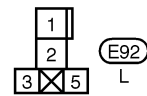
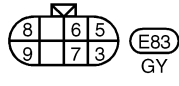
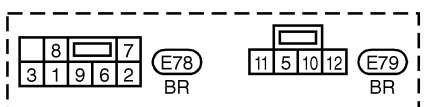
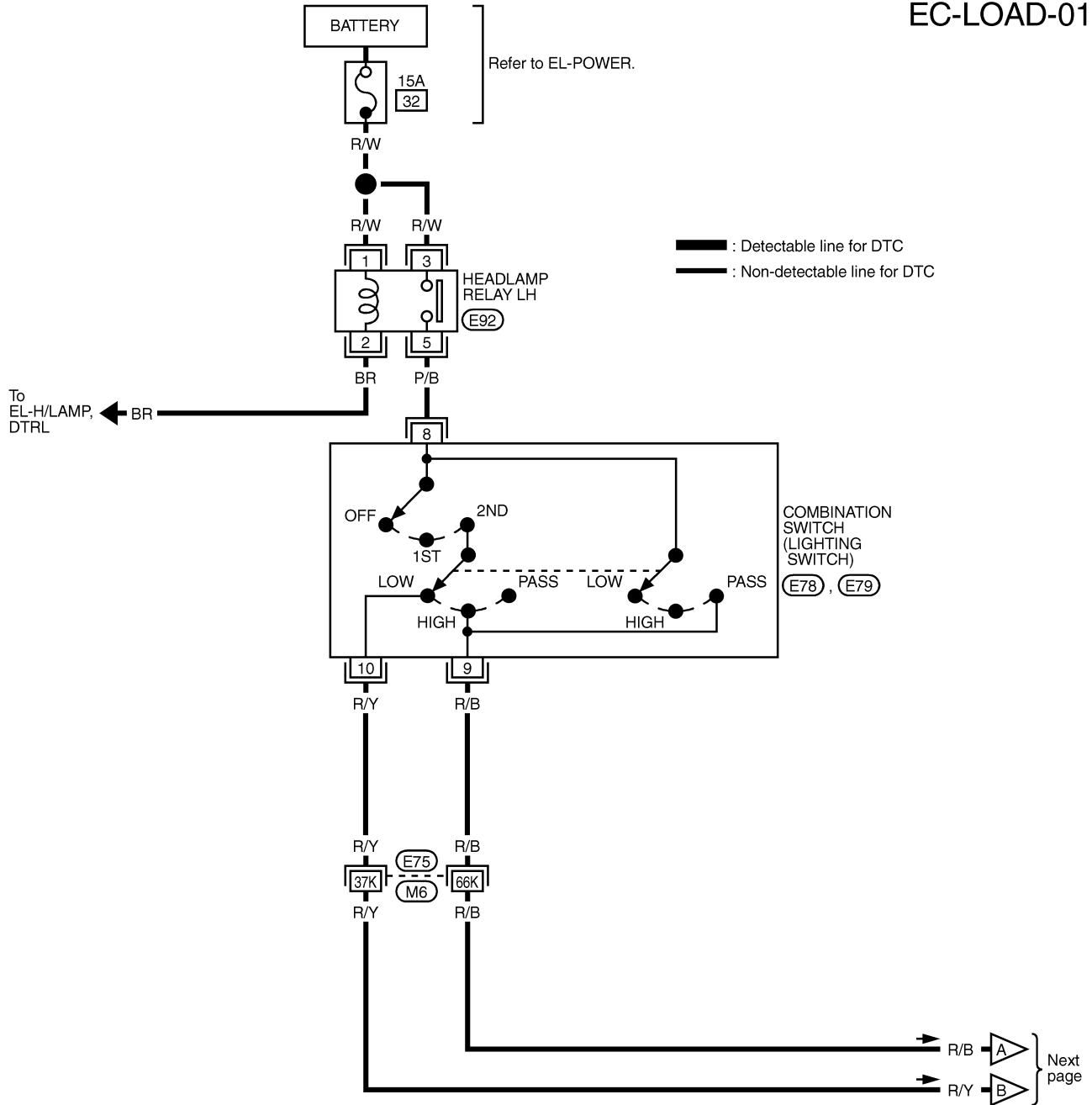
Wiring Diagram

Wiring Diagram

NCEC0641

EC-LOAD-01

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX



REFER TO THE FOLLOWING.
 (E75) -SUPER MULTIPLE JUNCTION (SMJ)

ELECTRICAL LOAD SIGNAL


Diagnostic Procedure

Diagnostic Procedure


NCEC0642

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 4.

GI
MA
EM

2	CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I							
<p> With CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>								
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>LOAD SIGNAL</td> <td>ON</td> </tr> </tbody> </table>			DATA MONITOR		MONITOR	NO DTC	LOAD SIGNAL	ON
DATA MONITOR								
MONITOR	NO DTC							
LOAD SIGNAL	ON							
<table border="1" style="margin: auto;"> <tbody> <tr> <td>Rear window defogger switch "ON"</td> <td style="text-align: center;">ON</td> </tr> <tr> <td>Rear window defogger switch "OFF"</td> <td style="text-align: center;">OFF</td> </tr> </tbody> </table>			Rear window defogger switch "ON"	ON	Rear window defogger switch "OFF"	OFF		
Rear window defogger switch "ON"	ON							
Rear window defogger switch "OFF"	OFF							
SEF229Y								
OK or NG								
OK	▶	GO TO 3.						
NG	▶	GO TO 6.						

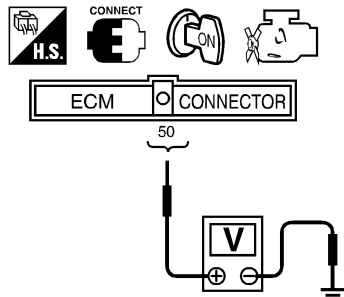
LC
EC
FE
CL
MT
AT
AX

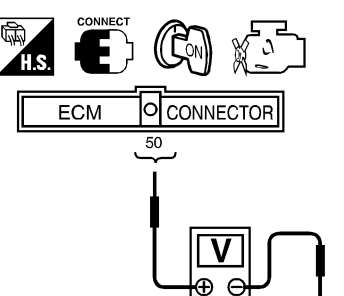
3	CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II							
<p> With CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>								
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>LOAD SIGNAL</td> <td>ON</td> </tr> </tbody> </table>			DATA MONITOR		MONITOR	NO DTC	LOAD SIGNAL	ON
DATA MONITOR								
MONITOR	NO DTC							
LOAD SIGNAL	ON							
<table border="1" style="margin: auto;"> <tbody> <tr> <td>Lighting switch "ON" at 2nd position</td> <td style="text-align: center;">ON</td> </tr> <tr> <td>Lighting switch "OFF"</td> <td style="text-align: center;">OFF</td> </tr> </tbody> </table>			Lighting switch "ON" at 2nd position	ON	Lighting switch "OFF"	OFF		
Lighting switch "ON" at 2nd position	ON							
Lighting switch "OFF"	OFF							
SEF230Y								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 10.						

SU
BR
ST
RS
BT
HA
SC
EL
IDX

ELECTRICAL LOAD SIGNAL

Diagnostic Procedure (Cont'd)

4	CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I							
<p> Without CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check voltage between ECM terminal 50 and ground under the following conditions.</p>								
								
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 60%;">Condition</th> <th style="width: 40%;">Voltage</th> </tr> </thead> <tbody> <tr> <td>Rear window defogger switch "ON"</td> <td>BATTERY VOLTAGE</td> </tr> <tr> <td>Rear window defogger switch "OFF"</td> <td>0V</td> </tr> </tbody> </table>			Condition	Voltage	Rear window defogger switch "ON"	BATTERY VOLTAGE	Rear window defogger switch "OFF"	0V
Condition	Voltage							
Rear window defogger switch "ON"	BATTERY VOLTAGE							
Rear window defogger switch "OFF"	0V							
SEF956X								
OK or NG								
OK	▶	GO TO 5.						
NG	▶	GO TO 6.						

5	CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II							
<p> Without CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check voltage between ECM terminal 50 and ground under the following conditions.</p>								
								
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 60%;">Condition</th> <th style="width: 40%;">Voltage</th> </tr> </thead> <tbody> <tr> <td>Lighting switch "ON" at 2nd position</td> <td>BATTERY VOLTAGE</td> </tr> <tr> <td>Lighting switch "OFF"</td> <td>0V</td> </tr> </tbody> </table>			Condition	Voltage	Lighting switch "ON" at 2nd position	BATTERY VOLTAGE	Lighting switch "OFF"	0V
Condition	Voltage							
Lighting switch "ON" at 2nd position	BATTERY VOLTAGE							
Lighting switch "OFF"	0V							
SEF957X								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 10.						

6	CHECK REAR WINDOW DEFOGGER FUNCTION	
<p>1. Start engine.</p> <p>2. Turn "ON" the rear window defogger switch.</p> <p>3. Check the rear windshield. Is the rear windshield heated up?</p>		
Yes or No		
Yes	▶	GO TO 7.
No	▶	Refer to EL-121, "Rear Window Defogger".

ELECTRICAL LOAD SIGNAL

Diagnostic Procedure (Cont'd)

7	CHECK REAR WINDOW DEFOGGER INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT							
<ol style="list-style-type: none"> 1. Stop engine. 2. Disconnect ECM harness connector. 3. Disconnect rear window defogger relay. 4. Check harness continuity between ECM terminal 50 and rear window defogger relay terminal 5. 								
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CONDITION 1</p> </div> <div style="text-align: center;"> <p>CONDITION 2</p> </div> </div>								
		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>CONDITION</th> <th>CONTINUITY</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">Should exist.</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Should not exist.</td> </tr> </tbody> </table>	CONDITION	CONTINUITY	1	Should exist.	2	Should not exist.
CONDITION	CONTINUITY							
1	Should exist.							
2	Should not exist.							
<p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: right;">SEF958X</p>								
OK or NG								
OK	▶	GO TO 9.						
NG	▶	GO TO 8.						

8	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M49, F23 ● Harness connectors E75, M6 ● Diode M93 ● Diode M94 ● 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.

9	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.		
		▶ INSPECTION END

10	CHECK HEADLAMP FUNCTION	
<ol style="list-style-type: none"> 1. Start engine. 2. Turn the lighting switch "ON" at 2nd position. 3. Check that headlamps are illuminated. 		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Refer to EL-29, "HEADLAMP (FOR USA)" or EL-41, "HEADLAMP (FOR CANADA) — DAYTIME LIGHT SYSTEM".

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

ELECTRICAL LOAD SIGNAL

Diagnostic Procedure (Cont'd)

11	CHECK HEADLAMP INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT						
<p>1. Stop engine. 2. Disconnect ECM harness connector. 3. Disconnect lighting switch harness connectors. 4. Check harness continuity between ECM terminal 50 and lighting switch terminals 9, 10 under the following conditions.</p>							
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CONDITION 1</p> </div> <div style="text-align: center;"> <p>CONDITION 2</p> </div> </div>							
<table border="1" style="border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">CONDITION</th> <th>CONTINUITY</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Should exist.</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Should not exist.</td> </tr> </tbody> </table>		CONDITION	CONTINUITY	1	Should exist.	2	Should not exist.
CONDITION	CONTINUITY						
1	Should exist.						
2	Should not exist.						
<p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>							
OK	▶	GO TO 13.					
NG	▶	GO TO 12.					

SEF959X

12	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M49, F23 ● Harness connectors E75, M6 ● Diode M94 ● 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.

13	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-146.	
▶	INSPECTION END

SERVICE DATA AND SPECIFICATIONS (SDS)

Fuel Pressure Regulator

Fuel Pressure Regulator

NCEC0467

Fuel pressure at idling kPa (kg/cm ² , psi)	Vacuum hose is connected	Approximately 235 (2.4, 34)
	Vacuum hose is disconnected	Approximately 294 (3.0, 43)

Idle Speed and Ignition Timing

NCEC0468

Target idle speed*1 rpm	No-load*3 (in "P" or "N" position)	800±50
Air conditioner: ON rpm	In "P" or "N" position	850 or more
Ignition timing*2	In "P" or "N" position	15°±2° BTDC
Throttle position sensor idle position V		0.15 - 0.85

*1: Throttle position sensor harness connector connected

*2: Throttle position sensor harness connector disconnected

*3: Under the following conditions:

- Air conditioner switch: OFF
- Electrical load: OFF (Lights & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Ignition Coil

NCEC0469

Primary voltage V	Battery voltage (11 - 14)
Primary resistance [at 25°C (77°F)] Ω	Approximately 0.8
Secondary resistance [at 25°C (77°F)] kΩ	Approximately 16

Mass Air Flow Sensor

NCEC0470

Supply voltage V	Battery voltage (11 - 14)
Output voltage V	1.3 - 1.7*
Mass air flow (Using CONSULT-II or GST) g-m/sec	2.5 - 5.0 at idle* 7.1 - 12.5 at 2,500 rpm*

*: Engine is warmed up to normal operating temperature and idling under no-load.

Engine Coolant Temperature Sensor

NCEC0471

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

EGR Volume Control Valve

NCEC0671

Resistance [at 20°C (68°F)] Ω Between terminals 1-2, 2-3, 4-5 and 5-6	20.9 - 23.1
--	-------------

EGR Temperature Sensor

NCEC0472

EGR temperature °C (°F)	Voltage V	Resistance MΩ
0 (32)	4.56	0.73 - 0.89
50 (122)	2.25	0.074 - 0.082
100 (212)	0.59	0.012 - 0.014

SERVICE DATA AND SPECIFICATIONS (SDS)

Fuel Pump

Fuel Pump		NCEC0473
Resistance [at 25°C (77°F)] Ω		0.2 - 5.0
IACV-AAC Valve		NCEC0474
Resistance [at 20°C (68°F)] Ω		20 - 24
Injector		NCEC0475
Resistance [at 20°C (68°F)] Ω		13.5 - 17.5
Resistor		NCEC0476
Resistance [at 25°C (77°F)] kΩ		4 - 8
Throttle Position Sensor		NCEC0477
Throttle valve conditions	Voltage (at normal operating temperature, engine off, ignition switch ON, throttle opener disengaged)	
Completely closed (a)	0.15 - 0.85V	
Partially open	Between (a) and (b)	
Completely open (b)	3.5 - 4.7V	
Heated Oxygen Sensor 1 Heater (Front)		NCEC0478
Resistance [at 25°C (77°F)] Ω		2.3 - 4.3
Calculated Load Value		NCEC0479
	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		NCEC0480
Temperature °C (°F)	Resistance kΩ	
20 (68)	2.1 - 2.9	
80 (176)	0.27 - 0.38	
EVAP Canister Purge Volume Control Valve		NCEC0481
Resistance [at 20°C (68°F)] Ω		22 - 26
Heated Oxygen Sensor 2 Heater (Rear)		NCEC0483
Resistance [at 25°C (77°F)] Ω		2.3 - 4.3
Crankshaft Position Sensor (OBD)		NCEC0484
Resistance [at 20°C (68°F)] Ω		166 - 204

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

SERVICE DATA AND SPECIFICATIONS (SDS)

Fuel Tank Temperature Sensor

Fuel Tank Temperature Sensor

=NCEC0485

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90