

1. General Description

A: SPECIFICATION

Specifications for SOHC U5 model are the same as the SOHC model. <Ref. to CO(H4SO)-2, General Description.>

LUBRICATION

LU(H4SO U5)

	Page
1. General Description	2



General Description

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES)

1. General Description

A: SPECIFICATION

Removal and installation procedures for SOHC U5 model are the same as the SOHC model. <Ref. to EC(H4SO)-2, General Description.>

INTAKE (INDUCTION)

IN(H4SO U5)

	Page
1. General Description	2



Basic Diagnostic Procedure

ENGINE (DIAGNOSTICS)

1. Basic Diagnostic Procedure

A: PROCEDURE

1. ENGINE

Step	Check	Yes	No
1 CHECK ENGINE START FAILURE. 1) Ask the customer when and how the trouble occurred using the interview check list. <Ref. to EN(H4SO U5)(diag)-3, CHECK, Check List for Interview.> 2) Start the engine.	Does the engine start?	Go to step 2.	Inspection using "Diagnostics for Engine Start Failure". <Ref. to EN(H4SO U5)(diag)-58, Diagnostics for Engine Starting Failure.>
2 CHECK ILLUMINATION OF MALFUNCTION INDICATOR LIGHT.	Does the malfunction indicator light illuminate?	Go to step 3.	Inspection using "General Diagnostic Table". <Ref. to EN(H4SO U5)(diag)-326, INSPECTION, General Diagnostic Table.>
3 CHECK INDICATION OF DTC ON DISPLAY. 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor or general scan tool to data link connector. 3) Turn the ignition switch to ON. 4) Read DTC using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor Refer to "Read Diagnostic Trouble Code" for detailed operation procedure. <Ref. to EN(H4SO U5)(diag)-35, Read Diagnostic Trouble Code (DTC).> • For detailed operation procedure, refer to the general scan tool operation manual.	Is DTC displayed on the Subaru Select Monitor?	Record the DTC. Repair the trouble cause. <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> Go to step 4.	Repair the related parts. NOTE: If DTC is not shown on display although the malfunction indicator light illuminates, perform the diagnosis of malfunction indicator light circuit or combination meter. <Ref. to EN(H4SO U5)(diag)-49, Malfunction Indicator Light.>
4 PERFORM DIAGNOSIS. 1) Perform the Clear Memory Mode. <Ref. to EN(H4SO U5)(diag)-46, Clear Memory Mode.> 2) Perform the Inspection Mode. <Ref. to EN(H4SO U5)(diag)-36, Inspection Mode.>	Is DTC displayed on the Subaru Select Monitor?	Inspect using "Diagnostic Procedure with Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-79, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Finish the diagnosis.

Check List for Interview

ENGINE (DIAGNOSTICS)

2. Check List for Interview

A: CHECK

1. CHECK LIST No. 1

Check the following item when problem has occurred.

NOTE:

Use copies of this page for interviewing customers.

Customer's name		Engine No.	
Date of sale		Fuel brand	
Date of repair		Odometer reading	km
V.I.N.			miles
Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Others:		
Ambient air temperature	°C (°F) ☐ Hot ☐ Warm ☐ Cool ☐ Cold		
Place	☐ Highway ☐ Suburbs ☐ Inner city ☐ Uphill ☐ Downhill ☐ Rough road ☐ Others:		
Engine temperature	☐ Cold ☐ Warming-up ☐ After warming-up ☐ Any temperature ☐ Others:		
Engine speed	rpm		
Vehicle speed	km/h (MPH)		
Driving conditions	☐ Not affected ☐ At starting ☐ While idling ☐ At racing ☐ While accelerating ☐ While cruising ☐ While decelerating ☐ While turning (RH/LH)		
Headlight	☐ ON/ ☐ OFF	Rear defogger	☐ ON/ ☐ OFF
Blower	☐ ON/ ☐ OFF	Audio	☐ ON/ ☐ OFF
A/C compressor	☐ ON/ ☐ OFF	Car phone	☐ ON/ ☐ OFF
Radiator fan	☐ ON/ ☐ OFF		
Front wiper	☐ ON/ ☐ OFF		
Rear wiper	☐ ON/ ☐ OFF		

Check List for Interview

ENGINE (DIAGNOSTICS)

2. CHECK LIST No. 2

Check the following item about the vehicle's state when malfunction indicator light turns on.

NOTE:

Use copies of this page for interviewing customers.

a) Other warning lights or indicators turn on. ☐ Yes / ☐ No
☐ Low fuel warning light ☐ Charge indicator light ☐ AT diagnostic indicator light ☐ ABS warning light ☐ Oil pressure indicator light
b) Fuel level
• Lack of gasoline: ☐ Yes / ☐ No • Indicator position of fuel gauge: • Experienced running out of fuel: ☐ Yes / ☐ No
c) Intentional connecting or disconnecting of harness connectors or spark plug cords: ☐ Yes / ☐ No
• What:
d) Intentional connecting or disconnecting of hoses: ☐ Yes / ☐ No
• What:
e) Installing of other parts except genuine parts: ☐ Yes / ☐ No
• What: • Where:
f) Occurrence of noise: ☐ Yes / ☐ No
• From where: • What kind:
g) Occurrence of smell: ☐ Yes / ☐ No
• From where: • What kind:
h) Intrusion of water into engine compartment or passenger compartment: ☐ Yes / ☐ No
i) Troubles occurred
☐ Engine does not start. ☐ Engine stalls during idling. ☐ Engine stalls while driving. ☐ Engine speed decreases. ☐ Engine speed does not decrease. ☐ Rough idling ☐ Poor acceleration ☐ Back fire ☐ After fire ☐ Does not shift. ☐ Excessive shift shock

3. General Description

A: CAUTION

1) Airbag system wiring harness is routed near the ECM, main relay and fuel pump relay.

CAUTION:

- All airbag system wiring harnesses and connectors are yellow. Do not use electrical test equipment on these circuits.
- Be careful not to damage the airbag system wiring harness when servicing the ECM, TCM, main relay and fuel pump relay.

2) Never connect the battery in reverse polarity.

- The ECM will be destroyed instantly.
- The fuel injector and other parts will be damaged.

3) Do not disconnect the battery terminals while the engine is running.

A large counter electromotive force will be generated in the generator, and this voltage may damage electronic parts such as ECM etc.

4) Before disconnecting the connectors of each sensor and ECM, be sure to turn the ignition switch to OFF. Perform the Clear Memory Mode after connecting the connectors.

5) Poor contact has been identified as a primary cause of this problem. Measure the voltage or resistance of individual sensor or all electrical control modules using a tapered pin with a diameter of less than 0.64 mm (0.025 in). Do not insert the pin more than 5 mm (0.20 in) into the part.

6) Before removing the ECM from the located position, disconnect two cables on battery.

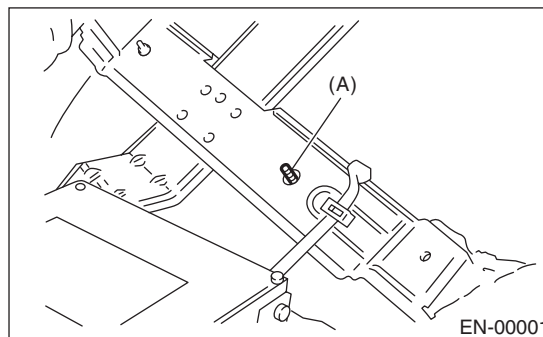
Otherwise, the ECM may be damaged.

CAUTION:

When replacing the ECM, be careful not to use the wrong spec. ECM to avoid any damage on the fuel injection system.

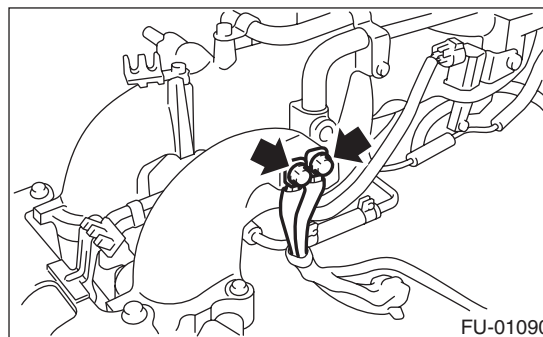
7) Connectors of each sensor in the engine compartment and the harness connectors on the engine side and body side are all designed to be waterproof. Even if the connectors are waterproof, take care not to allow water to get into them when washing the vehicle, or when servicing the vehicle in rainy weather.

8) Use ECM mounting stud bolts at the body side grounding point when measuring voltage and resistance inside the passenger compartment.

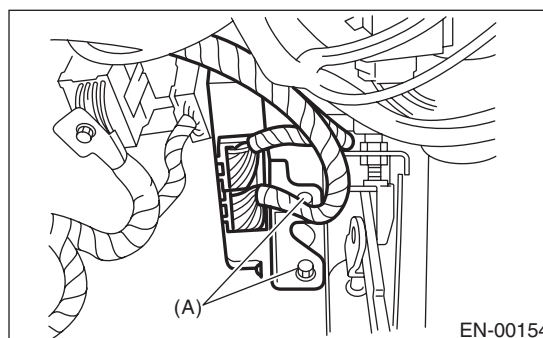


(A) Stud bolt

9) Use the engine ground terminal or engine assembly for the grounding point to the body when measuring the voltage and resistance in engine compartment.



10) Use TCM mounting stud bolts at the body side grounding point when measuring voltage and resistance inside the passenger compartment.



(A) Stud bolt

11) Every MFI-related part is a precision part. Do not drop them.

General Description

ENGINE (DIAGNOSTICS)

12) Observe the following cautions when installing a radio in MFI equipped models.

CAUTION:

- The antenna must be kept as far apart as possible from control unit. (The ECM is located under the steering column, inside of the instrument panel lower trim panel.)
- The antenna feeder must be placed as far apart as possible from the ECM and MFI harness.
- Carefully adjust the antenna for correct matching.
- When mounting a large power type radio, pay special attention to the three items mentioned above.
- Incorrect installation of the radio may affect the operation of ECM.

13) Before disconnecting the fuel hose, disconnect the fuel pump connector and crank the engine for five seconds or more to release pressure in the fuel system. If engine starts during this operation, run it until it stops.

14) Problems in the electronic-controlled automatic transmission may be caused by failure of the engine, the electronic control system, the transmission body, or by a combination of these. These three (the engine, electronic control system and transmission) causes must be distinguished clearly when performing diagnostics.

15) Diagnostics should be conducted with simple, easy operations first, and then with complicated, difficult operations. The most important thing in diagnostics is to understand the customer's complaint, and distinguish among the causes of engine, electronic control system and transmission.

16) For AT models, do not hold the stall test for five seconds or more at one time. (Fully open the throttle from closed throttle to decrease engine speed.)

17) For the model with ABS, the ABS warning light may illuminate when performing driving test with jacked-up or lifted-up condition, but this is not a system malfunction. The reason for this is the speed difference between the front and rear wheels. After diagnosis of engine control system, perform the ABS memory clear procedure of self-diagnosis function.

B: INSPECTION

Before performing diagnostics, check the following item which might affect engine problems.

1. BATTERY

1) Measure the battery voltage and specific gravity of electrolyte.

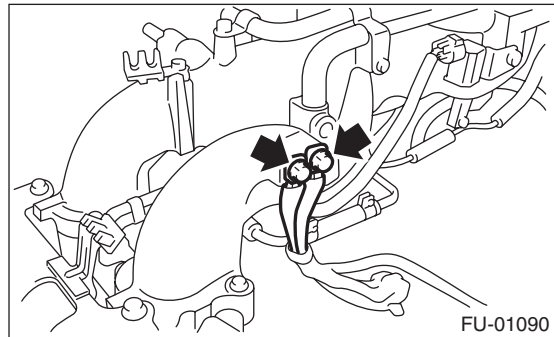
Standard voltage: 12 V

Specific gravity: Above 1.260

2) Check the condition of the main and other fuses, and harnesses and connectors. Also check for proper grounding.

2. ENGINE GROUND

Check if the engine ground terminal is properly connected to engine.



C: NOTE

1. DESCRIPTION

- The on-board diagnostics (OBD) system detects and indicates a fault in various inputs and outputs of the complex electronic control. Malfunction indicator light in the combination meter indicates occurrence of a fault or trouble.
- Further, against such a failure or sensors as may disable the drive, the fail-safe function is provided to ensure the minimal driveability.
- The OBD system incorporated with the vehicles within this engine family complies with OBD-II Regulations. The OBD system monitors the components and the system malfunction listed in "Engine Section" which affects on emissions.
- When the system decides that a malfunction occurs, malfunction indicator light illuminates. At the same time of the malfunction indicator light illumination or blinking, a DTC and a freeze frame engine conditions are stored into on-board computer.
- The OBD system stores freeze frame engine condition data (engine load, engine coolant temperature, fuel trim, engine speed and vehicle speed, etc.) into on-board computer first when it detects a malfunction.
- If the OBD system detects the various malfunctions including the fault of fuel trim or misfire, the OBD system first stores freeze frame engine conditions about the fuel trim or misfire.
- When the malfunction does not occur again for three consecutive driving cycles, malfunction indicator light is turned off, but DTC remains at on-board computer.
- When troubleshooting the vehicle which complies with OBD-II regulations, connect the Subaru Select Monitor or general scan tool to the vehicle.

2. ENGINE AND EMISSION CONTROL SYSTEM

- The Multipoint Fuel Injection (MFI) system is a system that supplies the optimum air-fuel mixture to the engine for all the various operating conditions through the use of the latest electronic technology.

With this system, the fuel which is pressurized at a constant pressure is injected into the intake air passage of the cylinder head. The injection quantity of fuel is controlled by an intermittent injection system, where the electro-magnetic injection valve (fuel injector) opens for a short period of time depending on the quantity of air required for one cycle of operation. In actual operation, the injection quantity is determined by the duration of an electric pulse applied to the fuel injector and this permits simple, yet highly precise metering of the fuel.

- Further, all the operating conditions of the engine are converted into electric signals, and this results in additional features of the system, such as large improved adaptability, easier addition of compensating element etc.

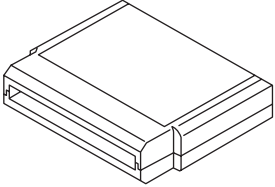
The MFI system also has the following features:

- Reduced emission of harmful exhaust gases.
- Reduction in fuel consumption.
- Increased engine output.
- Superior acceleration and deceleration.
- Superior startability and warm-up performance in cold weather since compensation is made for engine coolant and intake air temperature.

General Description

ENGINE (DIAGNOSTICS)

D: PREPARATION TOOL

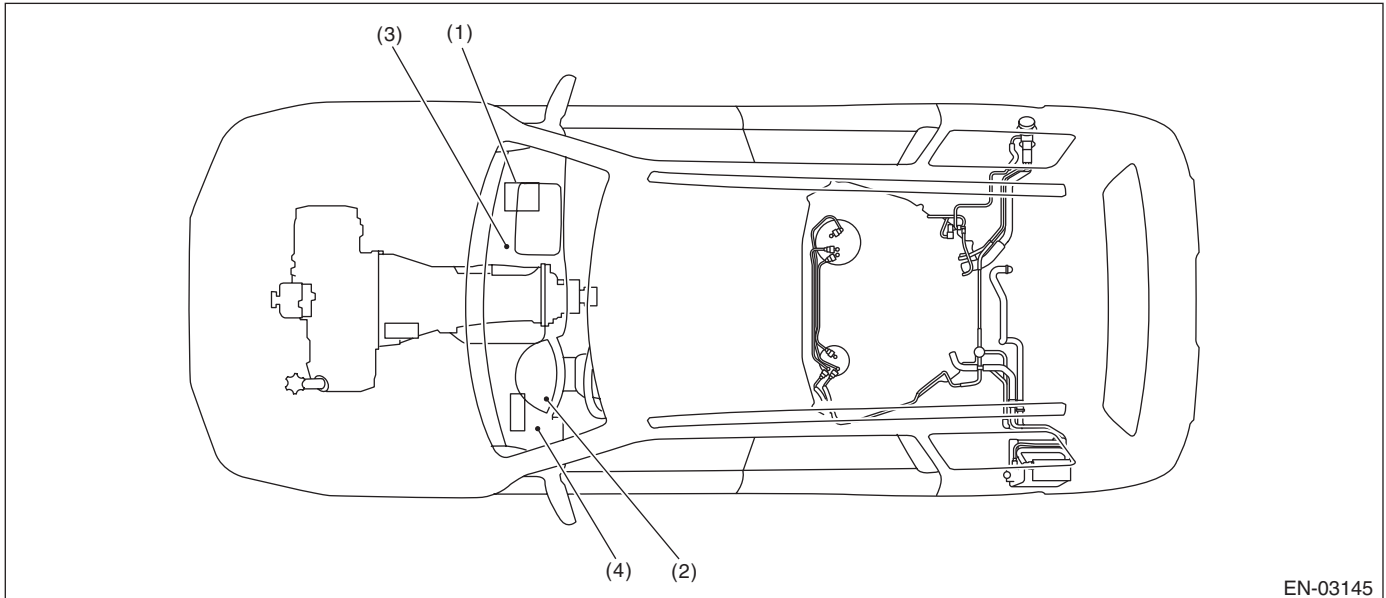
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18482AA010	18482AA010	CARTRIDGE	Troubleshooting for electrical system.
 ST22771AA030	22771AA030	SUBARU SELECT MONITOR KIT	Troubleshooting for electrical system.

4. Electrical Component Location

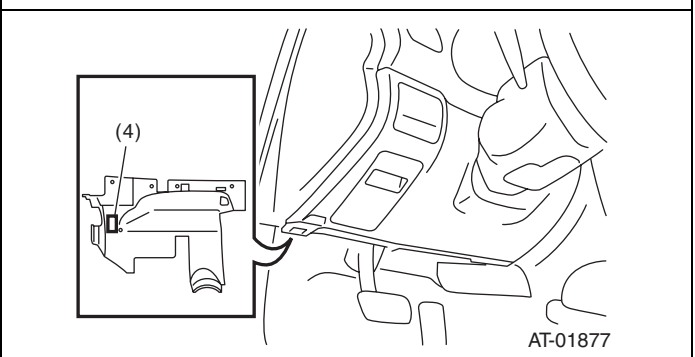
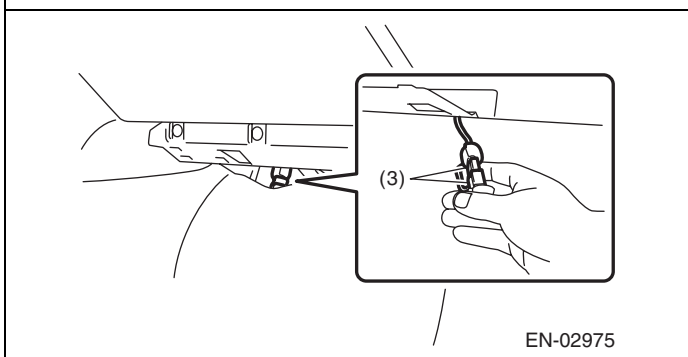
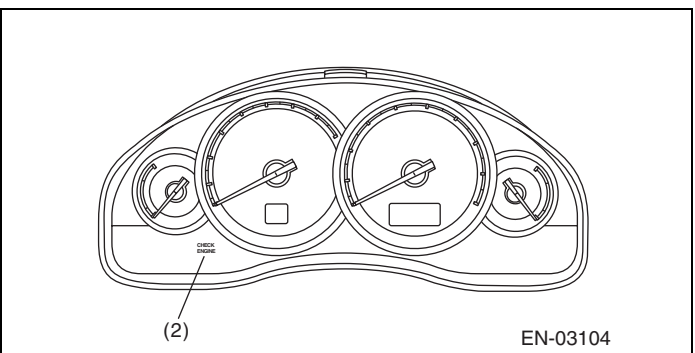
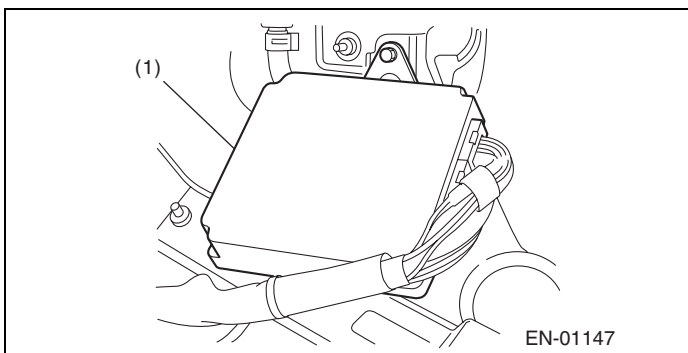
A: LOCATION

1. ENGINE

- Control module



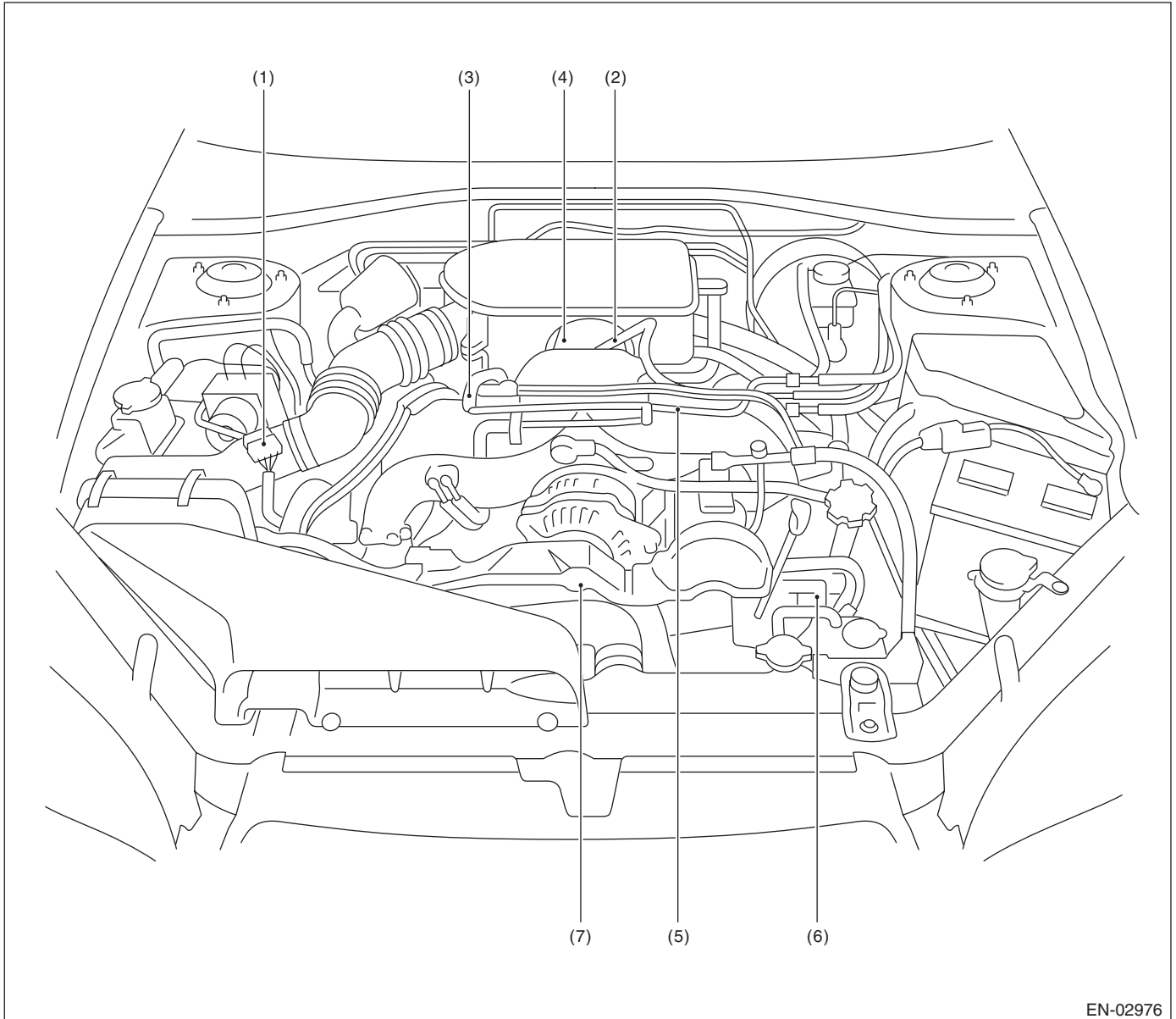
(1) Engine control module (ECM)	(3) Test mode connector	(4) Data link connector
(2) Malfunction indicator light		



Electrical Component Location

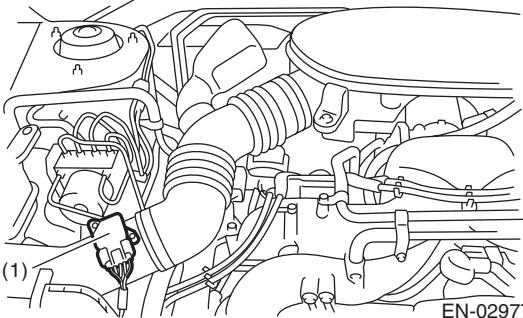
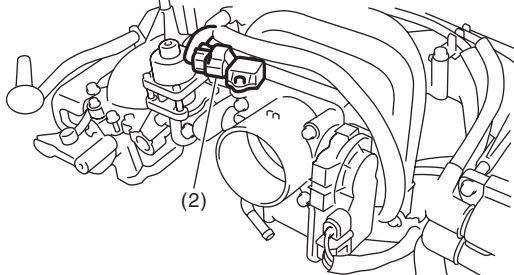
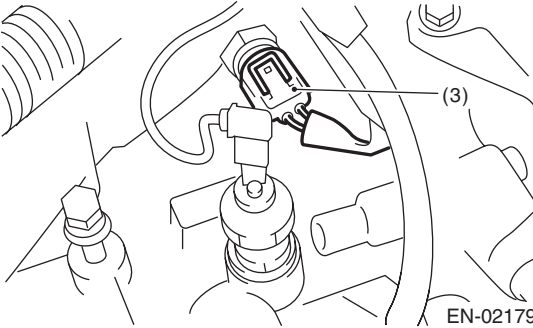
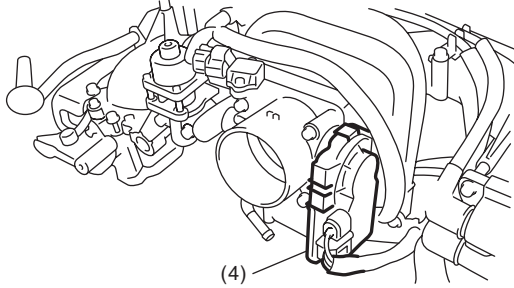
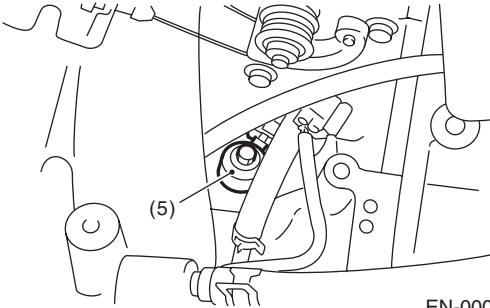
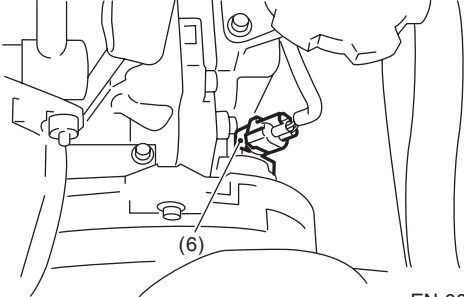
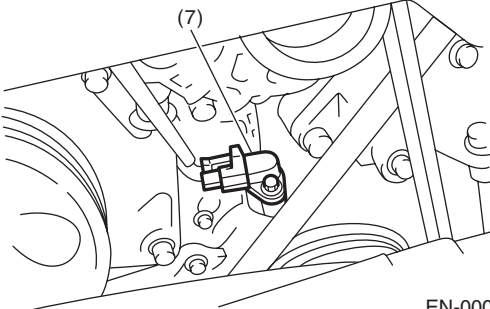
ENGINE (DIAGNOSTICS)

- Sensor



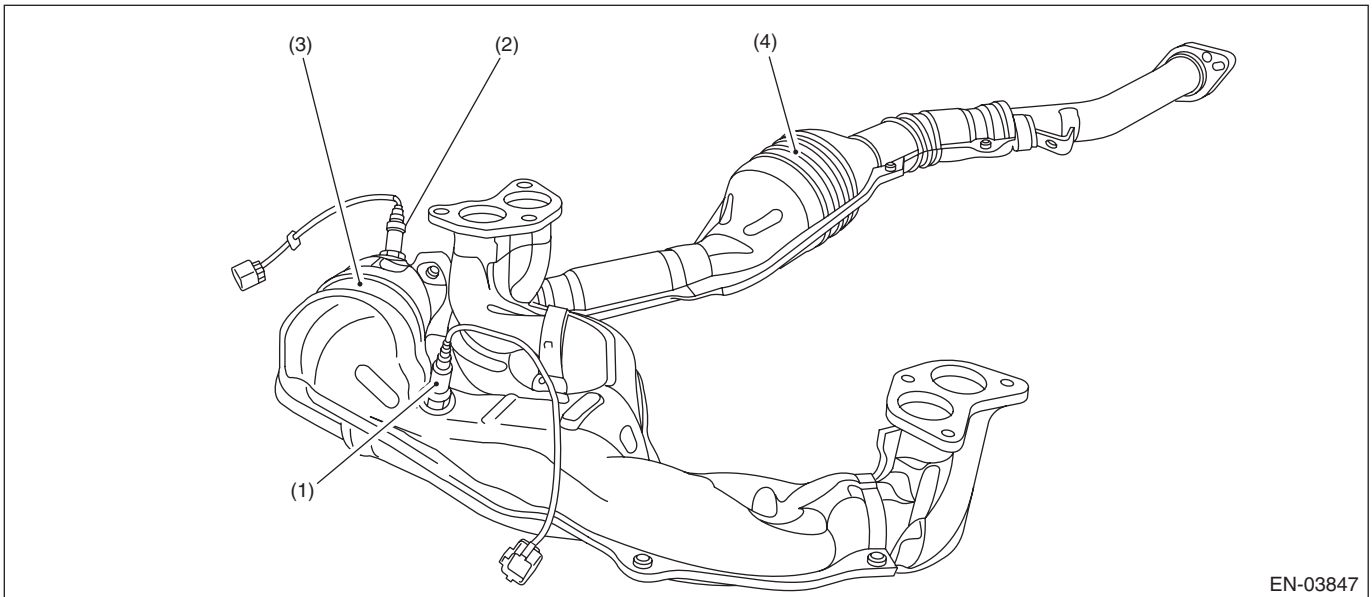
EN-02976

(1) Mass air flow and intake air temperature sensor	(3) Engine coolant temperature sensor	(5) Knock sensor
(2) Manifold absolute pressure sensor	(4) Electronic throttle control	(6) Camshaft position sensor
		(7) Crankshaft position sensor

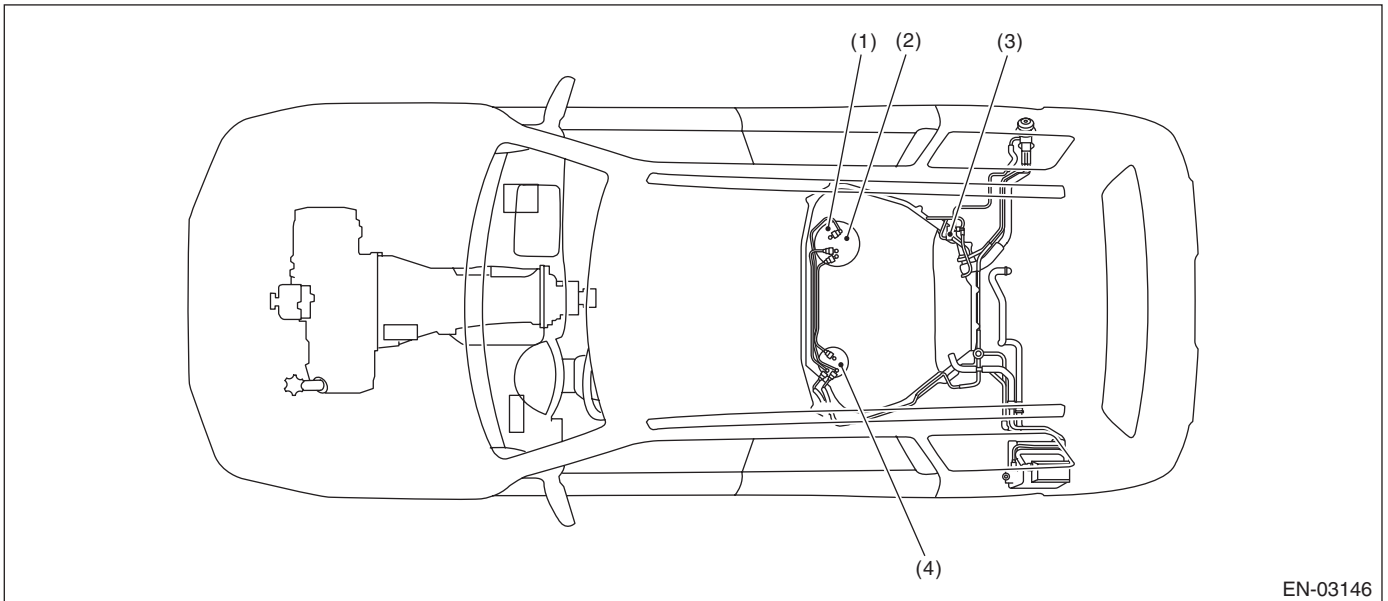
 (1) EN-02977	 (2) EN-01971
 (3) EN-02179	 (4) EN-01972
 (5) EN-00010	 (6) EN-00011
 (7) EN-00012	SUBARU.

Electrical Component Location

ENGINE (DIAGNOSTICS)



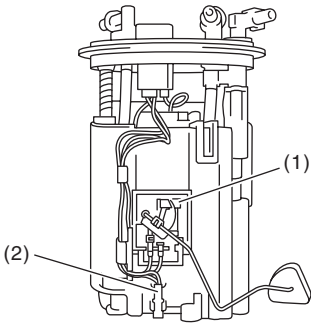
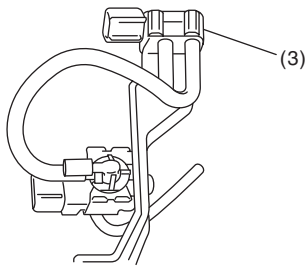
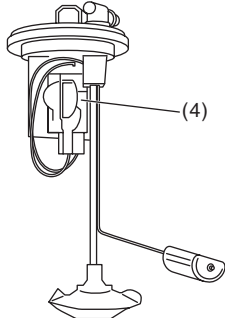
- (1) Front oxygen (A/F) sensor
- (2) Rear oxygen sensor
- (3) Front catalytic converter
- (4) Rear catalytic converter



- (1) Fuel level sensor
- (2) Fuel temperature sensor
- (3) Fuel tank pressure sensor
- (4) Fuel sub level sensor

Electrical Component Location

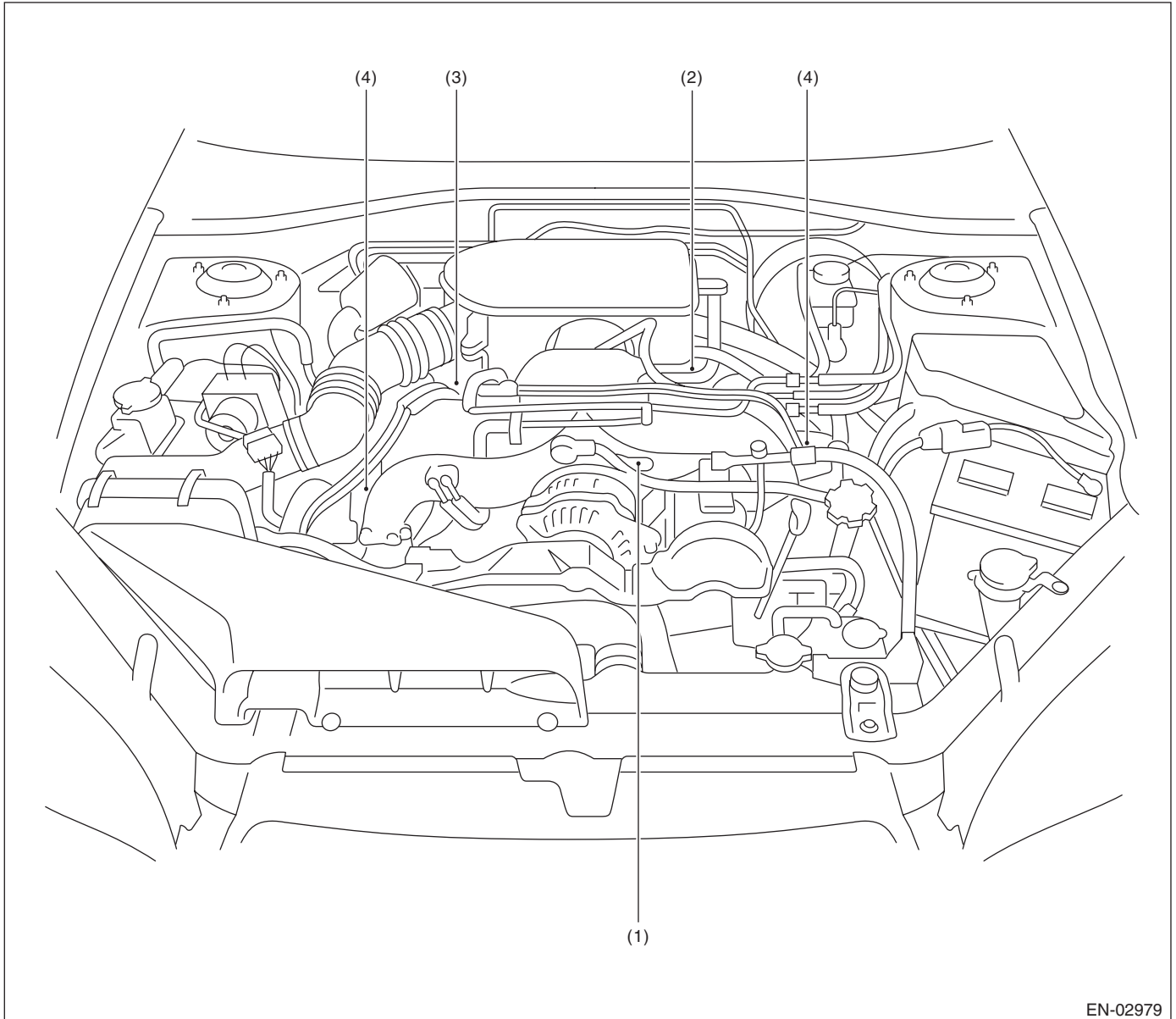
ENGINE (DIAGNOSTICS)

 EN-03147	 EN-03003
 EN-03132	

Electrical Component Location

ENGINE (DIAGNOSTICS)

- Solenoid valve, actuator, emission control system parts and ignition system parts



EN-02979

(1) Purge control solenoid valve

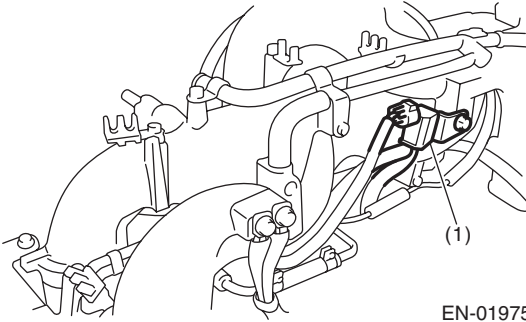
(3) Ignition coil and ignitor ASSY

(4) Fuel injector

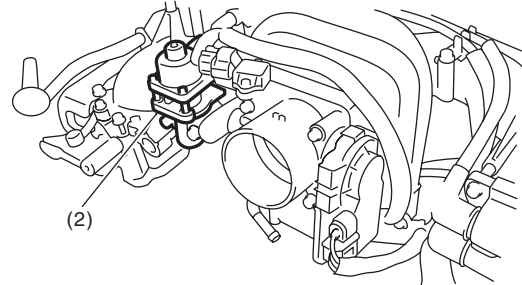
(2) EGR valve

Electrical Component Location

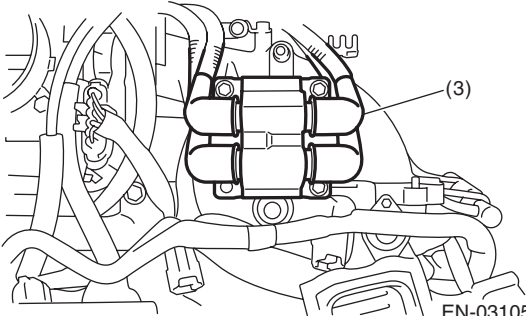
ENGINE (DIAGNOSTICS)



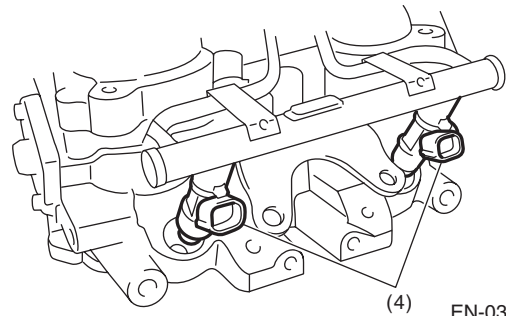
EN-01975



EN-01976



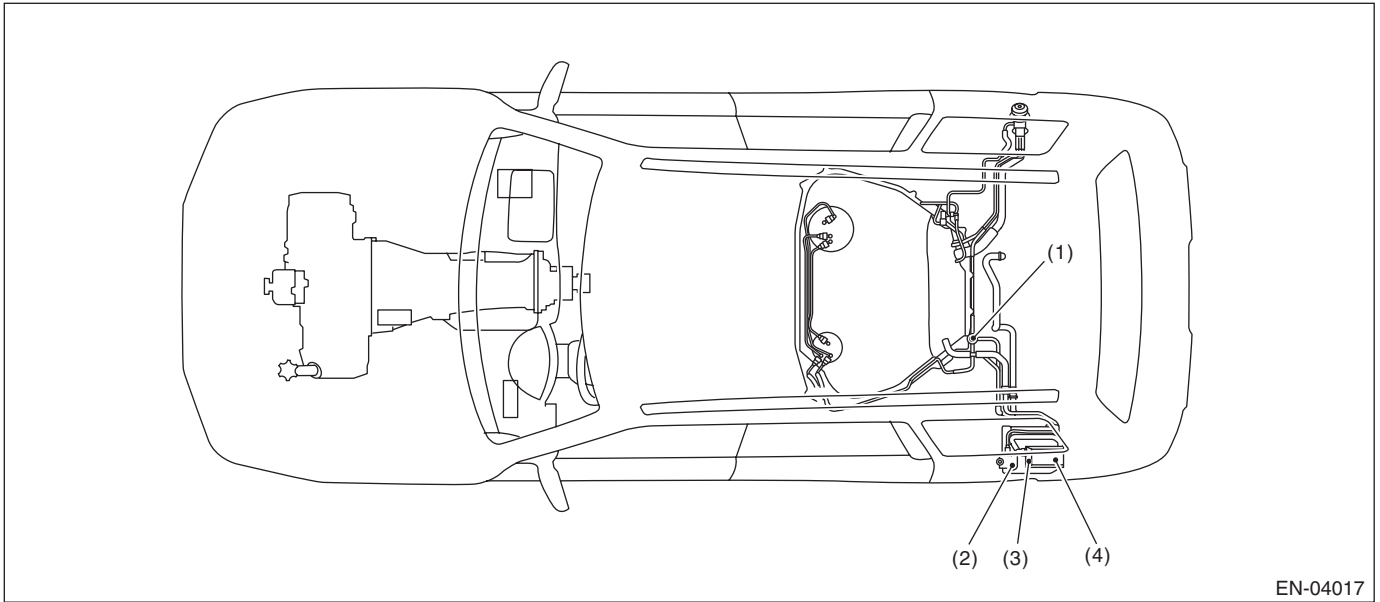
EN-03105



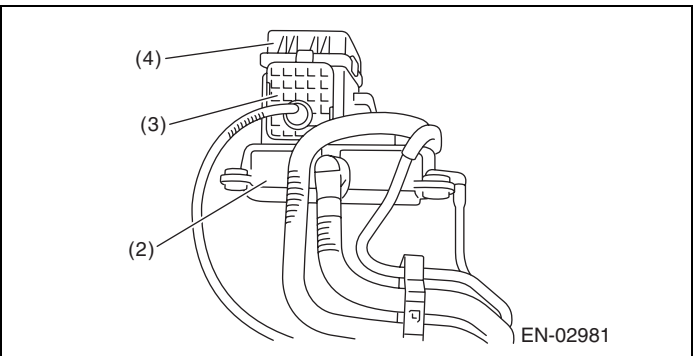
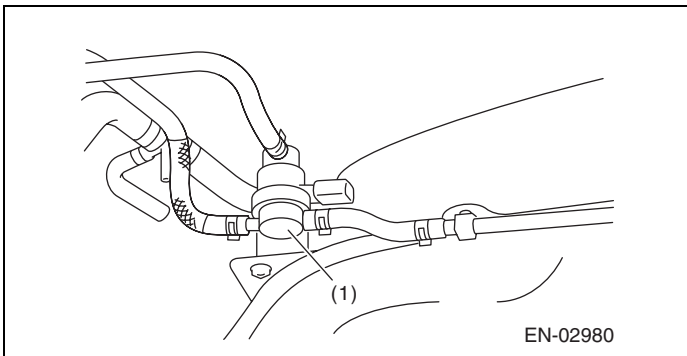
EN-03106

Electrical Component Location

ENGINE (DIAGNOSTICS)

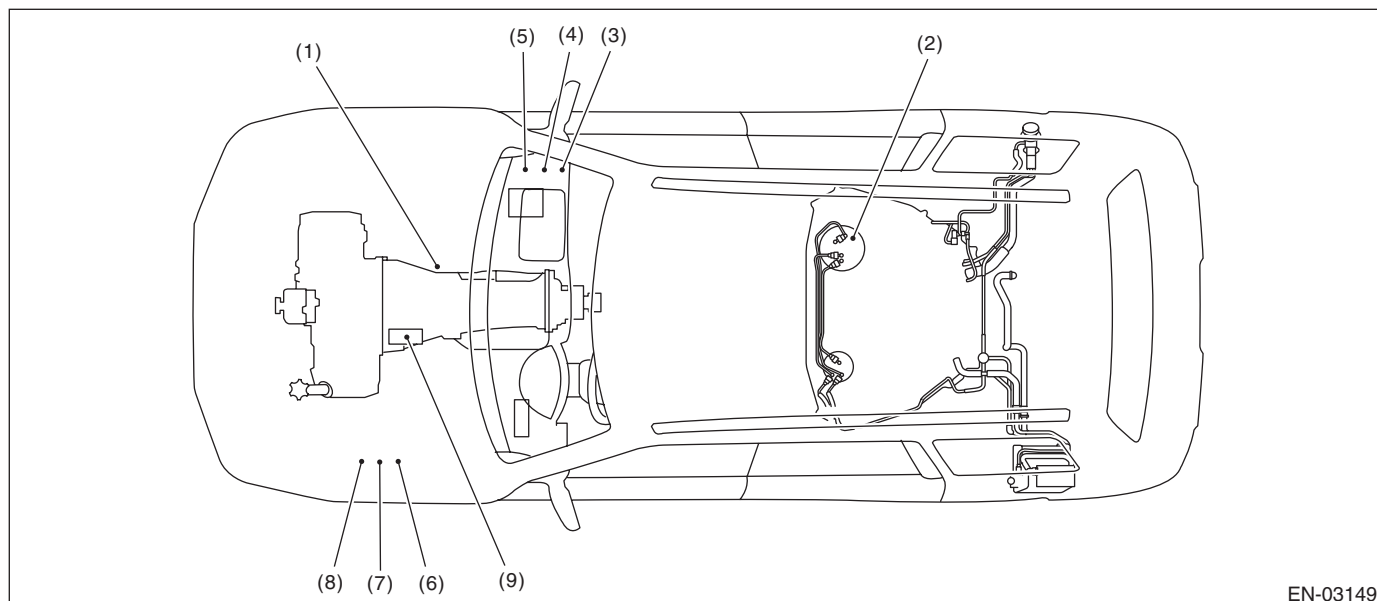


(1) Pressure control solenoid valve	(3) Drain valve	(4) Drain filter
(2) Canister		



Electrical Component Location

ENGINE (DIAGNOSTICS)

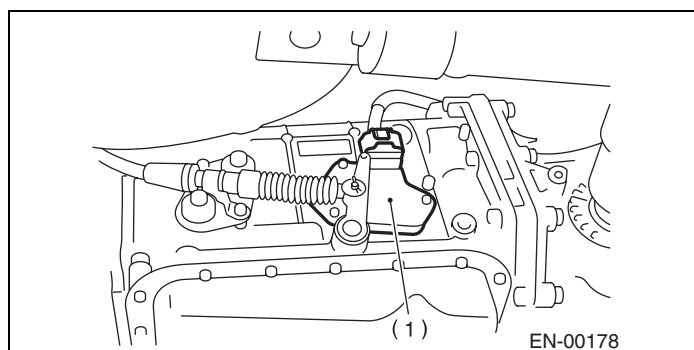


EN-03149

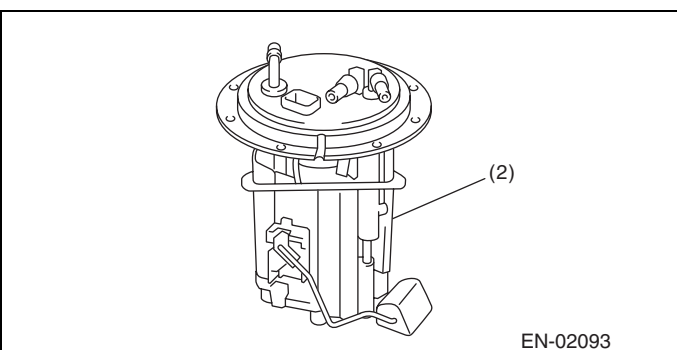
- (1) Inhibitor switch
- (2) Fuel pump
- (3) Main relay

- (4) Fuel pump relay
- (5) Electronic throttle control relay
- (6) Radiator main fan relay 1

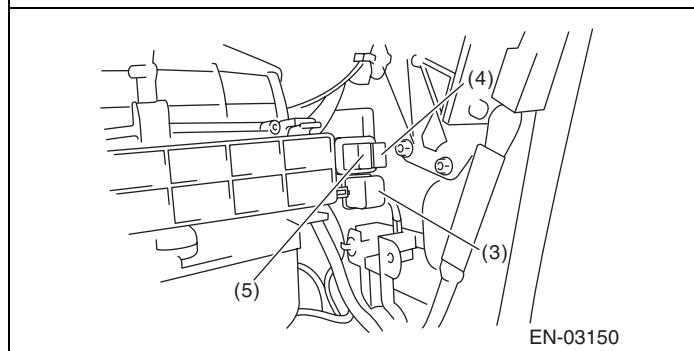
- (7) Radiator sub fan relay
- (8) Radiator main fan relay 2
- (9) Starter



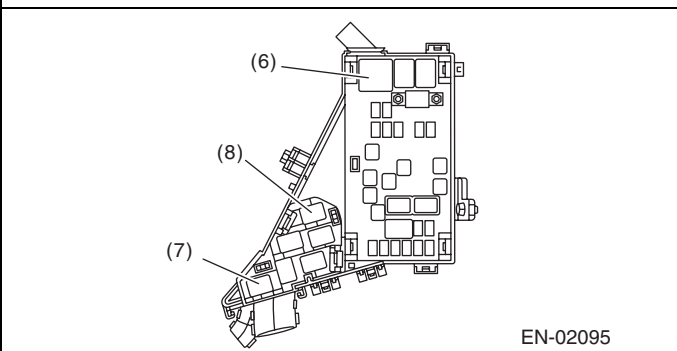
EN-00178



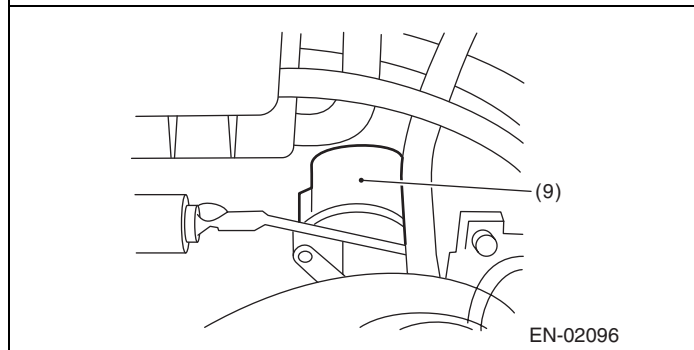
EN-02093



EN-03150



EN-02095



EN-02096



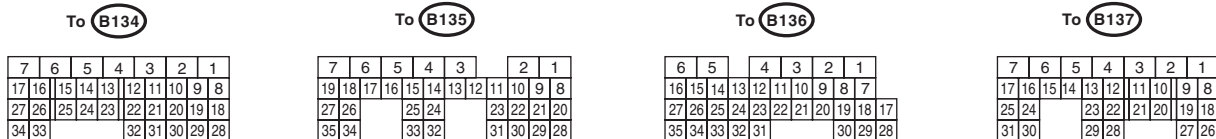
SUBARU

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

5. Engine Control Module (ECM) I/O Signal

A: ELECTRICAL SPECIFICATION



EN-01812

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Crankshaft position sensor	Signal (+)	B134	13	0	-7 — +7	Waveform
	Signal (-)	B134	14	0	0	—
	Shield	B134	24	0	0	—
Camshaft position sensor	Signal (+)	B134	12	0	-7 — +7	Waveform
	Signal (-)	B134	22	0	0	—
	Shield	B134	24	0	0	—
Electronic throttle control	Main	B134	18	0.64 — 0.72 Fully open: 3.96	0.64 — 0.72 (After engine is warmed-up.)	Fully closed: 0.6 Fully opened: 3.96
	Sub	B134	28	1.51 — 1.58 Fully open: 4.17	1.51 — 1.58 (After engine is warmed-up.)	Fully closed: 1.48 Fully open: 4.17
	Power supply	B134	19	5	5	—
	GND (sensor)	B134	29	0	0	—
Electronic throttle control motor (+)		B137	5	Duty waveform	Duty waveform	Drive frequency: 500 Hz
Electronic throttle control motor (-)		B137	4	Duty waveform	Duty waveform	Drive frequency: 500 Hz
Electronic throttle control motor power supply		B136	1	10 — 13	12 — 14	—
Electronic throttle control motor relay		B136	21	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	When ignition switch is turned to ON: ON

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Accelerator pedal position sensor	Main sensor signal	B135	23	Fully closed: 1.0 Fully open: 3.5	Fully closed: 1.0 Fully open: 3.5	—
	Main power supply	B135	21	5	5	—
	GND (Main sensor)	B135	29	0	0	—
	Sub sensor signal	B135	31	Fully closed: 1.0 Fully open: 3.5	Fully closed: 1.0 Fully open: 3.5	—
	Sub power supply	B135	22	5	5	—
	GND (Sub sensor)	B135	30	0	0	—
Rear oxygen sensor	Signal	B135	4	0	0 — 0.9	—
	Shield	B135	1	0	0	—
Front oxygen (A/F) sensor heater	Signal 1	B136	3	10 — 13	1 — 14	Duty waveform
	Signal 2	B136	2	10 — 13	1 — 14	Duty waveform
Rear oxygen sensor heater signal		B136	4	10 — 13	1 — 14	Duty waveform
Engine coolant temperature sensor		B134	34	1.0 — 1.4	1.0 — 1.4	After engine is warmed-up.
Starter switch		B136	32	0	0	Cranking: 8 — 14
Starter relay control		B136	20	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
A/C switch		B136	24	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	—
Ignition switch		B135	19	10 — 13	12 — 14	—
Neutral position switch	AT	B136	31	ON: 0 OFF: 12±0.5		For AT model, switch is ON when select lever is shifted into “P” or “N” range.
	MT			ON: 0 OFF: 12±0.5		For MT model, switch is ON when select lever is shifted into “N” position.
Test mode connector		B135	27	10 — 13	13 — 14	When connected: 0
Knock sensor	Signal	B134	15	2.5	2.5	—
	Shield	B134	25	0	0	—
Back-up power supply		B135	5	10 — 13	12 — 14	Ignition switch “OFF”: 10 — 13
Control module power supply		B134	7	10 — 13	12 — 14	—
		B135	2	10 — 13	12 — 14	—
Ignition control	#1, #2	B137	18	0	1 — 3.4	Waveform
	#3, #4	B137	19	0	1 — 3.4	Waveform
Fuel injector	#1	B137	8	10 — 13	1 — 14	Waveform
	#2	B137	9	10 — 13	1 — 14	Waveform
	#3	B137	10	10 — 13	1 — 14	Waveform
	#4	B137	11	10 — 13	1 — 14	Waveform
Fuel pump relay control		B136	12	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
A/C relay control		B136	9	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
Radiator fan relay 1 control		B136	18	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
Radiator fan relay 2 control		B136	29	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
Self-shutoff control		B136	23	0.5 or less	0.5 or less	—
Malfunction indicator light		B136	11	—	—	Light "ON": 1 or less Light "OFF": 10 — 14
Engine speed output		B136	22	—	0 — 13 or more	Waveform
Oil temperature sensor signal		B134	23	1.0 — 1.4	1.0 — 1.4	After engine is warmed-up.
PCV diagnosis connector		B134	30	0	0	—
Purge control solenoid valve		B137	29	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	Duty waveform
EGR solenoid valve	Signal 1	B134	8	0 or 10 — 13	0 or 12 — 14	Waveform
	Signal 2	B134	9	0 or 10 — 13	0 or 12 — 14	Waveform
	Signal 3	B134	10	0 or 10 — 13	0 or 12 — 14	Waveform
	Signal 4	B134	20	0 or 10 — 13	0 or 12 — 14	Waveform
Power steering oil pressure switch		B134	33	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	—
Blower fan switch		B135	16	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	—
A/C middle pressure switch		B136	33	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	—
Oil switching solenoid valve RH	Signal (+)	B137	25	0	Duty waveform	Drive frequency: 300 Hz
	Signal (–)	B137	24	0	0	—
Oil switching solenoid valve LH	Signal (+)	B137	31	0	Duty waveform	Drive frequency: 300 Hz
	Signal (–)	B137	30	0	0	—
Variable valve lift diagnosis oil pressure switch RH		B134	31	0	0	—
Variable valve lift diagnosis oil pressure switch LH		B134	32	0	0	—
Front oxygen (A/F) sensor signal (+)		B135	9	—	2.7 — 2.9	—
Front oxygen (A/F) sensor signal (–)		B135	8	—	2.35 — 2.25	—
Front oxygen (A/F) sensor shield		B135	1	0	0	—
Manifold absolute pressure sensor		B134	6	3.4 — 3.8	1.4 — 1.8	—
Air flow sensor	Signal	B135	26	—	0.3 — 4.5	—
	Shield	B135	35	0	0	—
	Ground	B135	34	0	0	—
Intake air temperature sensor signal		B135	18	0.3 — 4.6	0.3 — 4.6	—
Immobilizer communication 1		B136	26	1 or less ↔ 4 or more	1 or less ↔ 4 or more	—
Immobilizer communication 2		B136	34	1 or less ↔ 4 or more	1 or less ↔ 4 or more	—

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
SSM communication		B136	16	1 or less ↔ 4 or more	1 or less ↔ 4 or more	—
Sensor power supply		B134	19	5	5	—
		B135	22	5	5	—
GND (sensor)		B134	29	0	0	—
		B135	30	0	0	—
Ground	(Engine 1)	B134	5	0	0	—
	(Engine 2)	B137	7	0	0	—
	(Engine 3)	B137	2	0	0	—
	(Engine 4)	B137	1	0	0	—
	(Engine 5)	B137	3	0	0	—
	(Ignition 1)	B137	26	0	0	—
	(Ignition 2)	B137	6	0	0	—
	(Body)	B136	6	0	0	—
Clutch switch		B136	25	When clutch pedal is depressed: 0 When clutch pedal is released: 10 — 13	When clutch pedal is depressed: 0 When clutch pedal is released: 12 — 14	—
Brake switch 1		B135	20	When brake pedal is depressed: 0 When brake pedal is released: 10 — 13	When brake pedal is depressed: 0 When brake pedal is released: 12 — 14	—
Brake switch 2		B135	28	When brake pedal is depressed: 10 — 13 When brake pedal is released: 0	When brake pedal is depressed: 12 — 14 When brake pedal is released: 0	—
Cruise control main switch		B135	12	ON: 0 OFF: 5	ON: 0 OFF: 5	—
Cruise control command switch		B135	24	When operating nothing: 3.5 — 4.5 When operating RES/ACC: 2.5 — 3.5 When operating SET/COAST: 0.5 — 1.5 When operating CANCEL: 0 — 0.5	When operating nothing: 3.5 — 4.5 When operating RES/ACC: 2.5 — 3.5 When operating SET/COAST: 0.5 — 1.5 When operating CANCEL: 0 — 0.5	—
Fuel temperature sensor		B135	17	2.5 — 3.8	2.5 — 3.8	Ambient temperature: 25°C (77°F)
Fuel tank pressure sensor		B135	32	2.3 — 2.7	2.3 — 2.7	Value after removing fuel filler cap and installing again
Pressure control solenoid valve		B136	28	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	—
Drain valve		B136	17	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	—
CAN communication line (+)		B136	27	2.5 — 3.5	2.5 — 3.5	Waveform
CAN communication line (–)		B136	35	1.5 — 2.5	1.5 — 2.5	Waveform

Engine Condition Data

ENGINE (DIAGNOSTICS)

6. Engine Condition Data

A: ELECTRICAL SPECIFICATION

Remarks	Specification
Engine load	20 — 41 (%): Idling
	14.72 — 29.8 (%): 2,500 rpm racing

Measuring condition:

- After engine is warmed-up.
- Gear position is in “N” or “P” range.
- Turn the A/C to OFF.
- Turn all the accessory switches to OFF.

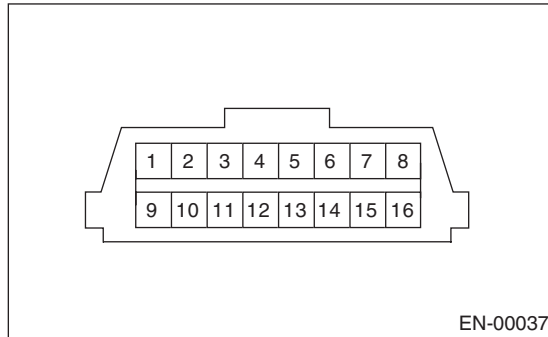
7. Data Link Connector

A: NOTE

This connector is used for Subaru Select Monitor.

CAUTION:

Do not connect any scan tools except Subaru Select Monitor or general scan tool because the circuit for Subaru Select Monitor may be damaged.



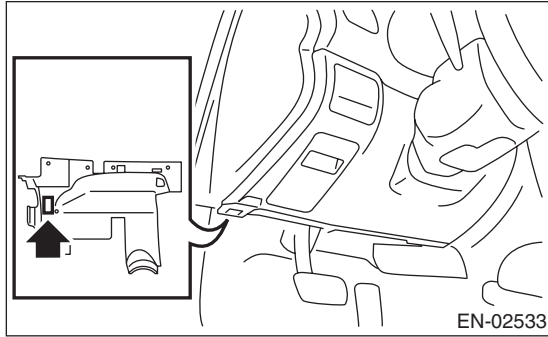
Terminal No.	Remarks	Terminal No.	Remarks
1	Power supply	9	Empty
2	Empty	10	Subaru Select Monitor signal
3	Empty	11	Empty
4	Empty	12	Ground
5	Empty	13	Ground
6	Empty	14	Empty
7	Empty	15	Empty
8	Empty	16	Empty

8. General Scan Tool

A: OPERATION

1. HOW TO USE GENERAL SCAN TOOL

- 1) Prepare a scan tool (general scan tool) required by SAE J1978.
- 2) Open the cover and connect the general scan tool to the data link connector located in the lower portion of instrument panel (on the driver's side).



- 3) Using the general scan tool, call up DTC and freeze frame data.

General scan tool functions consist of:

- (1) MODE \$01: Current powertrain diagnostic data
- (2) MODE \$02: Powertrain freeze frame data
- (3) MODE \$03: Emission-related powertrain DTC
- (4) MODE \$04: Clear/Reset emission-related diagnostic information
- (5) MODE \$06: Request on-board monitoring test results for non-continuously monitored systems
- (6) MODE \$07: Request on-board monitoring test results for continuously monitored systems
- (7) MODE \$09: Request vehicle information

Read out the data according to repair procedures.
(For detailed operation procedure, refer to the general scan tool instruction manual.)

NOTE:

For details concerning DTC, refer to "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>

2. MODE \$01 (CURRENT POWERTRAIN DIAGNOSTIC DATA)

Refer to data denoting the current operating condition of analog input/output, digital input/output or the powertrain system.

A list of the support data and PID (Parameter Identification) codes are shown in the following table.

PID	Data	Unit of measure
01	Number of emission-related powertrain DTC and malfunction indicator light status and diagnosis support information	—
03	Fuel system control status	—
04	Calculated engine load value	%
05	Engine coolant temperature	°C
06	Short term fuel trim	%
07	Long term fuel trim	%
0B	Intake manifold absolute pressure	kPa
0C	Engine revolution	rpm
0D	Vehicle speed	km/h and MPH
0E	Ignition timing advance	°
0F	Intake air temperature	°C and °F
10	Air flow rate from mass air flow sensor	g/sec
11	Throttle valve absolute opening angle	%
13	Check whether oxygen sensor is installed.	—
15	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor (Bank 1 Sensor 2)	V and %
1C	Supporting OBD system	—
24	A/F value and front oxygen (A/F) sensor output voltage (Bank 1 Sensor 1)	— and V
34	A/F value and front oxygen (A/F) sensor current (Bank 1 Sensor 1)	— and mA

NOTE:

Refer to general scan tool manufacturer's instruction manual to access generic OBD-II PIDs (MODE \$01).

3. MODE \$02 (POWERTRAIN FREEZE FRAME DATA)

Refer to data denoting the operating condition when trouble is detected by on-board diagnosis system.

A list of the support data and PID (Parameter Identification) codes are shown in the following table.

PID	Data	Unit of measure
02	DTC that caused CARB required freeze frame data storage	—
03	Fuel system control status	—
04	Calculated engine load value	%
05	Engine coolant temperature	°C
06	Short term fuel trim (Bank 1 Sensor 1)	%
07	Long term fuel trim (Bank 1 Sensor 1)	%
0B	Intake manifold absolute pressure	kPa
0C	Engine speed	rpm
0D	Vehicle speed	km/h and MPH
0E	Ignition timing advance	°
0F	Intake air temperature	°C and °F
10	Air flow rate from mass air flow sensor	g/sec
11	Throttle valve absolute opening angle	%
13	Check whether oxygen sensor is installed.	—
15	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor (Bank 1 Sensor 2)	V and %
1C	Supporting OBD system	—

NOTE:

Refer to general scan tool manufacturer's operation manual to access freeze frame data (MODE \$02).

General Scan Tool

ENGINE (DIAGNOSTICS)

4. MODE \$03 (EMISSION-RELATED POWERTRAIN DTC)

Refer to “List of Diagnostic Trouble Code (DTC)” for information about data denoting emission-related powertrain DTC. <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>

5. MODE \$04 (CLEAR/RESET EMISSION-RELATED DIAGNOSTIC INFORMATION)

Refer to the mode used to clear or reset emission-related diagnostic information (OBD-II trouble diagnostic information).

NOTE:

Refer to general scan tool manufacturer’s operation manual to clear or reset emission-related diagnostic information (MODE \$04).

6. MODE \$06

Refer to test value of troubleshooting and data of test limit on the support data bit sequence table. A list of the support data is shown in the following table.

TID	CID	Test value & Test limit
\$81	\$01	Catalyst system efficiency below threshold
\$82	\$01	Exhaust gas recirculation control circuit range/performance
	\$02	Exhaust gas recirculation control circuit range/performance
\$83	\$01	Evaporative emission control system (0.04 inch leak)
	\$02	Evaporative emission control system (0.04 inch leak)
	\$03	Evaporative emission control system (0.04 inch leak)
	\$04	Evaporative emission control system (0.04 inch leak)
	\$05	Evaporative emission control system (0.02 inch leak)
	\$06	Evaporative emission control system (0.02 inch leak)
\$84	\$01	Front oxygen (A/F) sensor (Bank 1 Sensor 1)
\$85	\$01	Rear O2 sensor circuit slow response (Bank 1 Sensor 2) Rich → Lean
	\$02	Rear O2 sensor circuit slow response (Bank 1 Sensor 2) Lean → Rich
\$41	\$01	Rear O2 sensor circuit (Bank 1 Sensor 2)
	\$02	Rear O2 sensor circuit (Bank 1 Sensor 2)

7. MODE \$07

Refer to the data of DTC (pending code) for troubleshooting result about emission in the first time.

8. MODE \$09

Refer to data of vehicle specification (V.I.N., calibration ID, diagnosis frequency etc.).

9. Subaru Select Monitor

A: OPERATION

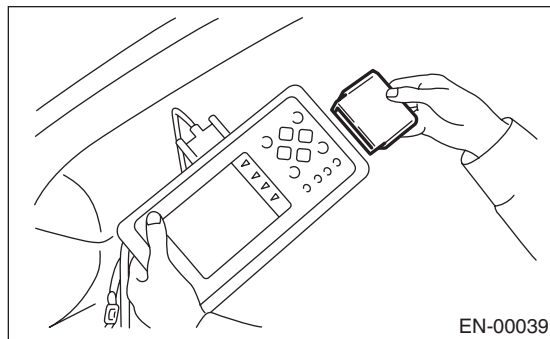
1. HOW TO USE SUBARU SELECT MONITOR

1) Prepare the Subaru Select Monitor kit. <Ref. to EN(H4SO U5)(diag)-8, PREPARATION TOOL, General Description.>



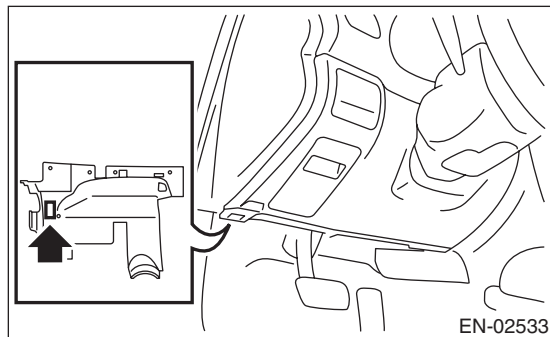
2) Connect the diagnosis cable to Subaru Select Monitor.

3) Insert the cartridge to Subaru Select Monitor. <Ref. to EN(H4SO U5)(diag)-8, PREPARATION TOOL, General Description.>



4) Connect the Subaru Select Monitor to the data link connector.

(1) Data link connector is located in the lower portion of instrument panel (on the driver's side).

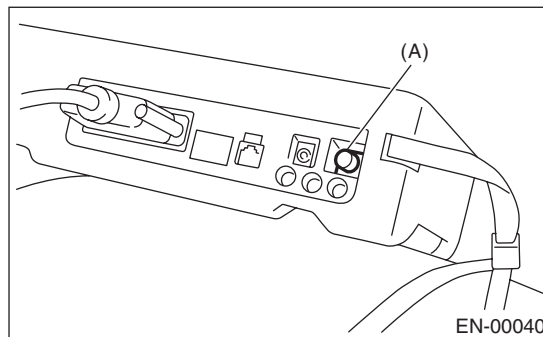


(2) Connect the diagnosis cable to data link connector.

CAUTION:

Do not connect any scan tools except Subaru Select Monitor or general scan tool.

5) Turn the ignition switch to ON (engine OFF) and Subaru Select Monitor switch to ON.



(A) Power switch

6) Using the Subaru Select Monitor, call up DTCs and data, then record them.

2. READ DIAGNOSTIC TROUBLE CODE (DTC) FOR ENGINE (NORMAL MODE)

Refer to "Read Diagnostic Trouble Code" for information about how to indicate DTC. <Ref. to EN(H4SO U5)(diag)-35, Read Diagnostic Trouble Code (DTC).>

3. READ DIAGNOSTIC TROUBLE CODE (DTC) FOR ENGINE (OBD MODE)

Refer to "Read Diagnostic Trouble Code" for information about how to indicate DTC. <Ref. to EN(H4SO U5)(diag)-35, Read Diagnostic Trouble Code (DTC).>

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

4. READ CURRENT DATA FOR ENGINE (NORMAL MODE)

- 1) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.
 - 2) On the «System Selection Menu» display screen, select the {Engine Control System} and press the [YES] key.
 - 3) Press the [YES] key after the information of engine type has been displayed.
 - 4) On the «Engine Diagnosis» display screen, select the {Current Data Display/Save}, and then press the [YES] key.
 - 5) On the «Data Display Menu» screen, select the {Data Display} and press the [YES] key.
 - 6) Using the scroll key, scroll the display screen up or down until the desired data is shown.
- A list of the support data is shown in the following table.

Remarks	Display	Unit of measure	Note (at idling)
Engine load	Engine Load	%	21.0%
Engine coolant temperature signal	Coolant Temp.	°C or °F	94°C or 201°F
A/F correction 1	A/F Correction #1	%	−0.8%
A/F learning 1	A/F Learning #1	%	0.0%
Intake manifold absolute pressure	Mani. Absolute Pressure	mmHg, kPa, inHg or psig	200 — 300 mmHg, 26.7 — 40 kPa, 7.8 — 11.8 inHg or 3.8 — 5.8 psig
Engine speed signal	Engine speed	rpm	700 rpm (Agree with the tachometer indication)
Meter vehicle speed signal	Vehicle Speed	km/h or MPH	0 km/h or 0 MPH (at parking)
Ignition timing signal	Ignition Timing	deg	14 — 16 deg
Intake air temperature signal	Intake Air Temp.	°C or °F	(Ambient air temperature)
Amount of intake air	Mass Air Flow	g/s or lb/m	2.5 g/s or 0.33 lb/m
Throttle opening angle signal	Throttle Opening Angle	%	2.0%
Rear oxygen sensor voltage	Rear O2 Sensor	V	0.1 — 0.7 V
Battery voltage	Battery Voltage	V	12 — 14 V
Mass air flow voltage	Air Flow Sensor Voltage	V	1.26 V
Injection 1 pulse width	Fuel Injection #1 Pulse	ms	2.82 ms
Knock sensor correction	Knocking Correction	deg	0.0 deg
Atmospheric pressure signal	Atmosphere Pressure	mmHg, kPa, inHg or psig	(Atmosphere pressure)
Intake manifold relative pressure	Mani. Relative Pressure	mmHg, kPa, inHg or psig	(Air intake absolute pressure – atmosphere pressure)
Fuel tank pressure signal	Fuel Tank Pressure	mmHg, kPa, inHg or psig	+7.9 mmHg, +1.1 kPa, +0.31 inHg or +0.15 psig
Acceleration opening angle signal	Accel. Opening Angle	%	0.0%
Fuel temperature signal	Fuel Temp.	°C or °F	+20°C or +68°F
Fuel level signal	Fuel Level	V	0 — 5 V
Purge control solenoid duty ratio	CPC Valve Duty Ratio	%	0 — 3%
EGR steps	No. of EGR Steps	STEP	0 STEP
A/F sensor current value 1	A/F Sensor #1 Current	mA	−0.2 — 0.2 mA
A/F sensor resistance value 1	A/F Sensor #1 Resistance	Ω	32 Ω
A/F sensor output lambda 1	A/F sensor output lambda 1	—	1.0
A/F correction 3	A/F Correction #3	%	0.3%
A/F learning 3	A/F Learning #3	%	0.00%
Throttle motor duty	Throttle Motor Duty	%	−15%
Throttle power supply voltage	Throttle Motor Voltage	V	(Battery voltage)
Sub throttle sensor voltage	Sub-throttle Sensor	V	1.52 V
Main throttle sensor voltage	Main-throttle Sensor	V	0.66 V

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

Remarks	Display	Unit of measure	Note (at idling)
Sub acceleration sensor voltage	Sub-accelerator Sensor	V	0.68 V
Main acceleration sensor voltage	Main-accelerator Sensor	V	0.68 V
Memory vehicle speed	Memorized Cruise Speed	km/h or MPH	0 km/h or 0 MPH
Fuel level sensor signal	Fuel Level Resistance	Ω	69.6 Ω
Engine oil temperature	Engine Oil Temperature	°C	≥ 85°C (After engine is warmed-up.)
Oil switching solenoid valve duty R	OSV Duty R	%	16.9%
Oil switching solenoid valve duty L	OSV Duty L	%	16.9%
Oil switching solenoid valve current R	OSV Current R	mA	192 mA
Oil switching solenoid valve current L	OSV Current L	mA	192 mA
Variable valve lift lift mode	VVL Lift Mode	—	1
#1 cylinder roughness monitor	Roughness Monitor #1	—	0
#2 cylinder roughness monitor	Roughness Monitor #2	—	0
#3 cylinder roughness monitor	Roughness Monitor #3	—	0
#4 cylinder roughness monitor	Roughness Monitor #4	—	0
AT/MT identification terminal	AT Vehicle ID Signal	—	AT vehicle/MT vehicle
Test mode terminal	Test Mode Terminal	—	U-check
Neutral position switch signal	Neutral Position Switch	—	Neutral
Soft idle switch signal	Idle Switch Signal	—	At idle
Ignition switch signal	Ignition Switch	—	ON input
Power steering switch signal	P/S Switch	—	OFF input (At OFF)
Air conditioning switch signal	A/C Switch	—	OFF input (At OFF)
Starter switch signal	Starter Switch	—	OFF input
Rear oxygen monitor	Rear O2 Rich Signal	—	Rich/Lean
Knocking signal	Knocking Signal	—	None
Crankshaft position sensor signal	Crankshaft Position Signal	—	Provided
Camshaft position sensor signal	Camshaft Position Signal	—	Provided
Rear defogger switch signal	Rear Defogger Switch	—	OFF input (At OFF)
Blower fan switch signal	Blower Fan Switch	—	OFF input (At OFF)
Light switch signal	Light Switch	—	OFF input (At OFF)
A/C middle pressure switch signal	A/C Mid Pressure Switch	—	OFF input (At OFF)
Air conditioner compressor relay output signal	A/C Compressor Signal	—	OFF output (At OFF)
Radiator fan relay 1 signal	Radiator Fan Relay #1	—	OFF output (At OFF)
Radiator fan relay 2 signal	Radiator Fan Relay #2	—	OFF output (At OFF)
Fuel pump relay signal	Fuel Pump Relay	—	ON output
PCV hose assembly diagnosis signal	Blow-by Leak Diagnosis Connector	—	Connected
Pressure control solenoid valve signal	PCV Solenoid Valve	—	OFF output
Drain valve signal	Vent. Solenoid Valve	—	OFF output
Variable valve lift diagnosis oil pressure switch signal 1	Eng. Oil Press. SW 1	—	ON
Variable valve lift diagnosis oil pressure switch signal 2	Eng. Oil Press. SW 2	—	ON
AT coordinate retard angle demand signal	Retard Signal from AT	—	None
AT coordinate fuel cut demand signal	Fuel Cut Signal from AT	—	None
AT cooperative permission signal	Torque Control Permission Signal	—	ON
Electronic throttle control motor relay signal	ETC Motor Relay	—	ON
Clutch switch signal	Clutch Switch	—	OFF (At OFF)
Stop light switch signal	Stop Light Switch	—	OFF (At OFF)
SET/COAST switch signal	SET/COAST Switch	—	OFF (At OFF)
RES/ACC switch signal	RESUME/ACCEL Switch	—	OFF (At OFF)

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

Remarks	Display	Unit of measure	Note (at idling)
Brake switch signal	Brake Switch	—	OFF input (At OFF)
Main switch signal	Main Switch	—	OFF input (At OFF)
Integrated unit data reception	Body Int. Unit Data	—	Provided
Body integrated unit counter update	Body Int. Unit Count	—	Provided
Cruise control cancel switch signal	Cruise Control Cancel Switch	—	OFF input (At OFF)

NOTE:

For detailed operation procedure, refer to the “SUBARU SELECT MONITOR OPERATION MANUAL”.

5. READ CURRENT DATA FOR ENGINE (OBD MODE)

- 1) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.
- 2) On the «System Selection Menu» display screen, select the {Engine Control System} and press the [YES] key.
- 3) Press the [YES] key after the information of engine type has been displayed.
- 4) On the «Engine Diagnosis» display screen, select the {OBD System} and press the [YES] key.
- 5) On the «OBD Menu» display screen, select the {Current Data Display/Save}, and then press the [YES] key.
- 6) On the «Data Display Menu» screen, select the {Data Display} and press the [YES] key.
- 7) Using the scroll key, scroll the display screen up or down until the desired data is shown.

A list of the support data is shown in the following table.

Description	Display	Unit of measure	Note (at idling)
Number of diagnosis code	Number of DTC	—	0
Condition of malfunction indicator light	MI (MIL)	—	OFF
Misfire monitoring	Misfire monitoring	—	Complete
Fuel system monitoring	Fuel system monitoring	—	Complete
Component monitoring	Component monitoring	—	Complete
Test of catalyst	Catalyst Diagnosis	—	Incomplete
Test of heating-type catalyst	Heated catalyst	—	No
Test of evaporative purge system	Evaporative purge system	—	Incomplete
Test of secondary air system	Secondary air system	—	No
Test of A/C system refrigerant	A/C system refrigerant	—	No
Test of oxygen sensor	Oxygen sensor	—	Incomplete
Test of oxygen sensor heater	O2 Heater Diagnosis	—	Complete
Test of EGR system	EGR system	—	Incomplete
A/F control #1	Fuel system for BANK 1	—	Normal CLOSE
Load	Calculated load valve	%	23.0%
Engine coolant temperature signal	Coolant Temp.	°C or °F	+92°C
A/F correction value #1	A/F Correction Value #1	%	-0.8%
A/F learning value #1	A/F Learning Value #1	%	+0.0%
Intake manifold absolute pressure	Mani. Absolute Pressure	mmHg, kPa, inHg or psig	211 mmHg, 28.1 kPa, 8.31 inHg or 4.08 psig
Engine speed signal	Engine Speed	rpm	700 rpm
Vehicle speed signal	Vehicle Speed	km/h or MPH	0 km/h or 0 MPH
Ignition timing #1	Ignition timing adv.#1	°	+16.0°
Intake air temperature signal	Intake Air Temp.	°C or °F	36°C or 97°F
Intake air amount	Mass Air Flow	g/s or lb/m	2.7 g/s or 0.36 lb/m
Throttle opening angle signal	Throttle Opening Angle	%	13%
Oxygen sensor (Bank 1 Sensor 2)	Oxygen sensor #12	V	0.7 V
A/F correction (Bank 1 Sensor 2)	A/F Correction #12	%	+0.0%
OBD system	OBD system	—	CARB-OBD2
Front oxygen (A/F) sensor (Bank 1 Sensor 1)	Oxygen sensor #11	—	Support
Oxygen sensor (Bank 1 Sensor 2)	Oxygen sensor #12	—	Support
Front oxygen (A/F) sensor (Bank 1 Sensor 1)	A/F sensor #11	—	1.001
Front oxygen (A/F) sensor (Bank 1 Sensor 1)	A/F sensor #11	V	2.79 V
Front oxygen (A/F) sensor (Bank 1 Sensor 1)	A/F sensor #11	—	1.001
Front oxygen (A/F) sensor (Bank 1 Sensor 1)	A/F sensor #11	mA	0.00 mA

NOTE:

For detailed operation procedure, refer to the “SUBARU SELECT MONITOR OPERATION MANUAL”.

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

6. READ FREEZE FRAME DATA FOR ENGINE (OBD MODE)

- 1) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.
 - 2) On the «System Selection Menu» display screen, select the {Engine Control System} and press the [YES] key.
 - 3) Press the [YES] key after the information of engine type has been displayed.
 - 4) On the «Engine Diagnosis» display screen, select the {OBD System} and press the [YES] key.
 - 5) On the »OBD Menu« display screen, select the {Freeze Frame Data} and press the [YES] key.
- A list of the support data is shown in the following table.

Contents	Display	Unit of measure
DTC of freeze frame data	Freeze frame data	DTC
Air fuel ratio control system for bank 1	Fuel system for Bank1	Normal CLOSE or initial OPEN
Engine load data	Engine Load	%
Engine coolant temperature signal	Coolant Temp.	°C or °F
Short term fuel trim by front oxygen (A/F) sensor	Short term fuel trim B1	%
Long term fuel trim by front oxygen (A/F) sensor	Long term fuel trim B1	%
Intake manifold absolute pressure signal	Mani.Absolute Pressure	mmHg, kPa, inHg or psig
Engine speed signal	Engine Speed	rpm
Vehicle speed signal	Vehicle Speed	km/h or MPH
Ignition timing signal	Ignition Timing	°
Intake air amount	Mass Air Flow	g/s or lb/m
Intake air temperature signal	Intake Air Temp.	°C
Throttle position signal	Throttle Opening Angle	%
Oxygen sensor (Bank 1 Sensor 2)	Oxygen sensor #12	V
A/F correction (Bank 1 Sensor 2)	Short term fuel trim #11	%
Front oxygen (A/F) sensor (Bank 1 Sensor 1)	Oxygen sensor #11	Support
Oxygen sensor (Bank 1 Sensor 2)	Oxygen sensor #12	Support

NOTE:

For detailed operation procedure, refer to the “SUBARU SELECT MONITOR OPERATION MANUAL”.

7. LED OPERATION MODE FOR ENGINE

- 1) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.
 - 2) On the «System Selection Menu» display screen, select the {Engine Control System} and press the [YES] key.
 - 3) Press the [YES] key after the information of engine type has been displayed.
 - 4) On the «Engine Diagnosis» display screen, select the {Current Data Display/Save}, and then press the [YES] key.
 - 5) On the «Data Display» screen, select the {Data LED Display} and press the [YES] key.
 - 6) Using the scroll key, scroll the display screen up or down until the desired data is shown.
- A list of the support data is shown in the following table.

Remarks	Display	Message	LED "ON" requirements
AT/MT identification signal	AT Vehicle ID Signal	ON or OFF	Illuminate (AT model)
Test mode signal	Test Mode Terminal	U check or D check	D check
Neutral position switch signal	Neutral Position Switch	ON or OFF	When neutral position signal is input.
Idle switch signal	Idle Switch Signal	ON or OFF	When idle switch signal is input.
Ignition switch signal	Ignition Switch	ON or OFF	When ignition switch is turned ON.
Power steering switch signal	P/S Switch	ON or OFF	When power steering switch is entered.
Air conditioning switch signal	A/C Switch	ON or OFF	When air conditioning switch is input.
Starter switch signal	Starter Switch	ON or OFF	When starter switch is input.
Rear oxygen sensor rich signal	Rear O2 Rich Signal	Rich or Lean	When rear oxygen sensor mixture ratio is rich.
Knocking signal	Knocking Signal	Provided or None	When knocking signal is input.
Crankshaft position sensor signal	Crankshaft Position Signal	Provided or None	When crankshaft position sensor signal is input.
Camshaft position sensor signal	Camshaft Position Signal	Provided or None	When camshaft position sensor signal is input.
Rear defogger switch signal	Rear Defogger Switch	ON or OFF	When rear defogger switch is turned to ON.
Blower fan switch signal	Blower Fan Switch	ON or OFF	When blower fan switch is turned to ON.
Light switch signal	Light Switch	ON or OFF	When light switch is turned ON.
A/C middle pressure switch signal	A/C Mid Pressure Switch	ON or OFF	When A/C middle pressure switch is turned to ON.
Air conditioning relay signal	A/C Compressor Signal	ON or OFF	When air conditioning relay is in function.
Radiator fan relay 1 signal	Radiator Fan Relay #1	ON or OFF	When radiator fan relay 1 is in function.
Radiator fan relay 2 signal	Radiator Fan Relay #2	ON or OFF	When radiator fan relay 2 is in function.
Fuel pump relay signal	Fuel Pump Relay	ON output or OFF output	ON output
PCV hose assembly diagnosis signal	Blow-by Leak Connector	Connected or Not connected	PVC hose assembly connected
Pressure control solenoid valve signal	PCV Solenoid Valve	ON or OFF	Pressure control solenoid valve is operated.
Drain valve signal	Vent Control Solenoid	ON or OFF	Drain valve is operated.
Variable valve lift diagnosis oil pressure switch signal 1	Oil Press. SW1	ON or OFF	When variable valve lift diagnosis oil pressure switch signal 1 is ON.
Variable valve lift diagnosis oil pressure switch signal 2	Oil Press. SW2	ON or OFF	When variable valve lift diagnosis oil pressure switch signal 2 is ON.
AT retard angle demand signal	Retard Signal	Provided or None	When AT retard angle demand signal is input.

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

Remarks	Display	Message	LED "ON" requirements
AT fuel cut signal	Fuel Cut	Provided or None	When AT fuel cut signal is input.
AT cooperative permission signal	Torque Control Permission	ON or OFF	When AT coordinate permission signal is input.
Electronic throttle control motor relay signal	ETC Motor Relay	ON or OFF	When electronic throttle control motor relay is in function.
Clutch switch signal	Clutch switch	ON or OFF	When clutch switch is turned to ON.
Stop light switch signal	Stop Light Switch	ON or OFF	When stop light switch is turned ON.
SET/COAST switch signal	SET/COAST Switch	ON or OFF	When SET/COAST switch is turned to ON.
RES/ACC switch signal	RESUME/ACCEL Switch	ON or OFF	When RES/ACC switch is turned to ON.
Brake switch signal	Brake Switch	ON or OFF	When brake switch is turned to ON.
Main switch signal	Main Switch	ON or OFF	When main switch is turned to ON.
Data reception signal	Body Int. Unit Data	Provided or None	Data reception signal input
Counter update signal	Body Int. Unit Count	Provided or None	Counter update signal input
Cancel switch signal	Cancel Switch	ON or OFF	When cancel switch is turned to ON.

NOTE:

For detailed operation procedure, refer to the "SUBARU SELECT MONITOR OPERATION MANUAL".

8. V.I.N. REGISTRATION

- 1) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.
- 2) On the «System Selection Menu» display screen, select the {Engine Control System} and press the [YES] key.
- 3) Press the [YES] key after the information of engine type has been displayed.
- 4) On the «Engine Diagnosis» display screen, select the {VIN Registration} and press the [YES] key.
- 5) Perform the procedure displayed on screen.

NOTE:

For detailed operation procedure, refer to the "SUBARU SELECT MONITOR OPERATION MANUAL".

10. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1. SUBARU SELECT MONITOR (NORMAL MODE)

- 1) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.
- 2) On the «System Selection Menu» display screen, select the {Engine Control System} and press the [YES] key.
- 3) Press the [YES] key after the information of engine type has been displayed.
- 4) On the «Engine Diagnosis» screen, select the {DTC Display}, and then press the [YES] key.
- 5) On the «Diagnostic Code(s) Display» screen, select the {Current Diagnostic Code(s)} or {History Diagnostic Code(s)}, and then press the [YES] key.

NOTE:

- For detailed operation procedure, refer to the “SUBARU SELECT MONITOR OPERATION MANUAL”.
- For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>

2. SUBARU SELECT MONITOR (OBD MODE)

- 1) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.
- 2) On the «System Selection Menu» display screen, select the {Engine Control System} and press the [YES] key.
- 3) Press the [YES] key after the information of engine type has been displayed.
- 4) On the «Engine Diagnosis» display screen, select the {OBD System} and press the [YES] key.
- 5) On the «OBD Menu» display screen, select the Diagnostic Code(s) Display and press the [YES] key.
- 6) Make sure DTC is shown on the screen.

NOTE:

- For detailed operation procedure, refer to the “SUBARU SELECT MONITOR OPERATION MANUAL”.
- For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>

3. GENERAL SCAN TOOL

Refer to data denoting emission-related powertrain DTC.

For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>

NOTE:

Refer to general scan tool manufacturer's instruction manual to access powertrain DTC (MODE \$03).

Inspection Mode

ENGINE (DIAGNOSTICS)

11. Inspection Mode

A: PROCEDURE

Perform the diagnosis shown in the following DTC table.

When performing the diagnosis not listed in “List of Diagnostic Trouble Code (DTC)”, refer the item on the drive cycle. <Ref. to EN(H4SO U5)(diag)-41, Drive Cycle.>

DTC	Item	Condition
P0031	HO2S Heater Control Circuit Low (Bank 1 Sensor 1)	—
P0032	HO2S Heater Control Circuit High (Bank 1 Sensor 1)	—
P0037	HO2S Heater Control Circuit Low (Bank 1 Sensor 2)	—
P0038	HO2S Heater Control Circuit High (Bank 1 Sensor 2)	—
P0077	Intake Valve Control Solenoid Circuit High (Bank 1)	—
P0083	Intake Valve Control Solenoid Circuit High (Bank 2)	—
P0102	Mass or Volume Air Flow Circuit Low Input	—
P0103	Mass or Volume Air Flow Circuit High Input	—
P0107	Manifold Absolute Pressure/Barometric Pressure Circuit Low Input	—
P0108	Manifold Absolute Pressure/Barometric Pressure Circuit High Input	—
P0112	Intake Air Temperature Sensor 1 Circuit Low	—
P0113	Intake Air Temperature Sensor 1 Circuit High	—
P0117	Engine Coolant Temperature Circuit Low	—
P0118	Engine Coolant Temperature Circuit High	—
P0122	Throttle/Pedal Position Sensor/Switch “A” Circuit Low	—
P0123	Throttle/Pedal Position Sensor/Switch “A” Circuit High	—
P0131	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 1)	—
P0132	O2 Sensor Circuit High Voltage (Bank 1 Sensor 1)	—
P0137	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 2)	—
P0138	O2 Sensor Circuit High Voltage (Bank 1 Sensor 2)	—
P0140	O2 Sensor Circuit No Activity Detected (Bank1 Sensor2)	—
P0182	Fuel Temperature Sensor “A” Circuit Low Input	—
P0183	Fuel Temperature Sensor “A” Circuit High Input	—
P0197	Engine Oil Temperature Sensor Low	—
P0198	Engine Oil Temperature Sensor High	—
P0222	Throttle/Pedal Position Sensor/Switch “B” Circuit Low	—
P0223	Throttle/Pedal Position Sensor/Switch “B” Circuit High	—
P0327	Knock Sensor 1 Circuit Low (Bank 1 or Single Sensor)	—
P0328	Knock Sensor 1 Circuit High (Bank 1 or Single Sensor)	—
P0335	Crankshaft Position Sensor “A” Circuit	—
P0336	Crankshaft Position Sensor “A” Circuit Range/Performance	—
P0340	Camshaft Position Sensor “A” Circuit (Bank 1 or Single Sensor)	—
P0341	Camshaft Position Sensor “A” Circuit Range/Performance (Bank 1 or Single Sensor)	—
P0447	Evaporative Emission Control System Vent Control Circuit Open	—
P0448	Evaporative Emission Control System Vent Control Circuit Shorted	—
P0452	Evaporative Emission Control System Pressure Sensor Low Input	—
P0453	Evaporative Emission Control System Pressure Sensor High Input	—
P0458	Evaporative Emission System Purge Control Valve Circuit Low	—
P0462	Fuel Level Sensor “A” Circuit Low	—
P0463	Fuel Level Sensor “A” Circuit High	—
P0502	Vehicle Speed Sensor Circuit Low Input	—
P0503	Vehicle Speed Sensor Circuit High Input	—
P0512	Starter Request Circuit	—
P0519	Idle Air Control System Performance	—
P0600	Serial Communication Link	—
P0604	Internal Control Module Random Access Memory (RAM) Error	—

Inspection Mode

ENGINE (DIAGNOSTICS)

DTC	Item	Condition
P0605	Internal Control Module Read Only Memory (ROM) Error	—
P0607	Control Module Performance	—
P0638	Throttle Actuator Control Range/Performance (Bank 1)	—
P0691	Fan 1 Control Circuit Low	—
P0692	Fan 1 Control Circuit High	—
P0700	Transmission Control System (MIL Request)	—
P0851	Park/Neutral Switch Input Circuit Low	—
P0852	Park/Neutral Switch Input Circuit High	—
P1152	O2 Sensor Circuit Range/Performance (Low) (Bank1 Sensor1)	—
P1153	O2 Sensor Circuit Range/Performance (High) (Bank1 Sensor1)	—
P1160	Return Spring Failure	—
P1400	Fuel Tank Pressure Control Solenoid Valve Circuit Low	—
P1420	Fuel Tank Pressure Control Sol. Valve Circuit High	—
P1491	Positive Crankcase Ventilation (Blow-by) Function Problem	—
P1518	Starter Switch Circuit Low Input	—
P1560	Back-Up Voltage Circuit Malfunction	—
P2101	Throttle Actuator Control Motor Circuit Range/Performance	—
P2102	Throttle Actuator Control Motor Circuit Low	—
P2103	Throttle Actuator Control Motor Circuit High	—
P2109	Throttle/Pedal Position Sensor "A" Minimum Stop Performance	—
P2122	Throttle/Pedal Position Sensor/Switch "D" Circuit Low Input	—
P2123	Throttle/Pedal Position Sensor/Switch "D" Circuit High Input	—
P2127	Throttle/Pedal Position Sensor/Switch "E" Circuit Low Input	—
P2128	Throttle/Pedal Position Sensor/Switch "E" Circuit High Input	—
P2135	Throttle/Pedal Position Sensor/Switch "A"/"B" Voltage Correlation	—
P2138	Throttle/Pedal Position Sensor/Switch "D"/"E" Voltage Correlation	—
P2227	Barometric Pressure Circuit Range/Performance	—
P2228	Barometric Pressure Circuit Low	—
P2229	Barometric Pressure Circuit High	—

Inspection Mode

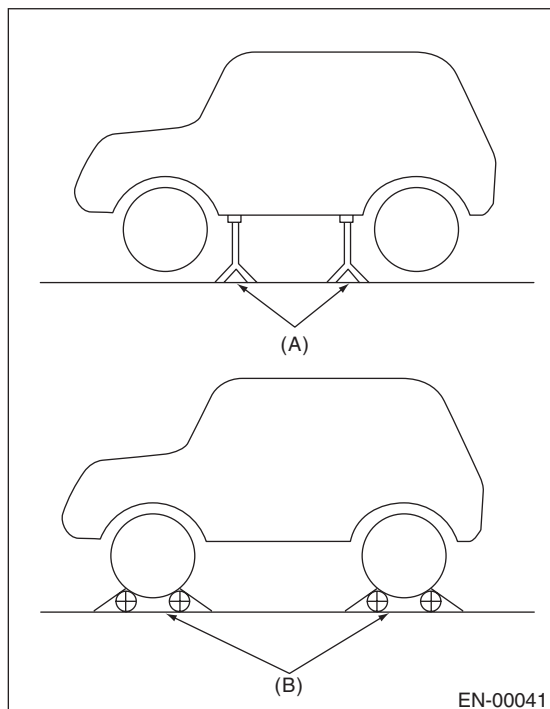
ENGINE (DIAGNOSTICS)

1. PREPARATION FOR THE INSPECTION MODE

- 1) Check that the battery voltage is 12 V or more and fuel remains approx. half [20 — 40 ℓ (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)].
- 2) Lift-up the vehicle using a garage jack and place it on rigid racks, or drive the vehicle onto free rollers.

WARNING:

- Before lifting-up the vehicle, ensure parking brakes are applied.
- Do not use a pantograph jack in place of a rigid rack.
- Secure a rope or wire to the front or rear towing hooks to prevent the lateral runout of front wheels.
- Do not abruptly depress/release clutch pedal or accelerator pedal during works even when the engine is operating at low speeds since this may cause vehicle to jump off free rollers.
- In order to prevent the vehicle from slipping due to vibration, do not place any wooden blocks or similar items between the rigid racks and vehicle.
- Since the rear wheels will also rotate, do not place anything near them. Also, make sure that nobody goes in front of the vehicle.



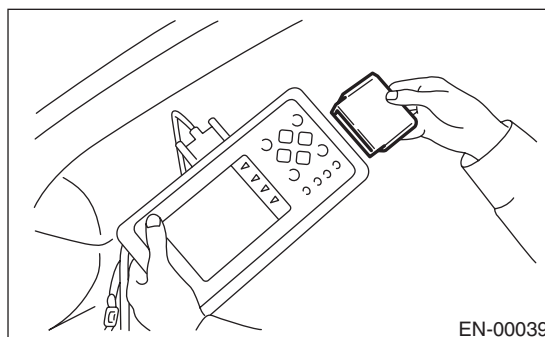
- (A) Rigid rack
(B) Free rollers

2. SUBARU SELECT MONITOR

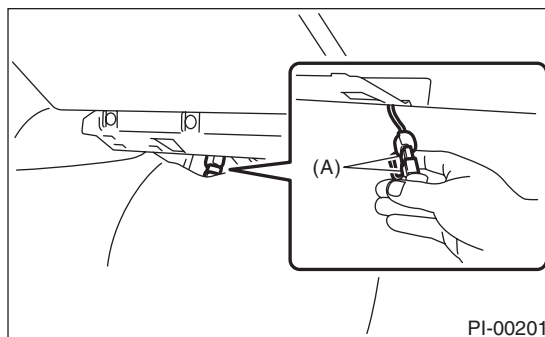
- 1) After clearing the memory, check for any remaining unresolved trouble data. <Ref. to EN(H4SO U5)(diag)-46, Clear Memory Mode.>
- 2) Warm-up the engine.
- 3) Prepare the Subaru Select Monitor kit. <Ref. to EN(H4SO U5)(diag)-8, PREPARATION TOOL, General Description.>



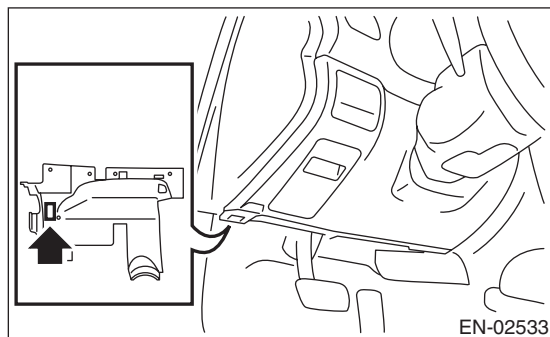
- 4) Connect the diagnosis cable to Subaru Select Monitor.
- 5) Insert the cartridge to Subaru Select Monitor. <Ref. to EN(H4SO U5)(diag)-8, PREPARATION TOOL, General Description.>



- 6) Connect the test mode connector (A) located under the glove box.



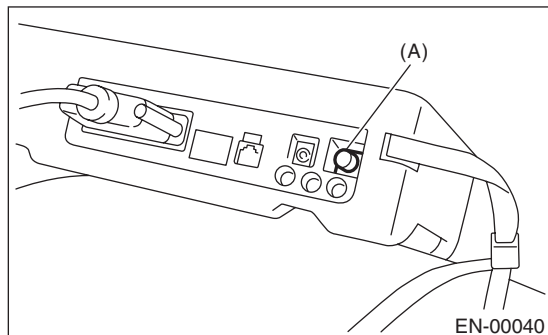
7) Connect the Subaru Select Monitor to data link connector located in the lower portion of the instrument panel (on the driver's side).



CAUTION:

Do not connect any scan tools except Subaru Select Monitor or general scan tool.

8) Turn the ignition switch to ON (engine OFF) and Subaru Select Monitor switch to ON.



(A) Power switch

9) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.

10) On the «System Selection Menu» display screen, select the {Engine Control System} and press the [YES] key.

11) Press the [YES] key after the information of engine type has been displayed.

12) On the «Engine Diagnosis» display screen, select the {D Check} and press the [YES] key.

13) When the "Perform D Check?" is shown on the screen, press the [YES] key.

14) Perform subsequent procedures as instructed on the display screen.

- If trouble still remains in the memory, the corresponding DTC appears on the display screen.

NOTE:

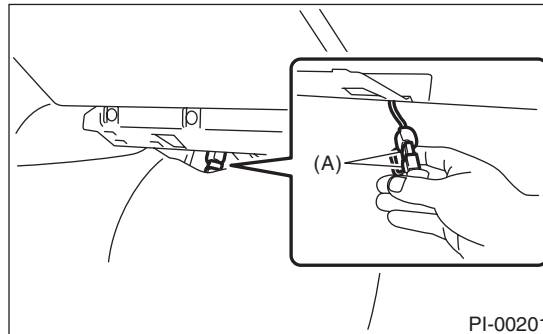
- For detailed operation procedure, refer to the "SUBARU SELECT MONITOR OPERATION MANUAL".
- For details concerning DTC, refer to "List of Diagnostic Trouble Code (DTC)".
<Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>
- Release the parking brake.
- The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunctions. When engine control diagnosis is finished, perform the ABS memory clearance procedure of self-diagnosis function.

3. GENERAL SCAN TOOL

1) After performing the diagnostics and clearing the memory, check for any remaining unresolved trouble data. <Ref. to EN(H4SO U5)(diag)-46, Clear Memory Mode.>

2) Warm-up the engine.

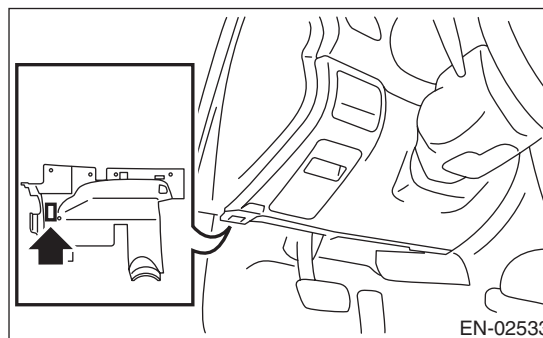
3) Connect the test mode connector (A) located under the glove box.



4) Connect the general scan tool to data link connector located in the lower portion of the instrument panel (on the driver's side).

CAUTION:

Do not connect any scan tools except Subaru Select Monitor or general scan tool.



ENGINE (DIAGNOSTICS)

5) Start the engine.

NOTE:

- Make sure the select lever is placed in “P” position before starting. (AT model)
- Depress the clutch pedal when starting engine. (MT model)

6) Shift the select lever to “P” range, or place the shift lever to “N” position.

7) Depress the brake pedal to turn the brake switch ON. (AT model)

8) Keep the engine speed in 2,500 — 3,000 rpm range for 40 seconds.

9) Place the select lever or shift lever in D position (AT model) or 1st gear (MT model) and drive the vehicle at 5 to 10 km/h (3 to 6 MPH).

NOTE:

- For AWD model, release the parking brake.
- The speed difference between front and rear wheels may light the ABS warning light, but this indicates no malfunctions. When engine control diagnosis is finished, perform the ABS memory clearance procedure of self-diagnosis system.

10) Using the general scan tool, check for DTC and record the result(s).

NOTE:

- For detailed operation procedure, refer to the general scan tool operation manual.
- For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”.

<Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>

12. Drive Cycle

A: PROCEDURE

For troubleshooting, there are several driving patterns shown below. Driving in the specified pattern allows to diagnose malfunctioning items listed below. After the repair of the following trouble items, be sure to drive the vehicle with the specified drive patterns to check whether the function is resumed correctly.

1. PREPARATION FOR DRIVE CYCLE

- 1) Check that the battery voltage is 12 V or more and fuel remains approx. half [20 — 40 ℓ (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)].
- 2) After performing the diagnostics and clearing the memory, check for any remaining unresolved trouble data. <Ref. to EN(H4SO U5)(diag)-46, Clear Memory Mode.>
- 3) Disconnect the test mode connector.

NOTE:

- Perform the diagnosis after warming up the engine except when the engine coolant temperature at starting is specified.
- Perform the diagnosis twice if the DTC marked with *. After completing the first diagnosis, stop the engine and perform second diagnosis in same condition.

2. DRIVE CYCLE A (AFTER RUNNING 20 MINUTES AT 80 KM/H (50 MPH), IDLE THE ENGINE FOR 1 MINUTE.)

DTC	Item	Condition
*P0125	Insufficient Coolant Temperature For Closed Loop Fuel Control	Coolant temperature at start is less than 20°C (68°F).
*P0128	Coolant Thermostat (Engine Coolant Temperature Below Thermostat Regulating Temperature)	—
*P0133	O2 Sensor Circuit Slow Response (Bank 1 Sensor 1)	—
*P0171	System Too Lean (Bank 1)	Complete diagnosis for drive cycle B or C.
*P0172	System Too Rich (Bank 1)	Complete diagnosis for drive cycle B or C.
P0196	Engine Oil Temperature Sensor Circuit Range/Performance	—
*P0301	Cylinder 1 Misfire Detected	Complete diagnosis for drive cycle B or C.
*P0302	Cylinder 2 Misfire Detected	Complete diagnosis for drive cycle B or C.
*P0303	Cylinder 3 Misfire Detected	Complete diagnosis for drive cycle B or C.
*P0304	Cylinder 4 Misfire Detected	Complete diagnosis for drive cycle B or C.
*P0420	Catalyst System Efficiency Below Threshold (Bank 1)	—
*P0442	Evaporative Emission Control System Leak Detected (Small Leak)	Coolant temperature at start is less than 30°C (86°F).
*P0451	Evaporative Emission Control System Pressure Sensor	—
*P0456	Evaporative Emission Control System Leak Detected (Very Small Leak)	Coolant temperature at start is less than 30°C (86°F).
*P0457	Evaporative Emission Control System Leak Detected (Fuel Cap Loose/Off)	Coolant temperature at start is less than 30°C (86°F).
*P0459	Evaporative Emission System Purge Control Valve Circuit High	—
P1443	Vent Control Solenoid Valve Function Problem	—
*P2096	Post Catalyst Fuel Trim System Too Lean Bank 1	Complete diagnosis for drive cycle B or C.
*P2097	Post Catalyst Fuel Trim System Too Rich Bank 1	Complete diagnosis for drive cycle B or C.

Drive Cycle

ENGINE (DIAGNOSTICS)

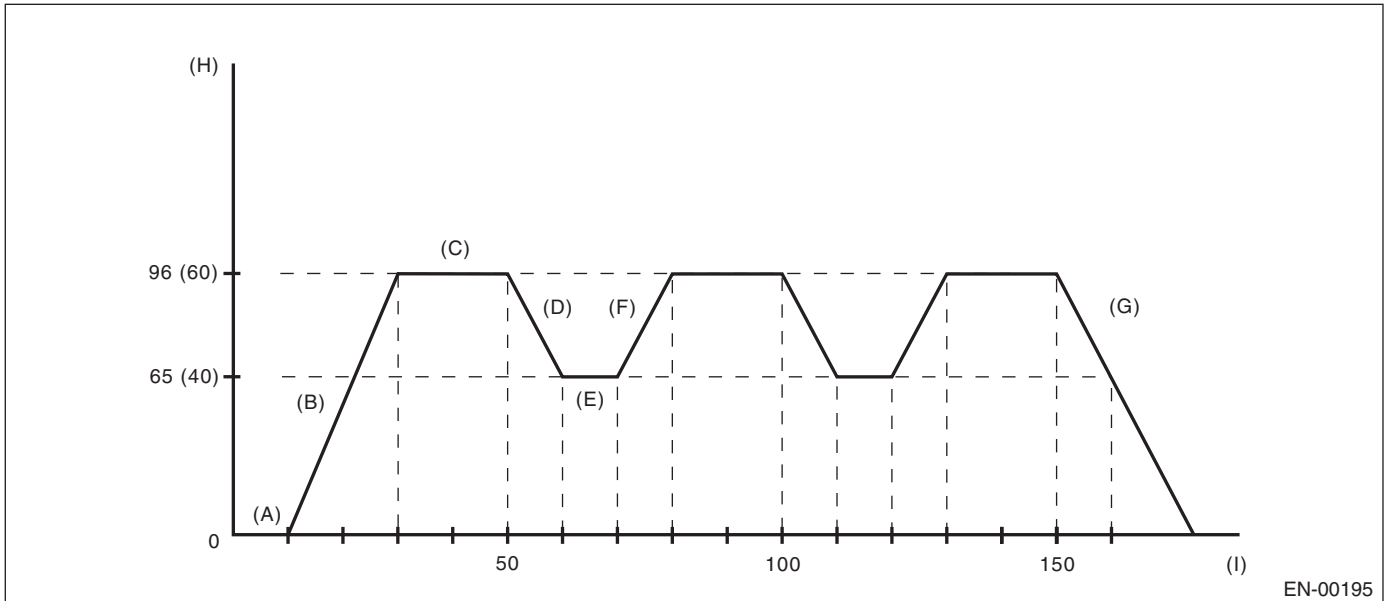
3. DRIVE CYCLE B (TEN MINUTES IDLING)

NOTE:

Drive the vehicle at 10 km/h (6 MPH) or more before diagnosis.

DTC	Item	Condition
*P0126	Insufficient Coolant Temperature for Stable Operation	—
*P0171	System Too Lean (Bank 1)	Complete diagnosis for drive cycle A or C
*P0172	System Too Rich (Bank 1)	Complete diagnosis for drive cycle A or C
*P0301	Cylinder 1 Misfire Detected	Complete diagnosis for drive cycle A or C
*P0302	Cylinder 2 Misfire Detected	Complete diagnosis for drive cycle A or C
*P0303	Cylinder 3 Misfire Detected	Complete diagnosis for drive cycle A or C
*P0304	Cylinder 4 Misfire Detected	Complete diagnosis for drive cycle A or C
*P0464	Fuel Level Sensor Circuit Intermittent	—
*P0483	Fan Rationality Check	—
*P0506	Idle Air Control System RPM Lower Than Expected	—
*P0507	Idle Air Control System RPM Higher Than Expected	—
*P2096	Post Catalyst Fuel Trim System Too Lean Bank 1	Complete diagnosis for drive cycle A or C
*P2097	Post Catalyst Fuel Trim System Too Rich Bank 1	Complete diagnosis for drive cycle A or C

4. DRIVE CYCLE C (DRIVE ACCORDING TO THE FOLLOWING DRIVE PATTERN)



(A) Idle the engine for 1 minute.	(E) Drive the vehicle at 65 km/h (40 MPH) for 10 seconds.	(G) Stop vehicle with the throttle fully closed.
(B) Accelerate to 96 km/h (60 MPH) within 20 seconds.	(F) Accelerate to 96 km/h (60 MPH) within 10 seconds.	(H) km/h (MPH)
(C) Drive the vehicle at 96 km/h (60 MPH) for 20 seconds.		(I) Sec.
(D) Decelerate with fully closed throttle to 65 km/h (40 MPH).		

DTC	Item	Condition
P0026	Intake Valve Control Solenoid Circuit Range/Performance (Bank 1)	—
P0028	Intake Valve Control Solenoid Circuit Range/Performance (Bank 2)	—
*P0030	HO2S Heater Control Circuit (Bank 1 Sensor 1)	—
*P0068	MAP/MAF - Throttle Position Correlation	—
P0076	Intake Valve Control Solenoid Circuit Low (Bank 1)	—
P0082	Intake Valve Control Solenoid Circuit Low (Bank 2)	—
*P0101	Mass or Volume Air Flow Circuit Range/Performance	—
*P0134	O2 Sensor Circuit No Activity Detected (Bank 1 Sensor 1)	—
*P0139	O2 Sensor Circuit Slow Response (Bank 1 Sensor 2)	—
*P0171	System Too Lean (Bank 1)	Complete diagnosis for drive cycle A or B
*P0172	System Too Rich (Bank 1)	Complete diagnosis for drive cycle A or B
*P0301	Cylinder 1 Misfire Detected	Complete diagnosis for drive cycle A or B
*P0302	Cylinder 2 Misfire Detected	Complete diagnosis for drive cycle A or B
*P0303	Cylinder 3 Misfire Detected	Complete diagnosis for drive cycle A or B
*P0304	Cylinder 4 Misfire Detected	Complete diagnosis for drive cycle A or B
*P0400	Exhaust Gas Recirculation Flow	—
P1492	EGR Solenoid Valve Signal #1 Circuit Malfunction (Low Input)	—
P1493	EGR Solenoid Valve Signal #1 Circuit Malfunction (High Input)	—
P1494	EGR Solenoid Valve Signal #2 Circuit Malfunction (Low Input)	—

Drive Cycle

ENGINE (DIAGNOSTICS)

DTC	Item	Condition
P1495	EGR Solenoid Valve Signal #2 Circuit Malfunction (High Input)	—
P1496	EGR Solenoid Valve Signal #3 Circuit Malfunction (Low Input)	—
P1497	EGR Solenoid Valve Signal #3 Circuit Malfunction (High Input)	—
P1498	EGR Solenoid Valve Signal #4 Circuit Malfunction (Low Input)	—
P1499	EGR Solenoid Valve Signal #4 Circuit Malfunction (High Input)	—
*P2096	Post Catalyst Fuel Trim System Too Lean Bank 1	Complete diagnosis for drive cycle A or B
*P2097	Post Catalyst Fuel Trim System Too Rich Bank 1	Complete diagnosis for drive cycle A or B

5. DRIVE CYCLE D

• DRIFT DIAGNOSIS

- 1) Make sure that the engine coolant temperature at engine starting is less than 30°C (86°F).
- 2) Make sure that fuel remains 9.6 ℓ or more (2.5 US gal, 2.1 Imp gal) and the battery voltage is 10.9 V or more.
- 3) Make sure that the engine coolant temperature rises for more than 10°C (18°F) from the level of engine starting and is also above 75°C (167°F).
- 4) Idle the engine for more than 120 seconds in the condition of step 3.

• STUCK DIAGNOSIS

- 1) Make sure that the battery voltage is more than 10.9 V.
- 2) Perform the Clear Memory Mode. <Ref. to EN(H4SO U5)(diag)-46, Clear Memory Mode.>
- 3) Drive the vehicle for the distance equal to the fuel of 50 ℓ (13.2 US gal, 11 Imp gal).

NOTE:

- It is acceptable to drive the vehicle intermittently.
- Do not disconnect the battery terminals while diagnosing. (Data will be cleared by disconnecting the battery terminals.)

DTC	Item	Condition
P0181	Fuel Temperature Sensor "A" Circuit Range/Performance	—

6. DRIVE CYCLE E

- 1) Make sure that the battery voltage is more than 10.9 V.
- 2) Perform the Clear Memory Mode. <Ref. to EN(H4SO U5)(diag)-46, Clear Memory Mode.>
- 3) Drive the vehicle for the distance equal to the fuel of 30 ℓ (7.9 US gal, 6.6 Imp gal).

NOTE:

- It is acceptable to drive the vehicle intermittently.
- Do not disconnect the battery terminals while diagnosing. (Data will be cleared by disconnecting the battery terminals.)

DTC	Item	Condition
P0461	Fuel Level Sensor "A" Circuit Range/Performance	—

7. DRIVE CYCLE F

- 1) Check that the engine coolant temperature at engine start is 30°C (86°F) or less.
- 2) Warm up the engine until the engine coolant temperature exceeds 95°C (203°F) from engine start.
- 3) After the engine has reached the state of procedure 2), idle the engine for more than 10 minutes.

NOTE:

Do not disconnect the battery terminals while diagnosing. (Data will be cleared when disconnecting the battery terminals.)

DTC	Item	Condition
P0111	Intake Air Temperature Sensor 1 Circuit Range/Performance	—

8. DRIVE CYCLE H

- 1) Perform the Clear Memory Mode. <Ref. to EN(H4SO U5)(diag)-46, Clear Memory Mode.>
- 2) With the ignition switch ON, read the engine coolant temperature, intake air temperature and fuel temperature. <Ref. to EN(H4SO U5)(diag)-28, READ CURRENT DATA FOR ENGINE (NORMAL MODE), OPERATION, Subaru Select Monitor.>
- 3) When the values in step 2) meet the two conditions shown below, start the engine.

Condition:

$| \text{Engine coolant temperature} - \text{Intake air temperature} | \leq 5^{\circ}\text{C} (41^{\circ}\text{F})$

$| \text{Engine coolant temperature} - \text{Fuel temperature} | \leq 2^{\circ}\text{C} (36^{\circ}\text{F})$

NOTE:

When the conditions are not met, turn the ignition switch to OFF and wait until those conditions are met. Start the engine in P range (AT model) or in N position (MT model).

- 4) Idle the engine for one minute in the condition of step 3).

DTC	Item	Condition
*P0602	Control Module Programming Error	—

13. Clear Memory Mode

A: OPERATION

1. SUBARU SELECT MONITOR (NORMAL MODE)

- 1) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.
- 2) On the «System Selection Menu» display screen, select the {Engine Control System} and press the [YES] key.
- 3) Press the [YES] key after the information of engine type has been displayed.
- 4) On the «Engine Diagnosis» display screen, select the {Clear Memory} and press the [YES] key.
- 5) When the “Done” and “Turn Ignition Switch OFF” are shown on the display screen, turn the ignition switch to OFF and then Subaru Select Monitor switch to OFF.

NOTE:

- Initial diagnosis of electronic throttle control is performed after memory clearance. For this reason, start the engine after 10 seconds or more have elapsed since the ignition switch was turned to ON.
- For detailed operation procedure, refer to the “SUBARU SELECT MONITOR OPERATION MANUAL”.

2. SUBARU SELECT MONITOR (OBD MODE)

- 1) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.
- 2) On the «System Selection Menu» display screen, select the {Engine Control System} and press the [YES] key.
- 3) Press the [YES] key after the information of engine type has been displayed.
- 4) On the «Engine Diagnosis» display screen, select the {OBD System} and press the [YES] key.
- 5) On the «OBD Menu» display screen, select {DTC Clear} and press the [YES] key.
- 6) When the “Clear Diagnostic Code?” is shown on the screen, press the [YES] key.
- 7) Turn the ignition switch to OFF and then turn the Subaru Select Monitor switch to OFF.

NOTE:

- Initial diagnosis of electronic throttle control is performed after memory clearance. For this reason, start the engine after 10 seconds or more have elapsed since the ignition switch was turned to ON.
- For detailed operation procedure, refer to the “SUBARU SELECT MONITOR OPERATION MANUAL”.

3. GENERAL SCAN TOOL

For clear memory procedures using the general scan tool, refer to “General Scan Tool Instruction Manual”.

NOTE:

Initial diagnosis of electronic throttle control is performed after memory clearance. For this reason, start the engine after 10 seconds or more have elapsed since the ignition switch was turned to ON.

14. Compulsory Valve Operation Check Mode

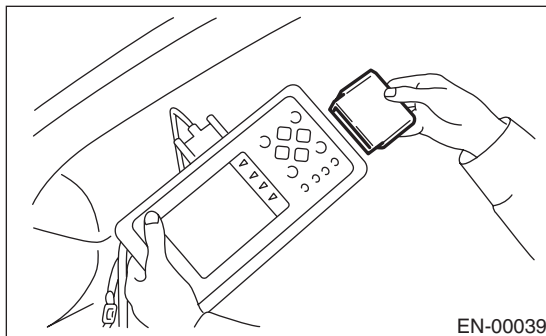
A: OPERATION

1) Prepare the Subaru Select Monitor kit. <Ref. to EN(H4SO U5)(diag)-8, PREPARATION TOOL, General Description.>

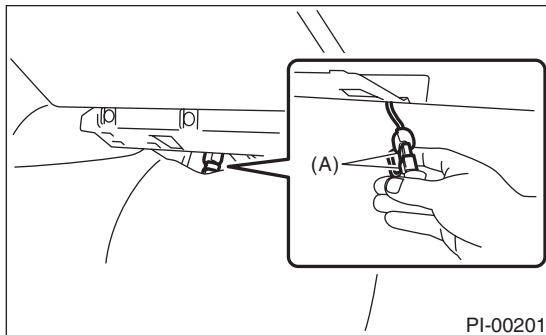


2) Connect the diagnosis cable to Subaru Select Monitor.

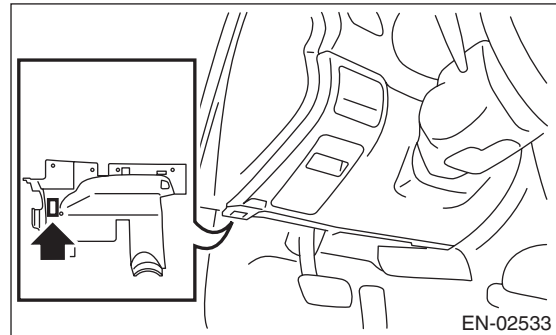
3) Insert the cartridge to Subaru Select Monitor. <Ref. to EN(H4SO U5)(diag)-8, PREPARATION TOOL, General Description.>



4) Connect the test mode connector (A) located under the glove box.



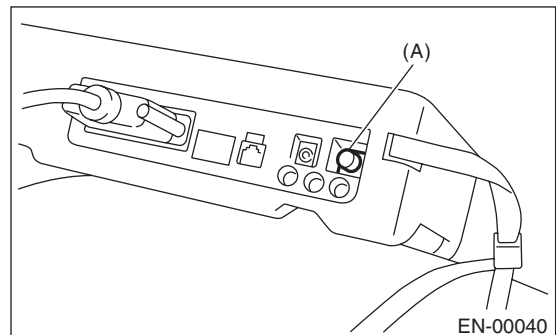
5) Connect the Subaru Select Monitor to data link connector located in the lower portion of the instrument panel (on the driver's side).



CAUTION:

Do not connect any scan tools except Subaru Select Monitor or general scan tool.

6) Turn the ignition switch to ON (engine OFF) and Subaru Select Monitor switch to ON.



(A) Power switch

7) On the «Main Menu» display screen, select the {Each System Check} and press the [YES] key.

8) On the «System Selection Menu» display screen, select the {Engine Control System} and press the [YES] key.

9) Press the [YES] key after the information of engine type has been displayed.

10) On the «Engine Diagnosis» display screen, select the {System Operation Check Mode} and press the [YES] key.

11) On the «System Operation Check Mode» display screen, select the {Actuator ON/OFF Operation} and press the [YES] key.

12) Select the desired compulsory actuator on the «Actuator ON/OFF Operation» display screen and press the [YES] key.

Compulsory Valve Operation Check Mode

ENGINE (DIAGNOSTICS)

13) Pressing the [NO] key completes the compulsory operation check mode. The display will then return to the «Actuator ON/OFF Operation» screen.

A list of the support data is shown in the following table.

Contents	Display
Compulsory fuel pump relay operation check	Fuel Pump
Compulsory radiator fan relay operation check	Radiator Fan Relay
Compulsory air conditioning relay operation check	A/C Compressor Relay
Compulsory purge control solenoid valve operation check	CPC Solenoid
Compulsory pressure control solenoid valve operation check	PCV Solenoid Valve
Compulsory drain valve operation check	Vent Control Solenoid Valve

NOTE:

- The following parts will be displayed but not functional.

Display
EGR Solenoid Valve
AAI Solenoid
ASV Solenoid Valve
FICD Solenoid
Pressure Switching Sol. 1
Pressure Switching Sol. 2
Turbocharger Wastegate Solenoid
Exhaust Bypass Valve Control Permit Flag
Fuel Tank Sensor Control Valve
Secondary Air Combination Valve 1

- For detailed operation procedure, refer to the "SUBARU SELECT MONITOR OPERATION MANUAL".

15. Malfunction Indicator Light

A: PROCEDURE

1. Activation of malfunction indicator light. <Ref. to EN(H4SO U5)(diag)-50, ACTIVATION OF MALFUNCTION INDICATOR LIGHT, Malfunction Indicator Light.>
↓
2. Malfunction indicator light does not come on. <Ref. to EN(H4SO U5)(diag)-51, MALFUNCTION INDICATOR LIGHT DOES NOT COME ON, Malfunction Indicator Light.>
↓
3. Malfunction indicator light does not go off. <Ref. to EN(H4SO U5)(diag)-53, MALFUNCTION INDICATOR LIGHT DOES NOT GO OFF., Malfunction Indicator Light.>
↓
4. Malfunction indicator light does not blink. <Ref. to EN(H4SO U5)(diag)-54, MALFUNCTION INDICATOR LIGHT DOES NOT BLINK., Malfunction Indicator Light.>
↓
5. Malfunction indicator light remains blinking. <Ref. to EN(H4SO U5)(diag)-56, MALFUNCTION INDICATOR LIGHT REMAINS BLINKING., Malfunction Indicator Light.>

Malfunction Indicator Light

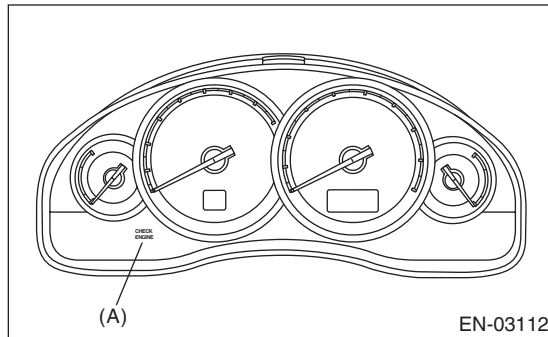
ENGINE (DIAGNOSTICS)

B: ACTIVATION OF MALFUNCTION INDICATOR LIGHT

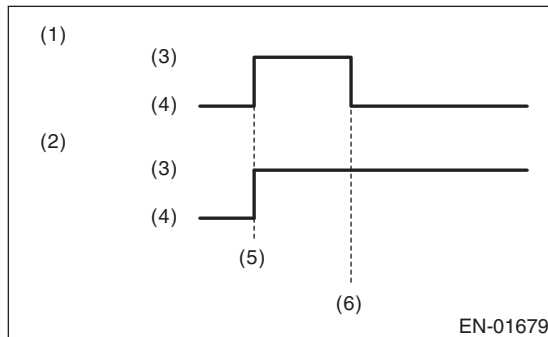
1) When the ignition switch is turned to ON (engine OFF), the malfunction indicator light (A) in the combination meter illuminates.

NOTE:

If the engine malfunction indicator light does not illuminate, perform diagnostics of malfunction indicator light circuit or the combination meter circuit.
<Ref. to EN(H4SO U5)(diag)-51, MALFUNCTION INDICATOR LIGHT DOES NOT COME ON, Malfunction Indicator Light.>

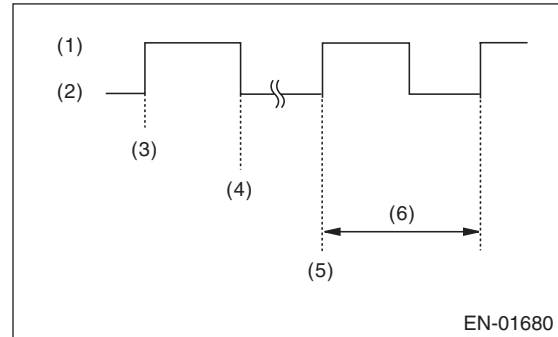


2) After starting the engine, the malfunction indicator light goes out. If it does not go off, either the engine or emission control system has malfunction.



- (1) No faulty
- (2) Trouble occurs
- (3) ON
- (4) OFF
- (5) Ignition switch ON
- (6) Engine start

3) Malfunction indicator light blinks at a cycle of 1 Hz when the diagnosis system detects the misfire which might damage the catalyst.



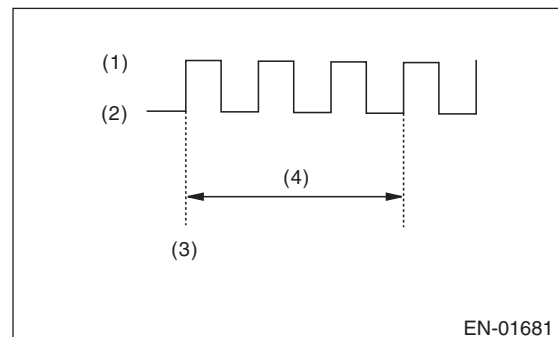
- (1) ON
- (2) OFF
- (3) Ignition switch ON
- (4) Engine start
- (5) Misfire occurs
- (6) 1 second

4) Turn the ignition switch to OFF and connect the test mode connector.

(1) When the ignition switch is turned to ON (engine OFF), the malfunction indicator light illuminates.

(2) After the engine starts, malfunction indicator light blinks in a cycle of 0.5 Hz. (During diagnosis)

(3) Malfunction indicator light blinks at a cycle of 3 Hz after diagnosis if there is no trouble. Malfunction indicator light illuminates if faulty.



- (1) ON
- (2) OFF
- (3) Ignition switch ON
- (4) 1 second

C: MALFUNCTION INDICATOR LIGHT DOES NOT COME ON

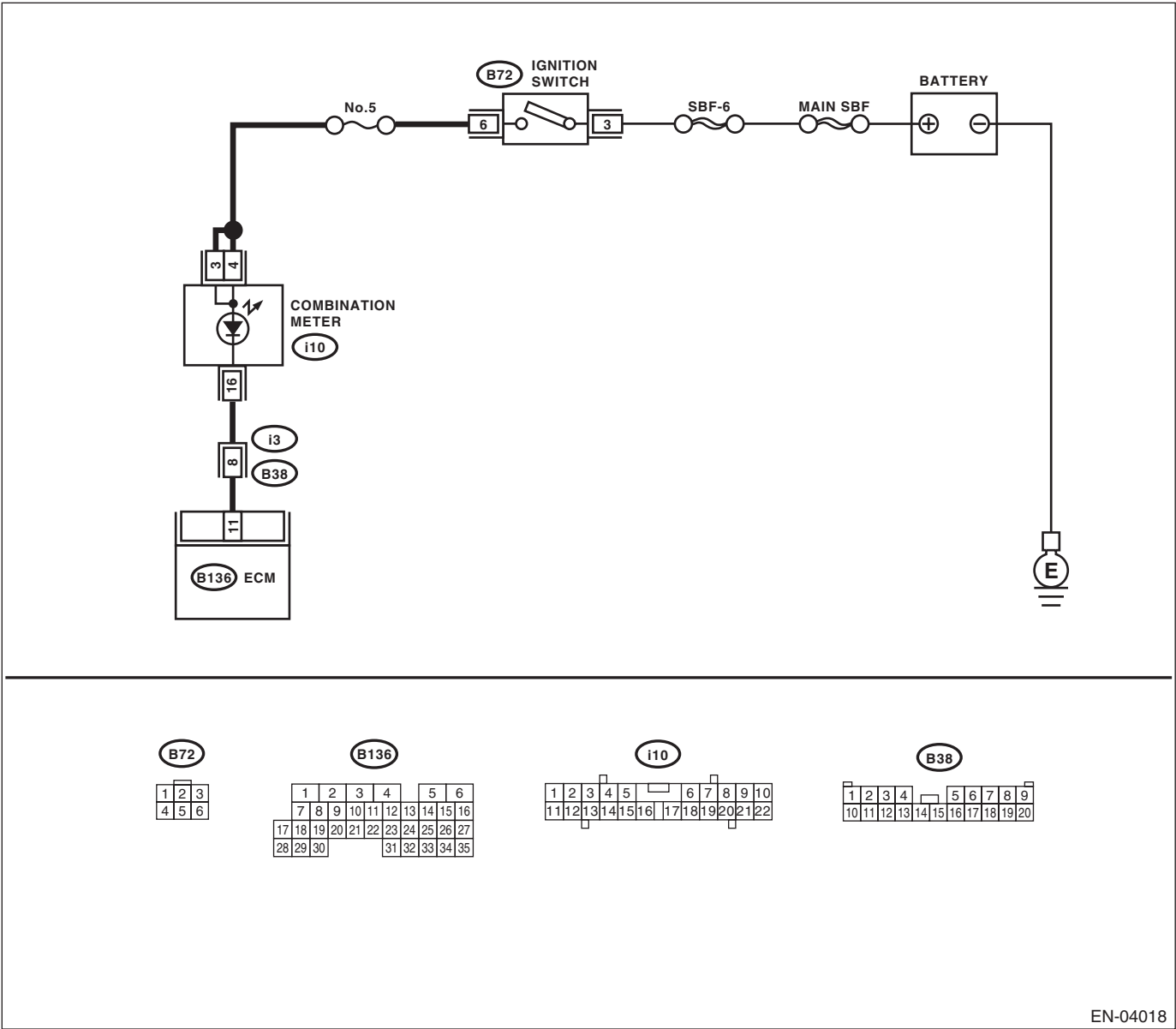
DIAGNOSIS:

The malfunction indicator light circuit is open or shorted.

TROUBLE SYMPTOM:

When the ignition switch is turned to ON (engine OFF), malfunction indicator light does not come on.

WIRING DIAGRAM:



EN-04018

Step	Check	Yes	No
1 CHECK OUTPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 11 (+) — Chassis ground (–):	Is the voltage less than 1 V?	Go to step 4.	Go to step 2.
2 CHECK POOR CONTACT. Check for poor connection by shaking or pulling ECM connector and harness.	Does the malfunction indicator light illuminate?	Repair the poor contact of ECM connector.	Go to step 3.

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
3 CHECK ECM CONNECTOR. Check the connection of ECM connector.	Is the ECM connector correctly connected?	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Repair the connection of ECM connector.
4 CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Remove the combination meter. <Ref. to IDI-14, Combination Meter.> 3) Disconnect the connector from ECM and combination meter. 4) Measure the resistance of harness between ECM and combination meter connector. Connector & terminal (B136) No. 11 — (i10) No. 16:	Is the resistance less than 1 Ω ?	Go to step 5.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and combination meter connector • Poor contact of coupling connector
5 CHECK POOR CONTACT. Check poor contact of combination meter connector.	Is there poor contact in combination meter connector?	Repair the poor contact of combination meter connector.	Go to step 6.
6 CHECK HARNESS BETWEEN COMBINATION METER AND IGNITION SWITCH CONNECTOR. 1) Turn the ignition switch to ON. 2) Measure the voltage between combination meter connector and chassis ground. Connector & terminal (i10) No. 3 (+) — Chassis ground (-): (i10) No. 4 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Replace the combination meter board. <Ref. to IDI-14, Combination Meter.>	Check the following item and repair if necessary. NOTE: • Blown out of fuse (No. 5) • Open or short circuit of harness between fuse (No. 5) and battery terminal • Poor contact of ignition switch connector

D: MALFUNCTION INDICATOR LIGHT DOES NOT GO OFF

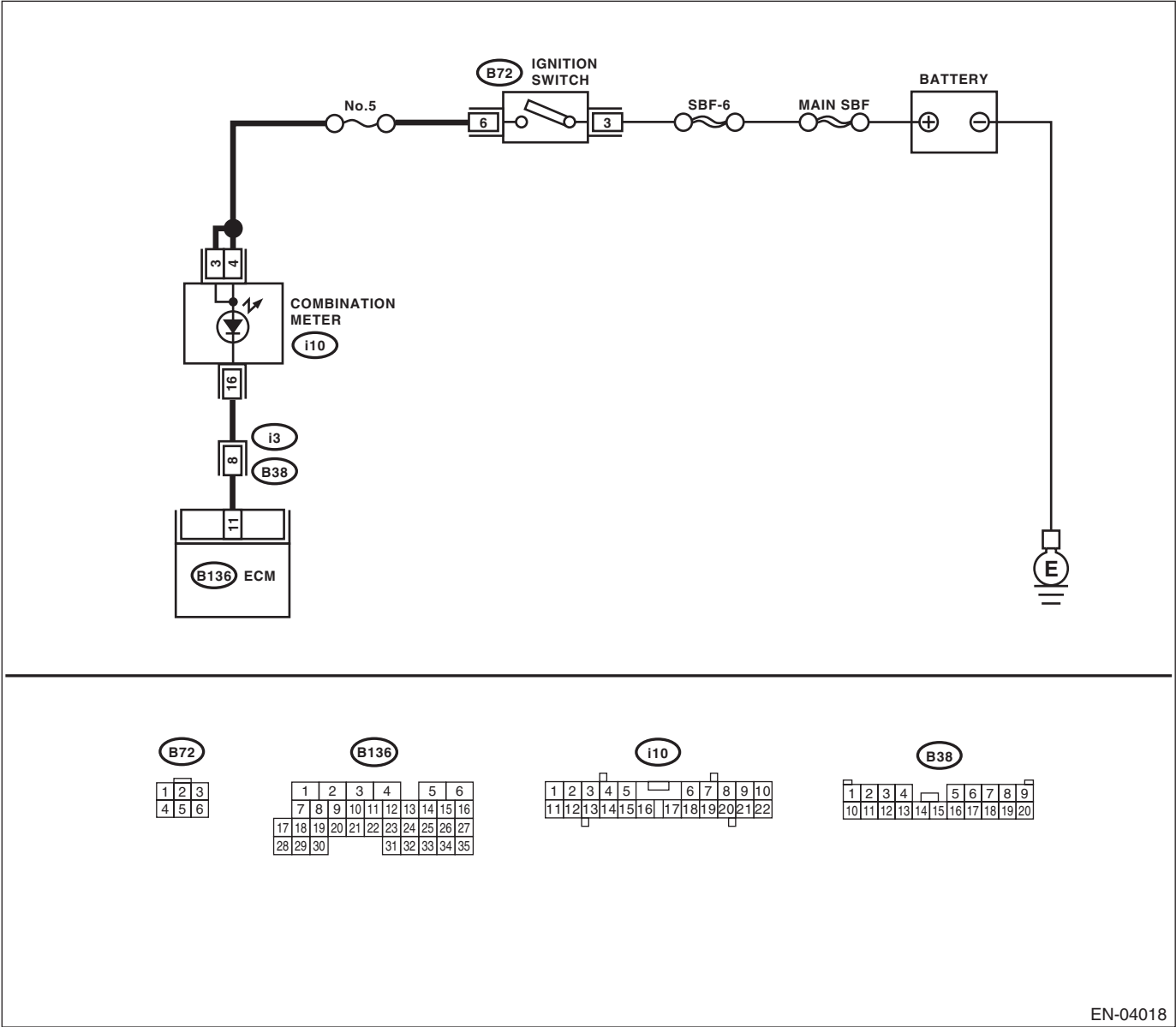
DIAGNOSIS:

The malfunction indicator light circuit is shorted.

TROUBLE SYMPTOM:

Although malfunction indicator light comes on when the engine runs, DTC is not shown on the Subaru Select Monitor display.

WIRING DIAGRAM:



EN-04018

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Turn the ignition switch to ON.	Does the malfunction indicator light illuminate?	Repair the short circuit of harness between combination meter and ECM connector.	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

E: MALFUNCTION INDICATOR LIGHT DOES NOT BLINK

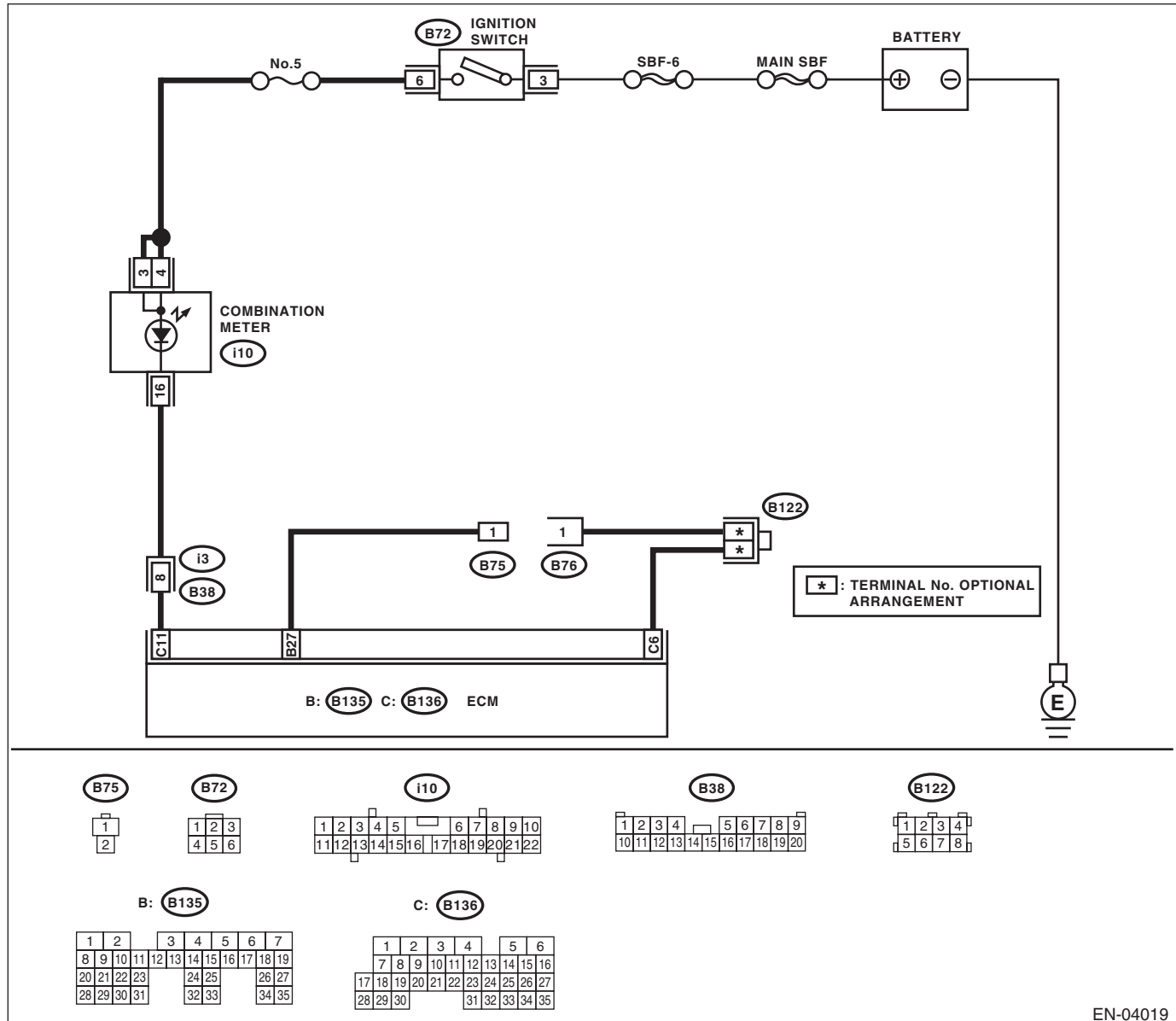
DIAGNOSIS:

- The malfunction indicator light circuit is open or shorted.
- Test mode connector circuit is open.

TROUBLE SYMPTOM:

Malfunction indicator light does not blink during Inspection Mode.

WIRING DIAGRAM:



EN-04019

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK STATUS OF MALFUNCTION INDICATOR LIGHT. 1) Turn the ignition switch to OFF. 2) Disconnect the test mode connector. 3) Turn the ignition switch to ON. (engine OFF)	Does the malfunction indicator light illuminate?	Go to step 2.	Repair the malfunction indicator light circuit. <Ref. to EN(H4SO U5)(diag)-51, MALFUNCTION INDICATOR LIGHT DOES NOT COME ON, Malfunction Indicator Light.>
2 CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Turn the ignition switch to ON.	Does the malfunction indicator light illuminate?	Repair the short circuit of harness between combination meter and ECM connector.	Go to step 3.
3 CHECK HARNESS BETWEEN TEST MODE CONNECTOR AND ECM. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance of harness between test mode connector and ECM. Connector & terminal (B76) No. 1 — (B136) No. 6:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between test mode connector and chassis ground
4 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Go to step 5.
5 CHECK HARNESS BETWEEN ECM AND TEST MODE CONNECTOR. 1) Connect the test mode connector. 2) Measure the resistance of harness between ECM and test mode connector. Connector & terminal (B135) No. 27 — (B136) No. 6:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the open circuit of harness between ECM and test mode connector.
6 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

F: MALFUNCTION INDICATOR LIGHT REMAINS BLINKING

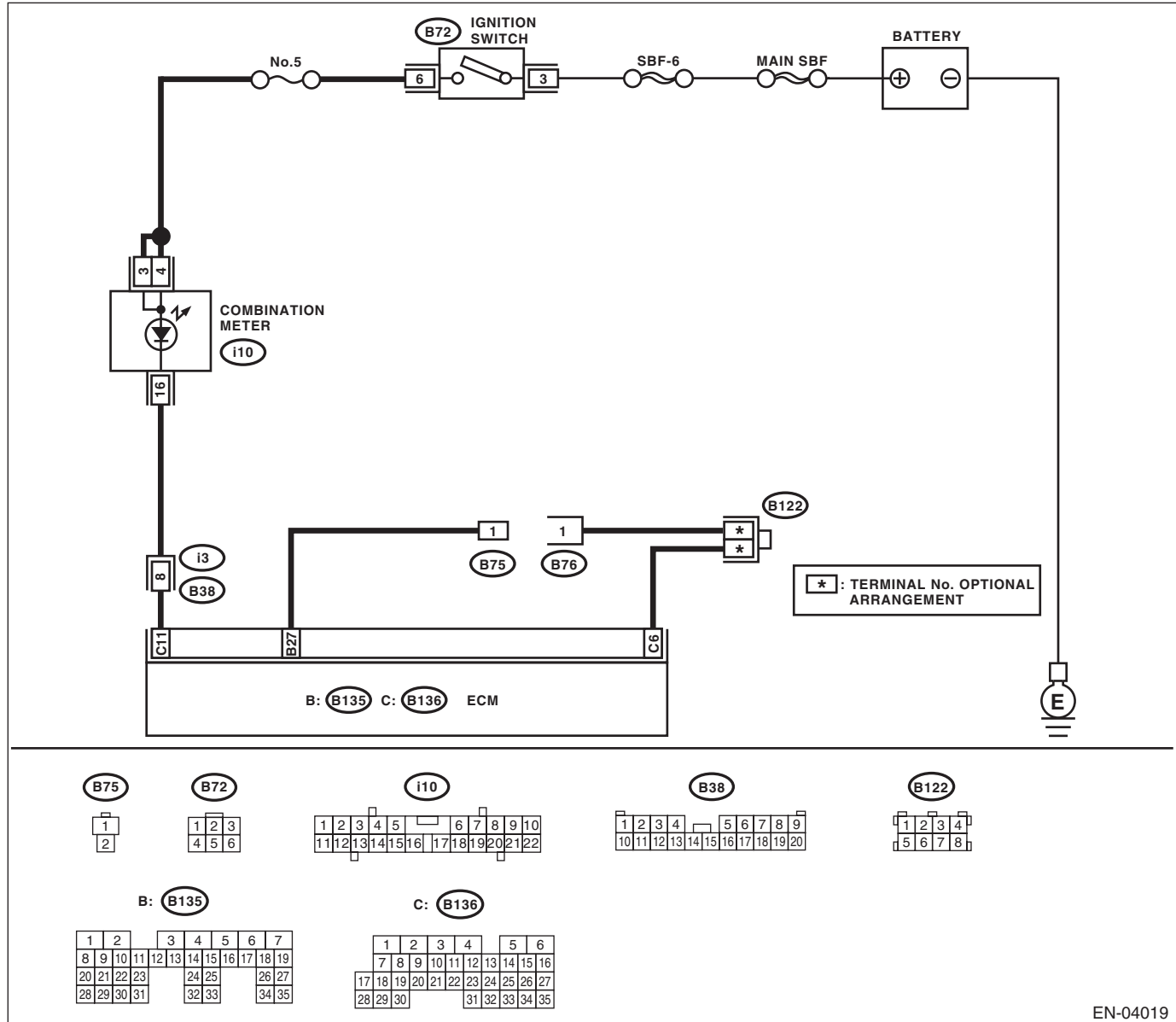
DIAGNOSIS:

Test mode connector circuit is shorted.

TROUBLE SYMPTOM:

Malfunction indicator light blinks when test mode connector is not connected.

WIRING DIAGRAM:



EN-04019

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK TEST MODE CONNECTOR. 1) Disconnect the test mode connector. 2) Turn the ignition switch to ON.	Does the malfunction indicator light blink?	Go to step 2.	System is normal. NOTE: Malfunction indicator light blinks when test mode connector is connected.
2 CHECK HARNESS BETWEEN ECM CONNECTOR AND TEST MODE CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance of harness between ECM connector and test mode connector. Connector & terminal (B135) No. 27 — (B136) No. 6:	Is the resistance less than 5 Ω ?	Repair the short circuit of harness between ECM and test mode connector.	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

16.Diagnostics for Engine Starting Failure

A: PROCEDURE

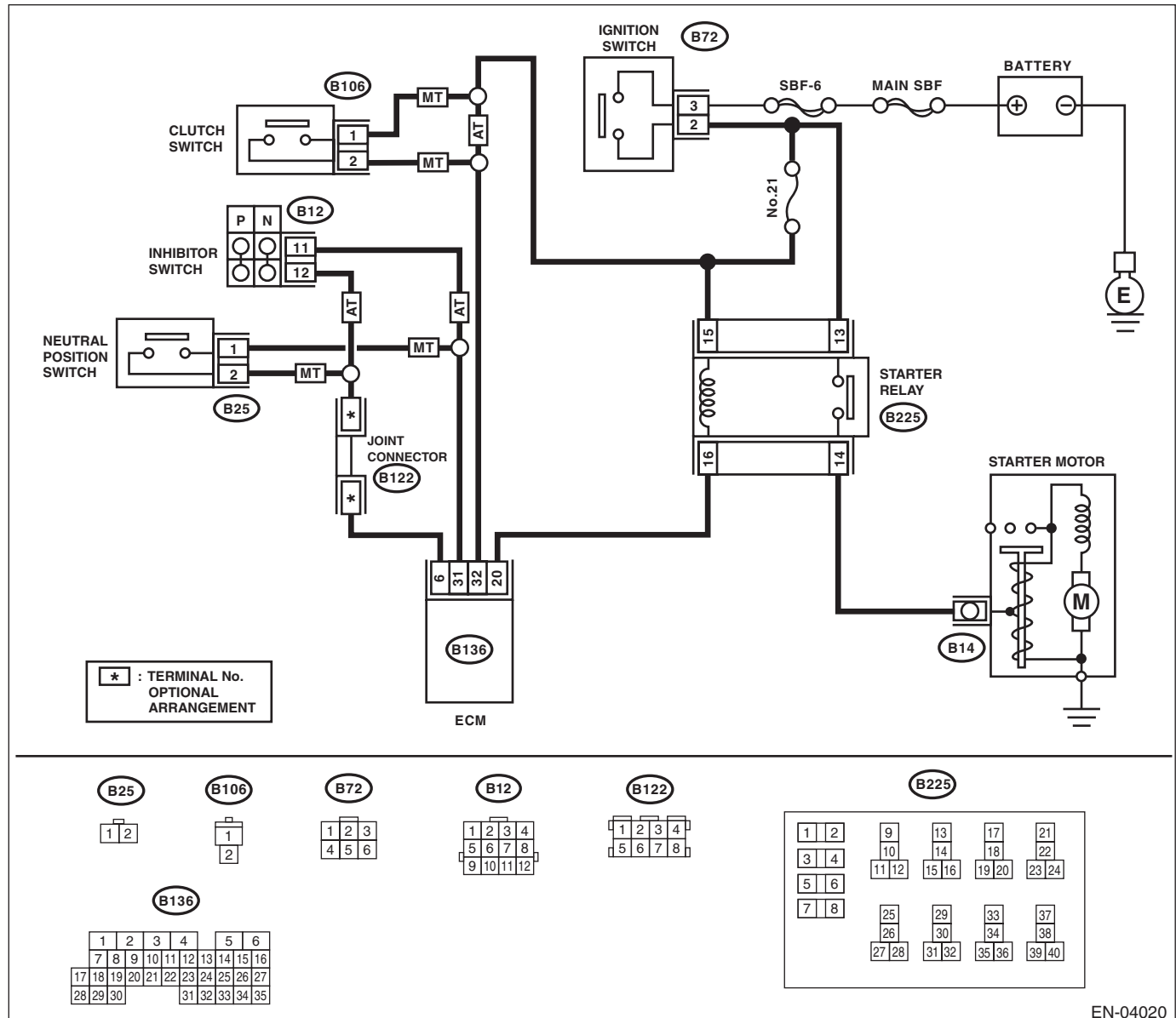
1. Check for fuel amount.
↓
2. Inspection of starter motor circuit. <Ref. to EN(H4SO U5)(diag)-59, STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
3. Inspection of ECM power supply and ground line. <Ref. to EN(H4SO U5)(diag)-63, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>
↓
4. Inspection of ignition control system. <Ref. to EN(H4SO U5)(diag)-65, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>
↓
5. Inspection of fuel pump circuit. <Ref. to EN(H4SO U5)(diag)-68, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
6. Inspection of fuel indicator circuit. <Ref. to EN(H4SO U5)(diag)-71, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

B: STARTER MOTOR CIRCUIT

CAUTION:

After repair or replacement of faulty parts, perform Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04020

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK BATTERY. Check the battery voltage.	Is the voltage more than 12 V?	Go to step 2.	Charge or replace the battery.
2 CHECK OPERATION OF STARTER MOTOR. NOTE: Check the security alarm is not sounding.	Does the starter motor operate?	Go to step 3.	Go to step 4.
3 CHECK DTC.	Is DTC displayed? <Ref. to EN(H4SO U5)(diag)-35, OPERATION, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the List of Diagnostic Trouble Code (DTC). <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Repair the poor contact of ECM connector.
4 CHECK INPUT SIGNAL FOR STARTER MOTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from starter motor. 3) Turn the ignition switch to START. 4) Measure the power supply voltage between starter motor connector terminal and engine ground. Connector & terminal (B14) No. 1 (+) — Engine ground (-): NOTE: For AT model, place the select lever in P or N range. For MT model, depress the clutch pedal.	Is the voltage more than 10 V?	Check the starter motor. <Ref. to SC(H4SO)-6, Starter.>	Go to step 5.
5 CHECK HARNESS BETWEEN BATTERY AND IGNITION SWITCH CONNECTOR. 1) Disconnect the connector from ignition switch. 2) Measure the power supply voltage between ignition switch connector and chassis ground. Connector & terminal (B72) No. 3 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 6.	Repair the open circuit or ground short of harness between ignition switch and battery, and check fuse SBF No. 6 and MAIN SBF.
6 CHECK IGNITION SWITCH. 1) Disconnect the connector from ignition switch. 2) Measure the resistance between ignition switch terminals after turning the ignition switch to START position. Terminals No. 2 — No. 3:	Is the resistance less than 5 Ω ?	Go to step 7.	Replace the ignition switch.
7 CHECK INPUT VOLTAGE OF STARTER RELAY. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from starter relay. 3) Connect the connector to ignition switch. 4) Measure the input voltage between starter relay connector and chassis ground after turning the ignition switch to START position. Connector & terminal (B225) No. 13 (+) — Chassis ground (-): (B225) No. 15 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 8.	Repair open or ground short circuit of harness between starter relay and ignition switch.

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
8 CHECK STARTER RELAY. 1) Connect the battery to starter relay terminals No. 15 and No. 16. 2) Measure the resistance between starter relay terminals. <i>Terminals</i> <i>No. 13 — No. 14:</i>	Is the resistance less than 1 Ω ?	Go to step 9.	Replace the starter relay.
9 CHECK HARNESS BETWEEN STARTER RELAY AND STARTER MOTOR. 1) Disconnect the connector from starter motor. 2) Measure the resistance of harness between starter relay and starter motor. <i>Connector & terminal</i> <i>(B225) No. 14 — (B14) No. 1:</i>	Is the resistance less than 1 Ω ?	Go to step 10.	Repair open or ground short circuit of harness between starter relay and starter motor.
10 CHECK HARNESS BETWEEN STARTER RELAY AND ECM. 1) Disconnect the connectors from ECM. 2) Measure the resistance of harness between starter relay and ECM. <i>Connector & terminal</i> <i>(B225) No. 16 — (B136) No. 20:</i>	Is the resistance less than 1 Ω ?	Go to step 11.	Repair the open or ground short circuit of harness between starter relay and ECM.
11 CHECK TRANSMISSION TYPE.	Is the transmission type AT?	Go to step 12.	Go to step 16.
12 CHECK ECM INPUT VOLTAGE. 1) Turn the ignition switch to START. 2) Measure the input voltage between ECM connector and chassis ground. <i>Connector & terminal</i> <i>(B136) No. 32 (+) — Chassis ground (-):</i>	Is the voltage more than 10 V?	Go to step 13.	Repair the open or ground short circuit of harness between ECM and ignition switch.
13 CHECK HARNESS BETWEEN ECM AND INHIBITOR SWITCH. 1) Turn the inhibitor switch to OFF. 2) Disconnect the connector from inhibitor switch. 3) Measure the resistance of harness connector between ECM and inhibitor switch. <i>Connector & terminal</i> <i>(B136) No. 31 — (B12) No. 11:</i>	Is the resistance less than 1 Ω ?	Go to step 14.	Repair the open or ground short circuit of harness between ECM and inhibitor switch.
14 CHECK INHIBITOR SWITCH AND ECM. Measure the resistance of harness between inhibitor switch and ECM <i>Connector & terminal</i> <i>(B12) No. 12 — (B136) No. 6:</i>	Is the resistance less than 5 Ω ?	Go to step 15.	Repair the open or ground short circuit of harness between inhibitor switch and ECM.
15 CHECK INHIBITOR SWITCH. 1) Place the select lever other than "N" and "P" range. 2) Measure the resistance between inhibitor switch connector terminals. <i>Terminals</i> <i>No. 11 — No. 12:</i>	Is the resistance more than 1 M Ω ?	Contact the SOA service center.	Replace the inhibitor switch.
16 CHECK ECM INPUT VOLTAGE. 1) Turn the ignition switch to START. 2) Measure the input voltage between ECM connector and chassis ground. <i>Connector & terminal</i> <i>(B136) No. 32 — Chassis ground (-):</i> NOTE: Depress the clutch pedal.	Is the voltage more than 10 V?	Go to step 17.	Repair the open or ground short circuit of harness between ECM and ignition switch.

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

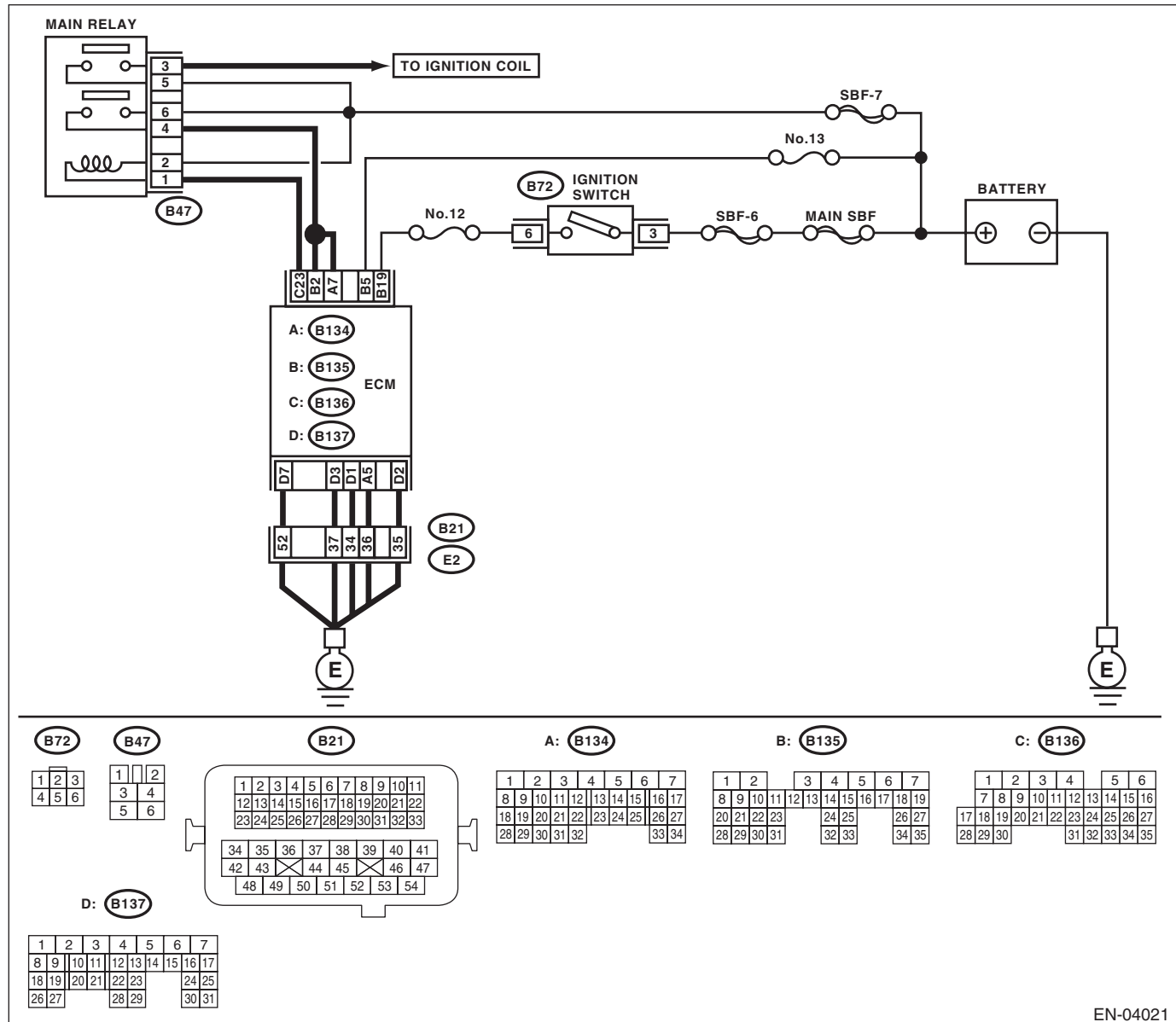
Step	Check	Yes	No
17 CHECK CLUTCH SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from clutch switch. 3) Measure the resistance between clutch switch terminals while depressing the clutch. Terminals No. 1 — No. 2:	Is the resistance less than 1 Ω ?	Go to step 18.	Replace the clutch switch.
18 CHECK HARNESS BETWEEN ECM AND NEUTRAL SWITCH. 1) Disconnect the connector from the neutral switch. 2) Measure the resistance of harness connector between ECM and neutral switch. Connector & terminal (B136) No. 31 — (B25) No. 1:	Is the resistance less than 1 Ω ?	Go to step 19.	Repair the open or ground short circuit of harness between ECM and neutral switch.
19 CHECK NEUTRAL SWITCH GROUND CIRCUIT. Measure the resistance of harness between neutral switch and ECM. Connector & terminal (B25) No. 2 — (B136) No. 6:	Is the resistance less than 5 Ω ?	Go to step 20.	Repair the open or ground short circuit of harness between neutral switch and ECM.
20 CHECK NEUTRAL SWITCH. 1) Set the shift lever to "N" range. 2) Measure the resistance between neutral switch connector terminals. Terminals No. 1 — No. 2:	Is the resistance more than 1 M Ω ?	Contact the SOA service center.	Replace the neutral switch.

C: CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM)

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04021

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

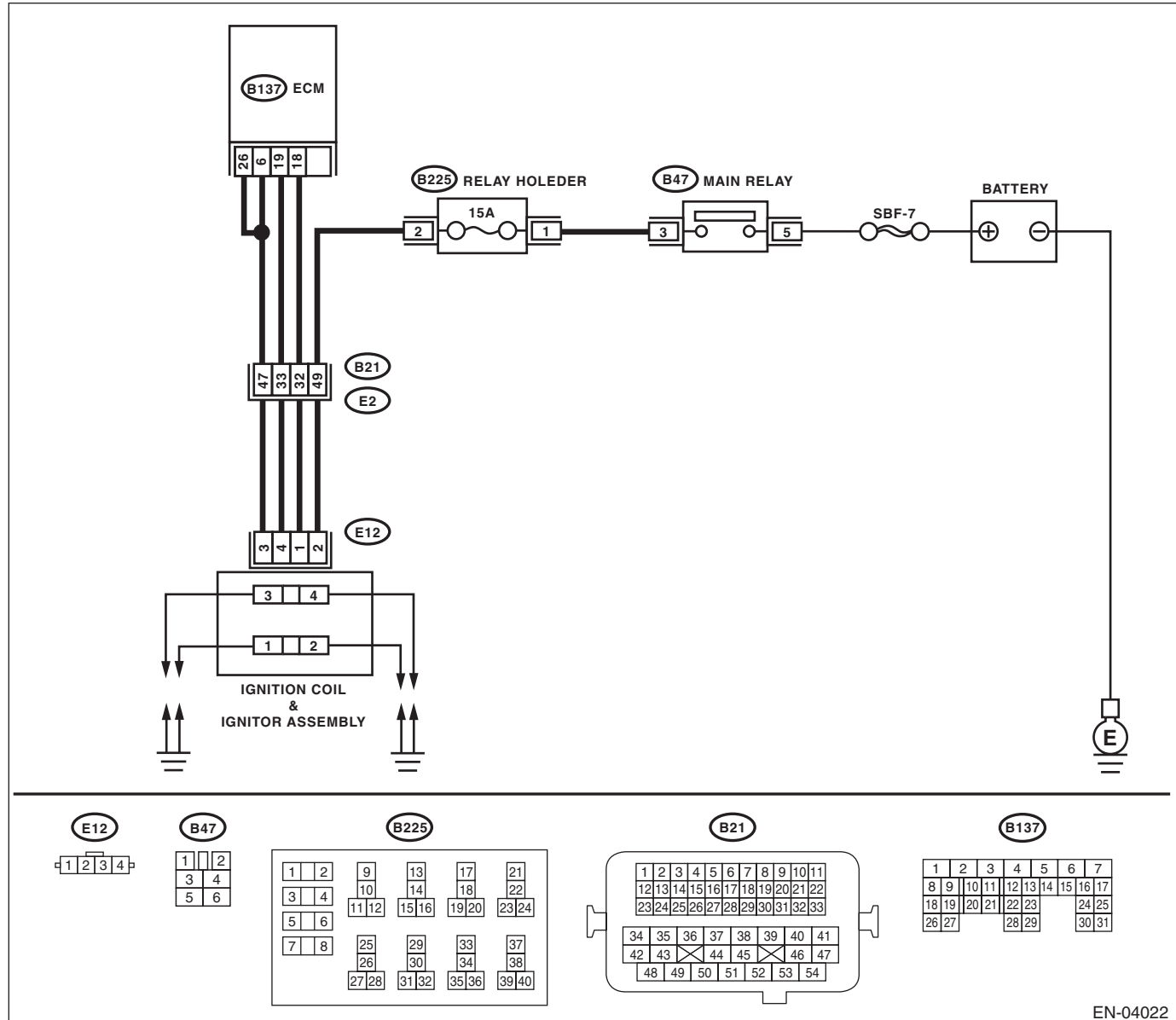
Step	Check	Yes	No
1 CHECK MAIN RELAY. 1) Turn the ignition switch to OFF. 2) Remove the main relay. 3) Connect the battery to main relay terminals No. 1 and No. 2. 4) Measure the resistance between main relay terminals. Terminals No. 3 — No. 5: No. 4 — No. 6:	Is the resistance less than 10 Ω ?	Go to step 2.	Replace the main relay.
2 CHECK GROUND CIRCUIT FOR ECM. 1) Disconnect the connectors from ECM. 2) Measure the resistance of harness between ECM and chassis ground. Connector & terminal (B134) No. 5 — Chassis ground: (B137) No. 1 — Chassis ground: (B137) No. 2 — Chassis ground: (B137) No. 3 — Chassis ground: (B137) No. 7 — Chassis ground:	Is the resistance less than 5 Ω ?	Go to step 3.	Repair the open circuit of harness between ECM connector and engine grounding terminal.
3 CHECK INPUT VOLTAGE OF ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 5 (+) — Chassis ground (-): (B135) No. 19 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 4.	Repair the open or ground short circuit of power supply circuit.
4 CHECK INPUT VOLTAGE OF MAIN RELAY. Measure the voltage between main relay connector and chassis ground. Connector & terminal (B47) No. 1 (+) — Chassis ground (-): (B47) No. 5 (+) — Chassis ground (-): (B47) No. 6 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 5.	Repair the open or ground short circuit of harness of power supply circuit.
5 CHECK INPUT VOLTAGE OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B134) No. 7 (+) — Chassis ground (-): (B135) No. 2 (+) — Chassis ground (-): (B136) No. 23 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Check ignition control system. <Ref. to EN(H4SO U5)(diag)-65, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Repair the open or ground short circuit of harness between ECM connector and main relay connector.

D: IGNITION CONTROL SYSTEM

CAUTION:

After repair or replacement of faulty parts, perform Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04022

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK IGNITION SYSTEM FOR SPARKS. 1) Remove the plug cord cap from each spark plug. 2) Install a new spark plug on plug cord cap. CAUTION: Do not remove the spark plug from engine. 3) Contact the spark plug thread portion on engine. 4) While opening the throttle valve fully, crank the engine to check that spark occurs at each cylinder.	Does spark occur at each cylinder?	Check fuel pump system. <Ref. to EN(H4SO U5)(diag)-68, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step 2.
2 CHECK POWER SUPPLY CIRCUIT FOR IGNITION COIL AND IGNITOR ASSEMBLY. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ignition coil and ignitor assembly. 3) Turn the ignition switch to ON. 4) Measure the power supply voltage between ignition coil and ignitor assembly connector and engine ground. Connector & terminal (E12) No. 2 (+) — Engine ground (-):	Is the voltage more than 10 V?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between the ignition coil and ignitor assembly, and main relay connector • Poor contact of coupling connector • Blown out of fuse
3 CHECK HARNESS BETWEEN IGNITION COIL AND IGNITOR ASSEMBLY, AND ECM. 1) Turn the ignition switch to OFF. 2) Measure the resistance between the ignition coil and ignitor assembly connector, and ECM. Connector & terminal (E12) No. 3 — (B137) No. 6: (E12) No. 3 — (B137) No. 26:	Is the resistance less than 5 Ω ?	Go to step 4.	Repair the harness and connector. NOTE: In this case, repair the following item: Open circuit in harness between ignition coil and ignitor assembly connector, and ECM
4 CHECK IGNITION COIL AND IGNITOR ASSEMBLY. 1) Remove the spark plug cords. 2) Measure the resistance between spark plug cord contact portions to check secondary coil. Terminals No. 1 — No. 2: No. 3 — No. 4:	Is the resistance between 10 and 15 k Ω ?	Go to step 5.	Replace the ignition coil and ignitor assembly. <Ref. to IG(H4SO)-7, Ignition Coil and Ignitor Assembly.>
5 CHECK INPUT SIGNAL FOR IGNITION COIL AND IGNITOR ASSEMBLY. 1) Connect the connector to the Ignition coil and ignitor assembly. 2) Check if voltage varies synchronously with engine speed when cranking, while monitoring voltage between ignition coil and ignitor assembly connector and engine ground. Connector & terminal (E12) No. 1 (+) — Engine ground (-): (E12) No. 4 (+) — Engine ground (-):	Does the voltage vary more than 10 V?	Go to step 6.	Replace the ignition coil and ignitor assembly. <Ref. to IG(H4SO)-7, Ignition Coil and Ignitor Assembly.>

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK HARNESS BETWEEN ECM AND IGNITION COIL AND IGNITOR ASSEMBLY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connector from ignition coil and ignitor assembly. 4) Measure the resistance of harness between ECM and ignition coil and ignitor assembly connector. Connector & terminal (B137) No. 18 — (E12) No. 1: (B137) No. 19 — (E12) No. 4:	Is the resistance less than 1 Ω ?	Go to step 7.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and ignition coil and ignitor assembly connector • Poor contact of coupling connector
7 CHECK HARNESS BETWEEN ECM AND IGNITION COIL AND IGNITOR ASSEMBLY CONNECTOR. Measure the resistance of harness between ECM and engine ground. Connector & terminal: (B137) No. 18 — Engine ground: (B137) No. 19 — Engine ground:	Is the resistance more than 1 M Ω ?	Go to step 8.	Repair the ground short circuit of harness between ECM and ignition coil and ignitor assembly connector.
8 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Check fuel pump circuit. <Ref. to EN(H4SO U5)(diag)-68, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>

ENGINE (DIAGNOSTICS)

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

Wiring diagram for the fuel system of a 2000 Honda Civic EX. The diagram shows the battery connected to the main system fuse (MAIN SBF) and the ignition switch. The ignition switch controls the fuel pump relay (B362) and the ECM (B136). The fuel pump relay controls the fuel pump (R58) and the fuel pump condenser (R142). The ECM (B136) also controls the fuel pump condenser (R142). The diagram includes terminal blocks for the fuel pump relay, ignition switch, ECM, fuel pump, and fuel pump condenser. The battery is connected to the main system fuse (MAIN SBF) and the ignition switch. The ignition switch controls the fuel pump relay (B362) and the ECM (B136). The fuel pump relay controls the fuel pump (R58) and the fuel pump condenser (R142). The ECM (B136) also controls the fuel pump condenser (R142). The diagram includes terminal blocks for the fuel pump relay, ignition switch, ECM, fuel pump, and fuel pump condenser.

Legend:

- B362: Fuel Pump Relay
- B72: Ignition Switch
- B97: Fuel Pump
- B136: ECM
- R58: Fuel Pump
- R67: Fuel Pump Condenser
- R142: Fuel Pump Condenser

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK OPERATING SOUND OF FUEL PUMP. Check if the fuel pump operates for two seconds when turning the ignition switch to ON. NOTE: Fuel pump operation can also be executed using Subaru Select Monitor. Refer to "Compulsory Valve Operation Check Mode" for procedures. <Ref. to EN(H4SO U5)(diag)-47, Compulsory Valve Operation Check Mode.>	Does the fuel pump emit operating sound?	Check the fuel injector circuit. <Ref. to EN(H4SO U5)(diag)-71, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step 2.
2 CHECK GROUND CIRCUIT OF FUEL PUMP. 1) Turn the ignition switch to OFF. 2) Remove the fuel pump access hole lid. 3) Disconnect the connector from fuel pump. 4) Measure the resistance of harness connector between fuel pump and chassis ground. Connector & terminal (R58) No. 6 — Chassis ground:	Is the resistance less than 5 Ω ?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following item: Open circuit in harness between fuel pump connector and chassis grounding terminal
3 CHECK POWER SUPPLY TO FUEL PUMP. 1) Turn the ignition switch to ON. 2) Measure the voltage of power supply circuit between fuel pump connector and chassis ground. Connector & terminal (R58) No. 5 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Replace the fuel pump. <Ref. to FU(H4SO)-50, Fuel Pump.>	Go to step 4.
4 CHECK HARNESS BETWEEN FUEL PUMP AND FUEL PUMP RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness connector between fuel pump and fuel pump relay. Connector & terminal (R58) No. 5 — (B362) No. 2:	Is the resistance less than 1 Ω ?	Go to step 5.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between fuel pump connector and chassis grounding terminal • Poor contact of coupling connector
5 CHECK HARNESS BETWEEN FUEL PUMP AND FUEL PUMP RELAY CONNECTOR. Measure the resistance of harness between fuel pump and fuel pump relay connector. Connector & terminal (R58) No. 5 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 6.	Repair the short circuit of harness between fuel pump and fuel pump relay connector.
6 CHECK FUEL PUMP RELAY. 1) Disconnect the connectors from fuel pump relay and main relay. 2) Remove the fuel pump relay and main relay with bracket. 3) Connect the battery to fuel pump relay connector terminals No. 3 and No. 4. 4) Measure the resistance between connector terminals of fuel pump relay. Terminals No. 1 — No. 2:	Is the resistance less than 10 Ω ?	Go to step 7.	Replace the fuel pump relay. <Ref. to FU(H4SO)-50, Fuel Pump.>

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

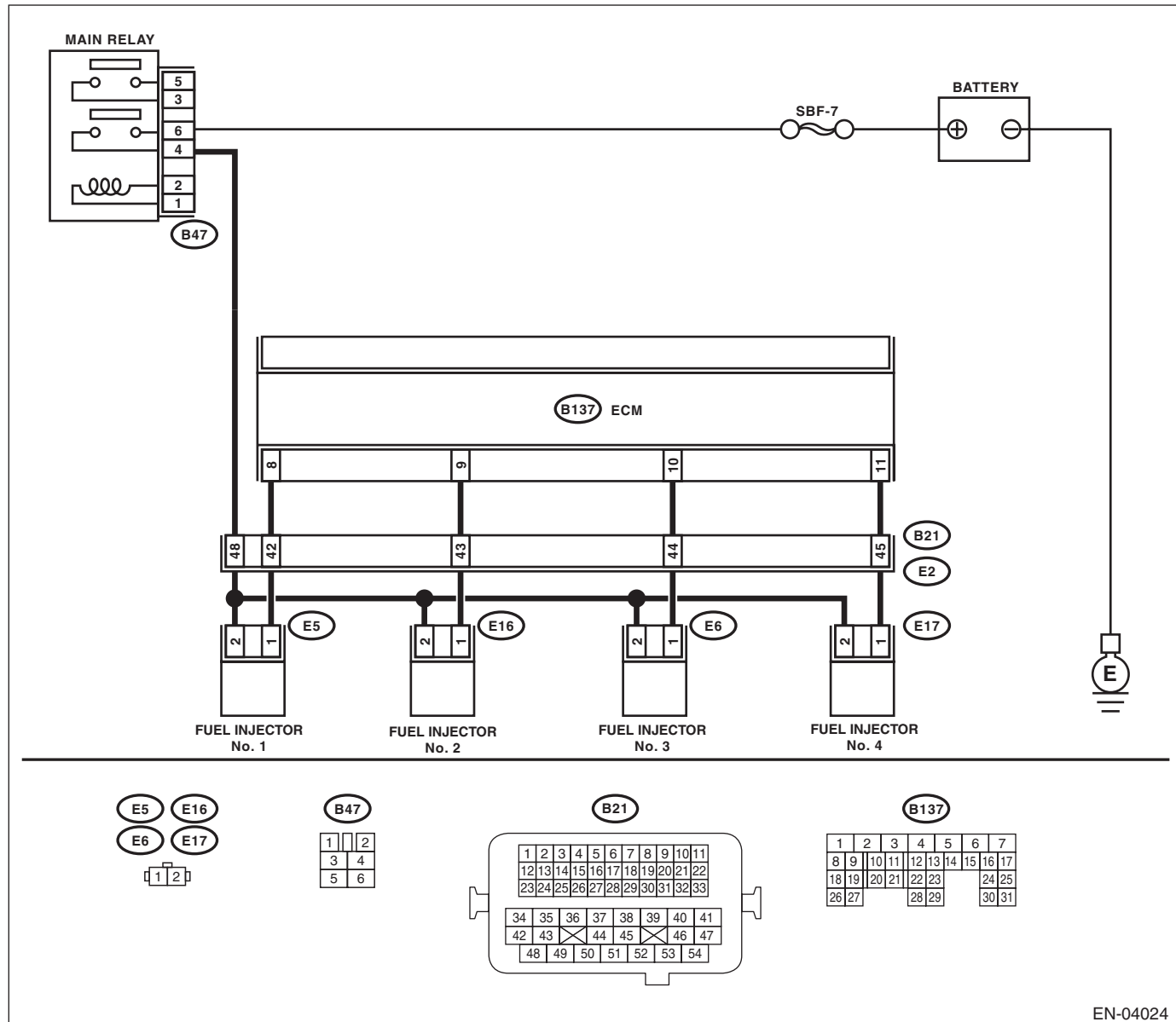
Step	Check	Yes	No
7 CHECK HARNESS BETWEEN ECM AND FUEL PUMP RELAY CONNECTOR. 1) Disconnect the connectors from ECM. 2) Measure the resistance of harness between ECM and fuel pump relay connector. Connector & terminal (B136) No. 12 — (B362) No. 3:	Is the resistance less than 1 Ω ?	Go to step 8 .	Repair the open circuit of harness between ECM and fuel pump relay connector.
8 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Check the fuel injector circuit. <Ref. to EN(H4SO U5)(diag)-71, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

F: FUEL INJECTOR CIRCUIT

CAUTION:

- Check or repair only faulty parts.
- After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK OPERATION OF EACH FUEL INJECTOR. While cranking the engine, check each fuel injector emits operating sound. Use a sound scope or attach a screwdriver to the injector for this check.	Does the fuel pump emit operating sound?	Check the fuel pressure. <Ref. to ME(H4SO)-25, INSPECTION, Fuel Pressure.>	Go to step 2.
2 CHECK POWER SUPPLY TO EACH FUEL INJECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector. 3) Turn the ignition switch to ON. 4) Measure the power supply voltage between fuel injector terminal and engine ground. Connector & terminal <i>#1 (E5) No. 2 (+) — Engine ground (-):</i> <i>#2 (E16) No. 2 (+) — Engine ground (-):</i> <i>#3 (E6) No. 2 (+) — Engine ground (-):</i> <i>#4 (E17) No. 2 (+) — Engine ground (-):</i>	Is the voltage more than 10 V?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between main relay and fuel injector connector • Poor contact of main relay connector • Poor contact of coupling connector • Poor contact of fuel injector connector
3 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. 1) Disconnect the connectors from ECM. 2) Measure the resistance of harness between ECM and fuel injector connector. Connector & terminal <i>#1 (B137) No. 8 — (E5) No. 1:</i> <i>#2 (B137) No. 9 — (E16) No. 1:</i> <i>#3 (B137) No. 10 — (E6) No. 1:</i> <i>#4 (B137) No. 11 — (E17) No. 1:</i>	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and fuel injector connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. Measure the resistance of harness between ECM and fuel injector connector. Connector & terminal <i>#1 (B137) No. 8 — Chassis ground:</i> <i>#2 (B137) No. 9 — Chassis ground:</i> <i>#3 (B137) No. 10 — Chassis ground:</i> <i>#4 (B137) No. 11 — Chassis ground:</i>	Is the resistance more than 1 M Ω ?	Go to step 5.	Repair the ground short circuit of harness between ECM and fuel injector connector.
5 CHECK EACH FUEL INJECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance between each fuel injector terminals. Terminals <i>No. 1 — No. 2:</i>	Is the resistance between 5 and 20 Ω ?	Go to step 6.	Replace the faulty fuel injector.
6 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Inspection using "General Diagnostic Table" <Ref. to EN(H4SO U5)(diag)-326, INSPECTION, General Diagnostic Table.>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

17.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Index
P0026	Intake Valve Control Solenoid Circuit Range/Performance (Bank 1)	<Ref. to EN(H4SO U5)(diag)-79, DTC P0026 INTAKE VALVE CONTROL SOLENOID CIRCUIT RANGE/PERFORMANCE (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0028	Intake Valve Control Solenoid Circuit Range/Performance (Bank 2)	<Ref. to EN(H4SO U5)(diag)-81, DTC P0028 INTAKE VALVE CONTROL SOLENOID CIRCUIT RANGE/PERFORMANCE (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0030	HO2S Heater Control Circuit (Bank 1 Sensor 1)	<Ref. to EN(H4SO U5)(diag)-83, DTC P0030 HO2S HEATER CONTROL CIRCUIT (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0031	HO2S Heater Control Circuit Low (Bank 1 Sensor 1)	<Ref. to EN(H4SO U5)(diag)-85, DTC P0031 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0032	HO2S Heater Control Circuit High (Bank 1 Sensor 1)	<Ref. to EN(H4SO U5)(diag)-87, DTC P0032 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0037	HO2S Heater Control Circuit Low (Bank 1 Sensor 2)	<Ref. to EN(H4SO U5)(diag)-89, DTC P0037 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0038	HO2S Heater Control Circuit High (Bank 1 Sensor 2)	<Ref. to EN(H4SO U5)(diag)-92, DTC P0038 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0068	MAP/MAF - Throttle Position Correlation	<Ref. to EN(H4SO U5)(diag)-94, DTC P0068 MAP/MAF - THROTTLE POSITION CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0076	Intake Valve Control Solenoid Circuit Low (Bank 1)	<Ref. to EN(H4SO U5)(diag)-96, DTC P0076 INTAKE VALVE CONTROL SOLENOID CIRCUIT LOW (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0077	Intake Valve Control Solenoid Circuit High (Bank 1)	<Ref. to EN(H4SO U5)(diag)-98, DTC P0077 INTAKE VALVE CONTROL SOLENOID CIRCUIT HIGH (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0082	Intake Valve Control Solenoid Circuit Low (Bank 2)	<Ref. to EN(H4SO U5)(diag)-100, DTC P0082 INTAKE VALVE CONTROL SOLENOID CIRCUIT LOW (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0083	Intake Valve Control Solenoid Circuit High (Bank 2)	<Ref. to EN(H4SO U5)(diag)-102, DTC P0083 INTAKE VALVE CONTROL SOLENOID CIRCUIT HIGH (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0101	Mass or Volume Air Flow Circuit Range/Performance	<Ref. to EN(H4SO U5)(diag)-104, DTC P0101 MASS OR VOLUME AIR FLOW CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0102	Mass or Volume Air Flow Circuit Low Input	<Ref. to EN(H4SO U5)(diag)-106, DTC P0102 MASS OR VOLUME AIR FLOW CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0103	Mass or Volume Air Flow Circuit High Input	<Ref. to EN(H4SO U5)(diag)-109, DTC P0103 MASS OR VOLUME AIR FLOW CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0107	Manifold Absolute Pressure/Barometric Pressure Circuit Low Input	<Ref. to EN(H4SO U5)(diag)-111, DTC P0107 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0108	Manifold Absolute Pressure/Barometric Pressure Circuit High Input	<Ref. to EN(H4SO U5)(diag)-114, DTC P0108 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0111	Intake Air Temperature Sensor 1 Circuit Range/Performance	<Ref. to EN(H4SO U5)(diag)-117, DTC P0111 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Index
P0112	Intake Air Temperature Sensor 1 Circuit Low	<Ref. to EN(H4SO U5)(diag)-119, DTC P0112 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0113	Intake Air Temperature Sensor 1 Circuit High	<Ref. to EN(H4SO U5)(diag)-121, DTC P0113 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0117	Engine Coolant Temperature Circuit Low	<Ref. to EN(H4SO U5)(diag)-124, DTC P0117 ENGINE COOLANT TEMPERATURE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0118	Engine Coolant Temperature Circuit High	<Ref. to EN(H4SO U5)(diag)-126, DTC P0118 ENGINE COOLANT TEMPERATURE CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0122	Throttle/Pedal Position Sensor/Switch "A" Circuit Low	<Ref. to EN(H4SO U5)(diag)-129, DTC P0122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0123	Throttle/Pedal Position Sensor/Switch "A" Circuit High	<Ref. to EN(H4SO U5)(diag)-131, DTC P0123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0125	Insufficient Coolant Temperature for Closed Loop Fuel Control	<Ref. to EN(H4SO U5)(diag)-133, DTC P0125 INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0126	Insufficient Engine Coolant Temperature for Stable Operation	<Ref. to EN(H4SO U5)(diag)-135, DTC P0126 INSUFFICIENT ENGINE COOLANT TEMPERATURE FOR STABLE OPERATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0128	Coolant Thermostat (Engine Coolant Temperature Below Thermostat Regulating Temperature)	<Ref. to EN(H4SO U5)(diag)-137, DTC P0128 COOLANT THERMOSTAT (ENGINE COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0131	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 1)	<Ref. to EN(H4SO U5)(diag)-138, DTC P0131 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0132	O2 Sensor Circuit High Voltage (Bank 1 Sensor 1)	<Ref. to EN(H4SO U5)(diag)-140, DTC P0132 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0133	O2 Sensor Circuit Slow Response (Bank 1 Sensor 1)	<Ref. to EN(H4SO U5)(diag)-142, DTC P0133 O2 SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0134	O2 Sensor Circuit No Activity Detected (Bank 1 Sensor 1)	<Ref. to EN(H4SO U5)(diag)-144, DTC P0134 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0137	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 2)	<Ref. to EN(H4SO U5)(diag)-146, DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0138	O2 Sensor Circuit High Voltage (Bank 1 Sensor 2)	<Ref. to EN(H4SO U5)(diag)-149, DTC P0138 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0139	O2 Sensor Circuit Slow Response (Bank 1 Sensor 2)	<Ref. to EN(H4SO U5)(diag)-152, DTC P0139 O2 SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0140	O2 Sensor Circuit No Activity Detected (Bank1 Sensor2)	<Ref. to EN(H4SO U5)(diag)-154, DTC P0140 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK1 SENSOR2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0171	System Too Lean (Bank 1)	<Ref. to EN(H4SO U5)(diag)-156, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0172	System Too Rich (Bank 1)	<Ref. to EN(H4SO U5)(diag)-157, DTC P0172 SYSTEM TOO RICH (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0181	Fuel Temperature Sensor "A" Circuit Range/Performance	<Ref. to EN(H4SO U5)(diag)-159, DTC P0181 FUEL TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Index
P0182	Fuel Temperature Sensor "A" Circuit Low Input	<Ref. to EN(H4SO U5)(diag)-161, DTC P0182 FUEL TEMPERATURE SENSOR "A" CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0183	Fuel Temperature Sensor "A" Circuit High Input	<Ref. to EN(H4SO U5)(diag)-163, DTC P0183 FUEL TEMPERATURE SENSOR "A" CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0196	Engine Oil Temperature Sensor Circuit Range/Performance	<Ref. to EN(H4SO U5)(diag)-166, DTC P0196 ENGINE OIL TEMPERATURE SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0197	Engine Oil Temperature Sensor Low	<Ref. to EN(H4SO U5)(diag)-168, DTC P0197 ENGINE OIL TEMPERATURE SENSOR LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0198	Engine Oil Temperature Sensor High	<Ref. to EN(H4SO U5)(diag)-170, DTC P0198 ENGINE OIL TEMPERATURE SENSOR HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0222	Throttle/Pedal Position Sensor/Switch "B" Circuit Low	<Ref. to EN(H4SO U5)(diag)-172, DTC P0222 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0223	Throttle/Pedal Position Sensor/Switch "B" Circuit High	<Ref. to EN(H4SO U5)(diag)-174, DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0301	Cylinder 1 Misfire Detected	<Ref. to EN(H4SO U5)(diag)-176, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0302	Cylinder 2 Misfire Detected	<Ref. to EN(H4SO U5)(diag)-176, DTC P0302 CYLINDER 2 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0303	Cylinder 3 Misfire Detected	<Ref. to EN(H4SO U5)(diag)-176, DTC P0303 CYLINDER 3 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0304	Cylinder 4 Misfire Detected	<Ref. to EN(H4SO U5)(diag)-177, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0327	Knock Sensor 1 Circuit Low (Bank 1 or Single Sensor)	<Ref. to EN(H4SO U5)(diag)-183, DTC P0327 KNOCK SENSOR 1 CIRCUIT LOW (BANK 1 OR SINGLE SENSOR), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0328	Knock Sensor 1 Circuit High (Bank 1 or Single Sensor)	<Ref. to EN(H4SO U5)(diag)-185, DTC P0328 KNOCK SENSOR 1 CIRCUIT HIGH (BANK 1 OR SINGLE SENSOR), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0335	Crankshaft Position Sensor "A" Circuit	<Ref. to EN(H4SO U5)(diag)-187, DTC P0335 CRANKSHAFT POSITION SENSOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0336	Crankshaft Position Sensor "A" Circuit Range/Performance	<Ref. to EN(H4SO U5)(diag)-189, DTC P0336 CRANKSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0340	Camshaft Position Sensor "A" Circuit (Bank 1 or Single Sensor)	<Ref. to EN(H4SO U5)(diag)-191, DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 1 OR SINGLE SENSOR), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0341	Camshaft Position Sensor "A" Circuit Range/Performance (Bank 1 or Single Sensor)	<Ref. to EN(H4SO U5)(diag)-193, DTC P0341 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 1 OR SINGLE SENSOR), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0400	Exhaust Gas Recirculation Flow	<Ref. to EN(H4SO U5)(diag)-196, DTC P0400 EXHAUST GAS RECIRCULATION FLOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0420	Catalyst System Efficiency Below Threshold (Bank 1)	<Ref. to EN(H4SO U5)(diag)-199, DTC P0420 CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0442	Evaporative Emission Control System Leak Detected (Small Leak)	<Ref. to EN(H4SO U5)(diag)-203, DTC P0442 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (SMALL LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0447	Evaporative Emission Control System Vent Control Circuit Open	<Ref. to EN(H4SO U5)(diag)-206, DTC P0447 EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL CIRCUIT OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Index
P0448	Evaporative Emission Control System Vent Control Circuit Shorted	<Ref. to EN(H4SO U5)(diag)-209, DTC P0448 EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL CIRCUIT SHORTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0451	Evaporative Emission Control System Pressure Sensor	<Ref. to EN(H4SO U5)(diag)-211, DTC P0451 EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0452	Evaporative Emission Control System Pressure Sensor Low Input	<Ref. to EN(H4SO U5)(diag)-213, DTC P0452 EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0453	Evaporative Emission Control System Pressure Sensor High Input	<Ref. to EN(H4SO U5)(diag)-216, DTC P0453 EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0456	Evaporative Emission Control System Leak Detected (Very Small Leak)	<Ref. to EN(H4SO U5)(diag)-219, DTC P0456 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (VERY SMALL LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0457	Evaporative Emission Control System Leak Detected (Fuel Cap Loose/Off)	<Ref. to EN(H4SO U5)(diag)-222, DTC P0457 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (FUEL CAP LOOSE/OFF), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0458	Evaporative Emission System Purge Control Valve Circuit Low	<Ref. to EN(H4SO U5)(diag)-225, DTC P0458 EVAPORATIVE EMISSION SYSTEM PURGE CONTROL VALVE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0459	Evaporative Emission System Purge Control Valve Circuit High	<Ref. to EN(H4SO U5)(diag)-227, DTC P0459 EVAPORATIVE EMISSION SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0461	Fuel Level Sensor "A" Circuit Range/Performance	<Ref. to EN(H4SO U5)(diag)-229, DTC P0461 FUEL LEVEL SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0462	Fuel Level Sensor "A" Circuit Low	<Ref. to EN(H4SO U5)(diag)-229, DTC P0462 FUEL LEVEL SENSOR "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0463	Fuel Level Sensor "A" Circuit High	<Ref. to EN(H4SO U5)(diag)-229, DTC P0463 FUEL LEVEL SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0464	Fuel Level Sensor Circuit Intermittent	<Ref. to EN(H4SO U5)(diag)-229, DTC P0464 FUEL LEVEL SENSOR CIRCUIT INTERMITTENT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0483	Fan Rationality Check	<Ref. to EN(H4SO U5)(diag)-230, DTC P0483 FAN RATIONALITY CHECK, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0500	Vehicle Speed Sensor "A"	<Ref. to EN(H4SO U5)(diag)-230, DTC P0500 VEHICLE SPEED SENSOR "A", Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0506	Idle Air Control System RPM Lower Than Expected	<Ref. to EN(H4SO U5)(diag)-231, DTC P0506 IDLE AIR CONTROL SYSTEM RPM LOWER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0507	Idle Air Control System RPM Higher Than Expected	<Ref. to EN(H4SO U5)(diag)-233, DTC P0507 IDLE AIR CONTROL SYSTEM RPM HIGHER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0512	Starter Request Circuit	<Ref. to EN(H4SO U5)(diag)-235, DTC P0512 STARTER REQUEST CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0519	Idle Air Control System Performance	<Ref. to EN(H4SO U5)(diag)-237, DTC P0519 IDLE AIR CONTROL SYSTEM PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0600	Serial Communication Link	<Ref. to EN(H4SO U5)(diag)-238, DTC P0600 SERIAL COMMUNICATION LINK, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0602	Control Module Programming Error	<Ref. to EN(H4SO U5)(diag)-239, DTC P0602 CONTROL MODULE PROGRAMMING ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0604	Internal Control Module Random Access Memory (RAM) Error	<Ref. to EN(H4SO U5)(diag)-249, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0605	Internal Control Module Read Only Memory (ROM) Error	<Ref. to EN(H4SO U5)(diag)-249, DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Index
P0607	Control Module Performance	<Ref. to EN(H4SO U5)(diag)-250, DTC P0607 CONTROL MODULE PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0638	Throttle Actuator Control Range/Performance (Bank 1)	<Ref. to EN(H4SO U5)(diag)-252, DTC P0638 THROTTLE ACTUATOR CONTROL RANGE/PERFORMANCE (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0691	Fan 1 Control Circuit Low	<Ref. to EN(H4SO U5)(diag)-252, DTC P0691 FAN 1 CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0692	Fan 1 Control Circuit High	<Ref. to EN(H4SO U5)(diag)-252, DTC P0692 FAN 1 CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0700	Transmission Control System (MIL Request)	<Ref. to EN(H4SO U5)(diag)-252, DTC P0700 TRANSMISSION CONTROL SYSTEM (MIL REQUEST), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0851	Park/Neutral Switch Input Circuit Low	<Ref. to EN(H4SO U5)(diag)-253, DTC P0851 PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW (AT MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).> or <Ref. to EN(H4SO U5)(diag)-255, DTC P0851 NEUTRAL SWITCH INPUT CIRCUIT LOW (MT MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0852	Park/Neutral Switch Input Circuit High	<Ref. to EN(H4SO U5)(diag)-257, DTC P0852 PARK/NEUTRAL SWITCH INPUT CIRCUIT HIGH (AT MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).> or <Ref. to EN(H4SO U5)(diag)-260, DTC P0852 NEUTRAL SWITCH INPUT CIRCUIT HIGH (MT MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1152	O2 Sensor Circuit Range/Performance (Low) (Bank1 Sensor1)	<Ref. to EN(H4SO U5)(diag)-262, DTC P1152 O2 SENSOR CIRCUIT RANGE/PERFORMANCE (LOW) (BANK1 SENSOR1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1153	O2 Sensor Circuit Range/Performance (High) (Bank1 Sensor1)	<Ref. to EN(H4SO U5)(diag)-264, DTC P1153 O2 SENSOR CIRCUIT RANGE/PERFORMANCE (HIGH) (BANK1 SENSOR1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1160	Return Spring Failure	<Ref. to EN(H4SO U5)(diag)-265, DTC P1160 RETURN SPRING FAILURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1400	Fuel Tank Pressure Control Solenoid Valve Circuit Low	<Ref. to EN(H4SO U5)(diag)-266, DTC P1400 FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1420	Fuel Tank Pressure Control Sol. Valve Circuit High	<Ref. to EN(H4SO U5)(diag)-268, DTC P1420 FUEL TANK PRESSURE CONTROL SOL. VALVE CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1443	Vent Control Solenoid Valve Function Problem	<Ref. to EN(H4SO U5)(diag)-270, DTC P1443 VENT CONTROL SOLENOID VALVE FUNCTION PROBLEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1491	Positive Crankcase Ventilation (Blow-by) Function Problem	<Ref. to EN(H4SO U5)(diag)-272, DTC P1491 POSITIVE CRANKCASE VENTILATION (BLOW-BY) FUNCTION PROBLEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1492	EGR Solenoid Valve Signal #1 Circuit Malfunction (Low Input)	<Ref. to EN(H4SO U5)(diag)-274, DTC P1492 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1493	EGR Solenoid Valve Signal #1 Circuit Malfunction (High Input)	<Ref. to EN(H4SO U5)(diag)-274, DTC P1493 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1494	EGR Solenoid Valve Signal #2 Circuit Malfunction (Low Input)	<Ref. to EN(H4SO U5)(diag)-274, DTC P1494 EGR SOLENOID VALVE SIGNAL #2 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1495	EGR Solenoid Valve Signal #2 Circuit Malfunction (High Input)	<Ref. to EN(H4SO U5)(diag)-274, DTC P1495 EGR SOLENOID VALVE SIGNAL #2 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1496	EGR Solenoid Valve Signal #3 Circuit Malfunction (Low Input)	<Ref. to EN(H4SO U5)(diag)-274, DTC P1496 EGR SOLENOID VALVE SIGNAL #3 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Index
P1497	EGR Solenoid Valve Signal #3 Circuit Malfunction (High Input)	<Ref. to EN(H4SO U5)(diag)-274, DTC P1497 EGR SOLENOID VALVE SIGNAL #3 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1498	EGR Solenoid Valve Signal #4 Circuit Malfunction (Low Input)	<Ref. to EN(H4SO U5)(diag)-275, DTC P1498 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1499	EGR Solenoid Valve Signal #4 Circuit Malfunction (High Input)	<Ref. to EN(H4SO U5)(diag)-278, DTC P1499 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1518	Starter Switch Circuit Low Input	<Ref. to EN(H4SO U5)(diag)-281, DTC P1518 STARTER SWITCH CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1560	Back-up Voltage Circuit Malfunction	<Ref. to EN(H4SO U5)(diag)-283, DTC P1560 BACK-UP VOLTAGE CIRCUIT MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2096	Post Catalyst Fuel Trim System Too Lean Bank 1	<Ref. to EN(H4SO U5)(diag)-285, DTC P2096 POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2097	Post Catalyst Fuel Trim System Too Rich Bank 1	<Ref. to EN(H4SO U5)(diag)-291, DTC P2097 POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2101	Throttle Actuator Control Motor Circuit Range/Performance	<Ref. to EN(H4SO U5)(diag)-296, DTC P2101 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2102	Throttle Actuator Control Motor Circuit Low	<Ref. to EN(H4SO U5)(diag)-302, DTC P2102 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2103	Throttle Actuator Control Motor Circuit High	<Ref. to EN(H4SO U5)(diag)-304, DTC P2103 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2109	Throttle/Pedal Position Sensor "A" Minimum Stop Performance	<Ref. to EN(H4SO U5)(diag)-305, DTC P2109 THROTTLE/PEDAL POSITION SENSOR "A" MINIMUM STOP PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2122	Throttle/Pedal Position Sensor/Switch "D" Circuit Low Input	<Ref. to EN(H4SO U5)(diag)-306, DTC P2122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2123	Throttle/Pedal Position Sensor/Switch "D" Circuit High Input	<Ref. to EN(H4SO U5)(diag)-309, DTC P2123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2127	Throttle/Pedal Position Sensor/Switch "E" Circuit Low Input	<Ref. to EN(H4SO U5)(diag)-311, DTC P2127 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2128	Throttle/Pedal Position Sensor/Switch "E" Circuit High Input	<Ref. to EN(H4SO U5)(diag)-314, DTC P2128 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2135	Throttle/Pedal Position Sensor/Switch "A"/"B" Voltage Correlation	<Ref. to EN(H4SO U5)(diag)-316, DTC P2135 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A"/"B" VOLTAGE CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2138	Throttle/Pedal Position Sensor/Switch "D"/"E" Voltage Correlation	<Ref. to EN(H4SO U5)(diag)-320, DTC P2138 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D"/"E" VOLTAGE CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2227	Barometric Pressure Circuit Range/Performance	<Ref. to EN(H4SO U5)(diag)-324, DTC P2227 BAROMETRIC PRESSURE CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2228	Barometric Pressure Circuit Low	<Ref. to EN(H4SO U5)(diag)-324, DTC P2228 BAROMETRIC PRESSURE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2229	Barometric Pressure Circuit High	<Ref. to EN(H4SO U5)(diag)-325, DTC P2229 BAROMETRIC PRESSURE CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

18. Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC P0026 INTAKE VALVE CONTROL SOLENOID CIRCUIT RANGE/PERFORMANCE (BANK 1)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-9, DTC P0026 INTAKE VALVE CONTROL SOLENOID CIRCUIT RANGE/PERFORMANCE (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

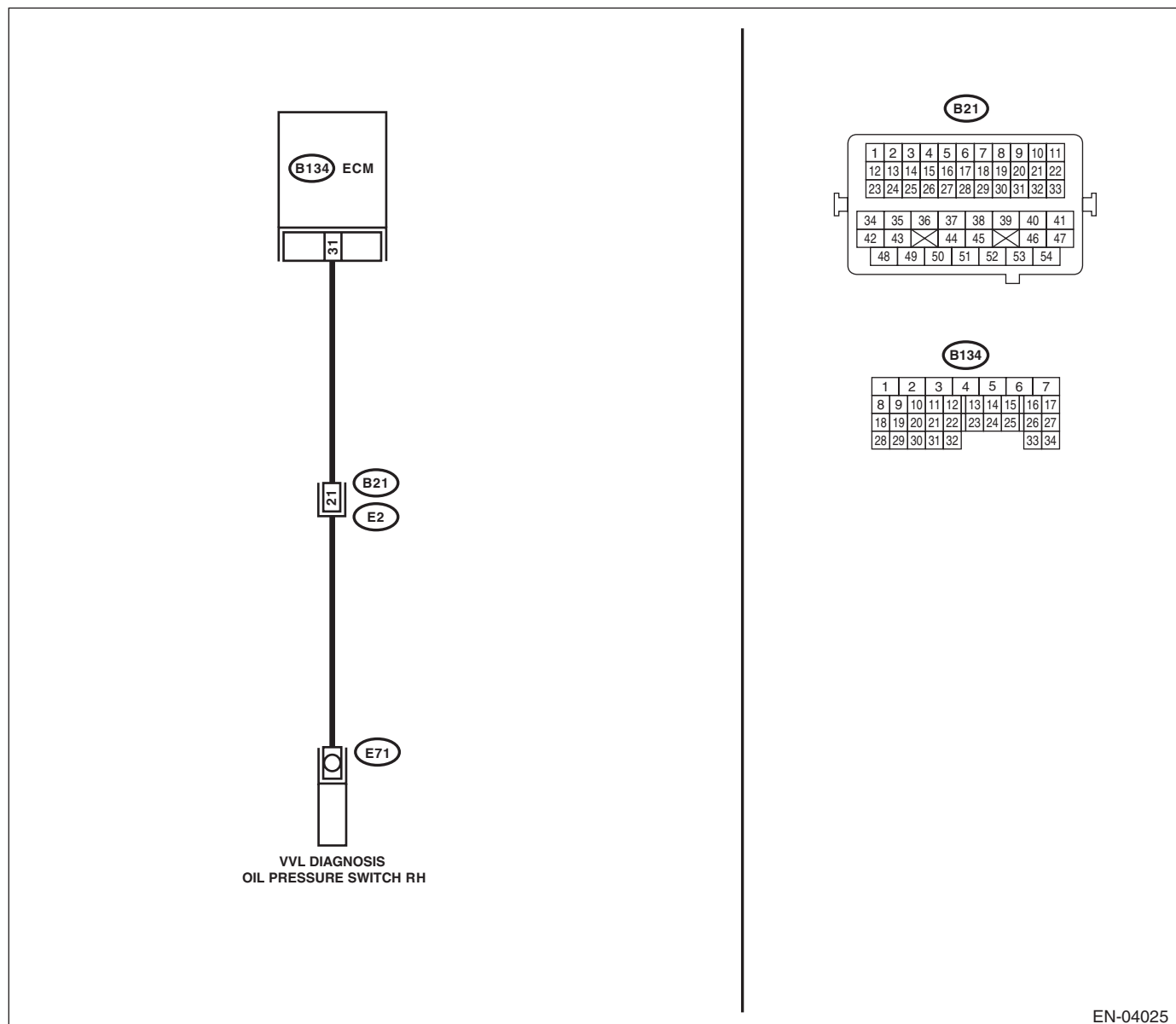
TROUBLE SYMPTOM:

Erroneous idling

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04025

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK HARNESS BETWEEN ECM AND VARIABLE VALVE LIFT DIAGNOSIS OIL PRESSURE SWITCH CONNECTOR. 1) Warm-up the engine. 2) Turn the ignition switch to OFF. 3) Disconnect the connectors from ECM and variable valve lift diagnosis oil pressure switch connector. 4) Measure the resistance of harness between variable valve lift diagnosis oil pressure switch connector and engine ground. Connector & terminal (E71) No. 1 — Engine ground:	Is the resistance more than 1 MΩ?	Go to step 3.	Repair the ground short circuit of harness between ECM and variable valve lift diagnosis oil pressure switch connector.
3 CHECK HARNESS BETWEEN ECM AND VARIABLE VALVE LIFT DIAGNOSIS OIL PRESSURE SWITCH CONNECTOR. Measure the resistance of harness between ECM and variable valve lift diagnosis oil pressure switch connector. Connector & terminal (B134) No. 31 — (E71) No. 1:	Is the resistance less than 1 Ω?	Replace the variable valve lift diagnosis oil pressure switch. <Ref. to FU(H4SO)-30, Variable Valve Lift Diagnosis Oil Pressure Switch.> Go to step 4.	Repair the open circuit of harness between ECM and variable valve lift diagnosis oil pressure switch connector.
4 CHECK DTC. 1) Clear the memory. <Ref. to EN(H4SO U5)(diag)-46, Clear Memory Mode.> 2) Check the DTC after idling the engine.	Is DTC displayed?	Replace the oil switching solenoid valve. <Ref. to ME(H4SO)-83, Oil Switching Solenoid Valve.> Go to step 5.	END
5 CHECK DTC. 1) Clear the memory. <Ref. to EN(H4SO U5)(diag)-46, Clear Memory Mode.> 2) Check the DTC after idling the engine.	Is DTC displayed?	Check for oil routing. Contact your SOA Service Center.	END

B: DTC P0028 INTAKE VALVE CONTROL SOLENOID CIRCUIT RANGE/PERFORMANCE (BANK 2)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-11, DTC P0028 INTAKE VALVE CONTROL SOLENOID CIRCUIT RANGE/PERFORMANCE (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

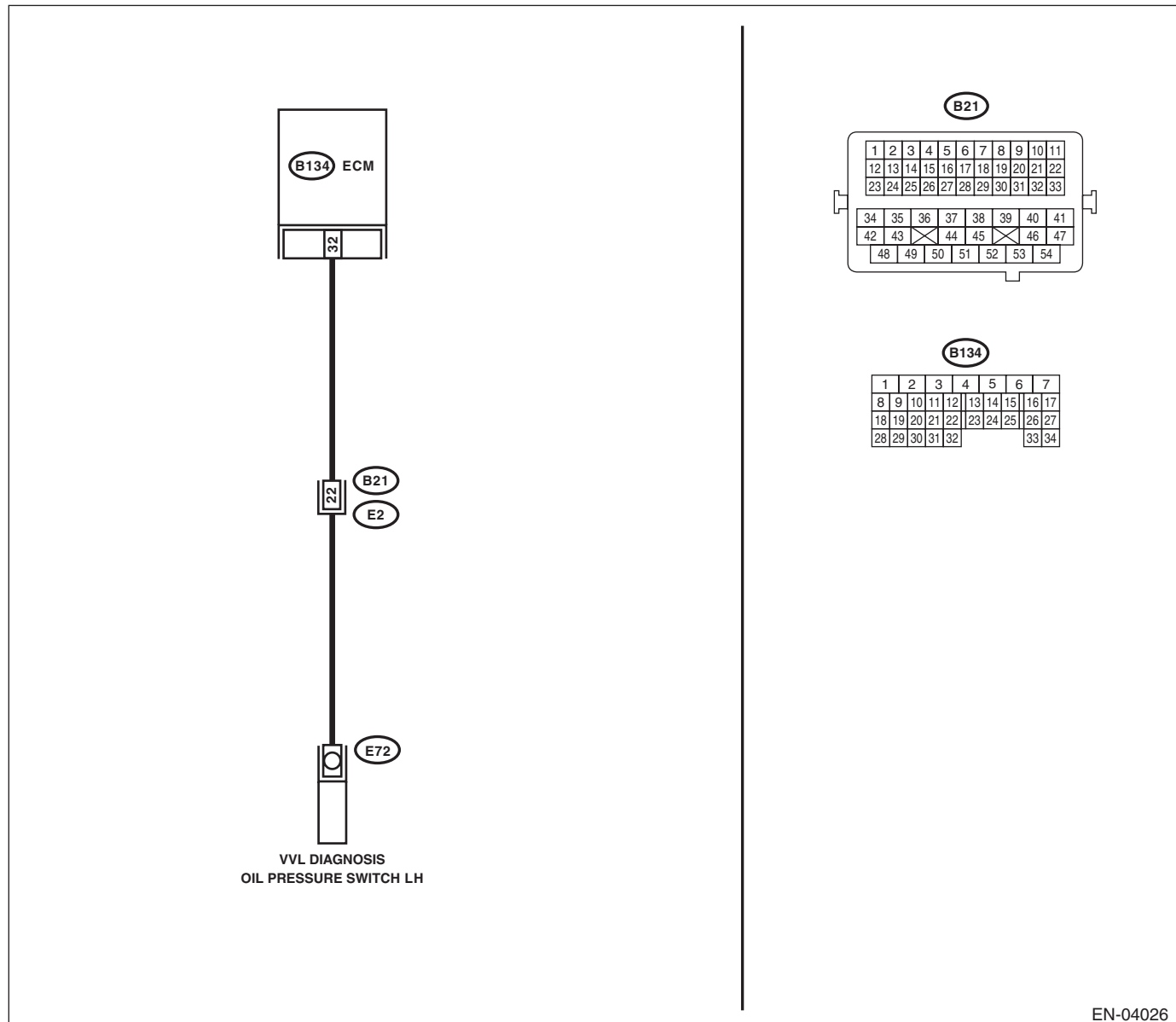
TROUBLE SYMPTOM:

Erroneous idling

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04026

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK HARNESS BETWEEN ECM AND VARIABLE VALVE LIFT DIAGNOSIS OIL PRESSURE SWITCH CONNECTOR. 1) Warm-up the engine. 2) Turn the ignition switch to OFF. 3) Disconnect the connectors from ECM and variable valve lift diagnosis oil pressure switch connector. 4) Measure the resistance of harness between variable valve lift diagnosis oil pressure switch connector and engine ground. Connector & terminal (E72) No. 1 — Engine ground:	Is the resistance more than 1 MΩ?	Go to step 3.	Repair the ground short circuit of harness between ECM and variable valve lift diagnosis oil pressure switch connector.
3 CHECK HARNESS BETWEEN ECM AND VARIABLE VALVE LIFT DIAGNOSIS OIL PRESSURE SWITCH CONNECTOR. Measure the resistance of harness between ECM and variable valve lift diagnosis oil pressure switch connector. Connector & terminal (B134) No. 32 — (E72) No. 1:	Is the resistance less than 1 Ω?	Replace the variable valve lift diagnosis oil pressure switch. <Ref. to FU(H4SO)-30, Variable Valve Lift Diagnosis Oil Pressure Switch.> Go to step 4.	Repair the open circuit of harness between ECM and variable valve lift diagnosis oil pressure switch connector.
4 CHECK DTC. 1) Clear the memory. <Ref. to EN(H4SO U5)(diag)-46, Clear Memory Mode.> 2) Check the DTC after idling the engine.	Is DTC displayed?	Replace the oil switching solenoid valve. <Ref. to ME(H4SO)-83, Oil Switching Solenoid Valve.> Go to step 5.	END
5 CHECK DTC. 1) Clear the memory. <Ref. to EN(H4SO U5)(diag)-46, Clear Memory Mode.> 2) Check the DTC after idling the engine.	Is DTC displayed?	Check for oil routing. Contact your SOA Service Center.	END

C: DTC P0030 HO2S HEATER CONTROL CIRCUIT (BANK 1 SENSOR 1)

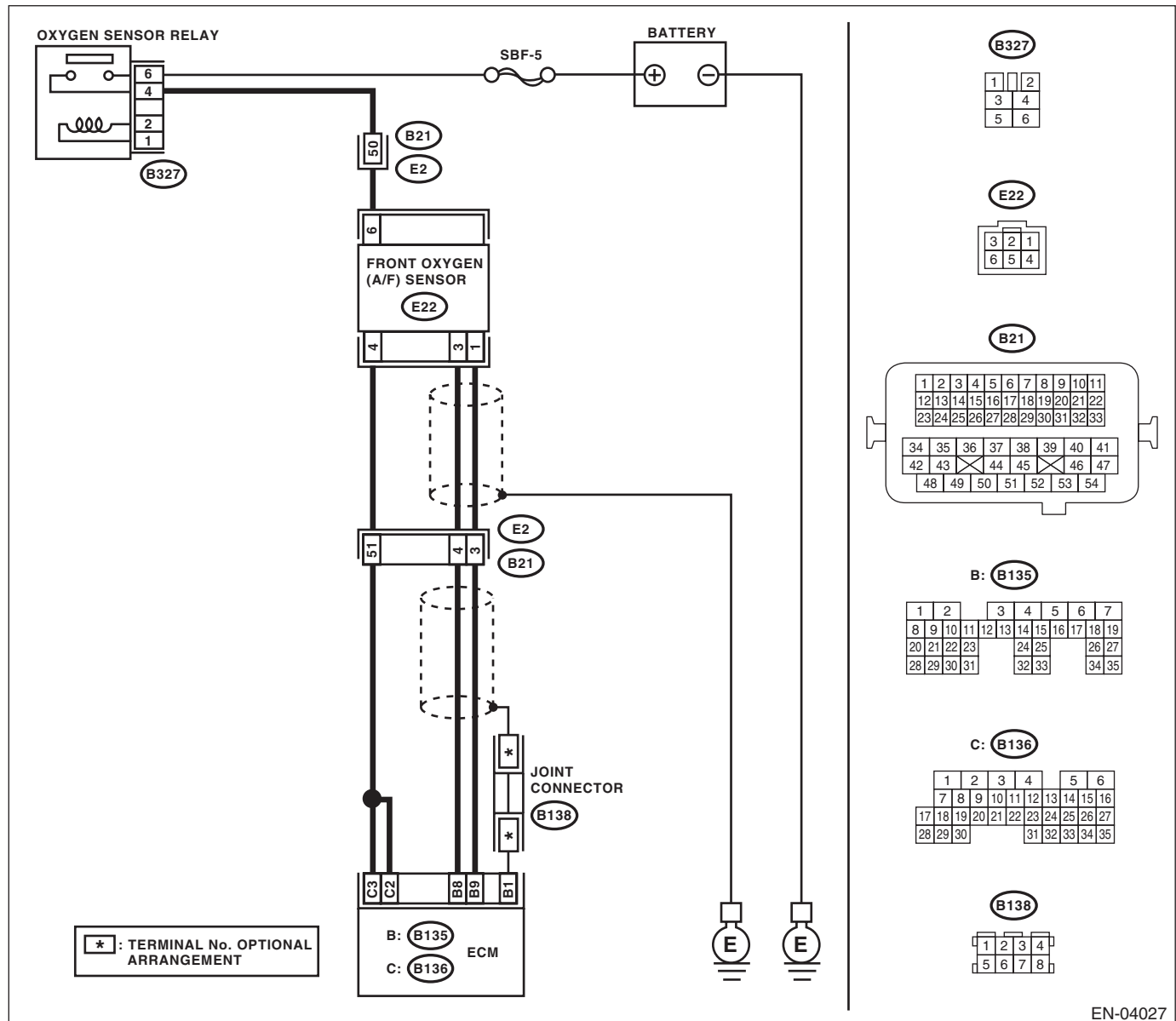
DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-11, DTC P0030 HO2S HEATER CONTROL CIRCUIT (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04027

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. 1) Start and warm-up the engine. 2) Turn the ignition switch to OFF. 3) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 4) Measure the resistance of harness between ECM and front oxygen (A/F) sensor connector. Connector & terminal (B136) No. 2 — (E22) No. 4: (B136) No. 3 — (E22) No. 4:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the open circuit of harness between ECM and front oxygen (A/F) sensor connector.
2 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. Measure the resistance of harness between ECM and front oxygen (A/F) sensor connector. Connector & terminal (B135) No. 9 — (E22) No. 1: (B135) No. 8 — (E22) No. 3:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit of harness between ECM and front oxygen (A/F) sensor connector.
3 CHECK HARNESS BETWEEN OXYGEN SENSOR RELAY AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. Measure the resistance of harness between oxygen sensor relay and front oxygen (A/F) sensor connector. Connector & terminal (B327) No. 4 — (E22) No. 6:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness between oxygen sensor relay and front oxygen (A/F) sensor connector.
4 CHECK FRONT OXYGEN (A/F) SENSOR. Measure the resistance between front oxygen (A/F) sensor connector terminals. Terminals No. 4 — No. 6:	Is the resistance less than 5 Ω ?	Go to step 5.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4SO)-32, Front Oxygen (A/F) Sensor.>
5 CHECK POOR CONTACT. Check poor contact of ECM and front oxygen (A/F) sensor connector.	Is there poor contact in ECM or front oxygen (A/F) sensor connector?	Repair the poor contact of ECM or front oxygen (A/F) sensor connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4SO)-32, Front Oxygen (A/F) Sensor.>

D: DTC P0031 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 1)

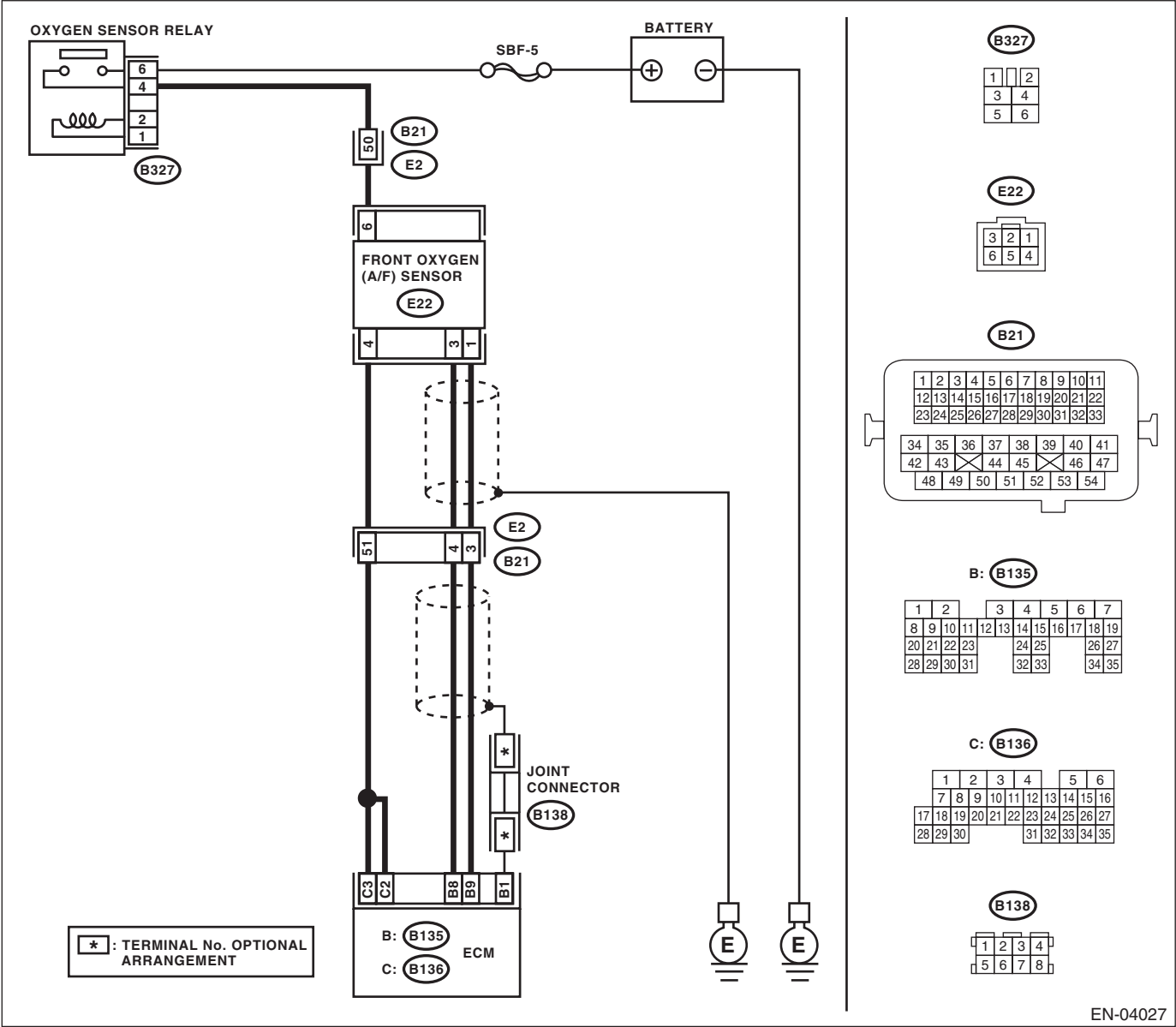
DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-13, DTC P0031 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



Step	Check	Yes	No
1	CHECK ANY OTHER DTC ON DISPLAY. Are other DTCs displayed on the Subaru Select Monitor and general scan tool?	Go to step 2.	Go to step 3.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK POWER SUPPLY TO FRONT OXYGEN (A/F) SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from front oxygen (A/F) sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between front oxygen (A/F) sensor connector and engine ground. Connector & terminal (E22) No. 6 (+) — Engine ground (-):	Is the voltage more than 10 V?	Go to step 3.	Repair the power supply line or replace the main relay. NOTE: In this case, repair the following item: • Open circuit in harness between oxygen sensor relay and front oxygen (A/F) sensor connector • Poor contact in oxygen sensor relay connector • Poor contact in coupling connector
3 CHECK CURRENT DATA. 1) Start the engine. 2) Read the data of front oxygen (A/F) sensor heater current using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the current more than 0.2 A?	Repair the poor contact of connector. NOTE: In this case, repair the following item: • Poor contact in front oxygen (A/F) sensor connector • Poor contact in ECM connector	Go to step 4.
4 CHECK INPUT SIGNAL OF ECM. 1) Start and idle the engine. 2) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 3 (+) — Chassis ground (-): (B136) No. 2 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 6.	Go to step 5.
5 CHECK OUTPUT SIGNAL OF ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 3 (+) — Chassis ground (-): (B136) No. 2 (+) — Chassis ground (-):	Does the voltage change by shaking the ECM harness and connector?	Repair the poor contact of ECM connector.	Go to step 6.
6 CHECK FRONT OXYGEN (A/F) SENSOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance between front oxygen (A/F) sensor connector terminals. Terminals No. 4 — No. 6:	Is the resistance less than 10 Ω ?	Repair the harness and connector. NOTE: In this case, repair the following item: • Open or ground short circuit of harness between front oxygen (A/F) sensor and ECM connector • Poor contact in front oxygen (A/F) sensor connector • Poor contact in ECM connector	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4SO)-32, Front Oxygen (A/F) Sensor.>

E: DTC P0032 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 1)

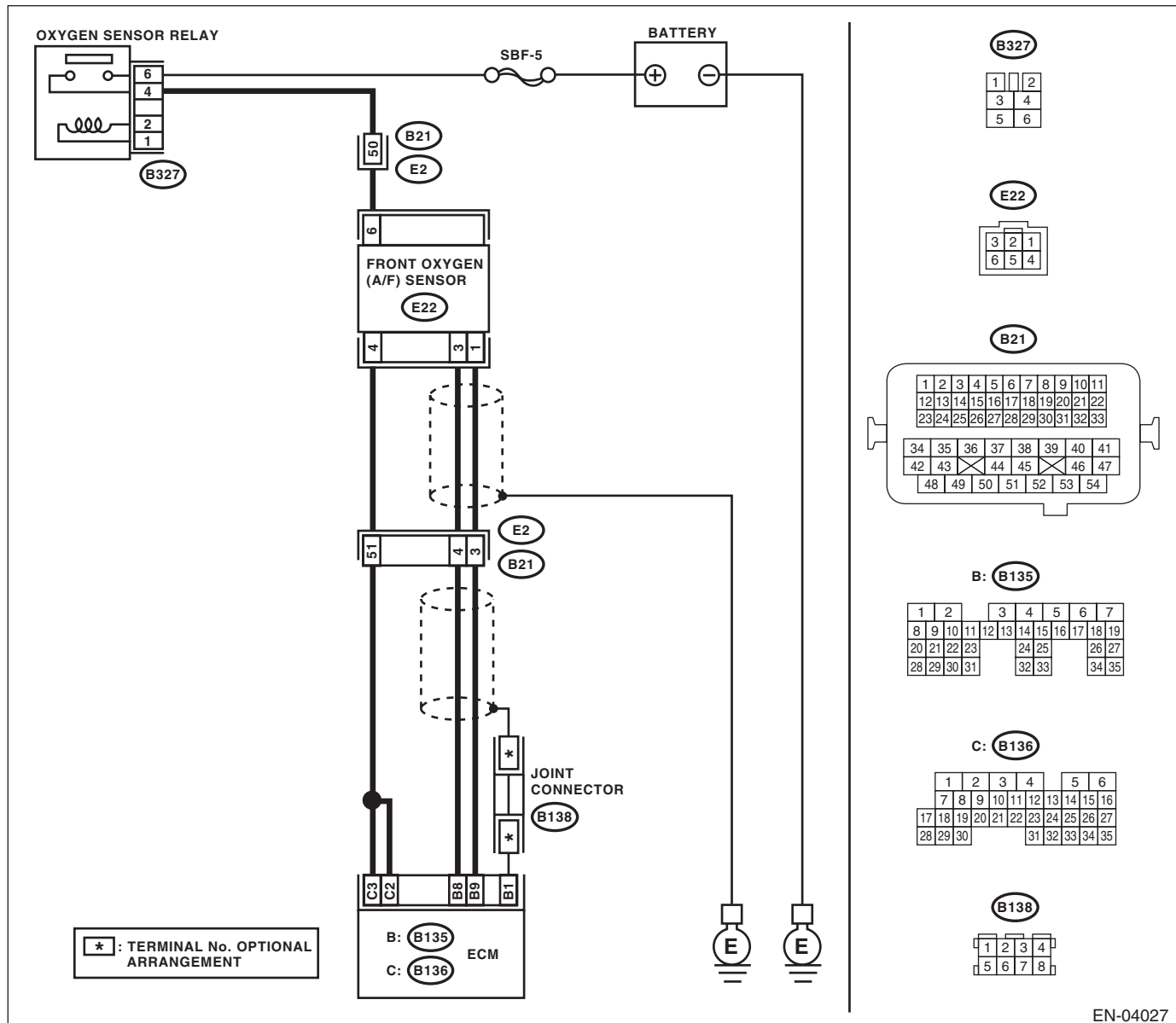
DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-15, DTC P0032 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04027

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK OUTPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 2 (+) — Chassis ground (-): (B136) No. 3 (+) — Chassis ground (-):	Is the voltage more than 8 V?	Go to step 2.	Go to step 3.
2 CHECK FRONT OXYGEN (A/F) SENSOR HEATER CURRENT. 1) Turn the ignition switch to OFF. 2) Repair the battery short circuit of harness between ECM and front oxygen (A/F) sensor connector. 3) Turn the ignition switch to ON. 4) Read the data of front oxygen (A/F) sensor heater current using Subaru Select Monitor or general scan tool. NOTE: - Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> - General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the current more than 2.3 A?	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	END
3 CHECK OUTPUT SIGNAL OF ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 2 (+) — Chassis ground (-): (B136) No. 3 (+) — Chassis ground (-):	Does the voltage change by shaking the ECM harness and connector?	Repair the battery short circuit of harness between ECM and front oxygen (A/F) sensor connector.	END

F: DTC P0037 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 2)

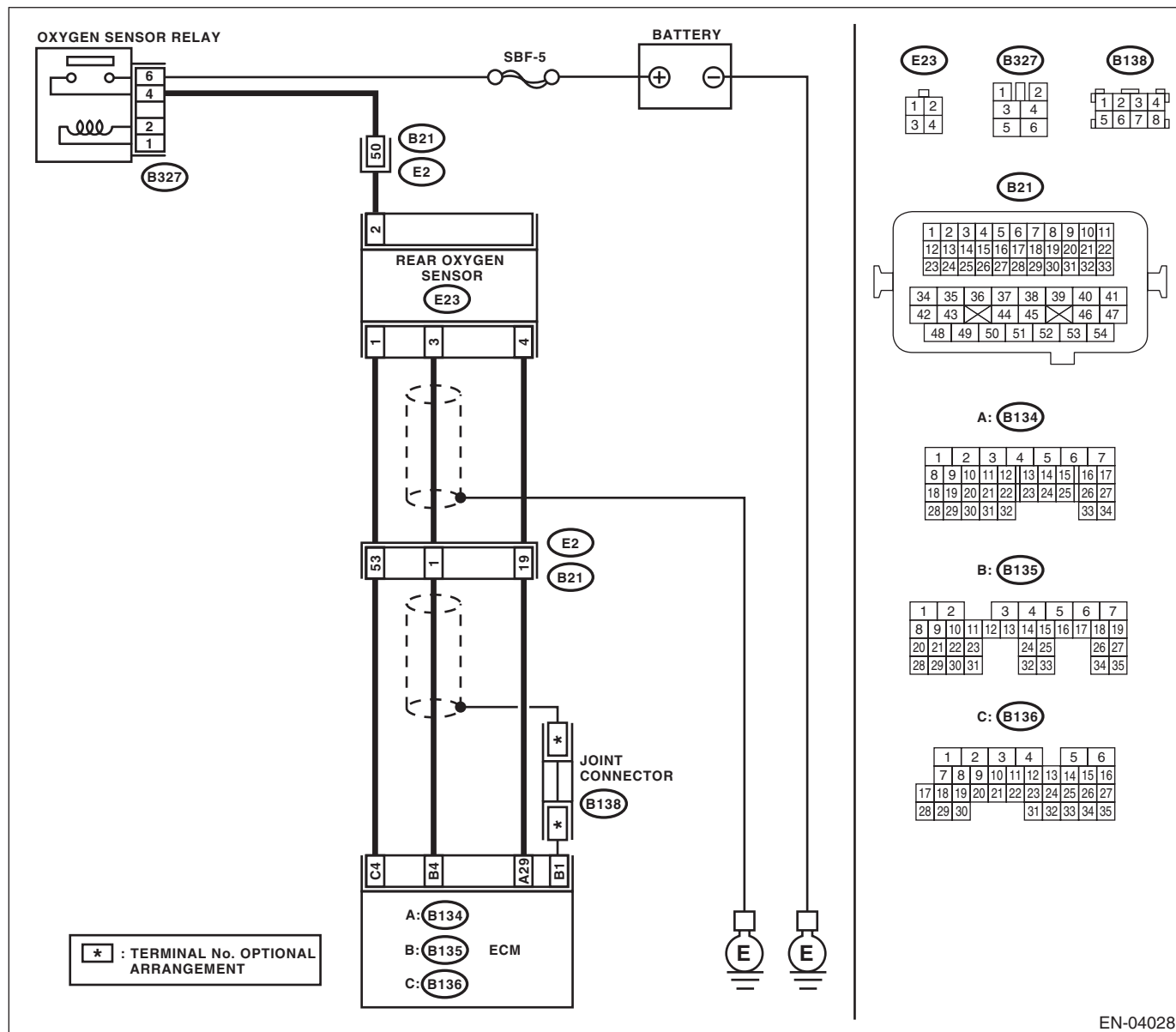
DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-17, DTC P0037 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04028

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the data of rear oxygen (A/F) sensor heater current using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the current more than 0.2 A?	Repair the connector. NOTE: In this case, repair the following item: • Poor contact of the rear oxygen sensor connector • Poor contact in rear oxygen sensor connecting harness connector • Poor contact in ECM connector	Go to step 2.
2 CHECK OUTPUT SIGNAL OF ECM. 1) Start and idle the engine. 2) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 4 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 5.	Go to step 3.
3 CHECK OUTPUT SIGNAL OF ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 4 (+) — Chassis ground (-):	Does the voltage change by shaking the ECM harness and connector?	Repair the poor contact of ECM connector.	Go to step 4.
4 CHECK OUTPUT SIGNAL OF ECM. 1) Disconnect the connector from the rear oxygen sensor. 2) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 4 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Repair the battery short circuit of harness between ECM and rear oxygen sensor connector. After repair, replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
5 CHECK POWER SUPPLY TO REAR OXYGEN SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the rear oxygen sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between rear oxygen sensor connector and engine ground or chassis ground. Connector & terminal (E23) No. 2 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 6.	Repair the power supply line or replace the main relay. NOTE: In this case, repair the following item: • Open circuit in harness between oxygen sensor relay and rear oxygen sensor connector • Poor contact in oxygen sensor relay connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK REAR OXYGEN SENSOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance between rear oxygen (A/F) sensor connector terminals. Terminals No. 1 — No. 2:	Is the resistance less than 30 Ω ?	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between rear oxygen sensor and ECM connector • Poor contact of the rear oxygen sensor connector • Poor contact in ECM connector • Poor contact of coupling connector	Replace the rear oxygen sensor. <Ref. to FU(H4SO)-34, Rear Oxygen Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

G: DTC P0038 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 2)

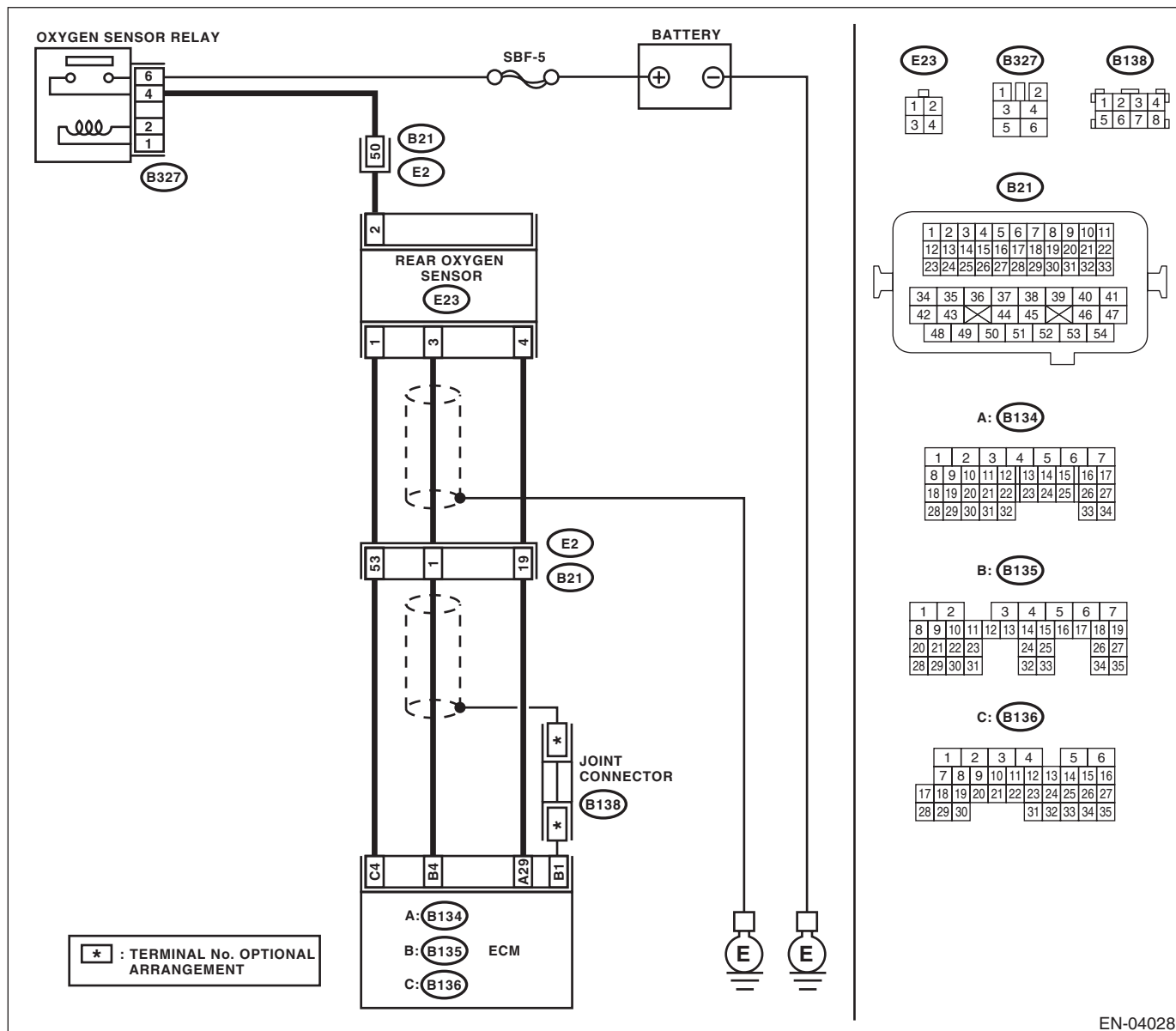
DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-19, DTC P0038 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04028

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK INPUT SIGNAL OF ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 4 (+) — Chassis ground (-):	Is the voltage more than 8 V?	Go to step 2.	Go to step 3.
2 CHECK CURRENT DATA. 1) Turn the ignition switch to OFF. 2) Repair the battery short circuit of harness between ECM and rear oxygen sensor connector. 3) Turn the ignition switch to ON. 4) Read the data of rear oxygen (A/F) sensor heater current using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the current more than 7 A?	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	END
3 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	END

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

H: DTC P0068 MAP/MAF - THROTTLE POSITION CORRELATION

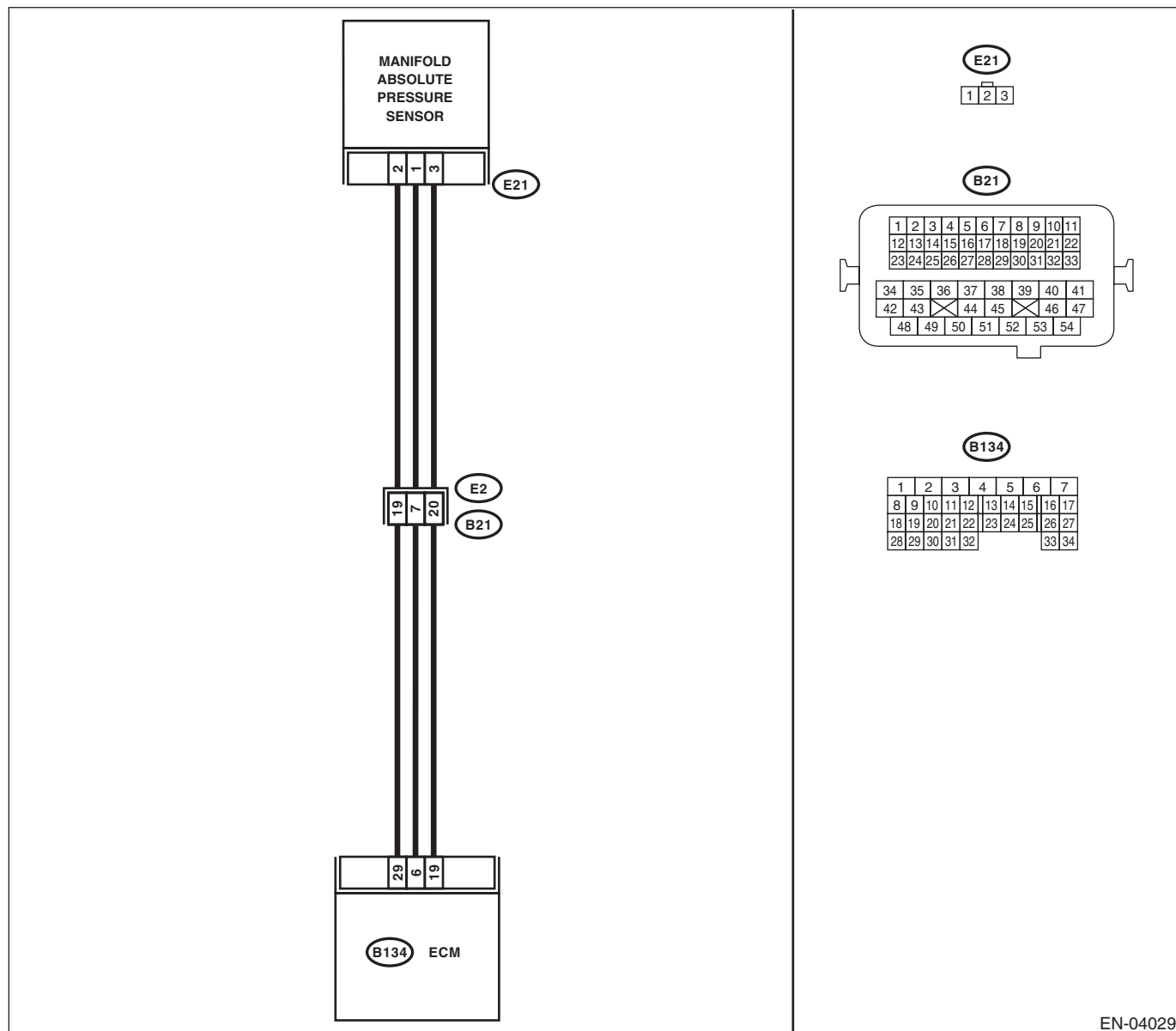
DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-21, DTC P0068 MAP/MAF - THROTTLE POSITION CORRELATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04029

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK AIR INTAKE SYSTEM.	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step 3.
3 CHECK MANIFOLD ABSOLUTE PRESSURE SENSOR. 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F). 2) Place the select lever or shift lever in "P" or "N" range. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the data of intake manifold pressure sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the "General Scan Tool Instruction Manual".	Is the measured value 73.3 — 106.6 kPa (550 — 800 mmHg, 21.65 — 31.50 inHg) when the ignition is turned ON, and 20.0 — 46.7 kPa (150 — 350 mmHg, 5.91 — 13.78 inHg) during idling?	Go to step 4.	Replace the manifold absolute pressure sensor. <Ref. to FU(H4SO)-24, Manifold Absolute Pressure Sensor.>
4 CHECK THROTTLE OPENING ANGLE. Read the data of throttle position signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the "General Scan Tool Instruction Manual".	Is the measured value less than 5% when throttle is fully closed?	Go to step 5.	Adjust or replace the throttle position sensor. <Ref. to FU(H4SO)-23, Throttle Position Sensor.>
5 CHECK THROTTLE OPENING ANGLE.	Is the measured value more than 85% when throttle is fully open?	Replace the manifold absolute pressure sensor. <Ref. to FU(H4SO)-24, Manifold Absolute Pressure Sensor.>	Replace the throttle position sensor. <Ref. to FU(H4SO)-23, Throttle Position Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

I: DTC P0076 INTAKE VALVE CONTROL SOLENOID CIRCUIT LOW (BANK 1)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-23, DTC P0076 INTAKE VALVE CONTROL SOLENOID CIRCUIT LOW (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

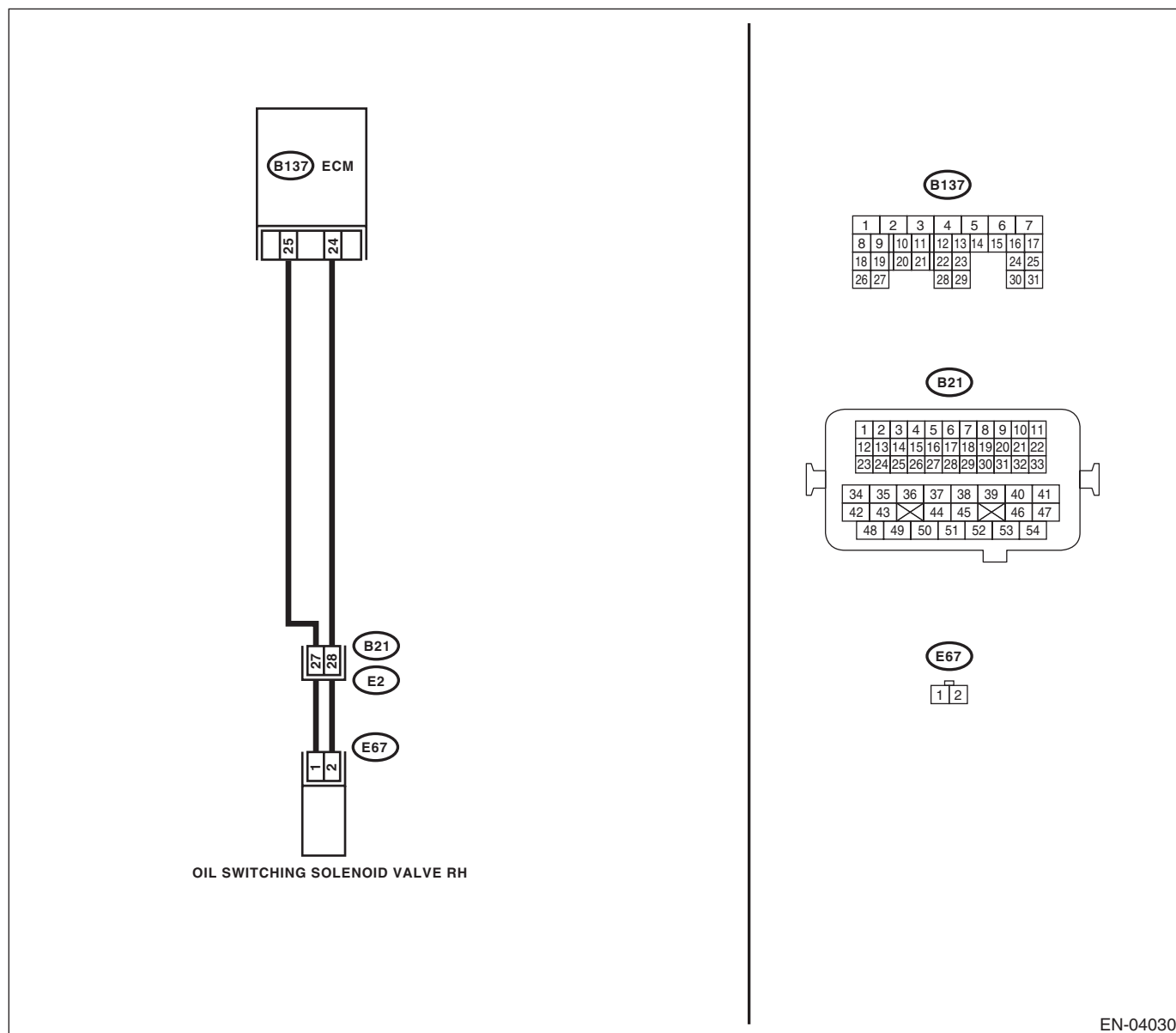
TROUBLE SYMPTOM:

Erroneous idling

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND OIL SWITCHING SOLENOID VALVE. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and oil switching solenoid valve. 3) Measure the resistance between ECM and oil switching solenoid valve. Connector & terminal (B137) No. 25 — (E67) No. 1: (B137) No. 24 — (E67) No. 2:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the open circuit of harness between ECM and oil switching solenoid valve connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and oil switching solenoid valve connector • Poor contact of coupling connector
2 CHECK OIL SWITCHING SOLENOID VALVE. 1) Remove the oil switching solenoid valve connector. 2) Measure the resistance between oil switching solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance between 6 and 12 Ω ?	Repair the poor contact of ECM and oil switching solenoid valve.	Replace the oil switching solenoid valve. <Ref. to ME(H4SO)-83, Oil Switching Solenoid Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

J: DTC P0077 INTAKE VALVE CONTROL SOLENOID CIRCUIT HIGH (BANK 1)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-24, DTC P0077 INTAKE VALVE CONTROL SOLENOID CIRCUIT HIGH (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

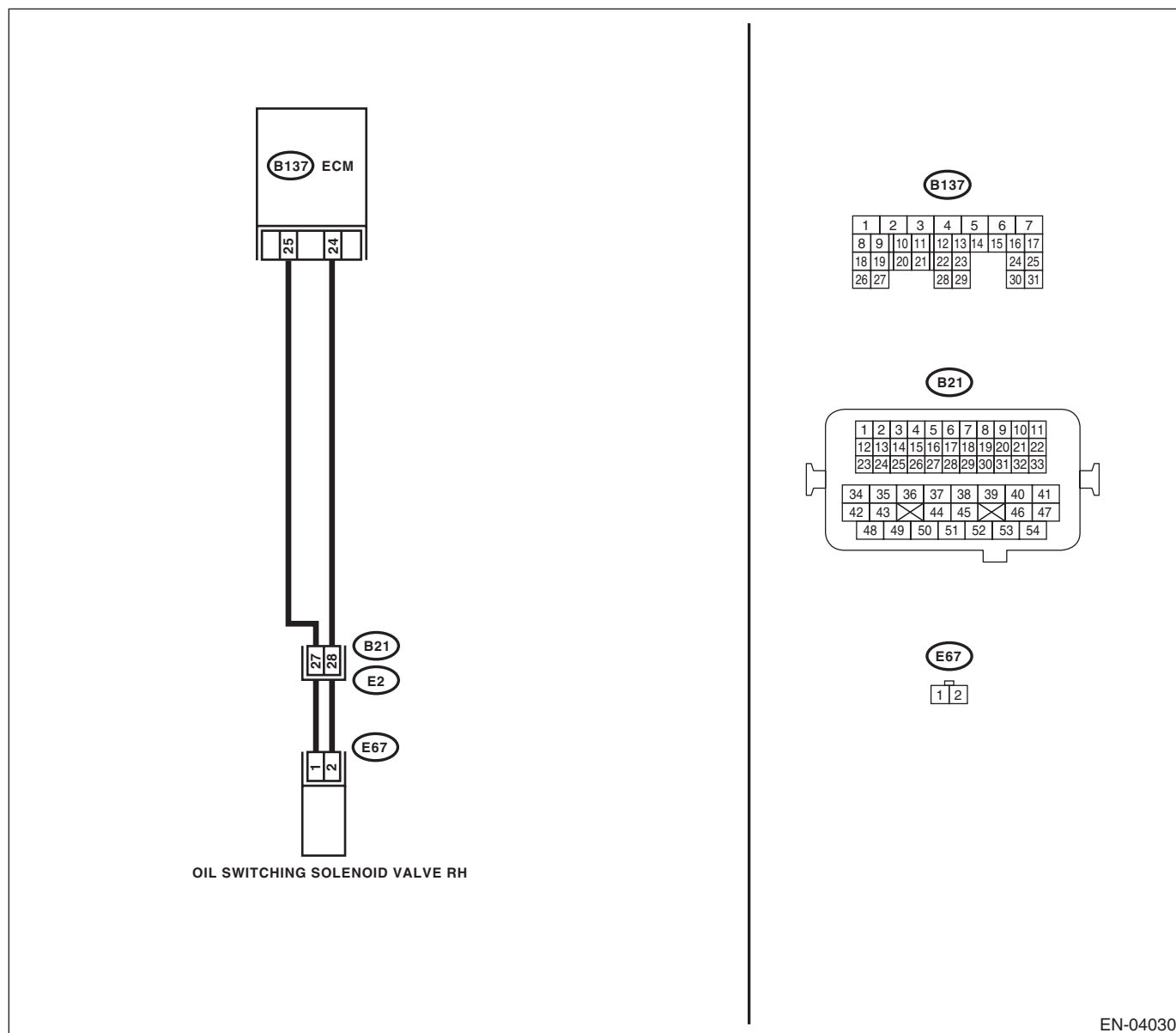
TROUBLE SYMPTOM:

Erroneous idling

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04030

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND OIL SWITCHING SOLENOID VALVE. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and oil switching solenoid valve. 3) Measure the resistance between oil switching solenoid valve and engine ground. Connector & terminal (E67) No. 1 — Engine ground: (E67) No. 2 — Engine ground:	Is the resistance more than 1 MΩ?	Go to step 2.	Repair the short circuit between ECM and oil switching solenoid valve connector.
2 CHECK OIL SWITCHING SOLENOID VALVE. 1) Remove the oil switching solenoid valve connector. 2) Measure the resistance between oil switching solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance between 6 and 12 Ω?	Repair the poor contact of ECM and oil switching solenoid valve.	Replace the oil switching solenoid valve. <Ref. to ME(H4SO)-83, Oil Switching Solenoid Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

K: DTC P0082 INTAKE VALVE CONTROL SOLENOID CIRCUIT LOW (BANK 2)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-25, DTC P0082 INTAKE VALVE CONTROL SOLENOID CIRCUIT LOW (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

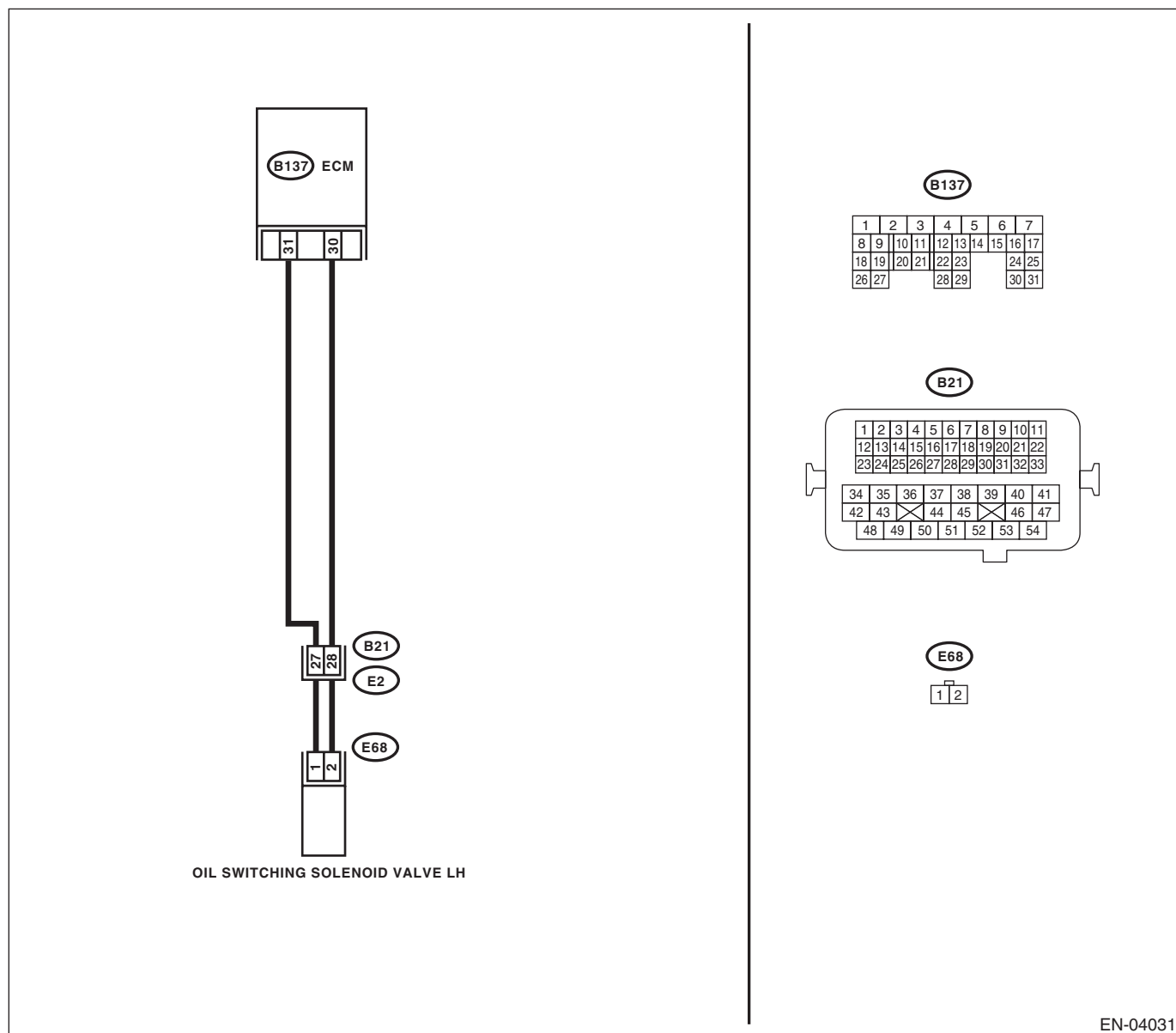
TROUBLE SYMPTOM:

Erroneous idling

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04031

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND OIL SWITCHING SOLENOID VALVE. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and oil switching solenoid valve. 3) Measure the resistance between ECM and oil switching solenoid valve. Connector & terminal (B137) No. 31 — (E68) No. 1: (B137) No. 30 — (E68) No. 2:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the open circuit of harness between ECM and oil switching solenoid valve connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and oil switching solenoid valve connector • Poor contact of coupling connector
2 CHECK OIL SWITCHING SOLENOID VALVE. 1) Remove the oil switching solenoid valve connector. 2) Measure the resistance between oil switching solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance between 6 and 12 Ω ?	Repair the poor contact of ECM and oil switching solenoid valve.	Replace the oil switching solenoid valve. <Ref. to ME(H4SO)-83, Oil Switching Solenoid Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

L: DTC P0083 INTAKE VALVE CONTROL SOLENOID CIRCUIT HIGH (BANK 2)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-25, DTC P0083 INTAKE VALVE CONTROL SOLENOID CIRCUIT HIGH (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

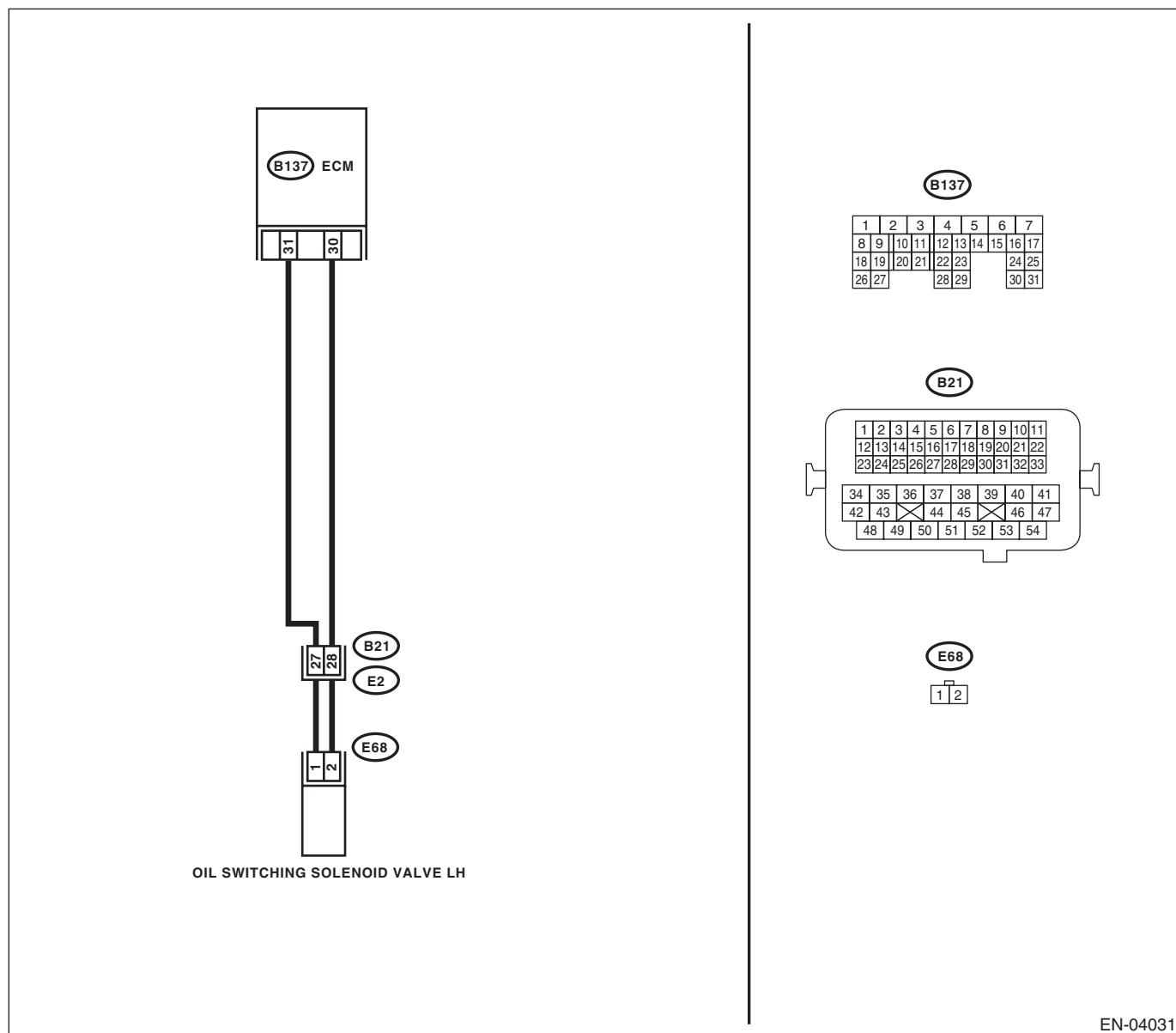
TROUBLE SYMPTOM:

Erroneous idling

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04031

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND OIL SWITCHING SOLENOID VALVE. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and oil switching solenoid valve. 3) Measure the resistance between oil switching solenoid valve and engine ground. Connector & terminal (E68) No. 1 — Engine ground: (E68) No. 2 — Engine ground:	Is the resistance more than 1 MΩ?	Go to step 2.	Repair the short circuit between ECM and oil switching solenoid valve connector.
2 CHECK OIL SWITCHING SOLENOID VALVE. 1) Remove the oil switching solenoid valve connector. 2) Measure the resistance between oil switching solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance between 6 and 12 Ω?	Repair the poor contact of ECM and oil switching solenoid valve.	Replace the oil switching solenoid valve. <Ref. to ME(H4SO)-83, Oil Switching Solenoid Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

M: DTC P0101 MASS OR VOLUME AIR FLOW CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-26, DTC P0101 MASS OR VOLUME AIR FLOW CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

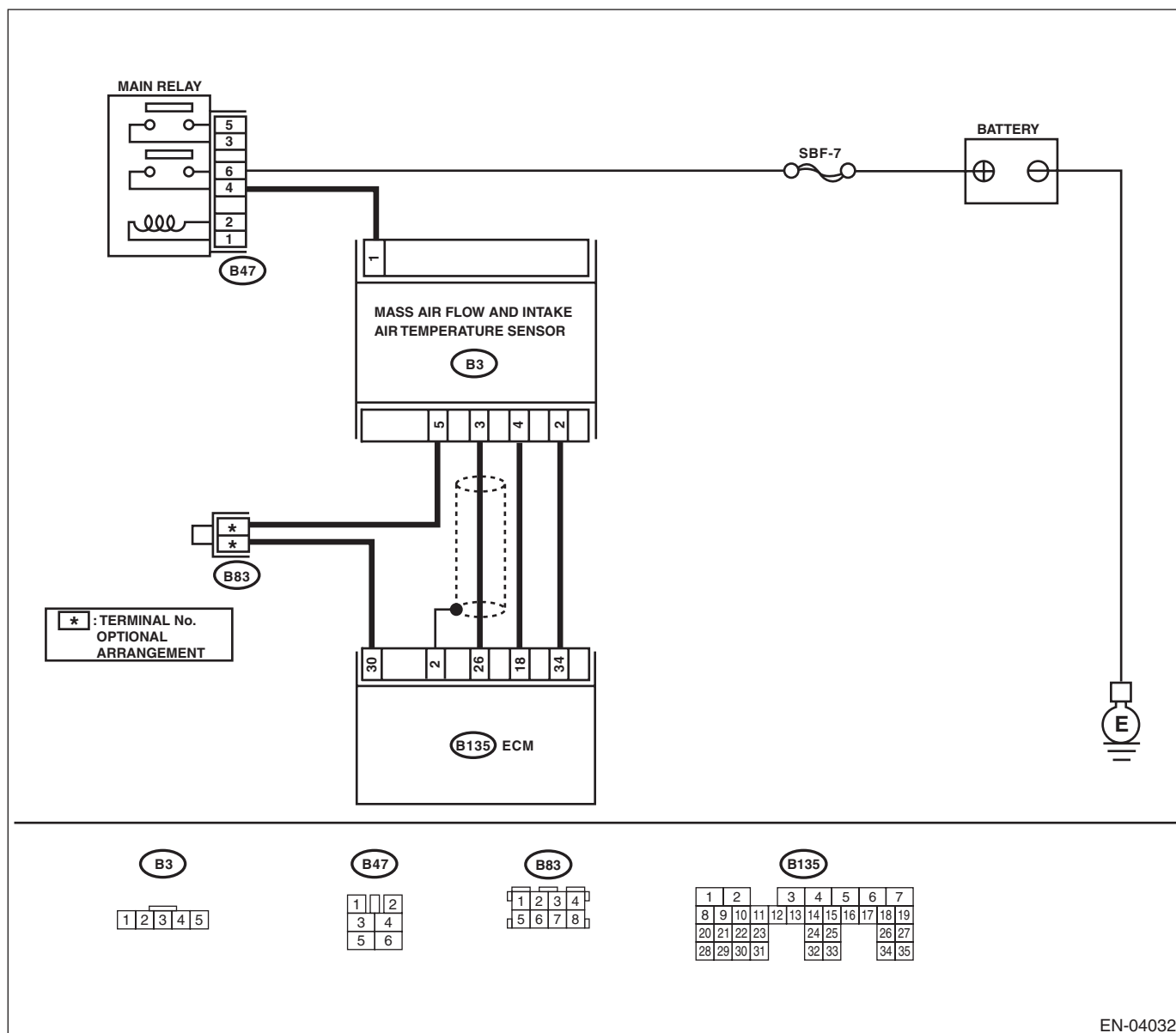
TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04032

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0101.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4SO)-25, Mass Air Flow and Intake Air Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

N: DTC P0102 MASS OR VOLUME AIR FLOW CIRCUIT LOW INPUT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-29, DTC P0102 MASS OR VOLUME AIR FLOW CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

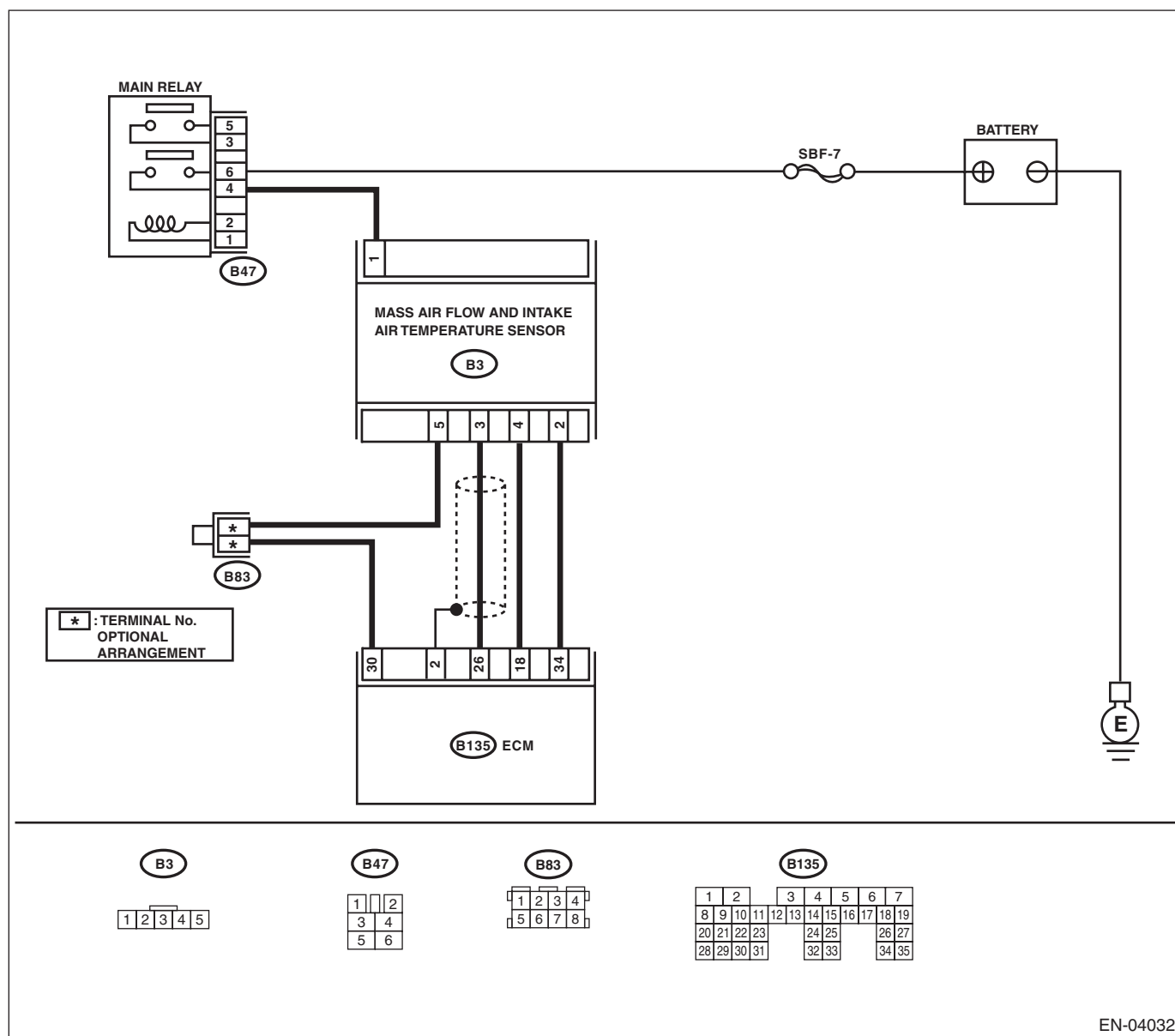
TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04032

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CONNECT SUBARU SELECT MONITOR OR THE GENERAL SCAN TOOL, AND READ DATA. 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor or general scan tool to data link connector. 3) Turn the ignition switch to ON, and the Subaru Select Monitor or general scan tool power switch to ON. 4) Start the engine. 5) Read the voltage of mass air flow sensor using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the voltage 0.2 — 4.7 V?	Even if the malfunction indicator light illuminates, the circuit has returned to a normal condition at this time. Temporary poor contact of connector or harness may be the cause. Repair the harness or connector in mass air flow sensor. NOTE: In this case, repair the following item: • Open or ground short circuit of harness between mass air flow sensor and ECM connector • Poor contact of mass air flow sensor or ECM connector	Go to step 2.
2 CHECK INPUT SIGNAL OF ECM. Measure the voltage between ECM connector and chassis ground while engine is idling. Connector & terminal (B135) No. 26 (+) — Chassis ground (-):	Is the voltage more than 0.2 V?	Go to step 4.	Go to step 3.
3 CHECK INPUT SIGNAL FOR ECM (USING SUBARU SELECT MONITOR). Measure the voltage between ECM connector and chassis ground while engine is idling.	Does the voltage change by shaking the harness and connector of ECM while monitoring the value with Subaru Select Monitor?	Repair the poor contact of ECM connector.	Contact your SOA Service Center.
4 CHECK POWER SUPPLY TO MASS AIR FLOW SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from mass air flow sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between mass air flow sensor connector and chassis ground. Connector & terminal (B3) No. 1 (+) — Chassis ground (-):	Is the voltage more than 5 V?	Go to step 5.	Repair the open circuit between mass air flow sensor and main relay.
5 CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance of harness between ECM and mass air flow sensor connector. Connector & terminal (B135) No. 26 — (B3) No. 3: (B135) No. 34 — (B3) No. 2: (B135) No. 30 — (B3) No. 5:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the open circuit between ECM and mass air flow sensor connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW SENSOR CONNECTOR. Measure the resistance of harness between ECM and chassis ground. Connector & terminal (B135) No. 26 — Chassis ground: (B135) No. 34 — Chassis ground: (B135) No. 30 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 7.	Repair the ground short circuit between ECM and mass air flow sensor connector.
7 CHECK POOR CONTACT. Check poor contact of mass air flow sensor connector.	Is there poor contact in mass air flow sensor connector?	Repair the poor contact of mass air flow sensor connector.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4SO)-25, Mass Air Flow and Intake Air Temperature Sensor.>

O: DTC P0103 MASS OR VOLUME AIR FLOW CIRCUIT HIGH INPUT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-31, DTC P0103 MASS OR VOLUME AIR FLOW CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

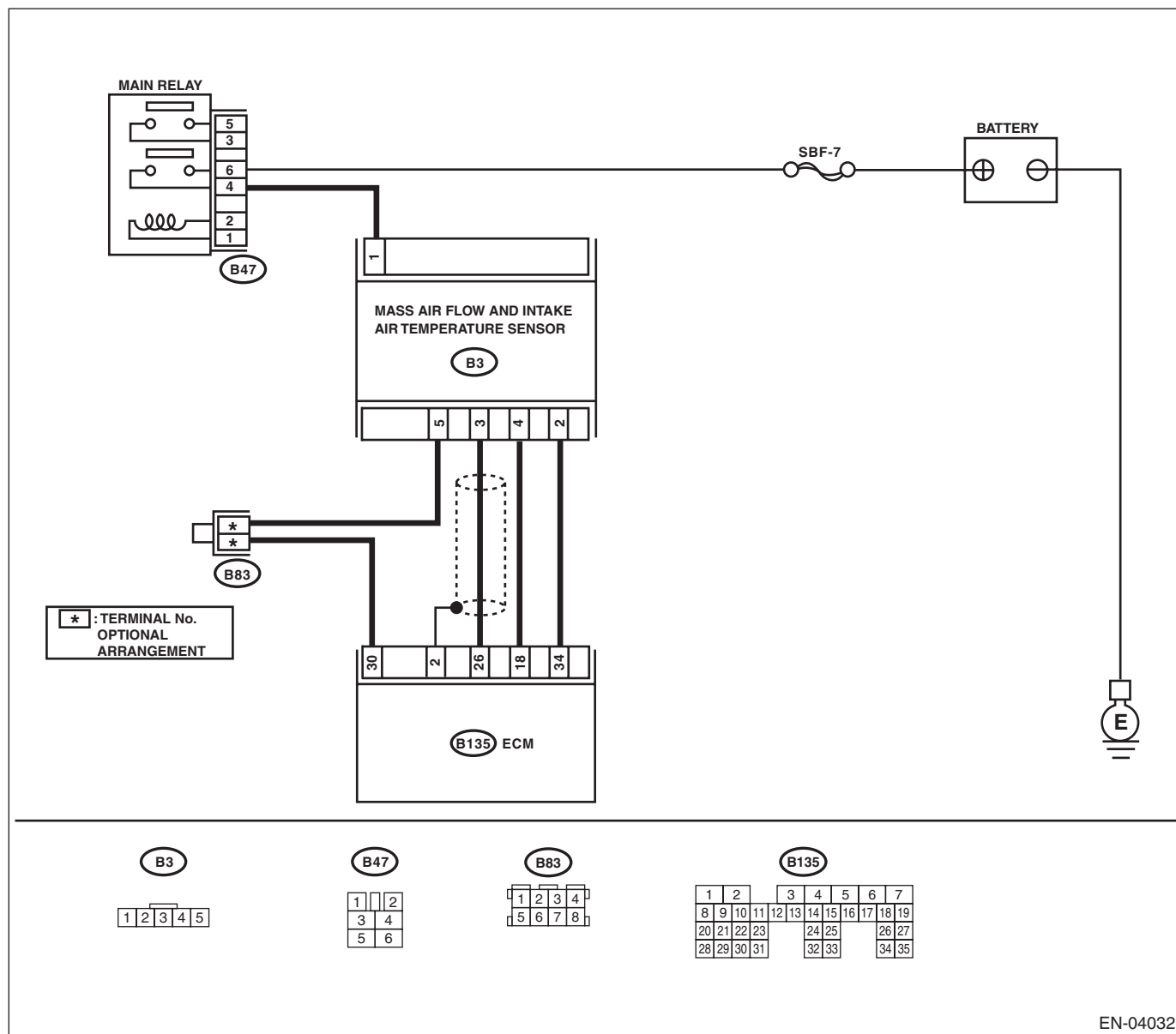
TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04032

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

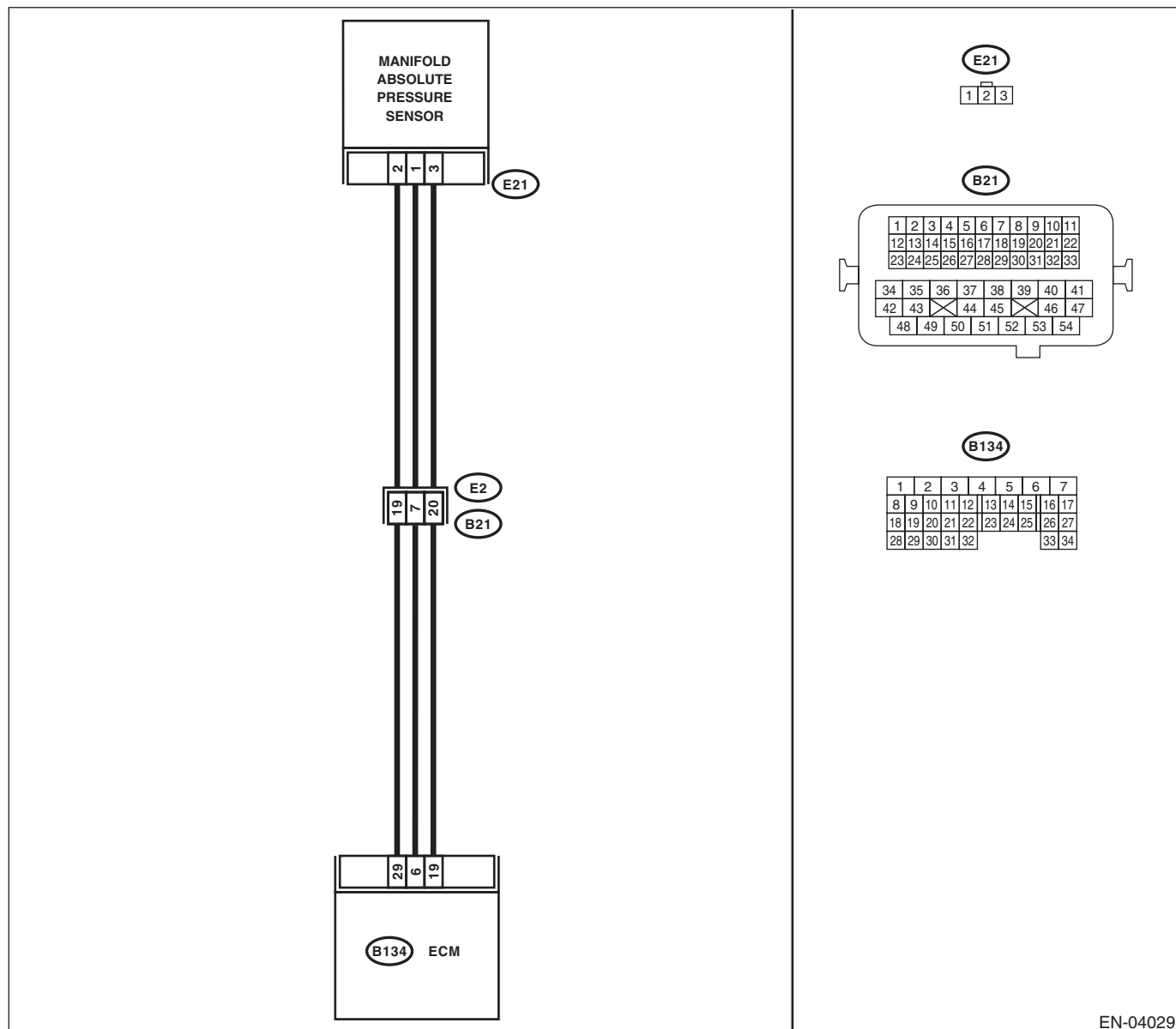
Step	Check	Yes	No
1 CONNECT SUBARU SELECT MONITOR OR THE GENERAL SCAN TOOL, AND READ DATA. 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor or general scan tool to data link connector. 3) Turn the ignition switch to ON, and the Subaru Select Monitor or general scan tool power switch to ON. 4) Start the engine. 5) Read the voltage of mass air flow sensor using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the voltage 0.2 — 4.7 V?	Even if the malfunction indicator light illuminates, the circuit has returned to a normal condition at this time.	Go to step 2.
2 CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from mass air flow sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between mass air flow sensor connector and chassis ground. Connector & terminal (B3) No. 3 (+) — Chassis ground (-):	Is the voltage more than 5 V?	Repair the battery short circuit of harness between mass air flow sensor connector and ECM connector.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance of harness between ECM connector and mass air flow sensor connector. Connector & terminal (B3) No. 2 — (B135) No. 34:	Is the resistance less than 1 Ω ?	Replace the mass air flow sensor. <Ref. to FU(H4SO)-25, Mass Air Flow and Intake Air Temperature Sensor.>	Repair the open circuit of harness between mass air flow sensor connector and ECM connector.

P: DTC P0107 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT LOW INPUT**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-33, DTC P0107 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

EN-04029

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the data of intake manifold absolute pressure signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the measured value less than 13.3 kPa (100 mmHg, 3.94 inHg) ?	Go to step 3.	Go to step 2.
2 CHECK POOR CONTACT. Check the poor contact in ECM and manifold absolute pressure sensor connector.	Is there poor contact in ECM or manifold absolute pressure sensor connector?	Repair the poor contact in ECM or manifold absolute pressure sensor connector.	Even if the malfunction indicator light illuminates, the circuit has returned to a normal condition at this time.
3 CHECK OUTPUT SIGNAL OF ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B134) No. 19 (+) — Chassis ground (-):	Is the voltage more than 4.5 V?	Go to step 5.	Go to step 4.
4 CHECK OUTPUT SIGNAL OF ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B134) No. 19 (+) — Chassis ground (-):	Does the voltage change by shaking the ECM harness and connector?	Repair the poor contact of ECM connector.	Contact the SOA service center.
5 CHECK INPUT SIGNAL OF ECM. Measure the voltage between ECM and chassis ground. Connector & terminal (B134) No. 6 (+) — Chassis ground (-):	Is the voltage less than 0.2 V?	Go to step 7.	Go to step 6.
6 CHECK INPUT SIGNAL FOR ECM (USING SUBARU SELECT MONITOR). Read the data of atmospheric absolute pressure signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the measured value more than 13.3 kPa (100 mmHg, 3.94 inHg) when shaking the ECM harness and connector?	Repair the poor contact of ECM connector.	Go to step 7.
7 CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from manifold absolute pressure sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between manifold absolute pressure sensor connector and engine ground. Connector & terminal (E21) No. 3 (+) — Engine ground (-):	Is the voltage more than 4.5 V?	Go to step 8.	Repair the open circuit of harness between ECM and manifold absolute pressure sensor connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
8 CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance of harness between ECM and manifold absolute pressure sensor connector. Connector & terminal (B134) No. 29 — (E21) No. 2:	Is the resistance less than 1 Ω ?	Go to step 9.	Repair the open circuit of harness between ECM and manifold absolute pressure sensor connector.
9 CHECK POOR CONTACT. Check poor contact of manifold absolute pressure sensor connector.	Is there poor contact in manifold absolute pressure sensor connector?	Repair the poor contact of manifold absolute pressure sensor connector.	Replace the manifold absolute pressure sensor. <Ref. to FU(H4SO)-24, Manifold Absolute Pressure Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Q: DTC P0108 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT HIGH INPUT

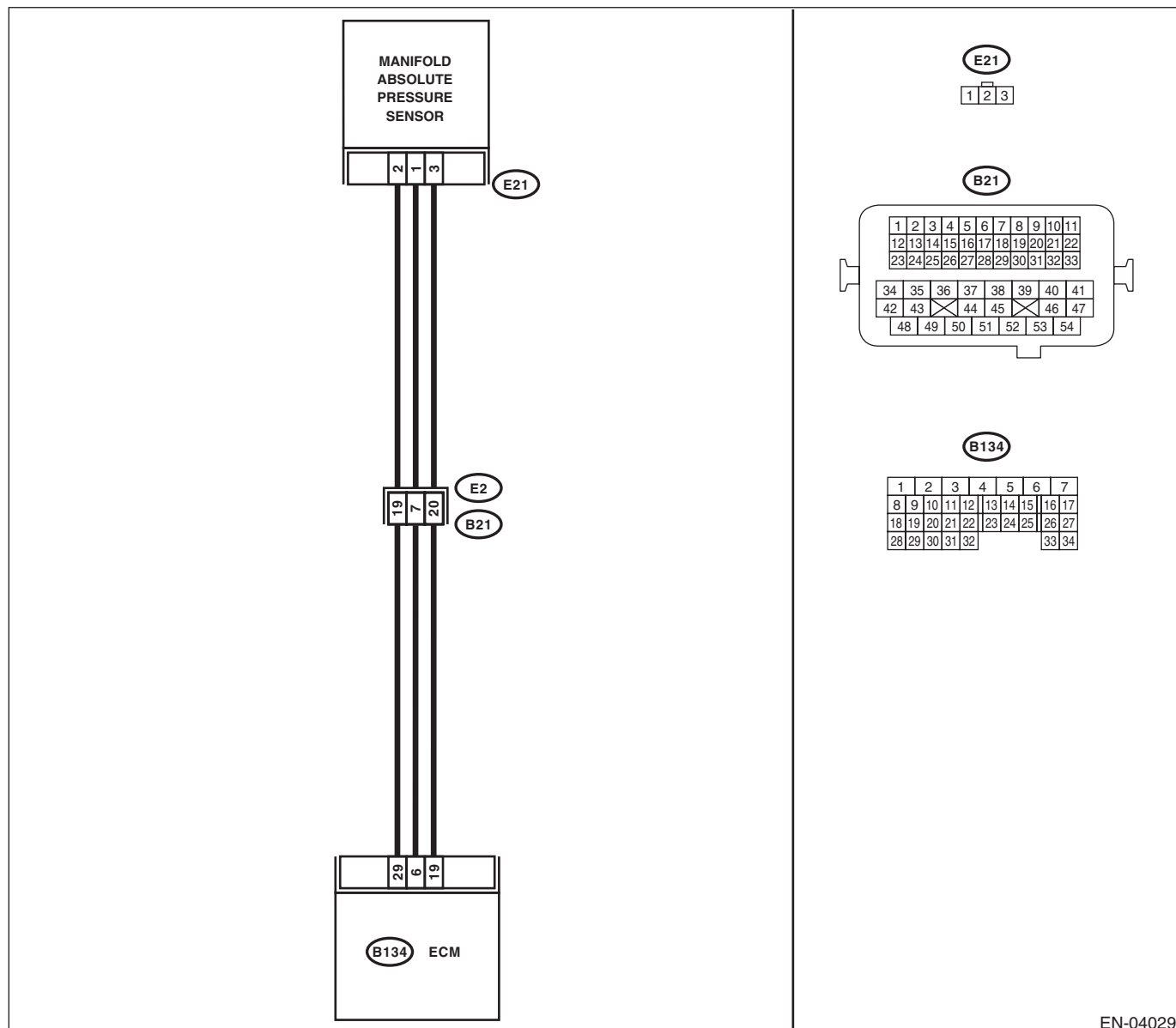
DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-35, DTC P0108 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04029

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the data of intake manifold absolute pressure signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the measured value more than 119.5 kPa (896.5 mmHg, 35.29 inHg) ?	Go to step 10.	Go to step 2.
2 CHECK OUTPUT SIGNAL OF ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B134) No. 19 (+) — Chassis ground (-):	Is the voltage more than 4.5 V?	Go to step 4.	Go to step 3.
3 CHECK OUTPUT SIGNAL OF ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B134) No. 19 (+) — Chassis ground (-):	Does the voltage change by shaking the ECM harness and connector?	Repair the poor contact of ECM connector.	Contact the SOA service center.
4 CHECK INPUT SIGNAL OF ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B134) No. 6 (+) — Chassis ground (-):	Is the voltage less than 0.2 V?	Go to step 6.	Go to step 5.
5 CHECK INPUT SIGNAL FOR ECM (USING SUBARU SELECT MONITOR). Read the data of atmospheric absolute pressure signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the measured value more than 13.3 kPa (100 mmHg, 3.94 inHg) when shaking the ECM harness and connector?	Repair the poor contact of ECM connector.	Go to step 6.
6 CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from manifold absolute pressure sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between manifold absolute pressure sensor connector and engine ground. Connector & terminal (E21) No. 3 (+) — Engine ground (-):	Is the voltage more than 4.5 V?	Go to step 7.	Repair the open circuit of harness between ECM and manifold absolute pressure sensor connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance of harness between ECM and manifold absolute pressure sensor connector. Connector & terminal (B134) No. 6 — (E21) No. 1:	Is the resistance less than 1 Ω ?	Go to step 8.	Repair the open circuit of harness between ECM and manifold absolute pressure sensor connector.
8 CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR. Measure the resistance of harness between ECM and manifold absolute pressure sensor connector. Connector & terminal (B134) No. 29 — (E21) No. 2:	Is the resistance less than 1 Ω ?	Go to step 9.	Repair the open circuit of harness between ECM and manifold absolute pressure sensor connector.
9 CHECK POOR CONTACT. Check poor contact of manifold absolute pressure sensor connector.	Is there poor contact in manifold absolute pressure sensor connector?	Repair the poor contact of manifold absolute pressure sensor connector.	Replace the manifold absolute pressure sensor. <Ref. to FU(H4SO)-24, Manifold Absolute Pressure Sensor.>
10 CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF and Subaru Select Monitor or the general scan tool switch to OFF. 2) Disconnect the connector from manifold absolute pressure sensor. 3) Turn the ignition switch to ON, and the Subaru Select Monitor or general scan tool power switch to ON. 4) Read the data of intake manifold absolute pressure signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the measured value more than 119.5 kPa (896.5 mmHg, 35.29 inHg) ?	Repair the battery short circuit of harness between ECM and manifold absolute pressure sensor connector.	Replace the manifold absolute pressure sensor. <Ref. to FU(H4SO)-24, Manifold Absolute Pressure Sensor.>

R: DTC P0111 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE**DTC DETECTING CONDITION:**

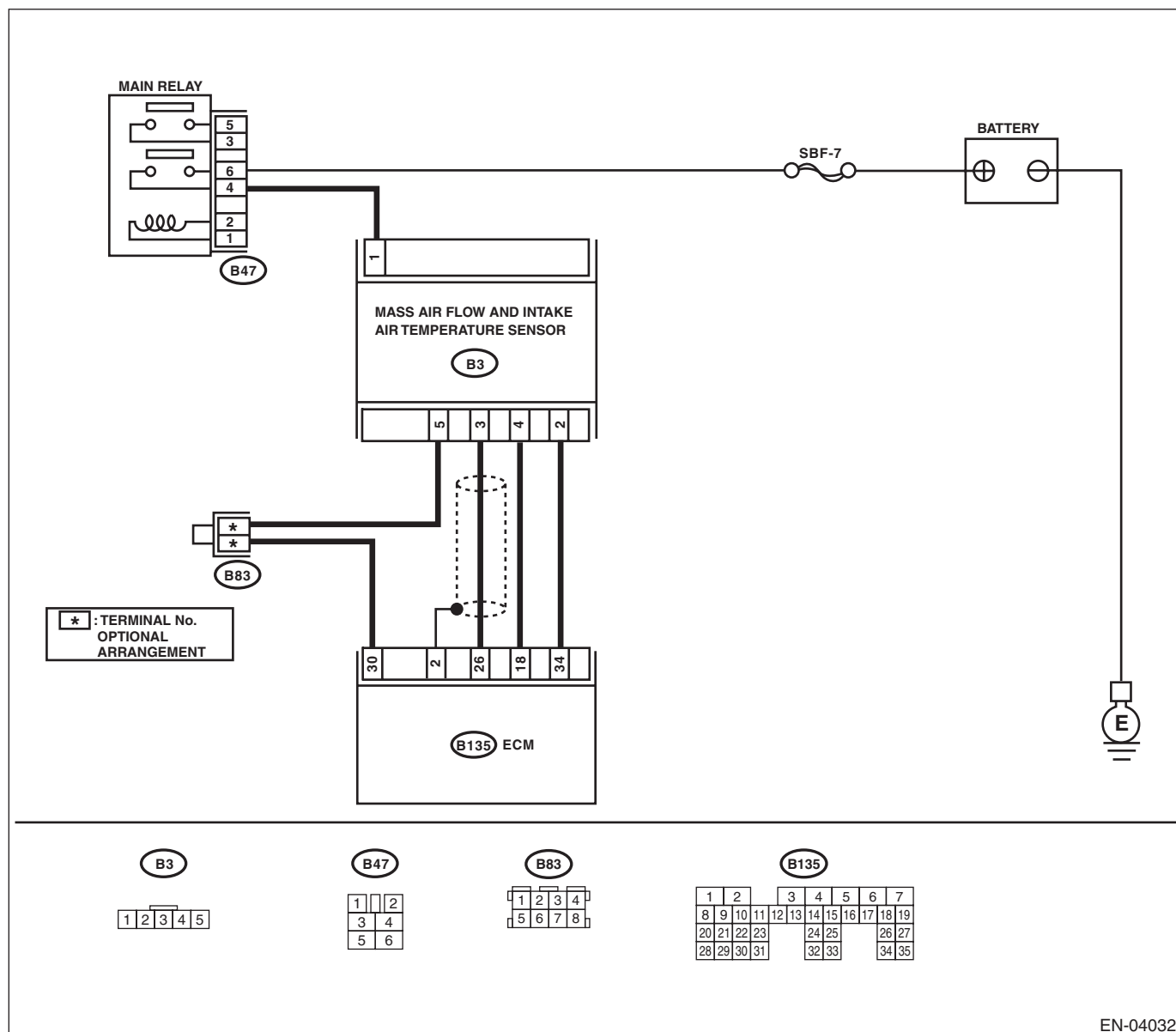
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-37, DTC P0111 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Erroneous idling
- Poor driving performance

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

EN-04032

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trou- ble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0111.	Replace the intake air temperature sensor. <Ref. to FU(H4SO)-25, Mass Air Flow and Intake Air Temper- ature Sensor.>

S: DTC P0112 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-39, DTC P0112 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

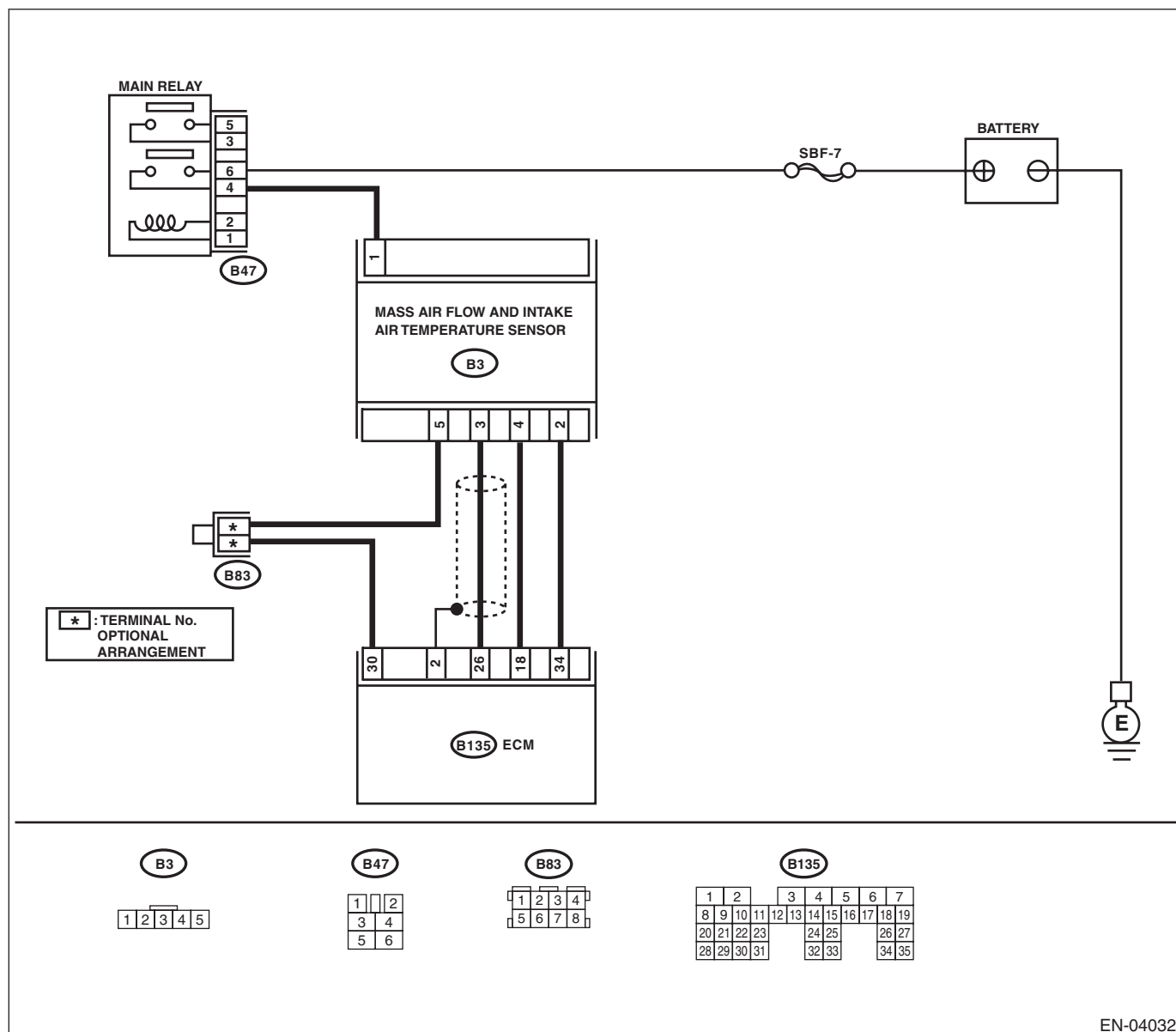
TROUBLE SYMPTOM:

- Erroneous idling
- Poor driving performance

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04032

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the data of intake air temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the intake air temperature above 120°C (248°F) ?	Go to step 2.	Repair the poor contact. NOTE: In this case, repair the following item: • Poor contact in intake air temperature sensor • Poor contact in ECM • Poor contact of coupling connector • Poor contact of joint connector
2 CHECK HARNESS BETWEEN INTAKE AIR TEMPERATURE SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from intake air temperature sensor. 3) Turn the ignition switch to ON. 4) Read the data of intake air temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the intake air temperature less than -40°C (-40°F) ?	Replace the intake air temperature sensor. <Ref. to FU(H4SO)-25, Mass Air Flow and Intake Air Temperature Sensor.>	Repair the ground short circuit of harness between intake air temperature sensor and ECM connector.

T: DTC P0113 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-41, DTC P0113 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

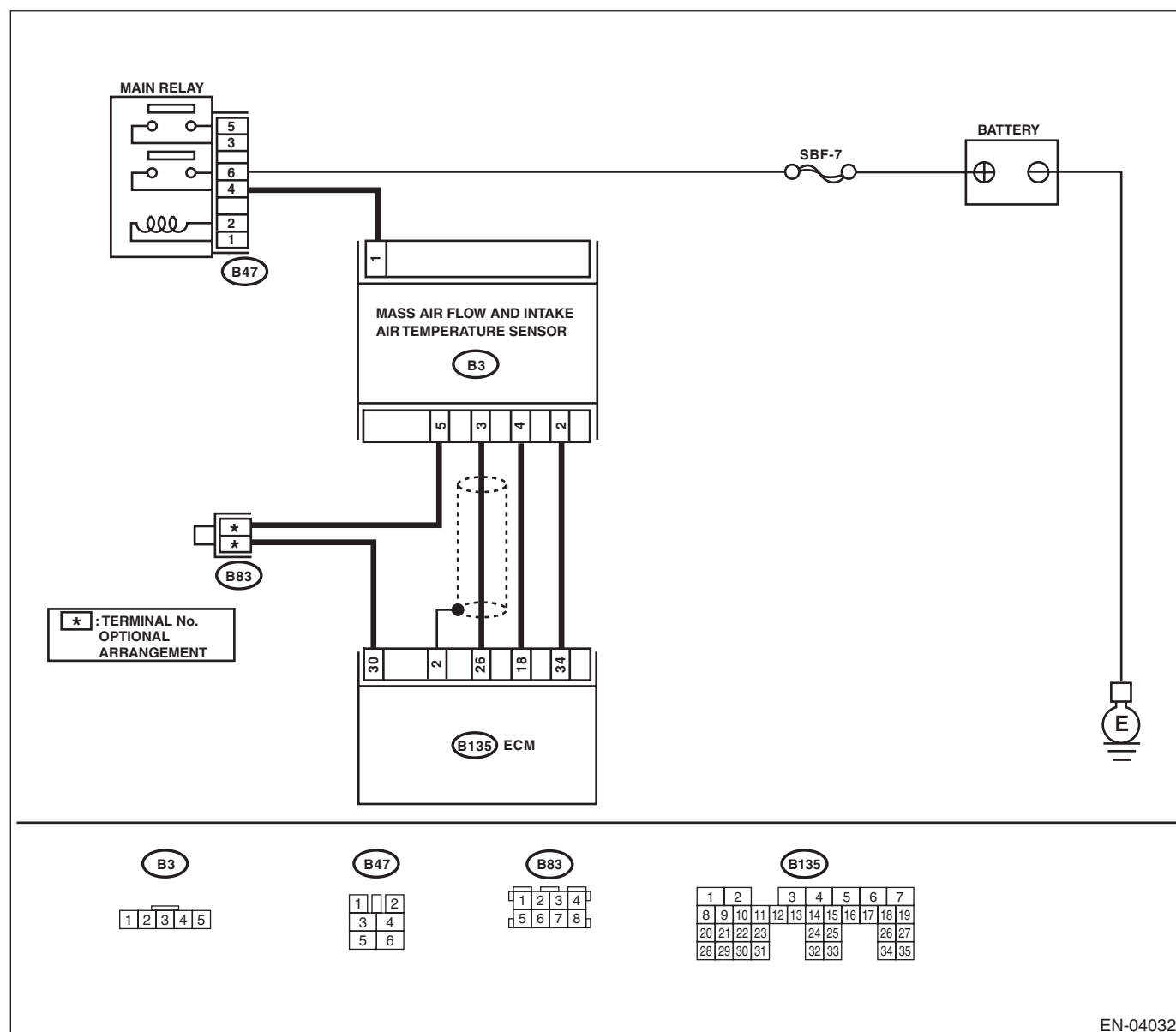
TROUBLE SYMPTOM:

- Erroneous idling
- Poor driving performance

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04032

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the data of intake air temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the intake air temperature less than -40°C (-40°F) ?	Go to step 2.	Repair the poor contact. NOTE: In this case, repair the following item: • Poor contact in intake air temperature sensor • Poor contact in ECM • Poor contact of coupling connector • Poor contact of joint connector
2 CHECK HARNESS BETWEEN INTAKE AIR TEMPERATURE SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from intake air temperature sensor. 3) Measure the voltage between intake air temperature sensor connector and engine ground. Connector & terminal (B3) No. 4 (+) — Engine ground (–):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between intake air temperature sensor and ECM connector.	Go to step 3.
3 CHECK HARNESS BETWEEN INTAKE AIR TEMPERATURE SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to ON. 2) Measure the voltage between intake air temperature sensor connector and engine ground. Connector & terminal (B3) No. 4 (+) — Engine ground (–):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between intake air temperature sensor and ECM connector.	Go to step 4.
4 CHECK HARNESS BETWEEN INTAKE AIR TEMPERATURE SENSOR AND ECM CONNECTOR. Measure the voltage between intake air temperature sensor connector and engine ground. Connector & terminal (B3) No. 4 (+) — Engine ground (–):	Is the voltage more than 3 V?	Go to step 5.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between intake air temperature sensor and ECM connector • Poor contact in intake air temperature sensor • Poor contact in ECM • Poor contact of coupling connector • Poor contact of joint connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK HARNESS BETWEEN INTAKE AIR TEMPERATURE SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between intake air temperature sensor connector and engine ground. Connector & terminal (B3) No. 5 — Engine ground:	Is the resistance less than 5 Ω ?	Replace the intake air temperature sensor. <Ref. to FU(H4SO)-25, Mass Air Flow and Intake Air Temperature Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between intake air temperature sensor and ECM connector • Poor contact in intake air temperature sensor • Poor contact in ECM • Poor contact of coupling connector • Poor contact of joint connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

U: DTC P0117 ENGINE COOLANT TEMPERATURE CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-43, DTC P0117 ENGINE COOLANT TEMPERATURE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

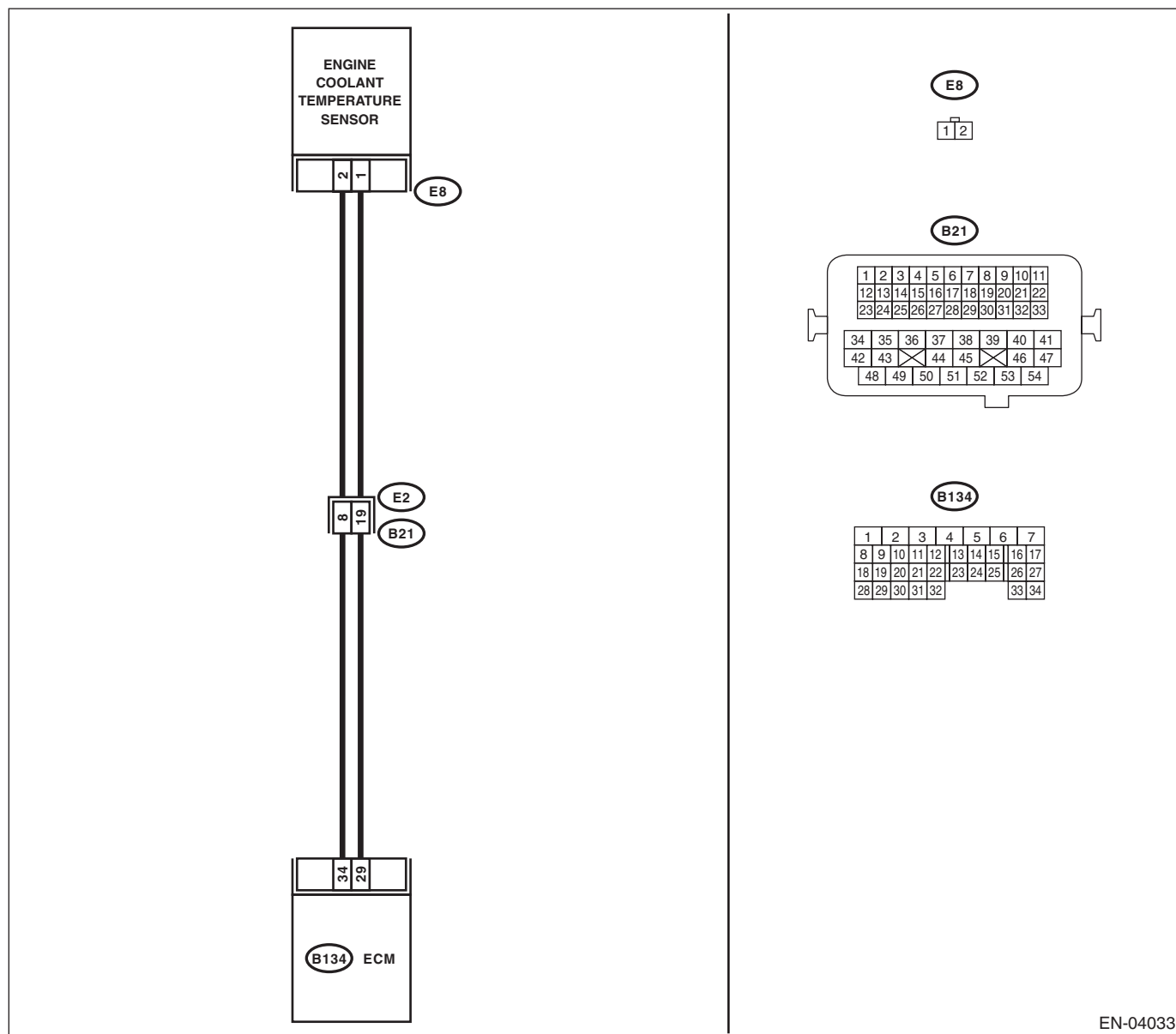
TROUBLE SYMPTOM:

- Hard to start
- Erroneous idling
- Poor driving performance

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the data of engine coolant temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the engine coolant temperature above 150°C (302°F) ?	Go to step 2.	Repair the poor contact. NOTE: In this case, repair the following item: • Poor contact of engine coolant temperature sensor • Poor contact in ECM • Poor contact of coupling connector • Poor contact of joint connector
2 CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the engine coolant temperature sensor. 3) Turn the ignition switch to ON. 4) Read the data of engine coolant temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the engine coolant temperature less than -40°C (-40°F) ?	Replace the engine coolant temperature sensor. <Ref. to FU(H4SO)-19, Engine Coolant Temperature Sensor.>	Repair the ground short circuit of harness between engine coolant temperature sensor and ECM connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

V: DTC P0118 ENGINE COOLANT TEMPERATURE CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-45, DTC P0118 ENGINE COOLANT TEMPERATURE CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

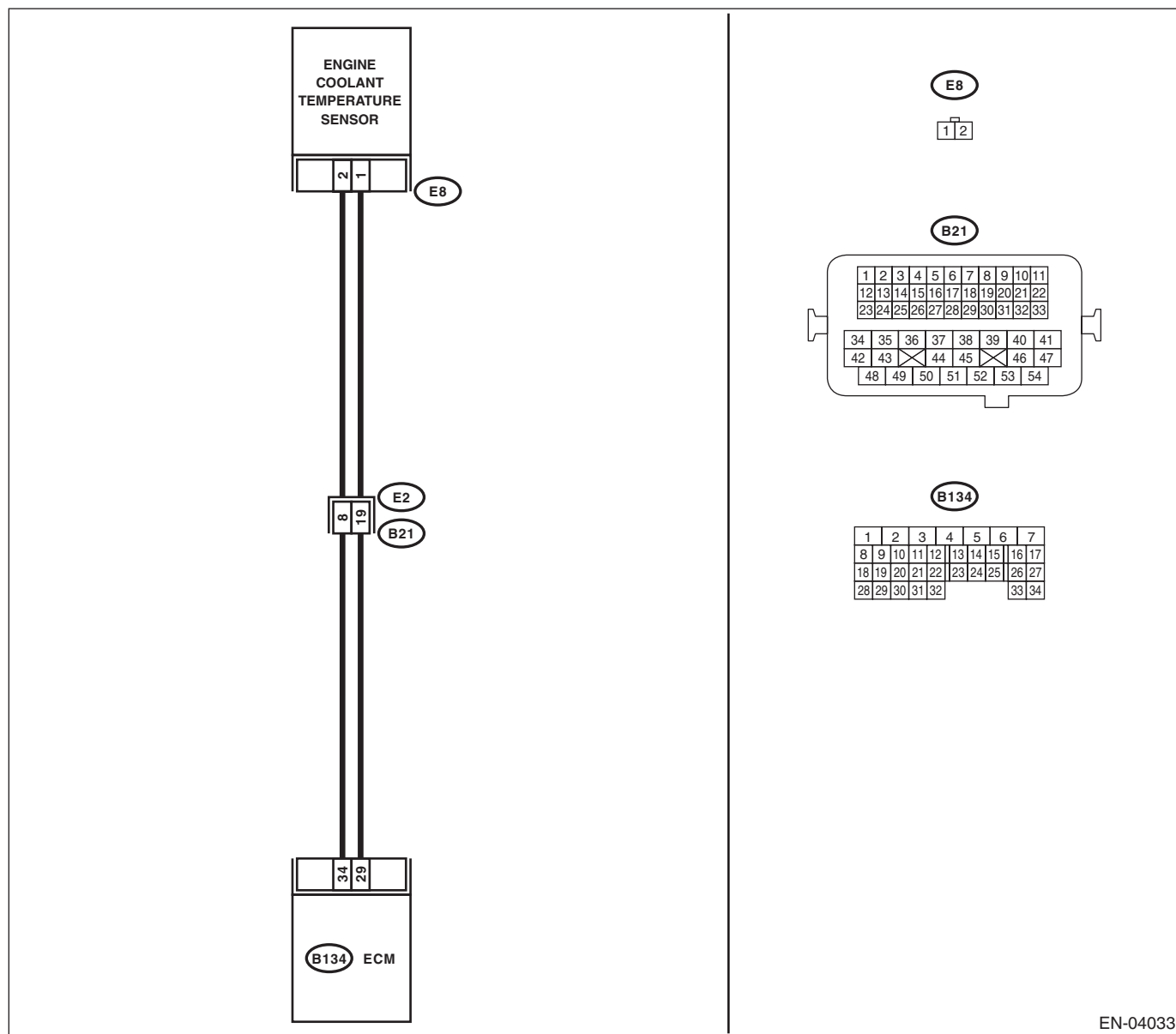
TROUBLE SYMPTOM:

- Hard to start
- Erroneous idling
- Poor driving performance

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04033

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the data of engine coolant temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the engine coolant temperature less than -40°C (-40°F) ?	Go to step 2.	Repair the poor contact. NOTE: In this case, repair the following item: • Poor contact of engine coolant temperature sensor • Poor contact in ECM • Poor contact of coupling connector • Poor contact of joint connector
2 CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the engine coolant temperature sensor. 3) Measure the voltage between engine coolant temperature sensor connector and engine ground. Connector & terminal (E8) No. 2 (+) — Engine ground (–):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and engine coolant temperature sensor connector.	Go to step 3.
3 CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to ON. 2) Measure the voltage between engine coolant temperature sensor connector and engine ground. Connector & terminal (E8) No. 2 (+) — Engine ground (–):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and engine coolant temperature sensor connector.	Go to step 4.
4 CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR. Measure the voltage between engine coolant temperature sensor connector and engine ground. Connector & terminal (E8) No. 2 (+) — Engine ground (–):	Is the voltage more than 4 V?	Go to step 5.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and engine coolant temperature sensor connector • Poor contact of engine coolant temperature sensor connector • Poor contact in ECM connector • Poor contact of coupling connector • Poor contact of joint connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between engine coolant temperature sensor connector and engine ground. Connector & terminal (E8) No. 1 — Engine ground:	Is the resistance less than 5 Ω ?	Replace the engine coolant temperature sensor. <Ref. to FU(H4SO)-19, Engine Coolant Temperature Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and engine coolant temperature sensor connector • Poor contact of engine coolant temperature sensor connector • Poor contact in ECM connector • Poor contact of coupling connector • Poor contact of joint connector

W: DTC P0122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-47, DTC P0122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

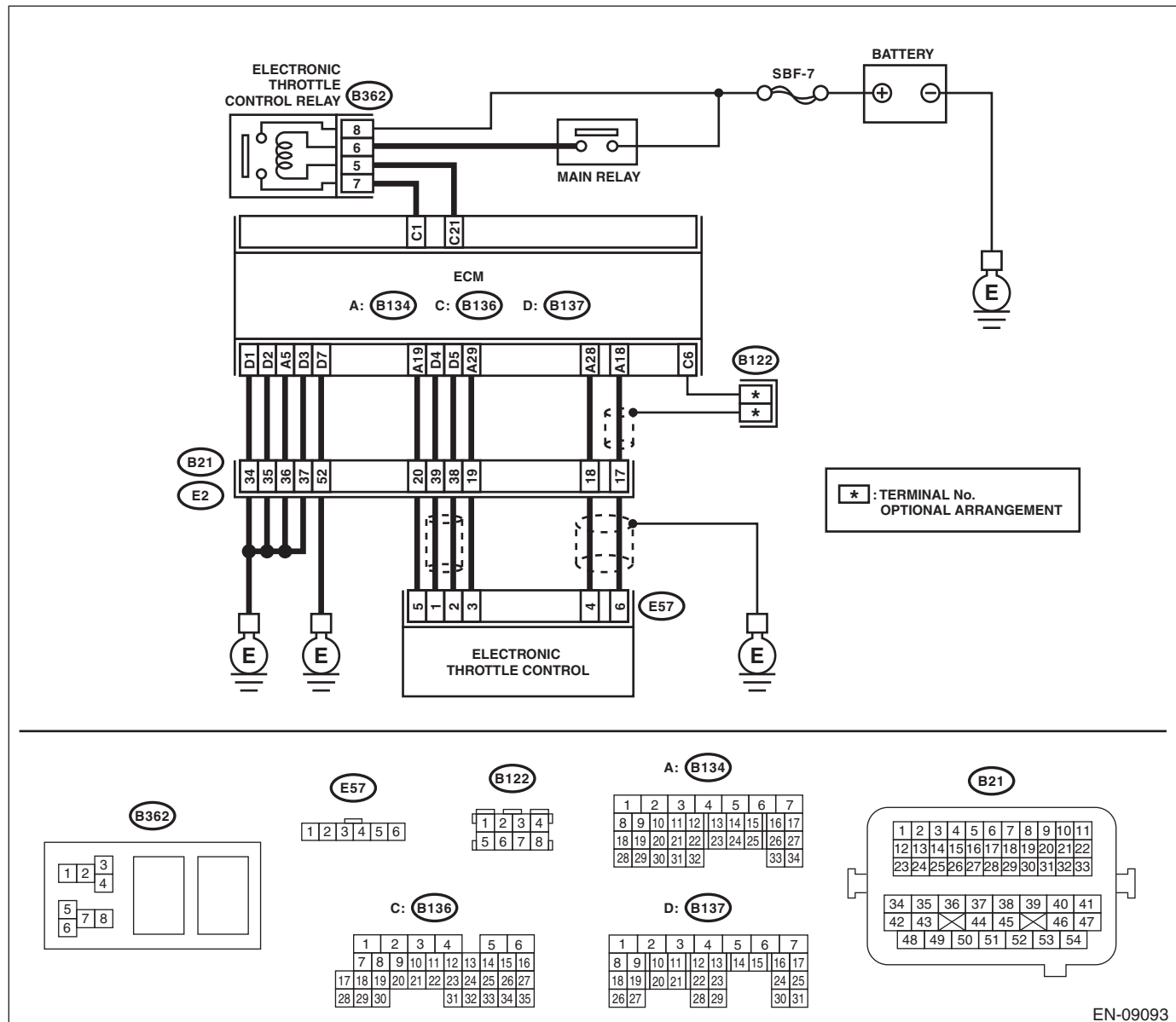
TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-09093

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK SENSOR OUTPUT. 1) Turn the ignition switch to ON. 2) Read the data of main throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage more than 0.4 V?	Go to step 2.	Go to step 3.
2 CHECK POOR CONTACT. Check poor contact in connector between ECM and electronic throttle control.	Is there poor contact in connector between ECM and electronic throttle control?	Repair the poor contact.	Temporary poor contact occurred, but it is normal at present.
3 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from electronic throttle control. 4) Measure the resistance between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 18 — (E57) No. 6: (B134) No. 19 — (E57) No. 5:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness connector.
4 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 18 — Chassis ground: (B134) No. 19 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 5.	Repair the chassis short circuit of harness.
5 CHECK POWER SUPPLY OF ELECTRONIC THROTTLE CONTROL. 1) Connect the ECM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 5 (+) — Engine ground (-):	Is the voltage 4.5 — 5.5 V?	Go to step 6.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
6 CHECK SHORT CIRCUIT INSIDE THE ECM. 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 6 — Engine ground:	Is the resistance more than 10 Ω ?	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>

X: DTC P0123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-49, DTC P0123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

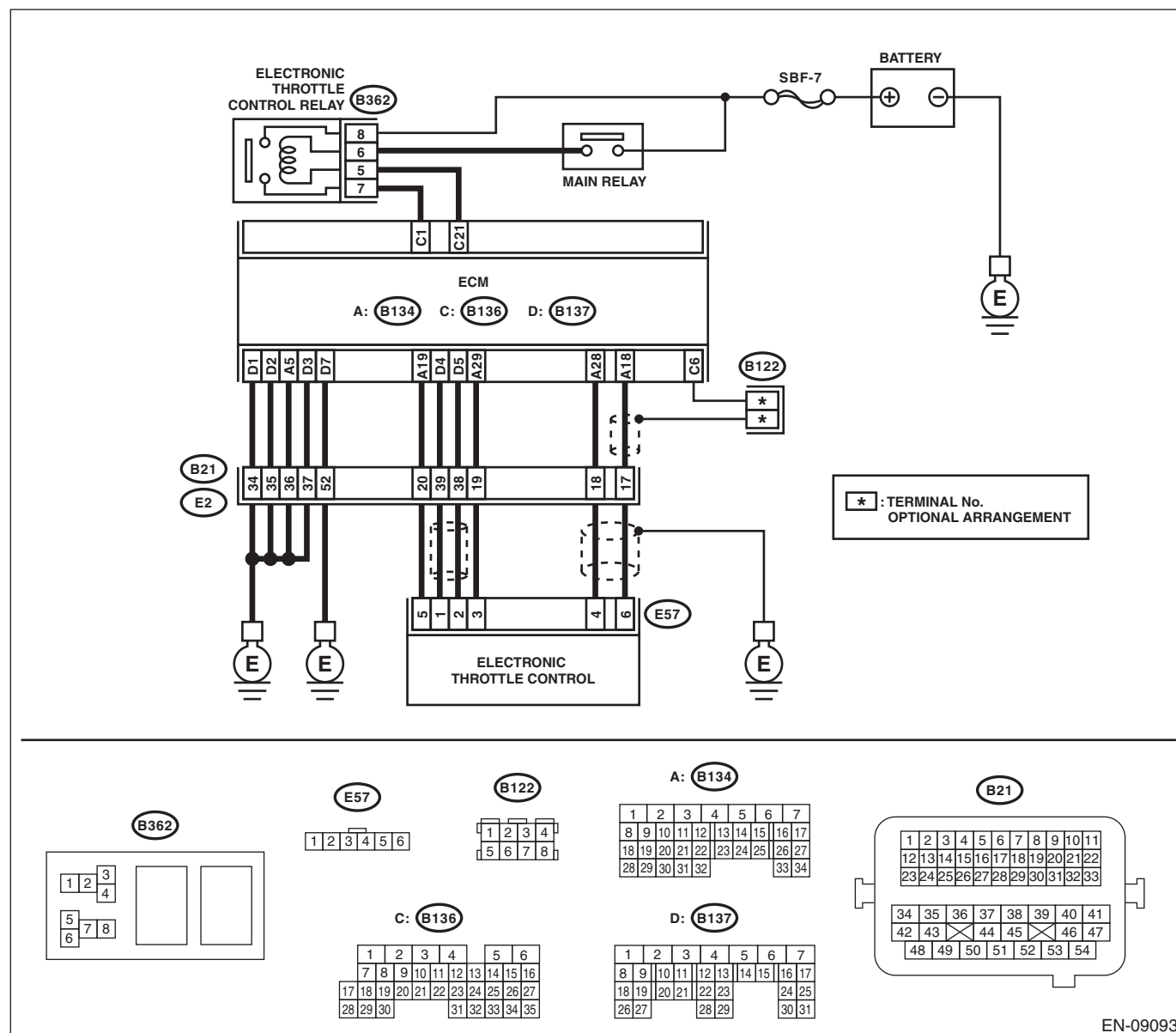
TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-09093

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK SENSOR OUTPUT. 1) Turn the ignition switch to ON. 2) Read the data of main throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage less than 4.63 V?	Go to step 2.	Go to step 3.
2 CHECK POOR CONTACT. Check poor contact in connector between ECM and electronic throttle control.	Is there poor contact in connector between ECM and electronic throttle control?	Repair the poor contact.	Temporary poor contact occurred, but it is normal at present.
3 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from electronic throttle control. 4) Measure the resistance between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 18 — (E57) No. 6: (B134) No. 29 — (E57) No. 3:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness connector.
4 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Connect the ECM connector. 2) Measure the resistance between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 3 — Engine ground:	Is the resistance less than 1 Ω ?	Go to step 5.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
5 CHECK SENSOR OUTPUT POWER SUPPLY. Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 6 (+) — Engine ground (-):	Is the voltage less than 10 V?	Go to step 6.	Repair the battery short circuit of harness between ECM connector and electronic throttle control connector.
6 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance between ECM connectors. Connector & terminal (B134) No. 18 — (B134) No. 19:	Is the resistance more than 1 M Ω ?	Repair the poor contact of harness. Replace the electronic throttle control.	Repair the short circuit to sensor power supply.

Y: DTC P0125 INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-51, DTC P0125 INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL, Diagnostic Trouble Code (DTC) Detecting Criteria.>

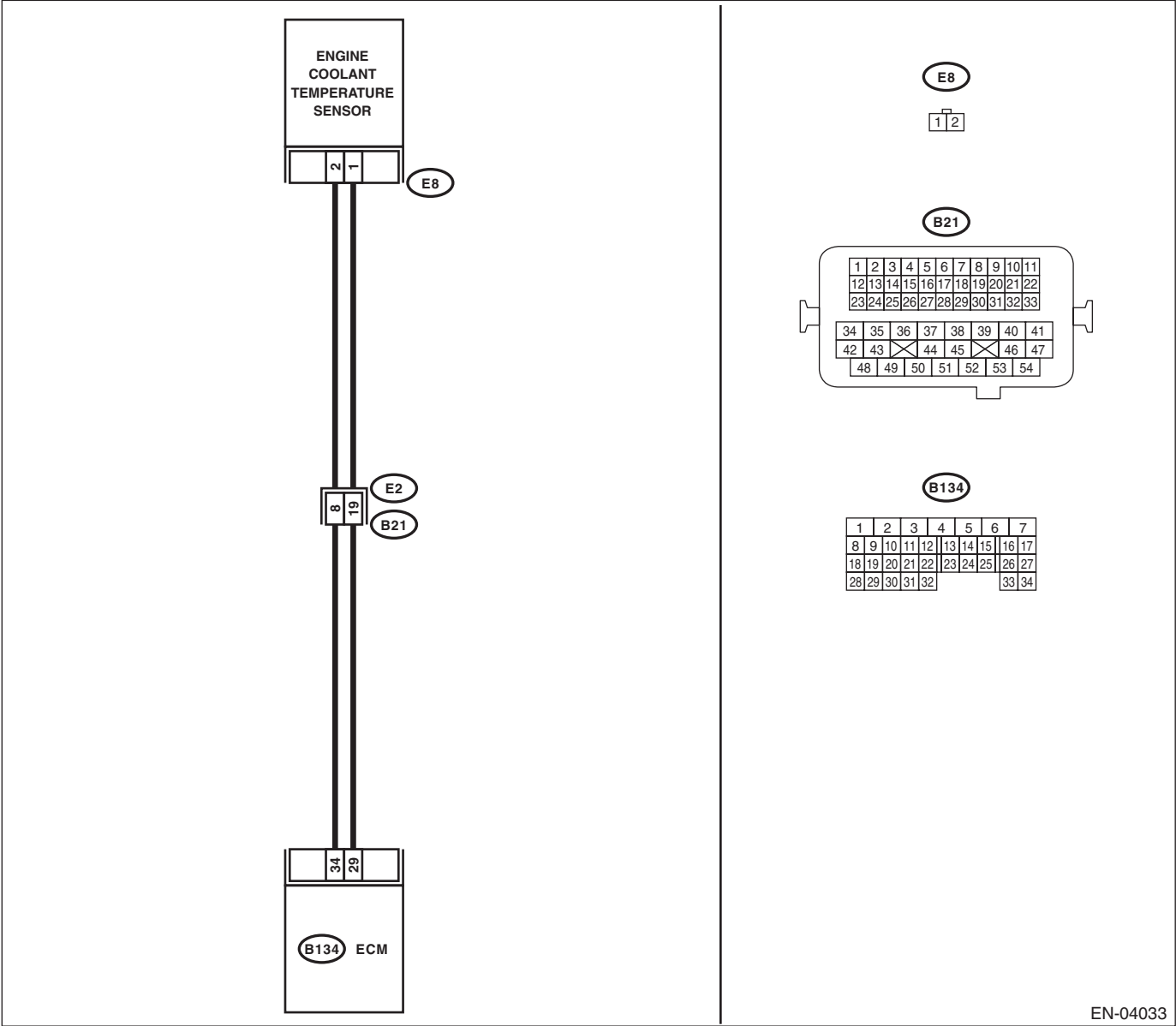
TROUBLE SYMPTOM:

Engine does not return to idle.

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04033

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trou- ble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0125.	Go to step 2.
2 CHECK THERMOSTAT.	Does the thermostat remain opened?	Replace the ther- mostat. <Ref. to CO(H4SO)-17, Thermostat.>	Replace the engine coolant temperature sen- sor. <Ref. to FU(H4SO)-19, Engine Coolant Temperature Sen- sor.>

Z: DTC P0126 INSUFFICIENT ENGINE COOLANT TEMPERATURE FOR STABLE OPERATION

DTC DETECTING CONDITION:

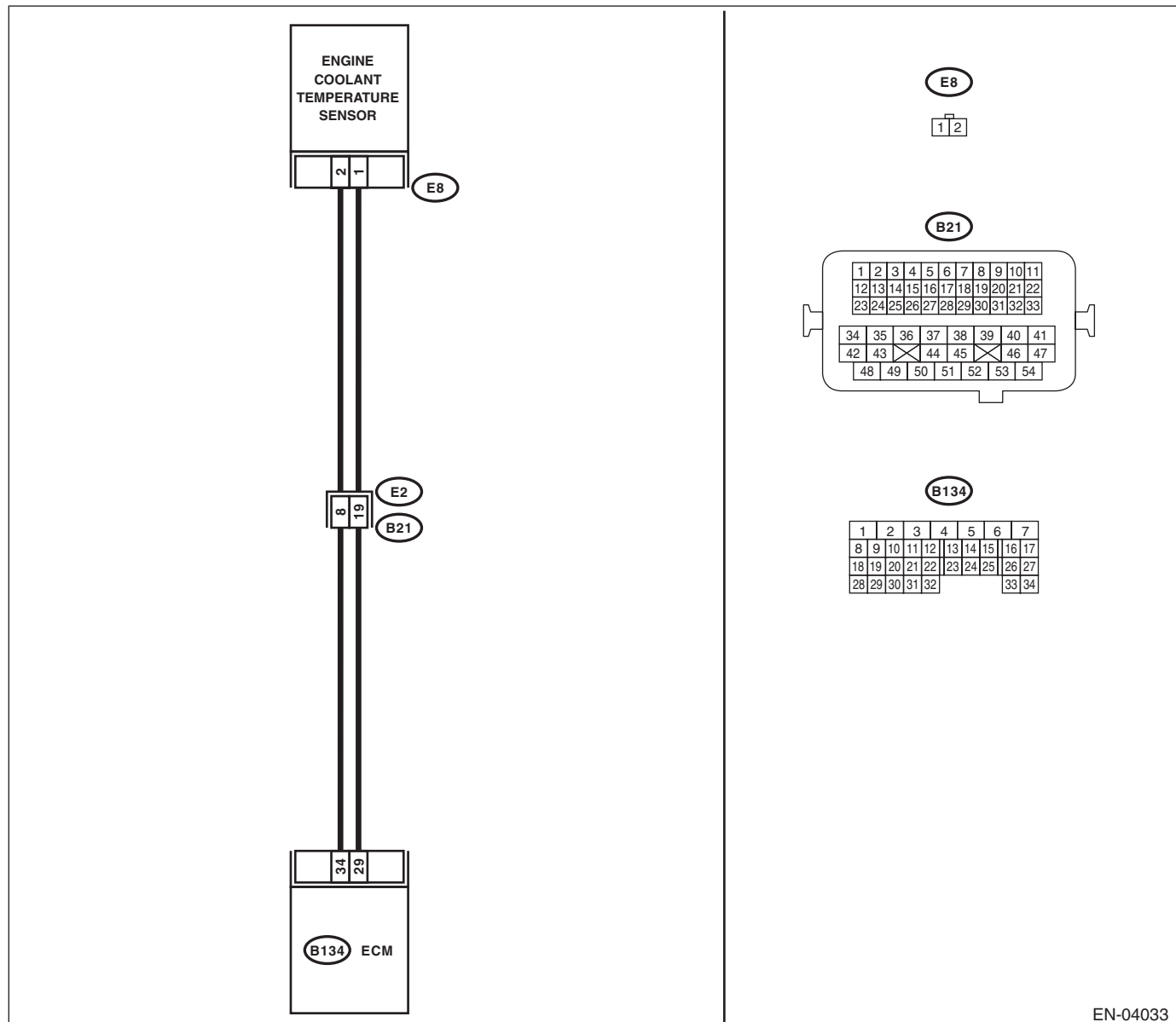
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-53, DTC P0126 INSUFFICIENT ENGINE COOLANT TEMPERATURE FOR STABLE OPERATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Engine does not return to idle.

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.



EN-04033

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK ENGINE COOLANT TEMPERATURE SENSOR. Measure the resistance between engine coolant temperature sensor terminals when the engine coolant is cold and after warmed-up. Terminals No. 1 — No. 2:	Is the resistance of engine coolant temperature sensor different between when engine coolant is cold and after warmed-up?	Contact your SOA Service Center.	Replace the engine coolant temperature sensor. <Ref. to FU(H4SO)-19, Engine Coolant Temperature Sensor.>

AA:DTC P0128 COOLANT THERMOSTAT (ENGINE COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-55, DTC P0128 COOLANT THERMOSTAT (ENGINE COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Thermostat remains open.

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK VEHICLE.	Was the vehicle driven or idled with the engine partially submerged under water?	In this case, it is not necessary to inspect DTC P0128.	Go to step 2.
2 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Go to step 3.
3 CHECK ENGINE COOLANT.	Are the engine coolant level and mixture ratio of cooling water to antifreeze solution correct?	Go to step 4.	Replace the engine coolant. <Ref. to CO(H4SO)-12, REPLACEMENT, Engine Coolant.>
4 CHECK RADIATOR FAN. 1) Start the engine. 2) Check the radiator fan operation.	Does the radiator fan continuously rotate for more than 3 minutes during idling?	Repair radiator fan circuit. <Ref. to CO(H4SO)-23, Radiator Main Fan and Fan Motor.> and <Ref. to CO(H4SO)-25, Radiator Sub Fan and Fan Motor.>	Replace the thermostat. <Ref. to CO(H4SO)-17, Thermostat.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AB:DTC P0131 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 1)

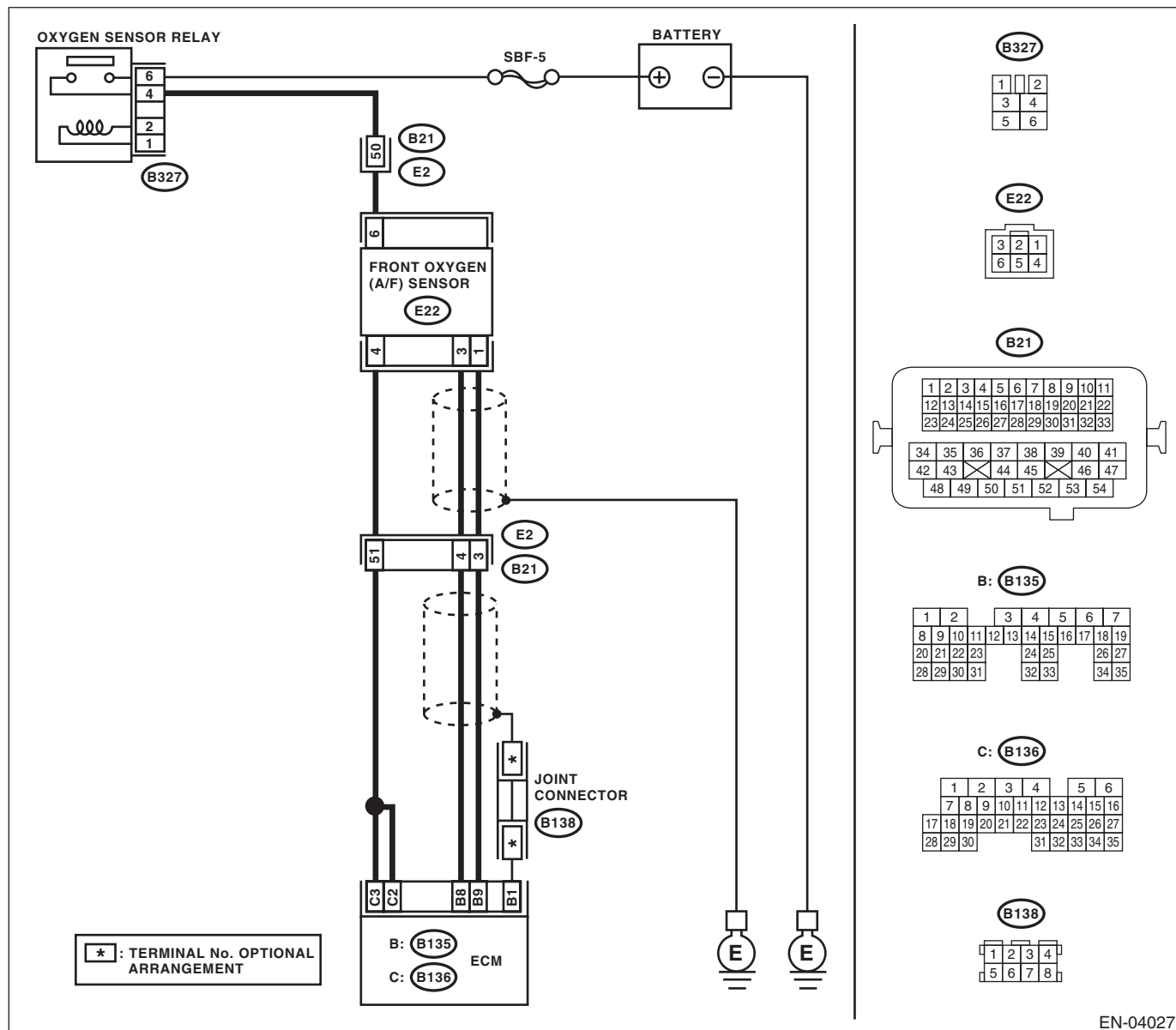
DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-57, DTC P0131 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04027

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No	
1	CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.	Does water enter the connector?	Dry the water thoroughly.	Go to step 2.
2	CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and front oxygen (A/F) sensor connector. 3) Measure the resistance of harness between ECM and front oxygen (A/F) sensor connector. Connector & terminal (B135) No. 9 — Chassis ground: (B135) No. 8 — Chassis ground:	Is the resistance more than 1 MΩ?	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4SO)-32, Front Oxygen (A/F) Sensor.>	Repair the ground short circuit of harness between ECM and front oxygen (A/F) sensor connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AC:DTC P0132 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 1)

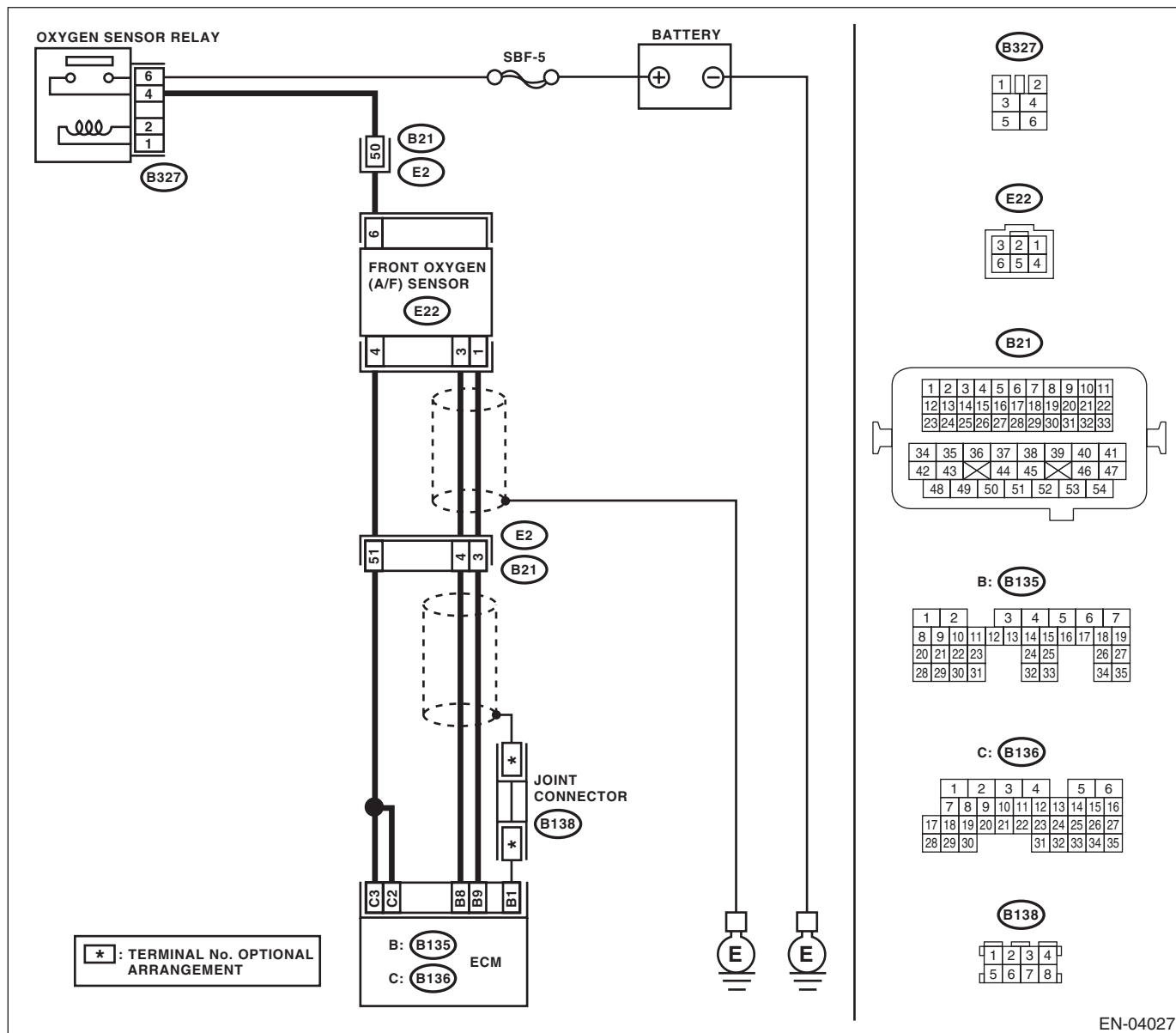
DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-59, DTC P0132 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04027

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No	
1	CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.	Does water enter the connector?	Dry the water thoroughly.	Go to step 2.
2	CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. 1) Turn the ignition switch to ON. 2) Disconnect the connector from front oxygen (A/F) sensor. 3) Measure the voltage of harness between ECM connector and chassis ground. Connector & terminal (B135) No. 9 (+) — Chassis ground (-): (B135) No. 8 (+) — Chassis ground (-):	Is the voltage more than 8 V?	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4SO)-32, Front Oxygen (A/F) Sensor.>	Repair the battery short circuit of harness between ECM and front oxygen (A/F) sensor connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AD:DTC P0133 O2 SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 1)

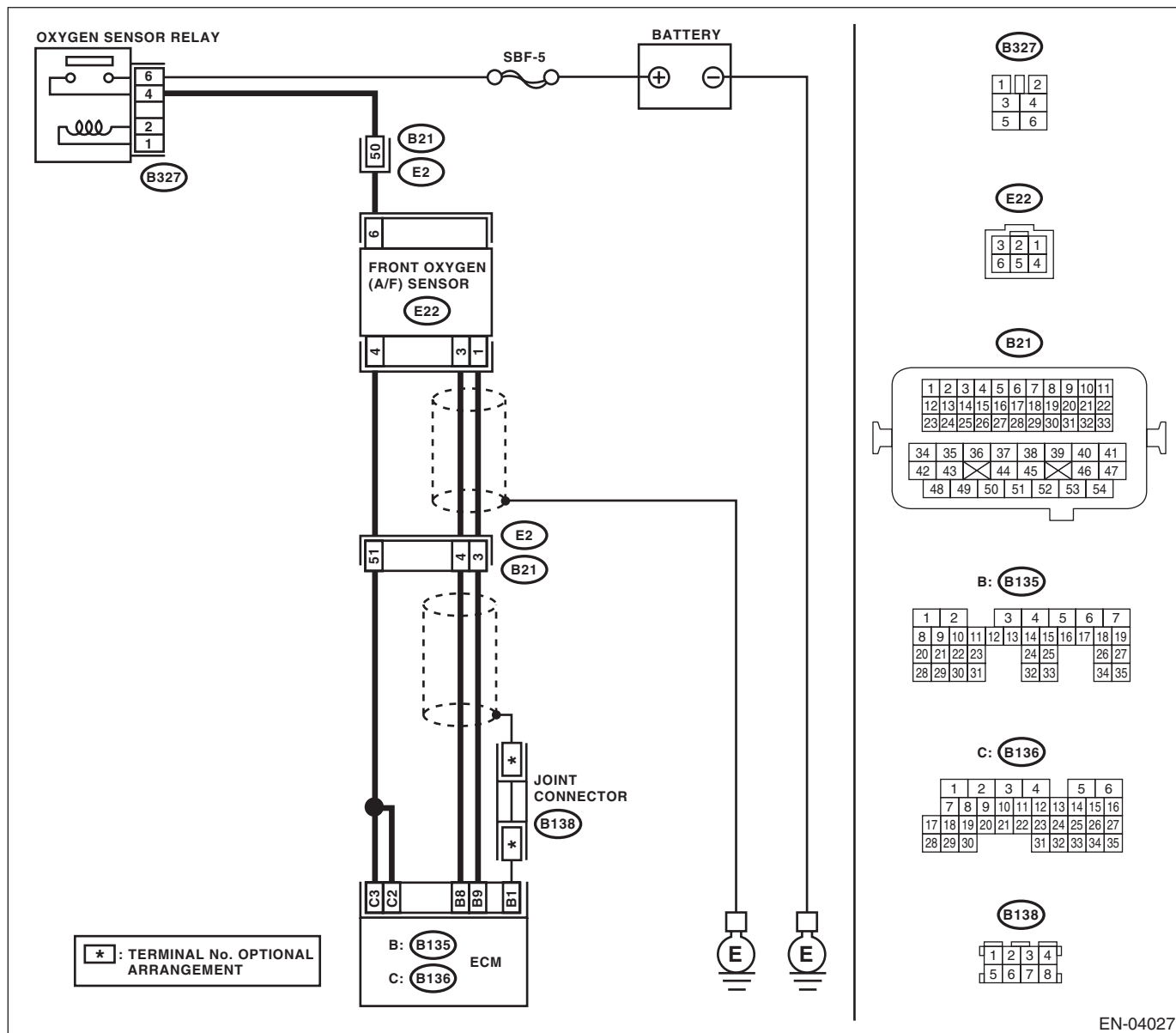
DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-61, DTC P0133 O2 SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04027

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0133.	Go to step 2.
2 CHECK EXHAUST SYSTEM. NOTE: Check the following items. • Loose installation of front portion of exhaust pipe onto cylinder heads • Loose connection between front exhaust pipe and front catalytic converter • Damage of exhaust pipe resulting in a hole	Is there any fault in exhaust system?	Repair the exhaust system.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4SO)-32, Front Oxygen (A/F) Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AE:DTC P0134 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK 1 SENSOR 1)

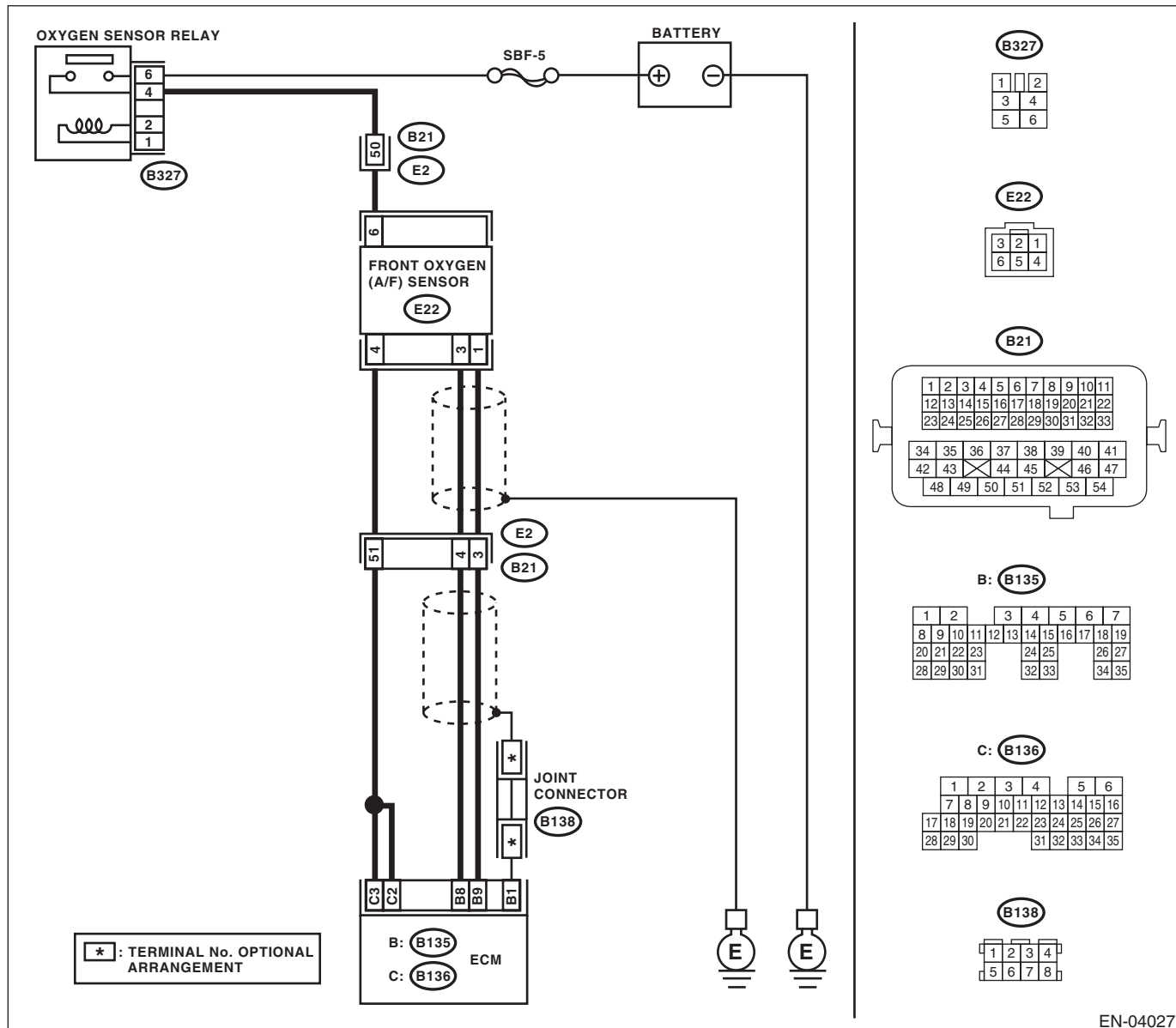
DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-64, DTC P0134 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>

WIRING DIAGRAM:



EN-04027

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and front oxygen (A/F) sensor connector. 3) Measure the resistance of harness between ECM and front oxygen (A/F) sensor connector. Connector & terminal (B135) No. 9 — (E22) No. 1: (B135) No. 8 — (E22) No. 3:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and front oxygen (A/F) sensor connector • Poor contact in front oxygen (A/F) sensor connector • Poor contact in ECM connector
2 CHECK POOR CONTACT. Check poor contact of front oxygen (A/F) sensor connector.	Is there poor contact in front oxygen (A/F) sensor connector?	Repair the poor contact of the front oxygen (A/F) sensor connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4SO)-32, Front Oxygen (A/F) Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AF:DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 2)

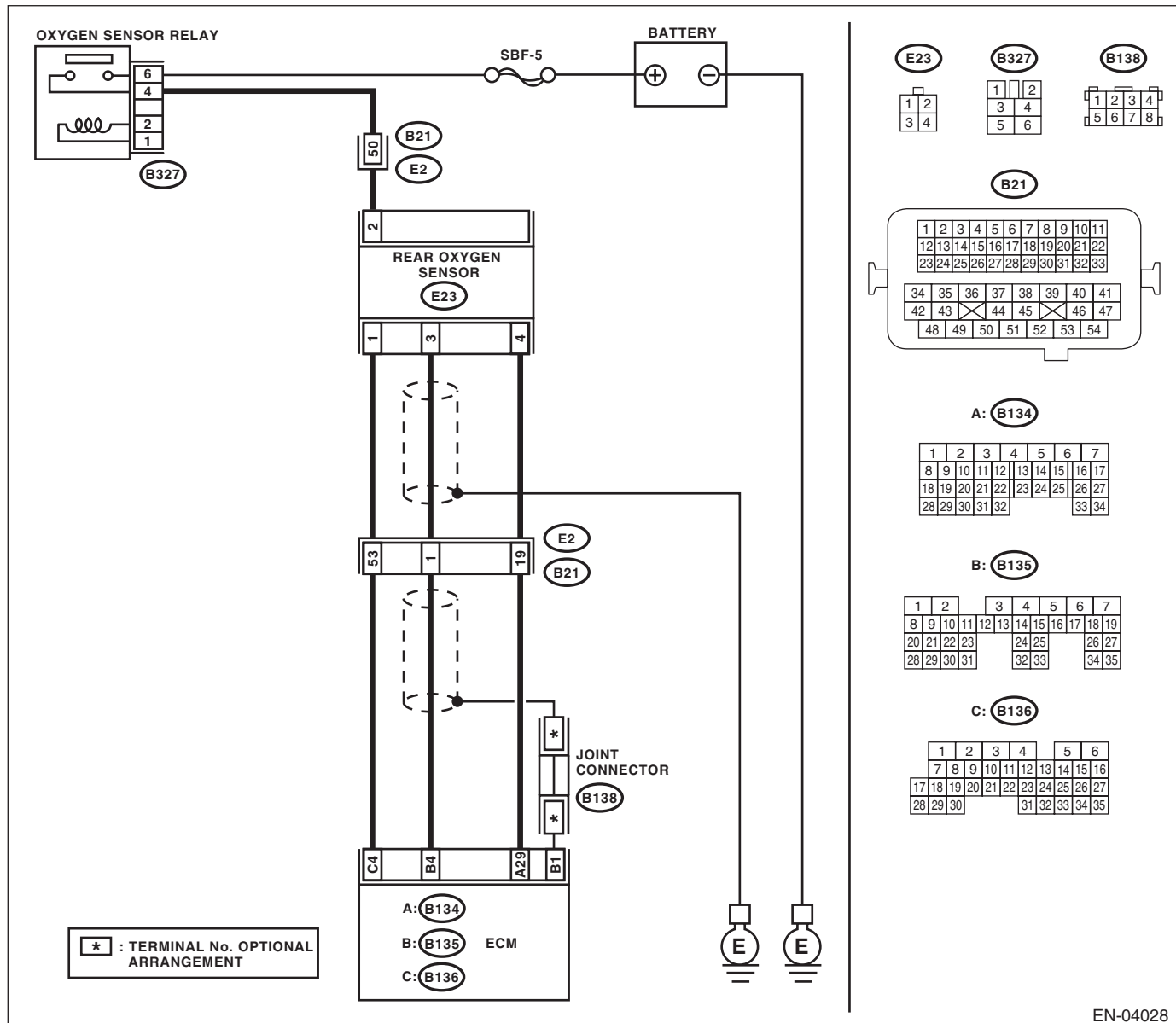
DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-66, DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04028

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0137.	Go to step 2.
2 CHECK REAR OXYGEN SENSOR DATA. 1) Warm-up the engine until engine coolant temperature is above 70°C (158°F), and keep the engine speed at 3,000 rpm. (Max. 2 minutes) 2) Read the data of rear oxygen sensor signal using Subaru Select Monitor or general scan tool. NOTE: • For MT model, depress the clutch pedal. • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the voltage 490 mV or more?	Go to step 6.	Go to step 3.
3 CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.	Does water enter the connector?	Dry the water thoroughly.	Go to step 4.
4 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM and rear oxygen sensor connector. Connector & terminal (B135) No. 4 — (E23) No. 3: (B134) No. 29 — (E23) No. 4:	Is the resistance more than 3 Ω?	Repair the open circuit of harness between ECM and rear oxygen sensor connector.	Go to step 5.
5 CHECK HARNESS BETWEEN REAR OXYGEN SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the rear oxygen sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between rear oxygen sensor harness connector and engine ground or chassis ground. Connector & terminal (E23) No. 3 (+) — Engine ground (-):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4SO)-34, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between rear oxygen sensor and ECM connector • Poor contact of the rear oxygen sensor connector • Poor contact in ECM connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

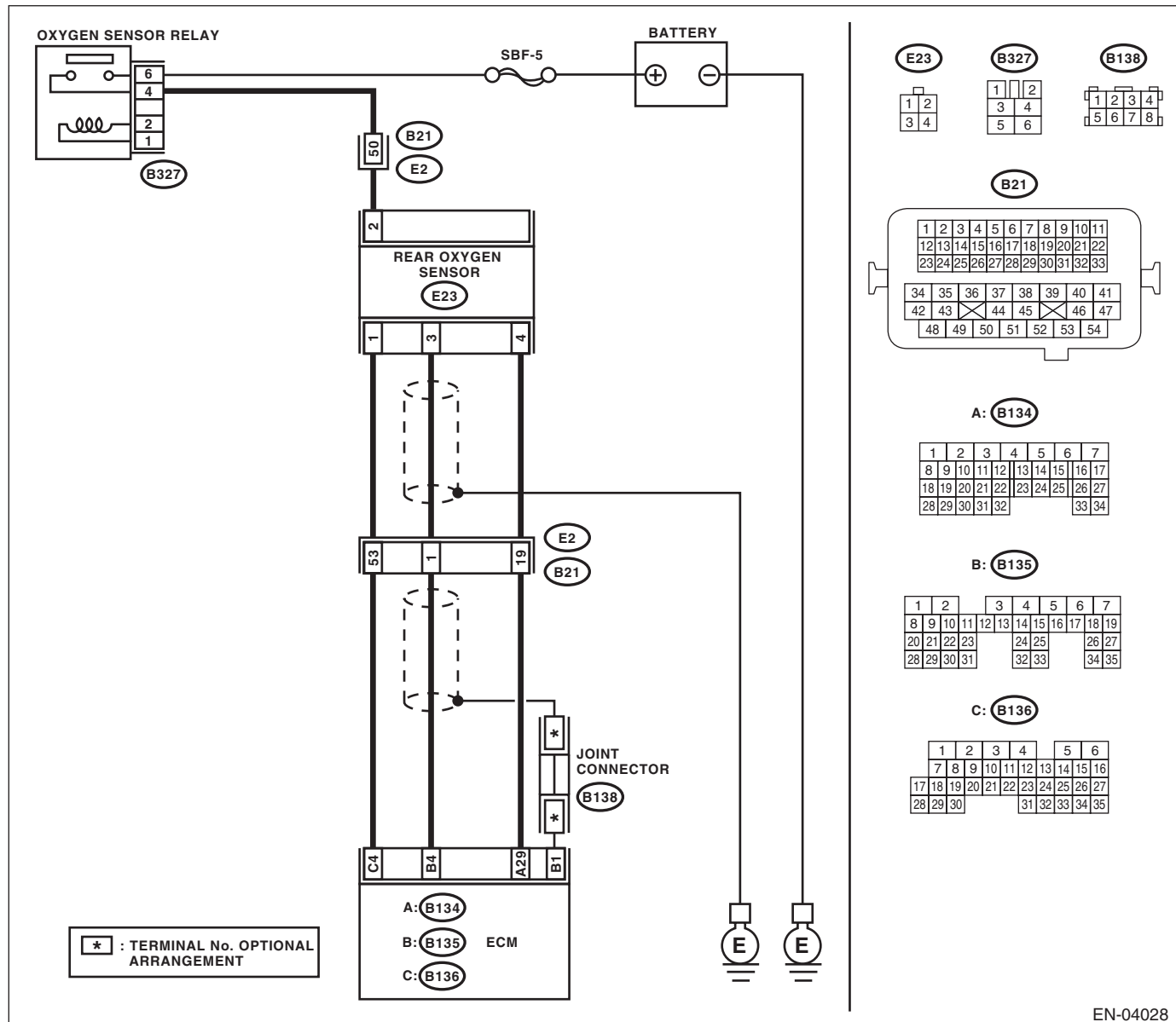
Step		Check	Yes	No
6	CHECK EXHAUST SYSTEM. Check exhaust system parts. NOTE: Check the following items. • Loose installation of portions • Damage (crack, hole etc.) of parts • Looseness and improper fitting of parts between front oxygen (A/F) sensor and rear oxygen sensor	Is there any fault in exhaust system?	Repair or replace faulty parts.	Replace the rear oxygen sensor. <Ref. to FU(H4SO)-34, Rear Oxygen Sensor.>

AG:DTC P0138 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 2)**DTC DETECTING CONDITION:**

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-68, DTC P0138 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

EN-04028

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0138.	Go to step 2.
2 CHECK REAR OXYGEN SENSOR DATA. 1) Warm-up the engine until engine coolant temperature is above 70°C (158°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the data of rear oxygen sensor signal using Subaru Select Monitor or general scan tool. NOTE: • For MT model, depress the clutch pedal. • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the voltage 250 mV or less?	Go to step 6.	Go to step 3.
3 CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.	Does water enter the connector?	Dry the water thoroughly.	Go to step 4.
4 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM and rear oxygen sensor connector. Connector & terminal (B135) No. 4 — (E23) No. 3: (B134) No. 29 — (E23) No. 4:	Is the resistance more than 3 Ω?	Repair the open circuit of harness between ECM and rear oxygen sensor connector.	Go to step 5.
5 CHECK HARNESS BETWEEN REAR OXYGEN SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the rear oxygen sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between rear oxygen sensor harness connector and engine ground or chassis ground. Connector & terminal (E23) No. 3 (+) — Engine ground (-):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4SO)-34, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between rear oxygen sensor and ECM connector • Poor contact of the rear oxygen sensor connector • Poor contact in ECM connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step		Check	Yes	No
6	CHECK EXHAUST SYSTEM. Check exhaust system parts. NOTE: Check the following items. • Loose installation of portions • Damage (crack, hole etc.) of parts • Looseness and improper fitting of parts between front oxygen (A/F) sensor and rear oxygen sensor	Is there any fault in exhaust system?	Repair or replace faulty parts.	Replace the rear oxygen sensor. <Ref. to FU(H4SO)-34, Rear Oxygen Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AH:DTC P0139 O2 SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 2)

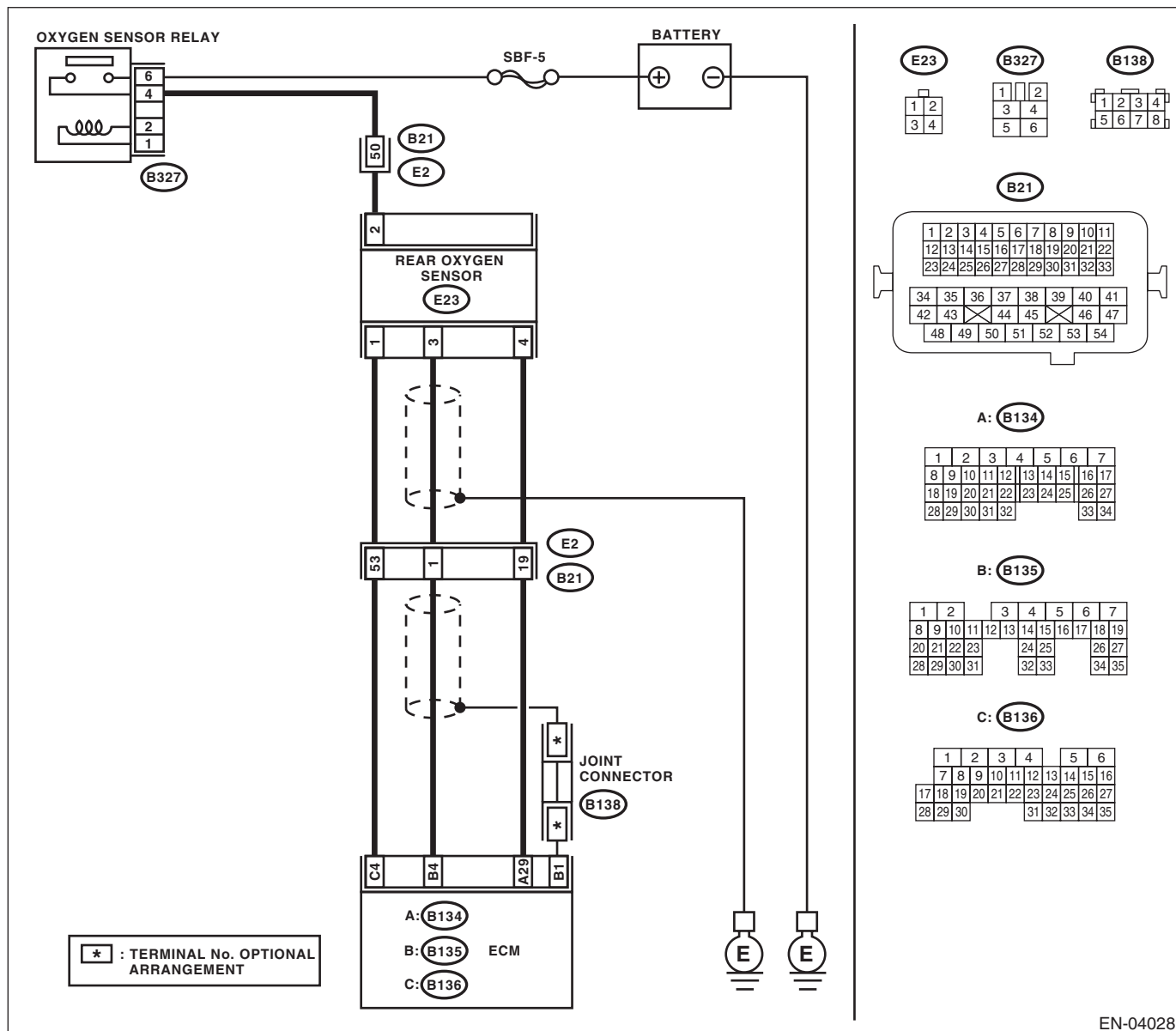
DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-69, DTC P0139 O2 SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04028

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0139.	Go to step 2.
2 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM and rear oxygen sensor connector. Connector & terminal (B135) No. 4 — (E23) No. 3:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit of harness between ECM and rear oxygen sensor connector.
3 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. Measure the resistance between rear oxygen sensor harness connector and chassis ground. Connector & terminal (E23) No. 3 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 4.	Repair the chassis short circuit of harness.
4 CHECK REAR OXYGEN SENSOR. Measure the resistance between the rear oxygen sensor connectors. Terminals No. 3 — No. 4:	Is the resistance less than 1 Ω ?	Replace the rear oxygen sensor. <Ref. to FU(H4SO)-34, Rear Oxygen Sensor.>	Temporary poor contact occurs. Check poor contact of connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AI: DTC P0140 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK1 SENSOR2)

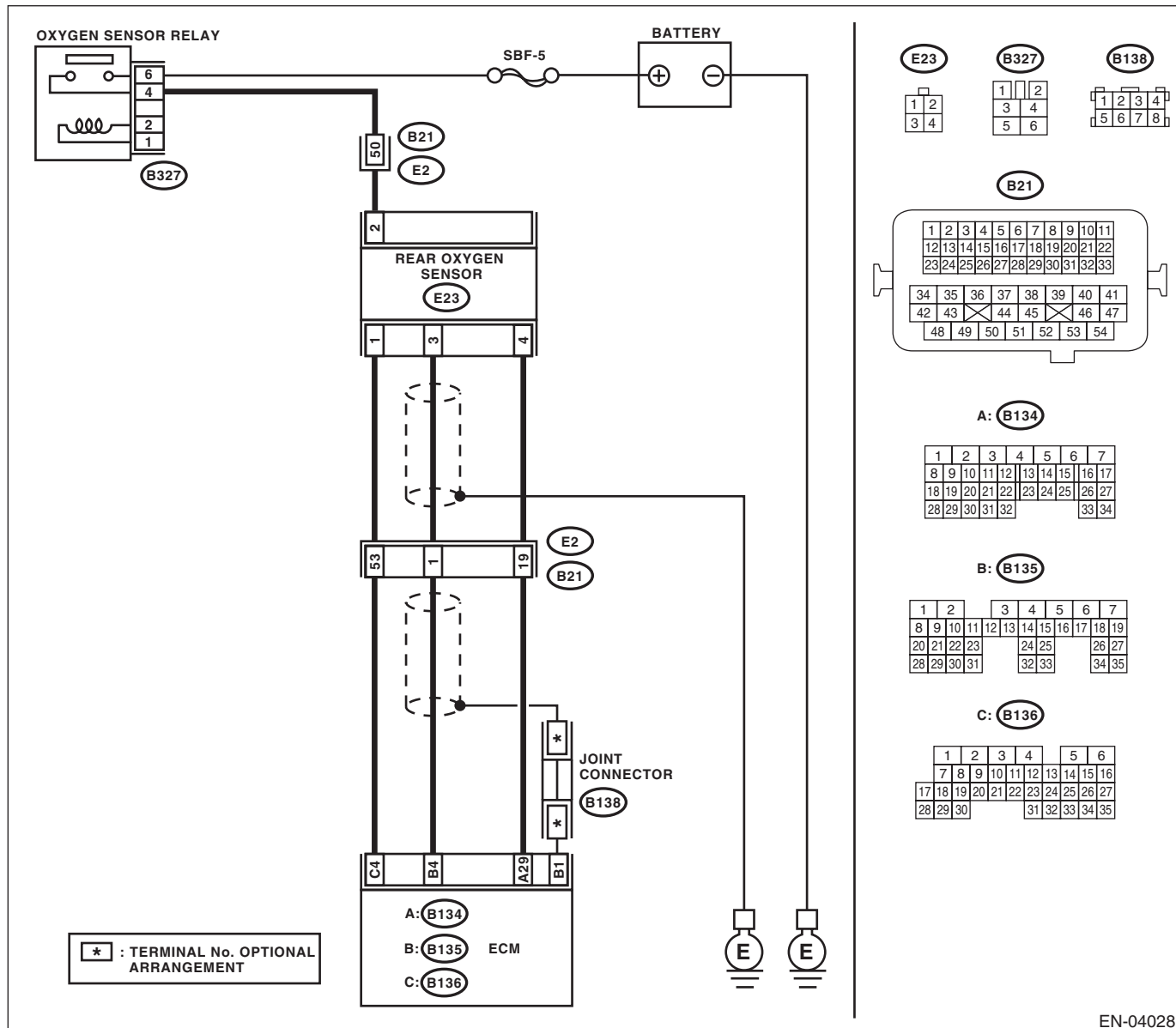
DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-69, DTC P0139 O2 SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>

WIRING DIAGRAM:



EN-04028

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0140.	Go to step 2.
2 CHECK REAR OXYGEN SENSOR DATA. 1) Warm-up the engine until engine coolant temperature is above 70°C (158°F), and keep the engine speed at 3,000 rpm. (Max. 2 minutes) 2) Read the data of rear oxygen sensor signal using Subaru Select Monitor or general scan tool. NOTE: • For MT model, depress the clutch pedal. • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the "General Scan Tool Instruction Manual".	Is the voltage more than 490 mV?	Go to step 7.	Go to step 3.
3 CHECK REAR OXYGEN SENSOR DATA. 1) Warm-up the engine until engine coolant temperature is above 70°C (158°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the data of rear oxygen sensor signal using Subaru Select Monitor or general scan tool. NOTE: • For MT model, depress the clutch pedal. • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the "General Scan Tool Instruction Manual".	Is the voltage 250 mV or less?	Go to step 7.	Go to step 4.
4 CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.	Does water enter the connector?	Dry the water thoroughly.	Go to step 5.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM and rear oxygen sensor connector. Connector & terminal (B135) No. 4 — (E23) No. 3: (B134) No. 29 — (E23) No. 4:	Is the resistance more than 3Ω?	Repair the open circuit of harness between ECM and rear oxygen sensor connector.	Go to step 6.
6 CHECK HARNESS BETWEEN REAR OXYGEN SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from rear oxygen sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between rear oxygen sensor harness connector and chassis ground. Connector & terminal (E23) No. 3 (+) — Chassis ground (-):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4SO)-34, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between rear oxygen sensor and ECM connector • Poor contact in rear oxygen sensor connector • Poor contact in ECM connector
7 CHECK EXHAUST SYSTEM. Check exhaust system parts. NOTE: Check the following items. • Looseness and improper fitting of exhaust system parts • Damage (crack, hole etc.) of parts • Looseness and improper fitting of parts between front oxygen (A/F) sensor and rear oxygen sensor	Is there any fault in exhaust system?	Repair or replace faulty parts.	Replace the rear oxygen sensor. <Ref. to FU(H4SO)-34, Rear Oxygen Sensor.>

AJ:DTC P0171 SYSTEM TOO LEAN (BANK 1)

Refer to DTC P0172 for diagnostic procedure. <Ref. to EN(H4SO U5)(diag)-157, DTC P0172 SYSTEM TOO RICH (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AK:DTC P0172 SYSTEM TOO RICH (BANK 1)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-78, DTC P0172 SYSTEM TOO RICH (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK EXHAUST SYSTEM.	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step 2.
2 CHECK AIR INTAKE SYSTEM.	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step 3.
3 CHECK FUEL PRESSURE. WARNING: • Place “NO FIRE” signs near the working area. • Be careful not to spill fuel. Measure the fuel pressure. <Ref. to ME(H4SO)-25, INSPECTION, Fuel Pressure.> WARNING: Release fuel pressure before removing the fuel pressure gauge.	Is the fuel pressure 339.5 — 360.5 kPa (3.5 — 3.7 kgf/cm ² , 49 — 52 psi)?	Go to step 4.	Repair the following item. Fuel pressure is too high: • Clogged fuel line or bent hose Fuel pressure is too low: • Improper fuel pump discharge • Clogged fuel line
4 CHECK ENGINE COOLANT TEMPERATURE SENSOR. 1) Start the engine and warm-up completely. 2) Read the data of engine coolant temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the engine coolant temperature above 60°C (140°F) ?	Go to step 5.	Replace the engine coolant temperature sensor. <Ref. to FU(H4SO)-19, Engine Coolant Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F). 2) Place the select lever in "N" or "P" position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the data of mass air flow and intake air temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the measured value 2.1 — 3.4 g/s (0.28 — 0.45 lb/m)?	Go to step 6.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4SO)-25, Mass Air Flow and Intake Air Temperature Sensor.>
6 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F). 2) Place the shift lever in neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Open the front hood. 6) Measure the ambient temperature. 7) Read the data of mass air flow and intake air temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Subtract ambient temperature from intake air temperature. Is the obtained value -10 — 50°C (-18 — 90°F)?	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Check the mass air flow and intake air temperature sensor. <Ref. to FU(H4SO)-25, Mass Air Flow and Intake Air Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

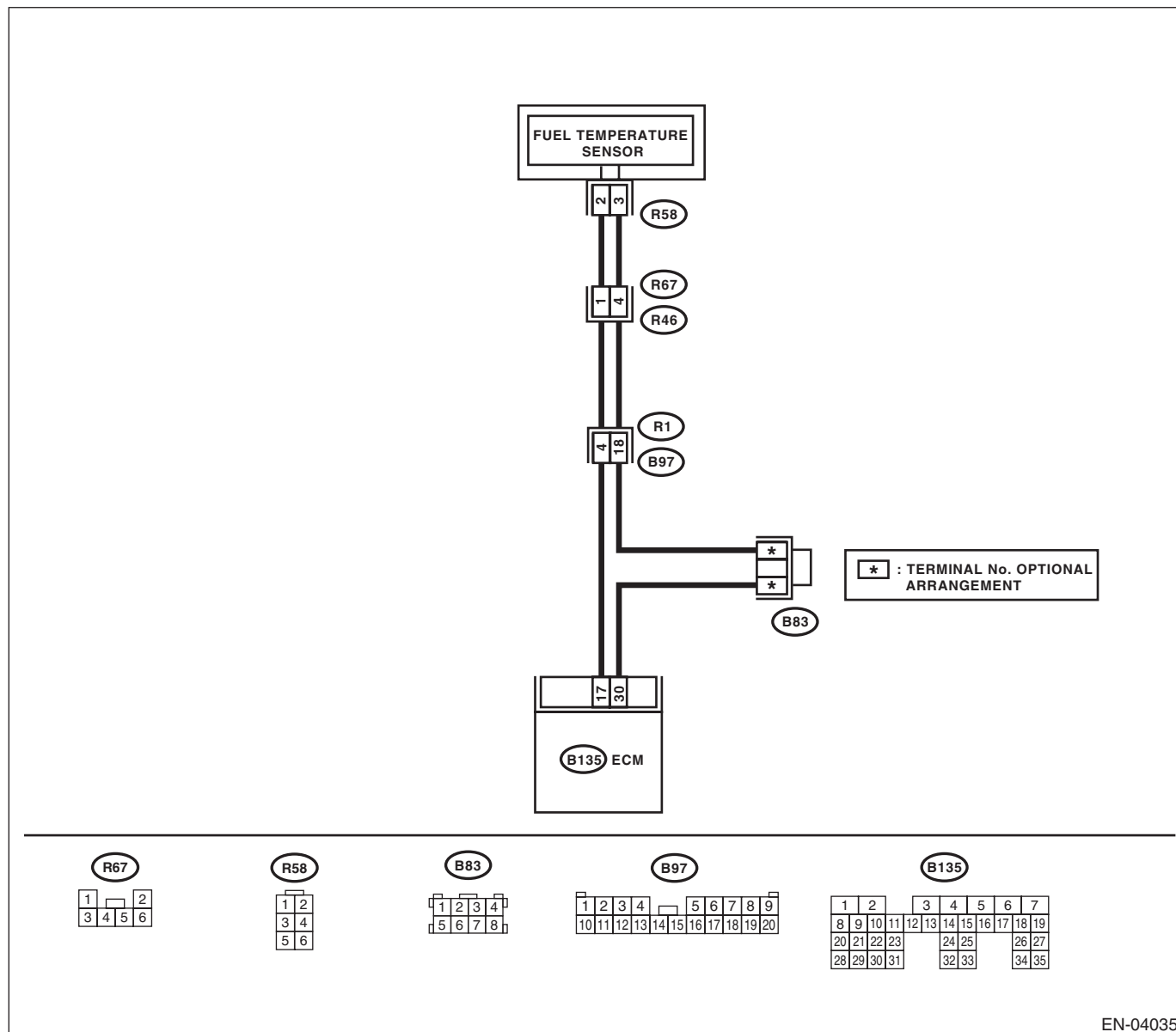
Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0181.	Replace the fuel temperature sensor. <Ref. to EC(H4SO)-9, Fuel Temperature Sensor.>

AM:DTC P0182 FUEL TEMPERATURE SENSOR “A” CIRCUIT LOW INPUT**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-83, DTC P0182 FUEL TEMPERATURE SENSOR “A” CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

EN-04035

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

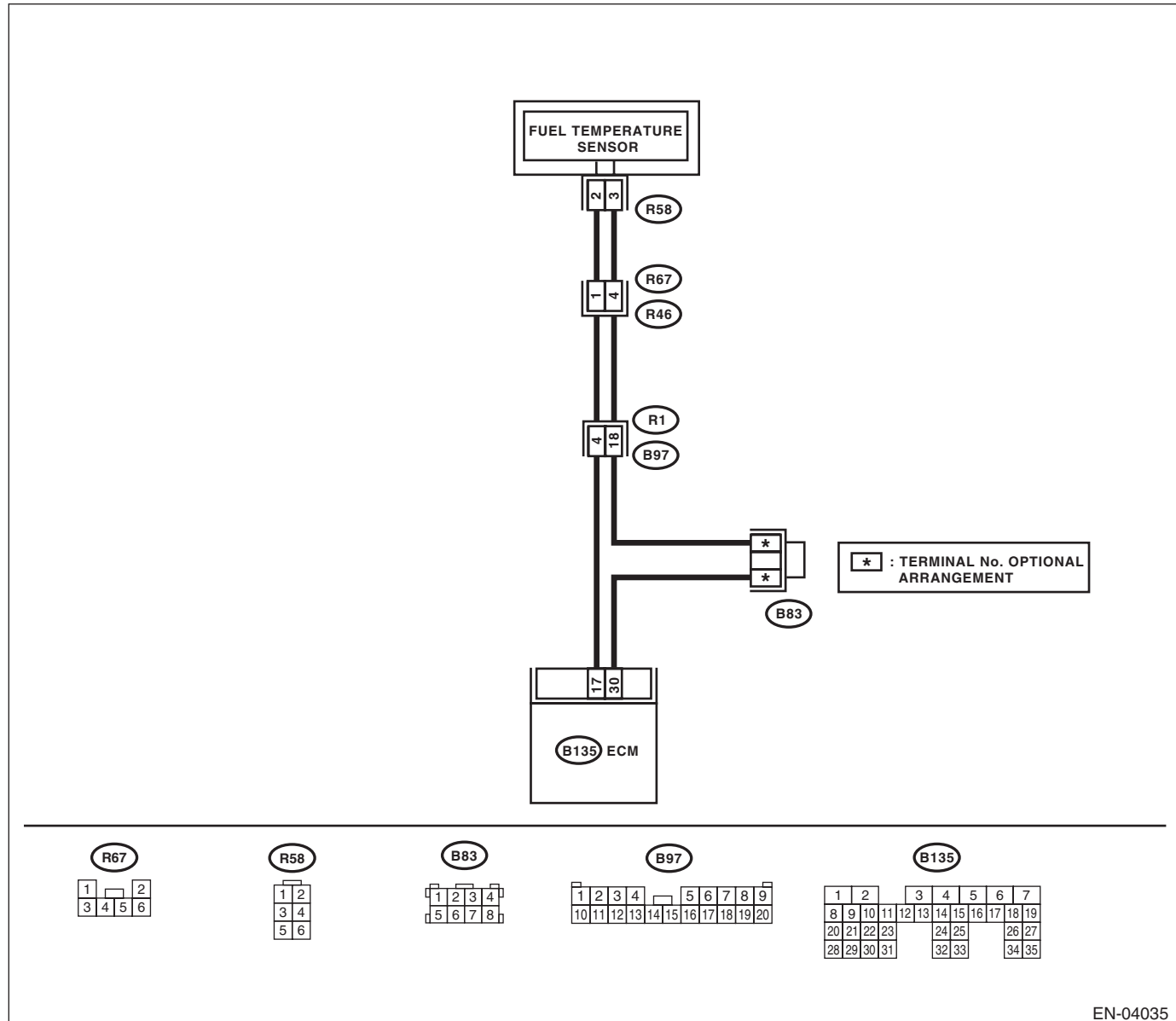
Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the data of fuel temperature sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the fuel temperature above 150°C (302°F) ?	Go to step 2.	Even if the malfunction indicator light illuminates, the circuit has returned to a normal condition at this time.
2 CHECK CURRENT DATA. 1) Turn the ignition switch to OFF. 2) Remove the access hole lid. 3) Disconnect the connector from fuel pump. 4) Turn the ignition switch to ON. 5) Read the data of fuel temperature sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the fuel temperature less than -40°C (-40°F) ?	Replace the fuel temperature sensor. <Ref. to EC(H4SO)-9, Fuel Temperature Sensor.>	Repair the ground short circuit of the harness between fuel injector and ECM connector.

AN:DTC P0183 FUEL TEMPERATURE SENSOR “A” CIRCUIT HIGH INPUT**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-85, DTC P0183 FUEL TEMPERATURE SENSOR “A” CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

EN-04035

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the data of fuel temperature sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the fuel temperature less than -40°C (-40°F) ?	Go to step 2.	Repair the poor contact. NOTE: In this case, repair the following item: • Poor contact in fuel pump connector • Poor contact in ECM connector • Poor contact of coupling connector • Poor contact of joint connector
2 CHECK HARNESS BETWEEN FUEL TEMPERATURE SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Remove the access hole lid. 3) Disconnect the connector from fuel pump. 4) Measure the voltage between fuel pump connector and chassis ground. Connector & terminal (R58) No. 2 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and fuel pump connector.	Go to step 3.
3 CHECK HARNESS BETWEEN FUEL TEMPERATURE SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to ON. 2) Measure the voltage between fuel pump connector and chassis ground. Connector & terminal (R58) No. 2 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and fuel pump connector.	Go to step 4.
4 CHECK HARNESS BETWEEN FUEL TEMPERATURE SENSOR AND ECM CONNECTOR. Measure the voltage between fuel pump connector and chassis ground. Connector & terminal (R58) No. 2 (+) — Chassis ground (-):	Is the voltage more than 4 V?	Go to step 5.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and fuel pump connector • Poor contact in fuel pump connector • Poor contact in ECM connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK HARNESS BETWEEN FUEL TEMPERATURE SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance of harness between fuel pump connector and ECM. Connector & terminal (R58) No. 3 — (B135) No. 30:	Is the resistance less than 1 Ω ?	Replace the fuel temperature sensor. <Ref. to EC(H4SO)-9, Fuel Temperature Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and fuel pump connector • Poor contact in fuel pump connector • Poor contact in ECM connector • Poor contact of coupling connector • Poor contact of joint connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AO:DTC P0196 ENGINE OIL TEMPERATURE SENSOR CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-87, DTC P0196 ENGINE OIL TEMPERATURE SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

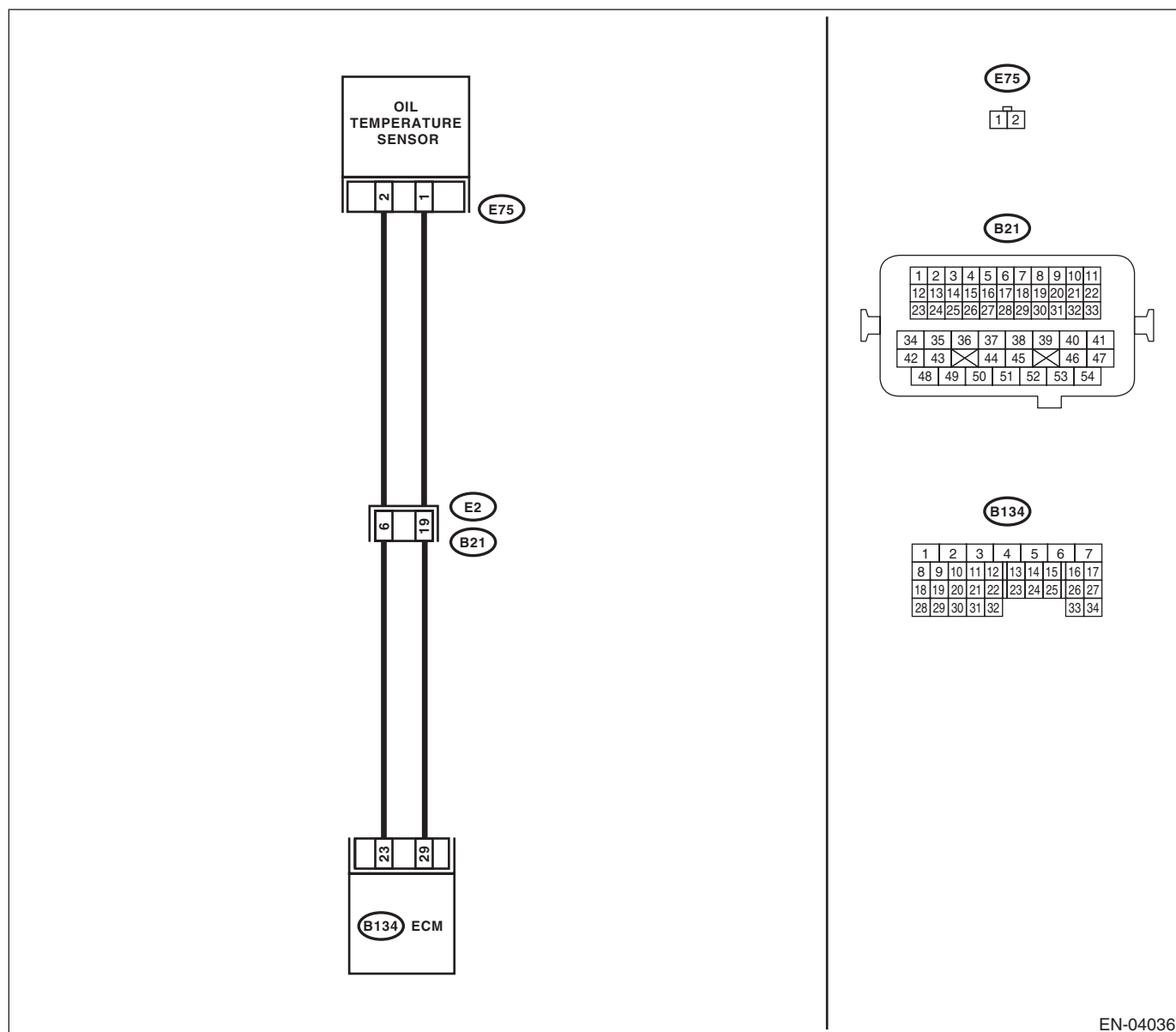
TROUBLE SYMPTOM:

- Hard to start
- Erroneous idling
- Poor driving performance

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04036

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trou- ble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0196.	Replace the oil temperature sen- sor. <Ref. to FU(H4SO)-31, Oil Temperature Sen- sor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AP:DTC P0197 ENGINE OIL TEMPERATURE SENSOR LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-89, DTC P0197 ENGINE OIL TEMPERATURE SENSOR LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

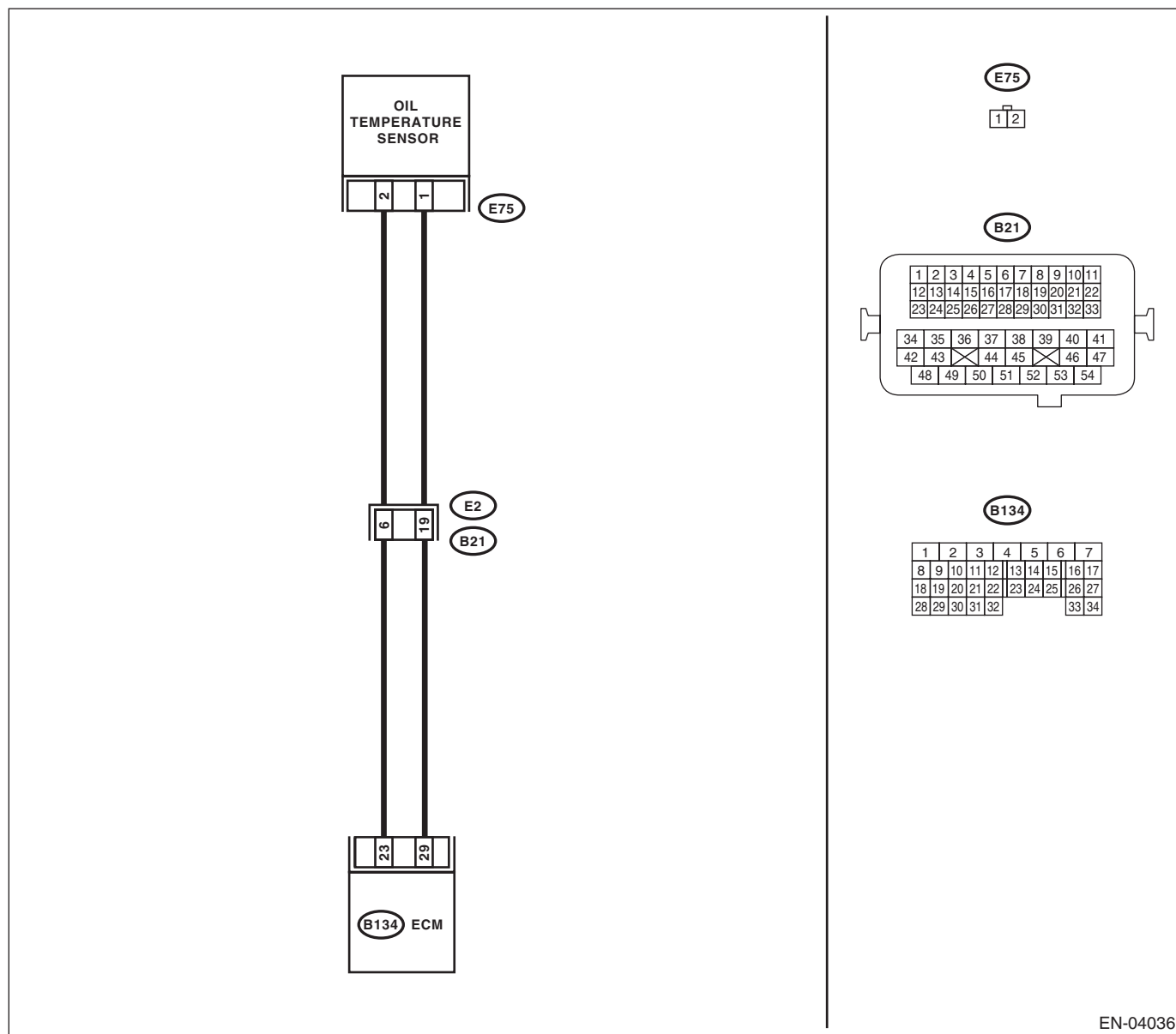
TROUBLE SYMPTOM:

- Hard to start
- Erroneous idling
- Poor driving performance

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04036

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN OIL TEMPERATURE SENSOR AND ECM CONNECTOR. 1) Disconnect the ECM connector and oil temperature sensor connector. 2) Measure the resistance of harness between oil temperature sensor connector and engine ground. Connector & terminal (B134) No. 23 — Engine ground: (B134) No. 29 — Engine ground:	Is the resistance more than 1 M Ω ?	Go to step 2.	Repair the ground short circuit between ECM and oil temperature sensor connector.
2 CHECK POOR CONTACT. Check poor contact of oil temperature sensor connector.	Is there poor contact in oil temperature sensor connector?	Repair the poor contact.	Replace the oil temperature sensor. <Ref. to FU(H4SO)-31, Oil Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AQ:DTC P0198 ENGINE OIL TEMPERATURE SENSOR HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-90, DTC P0198 ENGINE OIL TEMPERATURE SENSOR HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

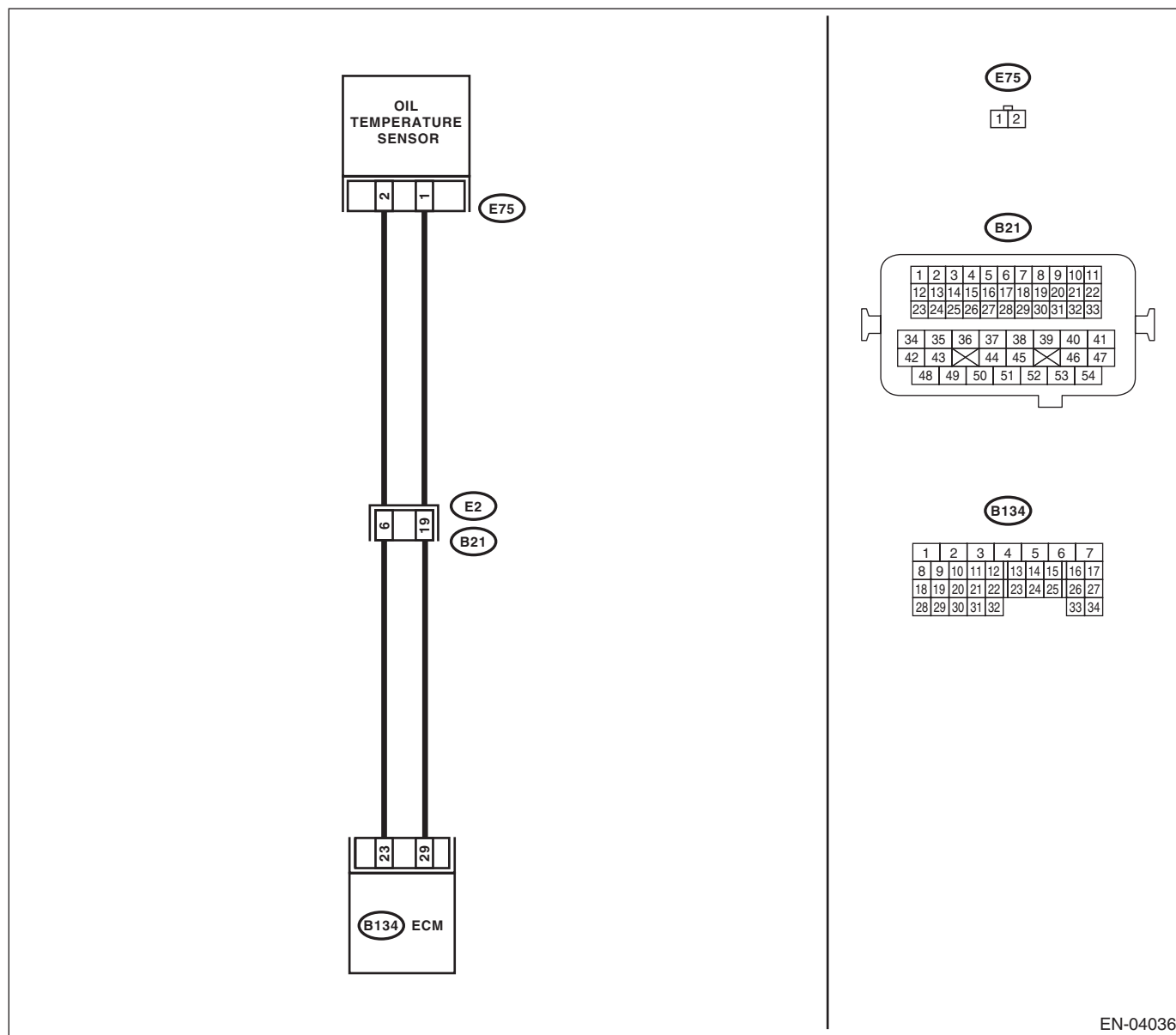
TROUBLE SYMPTOM:

- Hard to start
- Erroneous idling
- Poor driving performance

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04036

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN OIL TEMPERATURE SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the oil temperature sensor. 3) Measure the voltage between oil temperature sensor connector and engine ground. Connector & terminal (E75) No. 2 (+) — Engine ground (-):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and oil temperature sensor connector.	Go to step 2.
2 CHECK HARNESS BETWEEN OIL TEMPERATURE SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to ON. 2) Measure the voltage between oil temperature sensor connector and engine ground. Connector & terminal (E75) No. 2 (+) — Engine ground (-):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and oil temperature sensor connector.	Go to step 3.
3 CHECK HARNESS BETWEEN OIL TEMPERATURE SENSOR AND ECM CONNECTOR. Measure the voltage between oil temperature sensor connector and engine ground. Connector & terminal (E75) No. 2 (+) — Engine ground (-):	Is the voltage more than 4 V?	Go to step 4.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and oil temperature sensor connector • Poor contact of oil temperature sensor connector • Poor contact in ECM connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN OIL TEMPERATURE SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between oil temperature sensor connector and engine ground. Connector & terminal (E75) No. 1 — Engine ground:	Is the resistance less than 5 Ω ?	Replace the oil temperature sensor. <Ref. to FU(H4SO)-31, Oil Temperature Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and oil temperature sensor connector • Poor contact of oil temperature sensor connector • Poor contact in ECM connector • Poor contact of coupling connector • Poor contact of joint connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AR:DTC P0222 THROTTLE/PEDAL POSITION SENSOR/SWITCH “B” CIRCUIT LOW

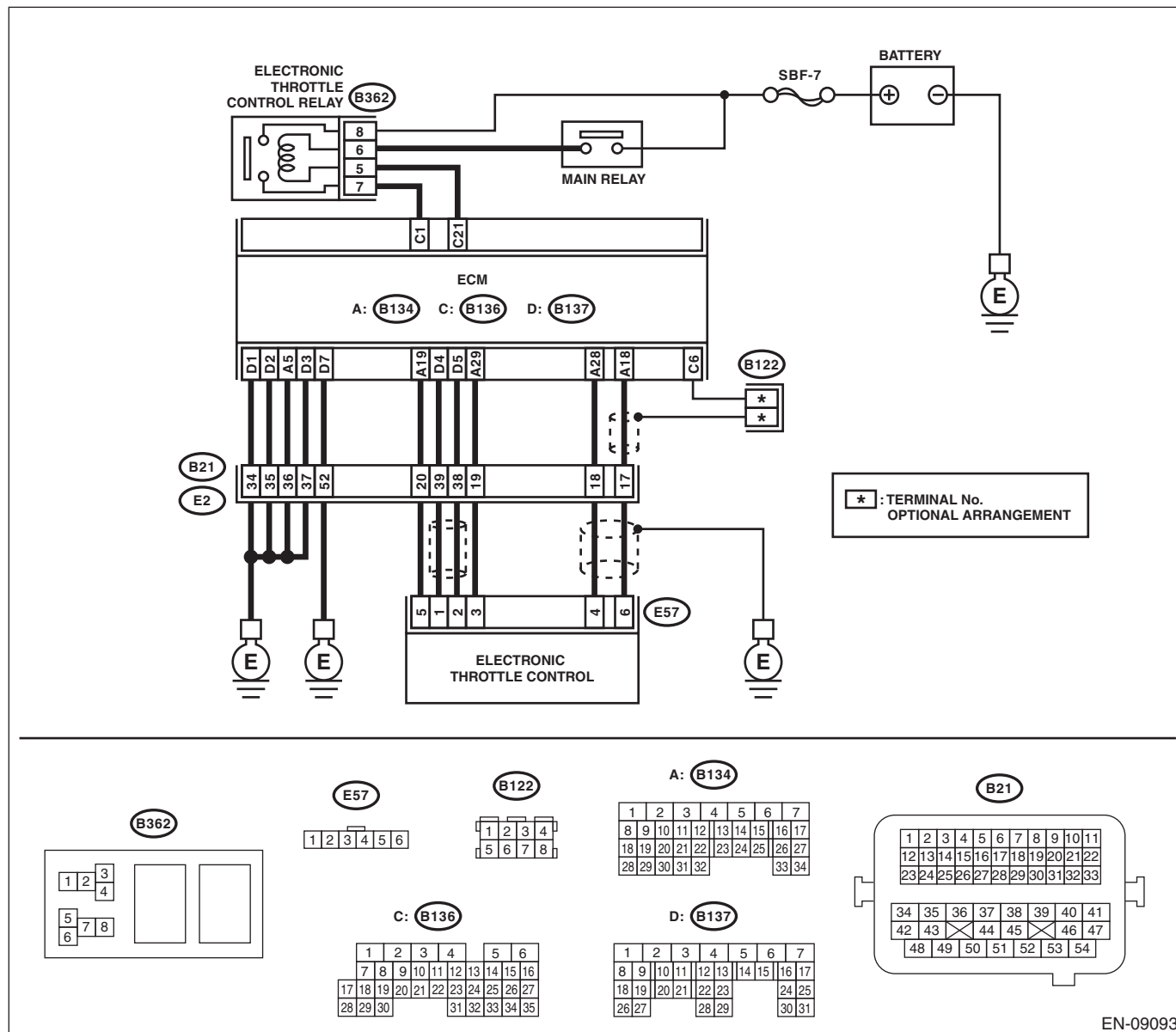
DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-91, DTC P0222 THROTTLE/PEDAL POSITION SENSOR/SWITCH “B” CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Erroneous idling
- Poor driving performance
- Engine stalls.

WIRING DIAGRAM:



EN-09093

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK SENSOR OUTPUT. 1) Turn the ignition switch to ON. 2) Read the data of sub throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage more than 0.8 V?	Go to step 2.	Go to step 3.
2 CHECK POOR CONTACT. Check poor contact in connector between ECM and electronic throttle control.	Is there poor contact?	Repair the poor contact.	Temporary poor contact occurred, but it is normal at present.
3 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from electronic throttle control. 4) Measure the resistance between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 28 — (E57) No. 4: (B134) No. 19 — (E57) No. 5:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness connector.
4 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 28 — Chassis ground: (B134) No. 19 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 5.	Repair the chassis short circuit of harness.
5 CHECK SENSOR POWER SUPPLY. 1) Connect the ECM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 5 (+) — Engine ground (-):	Is the voltage 4.5 — 5.5 V?	Go to step 6.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
6 CHECK SHORT CIRCUIT INSIDE THE ECM. 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 4 — Engine ground:	Is the resistance more than 10 Ω ?	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AS:DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH “B” CIRCUIT HIGH

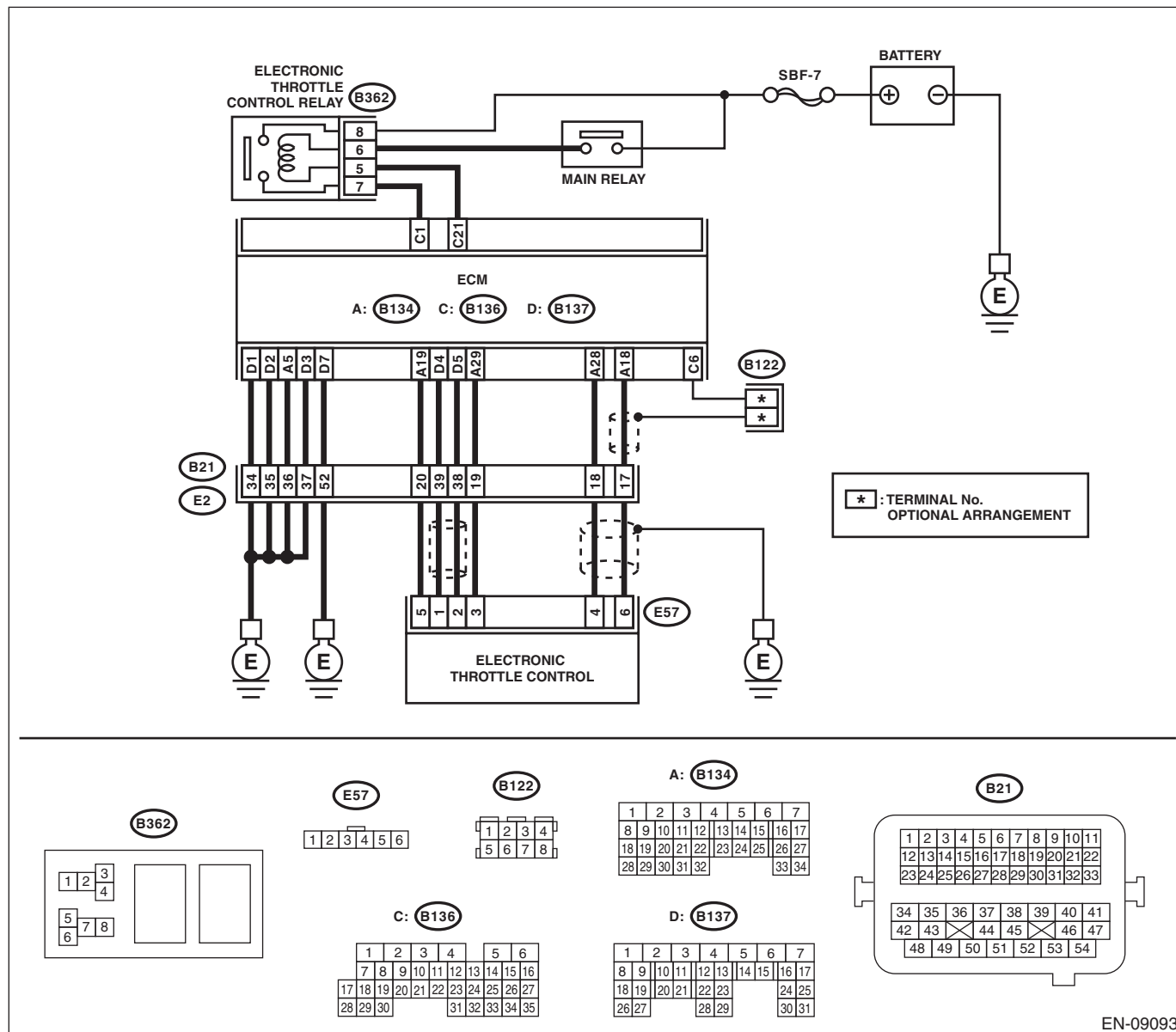
DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-93, DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH “B” CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Erroneous idling
- Poor driving performance
- Engine stalls.

WIRING DIAGRAM:



EN-09093

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK SENSOR OUTPUT. 1) Turn the ignition switch to ON. 2) Read the data of sub throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage less than 4.73 V?	Go to step 2.	Go to step 3.
2 CHECK POOR CONTACT. Check poor contact in connector between ECM and electronic throttle control.	Is there poor contact in connector between ECM and electronic throttle control?	Repair the poor contact.	Temporary poor contact occurred, but it is normal at present.
3 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from electronic throttle control. 4) Measure the resistance between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 29 — (E57) No. 3: (B134) No. 28 — (E57) No. 4:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness connector.
4 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Connect the ECM connector. 2) Measure the resistance between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 3 — Engine ground:	Is the resistance less than 5 Ω ?	Go to step 5.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
5 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 4 (+) — Engine ground (-):	Is the voltage less than 10 V?	Go to step 6.	Repair the battery short circuit of harness between ECM connector and electronic throttle control connector.
6 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance between connector terminals. Connector & terminal (B134) No. 28 — (B134) No. 19:	Is the resistance more than 1 M Ω ?	Repair the poor contact. Replace the electronic throttle control.	Sensor power supply circuit may be shorted.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AT:DTC P0301 CYLINDER 1 MISFIRE DETECTED

NOTE:

For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(H4SO U5)(diag)-177, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AU:DTC P0302 CYLINDER 2 MISFIRE DETECTED

NOTE:

For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(H4SO U5)(diag)-177, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AV:DTC P0303 CYLINDER 3 MISFIRE DETECTED

NOTE:

For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(H4SO U5)(diag)-177, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AW:DTC P0304 CYLINDER 4 MISFIRE DETECTED

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- Immediately at fault recognition (A misfire which could damage catalyst occurs.)
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-100, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

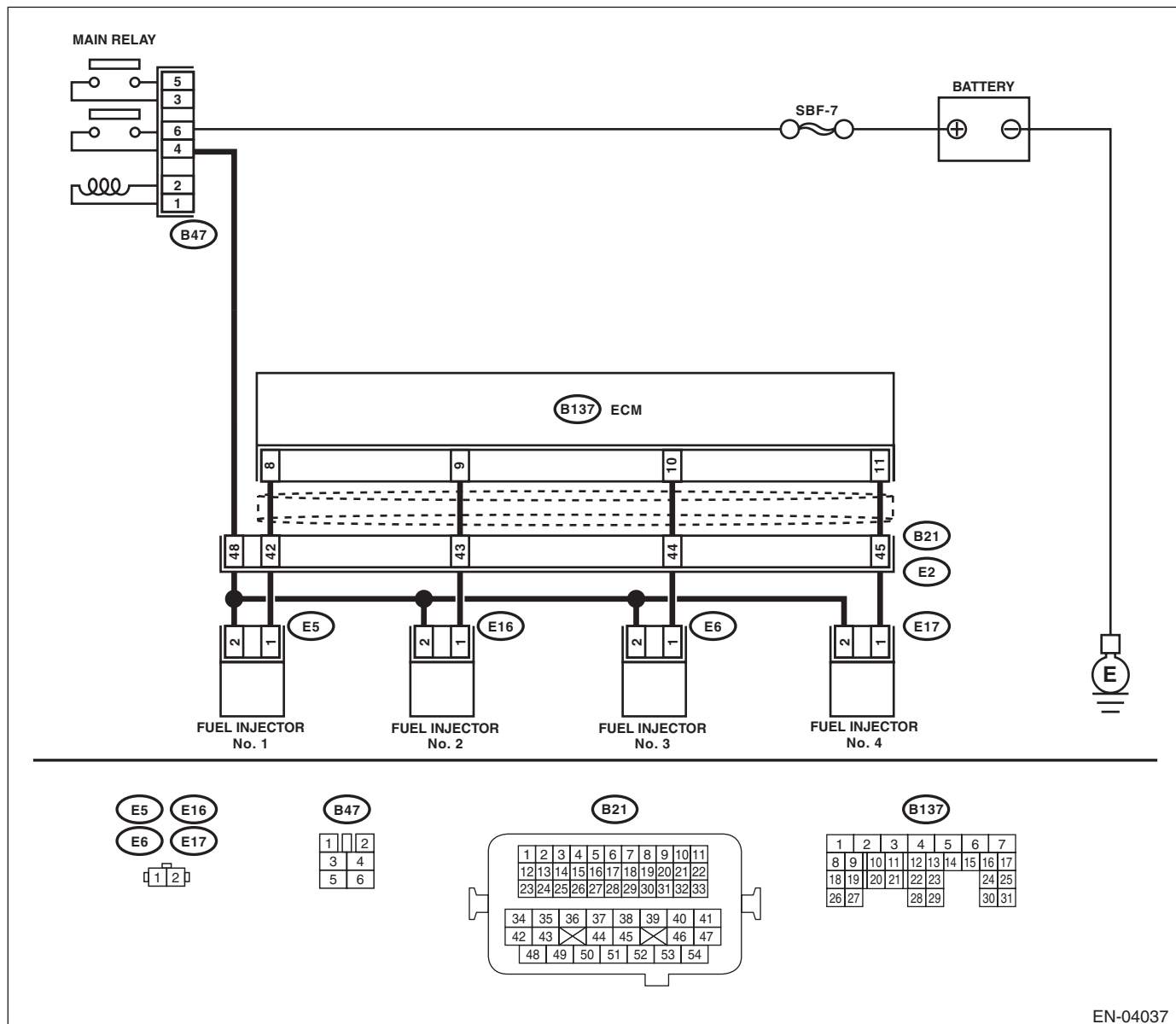
TROUBLE SYMPTOM:

- Engine stalls.
- Erroneous idling
- Rough driving

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0301, P0302, P0303 and P0304.	Go to step 2.
2 CHECK OUTPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground on faulty cylinders. Connector & terminal #1 (B137) No. 8 (+) — Chassis ground (-): #2 (B137) No. 9 (+) — Chassis ground (-): #3 (B137) No. 10 (+) — Chassis ground (-): #4 (B137) No. 11 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 7.	Go to step 3.
3 CHECK HARNESS BETWEEN FUEL INJECTOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Measure the resistance between ECM connector and engine ground on faulty cylinders. Connector & terminal #1 (E5) No. 1 — Engine ground: #2 (E16) No. 1 — Engine ground: #3 (E6) No. 1 — Engine ground: #4 (E17) No. 1 — Engine ground:	Is the resistance more than 1 MΩ?	Go to step 4.	Repair the ground short circuit of harness between fuel injector and ECM connector.
4 CHECK HARNESS BETWEEN FUEL INJECTOR AND ECM CONNECTOR. Measure the resistance of harness connector between ECM connector and fuel injector on faulty cylinders. Connector & terminal #1 (B137) No. 8 — (E5) No. 1: #2 (B137) No. 9 — (E16) No. 1: #3 (B137) No. 10 — (E6) No. 1: #4 (B137) No. 11 — (E17) No. 1:	Is the resistance less than 1 Ω?	Go to step 5.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and fuel injector connector • Poor contact of coupling connector
5 CHECK FUEL INJECTOR. Measure the resistance between fuel injector terminals on faulty cylinder. Terminals No. 1 — No. 2:	Is the resistance between 5 and 20 Ω?	Go to step 6.	Replace the faulty fuel injector. <Ref. to FU(H4SO)-27, Fuel Injector.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK POWER SUPPLY LINE. 1) Turn the ignition switch to ON. 2) Measure the voltage between fuel injector and engine ground on faulty cylinders. Connector & terminal #1 (E5) No. 2 (+) — Engine ground (-): #2 (E16) No. 2 (+) — Engine ground (-): #3 (E6) No. 2 (+) — Engine ground (-): #4 (E17) No. 2 (+) — Engine ground (-):	Is the voltage more than 10 V?	Repair the poor contact of all connectors in fuel injector circuit.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between main relay and fuel injector connector on faulty cylinders • Poor contact of coupling connector • Poor contact of main relay connector • Poor contact of fuel injector connector on faulty cylinders
7 CHECK HARNESS BETWEEN FUEL INJECTOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground on faulty cylinders. Connector & terminal #1 (B137) No. 8 (+) — Chassis ground (-): #2 (B137) No. 9 (+) — Chassis ground (-): #3 (B137) No. 10 (+) — Chassis ground (-): #4 (B137) No. 11 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and fuel injector. After repair, replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Go to step 8.
8 CHECK FUEL INJECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance between fuel injector terminals on faulty cylinder. Terminals No. 1 — No. 2:	Is the resistance less than 1 Ω ?	Replace the faulty fuel injector <Ref. to FU(H4SO)-27, Fuel Injector.> and ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Go to step 9.
9 CHECK INSTALLATION OF CAMSHAFT POSITION SENSOR/CRANKSHAFT POSITION SENSOR.	Is the camshaft position sensor or crankshaft position sensor loosely installed?	Tighten the camshaft position sensor or crankshaft position sensor.	Go to step 10.
10 CHECK CRANK SPROCKET. Remove the timing belt cover.	Is the crank sprocket rusted or does it have damaged teeth?	Replace the crank sprocket. <Ref. to ME(H4SO)-46, Crank Sprocket.>	Go to step 11.
11 CHECK INSTALLATION CONDITION OF TIMING BELT. Turn the crankshaft, and align alignment mark on crank sprocket with alignment mark on cylinder block.	Is the timing belt dislocated from its proper position?	Repair the installation condition of timing belt. <Ref. to ME(H4SO)-40, Timing Belt.>	Go to step 12.
12 CHECK FUEL LEVEL.	Is the fuel meter indication higher than the "Lower" level?	Go to step 13.	Refill the fuel so that fuel meter indication is higher than the "Lower" level. After filling fuel, Go to step 13.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
13 CHECK STATUS OF MALFUNCTION INDICATOR LIGHT. 1) Clear the memory using Subaru Select Monitor. <Ref. to EN(H4SO U5)(diag)-46, Clear Memory Mode.> 2) Start the engine, and drive the vehicle more than 10 minutes.	Does the malfunction indicator light illuminate or blink?	Go to step 16.	Go to step 14.
14 CHECK CAUSE OF MISFIRE.	Has the cause of misfire been detected while running the engine? Ex.: Disconnection of spark plug cord	Finish diagnostics operation, if the engine has no abnormality.	Go to step 15.
15 CHECK POOR CONTACT.	Is there poor contact in the ignition coil, fuel injector, ECM and coupling connector?	Repair the poor contact.	Contact your SOA Service Center after checking followings. NOTE: In this case, check the following: • Condition of fuel • Fuel additive used or not • Visually check spark plug • Visually check spark plug cord • Condition of engine oil
16 CHECK AIR INTAKE SYSTEM.	Is there any fault in air intake system?	Repair the air intake system. NOTE: Check the following items. • Are there air leaks or air suction caused by loose or dislocated nuts and bolts? • Are there cracks or any disconnection of hoses?	Go to step 17.
17 CHECK MISFIRE SYMPTOM. 1) Turn the ignition switch to ON. 2) Read the DTC. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual. • Perform the diagnosis according to following items.	Does the Subaru Select Monitor or general scan tool display only one DTC?	Go to step 22.	Go to step 18.
18 CHECK DTC.	Are DTCs P0301 and P0302 displayed on the Subaru Select Monitor or general scan tool?	Go to step 23.	Go to step 19.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step		Check	Yes	No
19	CHECK DTC.	Are DTCs P0303 and P0304 displayed on the Subaru Select Monitor or general scan tool?	Go to step 24.	Go to step 20.
20	CHECK DTC.	Are DTCs P0301 and P0303 displayed on the Subaru Select Monitor or general scan tool?	Go to step 25.	Go to step 21.
21	CHECK DTC.	Are DTCs P0302 and P0304 displayed on the Subaru Select Monitor or general scan tool?	Go to step 26.	Go to step 27.
22	ONLY ONE CYLINDER.	Is there any fault in the cylinder?	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Spark plug cord • Fuel injector • Compression ratio	Go to DTC P0171. <Ref. to EN(H4SO U5)(diag)-156, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
23	GROUP OF #1 AND #2 CYLINDERS.	Are there any faults in #1 and #2 cylinders?	Repair or replace faulty parts. NOTE: • Check the following items. • Spark plug • Fuel injector • Ignition coil • Compression ratio • If any fault are not found, check the "IGNITION CONTROL SYSTEM" of #1 and #2 cylinders side. <Ref. to EN(H4SO U5)(diag)-65, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Go to DTC P0171. <Ref. to EN(H4SO U5)(diag)-156, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
24 GROUP OF #3 AND #4 CYLINDERS.	Are there any faults in #3 and #4 cylinders?	Repair or replace faulty parts. NOTE: • Check the following items. • Spark plug • Fuel injector • Ignition coil • If any fault are not found, check the "IGNITION CONTROL SYSTEM" of #3 and #4 cylinders side. <Ref. to EN(H4SO U5)(diag)-65, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Go to DTC P0171. <Ref. to EN(H4SO U5)(diag)-156, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
25 GROUP OF #1 AND #3 CYLINDERS.	Are there any faults in #1 and #3 cylinders?	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Fuel injector • Skipping timing belt teeth	Go to DTC P0171. <Ref. to EN(H4SO U5)(diag)-156, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
26 GROUP OF #2 AND #4 CYLINDERS.	Are there any faults in #2 and #4 cylinders?	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Fuel injector • Compression ratio • Skipping timing belt teeth	Go to DTC P0171. <Ref. to EN(H4SO U5)(diag)-156, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
27 CYLINDER AT RANDOM.	Is the engine idle rough?	Go to DTC P0171. <Ref. to EN(H4SO U5)(diag)-156, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Fuel injector • Compression ratio

AX:DTC P0327 KNOCK SENSOR 1 CIRCUIT LOW (BANK 1 OR SINGLE SENSOR)**DTC DETECTING CONDITION:**

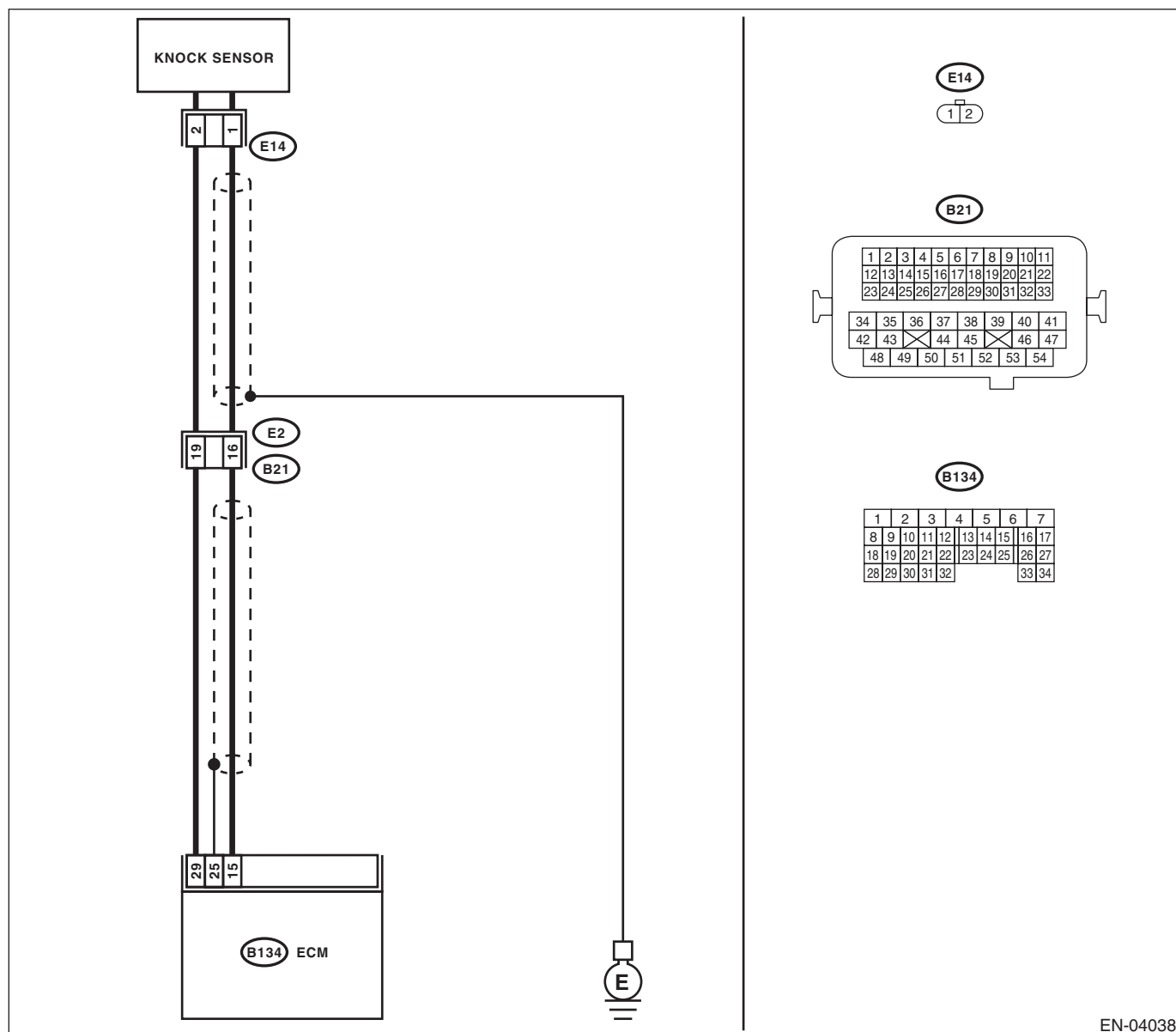
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-101, DTC P0327 KNOCK SENSOR 1 CIRCUIT LOW (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Poor driving performance
- Knocking occurs.

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

EN-04038

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN KNOCK SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance between ECM harness connector and chassis ground. Connector & terminal (B134) No. 15 — Chassis ground:	Is the resistance more than 700 k Ω ?	Go to step 2.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between knock sensor and ECM connector • Poor contact of knock sensor connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN KNOCK SENSOR AND ECM CONNECTOR. Measure the resistance between ECM and knock sensor connector. Connector & terminal (B134) No. 15 — (E14) No. 1: (B134) No. 29 — (E14) No. 2:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between knock sensor and ECM connector • Poor contact of knock sensor connector • Poor contact of coupling connector
3 CHECK KNOCK SENSOR. 1) Disconnect the connector from knock sensor. 2) Measure the resistance between knock sensor connector terminals. Terminals No. 1 — No. 2:	Is the resistance more than 700 k Ω ?	Replace the knock sensor. <Ref. to FU(H4SO)-22, Knock Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Poor contact of knock sensor connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AY:DTC P0328 KNOCK SENSOR 1 CIRCUIT HIGH (BANK 1 OR SINGLE SENSOR)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-103, DTC P0328 KNOCK SENSOR 1 CIRCUIT HIGH (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>

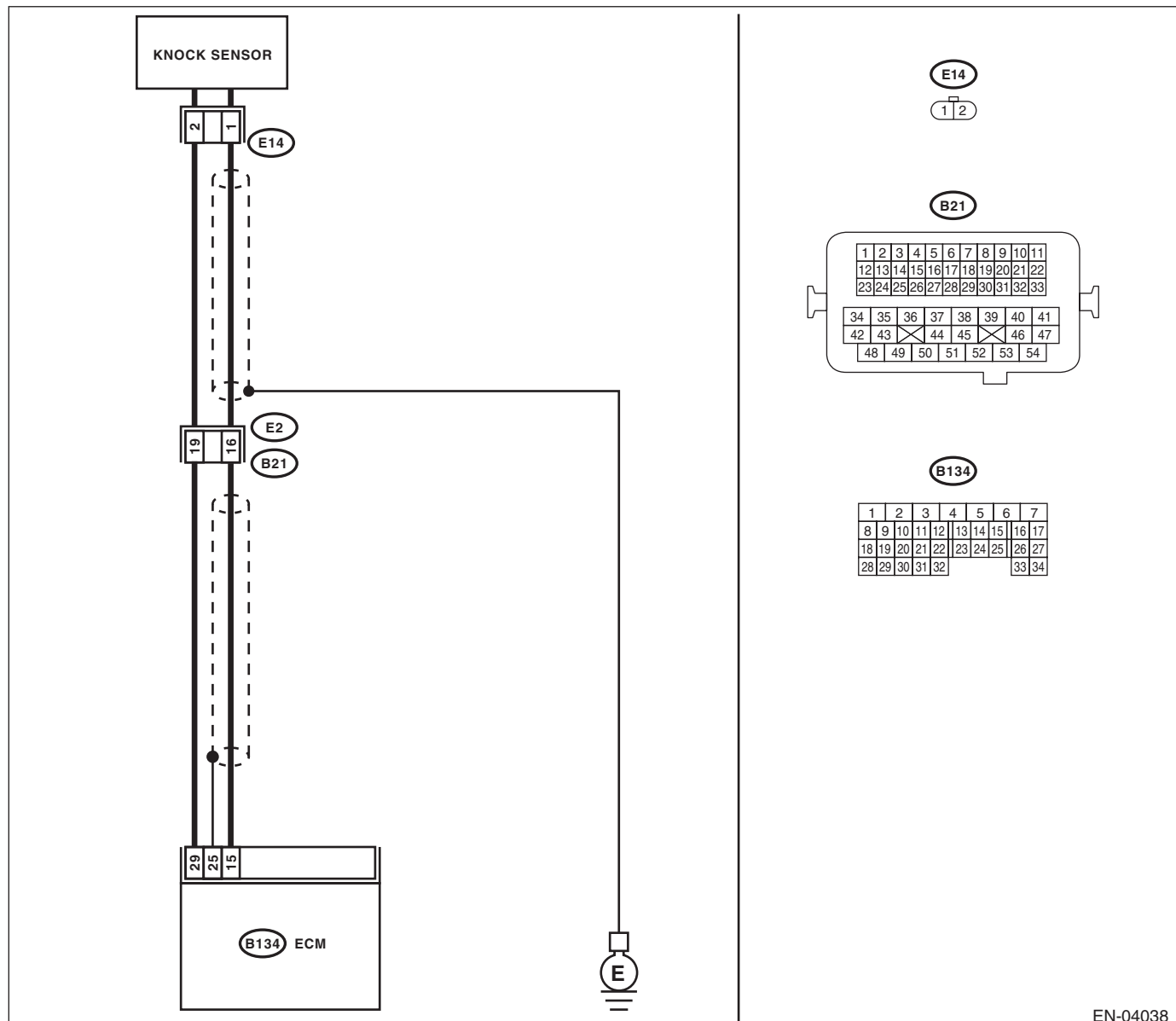
TROUBLE SYMPTOM:

- Poor driving performance
- Knocking occurs.

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN KNOCK SENSOR AND ECM CONNECTOR. Measure the resistance of harness between ECM connector and chassis ground. Connector & terminal (B134) No. 15 — Chassis ground:	Is the resistance less than 400 k Ω ?	Go to step 2.	Go to step 3.
2 CHECK KNOCK SENSOR. 1) Disconnect the connector from knock sensor. 2) Measure the resistance between knock sensor connector terminals. Terminals No. 1 — No. 2:	Is the resistance less than 400 k Ω ?	Replace the knock sensor. <Ref. to FU(H4SO)-22, Knock Sensor.>	Repair the ground short circuit of harness between knock sensor connector and ECM connector. NOTE: The harness between both connectors are shielded. Repair the short circuit of harness covered with shield.
3 CHECK INPUT SIGNAL OF ECM. 1) Connect the connectors to ECM and knock sensor. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM and chassis ground. Connector & terminal (B134) No. 15 (+) — Chassis ground (-):	Is the voltage more than 2 V?	Even if the malfunction indicator light illuminates, the circuit has returned to a normal condition at this time. (However, the possibility of poor contact still remains.) NOTE: In this case, repair the following item: • Poor contact of knock sensor connector • Poor contact in ECM connector • Poor contact of coupling connector	Repair the poor contact of ECM connector.

AZ:DTC P0335 CRANKSHAFT POSITION SENSOR "A" CIRCUIT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-105, DTC P0335 CRANKSHAFT POSITION SENSOR "A" CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

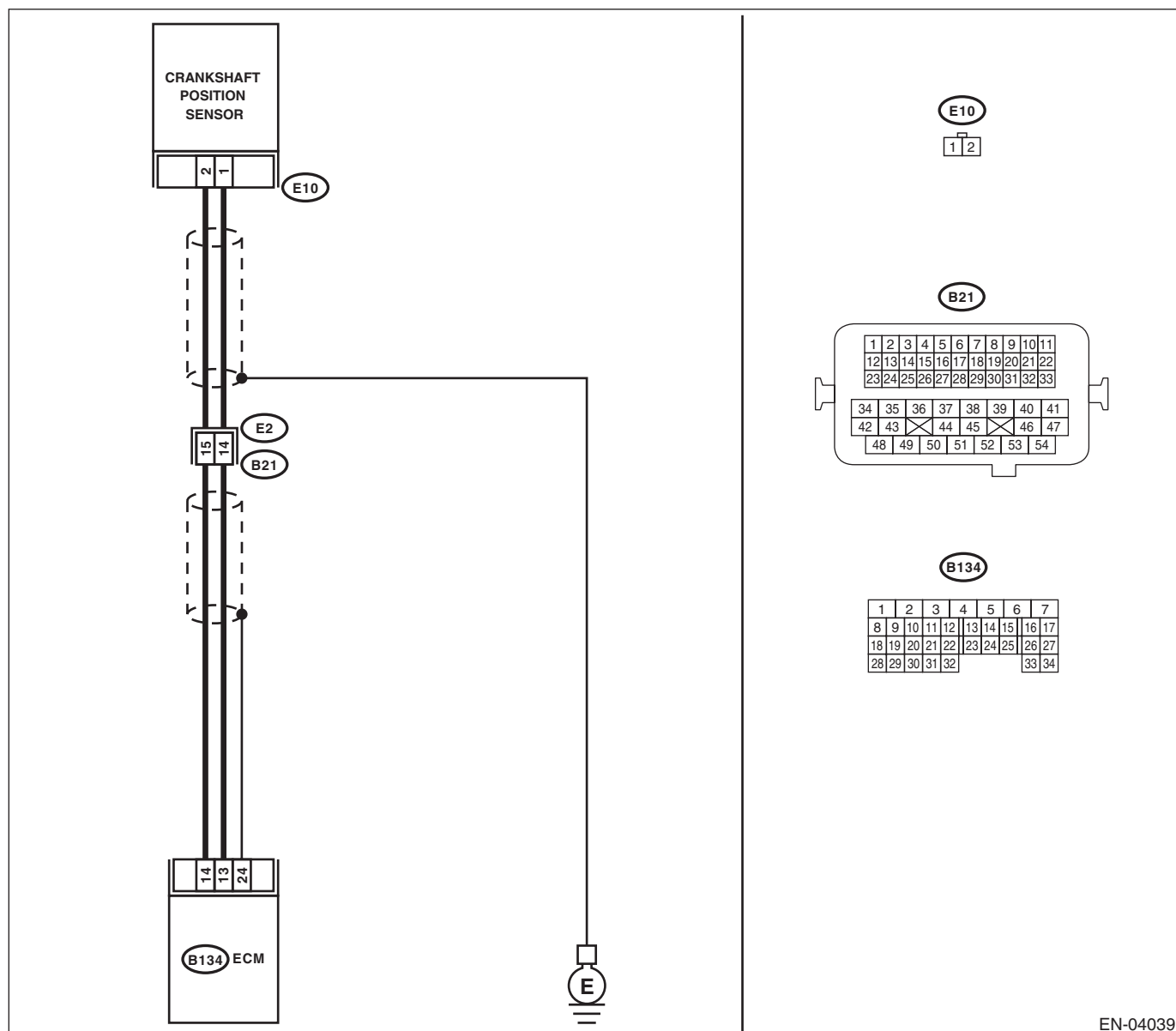
TROUBLE SYMPTOM:

- Engine stalls.
- Failure of engine to start

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04039

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN CRANKSHAFT POSITION SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from crankshaft position sensor. 3) Measure the resistance of harness between crankshaft position sensor connector and engine ground. Connector & terminal (E10) No. 1 — Engine ground:	Is the resistance more than 100 k Ω ?	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between crankshaft position sensor and ECM connector • Poor contact in ECM connector • Poor contact of coupling connector	Go to step 2.
2 CHECK HARNESS BETWEEN CRANKSHAFT POSITION SENSOR AND ECM CONNECTOR. Measure the resistance of harness between crankshaft position sensor connector and engine ground. Connector & terminal (E10) No. 1 — Engine ground:	Is the resistance less than 10 Ω ?	Repair the ground short circuit of harness between crankshaft position sensor and ECM connector. NOTE: The harness between both connectors are shielded. Repair the ground short circuit of harness with shield.	Go to step 3.
3 CHECK HARNESS BETWEEN CRANKSHAFT POSITION SENSOR AND ECM CONNECTOR. Measure the resistance of harness between crankshaft position sensor connector and engine ground. Connector & terminal (E10) No. 2 — Engine ground:	Is the resistance less than 5 Ω ?	Go to step 4.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between crankshaft position sensor and ECM connector • Poor contact in ECM connector • Poor contact of coupling connector
4 CHECK CONDITION OF CRANKSHAFT POSITION SENSOR.	Is the crankshaft position sensor installation bolt tightened securely?	Go to step 5.	Tighten the crankshaft position sensor installation bolt securely.
5 CHECK CRANKSHAFT POSITION SENSOR. 1) Remove the crankshaft position sensor. 2) Measure the resistance between connector terminals of crankshaft position sensor. Terminals No. 1 — No. 2:	Is the resistance between 1 and 4 k Ω ?	Repair the poor contact of crankshaft position sensor connector.	Replace the crankshaft position sensor. <Ref. to FU(H4SO)-20, Crankshaft Position Sensor.>

BA:DTC P0336 CRANKSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-107, DTC P0336 CRANKSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

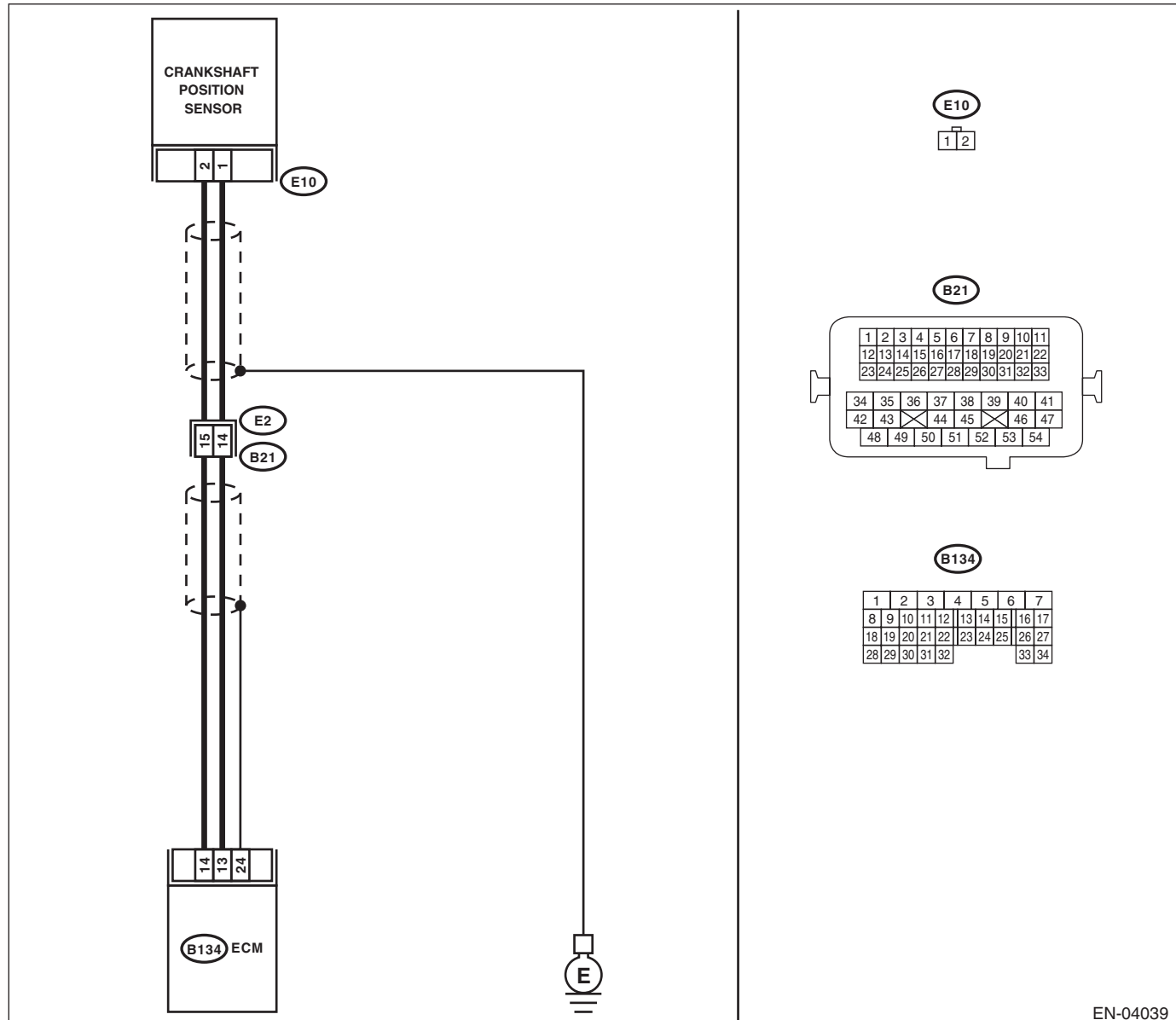
TROUBLE SYMPTOM:

- Engine stalls.
- Failure of engine to start

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04039

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK CONDITION OF CRANKSHAFT POSITION SENSOR. Turn the ignition switch to OFF.	Is the crankshaft position sensor installation bolt tightened securely?	Go to step 3.	Tighten the crankshaft position sensor installation bolt securely.
3 CHECK CRANK SPROCKET. Remove the timing belt cover.	Are crank sprocket teeth cracked or damaged?	Replace the crank sprocket. <Ref. to ME(H4SO)-46, Crank Sprocket.>	Go to step 4.
4 CHECK INSTALLATION CONDITION OF TIMING BELT. Turn the crankshaft, and align alignment mark on crank sprocket with alignment mark on cylinder block.	Is the timing belt dislocated from its proper position?	Repair the installation condition of timing belt. <Ref. to ME(H4SO)-40, Timing Belt.>	Replace the crankshaft position sensor. <Ref. to FU(H4SO)-20, Crankshaft Position Sensor.>

BB:DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 1 OR SINGLE SENSOR)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-109, DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>

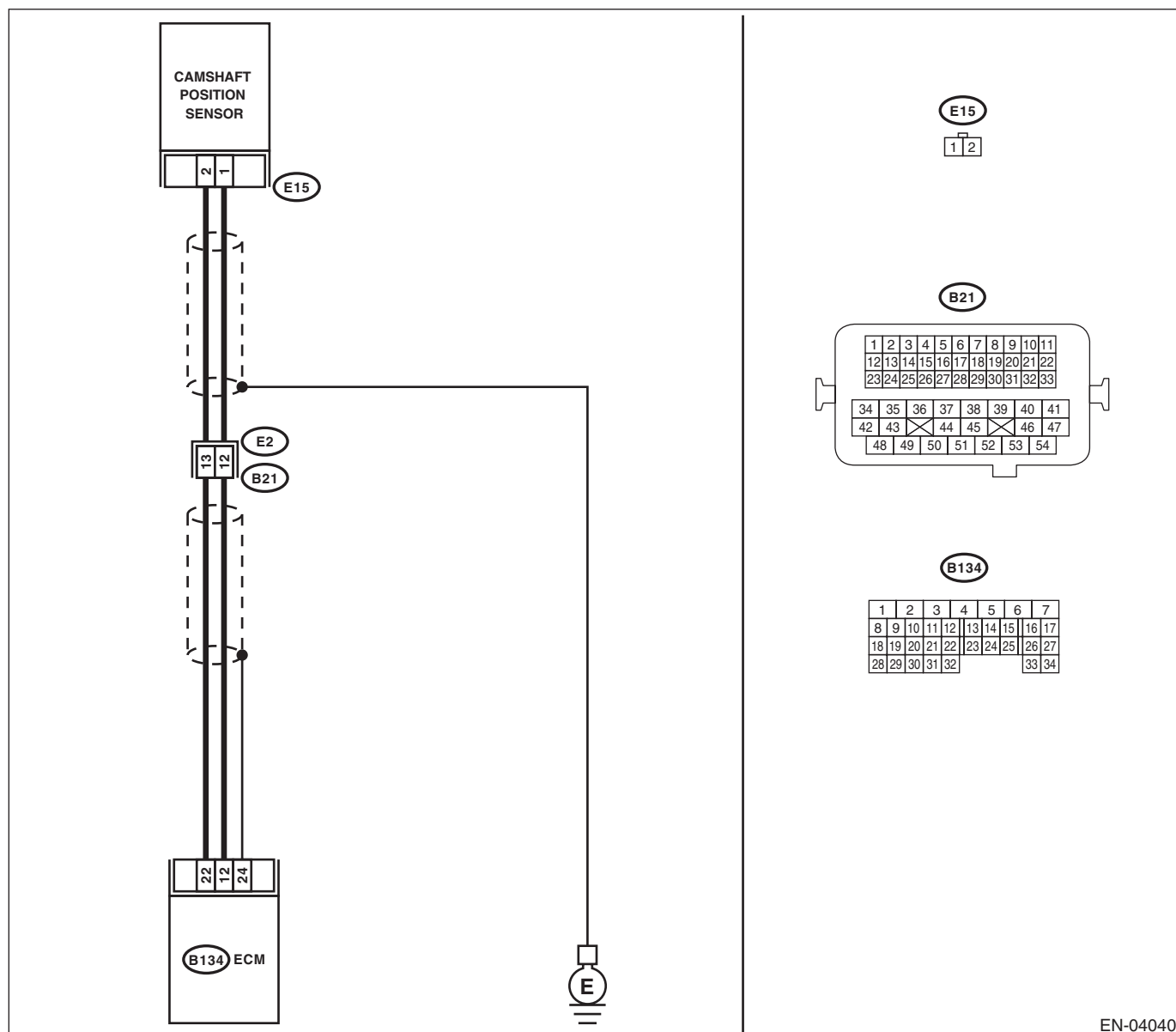
TROUBLE SYMPTOM:

- Engine stalls.
- Failure of engine to start

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04040

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from camshaft position sensor. 3) Measure the resistance of harness between camshaft position sensor connector and engine ground. Connector & terminal (E15) No. 1 — Engine ground:	Is the resistance more than 100 k Ω ?	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between camshaft position sensor and ECM connector • Poor contact in ECM connector • Poor contact of coupling connector	Go to step 2.
2 CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR. Measure the resistance of harness between camshaft position sensor connector and engine ground. Connector & terminal (E15) No. 1 — Engine ground:	Is the resistance less than 10 Ω ?	Repair the ground short circuit of harness between camshaft position sensor and ECM connector. NOTE: The harness between both connectors are shielded. Repair the ground short circuit of harness with shield.	Go to step 3.
3 CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR. Measure the resistance of harness between camshaft position sensor connector and engine ground. Connector & terminal (E15) No. 2 — Engine ground:	Is the resistance less than 5 Ω ?	Go to step 4.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between camshaft position sensor and ECM connector • Poor contact in ECM connector • Poor contact of coupling connector
4 CHECK CONDITION OF CAMSHAFT POSITION SENSOR.	Is the camshaft position sensor installation bolt tightened securely?	Go to step 5.	Tighten the camshaft position sensor installation bolt securely.
5 CHECK CAMSHAFT POSITION SENSOR. 1) Remove the camshaft position sensor. 2) Measure the resistance between connector terminals of camshaft position sensor. Terminals No. 1 — No. 2:	Is the resistance between 1 and 4 k Ω ?	Repair the poor contact of camshaft position sensor connector.	Replace the camshaft position sensor. <Ref. to FU(H4SO)-21, Camshaft Position Sensor.>

BC:DTC P0341 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 1 OR SINGLE SENSOR)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-111, DTC P0341 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>

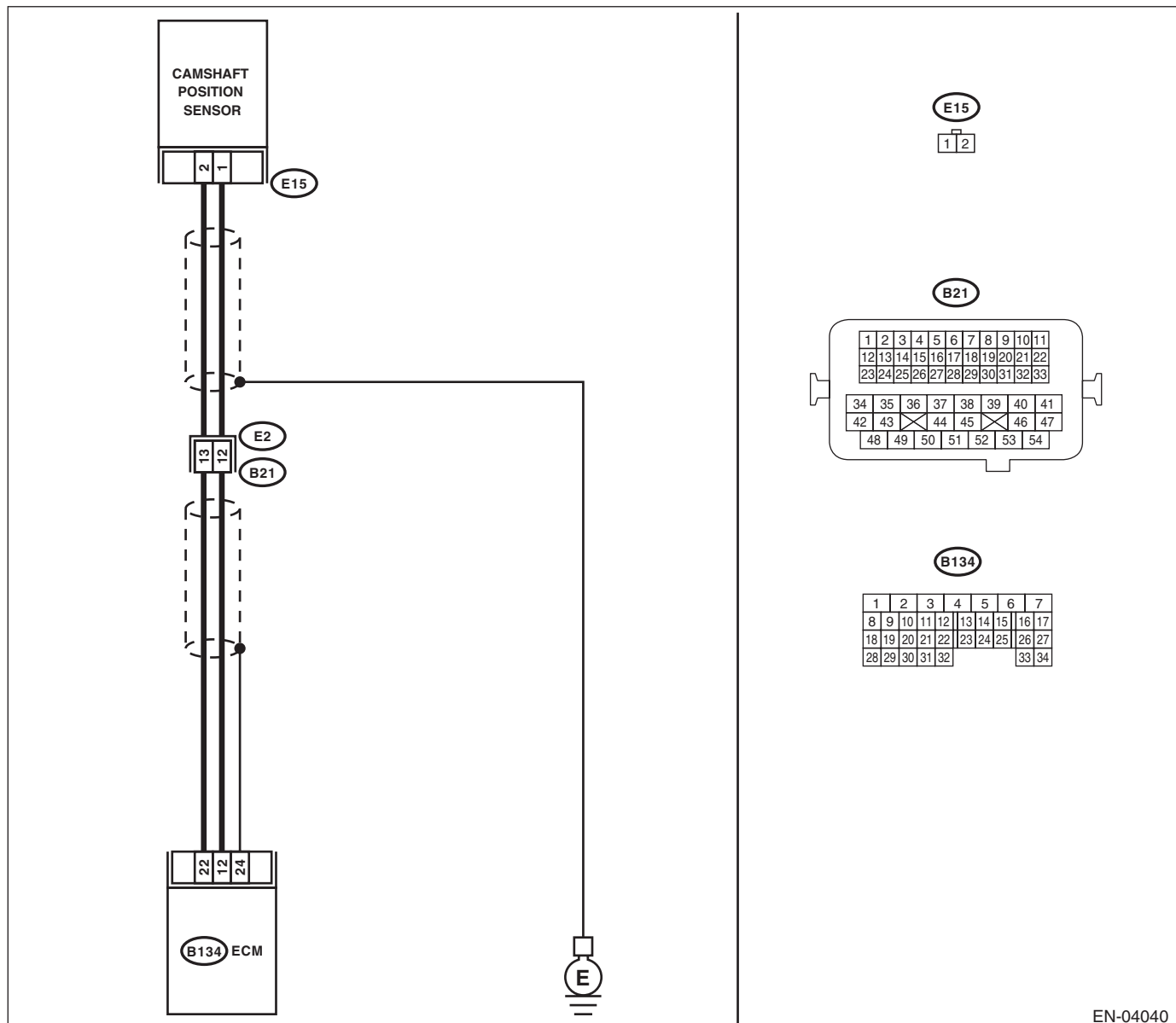
TROUBLE SYMPTOM:

- Engine stalls.
- Failure of engine to start

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04040

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from camshaft position sensor. 3) Measure the resistance of harness between camshaft position sensor connector and engine ground. Connector & terminal (E15) No. 1 — Engine ground:	Is the resistance more than 100 kΩ?	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between camshaft position sensor and ECM connector • Poor contact in ECM connector • Poor contact of coupling connector	Go to step 3.
3 CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR. Measure the resistance of harness between camshaft position sensor connector and engine ground. Connector & terminal (E15) No. 1 — Engine ground:	Is the resistance less than 10 Ω?	Repair the ground short circuit of harness between camshaft position sensor and ECM connector. NOTE: The harness between both connectors are shielded. Repair the ground short circuit of harness with shield.	Go to step 4.
4 CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR. Measure the resistance of harness between camshaft position sensor connector and engine ground. Connector & terminal (E15) No. 2 — Engine ground:	Is the resistance less than 5 Ω?	Go to step 5.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between camshaft position sensor and ECM connector • Poor contact in ECM connector • Poor contact of coupling connector
5 CHECK CONDITION OF CAMSHAFT POSITION SENSOR.	Is the camshaft position sensor installation bolt tightened securely?	Go to step 6.	Tighten the camshaft position sensor installation bolt securely.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK CAMSHAFT POSITION SENSOR. 1) Remove the camshaft position sensor. 2) Measure the resistance between connector terminals of camshaft position sensor. Terminals No. 1 — No. 2:	Is the resistance between 1 and 4 kΩ?	Go to step 7.	Replace the camshaft position sensor. <Ref. to FU(H4SO)-21, Camshaft Position Sensor.>
7 CHECK CONDITION OF CAMSHAFT POSITION SENSOR. Turn the ignition switch to OFF.	Is the camshaft position sensor installation bolt tightened securely?	Go to step 8.	Tighten the camshaft position sensor installation bolt securely.
8 CHECK CAM SPROCKET. Remove the timing belt cover. <Ref. to ME(H4SO)-39, Timing Belt Cover.>	Are cam sprocket teeth cracked or damaged?	Replace the camshaft position sensor. <Ref. to ME(H4SO)-45, Cam Sprocket.>	Go to step 9.
9 CHECK INSTALLATION CONDITION OF TIMING BELT. Turn the crankshaft, and align alignment marks on cam sprocket and timing belt cover LH.	Is the timing belt dislocated from its proper position?	Repair the installation condition of timing belt. <Ref. to ME(H4SO)-40, Timing Belt.>	Replace the camshaft position sensor. <Ref. to FU(H4SO)-21, Camshaft Position Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BD:DTC P0400 EXHAUST GAS RECIRCULATION FLOW

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-113, DTC P0400 EXHAUST GAS RECIRCULATION FLOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

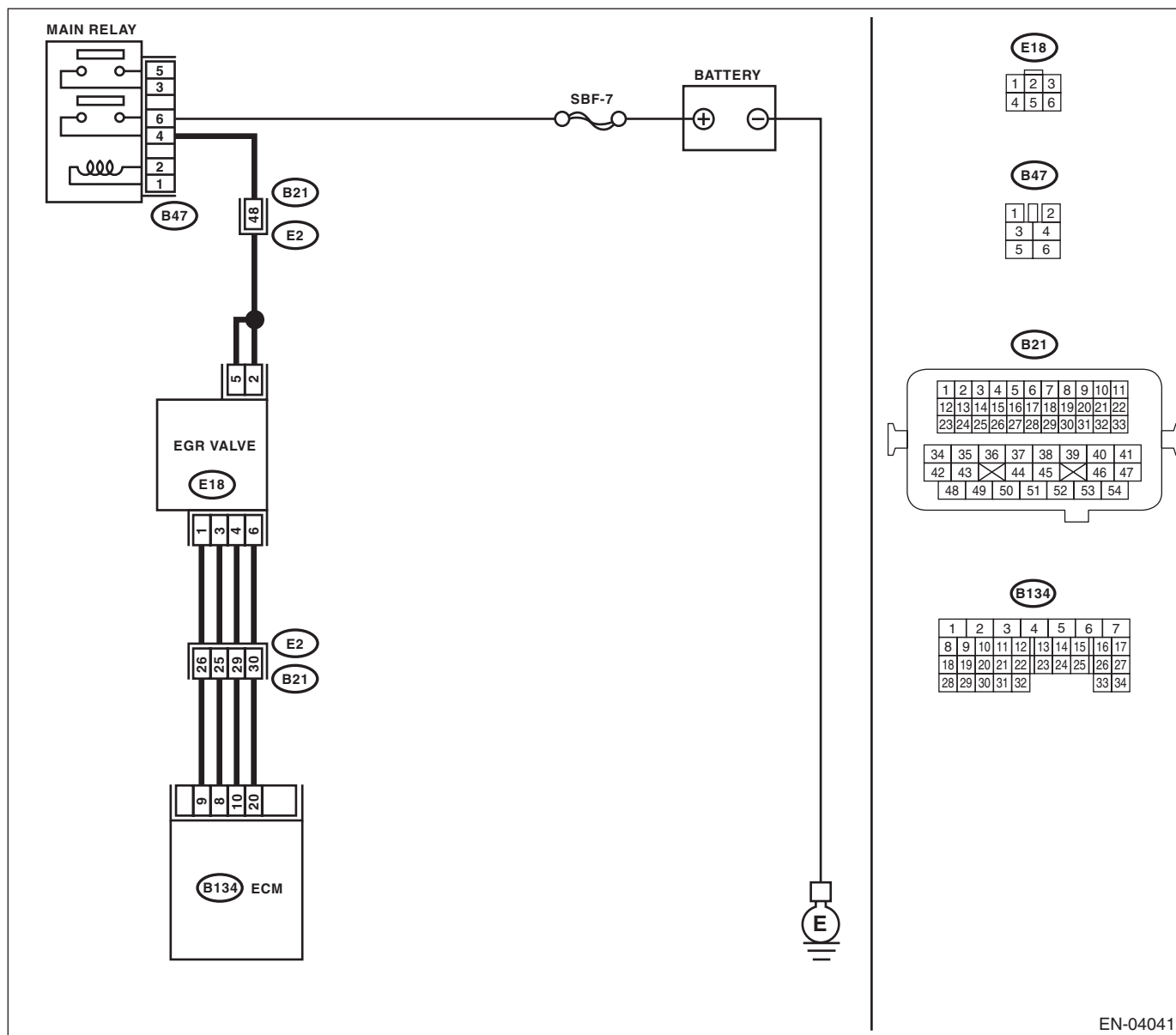
TROUBLE SYMPTOM:

- Movement performance problem when engine is low speed.
- Erroneous idling
- Movement performance problem

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04041

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-46, Clear Memory Mode.>	Go to step 2.
2 CHECK CURRENT DATA. 1) Start the engine. 2) Read data of intake manifold absolute pressure signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-46, Clear Memory Mode.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the measured value more than 53.3 kPa (400 mmHg, 15.75 inHg)?	Make sure that the EGR valve, manifold absolute pressure sensor and throttle body are installed securely.	Go to step 3.
3 CHECK POWER SUPPLY OF EGR VALVE. 1) Disconnect the connector from EGR valve. 2) Turn the ignition switch to ON. 3) Measure the voltage between EGR valve connector and engine ground. Connector & terminal: (E18) No. 2 — Engine ground: (E18) No. 5 — Engine ground:	Is the voltage more than 10 V?	Go to step 4.	Repair the open circuit of harness between main relay and EGR valve connector.
4 CHECK EGR VALVE. Measure the resistance between EGR valve terminals. NOTE: Make sure there is no foreign material between EGR valve and valve seat. Terminals No. 1 — No. 2: No. 3 — No. 2: No. 4 — No. 5: No. 6 — No. 5:	Is the resistance between 20 and 30 Ω?	Go to step 5.	Replace the EGR valve. <Ref. to FU(H4SO)-26, EGR Valve.>
5 CHECK OUTPUT SIGNAL FROM ECM. 1) Turn the ignition switch to OFF. 2) Connect the connector to ECM and EGR valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground. Connector & terminal: (B134) No. 10 (+) — Chassis ground (-): (B134) No. 9 (+) — Chassis ground (-): (B134) No. 8 (+) — Chassis ground (-): (B134) No. 20 (+) — Chassis ground (-):	Is the voltage 0 — 10 V?	Repair the poor contact portion of ECM connector.	Go to step 6.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK HARNESS BETWEEN EGR VALVE AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from EGR valve and ECM. 3) Measure the resistance of harness between EGR valve and ECM connector. Connector & terminal: (B134) No. 10 — (E18) No. 4: (B134) No. 9 — (E18) No. 1: (B134) No. 8 — (E18) No. 3: (B134) No. 20 — (E18) No. 6:	Is the resistance less than 1 Ω ?	Go to step 7.	Repair the open circuit of harness between ECM and EGR valve connector. <Ref. to FU(H4SO)-26, EGR Valve.>
7 CHECK HARNESS BETWEEN EGR VALVE AND ECM CONNECTOR. Measure the resistance of harness between EGR valve and chassis ground. Connector & terminal: (B134) No. 10 — Chassis ground: (B134) No. 9 — Chassis ground: (B134) No. 8 — Chassis ground: (B134) No. 20 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 8.	Repair the short circuit of harness between main relay and EGR valve connector.
8 CHECK POOR CONTACT. Check poor contact of ECM and EGR valve connectors.	Is there poor contact in ECM and EGR valve connector?	Repair the poor contact of ECM and EGR valve connectors.	Even if the malfunction indicator light illuminates, the circuit has returned to the specified condition at this time.

BE:DTC P0420 CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (BANK 1)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-117, DTC P0420 CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

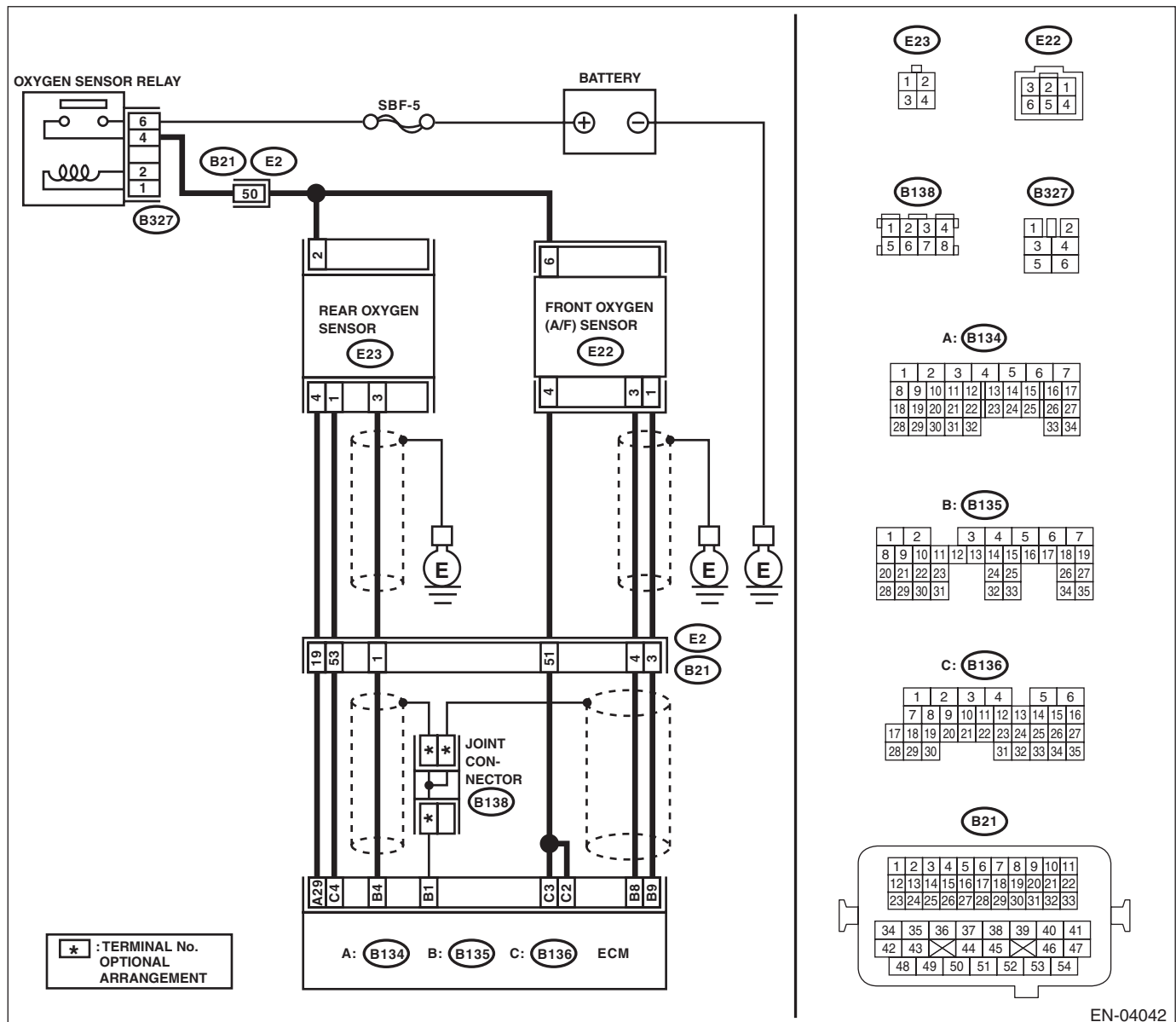
TROUBLE SYMPTOM:

- Engine stalls.
- Idle mixture is out of specifications.

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

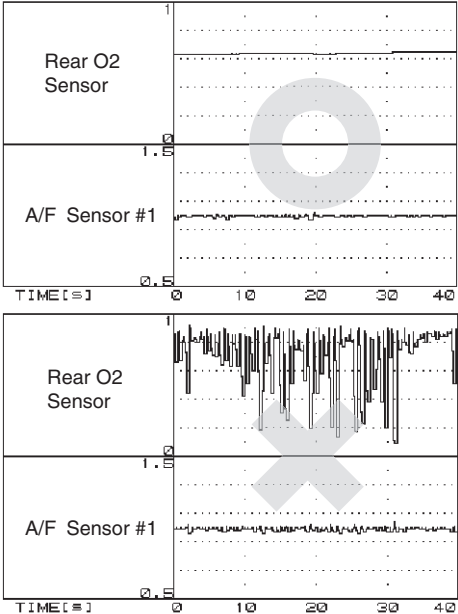
WIRING DIAGRAM:



EN-04042

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

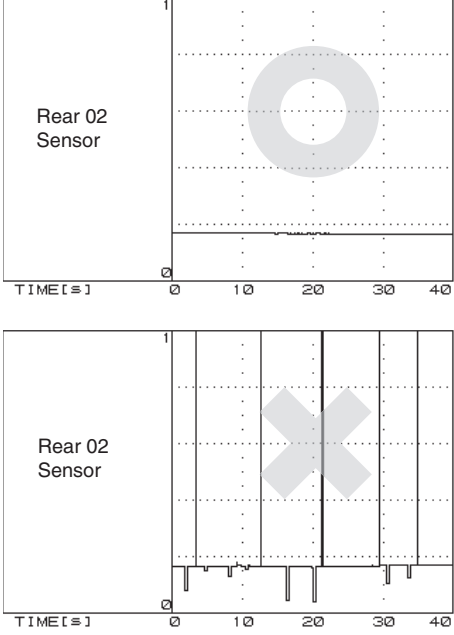
ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0420.	Go to step 2.
2 CHECK EXHAUST SYSTEM. Check for gas leaks or air suction caused by loose or dislocated nuts and bolts, and open hole at exhaust pipes. NOTE: Check the following positions. - Between cylinder head and front exhaust pipe - Between front exhaust pipe and front catalytic converter - Between front catalytic converter and rear catalytic converter - Loose part and improper installation of front oxygen (A/F) sensor or rear oxygen sensor	Is there any fault in exhaust system?	Repair or replace the exhaust system. <Ref. to EX(H4SO)-2, General Description.>	Go to step 3.
3 CHECK WAVEFORM DATA ON SUBARU SELECT MONITOR (WHILE DRIVING). 1) Drive the vehicle at a constant speed of 80 — 112 km/h (50 — 70 MPH). 2) Keep the condition of step 1) for 5 minutes, then read the waveform data in a driving condition using Subaru Select Monitor. 	Is normal waveform pattern displayed?	Contact your SOA Service Center. NOTE: The probable cause is considered as the deterioration of multiple parts.	Go to step 4.

EN-04680

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
4 CHECK WAVEFORM DATA ON SUBARU SELECT MONITOR (WHILE IDLING). 1) Idle the engine. 2) Under the condition of step 1), read the waveform data using Subaru Select Monitor.  TIME[≒] 0 10 20 30 40 EN-04681	Is normal waveform pattern displayed?	Go to step 10.	Go to step 5.
5 CHECK REAR OXYGEN SENSOR VOLTAGE. 1) Warm-up the engine until engine coolant temperature is above 70°C (158°F), and keep the engine speed at 3,000 rpm. (Max. 2 minutes) 2) Read the voltage of rear oxygen sensor using Subaru Select Monitor. NOTE: • For MT model, depress the clutch pedal. • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage more than 490 mV?	Go to step 9.	Go to step 6.
6 CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.	Does water enter the connector?	Dry the water thoroughly.	Go to step 7.
7 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM and rear oxygen sensor connector. Connector & terminal (B135) No. 4 — (E23) No. 3: (B135) No. 29 — (E23) No. 4:	Is the resistance more than 3 Ω?	Repair the open circuit of harness between ECM and rear oxygen sensor connector.	Go to step 8.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
8 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Turn the ignition switch to ON. 2) Measure the voltage between rear oxygen sensor connector and chassis ground. Connector & terminal (E23) No. 3 (+) — Chassis ground (-):	Is the voltage 0.2 — 0.5 V?	Go to step 11.	Repair the harness and connector. NOTE: Repair the following. • Open circuit in harness between rear oxygen sensor and ECM connector • Poor contact in rear oxygen sensor and ECM connector • Poor contact in ECM connector
9 CHECK REAR OXYGEN SENSOR VOLTAGE. 1) Warm-up the engine until engine coolant temperature is above 70°C (158°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the voltage of rear oxygen sensor using Subaru Select Monitor. NOTE: • For MT model, depress the clutch pedal. • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage 250 mV or less?	Contact your SOA Service Center. NOTE: The probable cause is considered as the deterioration of multiple parts.	Go to step 6.
10 CHECK CATALYTIC CONVERTER.	Is the catalytic converter damaged?	Replace the catalytic converter. <Ref. to EC(H4SO)-3, Front Catalytic Converter.>	Contact your SOA Service Center. NOTE: The probable cause is considered as the deterioration of multiple parts.
11 CHECK REAR OXYGEN SENSOR SHIELD. 1) Turn the ignition switch to OFF. 2) Bare the harness sensor shield on the body side of rear oxygen sensor connector. 3) Measure the resistance between sensor shield and chassis ground.	Is resistance less than 1 Ω?	Replace the rear oxygen sensor. <Ref. to FU(H4SO)-34, Rear Oxygen Sensor.>	Repair the open circuit of rear oxygen sensor harness.

BF:DTC P0442 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (SMALL LEAK)**DTC DETECTING CONDITION:**

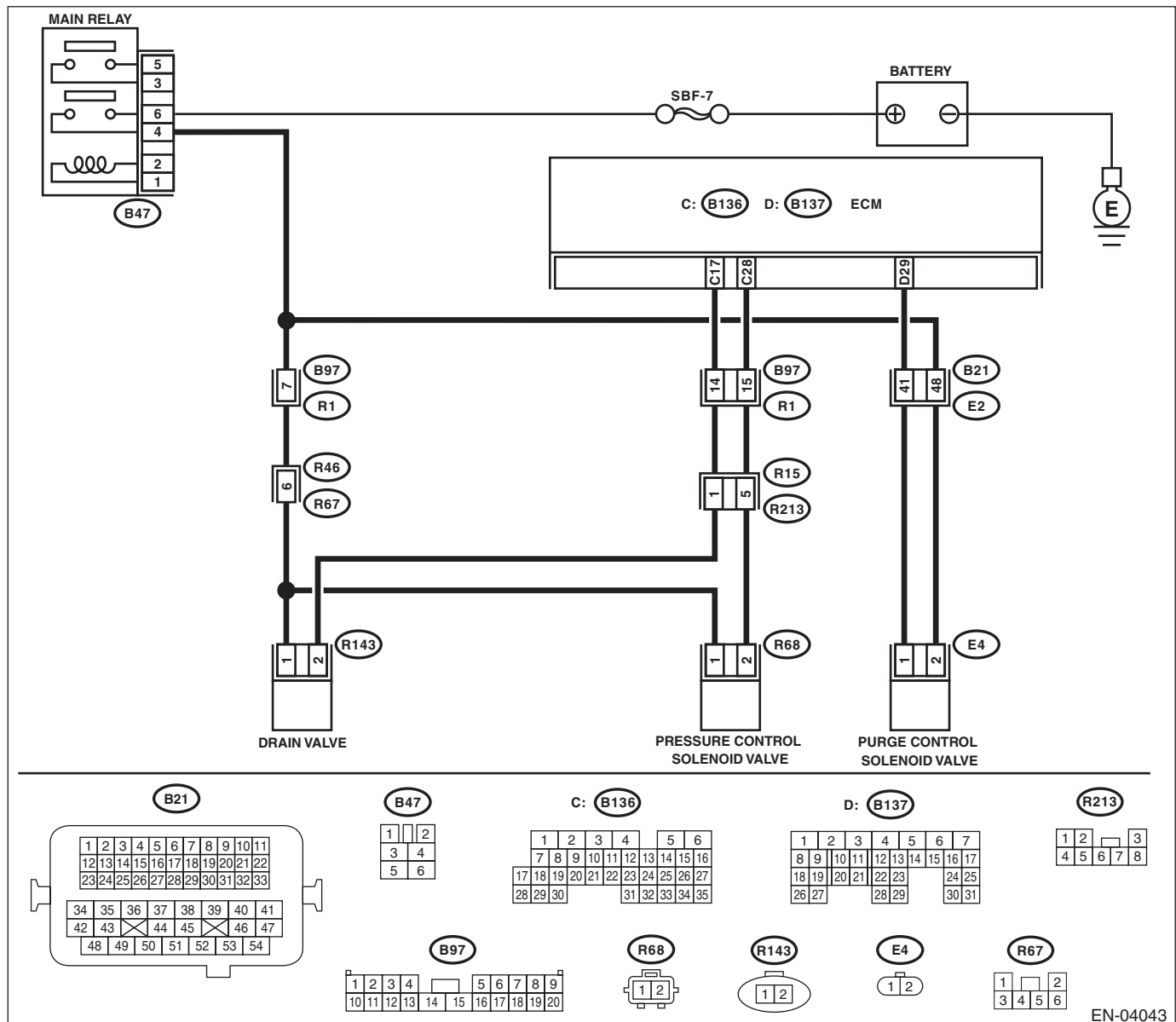
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-119, DTC P0442 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (SMALL LEAK), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Fuel odor
- There is a hole of more than 1.0 mm (0.04 in) dia. in evaporation system or fuel tank.

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

EN-04043

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK FUEL FILLER CAP. 1) Turn the ignition switch to OFF. 2) Check the fuel filler cap. NOTE: The DTC is stored in memory if fuel filler cap is or was loose or if the cap chain was caught while tightening.	Is the fuel filler cap tightened securely?	Go to step 3.	Securely install the fuel filler cap.
3 CHECK FUEL FILLER CAP.	Is the fuel filler cap genuine?	Go to step 4.	Replace with a genuine fuel filler cap.
4 CHECK FUEL FILLER PIPE PACKING.	Is there any damage to the seal between fuel filler cap and fuel filler pipe?	Repair or replace the fuel filler cap and fuel filler pipe. <Ref. to FU(H4SO)-47, Fuel Filler Pipe.>	Go to step 5.
5 CHECK DRAIN VALVE. 1) Connect the test mode connector. 2) Turn the ignition switch to ON. 3) Operate the drain valve. NOTE: Drain valve operation can be executed using Subaru Select Monitor. For procedure, refer to "Compulsory Valve Operation Check Mode". <Ref. to EN(H4SO U5)(diag)-47, Compulsory Valve Operation Check Mode.>	Does the drain valve operate?	Go to step 6.	Replace the drain valve. <Ref. to EC(H4SO)-15, Drain Valve.>
6 CHECK PURGE CONTROL SOLENOID VALVE. Operate the purge control solenoid valve. NOTE: Purge control solenoid valve operation can be executed using Subaru Select Monitor. For procedure, refer to "Compulsory Valve Operation Check Mode". <Ref. to EN(H4SO U5)(diag)-47, Compulsory Valve Operation Check Mode.>	Does the purge control solenoid valve operate?	Go to step 7.	Replace the purge control solenoid valve. <Ref. to EC(H4SO)-6, Purge Control Solenoid Valve.>
7 CHECK PRESSURE CONTROL SOLENOID VALVE. Operate the pressure control solenoid valve. NOTE: The pressure control solenoid valve operation can be executed using the Subaru Select Monitor. For procedure, refer to "Compulsory Valve Operation Check Mode". <Ref. to EN(H4SO U5)(diag)-47, Compulsory Valve Operation Check Mode.>	Does the pressure control solenoid valve operate?	Go to step 8.	Replace the pressure control solenoid valve. <Ref. to EC(H4SO)-12, Pressure Control Solenoid Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
8 CHECK EVAPORATIVE EMISSION CONTROL SYSTEM LINE. Turn the ignition switch to OFF.	Is there a hole of more than 1.0 mm (0.04 in) dia. in evaporation line?	Repair or replace the evaporation line. <Ref. to FU(H4SO)-56, Fuel Delivery and Evaporation Lines.>	Go to step 9 .
9 CHECK CANISTER.	Is the canister damaged or is there a hole of more than 1.0 mm (0.04 in) dia. in it?	Repair or replace the canister. <Ref. to EC(H4SO)-5, Canister.>	Go to step 10 .
10 CHECK FUEL TANK. Remove the fuel tank. <Ref. to FU(H4SO)-41, Fuel Tank.>	Is the fuel tank damaged or is there a hole of more than 1.0 mm (0.04 in) dia. in it?	Repair or replace the fuel tank. <Ref. to FU(H4SO)-41, Fuel Tank.>	Go to step 11 .
11 CHECK ANY OTHER MECHANICAL TROUBLE IN EVAPORATIVE EMISSION CONTROL SYSTEM.	Are there holes of more than 1.0 mm (0.04 in) dia., cracks, clogging, disconnections or bend of hoses or pipes in evaporative emission control system?	Repair or replace the hoses or pipes.	Contact the SOA service center.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BG:DTC P0447 EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL CIRCUIT OPEN

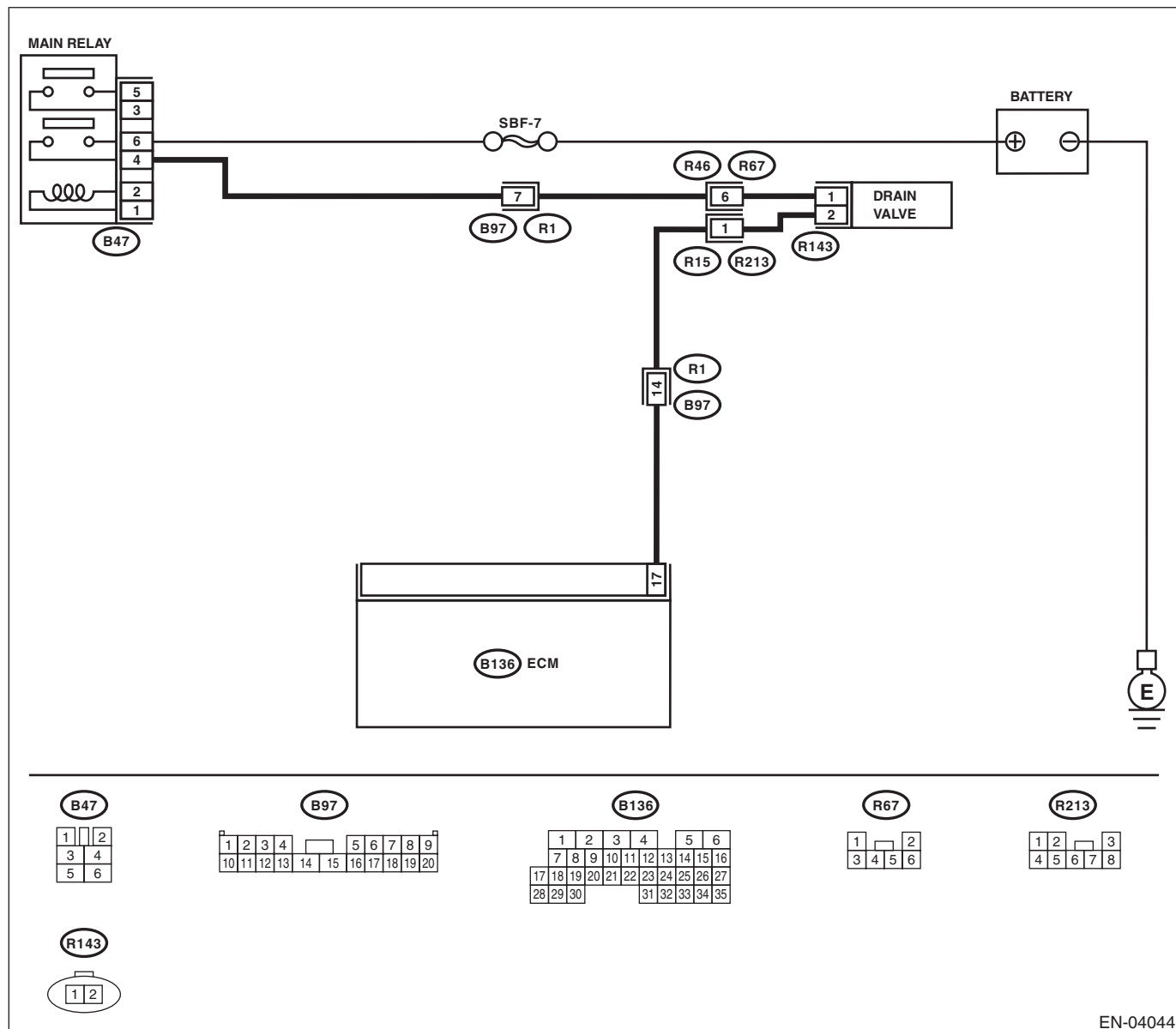
DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-134, DTC P0447 EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL CIRCUIT OPEN, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04044

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK OUTPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground. Connector & terminal (B136) No. 17 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 2.	Go to step 3.
2 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Even if the malfunction indicator light illuminates, the circuit has returned to a normal condition at this time. (However, the possibility of poor contact still remains.) NOTE: In this case, repair the following item: • Poor contact in drain valve connector • Poor contact in ECM connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN DRAIN VALVE AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from drain valve and ECM. 3) Measure the resistance of harness between drain valve connector and chassis ground. Connector & terminal (R143) No. 2 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 4.	Repair the ground short circuit of harness between ECM and drain valve connector.
4 CHECK HARNESS BETWEEN DRAIN VALVE AND ECM CONNECTOR. Measure the resistance of harness between ECM and drain valve connector. Connector & terminal (B136) No. 17 — (R143) No. 2:	Is the resistance less than 1 Ω?	Go to step 5.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and drain valve connector • Poor contact of coupling connector
5 CHECK DRAIN VALVE. Measure the resistance between drain valve terminals. Terminals No. 1 — No. 2:	Is the resistance between 10 and 100 Ω?	Go to step 6.	Replace the drain valve. <Ref. to EC(H4SO)-15, Drain Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK POWER SUPPLY TO DRAIN VALVE. 1) Turn the ignition switch to ON. 2) Measure the voltage between drain valve and chassis ground. Connector & terminal (R143) No. 1 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 7.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between main relay and drain valve • Poor contact of coupling connector • Poor contact of main relay connector
7 CHECK POOR CONTACT. Check poor contact in drain valve connector.	Is there poor contact in drain valve connector?	Repair poor contact in drain valve connector.	Contact the SOA service center.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

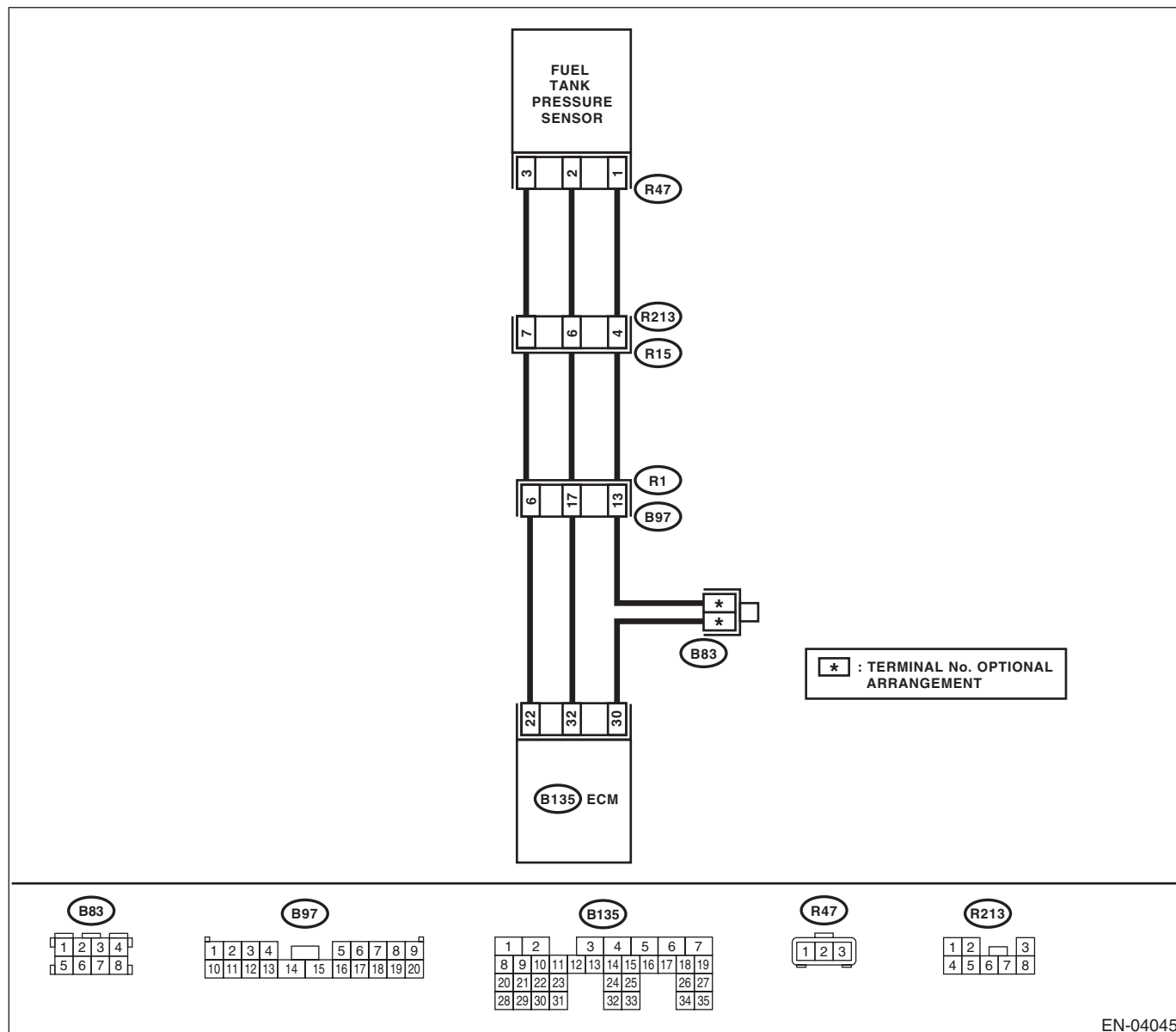
Step	Check	Yes	No
1 CHECK INPUT SIGNAL OF ECM. 1) Turn the ignition switch to OFF. 2) Connect the test mode connector at the lower portion of instrument panel (on the driver's side). 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground while operating the drain valve. NOTE: Drain valve operation can be executed using Subaru Select Monitor. For procedure, refer to "Compulsory Valve Operation Check Mode". <Ref. to EN(H4SO U5)(diag)-47, Compulsory Valve Operation Check Mode.> Connector & terminal (B136) No. 17 (+) — Chassis ground (-):	Is the voltage 0 — 10 V?	Go to step 2.	Even if the malfunction indicator light illuminates, the circuit has returned to a normal condition at this time. In this case, repair the poor contact in ECM connector.
2 CHECK INPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground. Connector & terminal (B136) No. 17 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 4.	Go to step 3.
3 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
4 CHECK HARNESS BETWEEN DRAIN VALVE AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the drain valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground. Connector & terminal (B136) No. 17 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and drain valve connector. After repair, replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Go to step 5.
5 CHECK DRAIN VALVE. 1) Turn the ignition switch to OFF. 2) Measure the resistance between drain valve terminals. Terminals No. 1 — No. 2:	Is the resistance less than 1 Ω ?	Replace the drain valve <Ref. to EC(H4SO)-15, Drain Valve.> and ECM <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>.	Go to step 6.
6 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>

BI: DTC P0451 EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR**DTC DETECTING CONDITION:**

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-138, DTC P0451 EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

EN-04045

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

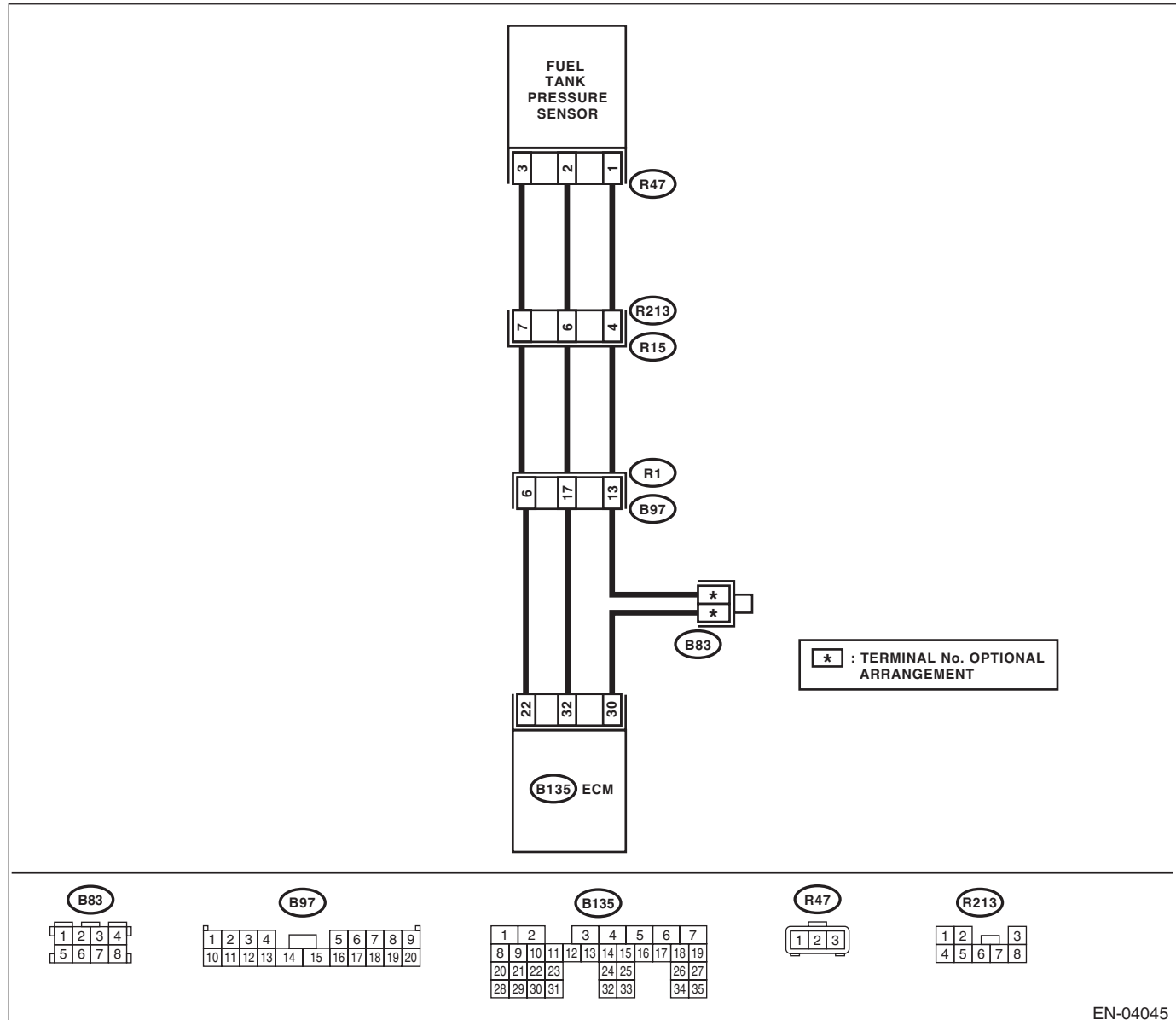
Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK FUEL FILLER CAP. 1) Turn the ignition switch to OFF. 2) Open the fuel flap.	Is the fuel filler cap tightened securely?	Go to step 3.	Securely install the fuel filler cap.
3 CHECK PRESSURE/VACUUM LINE. NOTE: Check the following items. • Disconnection, leakage and clogging of the vacuum hoses and pipes between fuel tank pressure sensor and fuel tank • Disconnection, leakage and clogging of the air ventilation hoses and pipes between fuel filler pipe and fuel tank	Is there any fault in pressure/vacuum line?	Repair or replace the hoses and pipes.	Replace the fuel tank pressure sensor. <Ref. to EC(H4SO)-11, Fuel Tank Pressure Sensor.>

BJ:DTC P0452 EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR LOW INPUT**DTC DETECTING CONDITION:**

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-140, DTC P0452 EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

EN-04045

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Turn the ignition switch to OFF. 2) Remove the fuel filler cap. 3) Install the fuel filler cap. 4) Turn the ignition switch to ON. 5) Read the data of fuel tank pressure sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the measured value less than -2.8 kPa (-21.0 mmHg, -0.827 inHg)?	Go to step 2.	Even if the malfunction indicator light illuminates, the circuit has returned to a normal condition at this time.
2 CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 22 (+) — Chassis ground (-):	Is the voltage more than 4.5 V?	Go to step 4.	Go to step 3.
3 CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 22 (+) — Chassis ground (-):	Does the voltage change by shaking the ECM harness and connector?	Repair the poor contact of ECM connector.	Contact the SOA service center.
4 CHECK INPUT SIGNAL OF ECM. Measure the voltage between ECM and chassis ground. Connector & terminal (B135) No. 32 (+) — Chassis ground (-):	Is the voltage less than 0.2 V?	Go to step 6.	Go to step 5.
5 CHECK INPUT SIGNAL FOR ECM (USING SUBARU SELECT MONITOR). Read the data of fuel tank pressure sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Does the measured value change by shaking the ECM harness and connector?	Repair the poor contact of ECM connector.	Go to step 6.
6 CHECK HARNESS CONNECTOR BETWEEN ECM AND FUEL TANK PRESSURE SENSOR. 1) Turn the ignition switch to OFF. 2) Remove the rear seat cushion. 3) Disconnect the connector (R15) and (R57). 4) Turn the ignition switch to ON. 5) Measure the voltage between the rear wiring harness connector and chassis ground. Connector & terminal (R15) No. 7 (+) — Chassis ground (-):	Is the voltage more than 4.5 V?	Go to step 7.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and rear wiring harness connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK HARNESS CONNECTOR BETWEEN ECM AND FUEL TANK PRESSURE SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance of harness between ECM and connector (R15). Connector & terminal (B135) No. 30 — (R15) No. 4:	Is the resistance less than 1 Ω ?	Go to step 8.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and rear wiring harness connector • Poor contact of coupling connector • Poor contact of joint connector
8 CHECK HARNESS CONNECTOR BETWEEN ECM AND FUEL TANK PRESSURE SENSOR. Measure the resistance of harness between connector (R15) and chassis ground. Connector & terminal (R15) No. 4 (+) — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 9.	Repair the ground short circuit of harness between ECM and rear wiring harness connector.
9 CHECK FUEL TANK HARNESS. 1) Disconnect the connector from fuel tank pressure sensor. 2) Measure the resistance of fuel tank harness. Connector & terminal (R213) No. 7 — (R47) No. 3:	Is the resistance less than 1 Ω ?	Go to step 10.	Repair the open circuit in fuel tank cord.
10 CHECK FUEL TANK HARNESS. Measure the resistance of fuel tank harness. Connector & terminal (R213) No. 4 — (R47) No. 1:	Is the resistance less than 1 Ω ?	Go to step 11.	Repair the open circuit in fuel tank cord.
11 CHECK FUEL TANK HARNESS. Measure the resistance of harness between fuel tank pressure sensor connector and engine ground. Connector & terminal (R47) No. 2 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 12.	Repair the ground short circuit of fuel tank cord.
12 CHECK POOR CONTACT. Check poor contact in fuel tank pressure sensor connector.	Is there poor contact in fuel tank pressure sensor connector?	Repair the poor contact in fuel tank pressure sensor connector.	Replace the fuel tank pressure sensor. <Ref. to EC(H4SO)-11, Fuel Tank Pressure Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BK:DTC P0453 EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR HIGH INPUT

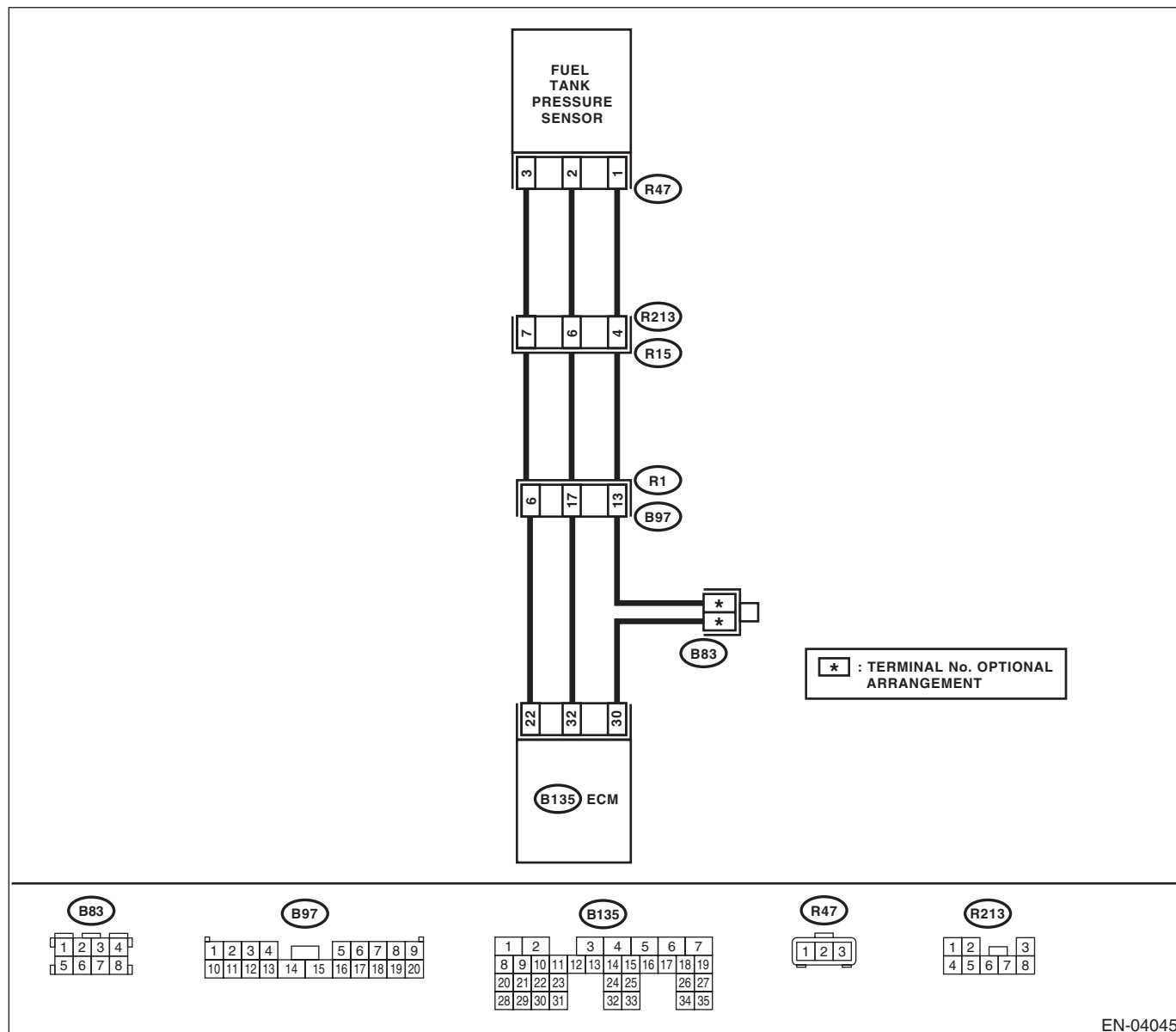
DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-142, DTC P0453 EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04045

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Turn the ignition switch to OFF. 2) Remove the fuel filler cap. 3) Install the fuel filler cap. 4) Turn the ignition switch to ON. 5) Read the data of fuel tank pressure sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the measured value 2.8 kPa (21.0 mmHg, 0.827 inHg) or more?	Go to step 11.	Go to step 2.
2 CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 22 (+) — Chassis ground (-):	Is the voltage more than 4.5 V?	Go to step 4.	Go to step 3.
3 CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 22 (+) — Chassis ground (-):	Does the voltage change by shaking the ECM harness and connector?	Repair the poor contact of ECM connector.	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
4 CHECK INPUT SIGNAL OF ECM. Measure the voltage between ECM and chassis ground. Connector & terminal (B135) No. 32 (+) — Chassis ground (-):	Is the voltage less than 0.2 V?	Go to step 6.	Go to step 5.
5 CHECK INPUT SIGNAL FOR ECM (USING SUBARU SELECT MONITOR). Read the data of fuel tank pressure sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Does the measured value change by shaking the ECM harness and connector?	Repair the poor contact of ECM connector.	Go to step 6.
6 CHECK HARNESS BETWEEN ECM AND COUPLING CONNECTOR IN REAR WIRING HARNESS. 1) Turn the ignition switch to OFF. 2) Remove the rear seat cushion. 3) Separate rear wiring harness and fuel tank cord. 4) Turn the ignition switch to ON. 5) Measure the voltage between the rear wiring harness connector and chassis ground. Connector & terminal (R15) No. 7 (+) — Chassis ground (-):	Is the voltage more than 4.5 V?	Go to step 7.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and rear wiring harness connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK HARNESS BETWEEN ECM AND COUPLING CONNECTOR IN REAR WIRING HARNESS. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance of harness between ECM and rear wiring harness connector. Connector & terminal (B135) No. 32 — (R15) No. 6: (B135) No. 30 — (R15) No. 4:	Is the resistance less than 1 Ω ?	Go to step 8.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and rear wiring harness connector • Poor contact of coupling connector
8 CHECK FUEL TANK HARNESS. 1) Disconnect the connector from the fuel tank pressure sensor. 2) Measure the resistance of fuel tank harness. Connector & terminal (R213) No. 6 — (R47) No. 2:	Is the resistance less than 1 Ω ?	Go to step 9.	Repair the open circuit in fuel tank cord.
9 CHECK FUEL TANK HARNESS. Measure the resistance of fuel tank harness. Connector & terminal (R213) No. 4 — (R47) No. 1:	Is the resistance less than 1 Ω ?	Go to step 10.	Repair the open circuit in fuel tank cord.
10 CHECK POOR CONTACT. Check poor contact in fuel tank pressure sensor connector.	Is there poor contact in fuel tank pressure sensor connector?	Repair the poor contact in fuel tank pressure sensor connector.	Replace the fuel tank pressure sensor. <Ref. to EC(H4SO)-11, Fuel Tank Pressure Sensor.>
11 CHECK HARNESS BETWEEN ECM AND FUEL TANK PRESSURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel tank pressure sensor. 3) Turn the ignition switch to ON. 4) Read the data of fuel tank pressure sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the measured value 2.8 kPa (21.0 mmHg, 0.827 inHg) or more?	Repair battery short circuit of harness between ECM and fuel tank pressure sensor connector.	Replace the fuel tank pressure sensor. <Ref. to EC(H4SO)-11, Fuel Tank Pressure Sensor.>

BL:DTC P0456 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (VERY SMALL LEAK)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-144, DTC P0456 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (VERY SMALL LEAK), Diagnostic Trouble Code (DTC) Detecting Criteria.>

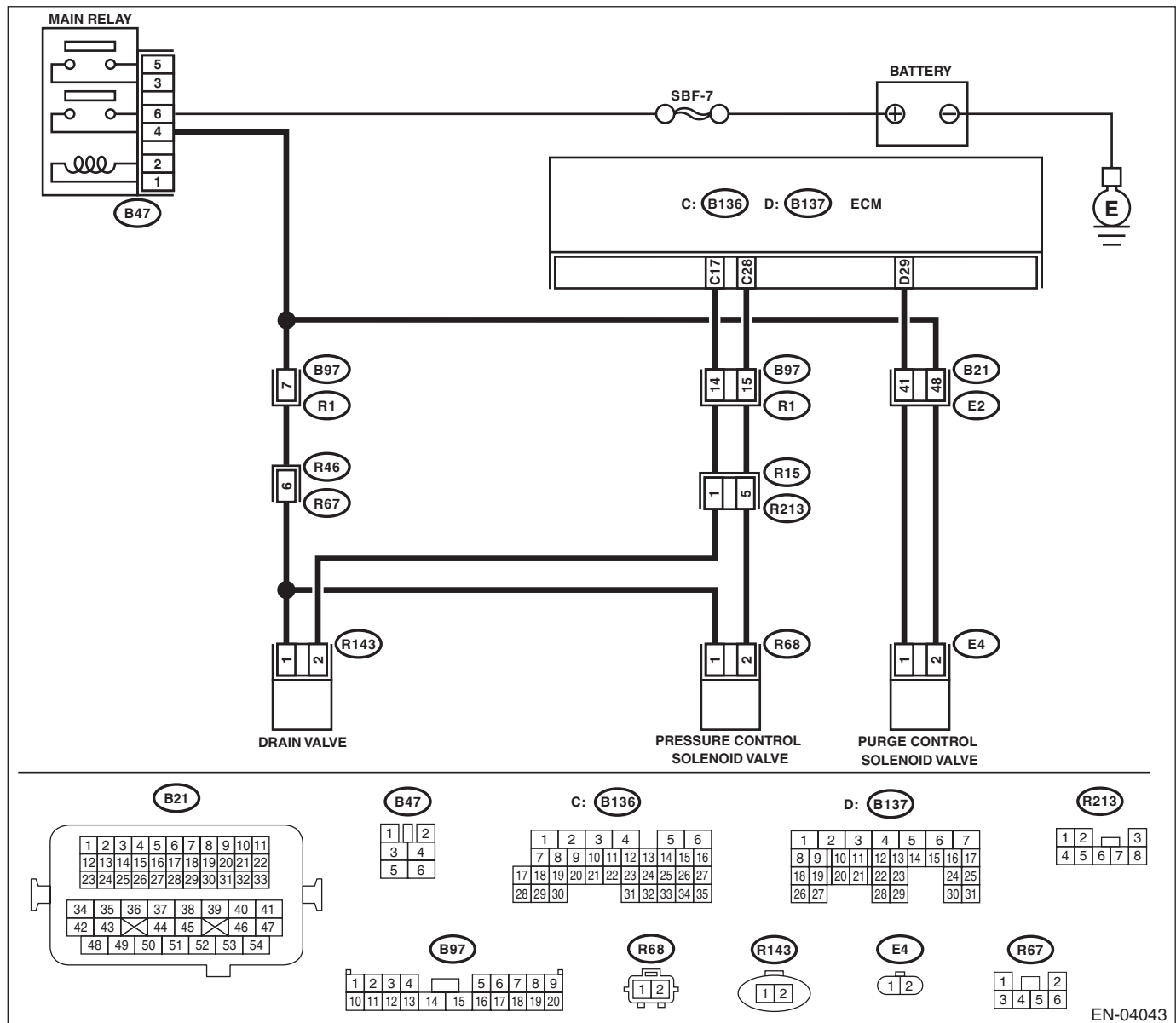
TROUBLE SYMPTOM:

- Fuel odor
- There is a hole of more than 0.5 mm (0.020 in) dia. in evaporation system or fuel tank.

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK FUEL FILLER CAP. 1) Turn the ignition switch to OFF. 2) Check the fuel filler cap. NOTE: The DTC is stored in memory if fuel filler cap is or was loose or if the cap chain was caught while tightening.	Is the fuel filler cap tightened securely?	Go to step 3.	Securely install the fuel filler cap.
3 CHECK FUEL FILLER CAP.	Is the fuel filler cap genuine?	Go to step 4.	Replace with a genuine fuel filler cap.
4 CHECK FUEL FILLER PIPE PACKING.	Is there any damage to the seal between fuel filler cap and fuel filler pipe?	Repair or replace the fuel filler cap and fuel filler pipe. <Ref. to FU(H4SO)-47, Fuel Filler Pipe.>	Go to step 5.
5 CHECK DRAIN VALVE. 1) Connect the test mode connector. 2) Turn the ignition switch to ON. 3) Check the drain valve. NOTE: Drain valve operation can be executed using Subaru Select Monitor. For procedure, refer to "Compulsory Valve Operation Check Mode". <Ref. to EN(H4SO U5)(diag)-47, Compulsory Valve Operation Check Mode.>	Does the drain valve operate?	Go to step 6.	Replace the drain valve. <Ref. to EC(H4SO)-15, Drain Valve.>
6 CHECK PURGE CONTROL SOLENOID VALVE. Operate the purge control solenoid valve. NOTE: Purge control solenoid valve operation can be executed using Subaru Select Monitor. For procedure, refer to "Compulsory Valve Operation Check Mode". <Ref. to EN(H4SO U5)(diag)-47, Compulsory Valve Operation Check Mode.>	Does the purge control solenoid valve operate?	Go to step 7.	Replace the purge control solenoid valve. <Ref. to EC(H4SO)-6, Purge Control Solenoid Valve.>
7 CHECK PRESSURE CONTROL SOLENOID VALVE. Operate the pressure control solenoid valve. NOTE: The pressure control solenoid valve operation can be executed using the Subaru Select Monitor. For procedure, refer to "Compulsory Valve Operation Check Mode". <Ref. to EN(H4SO U5)(diag)-47, Compulsory Valve Operation Check Mode.>	Does the pressure control solenoid valve operate?	Go to step 8.	Replace the pressure control solenoid valve. <Ref. to EC(H4SO)-6, Purge Control Solenoid Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
8 CHECK EVAPORATIVE EMISSION CONTROL SYSTEM LINE. Turn the ignition switch to OFF.	Is there a hole of more than 0.5 mm (0.020 in) dia. in evaporation line?	Repair or replace the evaporation line. <Ref. to FU(H4SO)-56, Fuel Delivery and Evaporation Lines.>	Go to step 9 .
9 CHECK CANISTER.	Is the canister damaged or is there a hole of more than 0.5 mm (0.020 in) dia. in it?	Repair or replace the canister. <Ref. to EC(H4SO)-5, Canister.>	Go to step 10 .
10 CHECK FUEL TANK. Remove the fuel tank. <Ref. to FU(H4SO)-41, Fuel Tank.>	Is the fuel tank damaged or is there a hole of more than 0.5 mm (0.020 in) dia. in it?	Repair or replace the fuel tank. <Ref. to FU(H4SO)-41, Fuel Tank.>	Go to step 11 .
11 CHECK ANY OTHER MECHANICAL TROUBLE IN EVAPORATIVE EMISSION CONTROL SYSTEM.	Are there holes of more than 0.5 mm (0.020 in) dia., cracks, clogging, disconnections or bend of hoses or pipes in evaporative emission control system?	Repair or replace the hoses or pipes.	Contact the SOA service center.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BM:DTC P0457 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECT-ED (FUEL CAP LOOSE/OFF)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-119, DTC P0442 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (SMALL LEAK), Diagnostic Trouble Code (DTC) Detecting Criteria.>

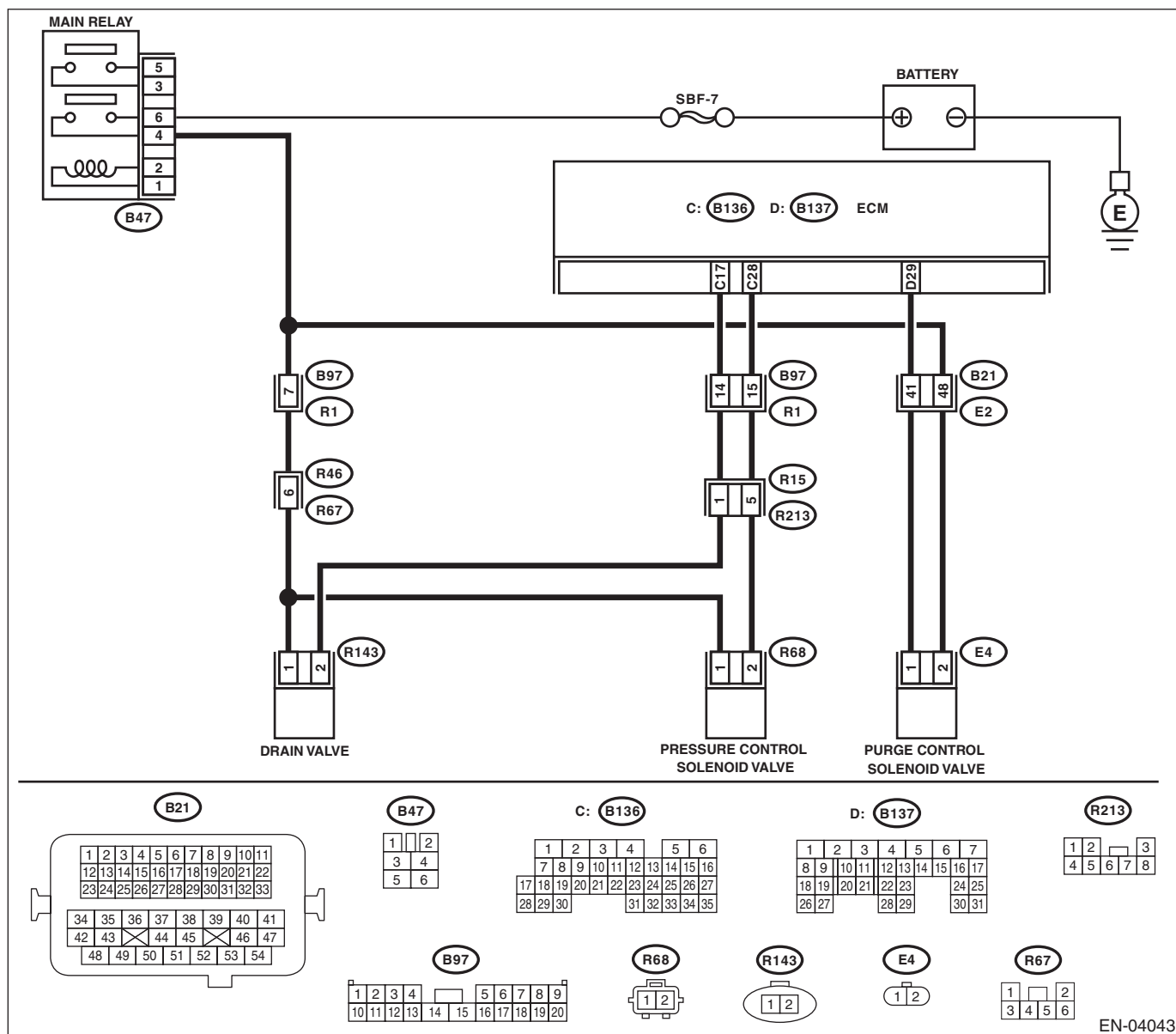
TROUBLE SYMPTOM:

- Fuel odor
- Fuel filler cap is loose or not installed.

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK FUEL FILLER CAP. 1) Turn the ignition switch to OFF. 2) Check the fuel filler cap. NOTE: The DTC is stored in memory if fuel filler cap is or was loose or if the cap chain was caught while tightening.	Is the fuel filler cap tightened securely?	Go to step 3.	Securely install the fuel filler cap.
3 CHECK FUEL FILLER CAP.	Is the fuel filler cap genuine?	Go to step 4.	Replace with a genuine fuel filler cap.
4 CHECK FUEL FILLER PIPE PACKING.	Is there any damage to the seal between fuel filler cap and fuel filler pipe?	Repair or replace the fuel filler cap and fuel filler pipe. <Ref. to FU(H4SO)-47, Fuel Filler Pipe.>	Go to step 5.
5 CHECK DRAIN VALVE. 1) Connect the test mode connector. 2) Turn the ignition switch to ON. 3) Check the drain valve. NOTE: Drain valve operation can be executed using Subaru Select Monitor. For procedure, refer to "Compulsory Valve Operation Check Mode". <Ref. to EN(H4SO U5)(diag)-47, Compulsory Valve Operation Check Mode.>	Does the drain valve operate?	Go to step 6.	Replace the drain valve. <Ref. to EC(H4SO)-15, Drain Valve.>
6 CHECK PURGE CONTROL SOLENOID VALVE. Operate the purge control solenoid valve. NOTE: Purge control solenoid valve operation can be executed using Subaru Select Monitor. For procedure, refer to "Compulsory Valve Operation Check Mode". <Ref. to EN(H4SO U5)(diag)-47, Compulsory Valve Operation Check Mode.>	Does the purge control solenoid valve operate?	Go to step 7.	Replace the purge control solenoid valve. <Ref. to EC(H4SO)-6, Purge Control Solenoid Valve.>
7 CHECK PRESSURE CONTROL SOLENOID VALVE. Operate the pressure control solenoid valve. NOTE: The pressure control solenoid valve operation can be executed using the Subaru Select Monitor. For procedure, refer to "Compulsory Valve Operation Check Mode". <Ref. to EN(H4SO U5)(diag)-47, Compulsory Valve Operation Check Mode.>	Does the pressure control solenoid valve operate?	Go to step 8.	Replace the pressure control solenoid valve. <Ref. to EC(H4SO)-6, Purge Control Solenoid Valve.>
8 CHECK CANISTER.	Is the canister damaged?	Repair or replace the canister. <Ref. to EC(H4SO)-5, Canister.>	Go to step 9.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step		Check	Yes	No
9	CHECK FUEL TANK. Remove the fuel tank. <Ref. to FU(H4SO)-41, Fuel Tank.>	Is the fuel tank damaged?	Repair or replace the fuel tank. <Ref. to FU(H4SO)-41, Fuel Tank.>	Go to step 10.
10	CHECK ANY OTHER MECHANICAL TROUBLE IN EVAPORATIVE EMISSION CONTROL SYSTEM.	Are there holes of more than 0.5 mm (0.020 in) dia., cracks, clogging or disconnections of hoses or pipes in evaporative emission control system?	Repair or replace the hoses or pipes.	Contact the SOA service center.

BN:DTC P0458 EVAPORATIVE EMISSION SYSTEM PURGE CONTROL VALVE CIRCUIT LOW

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-145, DTC P0458 EVAPORATIVE EMISSION SYSTEM PURGE CONTROL VALVE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

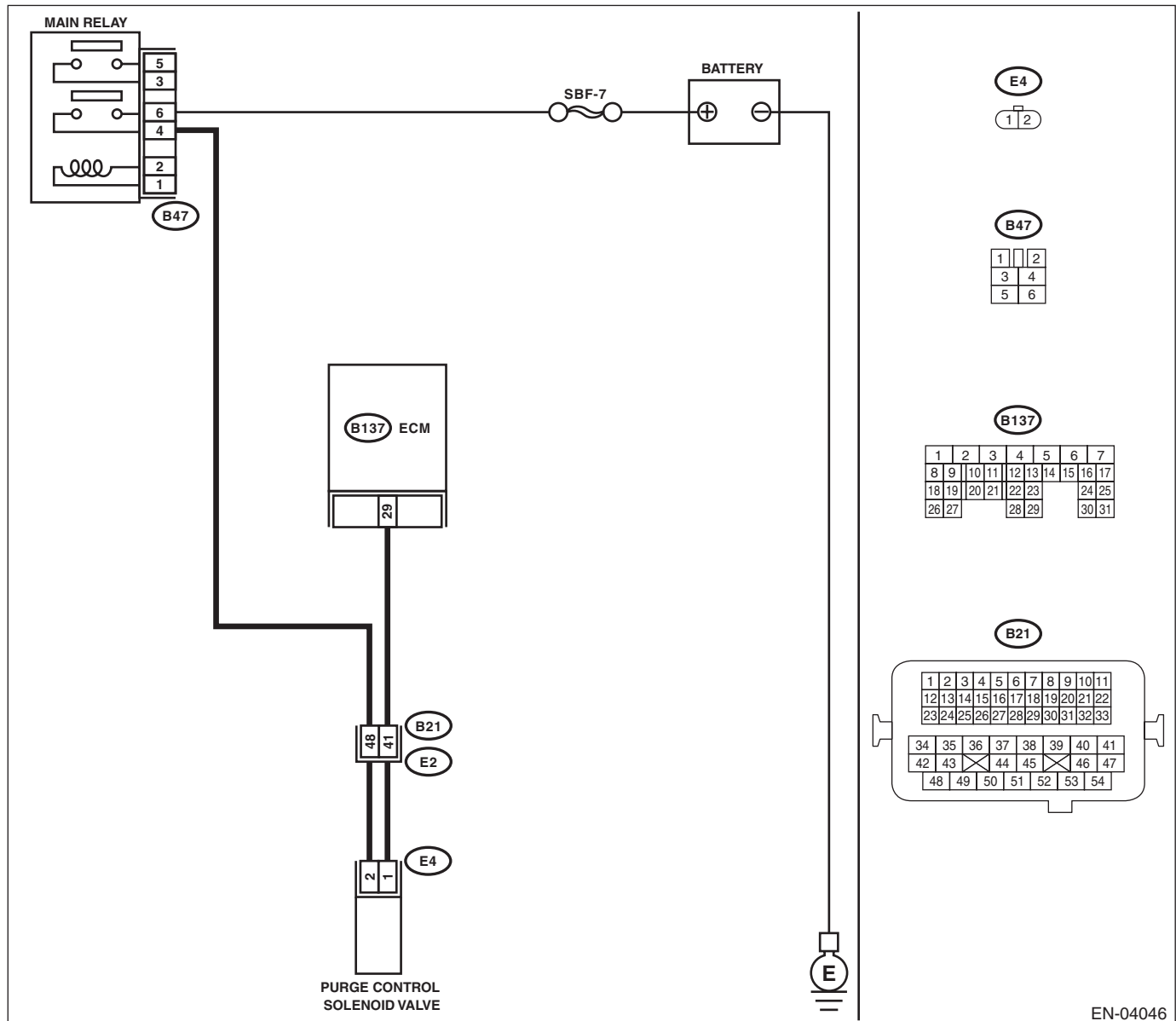
TROUBLE SYMPTOM:

Erroneous idling

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04046

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK OUTPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground. Connector & terminal (B137) No. 29 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Even if the malfunction indicator light illuminates, the circuit has returned to a normal condition at this time. Contact your SOA Service Center.	Go to step 2.
2 CHECK HARNESS BETWEEN PURGE CONTROL SOLENOID VALVE AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from purge control solenoid valve and ECM. 3) Measure the resistance of harness between purge control solenoid valve connector and engine ground. Connector & terminal (E4) No. 1 — Engine ground:	Is the resistance more than 1 MΩ?	Go to step 3.	Repair the ground short circuit of harness between ECM and purge control solenoid valve connector.
3 CHECK HARNESS BETWEEN PURGE CONTROL SOLENOID VALVE AND ECM CONNECTOR. Measure the resistance of harness between ECM and purge control solenoid valve. Connector & terminal (B137) No. 29 — (E4) No. 1:	Is the resistance less than 1 Ω?	Go to step 4.	Repair the open circuit of harness between ECM and purge control solenoid valve connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and purge control solenoid valve connector • Poor contact of coupling connector
4 CHECK PURGE CONTROL SOLENOID VALVE. 1) Remove the purge control solenoid valve. 2) Measure the resistance between purge control solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance between 10 and 100 Ω?	Go to step 5.	Replace the purge control solenoid valve. <Ref. to EC(H4SO)-6, Purge Control Solenoid Valve.>
5 CHECK POWER SUPPLY TO PURGE CONTROL SOLENOID VALVE. 1) Turn the ignition switch to ON. 2) Measure the voltage between purge control solenoid valve and engine ground. Connector & terminal (E4) No. 2 (+) — Engine ground (-):	Is the voltage more than 10 V?	Go to step 6.	Repair the open circuit of harness between main relay and purge control solenoid valve connector.
6 CHECK POOR CONTACT. Check poor contact of purge control solenoid valve connector.	Is there poor contact of purge control solenoid valve connector?	Repair the poor contact of purge control solenoid valve connector.	Contact the SOA service center.

BO:DTC P0459 EVAPORATIVE EMISSION SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH**DTC DETECTING CONDITION:**

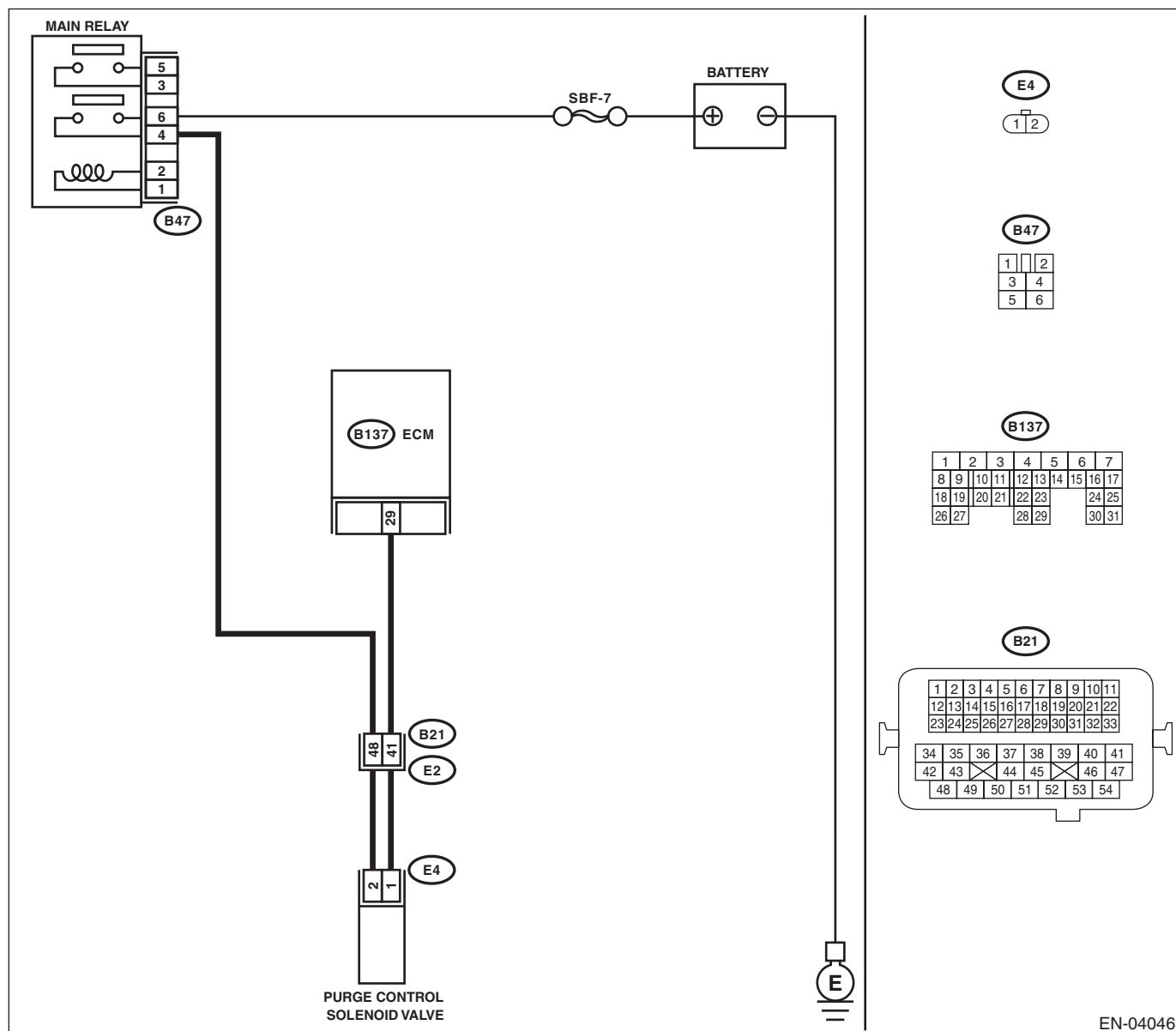
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-147, DTC P0459 EVAPORATIVE EMISSION SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Erroneous idling

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

EN-04046

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK OUTPUT SIGNAL OF ECM. 1) Turn the ignition switch to OFF. 2) Connect the test mode connector at the lower portion of instrument panel (on the driver's side). 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground while operating the purge control solenoid valve. NOTE: Purge control solenoid valve operation can be executed using Subaru Select Monitor. For procedure, refer to "Compulsory Valve Operation Check Mode". <Ref. to EN(H4SO U5)(diag)-47, Compulsory Valve Operation Check Mode.> Connector & terminal (B137) No. 29 (+) — Chassis ground (-):	Is the voltage 0 — 10 V?	Go to step 2.	Even if the malfunction indicator light illuminates, the circuit has returned to a normal condition at this time. In this case, repair the poor contact in ECM connector.
2 CHECK OUTPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground. Connector & terminal (B137) No. 29 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 4.	Go to step 3.
3 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
4 CHECK HARNESS BETWEEN PURGE CONTROL SOLENOID VALVE AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from purge control solenoid valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground. Connector & terminal (B137) No. 29 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and purge control solenoid valve connector. After repair, replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Go to step 5.
5 CHECK PURGE CONTROL SOLENOID VALVE. 1) Turn the ignition switch to OFF. 2) Measure the resistance between purge control solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance less than 1 Ω ?	Replace the purge control solenoid valve <Ref. to EC(H4SO)-6, Purge Control Solenoid Valve.> and ECM <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>.	Go to step 6.
6 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>

BP:DTC P0461 FUEL LEVEL SENSOR “A” CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-149, DTC P0461 FUEL LEVEL SENSOR “A” CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

NOTE:

For the diagnostic procedure, refer to DTC P0464. <Ref. to EN(H4SO U5)(diag)-229, DTC P0464 FUEL LEVEL SENSOR CIRCUIT INTERMITTENT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BQ:DTC P0462 FUEL LEVEL SENSOR “A” CIRCUIT LOW

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-151, DTC P0462 FUEL LEVEL SENSOR “A” CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

NOTE:

For the diagnostic procedure, refer to DTC P0464. <Ref. to EN(H4SO U5)(diag)-229, DTC P0464 FUEL LEVEL SENSOR CIRCUIT INTERMITTENT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BR:DTC P0463 FUEL LEVEL SENSOR “A” CIRCUIT HIGH

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-153, DTC P0463 FUEL LEVEL SENSOR “A” CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

NOTE:

For the diagnostic procedure, refer to DTC P0464. <Ref. to EN(H4SO U5)(diag)-229, DTC P0464 FUEL LEVEL SENSOR CIRCUIT INTERMITTENT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BS:DTC P0464 FUEL LEVEL SENSOR CIRCUIT INTERMITTENT

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-155, DTC P0464 FUEL LEVEL SENSOR CIRCUIT INTERMITTENT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is DTC P0461, P0462, P0463 or P0464 displayed on the Subaru Select Monitor?	Check the combination meter. <Ref. to IDI-9, CHECK FUEL LEVEL SENSOR, INSPECTION, Combination Meter System.>	Temporary poor contact occurs.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BT:DTC P0483 FAN RATIONALITY CHECK

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-158, DTC P0483 FAN RATIONALITY CHECK, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Occurrence of noise
- Overheating

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

NOTE:

If the vehicle, with the engine idling, is placed very close to a wall or another vehicle, preventing normal cooling function, the OBD system may detect malfunction.

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Check the radiator fan and fan motor. <Ref. to CO(H4SO)-23, Radiator Main Fan and Fan Motor.> and <Ref. to CO(H4SO)-25, Radiator Sub Fan and Fan Motor.>

BU:DTC P0500 VEHICLE SPEED SENSOR "A"

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-159, DTC P0500 VEHICLE SPEED SENSOR "A", Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repair or replacement of faulty parts, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK DTC OF ABS. Check DTC of ABS.	Is DTC of ABS displayed?	Perform the diagnosis according to DTC. <Ref. to ABS(diag)-34, List of Diagnostic Trouble Code (DTC).>	Repair the poor contact of ECM.

BV:DTC P0506 IDLE AIR CONTROL SYSTEM RPM LOWER THAN EXPECTED

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-161, DTC P0506 IDLE AIR CONTROL SYSTEM RPM LOWER THAN EXPECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

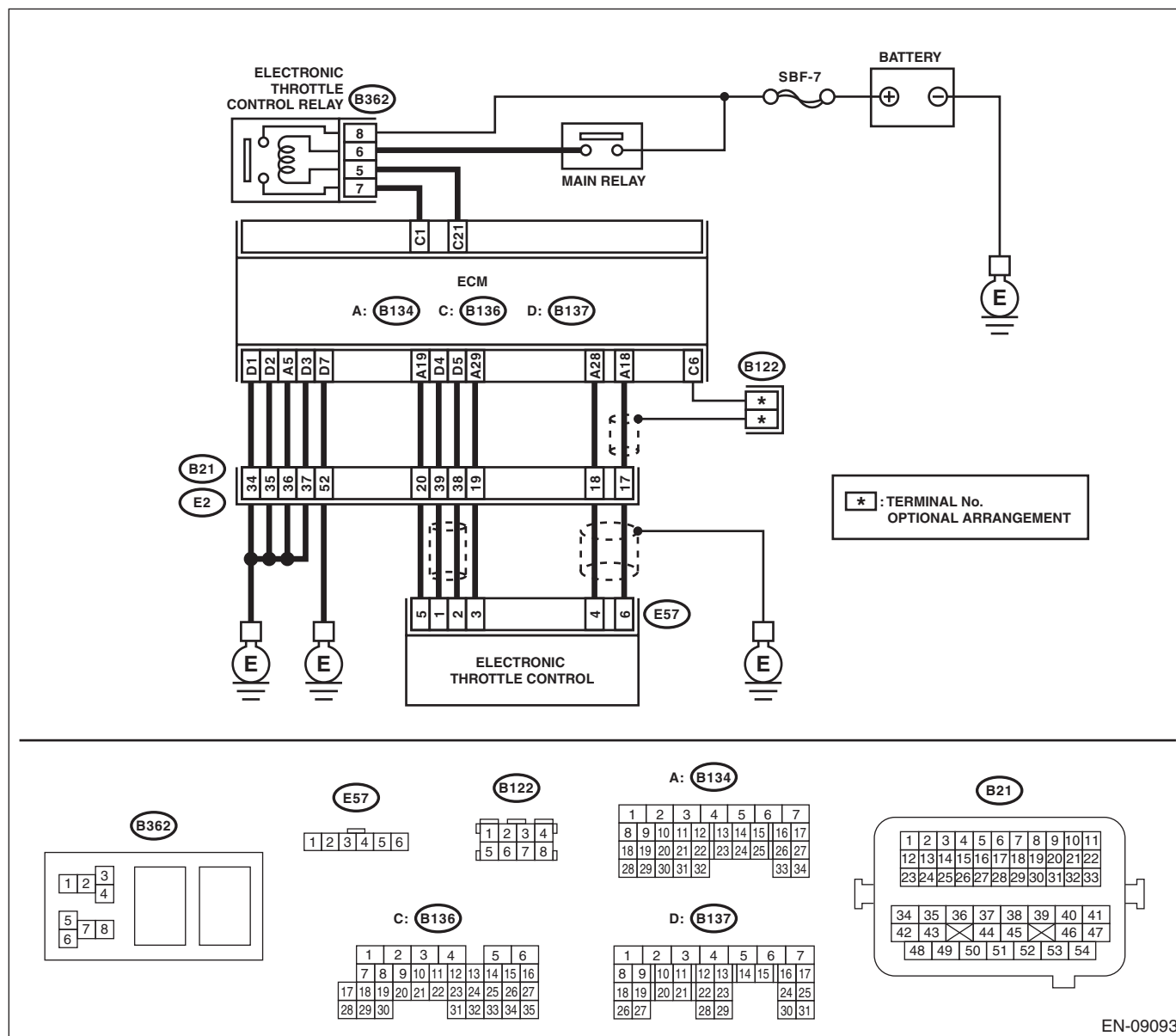
TROUBLE SYMPTOM:

- Engine is difficult to start.
- Engine does not start.
- Erroneous idling
- Engine stalls.

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-09093

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0506.	Go to step 2.
2 CHECK AIR CLEANER ELEMENT. 1) Turn the ignition switch to OFF. 2) Check the air cleaner element.	Is the air cleaner element excessively clogged?	Replace the air cleaner element. <Ref. to IN(H4SO)-4, Air Cleaner Element.>	Go to step 3.
3 CHECK ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control. 3) Check the electronic throttle control.	Are foreign matter found inside electronic throttle control?	Remove foreign matter from electronic throttle control.	Perform the diagnosis of DTC P2101.

BW:DTC P0507 IDLE AIR CONTROL SYSTEM RPM HIGHER THAN EXPECTED DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-163, DTC P0507 IDLE AIR CONTROL SYSTEM RPM HIGHER THAN EXPECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

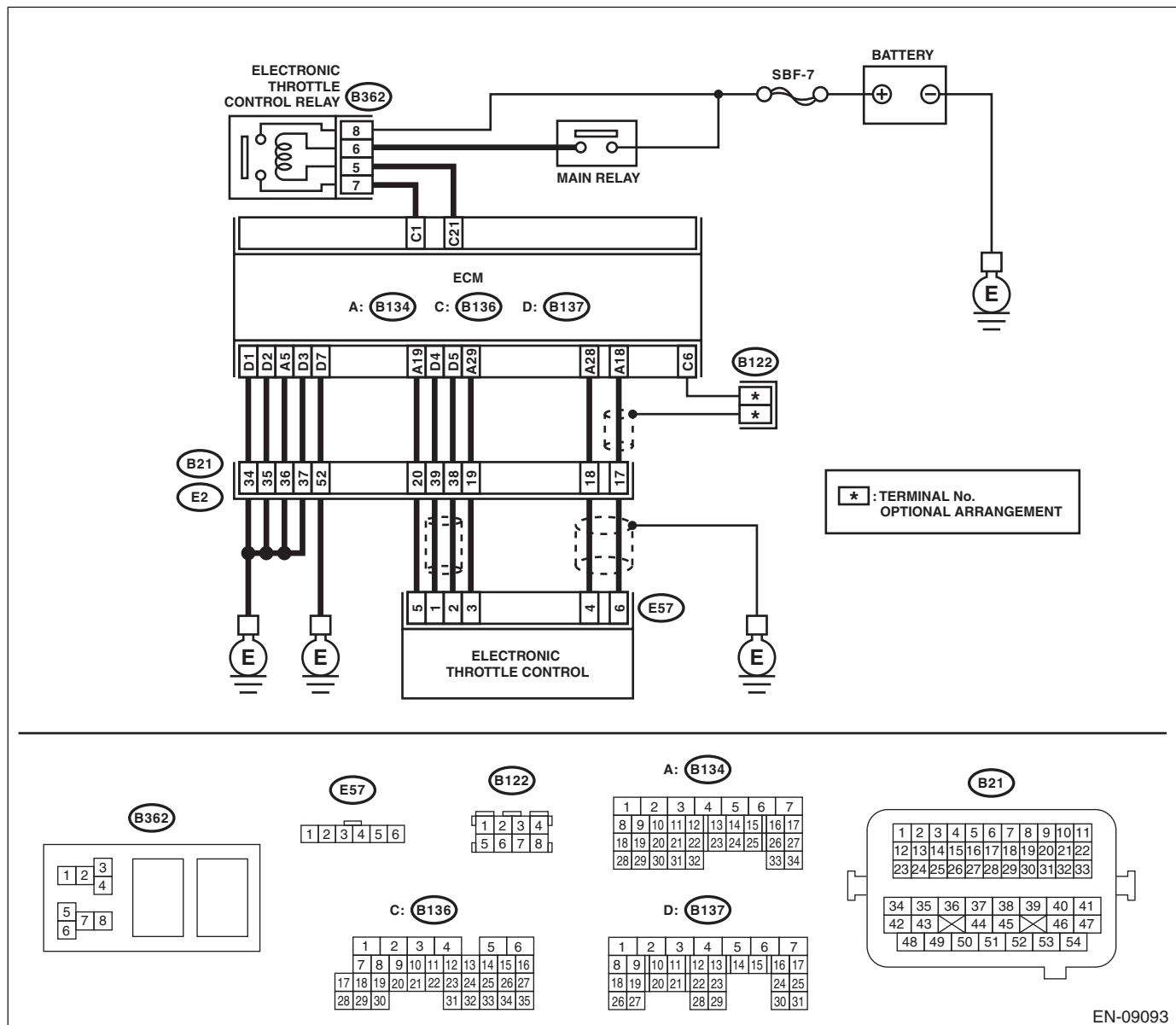
TROUBLE SYMPTOM:

Engine keeps running at higher speed than specified idle speed.

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-09093

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0507.	Go to step 3.
2 CHECK AIR INTAKE SYSTEM. 1) Turn the ignition switch to ON. 2) Start and idle the engine. 3) Check the following items. • Loose installation of intake manifold and throttle body • Cracks of intake manifold gasket and throttle body gasket • Disconnection of vacuum hoses	Is there any fault in air intake system?	Repair air suction and leaks.	Go to step 3.
3 CHECK ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control. 3) Check the electronic throttle control.	Are foreign matter found inside electronic throttle control?	Remove foreign matter from electronic throttle control.	Perform the diagnosis of DTC P2101.

BX:DTC P0512 STARTER REQUEST CIRCUIT**DTC DETECTING CONDITION:**

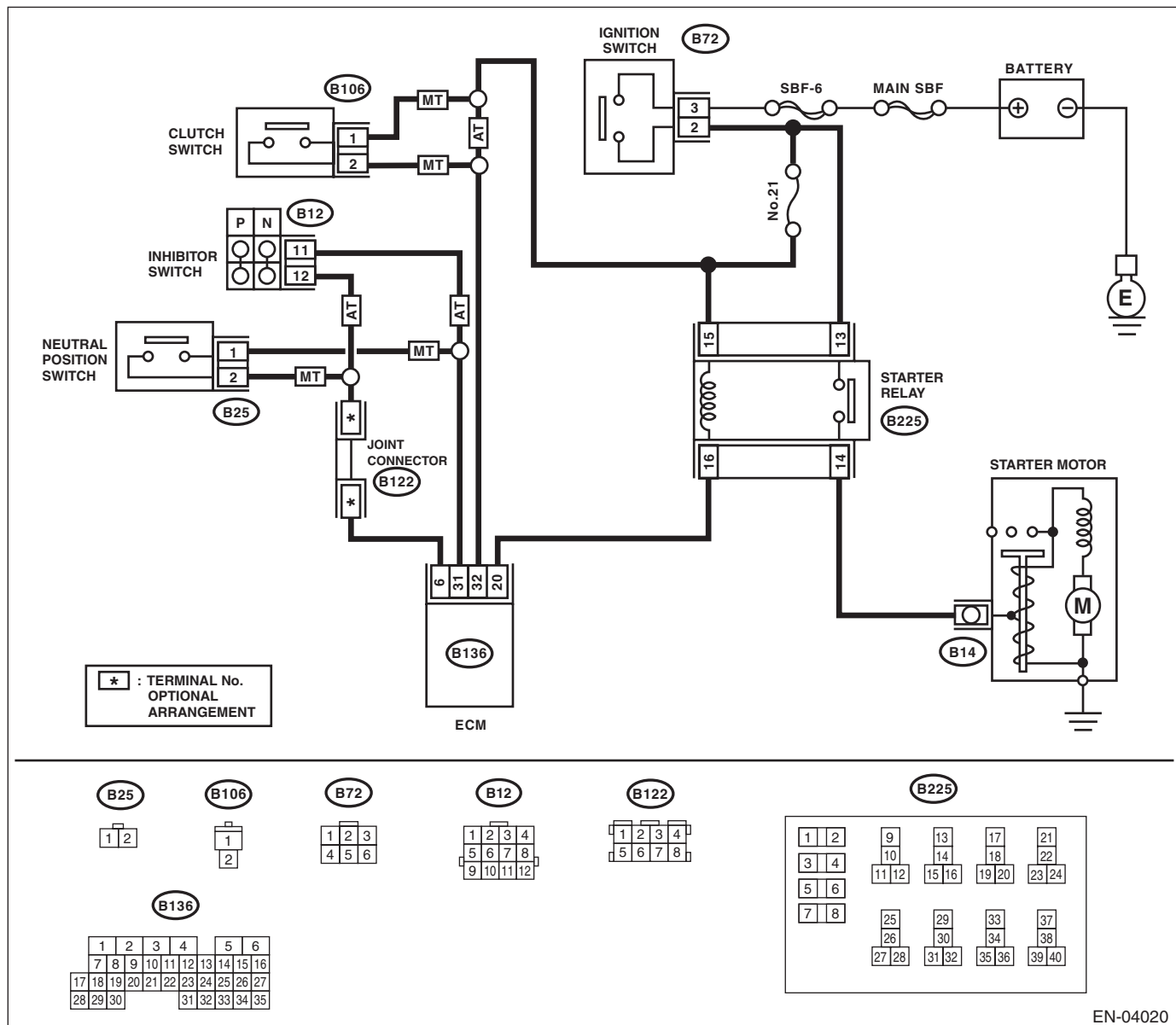
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-165, DTC P0512 STARTER REQUEST CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Failure of engine to start

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

EN-04020

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK OPERATION OF STARTER MOTOR. Turn the ignition switch to ON. NOTE: • Place the inhibitor switch in each position. (AT model) • Depress and release the clutch pedal. (MT model) • Check the security alarm is not sounding.	Does the starter motor operate?	Repair the battery short circuit in starter motor circuit.	Check the starter motor circuit. <Ref. to EN(H4SO U5)(diag)-59, STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

BY:DTC P0519 IDLE AIR CONTROL SYSTEM PERFORMANCE

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-167, DTC P0519 IDLE AIR CONTROL SYSTEM PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

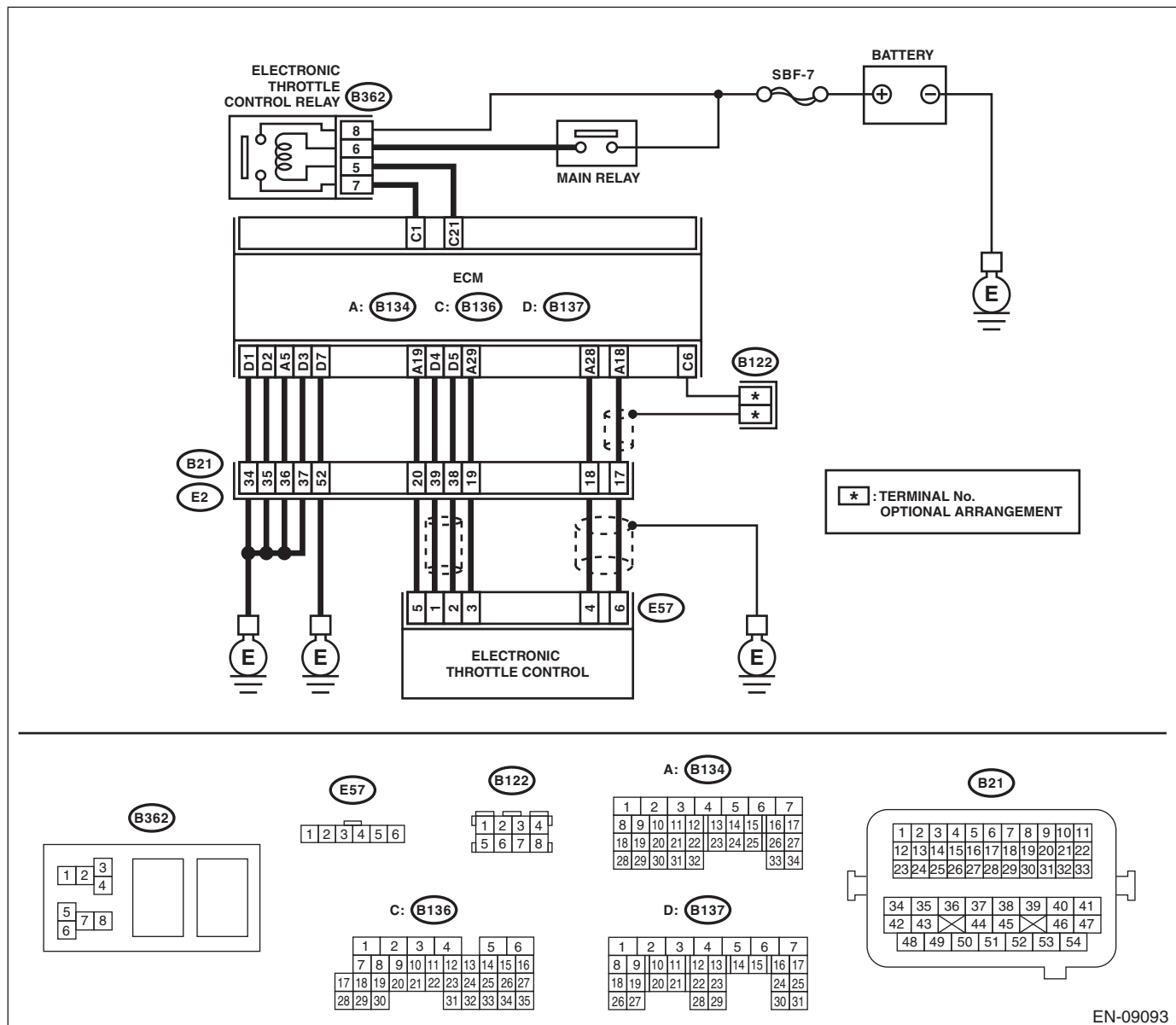
TROUBLE SYMPTOM:

Engine keeps running at higher speed than specified idle speed.

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-09093

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0519.	Go to step 2.
2 CHECK AIR INTAKE SYSTEM. 1) Turn the ignition switch to ON. 2) Start and idle the engine. 3) Check the following items. • Loose installation of intake manifold and throttle body • Cracks of intake manifold gasket and throttle body gasket • Disconnection of vacuum hoses	Is there any fault in air intake system?	Repair air suction and leaks.	Go to step 3.
3 CHECK ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control. 3) Check the electronic throttle control.	Are foreign matter found inside electronic throttle control?	Remove foreign matter from electronic throttle control.	Perform the diagnosis of DTC P2101.

BZ:DTC P0600 SERIAL COMMUNICATION LINK

NOTE:

For the diagnostic procedure, refer to LAN section. <Ref. to LAN(diag)-2, Basic Diagnostic Procedure.>

CA:DTC P0602 CONTROL MODULE PROGRAMMING ERROR

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-169, DTC P0602 CONTROL MODULE PROGRAMMING ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>

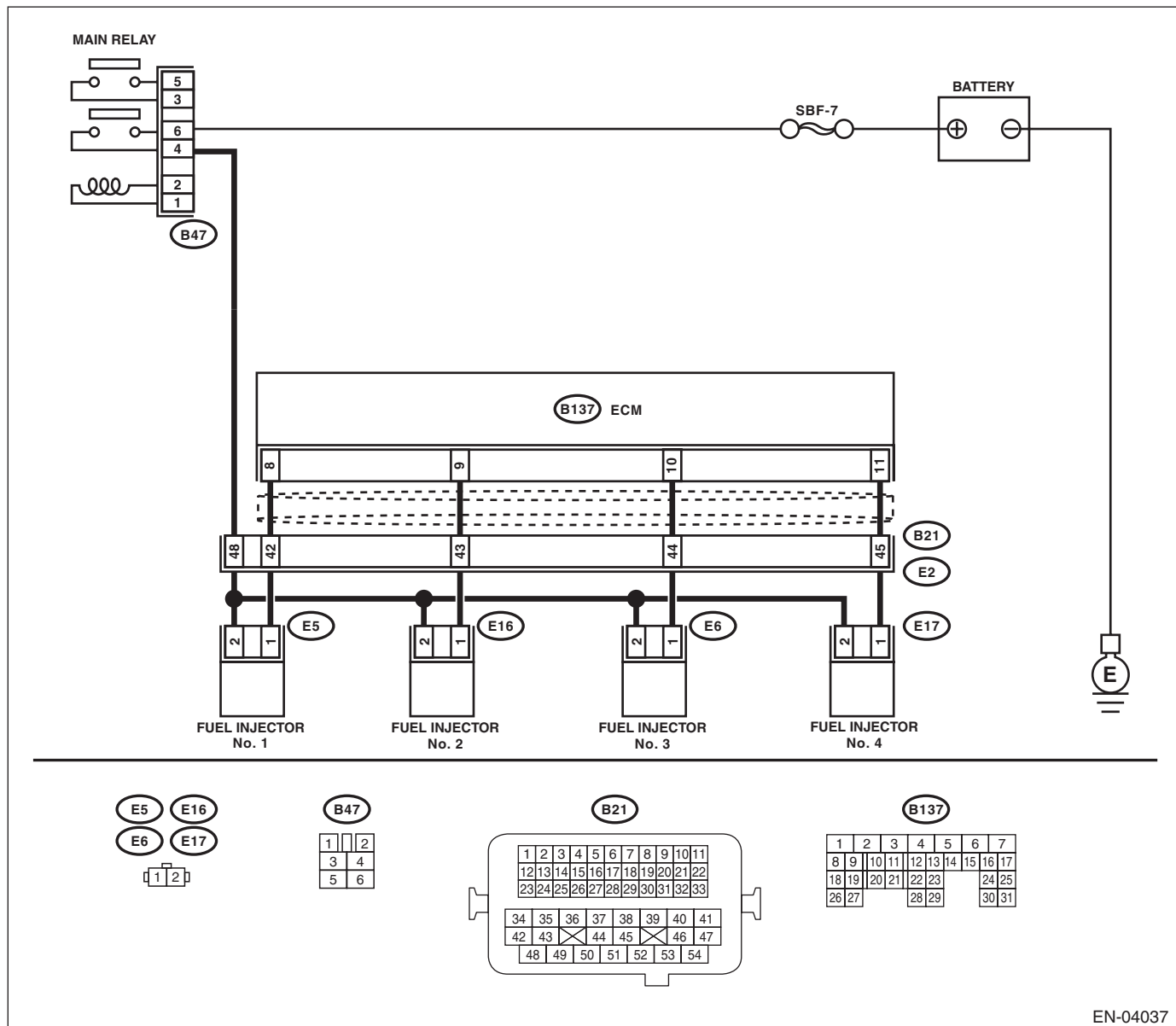
TROUBLE SYMPTOM:

- Engine keeps running at higher speed than specified idle speed.
- Engine keeps running at lower speed than specified idle speed.
- Engine stalls.

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

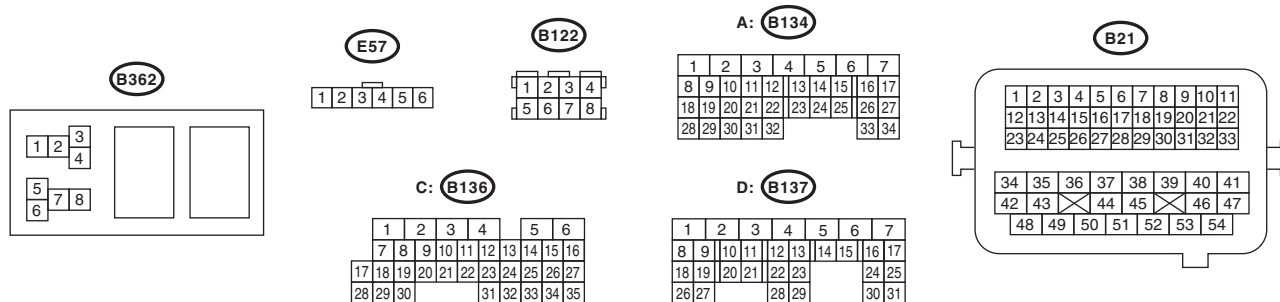
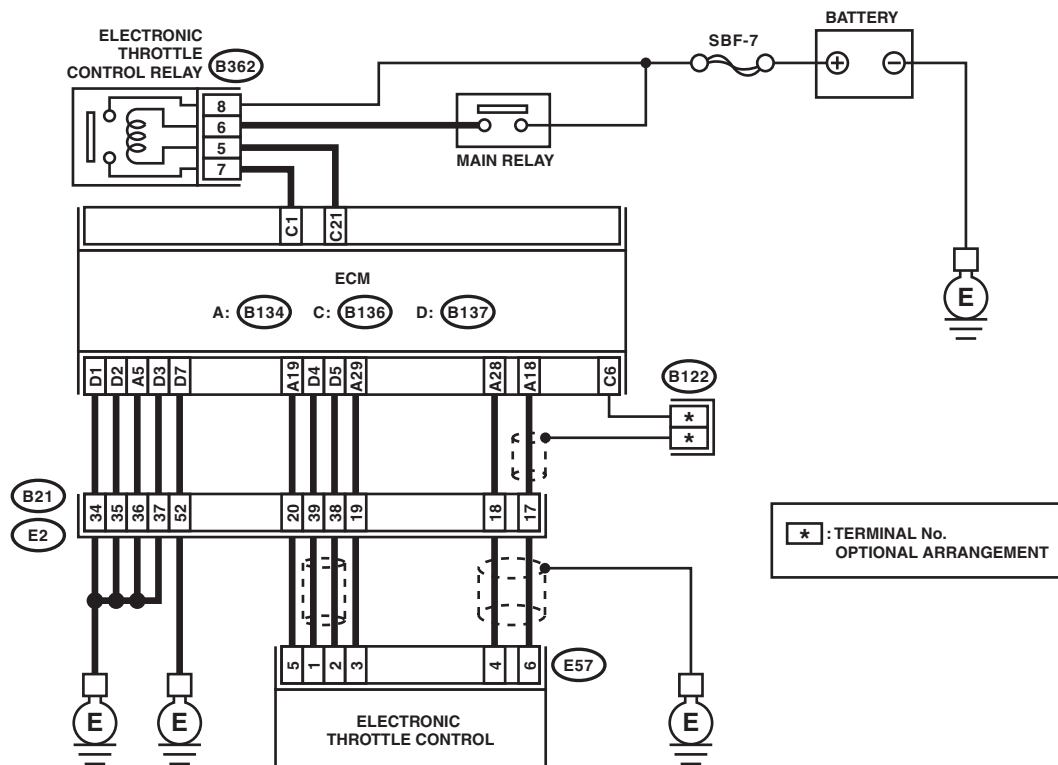
WIRING DIAGRAM:



EN-04037

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)



EN-09093

Step	Check	Yes	No
1	CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>
2	CHECK ENGINE OIL.	Is the engine oil filled to the specified level?	Go to step 3.
3	CHECK EXHAUST SYSTEM.	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

	Step	Check	Yes	No
4	CHECK AIR INTAKE SYSTEM.	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step 5.
5	CHECK FUEL PRESSURE. WARNING: - Place “NO FIRE” signs near the working area. - Be careful not to spill fuel. Measure the fuel pressure. <Ref. to ME(H4SO)-25, INSPECTION, Fuel Pressure.> WARNING: Release fuel pressure before removing the fuel pressure gauge.	Is the fuel pressure 339.5 — 360.5 kPa (3.5 — 3.7 kgf/cm ² , 49 — 52 psi)?	Go to step 6.	Repair the following item. Fuel pressure is too high: - Clogged fuel line or bent hose Fuel pressure is too low: - Improper fuel pump discharge - Clogged fuel line
6	CHECK ENGINE COOLANT TEMPERATURE SENSOR. 1) Start the engine and warm-up completely. 2) Read the data of engine coolant temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: - Subaru Select Monitor For detailed operation procedure, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> - General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the engine coolant temperature above 60°C (140°F)?	Go to step 7.	Replace the engine coolant temperature sensor. <Ref. to FU(H4SO)-19, Engine Coolant Temperature Sensor.>
7	CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F). 2) Place the select lever in “N” or “P” position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the data of mass air flow and intake air temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: - Subaru Select Monitor For detailed operation procedure, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> - General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the measured value 2.1 — 3.4 g/s (0.28 — 0.45 lb/m)?	Go to step 8.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4SO)-25, Mass Air Flow and Intake Air Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
8 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F). 2) Place the shift lever in neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Open the front hood. 6) Measure the ambient temperature. 7) Read the data of mass air flow and intake air temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Subtract ambient temperature from intake air temperature. Is the obtained value -10 — 50°C (-18 — 90°F)?	Go to step 9.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(H4SO)-25, Mass Air Flow and Intake Air Temperature Sensor.>
9 CHECK OUTPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. Connector & terminal <i>#1 (B137) No. 8 (+) — Chassis ground (-):</i> <i>#2 (B137) No. 9 (+) — Chassis ground (-):</i> <i>#3 (B137) No. 10 (+) — Chassis ground (-):</i> <i>#4 (B137) No. 11 (+) — Chassis ground (-):</i>	Is the voltage more than 10 V?	Go to step 14.	Go to step 10.
10 CHECK HARNESS BETWEEN FUEL INJECTOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Measure the resistance between ECM connector and engine ground on faulty cylinders. Connector & terminal <i>#1 (E5) No. 1 — Engine ground:</i> <i>#2 (E16) No. 1 — Engine ground:</i> <i>#3 (E6) No. 1 — Engine ground:</i> <i>#4 (E17) No. 1 — Engine ground:</i>	Is the resistance more than 1 MΩ?	Go to step 11.	Repair the ground short circuit of harness between fuel injector and ECM connector.
11 CHECK HARNESS BETWEEN FUEL INJECTOR AND ECM CONNECTOR. Measure the resistance of harness connector between ECM connector and fuel injector on faulty cylinders. Connector & terminal <i>#1 (B137) No. 8 — (E5) No. 1:</i> <i>#2 (B137) No. 9 — (E16) No. 1:</i> <i>#3 (B137) No. 10 — (E6) No. 1:</i> <i>#4 (B137) No. 11 — (E17) No. 1:</i>	Is the resistance less than 1 Ω?	Go to step 12.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and fuel injector connector • Poor contact of coupling connector
12 CHECK FUEL INJECTOR. Measure the resistance between fuel injector terminals on faulty cylinder. Terminals <i>No. 1 — No. 2:</i>	Is the resistance between 5 and 20 Ω?	Go to step 13.	Replace the faulty fuel injector. <Ref. to FU(H4SO)-27, Fuel Injector.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
13 CHECK POWER SUPPLY LINE. 1) Turn the ignition switch to ON. 2) Measure the voltage between fuel injector and engine ground on faulty cylinders. Connector & terminal #1 (E5) No. 2 (+) — Engine ground (-): #2 (E16) No. 2 (+) — Engine ground (-): #3 (E6) No. 2 (+) — Engine ground (-): #4 (E17) No. 2 (+) — Engine ground (-):	Is the voltage more than 10 V?	Repair the poor contact of all connectors in fuel injector circuit.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between main relay and fuel injector connector on faulty cylinders • Poor contact of coupling connector • Poor contact of main relay connector • Poor contact of fuel injector connector on faulty cylinders
14 CHECK HARNESS BETWEEN FUEL INJECTOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground on faulty cylinders. Connector & terminal #1 (B137) No. 8 (+) — Chassis ground (-): #2 (B137) No. 9 (+) — Chassis ground (-): #3 (B137) No. 10 (+) — Chassis ground (-): #4 (B137) No. 11 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and fuel injector. After repair, replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Go to step 15.
15 CHECK FUEL INJECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance between fuel injector terminals on faulty cylinder. Terminals No. 1 — No. 2:	Is the resistance less than 1 Ω ?	Replace the faulty fuel injector <Ref. to FU(H4SO)-27, Fuel Injector.> and ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Go to step 16.
16 CHECK INSTALLATION OF CAMSHAFT POSITION SENSOR/CRANKSHAFT POSITION SENSOR.	Is the camshaft position sensor or crankshaft position sensor loosely installed?	Tighten the camshaft position sensor or crankshaft position sensor.	Go to step 17.
17 CHECK CRANK SPROCKET. Remove the timing belt cover.	Is the crank sprocket rusted or does it have damaged teeth?	Replace the crank sprocket. <Ref. to ME(H4SO)-46, Crank Sprocket.>	Go to step 18.
18 CHECK INSTALLATION CONDITION OF TIMING BELT. Turn the crankshaft, and align alignment mark on crank sprocket with alignment mark on cylinder block.	Is the timing belt dislocated from its proper position?	Repair the installation condition of timing belt. <Ref. to ME(H4SO)-40, Timing Belt.>	Go to step 19.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
19 CHECK ELECTRONIC THROTTLE CONTROL RELAY. 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control relay. 3) Connect the battery to terminals No. 5 and No. 6 of electronic throttle control relay. 4) Measure the resistance between electronic throttle control relay terminals. Terminals No. 8 — No. 7:	Is the resistance less than 1 Ω ?	Go to step 20.	Replace the electronic throttle control relay.
20 CHECK POWER SUPPLY OF ELECTRONIC THROTTLE CONTROL RELAY. Measure the voltage between electronic throttle control relay connector and chassis ground. Connector & terminal (B362) No. 8 (+) — Chassis ground (-): (B362) No. 6 (+) — Chassis ground (-):	Is the voltage more than 5 V?	Go to step 21.	Repair the open or ground short circuit of power supply circuit.
21 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY. 1) Disconnect the connectors from ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control relay connector and chassis ground. Connector & terminal (B362) No. 5 (+) — Chassis ground (-):	Is the voltage less than 5 V?	Go to step 22.	Repair the power supply short circuit of harness between ECM and electronic throttle control.
22 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY. 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control relay connector and chassis ground. Connector & terminal (B362) No. 5 — Chassis ground: (B362) No. 7 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 23.	Repair the ground short circuit of harness between ECM and electronic throttle control relay.
23 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY. Measure the resistance between ECM connector and electronic throttle control relay connector. Connector & terminal (B136) No. 21 — (B362) No. 5: (B136) No. 1 — (B362) No. 7:	Is the resistance less than 1 Ω ?	Go to step 24.	Repair the open circuit of harness between ECM and electronic throttle control relay.
24 CHECK SENSOR OUTPUT. 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Read the data of main throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage more than 0.4 V?	Go to step 25.	Go to step 27.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
25 CHECK SENSOR OUTPUT. 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Read the data of sub throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage more than 0.8 V?	Go to step 26.	Go to step 27.
26 CHECK POOR CONTACT. Check poor contact in connector between ECM and electronic throttle control.	Is there poor contact?	Repair the poor contact.	Go to step 31.
27 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from electronic throttle control. 4) Measure the resistance between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 18 — (E57) No. 6: (B134) No. 28 — (E57) No. 4: (B134) No. 19 — (E57) No. 5:	Is the resistance less than 1 Ω ?	Go to step 28.	Repair the open circuit of harness connector.
28 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 18 — Chassis ground: (B134) No. 19 — Chassis ground: (B134) No. 28 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 29.	Repair the ground short circuit of harness.
29 CHECK SENSOR POWER SUPPLY. 1) Connect the ECM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 5 (+) — Engine ground (-):	Is the voltage 4.5 — 5.5 V?	Go to step 30.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
30 CHECK SHORT CIRCUIT IN ECM. 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 6 — Engine ground: (E57) No. 4 — Engine ground:	Is the resistance more than 10 Ω ?	Go to step 31.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
31 CHECK SENSOR OUTPUT. 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Read the data of main throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage less than 4.63 V?	Go to step 32.	Go to step 34.
32 CHECK SENSOR OUTPUT. Read the data of sub throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage less than 4.73 V?	Go to step 33.	Go to step 34.
33 CHECK POOR CONTACT. Check poor contact in connector between ECM and electronic throttle control.	Is there poor contact?	Repair the poor contact.	Go to step 39.
34 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from electronic throttle control. 4) Measure the resistance between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 29 — (E57) No. 3: (B134) No. 18 — (E57) No. 6: (B134) No. 28 — (E57) No. 4:	Is the resistance less than 1 Ω ?	Go to step 35.	Repair the open circuit of harness connector.
35 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Connect the ECM connector. 2) Measure the resistance between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 3 — Engine ground:	Is the resistance less than 5 Ω ?	Go to step 36.	Repair the poor contact of ECM connector. Replace the ECM if defective.
36 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 5 (+) — Engine ground (-):	Is the voltage more than 10 V?	Go to step 37.	Repair the battery short circuit of harness between ECM connector and electronic throttle control connector.
37 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 6 (+) — Engine ground (-): (E57) No. 4 (+) — Engine ground (-):	Is the voltage less than 10 V?	Go to step 38.	Repair the short circuit of harness between ECM connector and electronic throttle control connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
38 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Remove the ECM. 3) Measure the resistance between ECM connectors. Connector & terminal (B134) No. 18 — (B134) No. 19: (B134) No. 28 — (B134) No. 19:	Is the resistance more than 1 MΩ?	Go to step 39.	Repair the short circuit to sensor power supply.
39 CHECK SENSOR OUTPUT. 1) Turn the ignition switch to OFF. 2) Connect the connectors except for electric throttle control relay. 3) Turn the ignition switch to ON. 4) Read the data of main throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage 0.81 — 0.87 V?	Go to step 40.	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective.
40 CHECK SENSOR OUTPUT. Read the data of sub throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage 1.64 — 1.70 V?	Go to step 41.	Repair the poor contact of ECM connector. Replace the electronic throttle control if defective.
41 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL MOTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from electronic throttle control. 4) Measure the resistance between ECM connector and electronic throttle control connector. Connector & terminal (B137) No. 5 — (E57) No. 2: (B137) No. 4 — (E57) No. 1:	Is the resistance less than 1 Ω?	Go to step 42.	Repair the open circuit of harness connector.
42 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL MOTOR. 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 2 (+) — Engine ground (-): (E57) No. 1 (+) — Engine ground (-):	Is the voltage less than 5 V?	Go to step 43.	Repair the power supply short circuit of harness between ECM and electronic throttle control.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
43 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL MOTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 2 — Engine ground: (E57) No. 1 — Engine ground:	Is the resistance more than 1 M Ω ?	Go to step 44.	Repair the short circuit of harness.
44 CHECK ELECTRONIC THROTTLE CONTROL MOTOR HARNESS. Measure the resistance between electronic throttle control connector terminals. Connector & terminal (E57) No. 2 — (E57) No. 1:	Is the resistance more than 1 M Ω ?	Go to step 45.	Repair the short circuit of harness.
45 CHECK ELECTRONIC THROTTLE CONTROL GROUND CIRCUIT. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 5 — Chassis ground: (B136) No. 15 — Chassis ground: (B137) No. 1 — Chassis ground: (B137) No. 2 — Chassis ground: (B137) No. 3 — Chassis ground: (B137) No. 7 — Chassis ground:	Is the resistance less than 10 Ω ?	Go to step 46.	Repair the open circuit of harness.
46 CHECK ELECTRONIC THROTTLE CONTROL. Measure the resistance between electronic throttle control terminals. Terminals No. 1 — No. 2:	Is the resistance 50 Ω or less?	Go to step 47.	Replace the electronic throttle control.
47 CHECK ELECTRONIC THROTTLE CONTROL. Move the throttle valve to the fully open and fully closed positions with fingers. Check that the valve returns to the specified position when releasing fingers.	Does the valve return to the specified position? Standard value: 3 mm (0.12 in) from fully closed position	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Replace the electronic throttle control.

CB:DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-173, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine does not start.
- Engine stalls.

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Temporary poor contact occurs.

CC:DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR**NOTE:**

For the diagnostic procedure, refer to DTC P0607. <Ref. to EN(H4SO U5)(diag)-250, DTC P0607 CONTROL MODULE PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CD:DTC P0607 CONTROL MODULE PERFORMANCE

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-175, DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.> and <Ref. to GD(H4SO U5)-176, DTC P0607 CONTROL MODULE PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

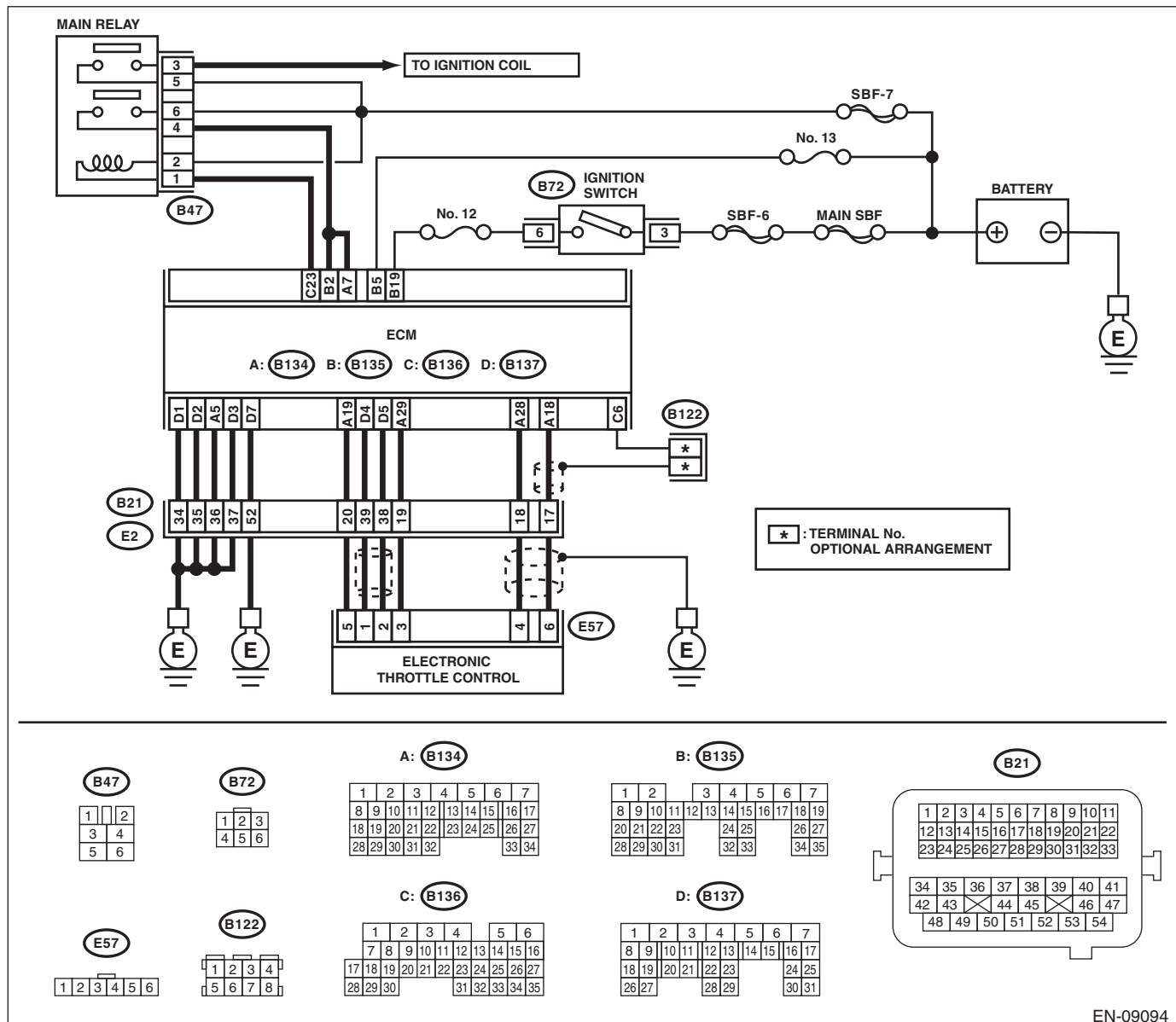
TROUBLE SYMPTOM:

- Erroneous idling
- Poor driving performance

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-09094

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK INPUT VOLTAGE OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and ground. Connector & terminal (B135) No. 2 (+) — Chassis ground (-): (B134) No. 7 (+) — Chassis ground (-):	Is the voltage 10 — 13 V?	Go to step 2.	Repair the open or ground short circuit of power supply circuit.
2 CHECK INPUT VOLTAGE OF ECM. 1) Start the engine. 2) Measure the voltage between ECM connector and ground. Connector & terminal (B135) No. 2 (+) — Chassis ground (-): (B134) No. 7 (+) — Chassis ground (-):	Is the voltage 13 — 15 V?	Go to step 3.	Repair the open or ground short circuit of power supply circuit.
3 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and electronic throttle control. 3) Measure the resistance of harness between ECM and electronic throttle control connector. Connector & terminal (E57) No. 5 — (B134) No. 19: (E57) No. 3 — (B134) No. 29:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness between ECM and electronic throttle control connector.
4 CHECK ECM GROUND HARNESS. Measure the voltage between ECM connector and ground. Connector & terminal (B134) No. 5 (+) — Chassis ground (-): (B137) No. 1 (+) — Chassis ground (-): (B137) No. 2 (+) — Chassis ground (-): (B137) No. 3 (+) — Chassis ground (-): (B137) No. 7 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Replace the ECM. <Ref. to FU(H4SO)-36, INSTALLATION, Engine Control Module (ECM).>	Repair the following items. • Further tighten the engine ground terminals. • Poor contact in ECM connector • Poor contact in coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CE:DTC P0638 THROTTLE ACTUATOR CONTROL RANGE/PERFORMANCE (BANK 1)

NOTE:

For the diagnostic procedure, refer to DTC P2101. <Ref. to EN(H4SO U5)(diag)-296, DTC P2101 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CF:DTC P0691 FAN 1 CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-182, DTC P0691 FAN 1 CONTROL CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Radiator fan does not operate properly.
- Overheating

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is DTC P0691 displayed on the Subaru Select Monitor?	Check the radiator fan system. <Ref. to CO(H4SO)-7, Radiator Fan System.>	Temporary poor contact occurs.

CG:DTC P0692 FAN 1 CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-183, DTC P0692 FAN 1 CONTROL CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Radiator fan does not operate properly.
- Overheating

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is DTC P0692 displayed on the Subaru Select Monitor?	Check the radiator fan system. <Ref. to CO(H4SO)-7, Radiator Fan System.>	Temporary poor contact occurs.

CH:DTC P0700 TRANSMISSION CONTROL SYSTEM (MIL REQUEST)

GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-184, DTC P0700 TRANSMISSION CONTROL SYSTEM (MIL REQUEST), Diagnostic Trouble Code (DTC) Detecting Criteria.>

NOTE:

For the diagnostic procedure, refer to AT section. <Ref. to 4AT(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

CI: DTC P0851 PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW (AT MODEL)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-185, DTC P0851 PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW (AT MODEL), Diagnostic Trouble Code (DTC) Detecting Criteria.>

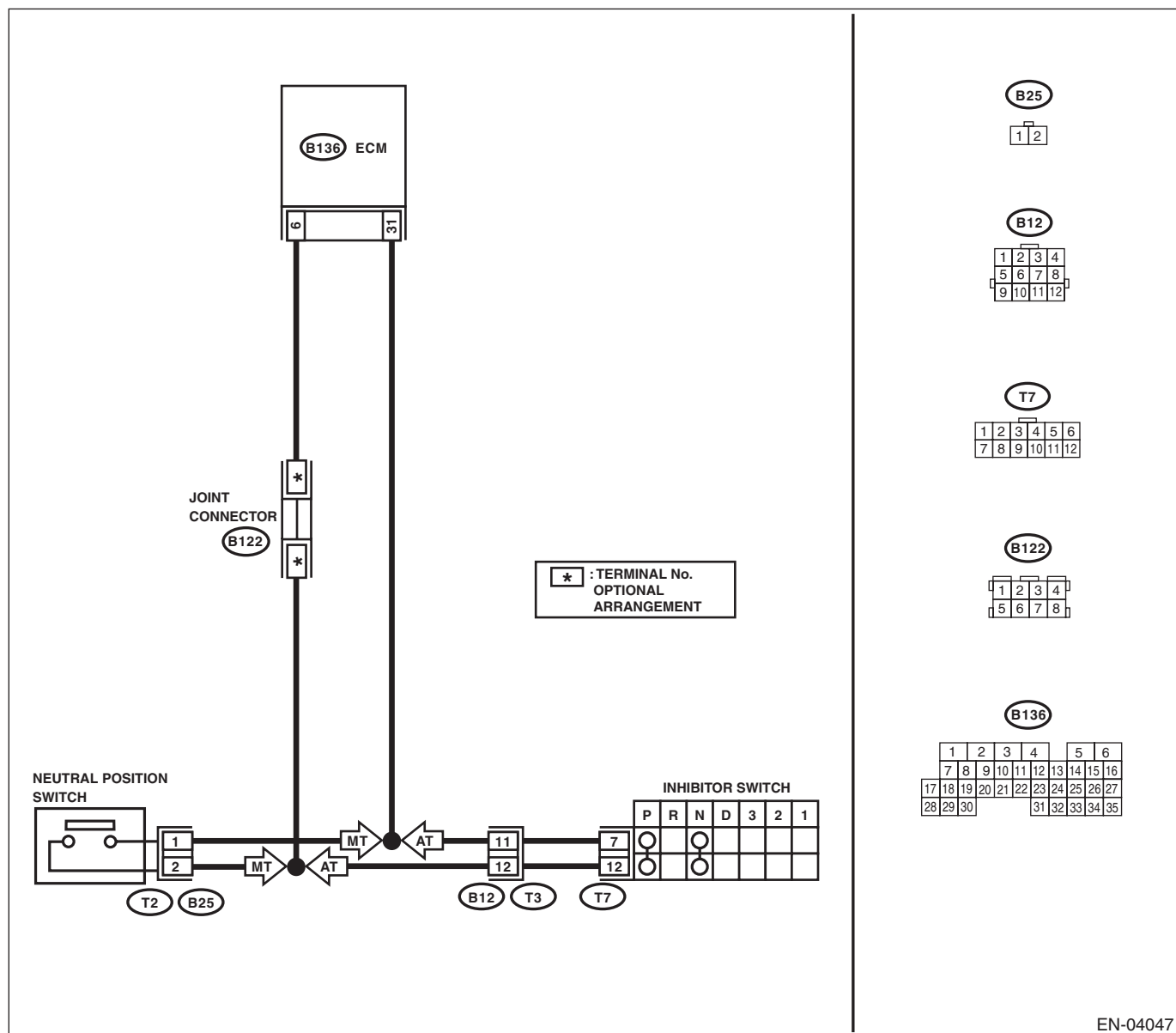
TROUBLE SYMPTOM:

Erroneous idling

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04047

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK SELECT CABLE.	Is there any fault in the select cable?	Repair or adjust the select cable. <Ref. to CS-26, INSPECTION, Select Cable.>	Go to step 2.
2 CHECK INPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Place the select lever other than "N" and "P" range. 3) Measure the voltage between ECM and chassis ground. Connector & terminal (B136) No. 31 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Even if the malfunction indicator light illuminates, the circuit has returned to a normal condition at this time.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND TRANSMISSION HARNESS CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and transmission harness connector (T3). 3) Measure the resistance of harness between ECM connector and chassis ground. Connector & terminal (B136) No. 31 — Chassis ground: (B136) No. 6 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 4.	Repair the ground short circuit of harness between ECM and transmission harness connector.
4 CHECK TRANSMISSION HARNESS CONNECTOR. 1) Disconnect the connector from inhibitor switch. 2) Measure the resistance of harness between transmission harness connector and engine ground. Connector & terminal (T3) No. 11 — Engine ground:	Is the resistance more than 1 MΩ?	Go to step 5.	Repair the ground short circuit of harness between transmission harness connector and inhibitor switch connector.
5 CHECK INHIBITOR SWITCH. Measure the resistance between inhibitor switch connector receptacles terminals with select lever at other than "N" or "P" range. Terminals No. 7 — No. 12:	Is the resistance more than 1 MΩ?	Contact the SOA service center.	Replace the inhibitor switch. <Ref. to 4AT-46, Inhibitor Switch.>

CJ:DTC P0851 NEUTRAL SWITCH INPUT CIRCUIT LOW (MT MODEL)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-186, DTC P0851 NEUTRAL SWITCH INPUT CIRCUIT LOW (MT MODEL), Diagnostic Trouble Code (DTC) Detecting Criteria.>

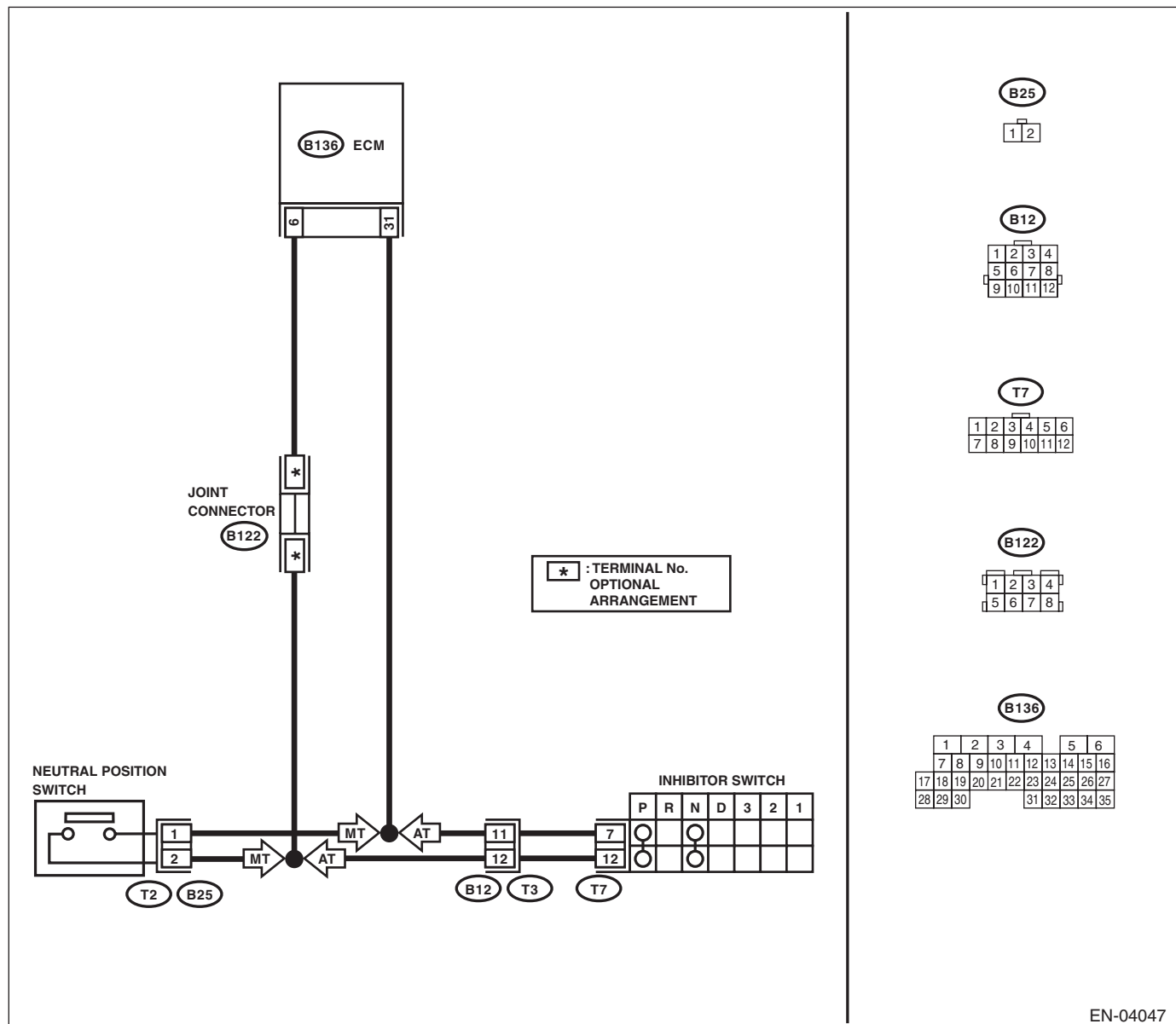
TROUBLE SYMPTOM:

Erroneous idling

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04047

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK INPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Place the shift lever in neutral. 3) Measure the voltage between ECM and chassis ground. Connector & terminal (B136) No. 31 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 2.	Go to step 4.
2 CHECK INPUT SIGNAL OF ECM. 1) Place the shift lever except in neutral. 2) Measure the voltage between ECM and chassis ground. Connector & terminal (B136) No. 31 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 3.	Go to step 4.
3 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Contact the SOA service center.
4 CHECK NEUTRAL POSITION SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the transmission harness. 3) Place the shift lever in neutral. 4) Measure the resistance between transmission harness and connector terminals. Connector & terminal (T2) No. 1 — No. 2:	Is the resistance more than 1 M Ω ?	Go to step 5.	Repair the short circuit in transmission harness, or replace the neutral position switch.
5 CHECK NEUTRAL POSITION SWITCH. 1) Place the shift lever except in neutral. 2) Measure the resistance between transmission harness connector terminals. Connector & terminal (T2) No. 1 — No. 2:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the short circuit in transmission harness, or replace the neutral position switch.
6 CHECK HARNESS BETWEEN ECM AND NEUTRAL POSITION SWITCH CONNECTOR. Measure the resistance between ECM and chassis ground. Connector & terminal (B136) No. 31 — Chassis ground: (B136) No. 6 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 7.	Repair the ground short circuit of harness between ECM and transmission harness connector.
7 CHECK HARNESS BETWEEN ECM AND NEUTRAL POSITION SWITCH CONNECTOR. 1) Disconnect the connectors from ECM. 2) Measure the resistance of harness between ECM and transmission harness connector. Connector & terminal (B136) No. 31 — (B25) No. 1:	Is the resistance less than 1 Ω ?	Go to step 8.	Repair the open circuit of harness between ECM and transmission harness connector.
8 CHECK HARNESS BETWEEN ECM AND NEUTRAL POSITION SWITCH CONNECTOR. Measure the resistance of harness between transmission harness connector and engine ground. Connector & terminal (B25) No. 2 — Engine ground:	Is the resistance less than 5 Ω ?	Go to step 9.	Repair the open circuit between transmission harness connector and engine ground terminal.
9 CHECK POOR CONTACT. Check poor contact of transmission harness connector.	Is there poor contact in transmission harness connector?	Repair the poor contact of transmission harness connector.	Contact the SOA service center.

CK:DTC P0852 PARK/NEUTRAL SWITCH INPUT CIRCUIT HIGH (AT MODEL)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-187, DTC P0852 PARK/NEUTRAL SWITCH INPUT CIRCUIT HIGH (AT MODEL), Diagnostic Trouble Code (DTC) Detecting Criteria.>

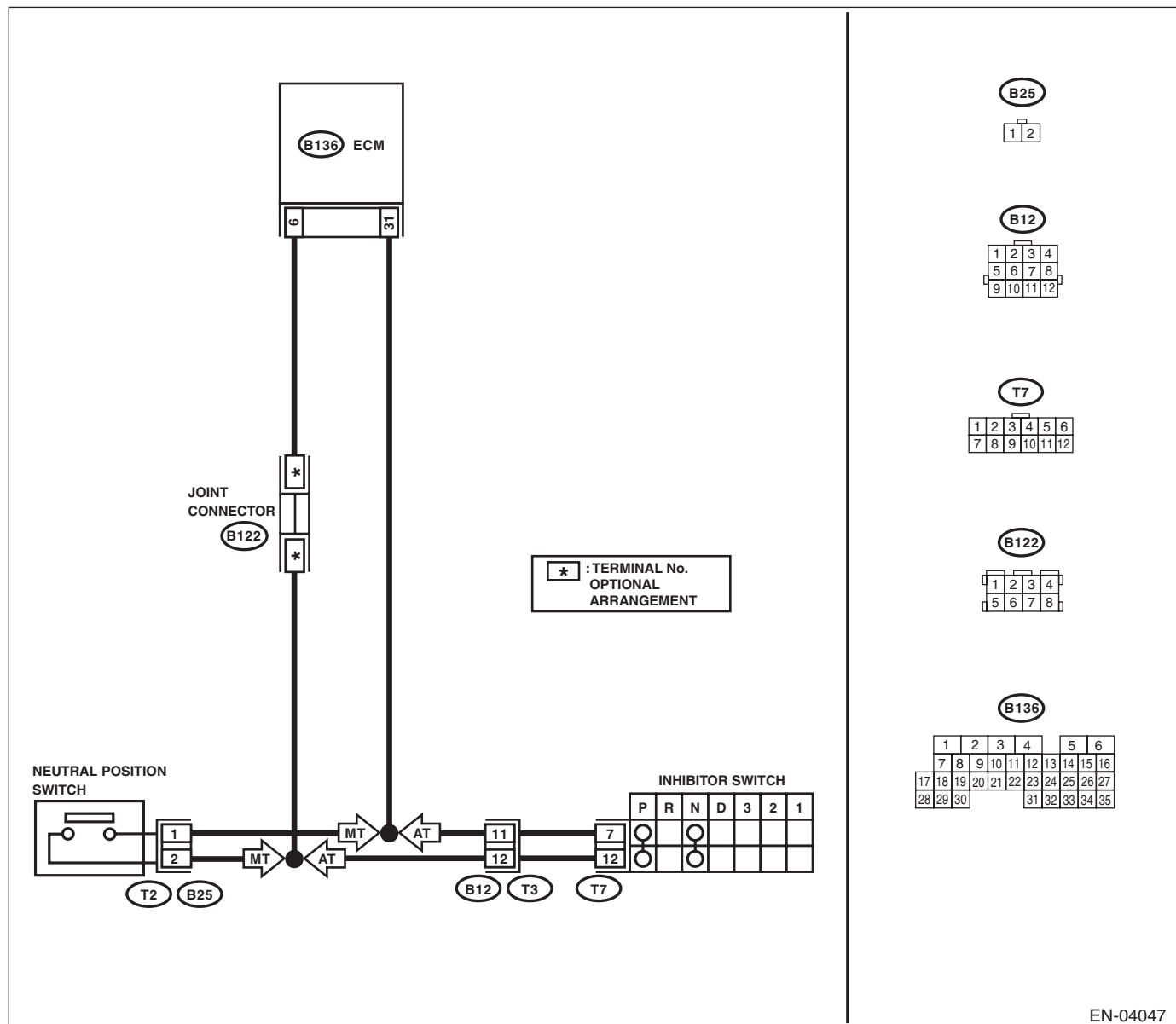
TROUBLE SYMPTOM:

Erroneous idling

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04047

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK SELECT CABLE.	Is there any fault in the select cable?	Repair or adjust the select cable. <Ref. to CS-26, INSPECTION, Select Cable.>	Go to step 2.
2 CHECK INPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground with select lever at "N" and "P" range. Connector & terminal (B136) No. 31 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 3.	Go to step 5.
3 CHECK INPUT SIGNAL OF ECM. Measure the voltage between ECM and chassis ground with select lever at other than "N" and "P" range. Connector & terminal (B136) No. 31 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 4.	Go to step 5.
4 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Contact the SOA service center.
5 CHECK INPUT SIGNAL OF ECM. Measure the voltage between ECM and chassis ground. Connector & terminal (B136) No. 31 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and inhibitor switch connector.	Go to step 6.
6 CHECK HARNESS BETWEEN ECM AND INHIBITOR SWITCH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and inhibitor switch. 3) Measure the resistance of harness between ECM and inhibitor switch connector. Connector & terminal (B136) No. 31 — (T7) No. 7: (B136) No. 6 — (T7) No. 12:	Is the resistance less than 1 Ω ?	Go to step 7.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and inhibitor switch connector • Poor contact of coupling connector • Poor contact of inhibitor switch connector • Poor contact in ECM connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK INHIBITOR SWITCH GROUND LINE. Measure the resistance of harness between inhibitor switch connector and engine ground. Connector & terminal (T7) No. 12 — Engine ground:	Is the resistance less than 5 Ω ?	Go to step 8.	Repair open circuit of harness between inhibitor switch connector and starter motor ground line. NOTE: In this case, repair the following item: • Open circuit in harness between inhibitor switch connector and starter motor ground line • Poor contact in starter motor connector • Poor contact in starter motor ground • Starter motor
8 CHECK INHIBITOR SWITCH. Measure the resistance between inhibitor switch connector receptacle's terminals with select lever at "N" and "P" range. Terminals No. 7 — No. 12:	Is the resistance less than 1 Ω ?	Contact the SOA service center.	Replace the inhibitor switch. <Ref. to 4AT-46, Inhibitor Switch.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CL:DTC P0852 NEUTRAL SWITCH INPUT CIRCUIT HIGH (MT MODEL)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-188, DTC P0852 NEUTRAL SWITCH INPUT CIRCUIT HIGH (MT MODEL), Diagnostic Trouble Code (DTC) Detecting Criteria.>

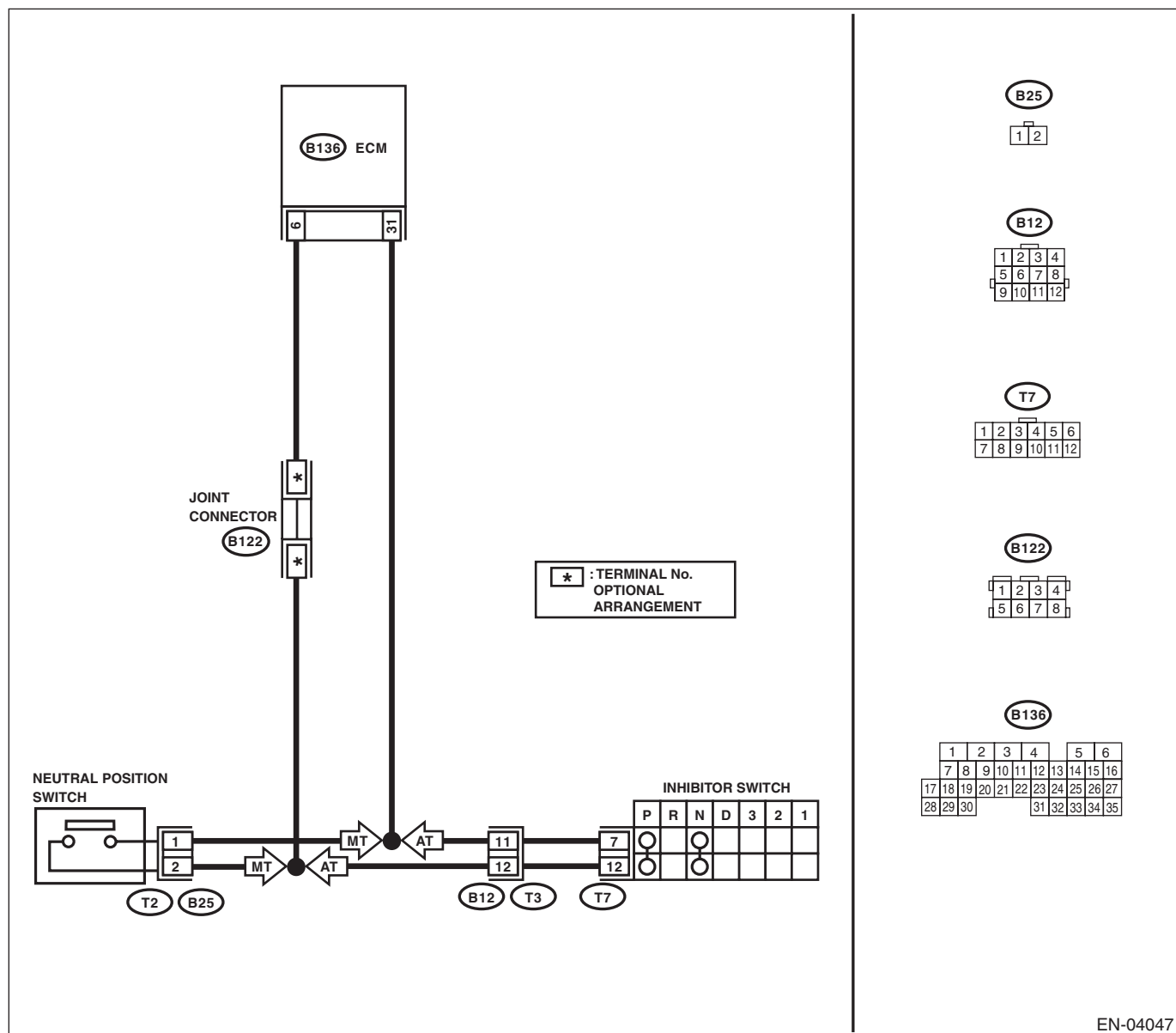
TROUBLE SYMPTOM:

Erroneous idling

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04047

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK INPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Place the shift lever in neutral. 3) Measure the voltage between ECM and chassis ground. Connector & terminal (B136) No. 31 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 2.	Go to step 4.
2 CHECK INPUT SIGNAL OF ECM. 1) Place the shift lever except in neutral. 2) Measure the voltage between ECM and chassis ground. Connector & terminal (B136) No. 31 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 3.	Go to step 5.
3 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Contact the SOA service center.
4 CHECK NEUTRAL SWITCH. 1) Place the shift lever except in neutral. 2) Measure the resistance between transmission harness connector terminals. Connector & terminal (T2) No. 1 — No. 2:	Is the resistance less than 1 Ω ?	Go to step 5.	Repair the open circuit in transmission harness or replace neutral switch.
5 CHECK HARNESS BETWEEN ECM AND NEUTRAL SWITCH CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM and transmission harness connector. Connector & terminal (B136) No. 31 — (B25) No. 1: (B136) No. 6 — (B25) No. 2:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair open circuit of harness between ECM and transmission harness connector.
6 CHECK HARNESS BETWEEN ECM AND NEUTRAL SWITCH CONNECTOR. Measure the resistance of harness between transmission harness connector and engine ground. Connector & terminal (B25) No. 2 — Engine ground:	Is the resistance less than 5 Ω ?	Go to step 7.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between transmission harness connector and engine ground • Poor contact in coupling connector
7 CHECK POOR CONTACT. Check poor contact of transmission harness connector.	Is there a poor contact in the transmission harness connector?	Repair the poor contact in transmission harness connector.	Contact the SOA service center.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CM:DTC P1152 O2 SENSOR CIRCUIT RANGE/PERFORMANCE (LOW) (BANK1 SENSOR1)

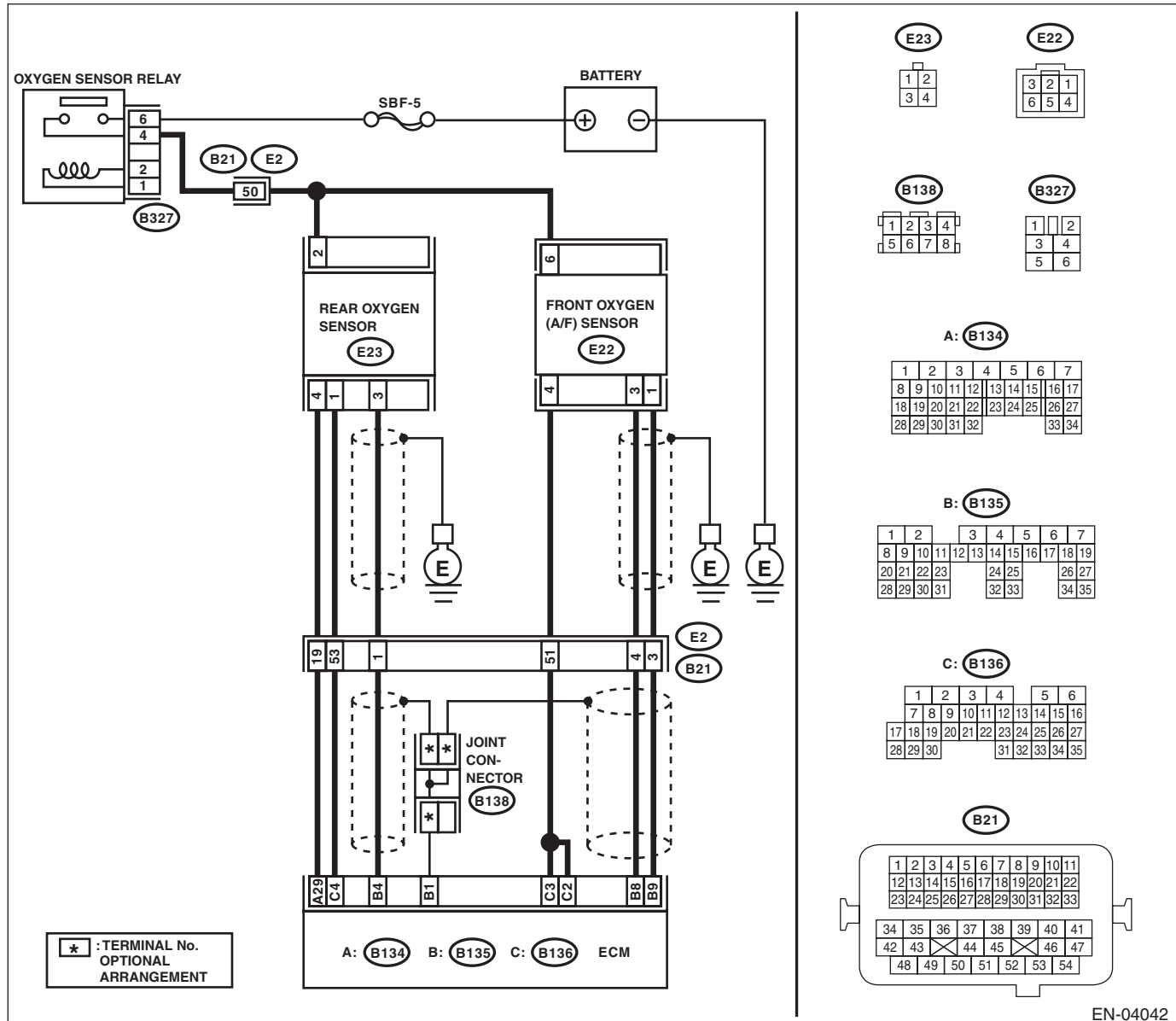
DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-189, DTC P1152 O2 SENSOR CIRCUIT RANGE/PERFORMANCE (LOW) (BANK1 SENSOR1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04042

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No	
1	CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.	Does water enter the connector?	Dry the water thoroughly.	Go to step 2.
2	CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and front oxygen (A/F) sensor connector. 3) Measure the resistance of harness between ECM and front oxygen (A/F) sensor connector. Connector & terminal (B135) No. 8 — (E22) No. 3: (B135) No. 9 — (E22) No. 1:	Is the resistance less than 1 Ω?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and front oxygen (A/F) sensor connector • Poor contact in front oxygen (A/F) sensor connector • Poor contact in ECM connector
3	CHECK POOR CONTACT. Check poor contact of front oxygen (A/F) sensor connector.	Is there poor contact in the front oxygen (A/F) sensor connector?	Repair the poor contact of the front oxygen (A/F) sensor connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4SO)-32, Front Oxygen (A/F) Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CN:DTC P1153 O2 SENSOR CIRCUIT RANGE/PERFORMANCE (HIGH) (BANK1 SENSOR1)

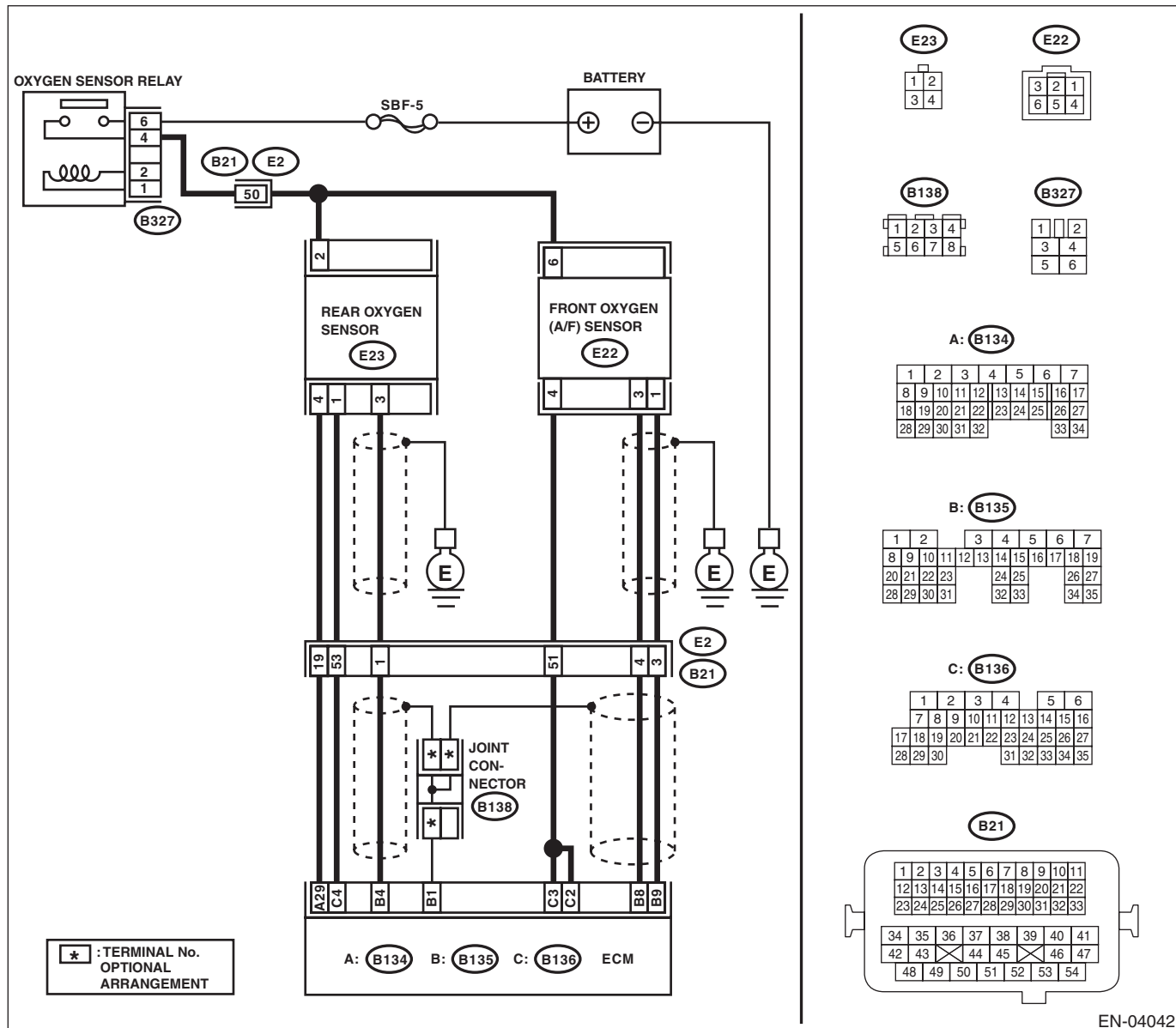
DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-192, DTC P1153 O2 SENSOR CIRCUIT RANGE/PERFORMANCE (HIGH) (BANK1 SENSOR1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>

WIRING DIAGRAM:



EN-04042

Step	Check	Yes	No	
1	CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.	Does water enter the connector?	Dry the water thoroughly.	Go to step 2.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance of harness between ECM connector and chassis ground. <i>Connector & terminal</i> <i>(B135) No. 8 — Chassis ground:</i>	Is the resistance more than 1 MΩ?	Repair the ground short circuit of harness between ECM and front oxygen (A/F) sensor connector.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. Measure the resistance of harness between ECM connector and chassis ground. <i>Connector & terminal</i> <i>(B135) No. 9 — Chassis ground:</i>	Is the resistance more than 1 MΩ?	Repair the ground short circuit of harness between ECM and front oxygen (A/F) sensor connector.	Go to step 4.
4 CHECK OUTPUT SIGNAL FOR ECM. 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. <i>Connector & terminal</i> <i>(B135) No. 8 (+) — Chassis ground (-):</i>	Is the voltage more than 4.5 V?	Go to step 5.	Go to step 6.
5 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between ECM connector and chassis ground. <i>Connector & terminal</i> <i>(B135) No. 8 (+) — Chassis ground (-):</i>	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.
6 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between ECM connector and chassis ground. <i>Connector & terminal</i> <i>(B135) No. 9 (+) — Chassis ground (-):</i>	Is the voltage more than 4.95 V?	Go to step 7.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4SO)-32, Front Oxygen (A/F) Sensor.>
7 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between ECM connector and chassis ground. <i>Connector & terminal</i> <i>(B135) No. 9 (+) — Chassis ground (-):</i>	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.

CO:DTC P1160 RETURN SPRING FAILURE

NOTE:

For the diagnostic procedure, refer to DTC P2101. <Ref. to EN(H4SO U5)(diag)-296, DTC P2101 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CP:DTC P1400 FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT LOW

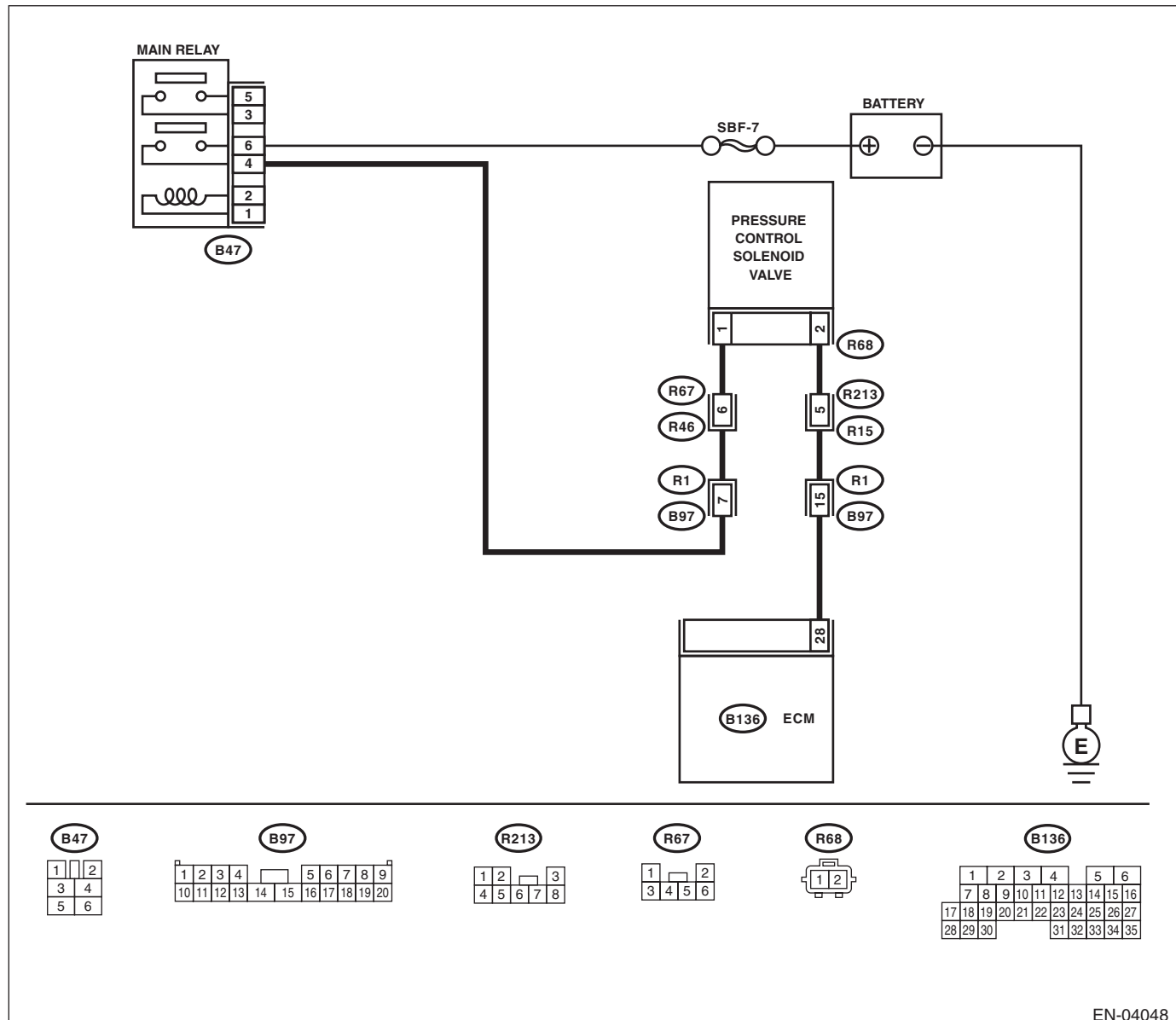
DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-197, DTC P1400 FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04048

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK OUTPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground. Connector & terminal (B136) No. 28 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 2.	Go to step 3.
2 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Contact the SOA service center.
3 CHECK HARNESS BETWEEN PRESSURE CONTROL SOLENOID VALVE AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the pressure control solenoid valve and ECM. 3) Measure the resistance of harness between pressure control solenoid valve connector and chassis ground. Connector & terminal (R68) No. 2 — Chassis ground:	Is the resistance less than 10 Ω ?	Repair the ground short circuit of harness between ECM and pressure control solenoid valve connector.	Go to step 4.
4 CHECK HARNESS BETWEEN PRESSURE CONTROL SOLENOID VALVE AND ECM CONNECTOR. Measure the resistance of harness between ECM and pressure control solenoid valve connector. Connector & terminal (B136) No. 28 — (R68) No. 2:	Is the resistance less than 1 Ω ?	Go to step 5.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and pressure control solenoid valve connector • Poor contact of coupling connector
5 CHECK PRESSURE CONTROL SOLENOID VALVE. Measure the resistance between pressure control solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance between 10 and 100 Ω ?	Go to step 6.	Replace the pressure control solenoid valve. <Ref. to EC(H4SO)-12, Pressure Control Solenoid Valve.>
6 CHECK POWER SUPPLY TO PRESSURE CONTROL SOLENOID VALVE. 1) Turn the ignition switch to ON. 2) Measure the voltage between pressure control solenoid valve and chassis ground. Connector & terminal (R68) No. 1 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 7.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between main relay and pressure control solenoid valve connector • Poor contact of coupling connector • Poor contact of main relay connector
7 CHECK POOR CONTACT. Check poor contact of pressure control solenoid valve connector.	Is there poor contact of the pressure control solenoid valve connector?	Repair the poor contact of pressure control solenoid valve connector.	Contact the SOA service center.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

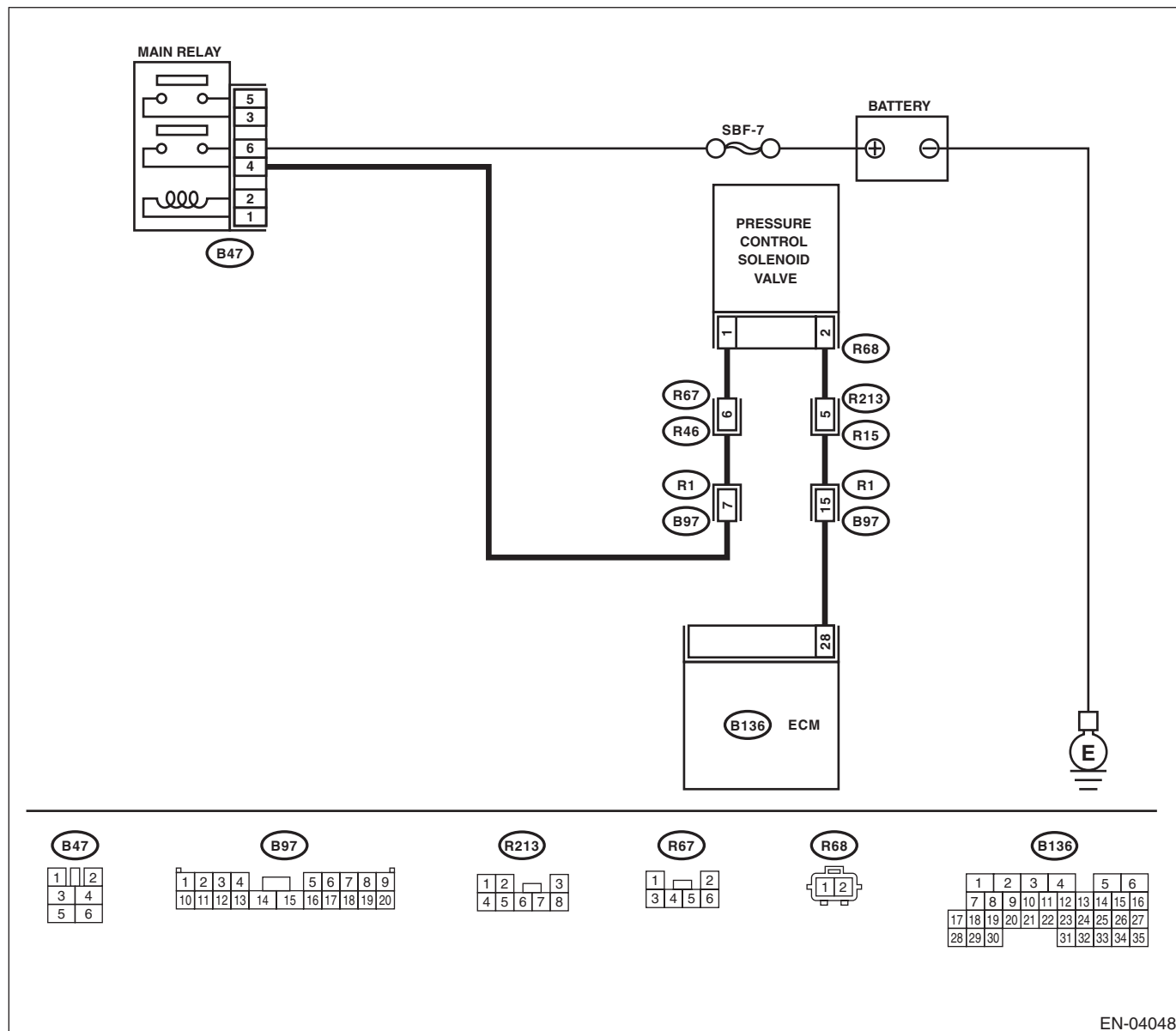
CQ:DTC P1420 FUEL TANK PRESSURE CONTROL SOL. VALVE CIRCUIT HIGH DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-199, DTC P1420 FUEL TANK PRESSURE CONTROL SOL. VALVE CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04048

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK INPUT SIGNAL OF ECM. 1) Turn the ignition switch to OFF. 2) Connect the test mode connector at the lower portion of instrument panel (on the driver's side). 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground while operating the pressure control solenoid valve. NOTE: The pressure control solenoid valve operation can be executed using the Subaru Select Monitor. For procedure, refer to "Compulsory Valve Operation Check Mode". <Ref. to EN(H4SO U5)(diag)-47, Compulsory Valve Operation Check Mode.> Connector & terminal (B136) No. 28 (+) — Chassis ground (-):	Is the voltage 0 — 10 V?	Go to step 2.	Even if the malfunction indicator light illuminates, the circuit has returned to a normal condition at this time. In this case, repair the poor contact in ECM connector.
2 CHECK INPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground. Connector & terminal (B136) No. 28 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 4.	Go to step 3.
3 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
4 CHECK HARNESS BETWEEN PRESSURE CONTROL SOLENOID VALVE AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the pressure control solenoid valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground. Connector & terminal (B136) No. 28 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and pressure control solenoid valve connector. After repair, replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Go to step 5.
5 CHECK PRESSURE CONTROL SOLENOID VALVE. 1) Turn the ignition switch to OFF. 2) Measure the resistance between pressure control solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance less than 1 Ω ?	Replace the pressure control solenoid valve <Ref. to EC(H4SO)-12, Pressure Control Solenoid Valve.> and ECM <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>.	Go to step 6.
6 CHECK POOR CONTACT. Check poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>

ENGINE (DIAGNOSTICS)

DTC DETECTING CONDITION:

- ### TROUBLE SYMPTOM:

CAUTION:

WIRING DIAGRAM:



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check the relevant DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK DRAIN HOSE. Check the drain hose for clogging.	Is there clogging in the drain hose?	Replace the drain hose.	Go to step 3.
3 CHECK DRAIN VALVE OPERATION. 1) Turn the ignition switch to OFF. 2) Connect the test mode connector at the lower portion of instrument panel (on the driver's side). 3) Turn the ignition switch to ON. 4) Check the drain valve. NOTE: Drain valve operation can be executed using Subaru Select Monitor. For procedure, refer to "Compulsory Valve Operation Check Mode". <Ref. to EN(H4SO U5)(diag)-47, Compulsory Valve Operation Check Mode.>	Does the drain valve operate?	Contact the SOA service center.	Replace the drain valve. <Ref. to EC(H4SO)-15, Drain Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CS:DTC P1491 POSITIVE CRANKCASE VENTILATION (BLOW-BY) FUNCTION PROBLEM

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-203, DTC P1491 POSITIVE CRANKCASE VENTILATION (BLOW-BY) FUNCTION PROBLEM, Diagnostic Trouble Code (DTC) Detecting Criteria.>

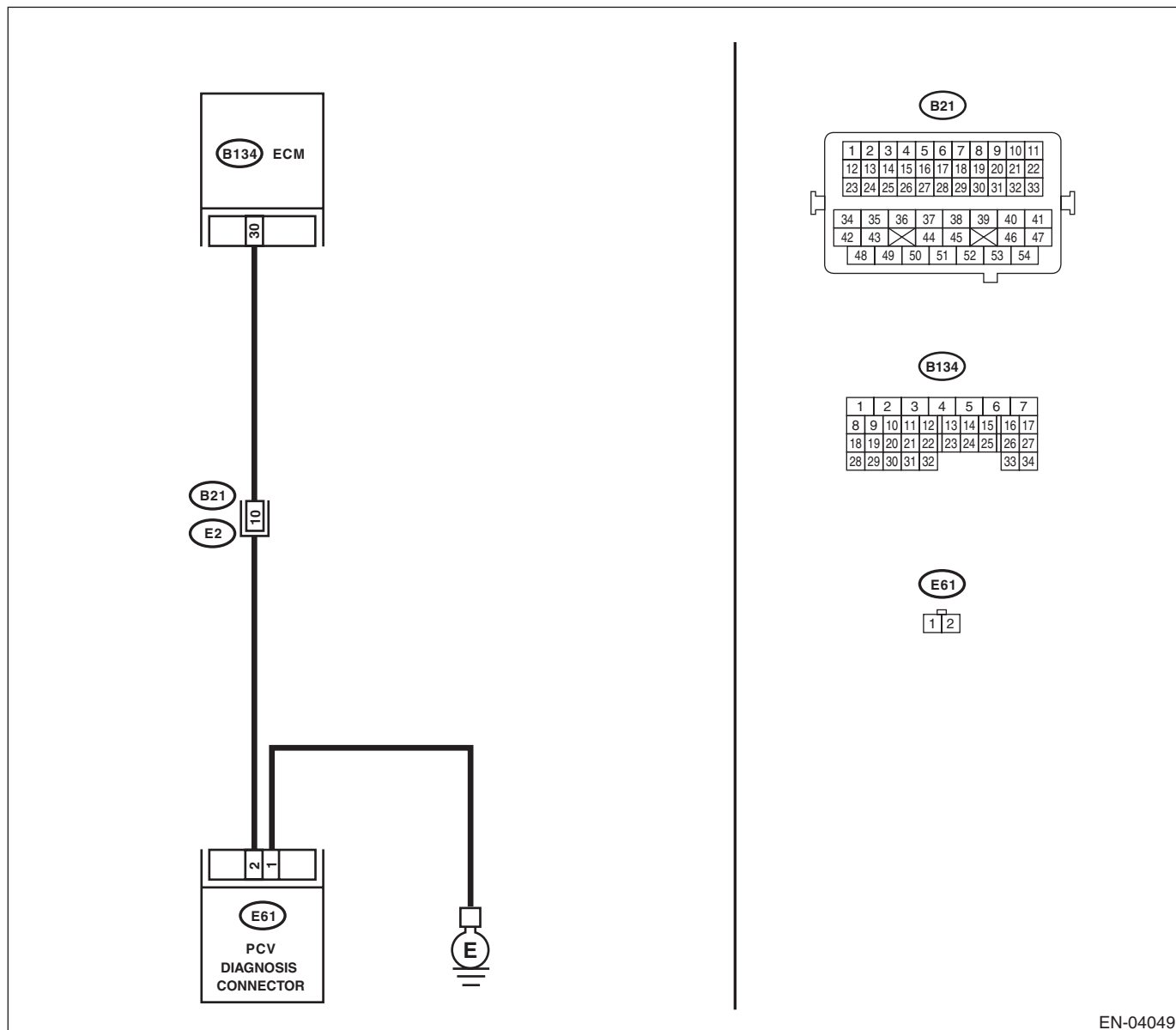
TROUBLE SYMPTOM:

Erroneous idling

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04049

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No	
1	CHECK BLOW-BY HOSE. Check the condition of the blow-by hose.	Is there any disconnection or crack in blow-by hose?	Replace or repair the blow-by hose.	Go to step 2.
2	CHECK HARNESS BETWEEN PCV DIAGNOSIS CONNECTOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the PCV diagnosis connector and ECM. 3) Measure the resistance of harness between PCV diagnosis connector and ECM connector. Connector & terminal (B134) No. 30 — (E61) No. 2:	Is the resistance less than 1 Ω?	Go to step 3.	Repair the open circuit of harness between PCV diagnosis connector and ECM connector.
3	CHECK HARNESS BETWEEN PCV DIAGNOSIS CONNECTOR AND ECM CONNECTOR. Measure the resistance of harness between PCV diagnosis connector and chassis ground. Connector & terminal (B134) No. 30 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 4.	Repair the ground short circuit of harness between PCV diagnosis connector and ECM connector.
4	CHECK GROUND CIRCUIT OF PCV DIAGNOSIS CONNECTOR. Measure the resistance of harness between PCV diagnosis connector and engine ground. Connector & terminal (E61) No. 1 — Engine ground:	Is the resistance less than 5 Ω?	Go to step 5.	Repair the ground circuit of PCV diagnosis connector.
5	CHECK PCV DIAGNOSIS CONNECTOR. Measure the resistance between PCV diagnosis connector terminals. Terminals No. 1 — No. 2:	Is the resistance less than 1 Ω?	Repair the poor contact in ECM connector and PCV diagnosis connector.	Replace the PCV diagnosis connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CT:DTC P1492 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (LOW INPUT)

NOTE:

For the diagnostic procedure, refer to DTC P1498. <Ref. to EN(H4SO U5)(diag)-275, DTC P1498 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CU:DTC P1493 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (HIGH INPUT)

NOTE:

For the diagnostic procedure, refer to DTC P1499. <Ref. to EN(H4SO U5)(diag)-278, DTC P1499 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CV:DTC P1494 EGR SOLENOID VALVE SIGNAL #2 CIRCUIT MALFUNCTION (LOW INPUT)

NOTE:

For the diagnostic procedure, refer to DTC P1498. <Ref. to EN(H4SO U5)(diag)-275, DTC P1498 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CW:DTC P1495 EGR SOLENOID VALVE SIGNAL #2 CIRCUIT MALFUNCTION (HIGH INPUT)

NOTE:

For the diagnostic procedure, refer to DTC P1499. <Ref. to EN(H4SO U5)(diag)-278, DTC P1499 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CX:DTC P1496 EGR SOLENOID VALVE SIGNAL #3 CIRCUIT MALFUNCTION (LOW INPUT)

NOTE:

For the diagnostic procedure, refer to DTC P1498. <Ref. to EN(H4SO U5)(diag)-275, DTC P1498 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CY:DTC P1497 EGR SOLENOID VALVE SIGNAL #3 CIRCUIT MALFUNCTION (HIGH INPUT)

NOTE:

For the diagnostic procedure, refer to DTC P1499. <Ref. to EN(H4SO U5)(diag)-278, DTC P1499 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CZ:DTC P1498 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (LOW INPUT)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-205, DTC P1492 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.> <Ref. to GD(H4SO U5)-209, DTC P1494 EGR SOLENOID VALVE SIGNAL #2 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.> <Ref. to GD(H4SO U5)-209, DTC P1496 EGR SOLENOID VALVE SIGNAL #3 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.> <Ref. to GD(H4SO U5)-209, DTC P1498 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Erroneous idling
- Poor driving performance
- Engine breathing

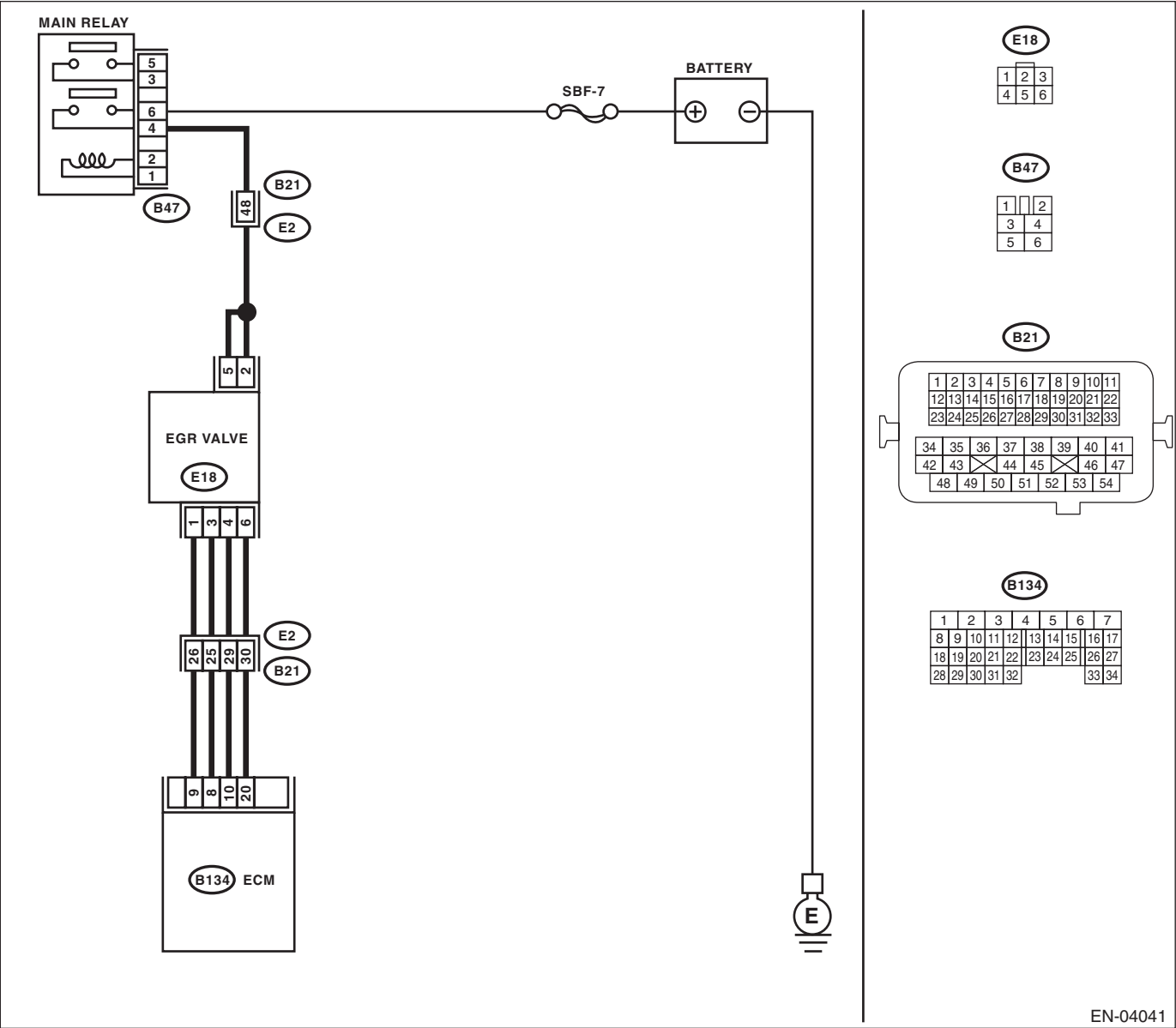
CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:



EN-04041

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK POWER SUPPLY TO EGR VALVE. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from EGR valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between EGR valve connector and engine ground. Connector & terminal (E18) No. 2 (+) — Engine ground (-): (E18) No. 5 (+) — Engine ground (-):	Is the voltage more than 10 V?	Go to step 2.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between EGR valve and main relay connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND EGR VALVE CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance between ECM and EGR valve connector. Connector & terminal DTC P1492; (B134) No. 8 — (E18) No. 3: DTC P1494; (B134) No. 9 — (E18) No. 1: DTC P1496; (B134) No. 10 — (E18) No. 4: DTC P1498; (B134) No. 20 — (E18) No. 6:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and EGR valve connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN ECM AND EGR VALVE CONNECTOR. 1) Disconnect the connectors from ECM. 2) Measure the resistance between ECM connector and chassis ground. Connector & terminal DTC P1492; (B134) No. 8 — Chassis ground: DTC P1494; (B134) No. 9 — Chassis ground: DTC P1496; (B134) No. 10 — Chassis ground: DTC P1498; (B134) No. 20 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 4.	Repair the ground short in harness between ECM and EGR valve connector.
4 CHECK POOR CONTACT. Check poor contact in ECM connector and EGR valve connector.	Is there poor contact in ECM connector or EGR valve connector?	Repair the poor contact in ECM connector or EGR valve connector.	Replace the EGR valve. <Ref. to FU(H4SO)-26, EGR Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DA:DTC P1499 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (HIGH INPUT)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-207, DTC P1493 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.> <Ref. to GD(H4SO U5)-209, DTC P1495 EGR SOLENOID VALVE SIGNAL #2 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.> <Ref. to GD(H4SO U5)-209, DTC P1497 EGR SOLENOID VALVE SIGNAL #3 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.> <Ref. to GD(H4SO U5)-209, DTC P1499 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Erroneous idling
- Poor driving performance
- Engine breathing

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

ENGINE (DIAGNOSTICS)

MAIN RELAY

BATTERY

SBF-7

EGR VALVE

ECM

E18

B47

B134

E

E18

1	2	3
4	5	6

B47

1	2
3	4
5	6

B134

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK HARNESS BETWEEN ECM AND EGR VALVE CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from EGR valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. Connector & terminal DTC P1493; (B134) No. 8 (+) — Chassis ground (-): DTC P1495; (B134) No. 9 (+) — Chassis ground (-): DTC P1497; (B134) No. 10 (+) — Chassis ground (-): DTC P1499; (B134) No. 20 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Repair the battery short in harness between ECM and EGR valve connector. After repair, replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>

DB:DTC P1518 STARTER SWITCH CIRCUIT LOW INPUT

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-210, DTC P1518 STARTER SWITCH CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

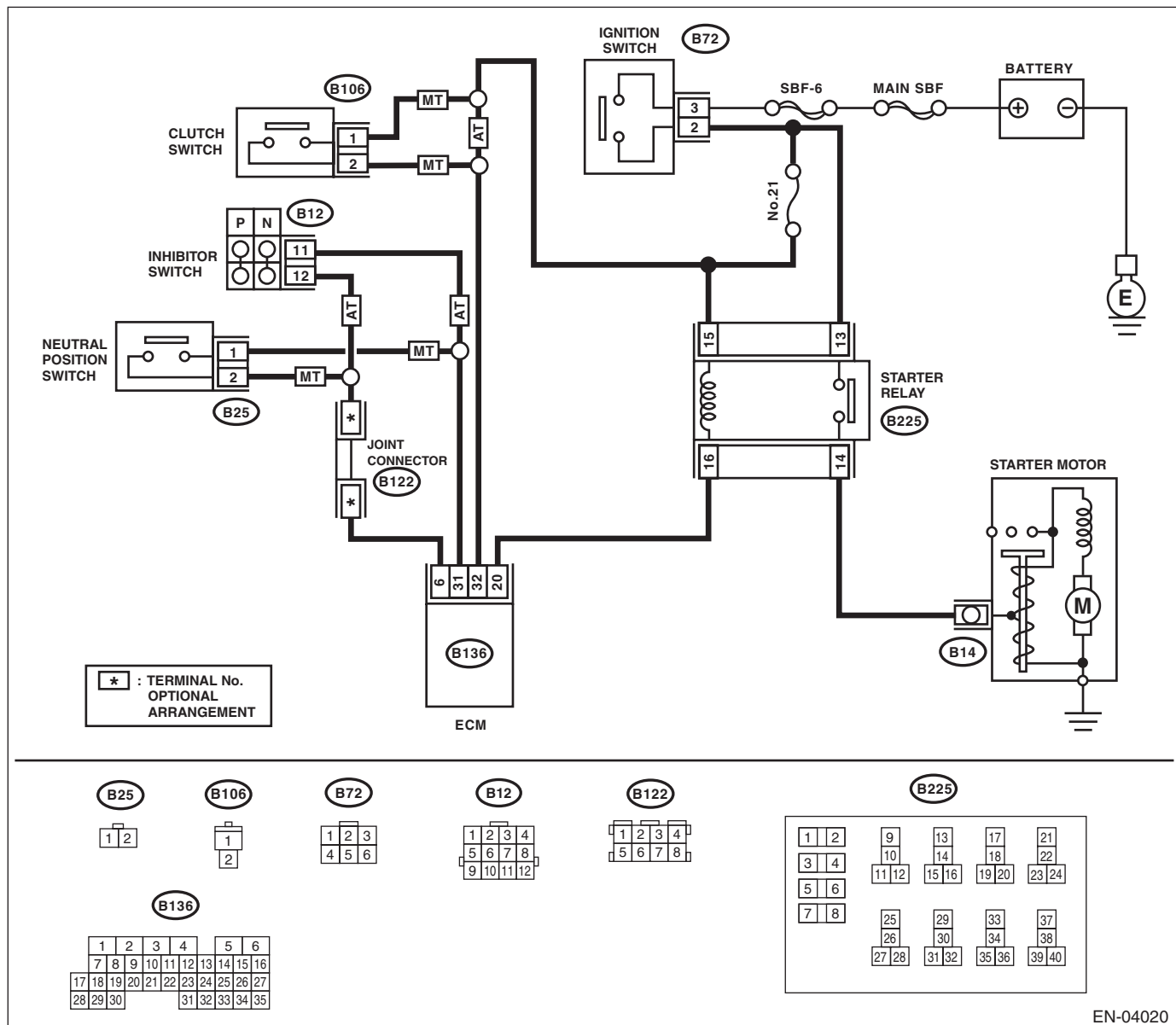
TROUBLE SYMPTOM:

Failure of engine to start

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04020

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK OPERATION OF STARTER MOTOR. - Place the inhibitor switch in "P" or "N" range. (AT model) - Depress the clutch pedal. (MT model) - Check the security alarm is not sounding.	Does the starter motor operate when ignition switch is turned to "ST"?	Repair the harness and connector. NOTE: In this case, repair the following item: - Open or ground short circuit of harness between ECM and starter motor connector - Poor contact in ECM connector	Check the starter motor circuit. <Ref. to EN(H4SO U5)(diag)-59, STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

DC:DTC P1560 BACK-UP VOLTAGE CIRCUIT MALFUNCTION

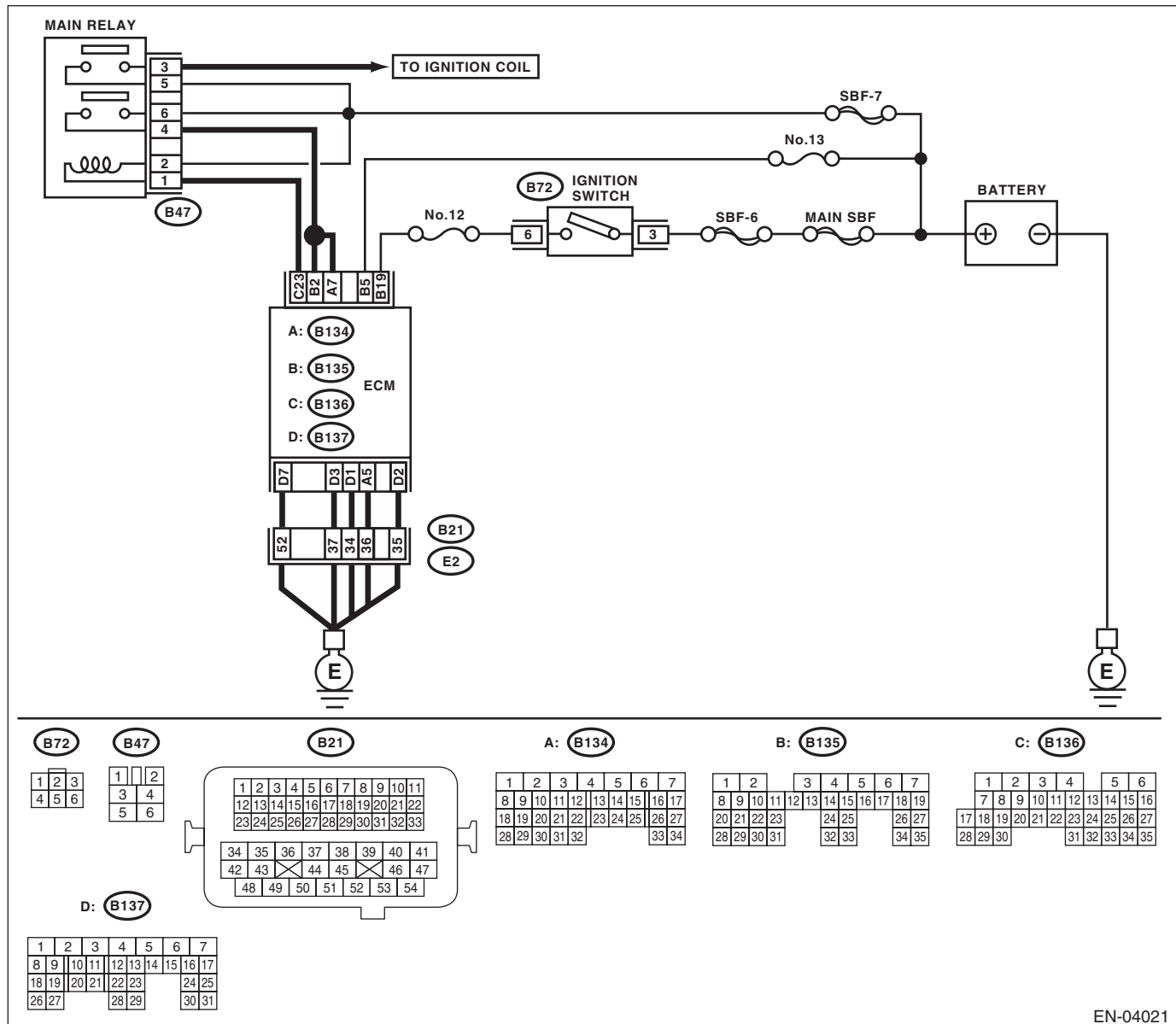
DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-211, DTC P1560 BACK-UP VOLTAGE CIRCUIT MALFUNCTION, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04021

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

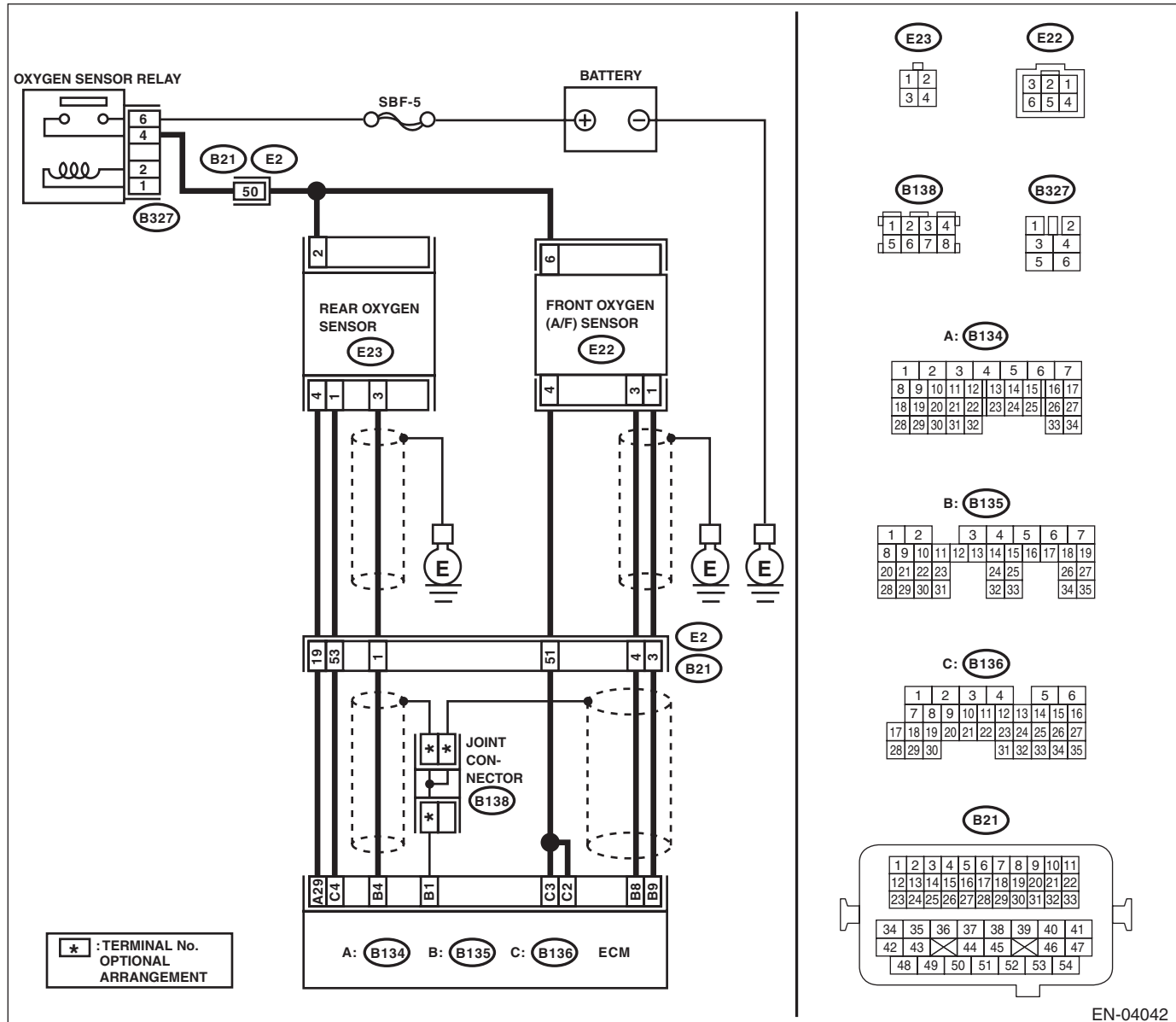
Step	Check	Yes	No
1 CHECK INPUT SIGNAL OF ECM. 1) Turn the ignition switch to OFF. 2) Measure the voltage between ECM and chassis ground. Connector & terminal (B135) No. 5 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Repair the poor contact of ECM connector.	Go to step 2.
2 CHECK HARNESS BETWEEN ECM AND MAIN FUSE BOX CONNECTOR. 1) Disconnect the connectors from ECM. 2) Measure the resistance of harness between ECM and chassis ground. Connector & terminal (B135) No. 5 — Chassis ground:	Is the resistance less than 10 Ω ?	Repair the ground short circuit of harness between ECM connector and battery terminal.	Go to step 3.
3 CHECK FUSE No. 13.	Is the fuse blown out?	Replace the fuse.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and battery • Poor contact in ECM connector • Poor contact of battery terminal

DD:DTC P2096 POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1**DTC DETECTING CONDITION:**

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-213, DTC P2096 POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

EN-04042

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P2096.	Go to step 2.
2 CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.	Does water enter the connector?	Dry the water thoroughly.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and front oxygen (A/F) sensor connector. 3) Measure the resistance of harness between ECM and front oxygen (A/F) sensor connector. Connector & terminal (B135) No. 8 — (E22) No. 3: (B135) No. 9 — (E22) No. 1:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and front oxygen (A/F) sensor connector • Poor contact in front oxygen (A/F) sensor connector • Poor contact in ECM connector
4 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. Measure the resistance of harness between ECM connector and chassis ground. Connector & terminal (B135) No. 8 — Chassis ground: (B135) No. 9 — Chassis ground:	Is the resistance more than 1 $M\Omega$?	Go to step 5.	Repair the ground short circuit of harness between ECM and front oxygen (A/F) sensor connector.
5 CHECK OUTPUT SIGNAL FOR ECM. 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 8 (+) — Chassis ground (-):	Is the voltage more than 4.5 V?	Go to step 6.	Go to step 7.
6 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 8 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between ECM connector and chassis ground. <i>Connector & terminal</i> <i>(B135) No. 9 (+) — Chassis ground (-):</i>	Is the voltage more than 4.95 V?	Go to step 8.	Go to step 9.
8 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between ECM connector and chassis ground. <i>Connector & terminal</i> <i>(B135) No. 9 (+) — Chassis ground (-):</i>	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.
9 CHECK EXHAUST SYSTEM.	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step 10.
10 CHECK AIR INTAKE SYSTEM.	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step 11.
11 CHECK FUEL PRESSURE. WARNING: - Place “NO FIRE” signs near the working area. - Be careful not to spill fuel. Measure the fuel pressure. <Ref. to ME(H4SO)-25, INSPECTION, Fuel Pressure.> WARNING: Release fuel pressure before removing the fuel pressure gauge.	Is the measured value 339.5 — 360.5 kPa (3.5 — 3.7 kgf/cm ² , 49 — 52 psi)?	Go to step 12.	Repair the following item. Fuel pressure is too high: - Clogged fuel line or bent hose Fuel pressure is too low: - Improper fuel pump discharge - Clogged fuel line
12 CHECK ENGINE COOLANT TEMPERATURE SENSOR. 1) Start the engine and warm-up completely. 2) Read the data of engine coolant temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: - Subaru Select Monitor For detailed operation procedure, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> - General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the temperature above 60°C (140°F)?	Go to step 13.	Replace the engine coolant temperature sensor. <Ref. to FU(H4SO)-19, Engine Coolant Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
13 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F). 2) Place the shift lever in neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the data of mass air flow and intake air temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the measured value 2.1 — 3.4 g/s (0.28 — 0.45 lb/m)?	Go to step 14.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4SO)-25, Mass Air Flow and Intake Air Temperature Sensor.>
14 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F). 2) Place the shift lever in neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Open the front hood. 6) Measure the ambient temperature. 7) Read the data of mass air flow and intake air temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Subtract ambient temperature from intake air temperature. Is the obtained value -10 — 50°C (-18 — 90°F)?	Go to step 15.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(H4SO)-25, Mass Air Flow and Intake Air Temperature Sensor.>
15 CHECK REAR OXYGEN SENSOR DATA. 1) Warm-up the engine until engine coolant temperature is above 70°C (158°F), and keep the engine speed at 3,000 rpm. (Max. 2 minutes) 2) Read the data of rear oxygen sensor signal using Subaru Select Monitor or general scan tool. NOTE: • For MT model, depress the clutch pedal. • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the voltage 490 mV or more?	Go to step 19.	Go to step 16.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
16 CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.	Does water enter the connector?	Dry the water thoroughly.	Go to step 17.
17 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM and rear oxygen sensor connector. Connector & terminal (B135) No. 4 — (E23) No. 3: (B134) No. 29 — (E23) No. 4:	Is the resistance more than 3 Ω ?	Repair the open circuit of harness between ECM and rear oxygen sensor connector.	Go to step 18.
18 CHECK HARNESS BETWEEN REAR OXYGEN SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the rear oxygen sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between rear oxygen sensor harness connector and engine ground or chassis ground. Connector & terminal (E23) No. 3 (+) — Engine ground (-):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4SO)-34, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between rear oxygen sensor and ECM connector • Poor contact of the rear oxygen sensor connector • Poor contact in ECM connector
19 CHECK REAR OXYGEN SENSOR DATA. 1) Warm-up the engine until engine coolant temperature is above 70°C (158°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the data of rear oxygen sensor signal using Subaru Select Monitor or general scan tool. NOTE: • For MT model, depress the clutch pedal. • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the voltage less than 250 mV?	Go to step 20.	Go to step 16.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
20 CHECK FRONT OXYGEN (A/F) SENSOR AND REAR OXYGEN SENSOR DATA. 1) Warm-up the engine until engine coolant temperature is above 70°C (158°F), and leave it for 5 minutes or more with idling. 2) Read the data of rear oxygen sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the voltage more than 0.8 V for more than 5 minutes during idling?	Replace the front oxygen (A/F) sensor.<Ref. to FU(H4SO)-32, Front Oxygen (A/F) Sensor.>	Go to step 17.

DE:DTC P2097 POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1

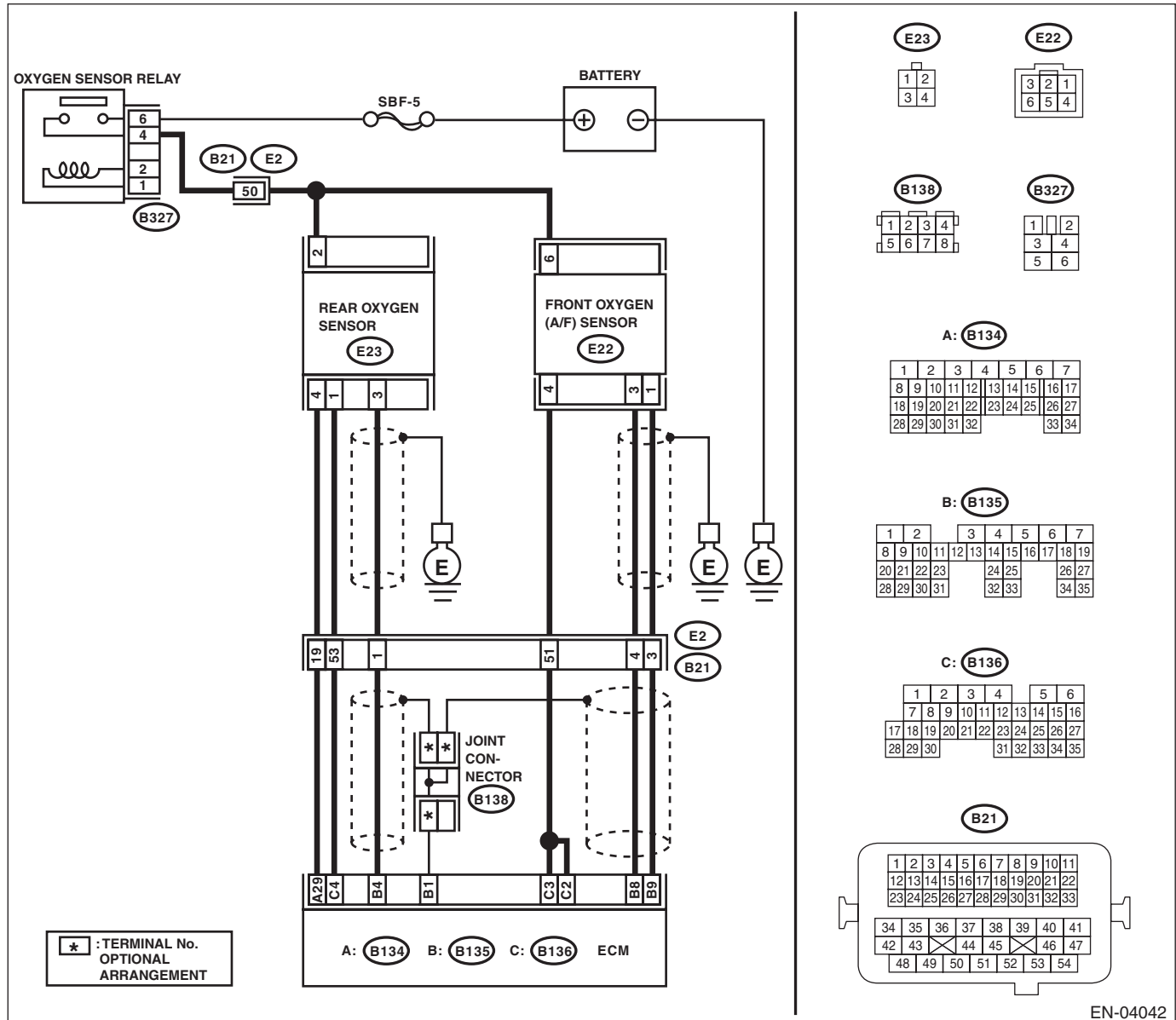
DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-215, DTC P2097 POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-04042

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P2097.	Go to step 2.
2 CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.	Does water enter the connector?	Dry the water thoroughly.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and front oxygen (A/F) sensor connector. 3) Measure the resistance of harness between ECM and front oxygen (A/F) sensor connector. Connector & terminal (B135) No. 8 — (E22) No. 3: (B135) No. 9 — (E22) No. 1:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and front oxygen (A/F) sensor connector • Poor contact in front oxygen (A/F) sensor connector • Poor contact in ECM connector
4 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. Measure the resistance of harness between ECM connector and chassis ground. Connector & terminal (B135) No. 8 — Chassis ground: (B135) No. 9 — Chassis ground:	Is the resistance more than 1 $M\Omega$?	Go to step 5.	Repair the ground short circuit of harness between ECM and front oxygen (A/F) sensor connector.
5 CHECK OUTPUT SIGNAL FOR ECM. 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 8 (+) — Chassis ground (-):	Is the voltage more than 4.5 V?	Go to step 6.	Go to step 7.
6 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 8 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 9 (+) — Chassis ground (-):	Is the voltage more than 4.95 V?	Go to step 8.	Go to step 9.
8 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 9 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Repair the battery short circuit of harness between ECM and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.
9 CHECK EXHAUST SYSTEM.	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step 10.
10 CHECK AIR INTAKE SYSTEM.	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair the air intake system.	Go to step 11.
11 CHECK FUEL PRESSURE. WARNING: • Place “NO FIRE” signs near the working area. • Be careful not to spill fuel. 1) Measure the fuel pressure. <Ref. to ME(H4SO)-25, INSPECTION, Fuel Pressure.> WARNING: Release fuel pressure before removing the fuel pressure gauge.	Is the measured value 339.5 — 360.5 kPa (3.5 — 3.7 kgf/cm ² , 49 — 52 psi)?	Go to step 12.	Repair the following item. Fuel pressure is too high: • Clogged fuel line or bent hose Fuel pressure is too low: • Improper fuel pump discharge • Clogged fuel line
12 CHECK ENGINE COOLANT TEMPERATURE SENSOR. 1) Start the engine and warm-up completely. 2) Read the data of engine coolant temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the temperature above 60°C (140°F)?	Go to step 13.	Replace the engine coolant temperature sensor. <Ref. to FU(H4SO)-19, Engine Coolant Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
13 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F). 2) Place the shift lever in neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Read the data of mass air flow and intake air temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the measured value 2.1 — 3.4 g/s (0.28 — 0.45 lb/m)?	Go to step 14.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4SO)-25, Mass Air Flow and Intake Air Temperature Sensor.>
14 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F). 2) Place the shift lever in neutral position. 3) Turn the A/C switch to OFF. 4) Turn all the accessory switches to OFF. 5) Open the front hood. 6) Measure the ambient temperature. 7) Read the data of mass air flow and intake air temperature sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Subtract ambient temperature from intake air temperature. Is the obtained value -10 — 50°C (-18 — 90°F)?	Go to step 15.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(H4SO)-25, Mass Air Flow and Intake Air Temperature Sensor.>
15 CHECK REAR OXYGEN SENSOR DATA. 1) Warm-up the engine until engine coolant temperature is above 70°C (158°F), and keep the engine speed at 3,000 rpm. (Max. 2 minutes) 2) Read the data of rear oxygen sensor signal using Subaru Select Monitor or general scan tool. NOTE: • For MT model, depress the clutch pedal. • Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the voltage more than 490 mV?	Go to step 19.	Go to step 16.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

	Step	Check	Yes	No
16	CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.	Does water enter the connector?	Dry the water thoroughly.	Go to step 17.
17	CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM and rear oxygen sensor connector. Connector & terminal (B135) No. 4 — (E23) No. 3: (B134) No. 29 — (E23) No. 4:	Is the resistance more than 3 Ω?	Repair the open circuit of harness between ECM and rear oxygen sensor connector.	Go to step 18.
18	CHECK HARNESS BETWEEN REAR OXYGEN SENSOR AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the rear oxygen sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between rear oxygen sensor harness connector and engine ground or chassis ground. Connector & terminal (E23) No. 3 (+) — Engine ground (-):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4SO)-34, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between rear oxygen sensor and ECM connector • Poor contact of the rear oxygen sensor connector • Poor contact in ECM connector
19	CHECK REAR OXYGEN SENSOR DATA. 1) Warm-up the engine until engine coolant temperature is above 70°C (158°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the data of rear oxygen sensor signal using Subaru Select Monitor or general scan tool. NOTE: • For MT model, depress the clutch pedal. • Subaru Select Monitor For detailed operation procedure, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the voltage less than 250 mV?	Go to step 20.	Go to step 16.
20	CHECK FRONT OXYGEN (A/F) SENSOR AND REAR OXYGEN SENSOR DATA. 1) Warm-up the engine until engine coolant temperature is above 70°C (158°F), and leave it for 5 minutes or more with idling. 2) Read the data of rear oxygen sensor signal using Subaru Select Monitor or general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.> • General scan tool For detailed operation procedure, refer to the general scan tool operation manual.	Is the voltage more than 0.8 V for more than 5 minutes during idling?	Replace the front oxygen (A/F) sensor.<Ref. to FU(H4SO)-32, Front Oxygen (A/F) Sensor.>	Go to step 17.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DF:DTC P2101 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT RANGE/ PERFORMANCE

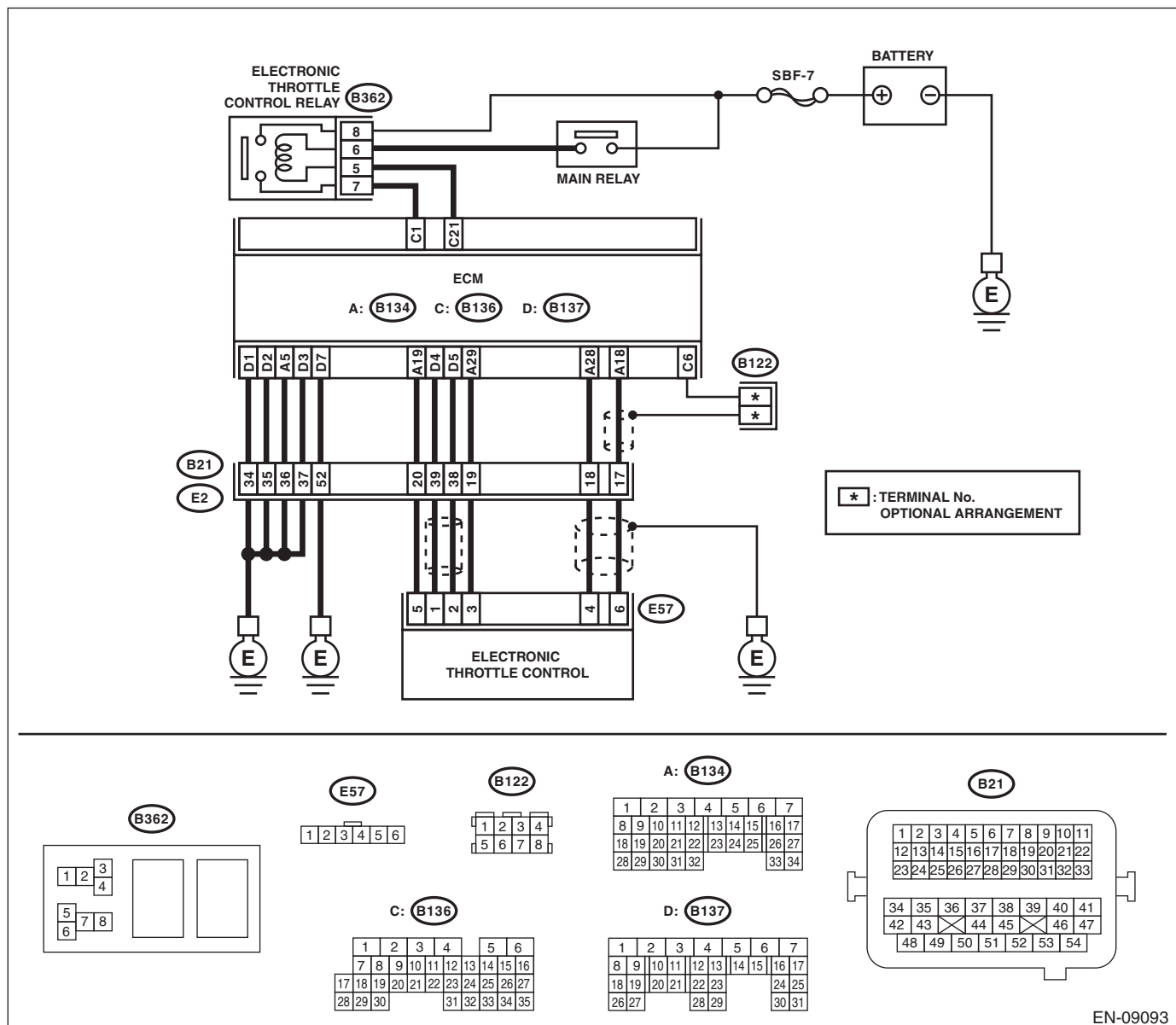
DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-179, DTC P0638 THROTTLE ACTUATOR CONTROL RANGE/PERFORMANCE (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.> <Ref. to GD(H4SO U5)-195, DTC P1160 RETURN SPRING FAILURE, Diagnostic Trouble Code (DTC) Detecting Criteria.> or <Ref. to GD(H4SO U5)-217, DTC P2101 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.> <Ref. to GD(H4SO U5)-223, DTC P2109 THROTTLE/PEDAL POSITION SENSOR "A" MINIMUM STOP PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Erroneous idling
- Poor driving performance
- Engine stalls.

WIRING DIAGRAM:



EN-09093

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ELECTRONIC THROTTLE CONTROL RELAY. 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control relay. 3) Connect the battery to terminals No. 5 and No. 6 of electronic throttle control relay. 4) Measure the resistance between electronic throttle control relay terminals. Terminals No. 8 — No. 7:	Is the resistance less than 1 Ω ?	Go to step 2.	Replace the electronic throttle control relay.
2 CHECK POWER SUPPLY OF ELECTRONIC THROTTLE CONTROL RELAY. 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control relay connector and chassis ground. Connector & terminal (B362) No. 8 (+) — Chassis ground (-): (B362) No. 6 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 3.	Repair the open or ground short circuit of power supply circuit.
3 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Turn the ignition switch to ON. 4) Measure the voltage between electronic throttle control relay connector and chassis ground. Connector & terminal (B362) No. 5 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Repair the power supply short circuit of harness between ECM and electronic throttle control.	Go to step 4.
4 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY. 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control relay connector and chassis ground. Connector & terminal (B362) No. 5 — Chassis ground: (B362) No. 7 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 5.	Repair the ground short circuit of harness between ECM and electronic throttle control relay.
5 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY. Measure the resistance between ECM connector and electronic throttle control relay connector. Connector & terminal (B136) No. 21 — (B362) No. 5: (B136) No. 1 — (B362) No. 7:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the open circuit of harness between ECM and electronic throttle control relay.
6 CHECK SENSOR OUTPUT. 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Read the data of main throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage more than 0.4 V?	Go to step 7.	Go to step 9.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK SENSOR OUTPUT. 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Read the data of sub throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage more than 0.8 V?	Go to step 8.	Go to step 9.
8 CHECK POOR CONTACT. Check poor contact in connector between ECM and electronic throttle control.	Is there poor contact?	Repair the poor contact.	Go to step 13.
9 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from electronic throttle control. 4) Measure the resistance between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 18 — (E57) No. 6: (B134) No. 28 — (E57) No. 4: (B134) No. 19 — (E57) No. 5:	Is the resistance less than 1 Ω ?	Go to step 10.	Repair the open circuit of harness connector.
10 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 18 — Chassis ground: (B134) No. 19 — Chassis ground: (B134) No. 28 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 11.	Repair the ground short circuit of harness.
11 CHECK SENSOR POWER SUPPLY. 1) Connect the ECM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 5 (+) — Engine ground (-):	Is the voltage 4.5 — 5.5 V?	Go to step 12.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
12 CHECK SHORT CIRCUIT IN ECM. 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 6 — Engine ground: (E57) No. 4 — Engine ground:	Is the resistance more than 10 Ω ?	Go to step 13.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
13 CHECK SENSOR OUTPUT. 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Read the data of main throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage less than 4.63 V?	Go to step 14.	Go to step 16.
14 CHECK SENSOR OUTPUT. Read the data of sub throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage less than 4.73 V?	Go to step 15.	Go to step 16.
15 CHECK POOR CONTACT. Check poor contact in connector between ECM and electronic throttle control.	Is there poor contact?	Repair the poor contact.	Go to step 21.
16 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from electronic throttle control. 4) Measure the resistance between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 29 — (E57) No. 3: (B134) No. 18 — (E57) No. 6: (B134) No. 28 — (E57) No. 4:	Is the resistance less than 1 Ω ?	Go to step 17.	Repair the open circuit of harness connector.
17 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Connect the ECM connector. 2) Measure the resistance between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 3 — Engine ground:	Is the resistance less than 5 Ω ?	Go to step 18.	Repair the poor contact of ECM connector. Replace the ECM if defective.
18 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 5 (+) — Engine ground (-):	Is the voltage less than 10 V?	Go to step 19.	Repair the battery short circuit of harness between ECM connector and electronic throttle control connector.
19 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 6 (+) — Engine ground (-): (E57) No. 4 (+) — Engine ground (-):	Is the voltage less than 10 V?	Go to step 20.	Repair the short circuit of harness between ECM connector and electronic throttle control connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
20 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Remove the ECM. 3) Measure the resistance between ECM connectors. Connector & terminal (B134) No. 18 — (B134) No. 19: (B134) No. 28 — (B134) No. 19:	Is the resistance more than 1 MΩ?	Go to step 21.	Repair the short circuit to sensor power supply.
21 CHECK SENSOR OUTPUT. 1) Turn the ignition switch to OFF. 2) Connect the connectors except for electric throttle control relay. 3) Turn the ignition switch to ON. 4) Read the data of main throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage 0.81 — 0.87 V?	Go to step 22.	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective.
22 CHECK SENSOR OUTPUT. Read the data of sub throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage 1.64 — 1.70 V?	Go to step 23.	Repair the poor contact of ECM connector. Replace the electronic throttle control if defective.
23 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL MOTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from electronic throttle control. 4) Measure the resistance between ECM connector and electronic throttle control connector. Connector & terminal (B137) No. 5 — (E57) No. 2: (B137) No. 4 — (E57) No. 1:	Is the resistance less than 1 Ω?	Go to step 24.	Repair the open circuit of harness connector.
24 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL MOTOR. 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 2 (+) — Engine ground (-): (E57) No. 1 (+) — Engine ground (-):	Is the voltage less than 5 V?	Go to step 25.	Repair the power supply short circuit of harness between ECM and electronic throttle control.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
25 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL MOTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 2 — Engine ground: (E57) No. 1 — Engine ground:	Is the resistance more than 1 MΩ?	Go to step 26.	Repair the short circuit of harness.
26 CHECK ELECTRONIC THROTTLE CONTROL MOTOR HARNESS. Measure the resistance between electronic throttle control connector terminals. Connector & terminal (E57) No. 2 — (E57) No. 1:	Is the resistance more than 1 MΩ?	Go to step 27.	Repair the short circuit of harness.
27 CHECK ELECTRONIC THROTTLE CONTROL GROUND CIRCUIT. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 5 — Chassis ground: (B136) No. 15 — Chassis ground: (B137) No. 1 — Chassis ground: (B137) No. 2 — Chassis ground: (B137) No. 3 — Chassis ground: (B137) No. 7 — Chassis ground:	Is the resistance less than 10 Ω?	Go to step 28.	Repair the open circuit of harness.
28 CHECK ELECTRONIC THROTTLE CONTROL. Measure the resistance between electronic throttle control terminals. Terminals No. 1 — No. 2:	Is the resistance 50 Ω or less?	Go to step 29.	Replace the electronic throttle control.
29 CHECK ELECTRONIC THROTTLE CONTROL. Move the throttle valve to the fully open and fully closed positions with fingers. Check that the valve returns to the specified position when releasing fingers.	Does the valve return to the specified position? Standard value: 3 mm (0.12 in) from fully closed position	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Replace the electronic throttle control.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DG:DTC P2102 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT LOW

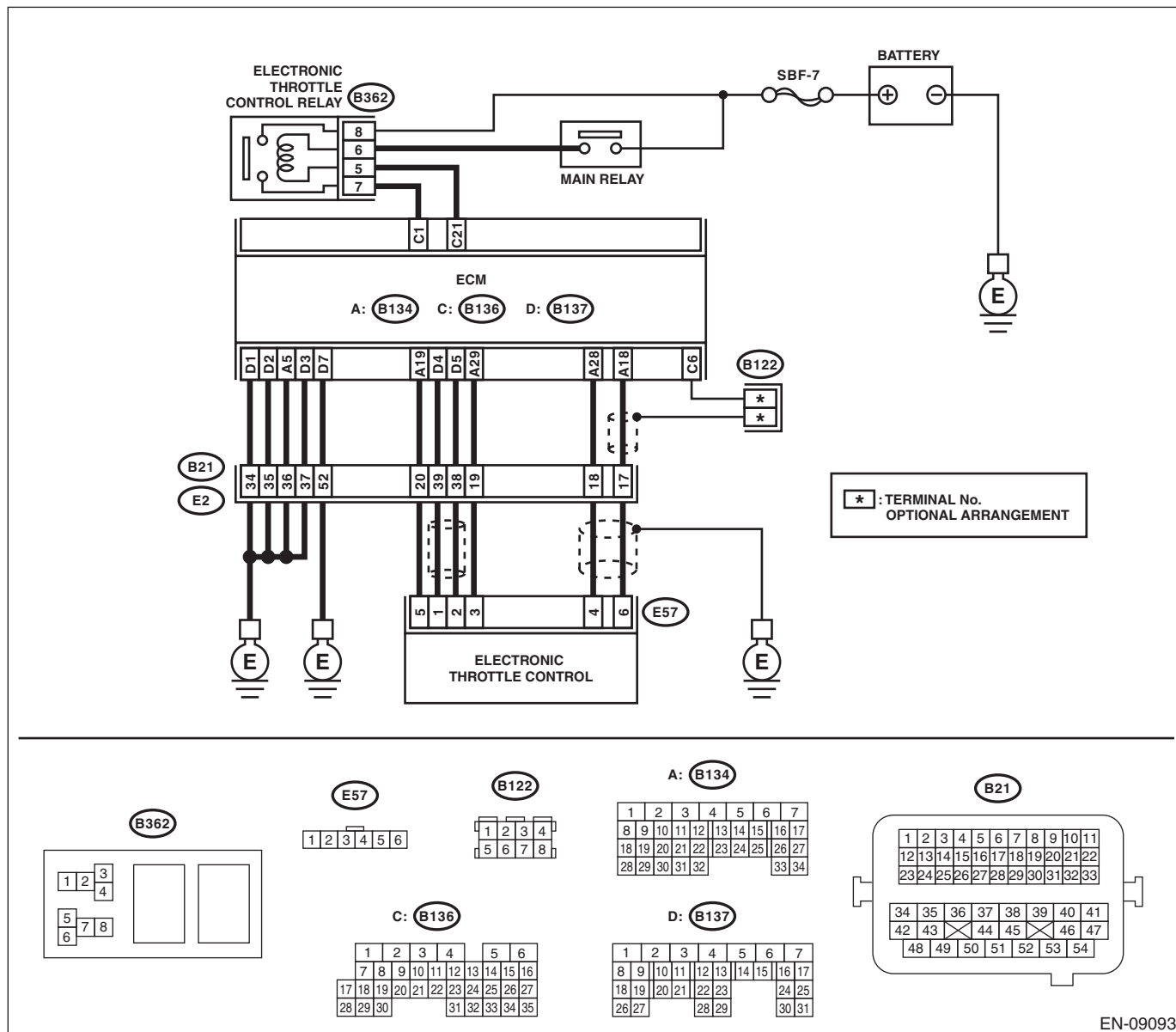
DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-219, DTC P2102 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Erroneous idling
- Poor driving performance
- Engine stalls.

WIRING DIAGRAM:



EN-09093

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ELECTRONIC THROTTLE CONTROL RELAY. 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control relay. 3) Connect the battery to terminals No. 5 and No. 6 of electronic throttle control relay. 4) Measure the resistance between electronic throttle control terminals. Terminals No. 8 — No. 7:	Is the resistance less than 1 Ω ?	Go to step 2.	Replace the electronic throttle control relay.
2 CHECK POWER SUPPLY OF ELECTRONIC THROTTLE CONTROL RELAY. 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control relay connector and chassis ground. Connector & terminal (B362) No. 8 (+) — Chassis ground (-): (B362) No. 6 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 3.	Repair the open or ground short circuit of power supply circuit.
3 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Turn the ignition switch to ON. 4) Measure the voltage between electronic throttle control relay connector and chassis ground. Connector & terminal (B362) No. 5 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Repair the power supply short circuit of harness between ECM and electronic throttle control relay.	Go to step 4.
4 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY. 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control relay connector and chassis ground. Connector & terminal (B362) No. 5 — Chassis ground: (B362) No. 7 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 5.	Repair the ground short circuit of harness between ECM and electronic throttle control relay.
5 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY. Measure the resistance between ECM connector and electronic throttle control relay connector. Connector & terminal (B136) No. 21 — (B362) No. 5: (B136) No. 1 — (B362) No. 7:	Is the resistance less than 1 Ω ?	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Repair the open circuit of harness between ECM and electronic throttle control relay.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

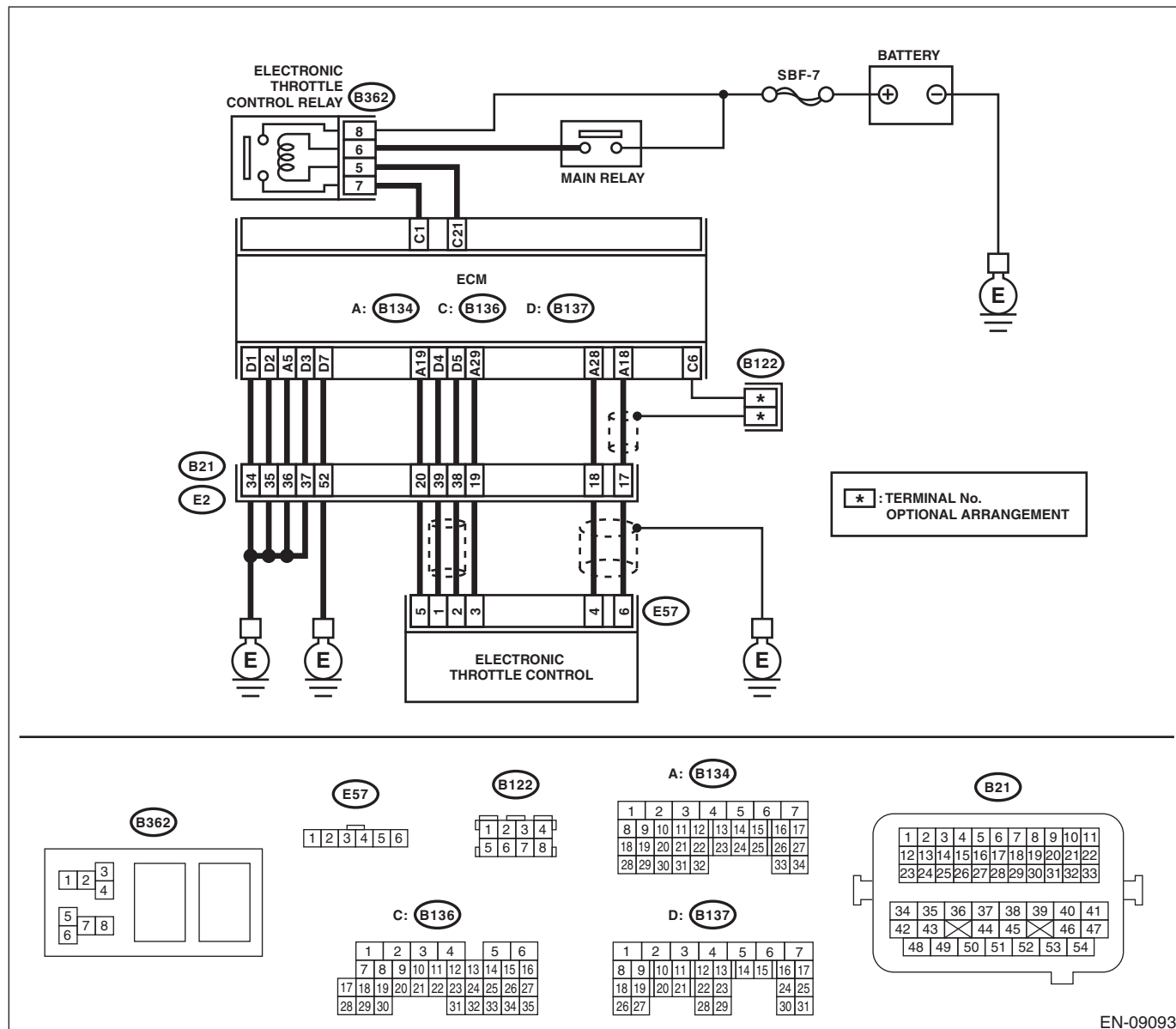
ENGINE (DIAGNOSTICS)

DH:DTC P2103 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-221, DTC P2103 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

WIRING DIAGRAM:



EN-09093

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ELECTRONIC THROTTLE CONTROL RELAY. 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control relay. 3) Measure the resistance between electronic throttle control relay terminals. Terminals No. 8 — No. 7:	Is the resistance more than 1 MΩ?	Go to step 2.	Replace the electronic throttle control relay.
2 CHECK SHORT CIRCUIT OF ELECTRONIC THROTTLE CONTROL RELAY POWER SUPPLY. 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control relay connector and chassis ground. Connector & terminal (B362) No. 7 (+) — Chassis ground (-):	Is the voltage more than 5 V?	Go to step 3.	Repair the power supply short circuit of harness between ECM and electronic throttle control relay.
3 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance between ECM connector and engine ground. Connector & terminal (B136) No. 21 — Engine ground:	Is the resistance more than 1 MΩ?	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Repair the ground short circuit of harness between ECM and electronic throttle control relay.

DI: DTC P2109 THROTTLE/PEDAL POSITION SENSOR “A” MINIMUM STOP PERFORMANCE

NOTE:

For the diagnostic procedure, refer to DTC P2101. <Ref. to EN(H4SO U5)(diag)-296, DTC P2101 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DJ:DTC P2122 THROTTLE/PEDAL POSITION SENSOR/SWITCH “D” CIRCUIT LOW INPUT

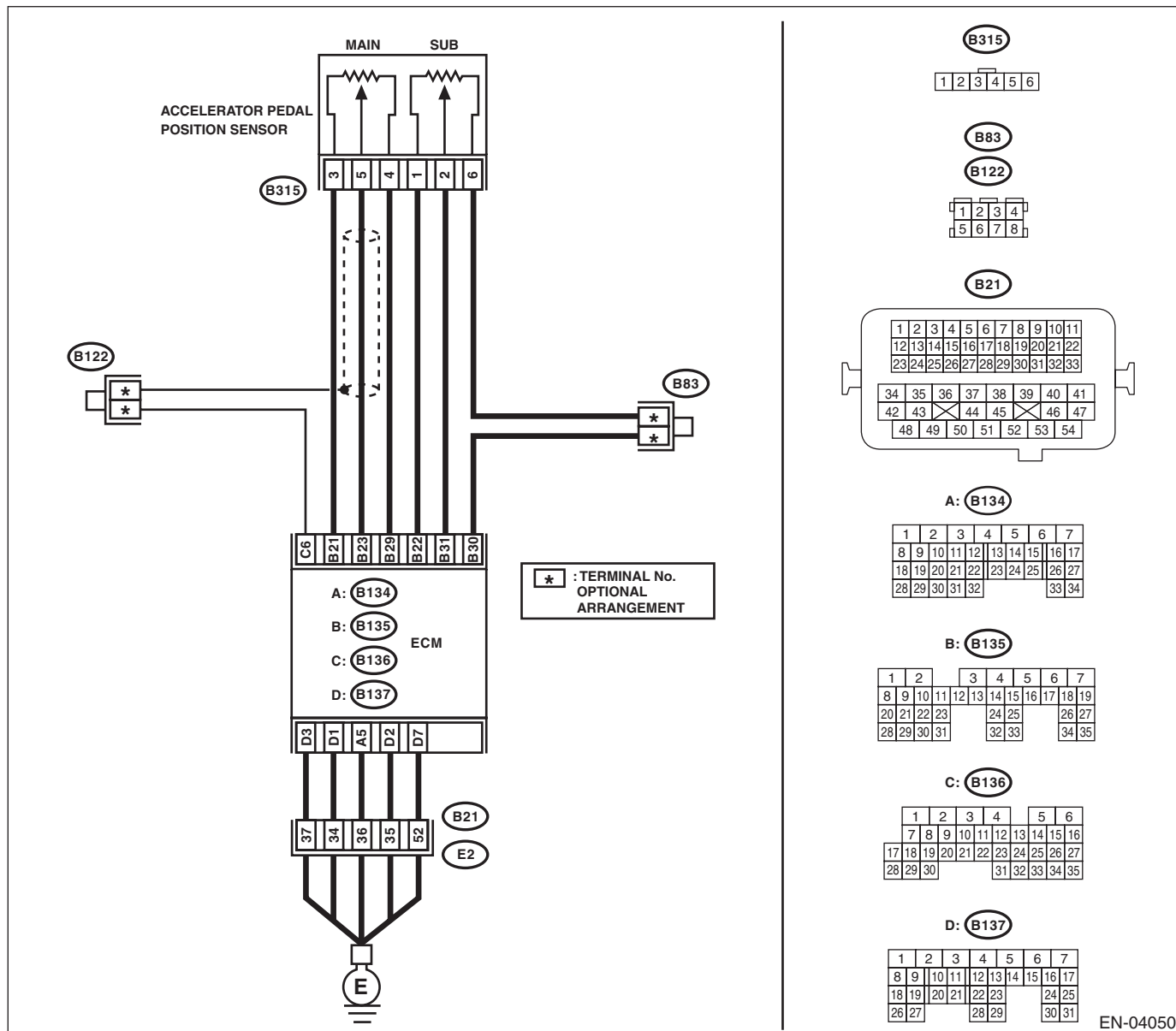
DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-225, DTC P2122 THROTTLE/PEDAL POSITION SENSOR/SWITCH “D” CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Erroneous idling
- Poor driving performance

WIRING DIAGRAM:



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ACCELERATOR PEDAL POSITION SENSOR OUTPUT. 1) Turn the ignition switch to ON. 2) Read the data of main accelerator pedal position sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage more than 0.4 V?	Go to step 2.	Go to step 3.
2 CHECK POOR CONTACT. Check poor contact of connector between ECM and accelerator pedal position sensor.	Is there poor contact?	Repair the poor contact.	Temporary poor contact occurred, but it is normal at present.
3 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from accelerator pedal position sensor. 4) Measure the resistance of ECM connector and accelerator pedal position sensor connector. Connector & terminal (B135) No. 29 — (B315) No. 4: (B135) No. 31 — (B315) No. 2:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness connector.
4 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B135) No. 29 — Chassis ground: (B135) No. 31 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 5.	Repair the chassis short circuit of harness.
5 CHECK POWER SUPPLY OF ACCELERATOR PEDAL POSITION SENSOR. 1) Connect the ECM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between accelerator pedal position sensor connector and chassis ground. Connector & terminal (B315) No. 2 (+) — Chassis ground (-):	Is the voltage 4.5 — 5.5 V?	Go to step 6.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
6 CHECK ACCELERATOR PEDAL POSITION SENSOR. Measure the resistance of accelerator pedal position sensor. Terminals No. 2 — No. 3:	Is the resistance between 1.2 and 4.8 k Ω ?	Go to step 7.	Replace the accelerator pedal position sensor. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
7 CHECK ACCELERATOR PEDAL POSITION SENSOR. Measure the resistance of accelerator pedal position sensor. Terminals No. 4 — No. 3: Check the measured value is within the specification without depressing the accelerator pedal.	Is the resistance between 0.2 and 1.0 k Ω ?	Go to step 8.	Replace the accelerator pedal position sensor. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
8 CHECK ACCELERATOR PEDAL POSITION SENSOR. Measure the resistance of accelerator pedal position sensor. Terminals No. 4 — No. 3: Check the measured value is within the specification with the accelerator pedal depressed.	Is the resistance between 0.5 and 2.5 k Ω ?	Repair the poor contact of ECM connector. Replace the ECM if defective.	Replace the accelerator pedal position sensor.

DK:DTC P2123 THROTTLE/PEDAL POSITION SENSOR/SWITCH “D” CIRCUIT HIGH INPUT

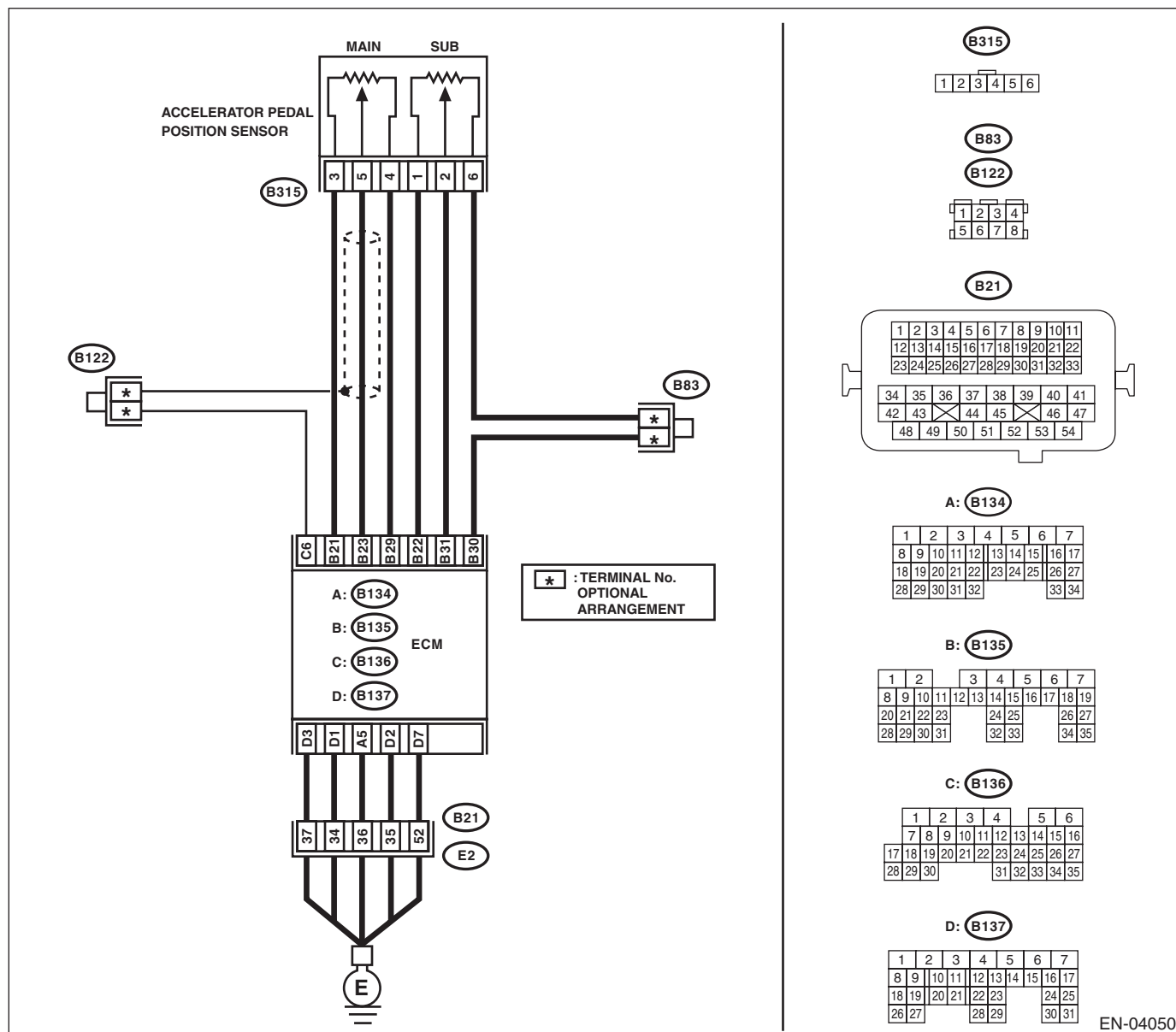
DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-227, DTC P2123 THROTTLE/PEDAL POSITION SENSOR/SWITCH “D” CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Erroneous idling
- Poor driving performance

WIRING DIAGRAM:



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ACCELERATOR PEDAL POSITION SENSOR OUTPUT. 1) Turn the ignition switch to ON. 2) Read the data of main accelerator pedal position sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage less than 4.8 V?	Go to step 2.	Go to step 3.
2 CHECK POOR CONTACT. Check poor contact of connector between ECM and accelerator pedal position sensor.	Is there poor contact?	Repair the poor contact.	Temporary poor contact occurred, but it is normal at present.
3 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from accelerator pedal position sensor. 4) Measure the resistance between ECM connector and accelerator pedal position sensor connector. Connector & terminal (B135) No. 21 — (B315) No. 3:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness connector.
4 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. 1) Connect the ECM connector. 2) Measure the resistance between accelerator pedal position sensor connector and chassis ground. Connector & terminal (B315) No. 3 — Chassis ground:	Is the resistance less than 5 Ω ?	Go to step 5.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
5 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. 1) Connect the ECM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between accelerator pedal position sensor connector and chassis ground. Connector & terminal (B315) No. 4 (+) — Chassis ground (-):	Is the voltage less than 6 V?	Go to step 6.	Repair the battery short circuit of harness between ECM connector and accelerator pedal position sensor connector.
6 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance between ECM connectors. Connector & terminal (B135) No. 23 — (B135) No. 21: (B135) No. 23 — (B135) No. 22:	Is the resistance more than 1 M Ω ?	Repair the poor contact of accelerator pedal position sensor connector. Replace the accelerator pedal position sensor if defective.	Repair the short circuit to sensor power supply.

DL:DTC P2127 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT LOW INPUT

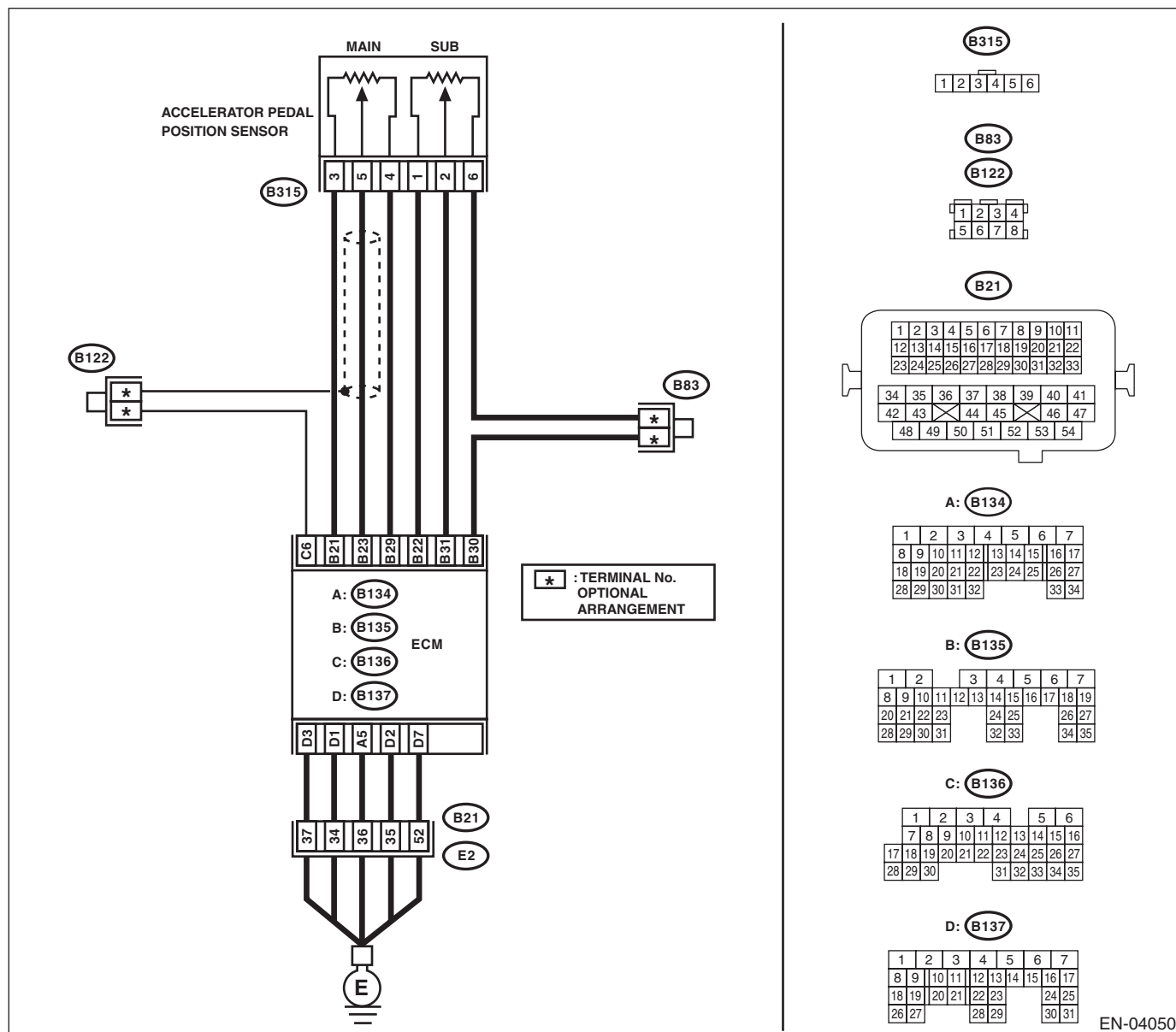
DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-229, DTC P2127 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Erroneous idling
- Poor driving performance

WIRING DIAGRAM:



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ACCELERATOR PEDAL POSITION SENSOR OUTPUT. 1) Turn the ignition switch to ON. 2) Read the data of sub accelerator pedal position sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage more than 0.4 V?	Go to step 2.	Go to step 3.
2 CHECK POOR CONTACT. Check poor contact of connector between ECM and accelerator pedal position sensor.	Is there poor contact?	Repair the poor contact.	Temporary poor contact occurred, but it is normal at present.
3 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from accelerator pedal position sensor. 4) Measure the resistance between ECM connector and accelerator pedal position sensor connector. Connector & terminal (B135) No. 31 — (B315) No. 2: (B135) No. 22 — (B315) No. 1:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness connector.
4 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B135) No. 31 — Chassis ground: (B135) No. 22 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 5.	Repair the chassis short circuit of harness.
5 CHECK POWER SUPPLY OF ACCELERATOR PEDAL POSITION SENSOR. 1) Connect the ECM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between accelerator pedal position sensor connector and chassis ground. Connector & terminal (B315) No. 1 (+) — Chassis ground (-):	Is the voltage 4.5 — 5.5 V?	Go to step 6.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
6 CHECK ACCELERATOR PEDAL POSITION SENSOR. Measure the resistance of accelerator pedal position sensor. Terminals No. 1 — No. 2:	Is the resistance between 0.75 and 3.15 k Ω ?	Go to step 7.	Replace the accelerator pedal position sensor.
7 CHECK ACCELERATOR PEDAL POSITION SENSOR. 1) Measure the resistance of accelerator pedal position sensor. Terminals No. 3 — No. 5: 2) Check the measured value is within the specification without depressing the accelerator pedal.	Is the resistance between 0.15 and 0.63 k Ω ?	Go to step 8.	Replace the accelerator pedal position sensor.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
8 CHECK ACCELERATOR PEDAL POSITION SENSOR. 1) Measure the resistance of accelerator pedal position sensor. Terminals No. 3 — No. 5: 2) Check the measured value is within the specification with the accelerator pedal depressed.	Is the resistance between 0.28 and 1.68 k Ω ?	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>	Replace the accelerator pedal position sensor.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DM:DTC P2128 THROTTLE/PEDAL POSITION SENSOR/SWITCH “E” CIRCUIT HIGH INPUT

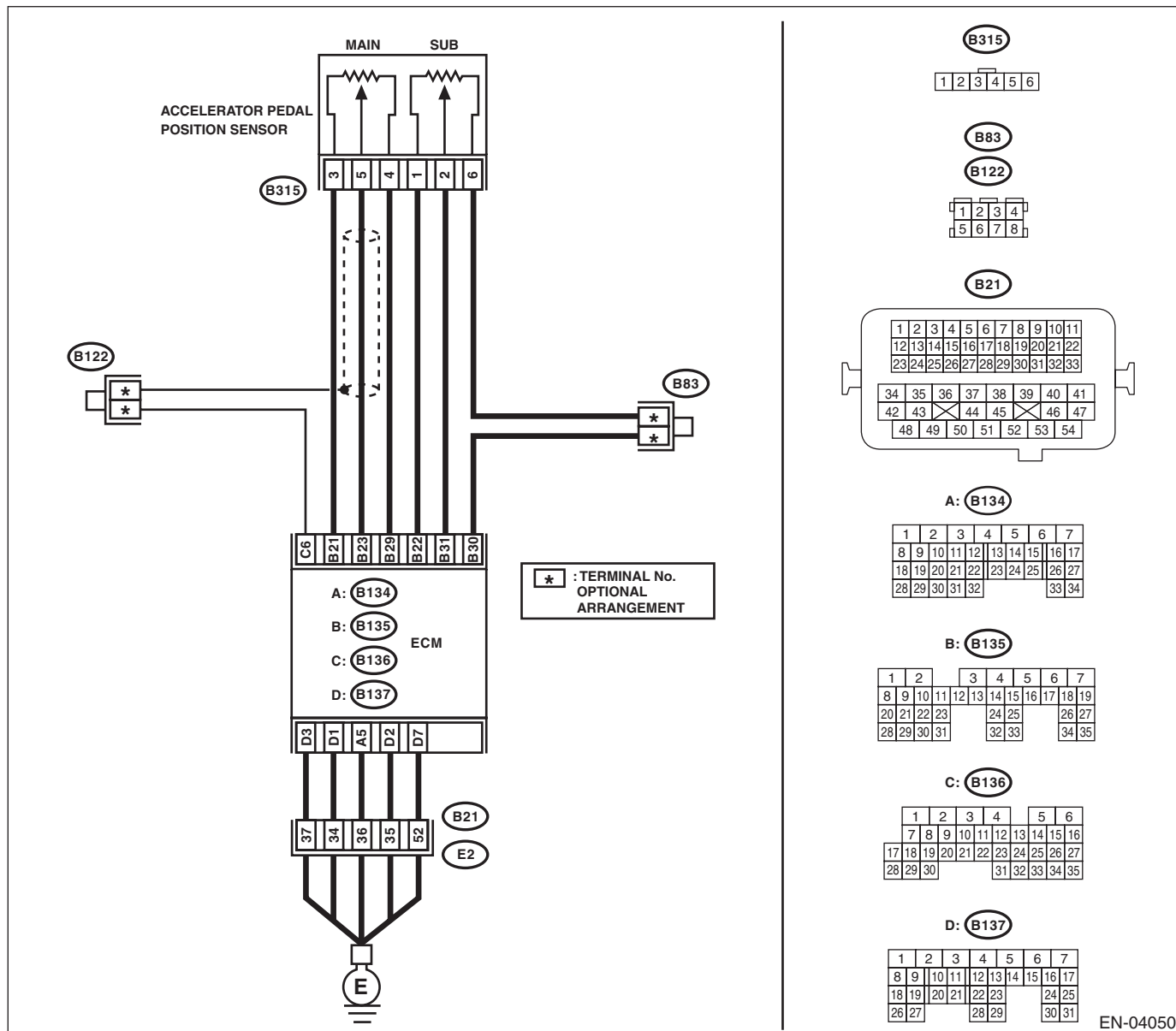
DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-231, DTC P2128 THROTTLE/PEDAL POSITION SENSOR/SWITCH “E” CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Erroneous idling
- Poor driving performance

WIRING DIAGRAM:



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ACCELERATOR PEDAL POSITION SENSOR OUTPUT. 1) Turn the ignition switch to ON. 2) Read the data of sub accelerator pedal position sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage less than 4.8 V?	Go to step 2.	Go to step 3.
2 CHECK POOR CONTACT. Check poor contact of connector between ECM and accelerator pedal position sensor.	Is there poor contact?	Repair the poor contact.	Temporary poor contact occurred, but it is normal at present.
3 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from accelerator pedal position sensor. 4) Measure the resistance between ECM connector and accelerator pedal position sensor connector. Connector & terminal (B135) No. 30 — (B315) No. 6:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness connector.
4 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. 1) Connect the ECM connector. 2) Measure the resistance between accelerator pedal position sensor connector and chassis ground. Connector & terminal (B315) No. 6 — Chassis ground:	Is the resistance less than 5 Ω ?	Go to step 5.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
5 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. 1) Connect the ECM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between accelerator pedal position sensor connector and chassis ground. Connector & terminal (B315) No. 4 (+) — Chassis ground (-):	Is the voltage less than 6 V?	Go to step 6.	Repair the battery short circuit of harness between ECM connector and accelerator pedal position sensor connector.
6 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance between ECM connectors. Connector & terminal (B135) No. 31 — (B135) No. 21: (B135) No. 31 — (B135) No. 22:	Is the resistance more than 1 M Ω ?	Repair the poor contact of accelerator pedal position sensor connector. Replace the accelerator pedal position sensor if defective.	Repair the short circuit to sensor power supply.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DN:DTC P2135 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A"/"B" VOLTAGE CORRELATION

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-233, DTC P2135 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A"/"B" VOLTAGE CORRELATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>

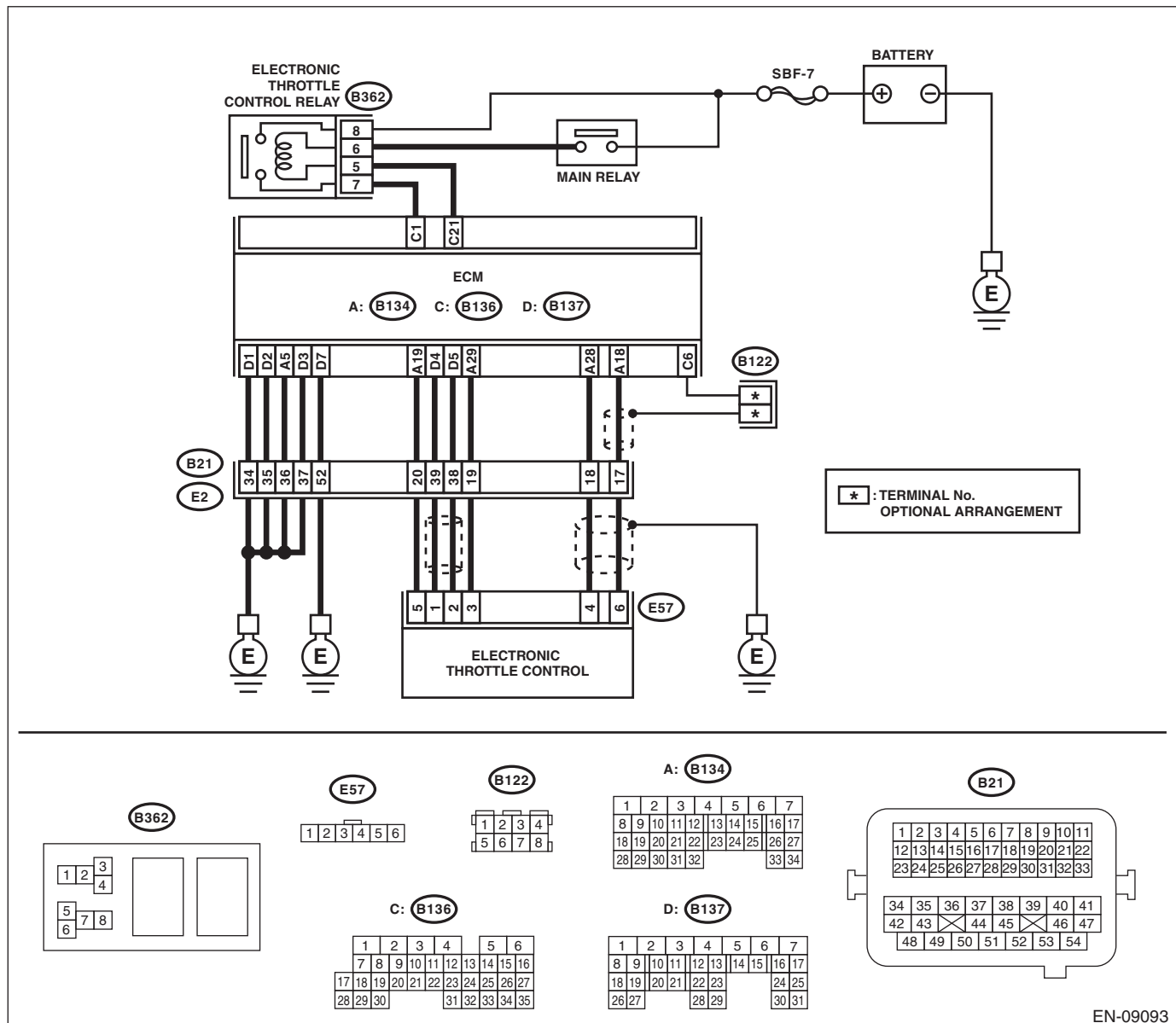
TROUBLE SYMPTOM:

- Erroneous idling
- Poor driving performance

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:



EN-09093

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK SENSOR OUTPUT. 1) Turn the ignition switch to ON. 2) Read the data of main throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage more than 0.4 V?	Go to step 2.	Go to step 4.
2 CHECK SENSOR OUTPUT. Read the data of sub throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage more than 0.8 V?	Go to step 3.	Go to step 4.
3 CHECK POOR CONTACT. Check poor contact in connector between ECM and electronic throttle control.	Is there poor contact?	Repair the poor contact.	Go to step 14.
4 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from electronic throttle control. 4) Measure the resistance between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 18 — (E57) No. 6: (B134) No. 28 — (E57) No. 4: (B134) No. 19 — (E57) No. 5:	Is the resistance less than 1 Ω ?	Go to step 5.	Repair the open circuit of harness connector.
5 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 18 — Chassis ground: (B134) No. 28 — Chassis ground: (B134) No. 19 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 6.	Repair the ground short circuit of harness.
6 CHECK SENSOR POWER SUPPLY. 1) Connect the ECM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 5 (+) — Engine ground (-):	Is the voltage 4.5 — 5.5 V?	Go to step 7.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
7 CHECK SHORT CIRCUIT IN ECM. 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 6 — Engine ground: (E57) No. 4 — Engine ground:	Is the resistance more than 10 Ω ?	Go to step 8.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
8 CHECK SENSOR OUTPUT. 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Read the data of main throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage less than 4.63 V?	Go to step 9.	Go to step 11.
9 CHECK SENSOR OUTPUT. Read the data of sub throttle sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage less than 4.73 V?	Go to step 10.	Go to step 11.
10 CHECK POOR CONTACT. Check poor contact in connector between ECM and electronic throttle control.	Is there poor contact?	Repair the poor contact.	Temporary poor contact occurred, but it is normal at present.
11 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from electronic throttle control. 4) Measure the resistance between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 29 — (E57) No. 3: (B134) No. 18 — (E57) No. 6: (B134) No. 28 — (E57) No. 4:	Is the resistance less than 1 Ω?	Go to step 12.	Repair the open circuit of harness connector.
12 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Connect the ECM connector. 2) Measure the resistance between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 3 — Engine ground:	Is the resistance less than 5 Ω?	Go to step 13.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
13 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Connect the ECM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 5 (+) — Engine ground (-):	Is the voltage less than 10 V?	Go to step 14.	Repair the battery short circuit of harness between ECM connector and electronic throttle control connector.
14 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 6 (+) — Engine ground (-): (E57) No. 4 (+) — Engine ground (-):	Is the voltage less than 10 V?	Go to step 15.	Repair the short circuit of harness between ECM connector and electronic throttle control connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
15 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL. 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector. 3) Measure the resistance between ECM connectors. Connector & terminal (B134) No. 18 — (B134) No. 19: (B134) No. 28 — (B134) No. 19:	Is the resistance more than 1 MΩ?	Go to step 16.	Repair the short circuit to sensor power supply.
16 CHECK ELECTRONIC THROTTLE CONTROL HARNESS. 1) Disconnect the connectors from ECM. 2) Disconnect the connectors from electronic throttle control. 3) Measure the resistance between electronic throttle control connector terminals. Connector & terminal (E57) No. 6 — (E57) No. 4:	Is the resistance more than 1 MΩ?	Repair the poor contact of ECM connector. Replace the ECM if defective.	Repair the short circuit of harness.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DO:DTC P2138 THROTTLE/PEDAL POSITION SENSOR/SWITCH “D”/“E” VOLTAGE CORRELATION

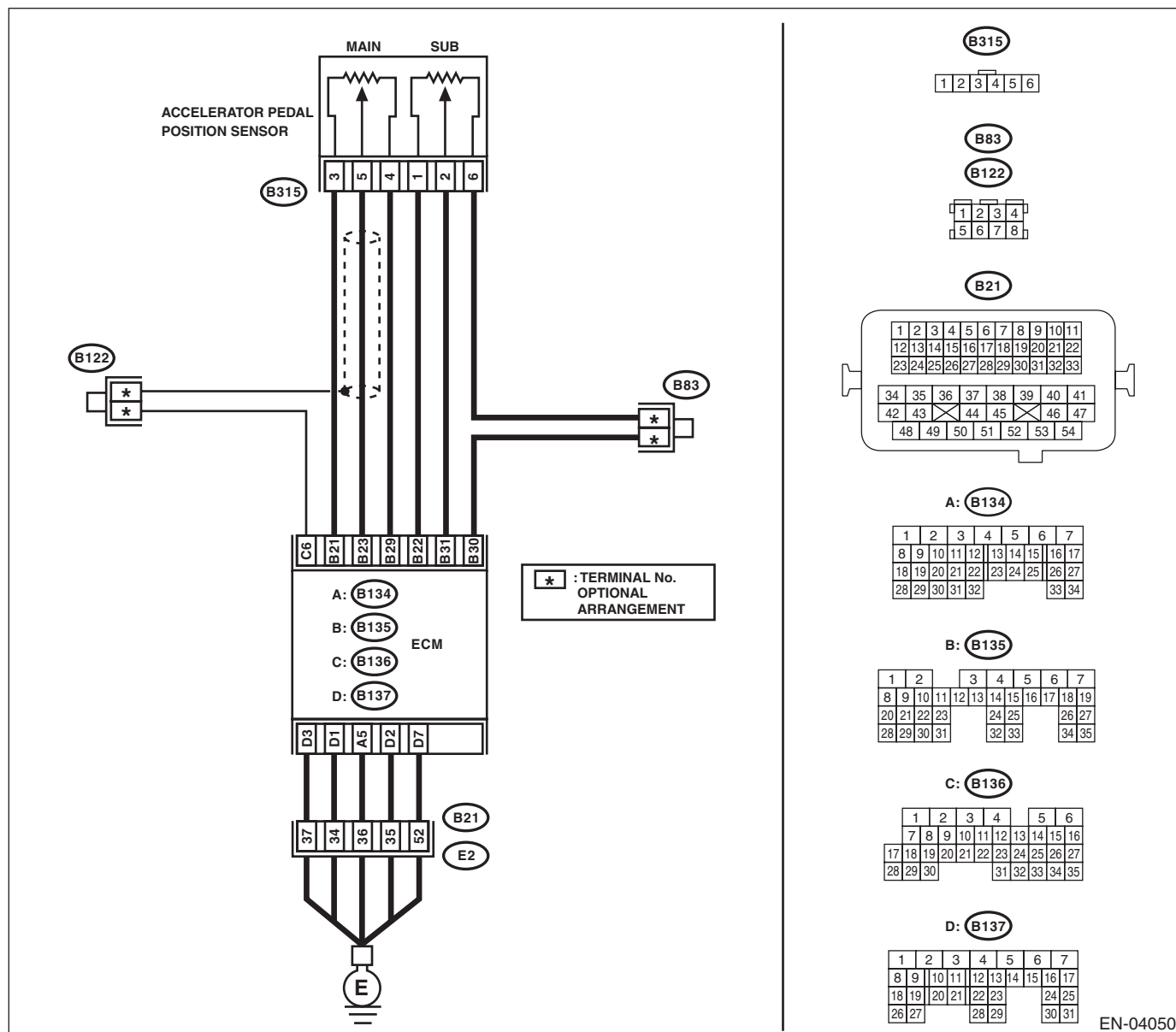
DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-235, DTC P2138 THROTTLE/PEDAL POSITION SENSOR/SWITCH “D”/“E” VOLTAGE CORRELATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Erroneous idling
- Poor driving performance

WIRING DIAGRAM:



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK ACCELERATOR PEDAL POSITION SENSOR OUTPUT. 1) Turn the ignition switch to ON. 2) Read the data of main accelerator pedal position sensor signal and sub accelerator pedal position sensor signal using Subaru Select Monitor. NOTE: Subaru Select Monitor For detailed operation procedure, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4SO U5)(diag)-27, Subaru Select Monitor.>	Is the voltage more than 0.4 V?	Go to step 2.	Go to step 3.
2 CHECK POOR CONTACT. Check poor contact of connector between ECM and accelerator pedal position sensor.	Is there poor contact?	Repair the poor contact.	Go to step 12.
3 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from accelerator pedal position sensor. 4) Measure the resistance between ECM connector and accelerator pedal position sensor connector. Connector & terminal (B135) No. 23 — (B315) No. 5: (B135) No. 21 — (B315) No. 3: (B135) No. 31 — (B315) No. 2: (B135) No. 22 — (B315) No. 1:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness connector.
4 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B135) No. 23 — Chassis ground: (B135) No. 21 — Chassis ground: (B135) No. 31 — Chassis ground: (B135) No. 22 — Chassis ground:	Is the resistance more than 1 M Ω ?	Go to step 5.	Repair the ground short circuit of harness.
5 CHECK POWER SUPPLY OF ACCELERATOR PEDAL POSITION SENSOR. 1) Connect the ECM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between accelerator pedal position sensor connector and engine ground. Connector & terminal (B315) No. 2 (+) — Engine ground (-): (B315) No. 1 (+) — Engine ground (-):	Is the voltage 4.5 — 5.5 V?	Go to step 6.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
6 CHECK ACCELERATOR PEDAL POSITION SENSOR. Measure the resistance of accelerator pedal position sensor. Terminals No. 2 — No. 3:	Is the resistance between 1.2 and 4.8 k Ω ?	Go to step 7.	Replace the accelerator pedal position sensor.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK ACCELERATOR PEDAL POSITION SENSOR. Measure the resistance of accelerator pedal position sensor. <i>Terminals</i> No. 1 — No. 6:	Is the resistance between 0.75 and 3.15 k Ω ?	Go to step 8.	Replace the accelerator pedal position sensor.
8 CHECK ACCELERATOR PEDAL POSITION SENSOR. Measure the resistance of accelerator pedal position sensor without depressing the accelerator pedal. <i>Terminals</i> No. 5 — No. 4:	Is the resistance between 0.2 and 0.8 k Ω ?	Go to step 9.	Replace the accelerator pedal position sensor.
9 CHECK ACCELERATOR PEDAL POSITION SENSOR. Measure the resistance of accelerator pedal position sensor without depressing the accelerator pedal. <i>Terminals</i> No. 2 — No. 6:	Is the resistance between 0.15 and 0.63 k Ω ?	Go to step 10.	Replace the accelerator pedal position sensor.
10 CHECK ACCELERATOR PEDAL POSITION SENSOR. Measure the resistance of accelerator pedal position sensor with depressing the accelerator pedal. <i>Terminals</i> No. 2 — No. 4:	Is the resistance between 0.5 and 2.5 k Ω ?	Go to step 11.	Replace the accelerator pedal position sensor.
11 CHECK ACCELERATOR PEDAL POSITION SENSOR. Measure the resistance of accelerator pedal position sensor with depressing the accelerator pedal. <i>Terminals</i> No. 2 — No. 6:	Is the resistance between 0.28 and 1.68 k Ω ?	Go to step 12.	Replace the accelerator pedal position sensor.
12 CHECK ACCELERATOR PEDAL POSITION SENSOR OUTPUT. 1) Turn the ignition switch to OFF. 2) Connect all connectors. 3) Turn the ignition switch to ON. 4) Read the data of main throttle sensor signal and sub accelerator pedal position sensor signal using Subaru Select Monitor.	Is the voltage less than 4.8 V?	Go to step 13.	Go to step 14.
13 CHECK POOR CONTACT. Check poor contact of connector between ECM and accelerator pedal position sensor.	Is there poor contact?	Repair the poor contact.	Go to step 18.
14 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from accelerator pedal position sensor. 4) Measure the resistance between ECM connector and accelerator pedal position sensor connector. <i>Connector & terminal</i> (B135) No. 29 — (B315) No. 4: (B135) No. 30 — (B315) No. 6:	Is the resistance less than 1 Ω ?	Go to step 15.	Repair the open circuit of harness connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
15 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. 1) Connect the ECM connector. 2) Measure the resistance between accelerator pedal position sensor connector and chassis ground. <i>Connector & terminal</i> <i>(B315) No. 4 — Chassis ground:</i> <i>(B315) No. 6 — Chassis ground:</i>	Is the resistance less than 5 Ω ?	Go to step 16.	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>
16 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. 1) Connect the ECM connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between accelerator pedal position sensor connector and chassis ground. <i>Connector & terminal</i> <i>(B315) No. 5 (+) — Chassis ground (-):</i> <i>(B315) No. 2 (+) — Chassis ground (-):</i>	Is the voltage less than 6 V?	Go to step 17.	Repair the battery short circuit of harness between ECM connector and accelerator pedal position sensor connector.
17 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Measure the resistance between ECM connectors. <i>Connector & terminal</i> <i>(B135) No. 23 — (B135) No. 21:</i> <i>(B135) No. 23 — (B135) No. 22:</i> <i>(B135) No. 31 — (B135) No. 21:</i> <i>(B135) No. 31 — (B135) No. 22:</i>	Is the resistance more than 1 M Ω ?	Go to step 18.	Repair the short circuit to sensor power supply.
18 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM. 3) Disconnect the connectors from accelerator pedal position sensor. 4) Measure the resistance between connector terminals of accelerator pedal position sensor. <i>Connector & terminal</i> <i>(B315) No. 5 — (B315) No. 2:</i>	Is the resistance more than 1 M Ω ?	Repair the poor contact of ECM connector. Replace the ECM if defective.	Repair the short circuit of harness between ECM connector and accelerator pedal position sensor connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DP:DTC P2227 BAROMETRIC PRESSURE CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-237, DTC P2227 BAROMETRIC PRESSURE CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).>	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>

DQ:DTC P2228 BAROMETRIC PRESSURE CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-238, DTC P2228 BAROMETRIC PRESSURE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> NOTE: It is not necessary to inspect DTC P2228.	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DR:DTC P2229 BAROMETRIC PRESSURE CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4SO U5)-239, DTC P2229 BAROMETRIC PRESSURE CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4SO U5)(diag)-46, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO U5)(diag)-36, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4SO U5)(diag)-73, List of Diagnostic Trouble Code (DTC).> NOTE: It is not necessary to inspect DTC P2229.	Replace the ECM. <Ref. to FU(H4SO)-36, Engine Control Module (ECM).>

General Diagnostic Table

ENGINE (DIAGNOSTICS)

19.General Diagnostic Table

A: INSPECTION

1. ENGINE

NOTE:

Malfunction of parts other than those listed is also possible. <Ref. to ME(H4SO)-89, Engine Trouble in General.>

Symptom	Problem parts
1. Engine stalls during idling.	1) Manifold absolute pressure sensor 2) Mass air flow and intake air temperature sensor 3) Ignition parts (*1) 4) Engine coolant temperature sensor (*2) 5) Crankshaft position sensor (*3) 6) Camshaft position sensor (*3) 7) Fuel injection parts (*4)
2. Rough idling	1) Manifold absolute pressure sensor 2) Mass air flow and intake air temperature sensor 3) Engine coolant temperature sensor (*2) 4) Ignition parts (*1) 5) Air intake system (*5) 6) Fuel injection parts (*4) 7) Electronic throttle control 8) Crankshaft position sensor (*3) 9) Camshaft position sensor (*3) 10) Oxygen sensor 11) Fuel pump and fuel pump relay 12) EGR valve
3. Engine does not return to idle.	1) Engine coolant temperature sensor 2) Electronic throttle control 3) Manifold absolute pressure sensor 4) Mass air flow and intake air temperature sensor 5) EGR valve
4. Poor acceleration	1) Manifold absolute pressure sensor 2) Mass air flow and intake air temperature sensor 3) Electronic throttle control 4) Fuel injection parts (*4) 5) Fuel pump and fuel pump relay 6) Engine coolant temperature sensor (*2) 7) Crankshaft position sensor (*3) 8) Camshaft position sensor (*3) 9) A/C switch and A/C cut relay 10) Engine torque control signal circuit 11) Ignition parts (*1) 12) EGR valve
5. Engine stalls, engine sags or hesitates at acceleration.	1) Manifold absolute pressure sensor 2) Mass air flow and intake air temperature sensor 3) Engine coolant temperature sensor (*2) 4) Crankshaft position sensor (*3) 5) Camshaft position sensor (*3) 6) Purge control solenoid valve 7) Fuel injection parts (*4) 8) Electronic throttle control 9) Fuel pump and fuel pump relay 10) EGR valve

General Diagnostic Table

ENGINE (DIAGNOSTICS)

Symptom	Problem parts
6. Surging	1) Mass air flow and intake air temperature sensor 2) Manifold absolute pressure sensor 3) Engine coolant temperature sensor (*2) 4) Crankshaft position sensor (*3) 5) Camshaft position sensor (*3) 6) Fuel injection parts (*4) 7) Electronic throttle control 8) Fuel pump and fuel pump relay 9) EGR valve
7. Spark knock	1) Mass air flow and intake air temperature sensor 2) Manifold absolute pressure sensor 3) Engine coolant temperature sensor 4) Knock sensor 5) Fuel injection parts (*4) 6) Fuel pump and fuel pump relay 7) EGR valve
8. After burning in exhaust system	1) Mass air flow and intake air temperature sensor 2) Manifold absolute pressure sensor 3) Engine coolant temperature sensor (*2) 4) Fuel injection parts (*4) 5) Fuel pump and fuel pump relay

*1: Check ignition coil and ignitor assembly and spark plug.

*2: Indicate the symptom occurring only in cold temperatures.

*3: Make sure the secure installation.

*4: Check fuel injector, fuel pressure regulator and fuel filter.

*5: Inspect air leak in air intake system.

2. AUTOMATIC TRANSMISSION

NOTE:

Check general diagnostics table with non-conformity symptom for automatic transmission. <Ref. to 4AT(diag)-2, Basic Diagnostic Procedure.>

General Diagnostic Table

ENGINE (DIAGNOSTICS)

GENERAL DESCRIPTION

GD(H4SO U5)

	Page
1. List of Diagnostic Trouble Code (DTC)	2
2. Diagnostic Trouble Code (DTC) Detecting Criteria	9

1. General Description

A: SPECIFICATION

Removal and installation procedures for SOHC U5 model are the same as the SOHC model. <Ref. to EX(H4SO)-2, General Description.>

COOLING

CO(H4SO U5)

	Page
1. General Description	2



General Description

FUEL INJECTION (FUEL SYSTEMS)

1. General Description

A: SPECIFICATION

Specifications for SOHC U5 model are the same as the SOHC model. <Ref. to FU(H4SO)-2, General Description.>

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES) *EC(H4SO U5)*

	Page
1. General Description	2

List of Diagnostic Trouble Code (DTC)

GENERAL DESCRIPTION

1. List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Index
P0026	Intake Valve Control Solenoid Circuit Range/Performance (Bank 1)	<Ref. to GD(H4SO U5)-9, DTC P0026 INTAKE VALVE CONTROL SOLENOID CIRCUIT RANGE/PERFORMANCE (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0028	Intake Valve Control Solenoid Circuit Range/Performance (Bank 2)	<Ref. to GD(H4SO U5)-11, DTC P0028 INTAKE VALVE CONTROL SOLENOID CIRCUIT RANGE/PERFORMANCE (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0030	HO2S Heater Control Circuit (Bank 1 Sensor 1)	<Ref. to GD(H4SO U5)-11, DTC P0030 HO2S HEATER CONTROL CIRCUIT (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0031	HO2S Heater Control Circuit Low (Bank 1 Sensor 1)	<Ref. to GD(H4SO U5)-13, DTC P0031 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0032	HO2S Heater Control Circuit High (Bank 1 Sensor 1)	<Ref. to GD(H4SO U5)-15, DTC P0032 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0037	HO2S Heater Control Circuit Low (Bank 1 Sensor 2)	<Ref. to GD(H4SO U5)-17, DTC P0037 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0038	HO2S Heater Control Circuit High (Bank 1 Sensor 2)	<Ref. to GD(H4SO U5)-19, DTC P0038 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0068	MAP/MAF - Throttle Position Correlation	<Ref. to GD(H4SO U5)-21, DTC P0068 MAP/MAF - THROTTLE POSITION CORRELATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0076	Intake Valve Control Solenoid Circuit Low (Bank 1)	<Ref. to GD(H4SO U5)-23, DTC P0076 INTAKE VALVE CONTROL SOLENOID CIRCUIT LOW (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0077	Intake Valve Control Solenoid Circuit High (Bank 1)	<Ref. to GD(H4SO U5)-24, DTC P0077 INTAKE VALVE CONTROL SOLENOID CIRCUIT HIGH (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0082	Intake Valve Control Solenoid Circuit Low (Bank 2)	<Ref. to GD(H4SO U5)-25, DTC P0082 INTAKE VALVE CONTROL SOLENOID CIRCUIT LOW (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0083	Intake Valve Control Solenoid Circuit High (Bank 2)	<Ref. to GD(H4SO U5)-25, DTC P0083 INTAKE VALVE CONTROL SOLENOID CIRCUIT HIGH (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0101	Mass or Volume Air Flow Circuit Range/Performance	<Ref. to GD(H4SO U5)-26, DTC P0101 MASS OR VOLUME AIR FLOW CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0102	Mass or Volume Air Flow Circuit Low Input	<Ref. to GD(H4SO U5)-29, DTC P0102 MASS OR VOLUME AIR FLOW CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0103	Mass or Volume Air Flow Circuit High Input	<Ref. to GD(H4SO U5)-31, DTC P0103 MASS OR VOLUME AIR FLOW CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0107	Manifold Absolute Pressure/Barometric Pressure Circuit Low Input	<Ref. to GD(H4SO U5)-33, DTC P0107 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0108	Manifold Absolute Pressure/Barometric Pressure Circuit High Input	<Ref. to GD(H4SO U5)-35, DTC P0108 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0111	Intake Air Temperature Sensor 1 Circuit Range/Performance	<Ref. to GD(H4SO U5)-37, DTC P0111 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0112	Intake Air Temperature Sensor 1 Circuit Low	<Ref. to GD(H4SO U5)-39, DTC P0112 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

List of Diagnostic Trouble Code (DTC)

GENERAL DESCRIPTION

DTC	Item	Index
P0113	Intake Air Temperature Sensor 1 Circuit High	<Ref. to GD(H4SO U5)-41, DTC P0113 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0117	Engine Coolant Temperature Circuit Low	<Ref. to GD(H4SO U5)-43, DTC P0117 ENGINE COOLANT TEMPERATURE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0118	Engine Coolant Temperature Circuit High	<Ref. to GD(H4SO U5)-45, DTC P0118 ENGINE COOLANT TEMPERATURE CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0122	Throttle/Pedal Position Sensor/Switch "A" Circuit Low	<Ref. to GD(H4SO U5)-47, DTC P0122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0123	Throttle/Pedal Position Sensor/Switch "A" Circuit High	<Ref. to GD(H4SO U5)-49, DTC P0123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0125	Insufficient Coolant Temperature For Closed Loop Fuel Control	<Ref. to GD(H4SO U5)-51, DTC P0125 INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0126	Insufficient Engine Coolant Temperature For Stable Operation	<Ref. to GD(H4SO U5)-53, DTC P0126 INSUFFICIENT ENGINE COOLANT TEMPERATURE FOR STABLE OPERATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0128	Coolant Thermostat (Engine Coolant Temperature Below Thermostat Regulating Temperature)	<Ref. to GD(H4SO U5)-55, DTC P0128 COOLANT THERMOSTAT (ENGINE COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0131	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 1)	<Ref. to GD(H4SO U5)-57, DTC P0131 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0132	O2 Sensor Circuit High Voltage (Bank 1 Sensor 1)	<Ref. to GD(H4SO U5)-59, DTC P0132 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0133	O2 Sensor Circuit Slow Response (Bank 1 Sensor 1)	<Ref. to GD(H4SO U5)-61, DTC P0133 O2 SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0134	O2 Sensor Circuit No Activity Detected (Bank 1 Sensor 1)	<Ref. to GD(H4SO U5)-64, DTC P0134 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0137	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 2)	<Ref. to GD(H4SO U5)-66, DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0138	O2 Sensor Circuit High Voltage (Bank 1 Sensor 2)	<Ref. to GD(H4SO U5)-68, DTC P0138 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0139	O2 Sensor Circuit Slow Response (Bank 1 Sensor 2)	<Ref. to GD(H4SO U5)-69, DTC P0139 O2 SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0140	O2 Sensor Circuit No Activity Detected (Bank1 Sensor2)	<Ref. to GD(H4SO U5)-74, DTC P0140 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK1 SENSOR2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0171	System Too Lean (Bank 1)	<Ref. to GD(H4SO U5)-76, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0172	System Too Rich (Bank 1)	<Ref. to GD(H4SO U5)-78, DTC P0172 SYSTEM TOO RICH (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0181	Fuel Temperature Sensor "A" Circuit Range/Performance	<Ref. to GD(H4SO U5)-80, DTC P0181 FUEL TEMPERATURE SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0182	Fuel Temperature Sensor "A" Circuit Low Input	<Ref. to GD(H4SO U5)-83, DTC P0182 FUEL TEMPERATURE SENSOR "A" CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

List of Diagnostic Trouble Code (DTC)

GENERAL DESCRIPTION

DTC	Item	Index
P0183	Fuel Temperature Sensor "A" Circuit High Input	<Ref. to GD(H4SO U5)-85, DTC P0183 FUEL TEMPERATURE SENSOR "A" CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0196	Engine Oil Temperature Sensor Circuit Range/Performance	<Ref. to GD(H4SO U5)-87, DTC P0196 ENGINE OIL TEMPERATURE SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0197	Engine Oil Temperature Sensor Low	<Ref. to GD(H4SO U5)-89, DTC P0197 ENGINE OIL TEMPERATURE SENSOR LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0198	Engine Oil Temperature Sensor High	<Ref. to GD(H4SO U5)-90, DTC P0198 ENGINE OIL TEMPERATURE SENSOR HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0222	Throttle/Pedal Position Sensor/Switch "B" Circuit Low	<Ref. to GD(H4SO U5)-91, DTC P0222 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0223	Throttle/Pedal Position Sensor/Switch "B" Circuit High	<Ref. to GD(H4SO U5)-93, DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0301	Cylinder 1 Misfire Detected	<Ref. to GD(H4SO U5)-95, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0302	Cylinder 2 Misfire Detected	<Ref. to GD(H4SO U5)-100, DTC P0302 CYLINDER 2 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0303	Cylinder 3 Misfire Detected	<Ref. to GD(H4SO U5)-100, DTC P0303 CYLINDER 3 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0304	Cylinder 4 Misfire Detected	<Ref. to GD(H4SO U5)-100, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0327	Knock Sensor 1 Circuit Low (Bank 1 or Single Sensor)	<Ref. to GD(H4SO U5)-101, DTC P0327 KNOCK SENSOR 1 CIRCUIT LOW (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0328	Knock Sensor 1 Circuit High (Bank 1 or Single Sensor)	<Ref. to GD(H4SO U5)-103, DTC P0328 KNOCK SENSOR 1 CIRCUIT HIGH (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0335	Crankshaft Position Sensor "A" Circuit	<Ref. to GD(H4SO U5)-105, DTC P0335 CRANKSHAFT POSITION SENSOR "A" CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0336	Crankshaft Position Sensor "A" Circuit Range/Performance	<Ref. to GD(H4SO U5)-107, DTC P0336 CRANKSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0340	Camshaft Position Sensor "A" Circuit (Bank 1 or Single Sensor)	<Ref. to GD(H4SO U5)-109, DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0341	Camshaft Position Sensor "A" Circuit Range/Performance (Bank 1 or Single Sensor)	<Ref. to GD(H4SO U5)-111, DTC P0341 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0400	Exhaust Gas Recirculation Flow	<Ref. to GD(H4SO U5)-113, DTC P0400 EXHAUST GAS RECIRCULATION FLOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0420	Catalyst System Efficiency Below Threshold (Bank 1)	<Ref. to GD(H4SO U5)-117, DTC P0420 CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0442	Evaporative Emission Control System Leak Detected (Small Leak)	<Ref. to GD(H4SO U5)-119, DTC P0442 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (SMALL LEAK), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0447	Evaporative Emission Control System Vent Control Circuit Open	<Ref. to GD(H4SO U5)-134, DTC P0447 EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL CIRCUIT OPEN, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0448	Evaporative Emission Control System Vent Control Circuit Shorted	<Ref. to GD(H4SO U5)-136, DTC P0448 EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL CIRCUIT SHORTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

List of Diagnostic Trouble Code (DTC)

GENERAL DESCRIPTION

DTC	Item	Index
P0451	Evaporative Emission Control System Pressure Sensor	<Ref. to GD(H4SO U5)-138, DTC P0451 EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0452	Evaporative Emission Control System Pressure Sensor Low Input	<Ref. to GD(H4SO U5)-140, DTC P0452 EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0453	Evaporative Emission Control System Pressure Sensor High Input	<Ref. to GD(H4SO U5)-142, DTC P0453 EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0456	Evaporative Emission Control System Leak Detected (Very Small Leak)	<Ref. to GD(H4SO U5)-144, DTC P0456 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (VERY SMALL LEAK), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0457	Evaporative Emission Control System Leak Detected (Fuel Cap Loose/Off)	<Ref. to GD(H4SO U5)-144, DTC P0457 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (FUEL CAP LOOSE/OFF), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0458	Evaporative Emission System Purge Control Valve Circuit Low	<Ref. to GD(H4SO U5)-145, DTC P0458 EVAPORATIVE EMISSION SYSTEM PURGE CONTROL VALVE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0459	Evaporative Emission System Purge Control Valve Circuit High	<Ref. to GD(H4SO U5)-147, DTC P0459 EVAPORATIVE EMISSION SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0461	Fuel Level Sensor "A" Circuit Range/Performance	<Ref. to GD(H4SO U5)-149, DTC P0461 FUEL LEVEL SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0462	Fuel Level Sensor "A" Circuit Low	<Ref. to GD(H4SO U5)-151, DTC P0462 FUEL LEVEL SENSOR "A" CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0463	Fuel Level Sensor "A" Circuit High	<Ref. to GD(H4SO U5)-153, DTC P0463 FUEL LEVEL SENSOR "A" CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0464	Fuel Level Sensor Circuit Intermittent	<Ref. to GD(H4SO U5)-155, DTC P0464 FUEL LEVEL SENSOR CIRCUIT INTERMITTENT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0483	Fan Rationality Check	<Ref. to GD(H4SO U5)-158, DTC P0483 FAN RATIONALITY CHECK, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0500	Vehicle Speed Sensor "A"	<Ref. to GD(H4SO U5)-159, DTC P0500 VEHICLE SPEED SENSOR "A", Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0506	Idle Air Control System RPM Lower Than Expected	<Ref. to GD(H4SO U5)-161, DTC P0506 IDLE AIR CONTROL SYSTEM RPM LOWER THAN EXPECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0507	Idle Air Control System RPM Higher Than Expected	<Ref. to GD(H4SO U5)-163, DTC P0507 IDLE AIR CONTROL SYSTEM RPM HIGHER THAN EXPECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0512	Starter Request Circuit	<Ref. to GD(H4SO U5)-165, DTC P0512 STARTER REQUEST CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0513	Incorrect Immobilizer Key	<Ref. to GD(H4SO U5)-166, DTC P0513 INCORRECT IMMOBILIZER KEY, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0519	Idle Air Control System Performance	<Ref. to GD(H4SO U5)-167, DTC P0519 IDLE AIR CONTROL SYSTEM PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0600	Serial Communication Link	<Ref. to GD(H4SO U5)-168, DTC P0600 SERIAL COMMUNICATION LINK, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0602	Control Module Programming Error	<Ref. to GD(H4SO U5)-169, DTC P0602 CONTROL MODULE PROGRAMMING ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0604	Internal Control Module Random Access Memory (RAM) Error	<Ref. to GD(H4SO U5)-173, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0605	Internal Control Module Read Only Memory (ROM) Error	<Ref. to GD(H4SO U5)-175, DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>

List of Diagnostic Trouble Code (DTC)

GENERAL DESCRIPTION

DTC	Item	Index
P0607	Control Module Performance	<Ref. to GD(H4SO U5)-176, DTC P0607 CONTROL MODULE PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0638	Throttle Actuator Control Range/Performance (Bank 1)	<Ref. to GD(H4SO U5)-179, DTC P0638 THROTTLE ACTUATOR CONTROL RANGE/PERFORMANCE (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0691	Fan 1 Control Circuit Low	<Ref. to GD(H4SO U5)-182, DTC P0691 FAN 1 CONTROL CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0692	Fan 1 Control Circuit High	<Ref. to GD(H4SO U5)-183, DTC P0692 FAN 1 CONTROL CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0700	Transmission Control System (MIL Request)	<Ref. to GD(H4SO U5)-184, DTC P0700 TRANSMISSION CONTROL SYSTEM (MIL REQUEST), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0851	Park/Neutral Switch Input Circuit Low (AT Model)	<Ref. to GD(H4SO U5)-185, DTC P0851 PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW (AT MODEL), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0851	Neutral Switch Input Circuit Low (MT Model)	<Ref. to GD(H4SO U5)-186, DTC P0851 NEUTRAL SWITCH INPUT CIRCUIT LOW (MT MODEL), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0852	Park/Neutral Switch Input Circuit High (AT Model)	<Ref. to GD(H4SO U5)-187, DTC P0852 PARK/NEUTRAL SWITCH INPUT CIRCUIT HIGH (AT MODEL), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0852	Neutral Switch Input Circuit High (MT Model)	<Ref. to GD(H4SO U5)-188, DTC P0852 NEUTRAL SWITCH INPUT CIRCUIT HIGH (MT MODEL), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1152	O2 Sensor Circuit Range/Performance (Low) (Bank1 Sensor1)	<Ref. to GD(H4SO U5)-189, DTC P1152 O2 SENSOR CIRCUIT RANGE/PERFORMANCE (LOW) (BANK1 SENSOR1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1153	O2 Sensor Circuit Range/Performance (High) (Bank1 Sensor1)	<Ref. to GD(H4SO U5)-192, DTC P1153 O2 SENSOR CIRCUIT RANGE/PERFORMANCE (HIGH) (BANK1 SENSOR1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1160	Return Spring Failure	<Ref. to GD(H4SO U5)-195, DTC P1160 RETURN SPRING FAILURE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1400	Fuel Tank Pressure Control Solenoid Valve Circuit Low	<Ref. to GD(H4SO U5)-197, DTC P1400 FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1420	Fuel Tank Pressure Control Sol. Valve Circuit High	<Ref. to GD(H4SO U5)-199, DTC P1420 FUEL TANK PRESSURE CONTROL SOL. VALVE CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1443	Vent Control Solenoid Valve Function Problem	<Ref. to GD(H4SO U5)-201, DTC P1443 VENT CONTROL SOLENOID VALVE FUNCTION PROBLEM, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1491	Positive Crankcase Ventilation (Blow-by) Function Problem	<Ref. to GD(H4SO U5)-203, DTC P1491 POSITIVE CRANKCASE VENTILATION (BLOW-BY) FUNCTION PROBLEM, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1492	EGR Solenoid Valve Signal #1 Circuit Malfunction (Low Input)	<Ref. to GD(H4SO U5)-205, DTC P1492 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1493	EGR Solenoid Valve Signal #1 Circuit Malfunction (High Input)	<Ref. to GD(H4SO U5)-207, DTC P1493 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1494	EGR Solenoid Valve Signal #2 Circuit Malfunction (Low Input)	<Ref. to GD(H4SO U5)-209, DTC P1494 EGR SOLENOID VALVE SIGNAL #2 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1495	EGR Solenoid Valve Signal #2 Circuit Malfunction (High Input)	<Ref. to GD(H4SO U5)-209, DTC P1495 EGR SOLENOID VALVE SIGNAL #2 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>

List of Diagnostic Trouble Code (DTC)

GENERAL DESCRIPTION

DTC	Item	Index
P1496	EGR Solenoid Valve Signal #3 Circuit Malfunction (Low Input)	<Ref. to GD(H4SO U5)-209, DTC P1496 EGR SOLENOID VALVE SIGNAL #3 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1497	EGR Solenoid Valve Signal #3 Circuit Malfunction (High Input)	<Ref. to GD(H4SO U5)-209, DTC P1497 EGR SOLENOID VALVE SIGNAL #3 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1498	EGR Solenoid Valve Signal #4 Circuit Malfunction (Low Input)	<Ref. to GD(H4SO U5)-209, DTC P1498 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1499	EGR Solenoid Valve Signal #4 Circuit Malfunction (High Input)	<Ref. to GD(H4SO U5)-209, DTC P1499 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1518	Starter Switch Circuit Low Input	<Ref. to GD(H4SO U5)-210, DTC P1518 STARTER SWITCH CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1560	Back-up Voltage Circuit Malfunction	<Ref. to GD(H4SO U5)-211, DTC P1560 BACK-UP VOLTAGE CIRCUIT MALFUNCTION, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1570	Antenna	<Ref. to GD(H4SO U5)-212, DTC P1570 ANTENNA, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1571	Reference Code Incompatibility	<Ref. to GD(H4SO U5)-212, DTC P1571 REFERENCE CODE INCOMPATIBILITY, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1572	Imm Circuit Failure (Except Antenna Circuit)	<Ref. to GD(H4SO U5)-212, DTC P1572 IMM CIRCUIT FAILURE (EXCEPT ANTENNA CIRCUIT), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1574	Key Communication Failure	<Ref. to GD(H4SO U5)-212, DTC P1574 KEY COMMUNICATION FAILURE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1576	EGI Control Module EEPROM	<Ref. to GD(H4SO U5)-212, DTC P1576 EGI CONTROL MODULE EEPROM, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1577	IMM Control Module EEPROM	<Ref. to GD(H4SO U5)-212, DTC P1577 IMM CONTROL MODULE EEPROM, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1578	Meter Failure	<Ref. to GD(H4SO U5)-212, DTC P1578 METER FAILURE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2096	Post Catalyst Fuel Trim System Too Lean Bank 1	<Ref. to GD(H4SO U5)-213, DTC P2096 POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2097	Post Catalyst Fuel Trim System Too Rich Bank 1	<Ref. to GD(H4SO U5)-215, DTC P2097 POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2101	Throttle Actuator Control Motor Circuit Range/Performance	<Ref. to GD(H4SO U5)-217, DTC P2101 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2102	Throttle Actuator Control Motor Circuit Low	<Ref. to GD(H4SO U5)-219, DTC P2102 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2103	Throttle Actuator Control Motor Circuit High	<Ref. to GD(H4SO U5)-221, DTC P2103 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2109	Throttle/Pedal Position Sensor "A" Minimum Stop Performance	<Ref. to GD(H4SO U5)-223, DTC P2109 THROTTLE/PEDAL POSITION SENSOR "A" MINIMUM STOP PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2122	Throttle/Pedal Position Sensor/Switch "D" Circuit Low Input	<Ref. to GD(H4SO U5)-225, DTC P2122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2123	Throttle/Pedal Position Sensor/Switch "D" Circuit High Input	<Ref. to GD(H4SO U5)-227, DTC P2123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2127	Throttle/Pedal Position Sensor/Switch "E" Circuit Low Input	<Ref. to GD(H4SO U5)-229, DTC P2127 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

List of Diagnostic Trouble Code (DTC)

GENERAL DESCRIPTION

DTC	Item	Index
P2128	Throttle/Pedal Position Sensor/ Switch "E" Circuit High Input	<Ref. to GD(H4SO U5)-231, DTC P2128 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2135	Throttle/Pedal Position Sensor/ Switch "A"/"B" Voltage Correlation	<Ref. to GD(H4SO U5)-233, DTC P2135 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A"/"B" VOLTAGE CORRELATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2138	Throttle/Pedal Position Sensor/ Switch "D"/"E" Voltage Correlation	<Ref. to GD(H4SO U5)-235, DTC P2138 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D"/"E" VOLTAGE CORRELATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2227	Barometric Pressure Circuit Range/Performance	<Ref. to GD(H4SO U5)-237, DTC P2227 BAROMETRIC PRESSURE CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2228	Barometric Pressure Circuit Low	<Ref. to GD(H4SO U5)-238, DTC P2228 BAROMETRIC PRESSURE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2229	Barometric Pressure Circuit High	<Ref. to GD(H4SO U5)-239, DTC P2229 BAROMETRIC PRESSURE CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

2. Diagnostic Trouble Code (DTC) Detecting Criteria

A: DTC P0026 INTAKE VALVE CONTROL SOLENOID CIRCUIT RANGE/PERFORMANCE (BANK 1)

1. OUTLINE OF DIAGNOSIS

Detect NG when having either Low NG or High NG.

A variable valve lift diagnosis oil pressure switch is installed for diagnosis. It is possible to determine whether the intake valve is in high mode (increase the amount of lift) or in low mode (suppressing the amount of lift) when the variable valve lift diagnosis oil pressure switch is turned OFF or ON.

• Normal

Oil switching solenoid valve duty	Intake valve	Variable valve lift diagnosis oil pressure switch
Large	High mode	OFF
Minimum	Low mode	ON

• Low NG

When the variable valve lift diagnosis oil pressure switch remains ON even though the intake valve tried to enter high mode (oil switching solenoid valve duty is large), this is judged as a Low NG.

• High NG

When the variable valve lift diagnosis oil pressure switch remains OFF even though the intake valve tried to enter low mode (oil switching solenoid valve duty is small), this is judged as a High NG.

2. COMPONENT DESCRIPTION

The variable valve lift system optimizes the intake valve lift by switching between the low lift cam and the high lift cam according to the engine speed. The amount of intake valve lift is varied by controlling the oil switching solenoid valve duty according to signals from the ECM.

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	≥ 10.9 V
After engine starting	≥ 6 sec.
Engine oil temperature	$\geq 15^{\circ}\text{C}$ (59°F)
Variable valve lift control	Operating

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously 6 seconds after engine start while variable valve lift is being controlled.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time is longer than the predetermined time when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Low NG Duty ratio Variable valve lift diagnosis oil pressure switch	≥ 62% ON
High NG Duty ratio Variable valve lift diagnosis oil pressure switch	< 33% OFF

Time Needed for Diagnosis:

Low side	0.784 seconds
High side	3.0 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the continuous time when the following conditions are established are more than 3 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
Low OK Duty ratio Variable valve lift diagnosis oil pressure switch	≥ 62% OFF
High OK Duty ratio Variable valve lift diagnosis oil pressure switch	< 33% ON

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

None

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

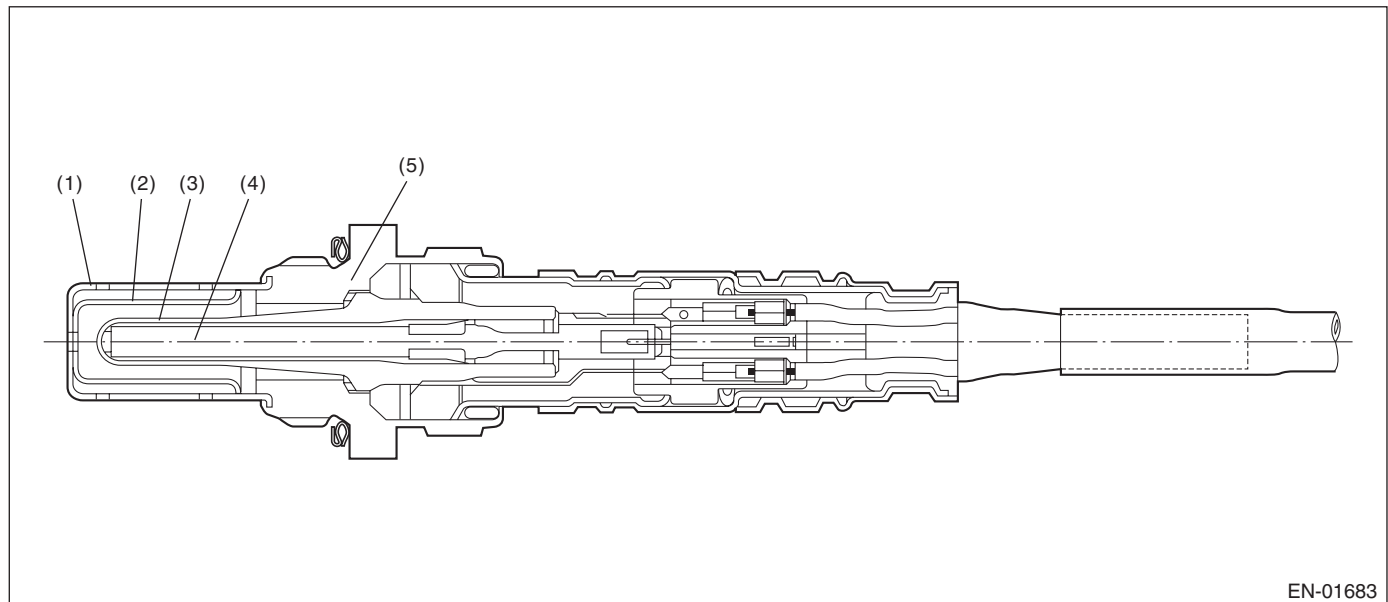
B: DTC P0028 INTAKE VALVE CONTROL SOLENOID CIRCUIT RANGE/PERFORMANCE (BANK 2)**NOTE:**

For diagnostic procedures, refer to DTC P0026. <Ref. to GD(H4SO U5)-9, DTC P0026 INTAKE VALVE CONTROL SOLENOID CIRCUIT RANGE/PERFORMANCE (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

C: DTC P0030 HO2S HEATER CONTROL CIRCUIT (BANK 1 SENSOR 1)**1. OUTLINE OF DIAGNOSIS**

Detect functional errors of the front oxygen (A/F) sensor heater.

Judge as NG when it is determined that the front oxygen (A/F) sensor impedance is large by referring to the engine condition such as fuel shut-off in deceleration, etc.

2. COMPONENT DESCRIPTION

(1) Element cover (outer)

(2) Element cover (inner)

(3) Sensor element

(4) Ceramic heater

(5) Sensor housing

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Continuous time where all of the following conditions are met	30 seconds or more
Battery voltage	> 10.9 V
After fuel cut	20 seconds or more
Heater current	Operating
Front lambda sensor duty $\geq 35\%$	Experienced

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after 50 seconds or more have passed since the engine started.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Judge as NG when the continuous time of meeting the malfunction criteria below becomes more than the time needed for diagnosis (10 seconds). Judge as OK and clear the NG when the continuous time of not completing the malfunction criteria below becomes more than the time needed for diagnosis (10 seconds).

Judgment Value

Malfunction Criteria	Threshold Value
Front oxygen (A/F) sensor impedance	> 50 Ω

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

- Front oxygen (A/F) sensor main learning compensation: Not allowed to calculate.
- Front oxygen (A/F) sensor sub learning compensation: Not allowed to calculate.
- Purge control: Not allowed to purge.

9. ECM OPERATION AT DTC SETTING

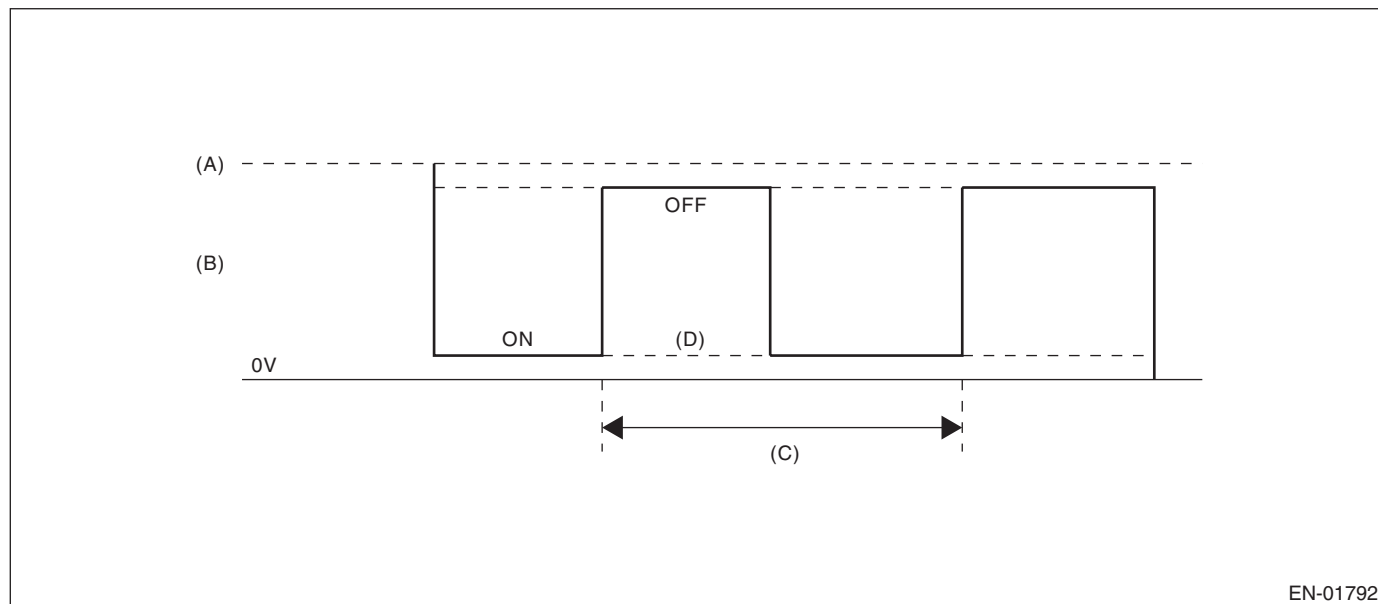
Memorize the freeze frame data. (For test mode \$02)

D: DTC P0031 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 1)**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of heater.

The heater performs duty control, and the output terminal voltage at ON is 0 V and the output terminal voltage at OFF is the battery voltage.

Judge as NG when the terminal voltage remains Low.

2. COMPONENT DESCRIPTION

(A) Battery voltage

(C) 128 milliseconds

(D) Low error

(B) Front oxygen (A/F) sensor heater
output voltage

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than 1 second (8 cycles).

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage level	Low
Front oxygen (A/F) sensor heater control duty	< 87.5%

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are completed.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage level	High

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

- Front oxygen (A/F) sensor heater control: Not allowed to turn on the heater.
- A/F main learning: Not allowed to calculate the A/F main learning compensation factor.
- A/F sub learning: Not allowed to calculate the A/F sub learning compensation factor.
- Purge control: Not allowed to purge.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

E: DTC P0032 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 1)

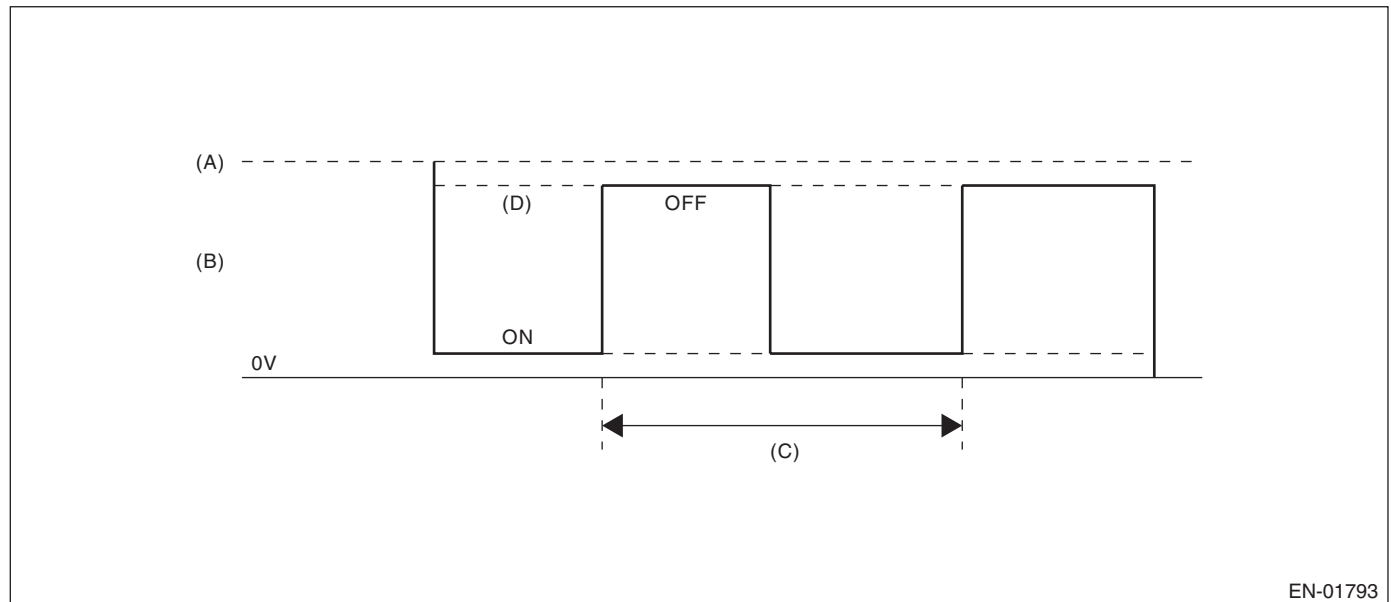
1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of heater.

The heater performs duty control, and the output terminal voltage at ON is 0 V and the output terminal voltage at OFF is the battery voltage.

Judge as NG when the terminal voltage remains High.

2. COMPONENT DESCRIPTION



(A) Battery voltage

(C) 128 milliseconds

(D) High malfunction

(B) Front oxygen (A/F) sensor heater
output voltage

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than 2 second (16 cycles).

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage level	High
Front oxygen (A/F) sensor heater control duty	$\geq 12.5\%$

Time Needed for Diagnosis: 2 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are completed.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage level	Low

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

- Front oxygen (A/F) sensor heater control: Not allowed to turn on the heater.
- A/F main learning: Not allowed to calculate the A/F main learning compensation factor.
- A/F sub learning: Not allowed to calculate the A/F sub learning compensation factor.
- Purge control: Not allowed to purge.

9. ECM OPERATION AT DTC SETTING

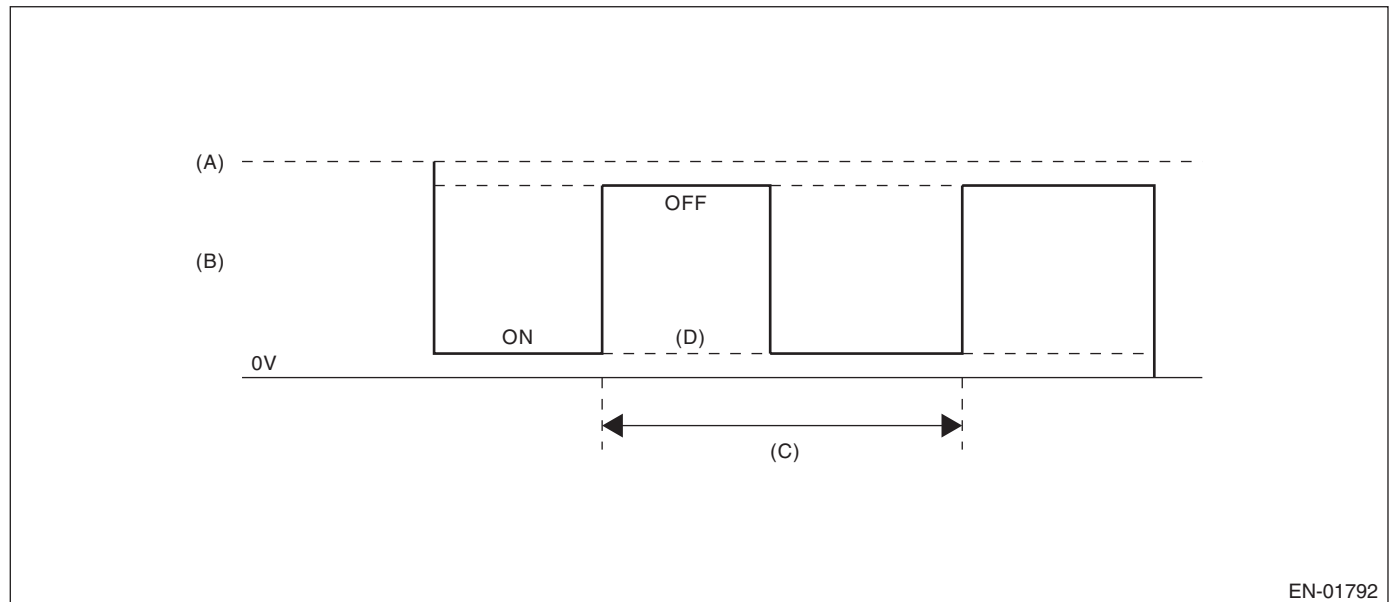
Memorize the freeze frame data. (For test mode \$02)

F: DTC P0037 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 2)**1. OUTLINE OF DIAGNOSIS**

Detect oxygen sensor heater open or short circuit.

The oxygen sensor heater performs duty control, and the output terminal voltage at ON is 0 V, and the output terminal voltage at OFF is the battery voltage.

Judge as NG when the terminal voltage remains Low.

2. COMPONENT DESCRIPTION

(A) Battery voltage

(C) 256 milliseconds (cycles)

(D) Low error

(B) Rear oxygen sensor heater output voltage

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	> 10.9 V
Elapsed time after engine starting	≥ 1 sec.

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time while meeting all of the malfunction criteria below is more than 2560 milliseconds (10 cycles).

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	Low
Rear oxygen sensor heater control duty	< 75%

Time Needed for Diagnosis: 2.56 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are completed.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	High

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

Sub feedback control: Not allowed.

9. ECM OPERATION AT DTC SETTING

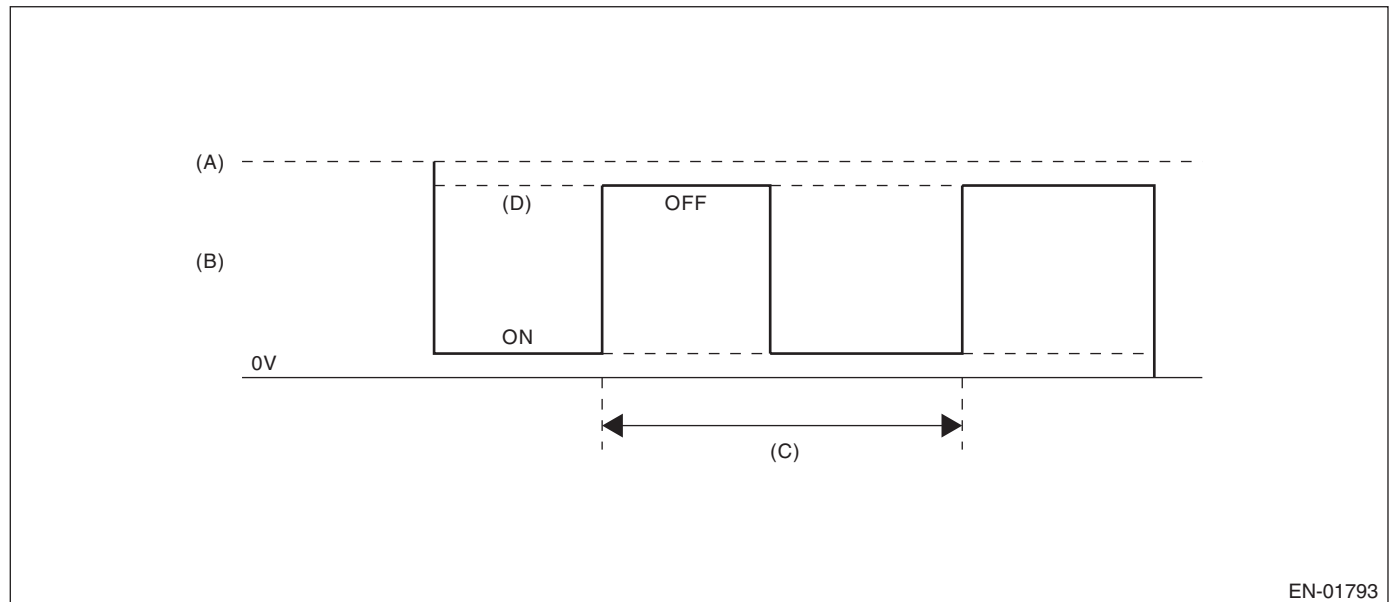
Memorize the freeze frame data. (For test mode \$02)

G: DTC P0038 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 2)**1. OUTLINE OF DIAGNOSIS**

Detect oxygen sensor heater open or short circuit.

The oxygen sensor heater performs duty control, and the output terminal voltage at ON is 0 V, and the output terminal voltage at OFF is the battery voltage.

Judge as NG when the terminal voltage remains High.

2. COMPONENT DESCRIPTION

EN-01793

(A) Battery voltage

(C) 256 milliseconds (cycles)

(D) High malfunction

(B) Rear oxygen sensor heater output
voltage

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	> 10.9 V
Elapsed time after engine starting	≥ 1 sec.

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time while meeting all of the malfunction criteria below is more than 2560 milliseconds (10 cycles).

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	High
Rear oxygen sensor heater control duty	≥ 20%

Time Needed for Diagnosis: 2.56 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are completed.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	Low

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

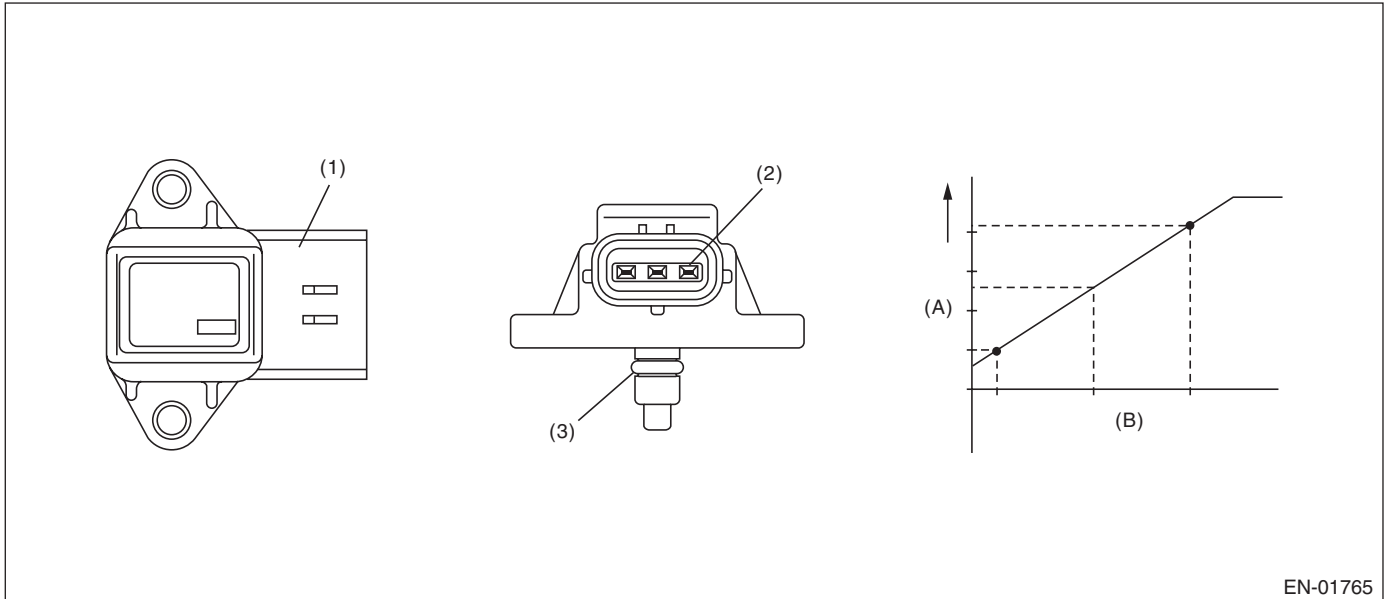
Sub feedback control: Not allowed.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

H: DTC P0068 MAP/MAF - THROTTLE POSITION CORRELATION**1. OUTLINE OF DIAGNOSIS**

Detect the malfunction of intake manifold pressure sensor output property. Judge as NG when the intake air pressure AD value is Low whereas it seemed to be High from the viewpoint of engine condition, or when it is High whereas it seemed to be Low from the engine condition.

2. COMPONENT DESCRIPTION

EN-01765

(1) Connector	(A) Output voltage
(2) Terminal	(B) Absolute pressure
(3) O-ring	

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Engine coolant temperature	$\geq 75^{\circ}\text{C}$ (167°F)

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after idling.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when either Low side or High side becomes NG.

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Low side	
Engine speed	< 2500 rpm
Throttle position	$\geq 12^\circ$
Intake air amount every 0.5 engine revs.	$\geq 0.55 \text{ g (0.019 oz)/rev}$
Output voltage	< 1.4 V
High side	
Engine speed	600 — 900 rpm
Throttle position	$\leq 2.44^\circ$
Intake air amount every 0.5 engine revs.	< 0.4 g (0.014 oz)/rev
Output voltage	$\geq 3.4 \text{ V}$

Time Needed for Diagnosis: 3 seconds for low side, 7 seconds for high side

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when both Low side and High side become OK.

Judge as OK when the malfunction criteria below are completed.

Judgment Value

Malfunction Criteria	Threshold Value
Low side	
Engine speed	< 2500 rpm
Throttle position	$\geq 12^\circ$
Intake air amount every 0.5 engine revs.	$\geq 0.55 \text{ g (0.019 oz)/rev}$
Output voltage	$\geq 1.4 \text{ V}$
High side	
Engine speed	600 — 900 rpm
Throttle position	$\leq 2.44^\circ$
Intake air amount every 0.5 engine revs.	< 0.4 g (0.014 oz)/rev
Output voltage	< 3.4 V

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

- Intake manifold pressure sensor process: Estimate the pressure from engine load.
- ISC feedback: Not allowed to calculate the amount of feedback.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

I: DTC P0076 INTAKE VALVE CONTROL SOLENOID CIRCUIT LOW (BANK 1)

1. OUTLINE OF DIAGNOSIS

Detect the open circuit of the oil switching solenoid valve.

Judge as NG when the current is small even though the output duty is large.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	≥ 10.9 V

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time when the following conditions are established is more than 2 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
Duty ratio	$\geq 30\%$
Control current	< 0.026 A

Time Needed for Diagnosis: 2 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the continuous time when the following conditions are established are more than 2 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
Oil switching solenoid valve current target current value – oil switching solenoid valve current value	< 0.08 A
Control current	≥ 0.11 A

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When “Clear Memory” is performed

7. FAIL SAFE

None

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

J: DTC P0077 INTAKE VALVE CONTROL SOLENOID CIRCUIT HIGH (BANK 1)

1. OUTLINE OF DIAGNOSIS

Detect short circuits of the oil switching solenoid valve.

Judge as a short NG when the current is large even though the output duty is small.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	≥ 10.9 V

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time when the following conditions are established is more than 2 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
Duty ratio	$< 7\%$
Control current	≥ 0.465 A

Time Needed for Diagnosis: 2 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the continuous time when the following conditions are established are more than 2 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
Oil switching solenoid valve current target current value – oil switching solenoid valve current value	< 0.08 A

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When “Clear Memory” is performed

7. FAIL SAFE

None

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

K: DTC P0082 INTAKE VALVE CONTROL SOLENOID CIRCUIT LOW (BANK 2)

NOTE:

For the diagnostic procedure, refer to DTC P0076. <Ref. to GD(H4SO U5)-23, DTC P0076 INTAKE VALVE CONTROL SOLENOID CIRCUIT LOW (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

L: DTC P0083 INTAKE VALVE CONTROL SOLENOID CIRCUIT HIGH (BANK 2)

NOTE:

For the diagnostic procedure, refer to DTC P0077. <Ref. to GD(H4SO U5)-24, DTC P0077 INTAKE VALVE CONTROL SOLENOID CIRCUIT HIGH (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

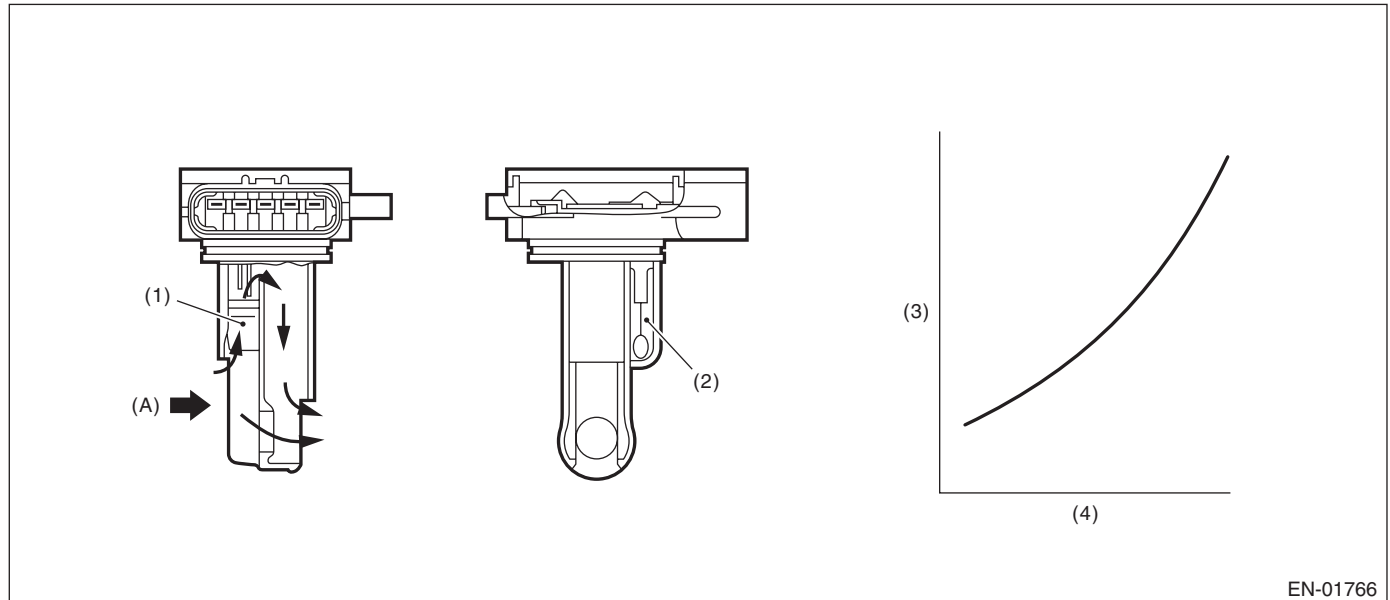
M: DTC P0101 MASS OR VOLUME AIR FLOW CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of air flow sensor output property.

Judge as a low side NG when the air flow voltage indicates a small value regardless of running in a state where the air flow voltage increases. Judge as a high side NG when the air flow voltage indicates a large value regardless of running in a state where the air flow voltage decreases. Judge air flow sensor property NG when the Low side or High side becomes NG.

2. COMPONENT DESCRIPTION



EN-01766

(1) Air flow sensor	(3) Voltage (V)	(A) Air
(2) Intake air temperature sensor	(4) Intake air volume (kg/s)	

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Engine coolant temperature	$\geq 75^{\circ}\text{C}$ (167°F)

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after idling.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
(Low side error) Output voltage Engine speed Throttle opening angle Intake manifold pressure	< 1.2 V ≥ 2000 rpm ≥ 13° ≥ 53.3 kPa (400 mmHg, 15.7 inHg)
(High side error 1) Output voltage Engine speed Throttle opening angle Intake manifold pressure	≥ 2.66 V 600 — 900 rpm < 2.44° < 40.0 kPa (300 mmHg, 11.8 inHg)
(High side error 2) Output voltage Engine speed Throttle opening angle Intake manifold pressure Fuel system diagnosis	≥ 1.45 V 600 — 900 rpm < 2.44° < 40.0 kPa (300 mmHg, 11.8 inHg) Rich side malfunction

Time Needed for Diagnosis:

Low side	3 seconds
High side	10 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK when the criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
(Low side error) Output voltage Engine speed Throttle opening angle Intake manifold pressure	≥ 1.2 V ≥ 2000 rpm ≥ 13° ≥ 53.3 kPa (400 mmHg, 15.7 inHg)
(High side error) Output voltage Engine speed Throttle opening angle Intake manifold pressure	< 2.66 V 600 — 900 rpm < 2.44° < 40.0 kPa (300 mmHg, 11.8 inHg)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

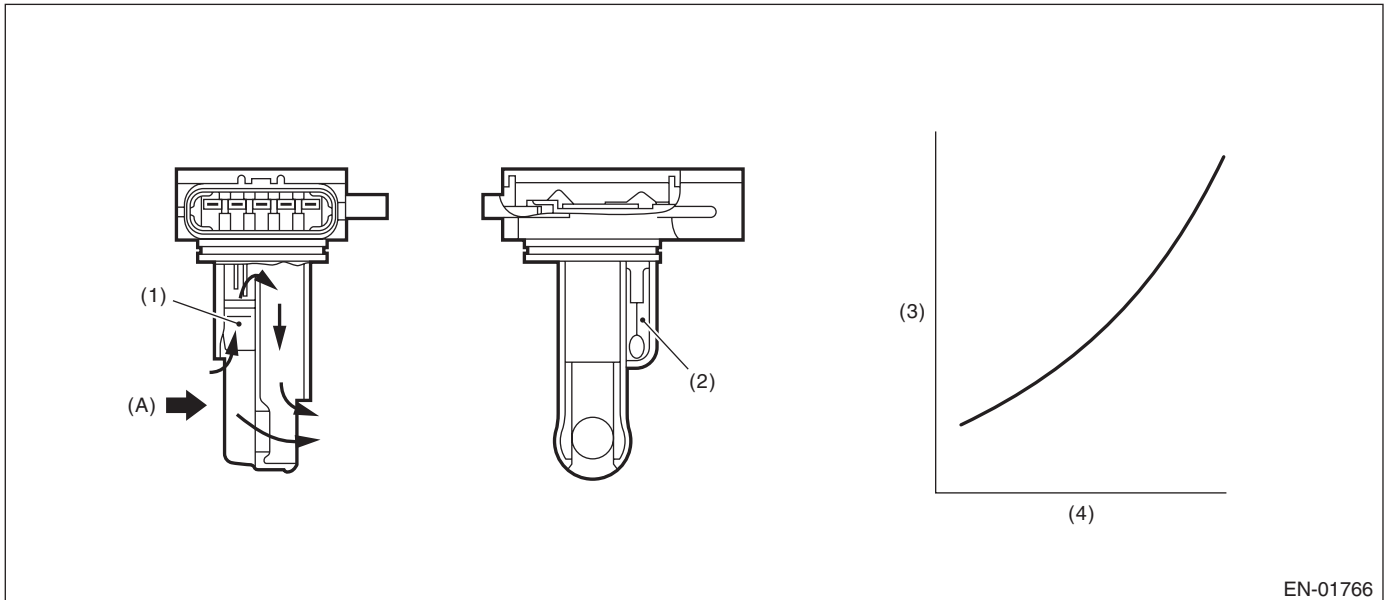
None

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

N: DTC P0102 MASS OR VOLUME AIR FLOW CIRCUIT LOW INPUT**1. OUTLINE OF DIAGNOSIS**

Detect open or short circuits of the air flow sensor.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

(1) Air flow sensor

(3) Voltage (V)

(A) Air

(2) Intake air temperature sensor

(4) Intake air volume (kg/s)

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the continuous time of completing the malfunction criteria below becomes 0.5 seconds or more. Judge as OK and clear the NG when the malfunction criteria below are not met.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	$\leq 0.2 \text{ V}$

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

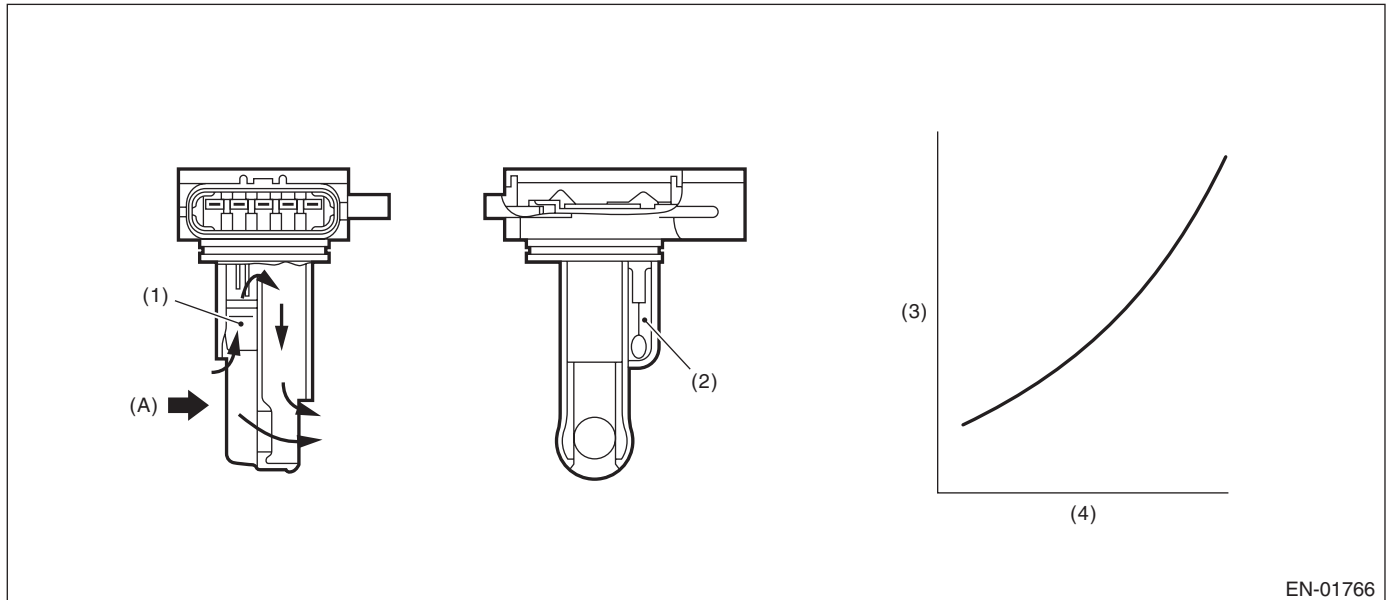
None

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

O: DTC P0103 MASS OR VOLUME AIR FLOW CIRCUIT HIGH INPUT**1. OUTLINE OF DIAGNOSIS**

Detect open or short circuits of the air flow sensor.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

EN-01766

(1) Air flow sensor	(3) Voltage (V)	(A) Air
(2) Intake air temperature sensor	(4) Intake air volume (kg/s)	

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than 0.5 seconds. Judge as OK and clear the NG when the malfunction criteria below are not met.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.985 V

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

None

9. ECM OPERATION AT DTC SETTING

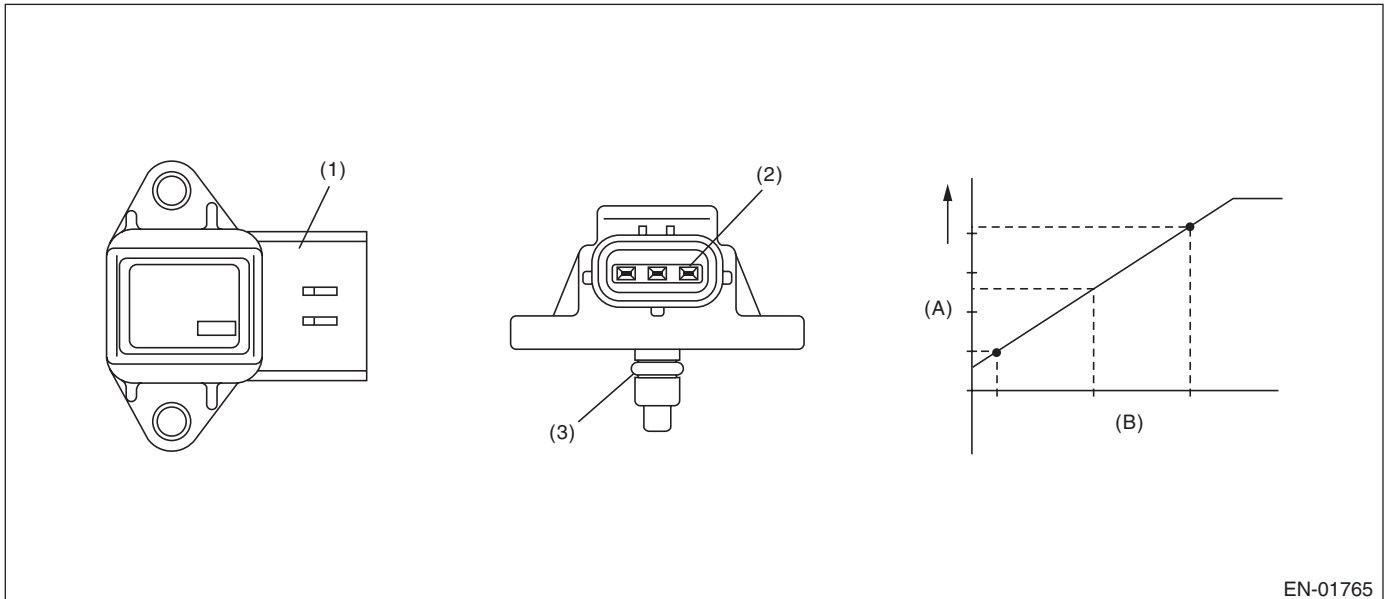
Memorize the freeze frame data. (For test mode \$02)

P: DTC P0107 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT LOW INPUT

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of intake manifold pressure sensor.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION



EN-01765

(1) Connector	(A) Output voltage
(2) Terminal	(B) Absolute pressure
(3) O-ring	

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the continuous time of completing the malfunction criteria below becomes 0.5 seconds or more. Judge as OK and clear the NG when the malfunction criteria below are not met.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.568 V

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

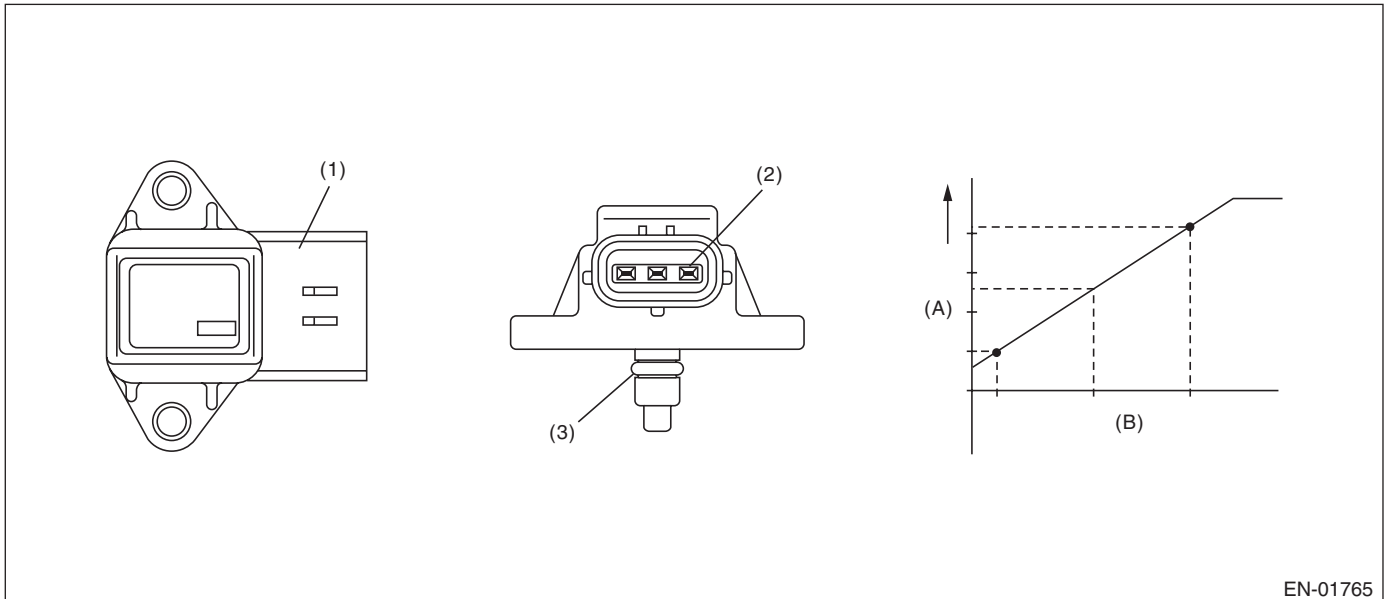
ISC feedback: Not allowed to calculate the amount of feedback.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Q: DTC P0108 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT HIGH INPUT**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of intake manifold pressure sensor.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

EN-01765

(1) Connector	(A) Output voltage
(2) Terminal	(B) Absolute pressure
(3) O-ring	

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the continuous time of completing the malfunction criteria below becomes 0.5 seconds or more. Judge as OK and clear the NG when the malfunction criteria below are not met.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.921 V

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

ISC feedback: Not allowed to calculate the amount of feedback.

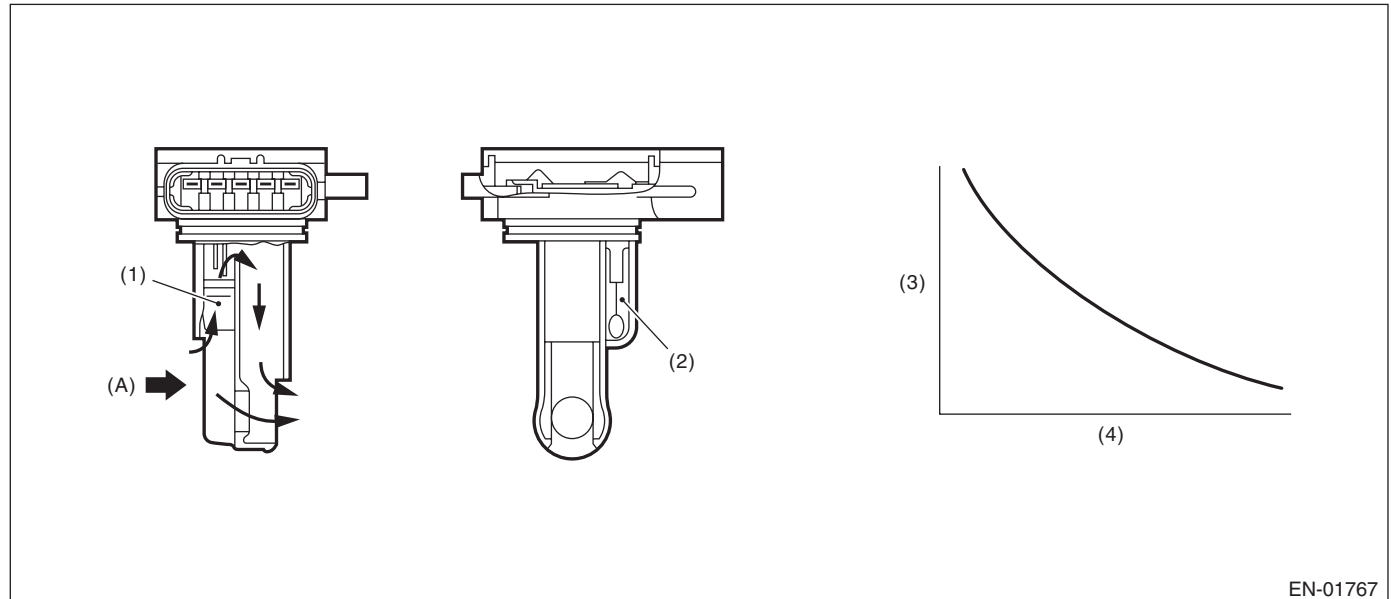
9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

R: DTC P0111 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE**1. OUTLINE OF DIAGNOSIS**

Detect the malfunction of intake air temperature sensor output property.

Judge as NG when the intake air temperature is not varied whereas it seemed to be varied from the viewpoint of engine condition.

2. COMPONENT DESCRIPTION

(1) Air flow sensor

(2) Intake air temperature sensor

(3) Resistance value (Ω)

(4) Intake air temperature °C (°F)

(A) Air

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Coolant temp. before engine start	< 30°C (86°F)
Engine coolant temperature	> 100°C (212°F)
Battery voltage	≥ 10.9 V
Continuous time when the vehicle speed is less than 60 km/h (37 MPH)	600 seconds or more

4. GENERAL DRIVING CYCLE

Perform the diagnosis when the vehicle speed condition is completed after idling from starting the cooled engine.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes 1 second or more.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage difference between Max. and Min.	< 20 mV (Equivalent to approximately 0.5°C (0.9°F) near 25°)

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage difference between Max. and Min.	≥ 20 mV

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

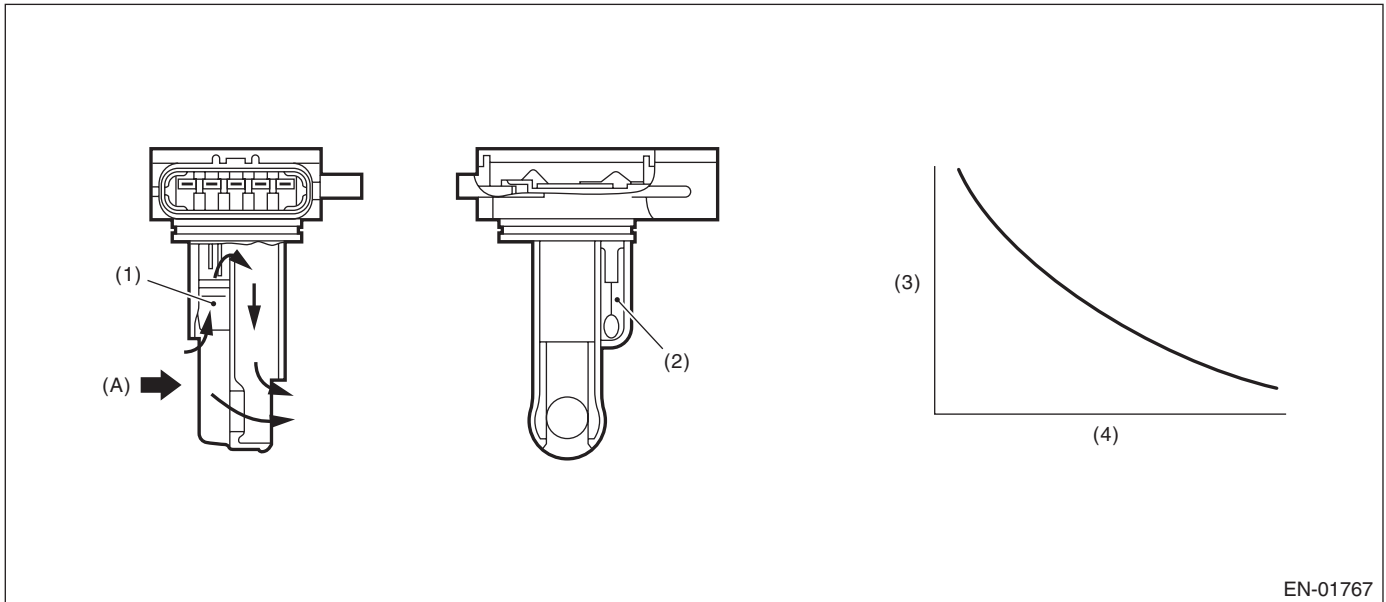
Intake air temperature sensor process: Intake air temperature is fixed at 20°C (68°F).

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

S: DTC P0112 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW**1. OUTLINE OF DIAGNOSIS**

Detect open or short circuit of the intake air temperature sensor.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

EN-01767

(1) Air flow sensor

(3) Resistance value (Ω)

(A) Air

(2) Intake air temperature sensor

(4) Intake air temperature $^{\circ}\text{C}$ ($^{\circ}\text{F}$)**3. ENABLE CONDITION**

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes 0.5 seconds or more.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.166 V
Ignition switch	ON

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 0.166 V
Ignition switch	ON

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

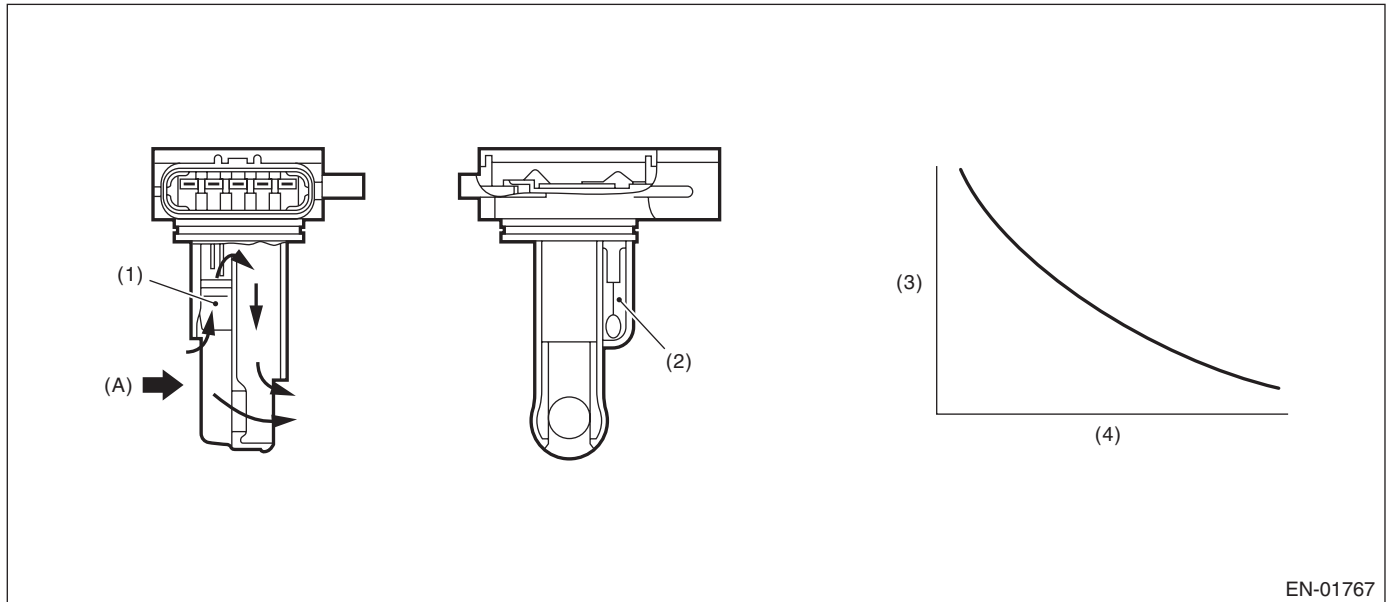
Intake air temperature sensor process: Intake air temperature is fixed at 20°C (68°F).

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

T: DTC P0113 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH**1. OUTLINE OF DIAGNOSIS**

Detect open or short circuit of the intake air temperature sensor.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

EN-01767

(1) Air flow sensor	(3) Resistance value (Ω)	(A) Air
(2) Intake air temperature sensor	(4) Intake air temperature $^{\circ}\text{C}$ ($^{\circ}\text{F}$)	

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes 0.5 seconds or more.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.716 V
Ignition switch	ON

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 4.716 V
Ignition switch	ON

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

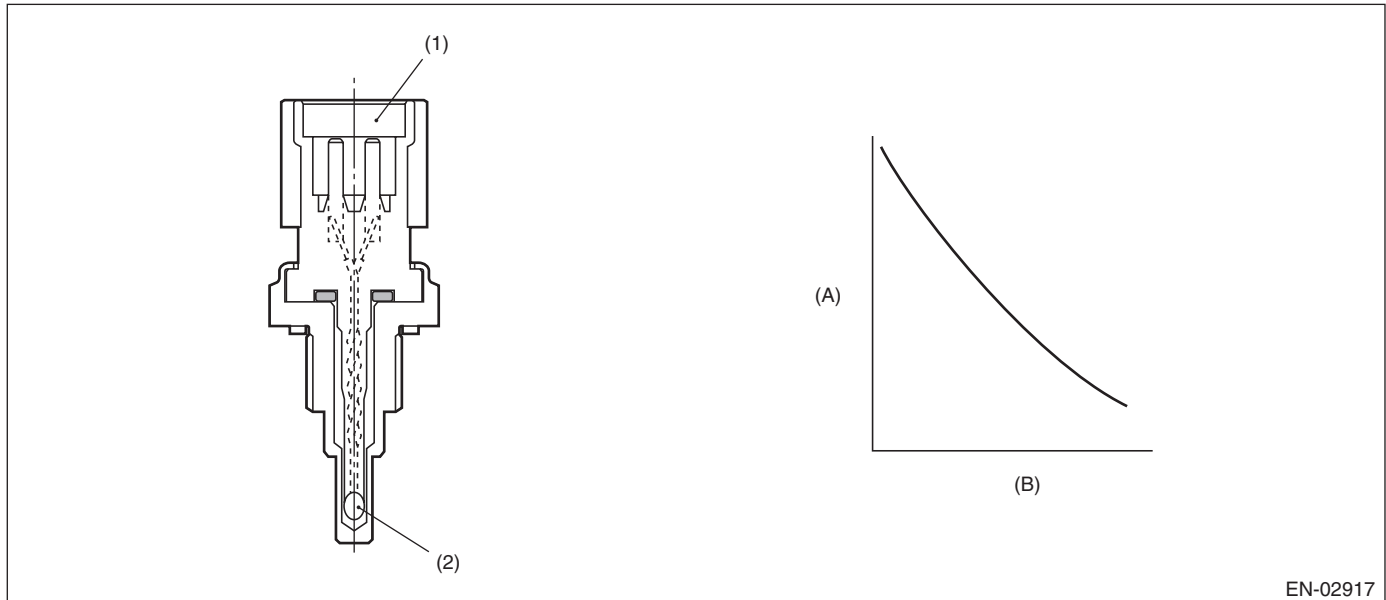
Intake air temperature sensor process: Intake air temperature is fixed at 20°C (68°F).

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

U: DTC P0117 ENGINE COOLANT TEMPERATURE CIRCUIT LOW**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of the engine coolant temperature sensor.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

EN-02917

- (1) Connector
(2) Thermistor element

- (A) Resistance value (kΩ)
(B) Temperature °C (°F)

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the continuous time of completing the malfunction criteria below becomes 0.5 seconds or more. Judge as OK and clear the NG when the malfunction criteria below are not met.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.166 V

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

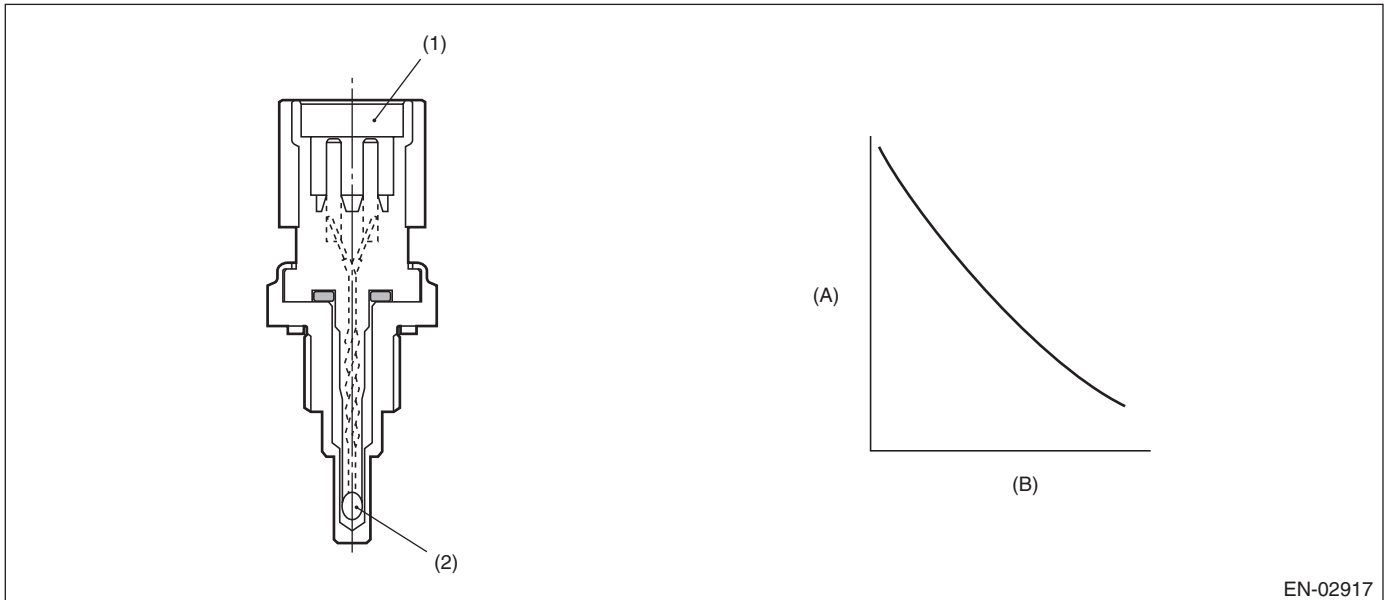
- Engine coolant temperature sensor process: Engine coolant temperature is fixed at 70°C (158°F)
- ISC Feedback: Calculate target engine speed as engine coolant temperature 70°C (158°F)
- ISC learning: Not allowed to learn.
- Air conditioner control: Not allowed to turn the air conditioner to ON.
- Radiator fan control: Both main and sub fan turn to ON.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

V: DTC P0118 ENGINE COOLANT TEMPERATURE CIRCUIT HIGH**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of the engine coolant temperature sensor.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

EN-02917

- (1) Connector
(2) Thermistor element

- (A) Resistance value (kΩ)
(B) Temperature °C (°F)

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the continuous time of completing the malfunction criteria below becomes 0.5 seconds or more. Judge as OK and clear the NG when the malfunction criteria below are not met.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.716 V

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

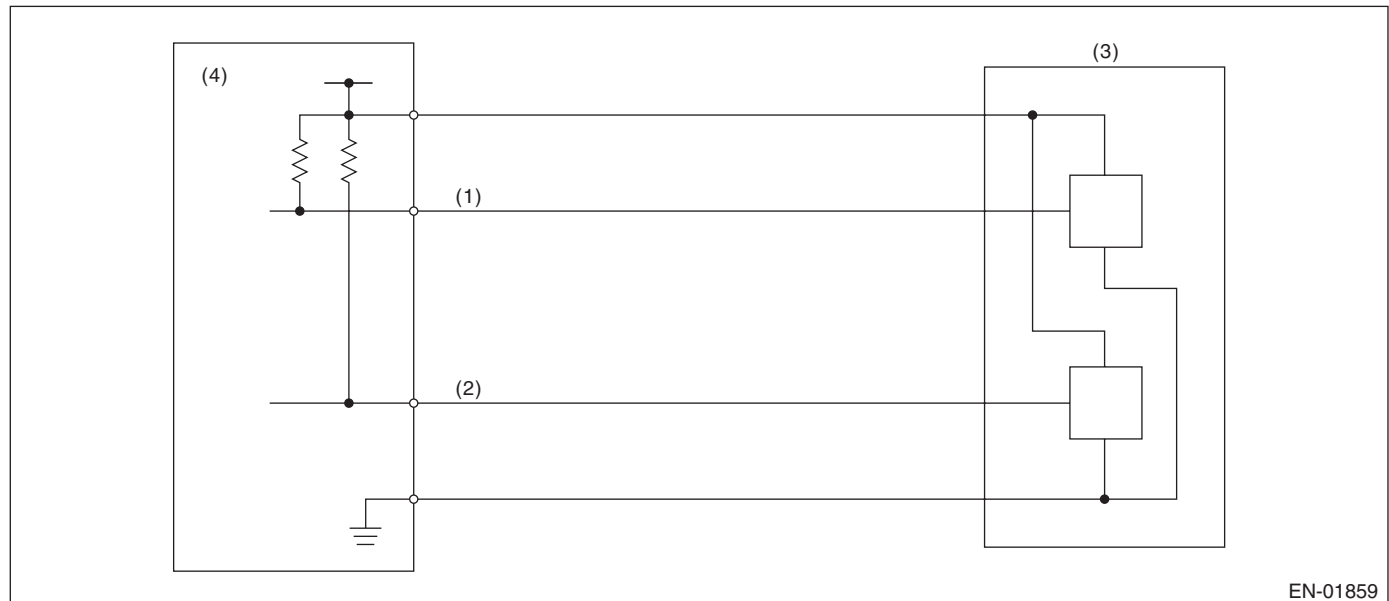
- Engine coolant temperature sensor process: Engine coolant temperature is fixed at 70°C (158°F)
- ISC Feedback: Calculate target engine speed as engine coolant temperature 70°C (158°F)
- ISC learning: Not allowed to learn.
- Air conditioner control: Not allowed to turn the air conditioner to ON.
- Radiator fan control: Both main and sub fan turn to ON.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

W: DTC P0122 THROTTLE/PEDAL POSITION SENSOR/SWITCH “A” CIRCUIT LOW**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of throttle position sensor 1.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

- (1) Throttle position sensor 1 signal (3) Throttle position sensor (4) Engine control module (ECM)
(2) Throttle position sensor 2 signal

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 1 input voltage	$\geq 0.224 \text{ V}$

Time Needed for Diagnosis: 24 milliseconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed (Only with engine stopped)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

8. FAIL SAFE

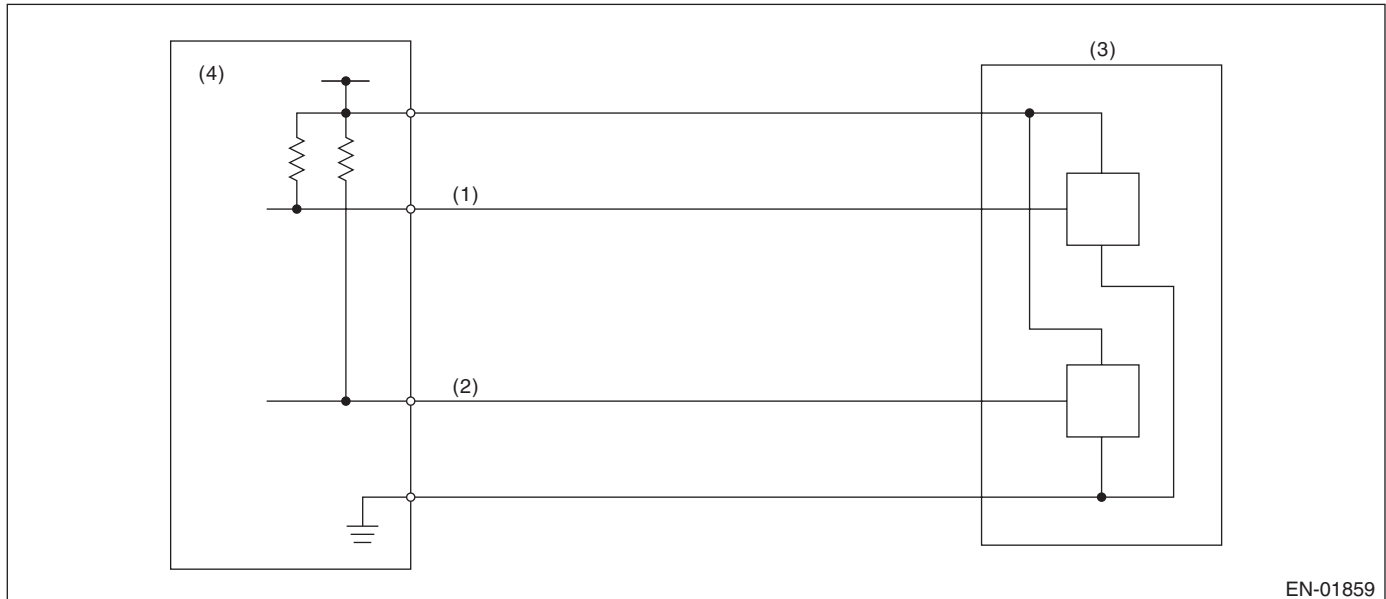
Stop the continuity to the electronic control throttle motor. (Throttle opening is fixed to 6°.)

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

X: DTC P0123 THROTTLE/PEDAL POSITION SENSOR/SWITCH “A” CIRCUIT HIGH**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of throttle position sensor 1.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

EN-01859

- (1) Throttle position sensor 1 signal (3) Throttle position sensor (4) Engine control module (ECM)
(2) Throttle position sensor 2 signal

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 1 input voltage	≤ 4.851 V

Time Needed for Diagnosis: 24 milliseconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed (Only with engine stopped)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

8. FAIL SAFE

Stop the continuity to the electronic control throttle motor. (Throttle opening is fixed to 6°.)

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

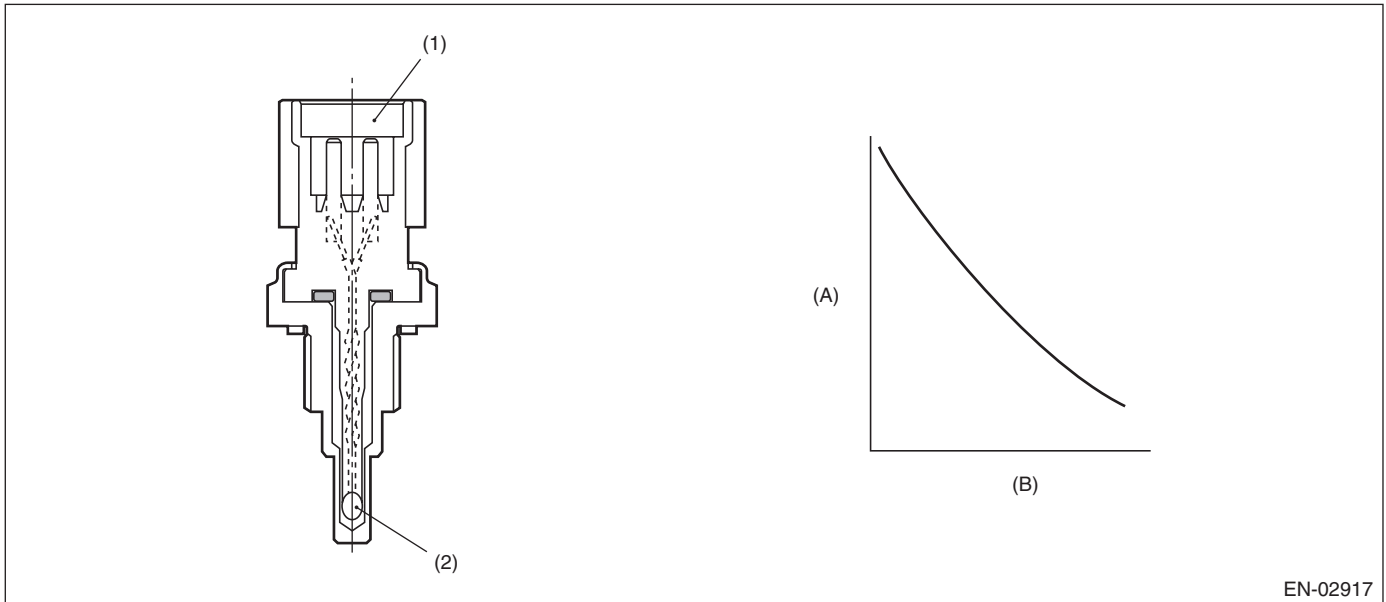
Y: DTC P0125 INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of engine coolant temperature output property.

Judge as NG when the engine coolant temperature does not rise in driving conditions where it should.

2. COMPONENT DESCRIPTION



EN-02917

- (1) Connector
- (2) Thermistor element

- (A) Resistance value (k Ω)
- (B) Temperature °C (°F)

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Engine speed	≥ 500 rpm
Battery voltage	> 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once after engine starting.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Engine coolant temperature	< 20°C (68°F)
Timer for diagnosis after engine starting	≥ Judgment value of timer after engine starting

Timer for diagnosis after engine starting

- Timer stop at fuel cut mode.
- During the driving conditions except a) above, timer count up by 64 milliseconds + TWCNT milliseconds at every 64 milliseconds.

TWCNT is defined as follows,

TWCNT = 0 at idle switch ON,

TWCNT show on the following table at idle switch OFF.

		Vehicle speed km/h (MPH)							
		0 (0)	8 (4.97)	16 (9.94)	24 (14.9)	32 (19.9)	40 (24.9)	48 (29.8)	56 (34.8)
Temperature °C (°F)	-20 (-4)	0 ms	32.076 ms	39.977 ms	47.879 ms	82.544 ms	117.209 ms	154.214 ms	185.260 ms
	-10 (14)	0 ms	25.704 ms	33.606 ms	41.508 ms	68.520 ms	95.532 ms	125.667 ms	155.802 ms
	0 (32)	0 ms	17.646 ms	25.548 ms	33.450 ms	53.652 ms	73.855 ms	97.120 ms	120.386 ms
	10 (50)	0 ms	7.901 ms	15.802 ms	23.704 ms	37.941 ms	52.177 ms	68.573 ms	82.538 ms

Judgment value of timer after engine starting

$t = 574 - 33 \times T_i$ (seconds)

T_i is the lowest coolant temperature after starting the engine.

Time Needed for Diagnosis: To be determined. (It is varied by the Min. engine coolant temperature and engine conditions such as vehicle speed and engine coolant temperature.)

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Engine coolant temperature	≥ 20°C (68°F)

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

- Engine coolant temperature sensor process: Engine coolant temperature is fixed at 70°C (158°F)
- ISC Feedback: Calculate target engine speed as engine coolant temperature 70°C (158°F)
- ISC learning: Not allowed to learn.
- Air conditioner control: Not allowed to turn the air conditioner to ON.
- Radiator fan control: Both main and sub fan turn to ON.

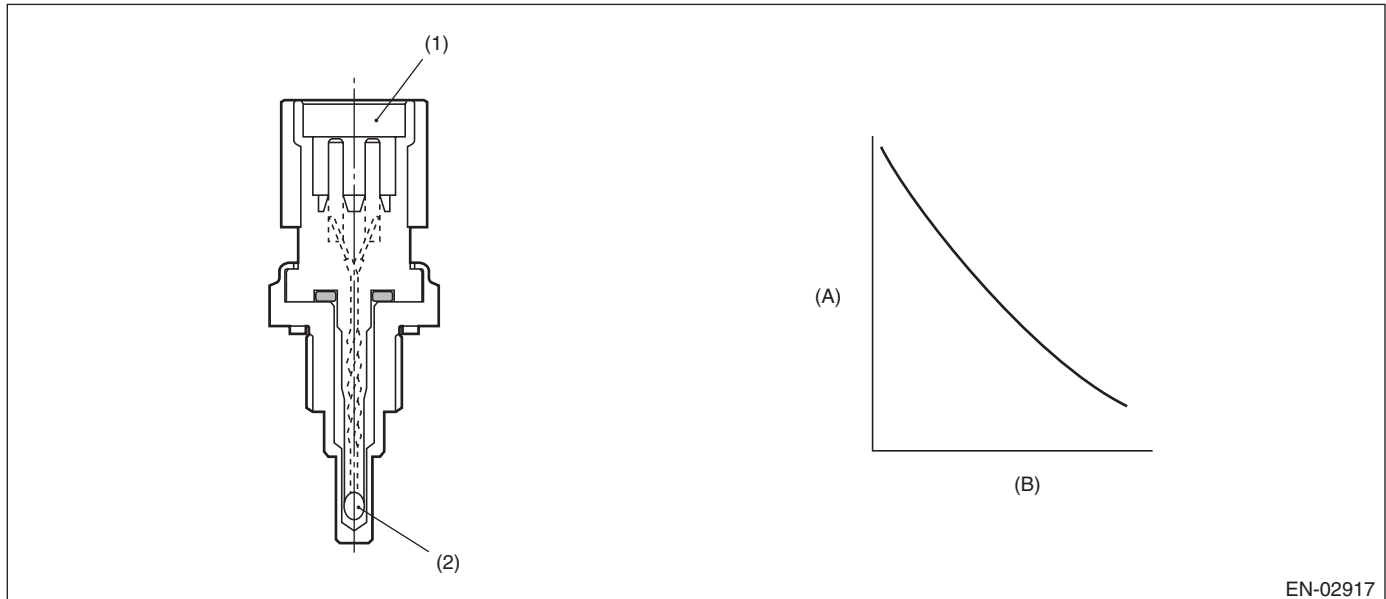
9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Z: DTC P0126 INSUFFICIENT ENGINE COOLANT TEMPERATURE FOR STABLE OPERATION**1. OUTLINE OF DIAGNOSIS**

Detect the malfunction of engine coolant temperature sensor characteristics.

Memorize the engine coolant temperature and fuel temperature at the last engine stop, and use them to judge as NG when the engine coolant temperature does not decrease when it should.

2. COMPONENT DESCRIPTION

EN-02917

- (1) Connector
(2) Thermistor element

- (A) Resistance value (kΩ)
(B) Temperature °C (°F)

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Refueling from the last engine stop till the current engine start	None
Fuel level	$\geq 15 \text{ } \varnothing$
Engine coolant temperature at the last engine stop	$\geq 75^{\circ}\text{C}$ (167°F) and $< 100^{\circ}\text{C}$ (212°F)

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once after starting the engine.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG if the continuous time with the following conditions established is more than 2.5 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
Engine coolant temperature at the last engine stop – Minimum engine coolant temperature after the engine start	< 2.5°C (4.5°F)
Fuel temperature at the last engine stop – fuel temperature	> 5°C (9°F)
Intake air temperature – fuel temperature	< 2.5°C (4.5°F)
Fuel temperature	< 35°C (54°F)

Normality Judgment

When the following conditions are established, judged as OK.

Judgment Value

Malfunction Criteria	Threshold Value
Engine coolant temperature at the last engine stop – Minimum engine coolant temperature after the engine start	≥ 2.5°C (4.5°F)

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When “Clear Memory” is performed

8. FAIL SAFE

None

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

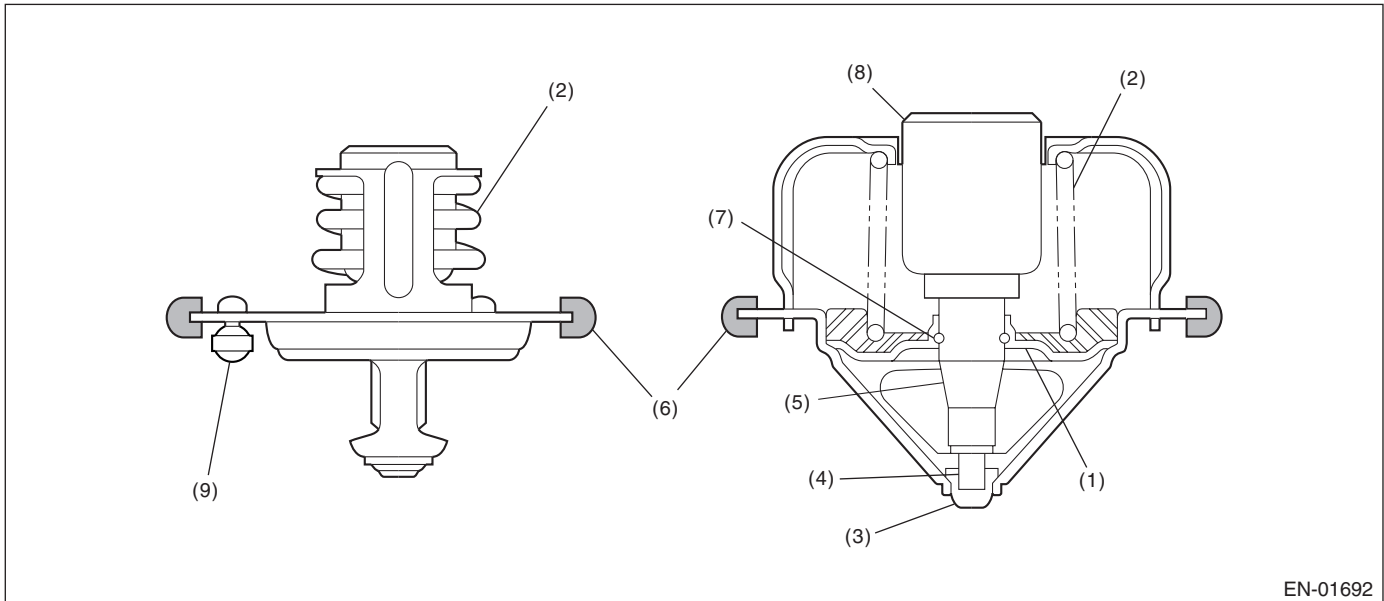
AA:DTC P0128 COOLANT THERMOSTAT (ENGINE COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE)

1. OUTLINE OF DIAGNOSIS

Detect malfunctions of the thermostat function.

Judge as NG when the engine coolant temperature is lower than the estimated engine coolant temperature and the difference between them is large. Judge as OK when the engine coolant temperature becomes to 70°C (158°F), and the difference is small, before judging NG.

2. COMPONENT DESCRIPTION



EN-01692

(1) Valve	(4) Piston	(7) Stop ring
(2) Spring	(5) Guide	(8) Wax element
(3) Stopper	(6) Rubber packing	(9) Jiggle valve

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes 30 seconds or more.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Engine coolant temperature at engine starting	$< 55^{\circ}\text{C}$ (131°F)
Engine coolant temperature	$< 75^{\circ}\text{C}$ (167°F)
(Estimated – measured) Engine coolant temperature	$> 30^{\circ}\text{C}$ (54°F)
Vehicle speed	≥ 30 km/h (18.6 MPH)
Estimated coolant temperature	$\geq 75^{\circ}\text{C}$ (167°F)
Estimate ambient temperature	$\geq -7^{\circ}\text{C}$ (19°F)

Time Needed for Diagnosis: Not fixed

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Engine coolant temperature at engine starting	$< 55^{\circ}\text{C}$ (131°F)
Engine coolant temperature	$\geq 75^{\circ}\text{C}$ (167°F)
(Estimated – measured) Engine coolant temperature	$\leq 30^{\circ}\text{C}$ (54°F)

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When “Clear Memory” is performed

8. FAIL SAFE

None

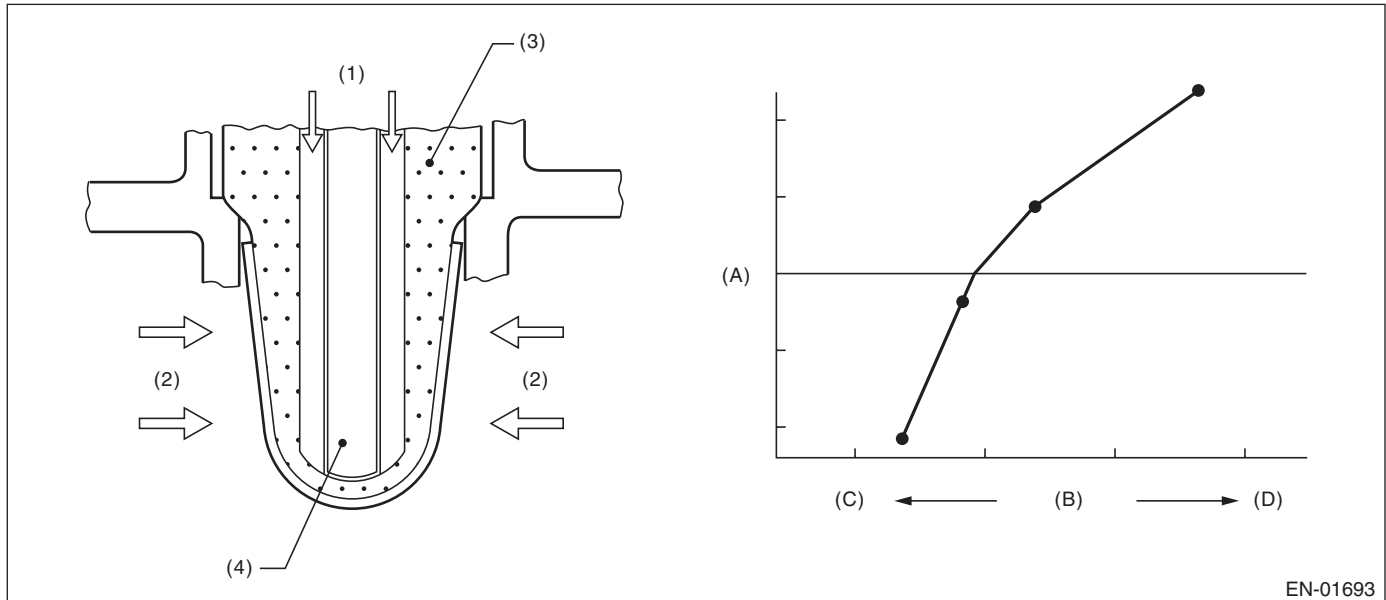
9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

AB:DTC P0131 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 1)**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of sensor.

Judge as NG when the element impressed voltage is out of range, or the element current is out of range.

2. COMPONENT DESCRIPTION

EN-01693

(1) Atmosphere	(A) Electromotive force
(2) Exhaust gas	(B) Air fuel ratio
(3) ZrO ₂	(C) Lean
(4) Ceramic heater	(D) Rich

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the continuous time of completing any malfunction criteria below is more than 1 second.

Judgment Value

Malfunction Criteria	Threshold Value
Input voltage	$< 1.8 \text{ V}$
Input current	$< -0.005 \text{ A}$

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

- Front oxygen (A/F) sensor heater control: Not allowed to turn on the heater.
- A/F main learning: Not allowed to calculate the A/F main learning compensation factor.
- A/F sub learning: Not allowed to calculate the A/F sub learning compensation factor.
- Purge control: Not allowed to purge.

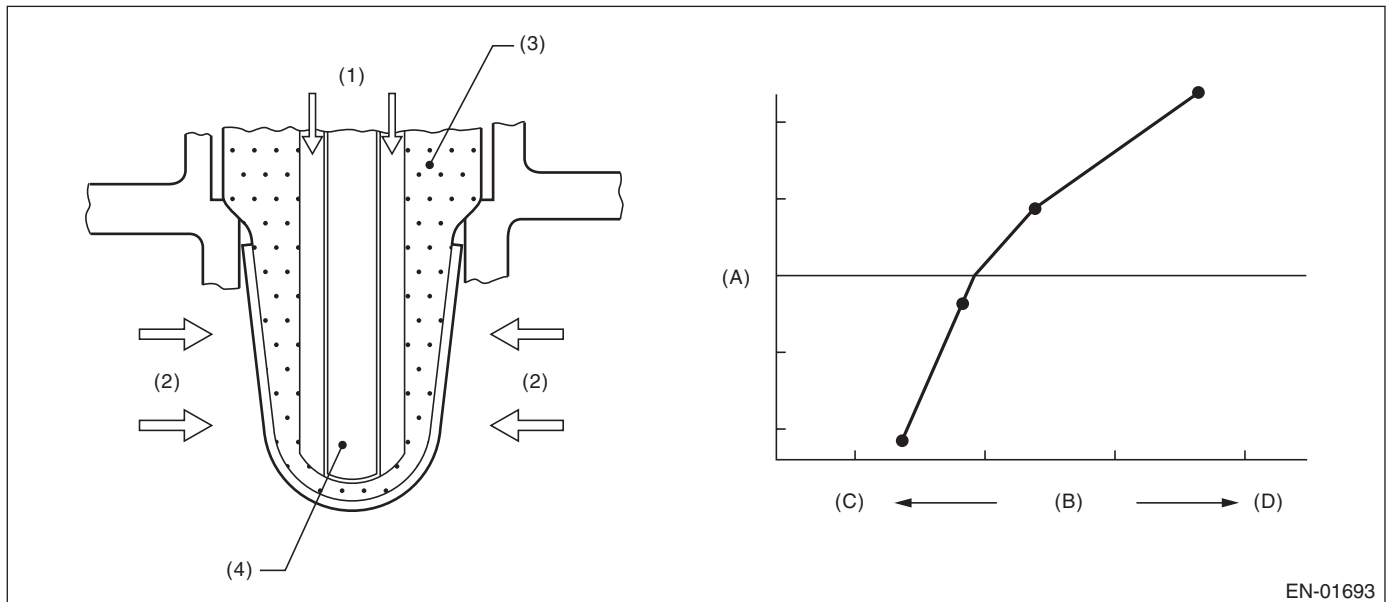
9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

AC:DTC P0132 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 1)**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of sensor.

Judge as NG when the element impressed voltage is out of range, or the element current is out of range.

2. COMPONENT DESCRIPTION

- (1) Atmosphere
- (2) Exhaust gas
- (3) ZrO₂
- (4) Ceramic heater

- (A) Electromotive force
- (B) Air fuel ratio
- (C) Lean
- (D) Rich

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the continuous time of completing any malfunction criteria below is more than 1 second.

Judgment Value

Malfunction Criteria	Threshold Value
Input voltage	$\geq 3.8 \text{ V}$
Input current	$\geq 0.005 \text{ A}$

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

- Front oxygen (A/F) sensor heater control: Not allowed to turn on the heater.
- A/F main learning: Not allowed to calculate the A/F main learning compensation factor.
- A/F sub learning: Not allowed to calculate the A/F sub learning compensation factor.
- Purge control: Not allowed to purge.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

AD:DTC P0133 O2 SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 1)

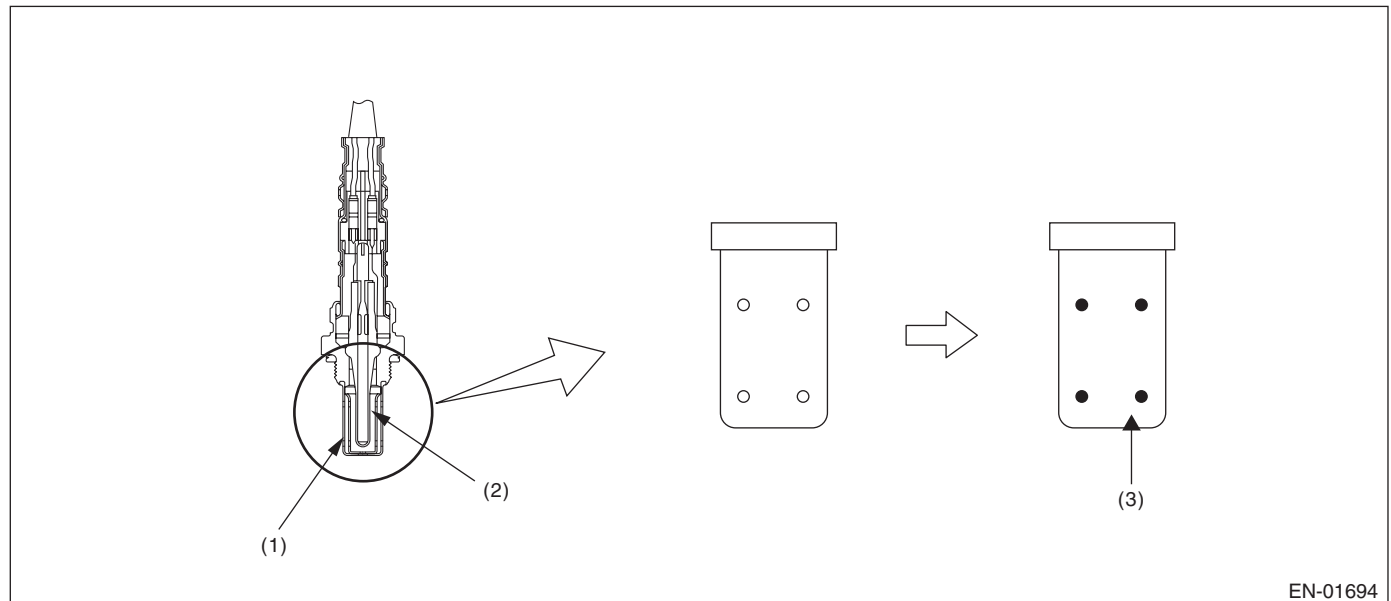
1. OUTLINE OF DIAGNOSIS

Detect the slow response of front oxygen (A/F) sensor.

Front oxygen (A/F) sensor cover has some ventilation holes for exhaust gas. Clogged ventilation holes are diagnosed.

When the holes are clogged, the A/F output variation becomes slow comparing with the actual A/F variation because oxygen which reaches the zirconia layer is insufficient. Therefore, if the sensor cover holes are clogged, the rich to lean judgment in the ECM is delayed when the change from rich to lean occurs.

Judge as NG when the actual movement in comparison to the ECM control amount is slow.



(1) Cover

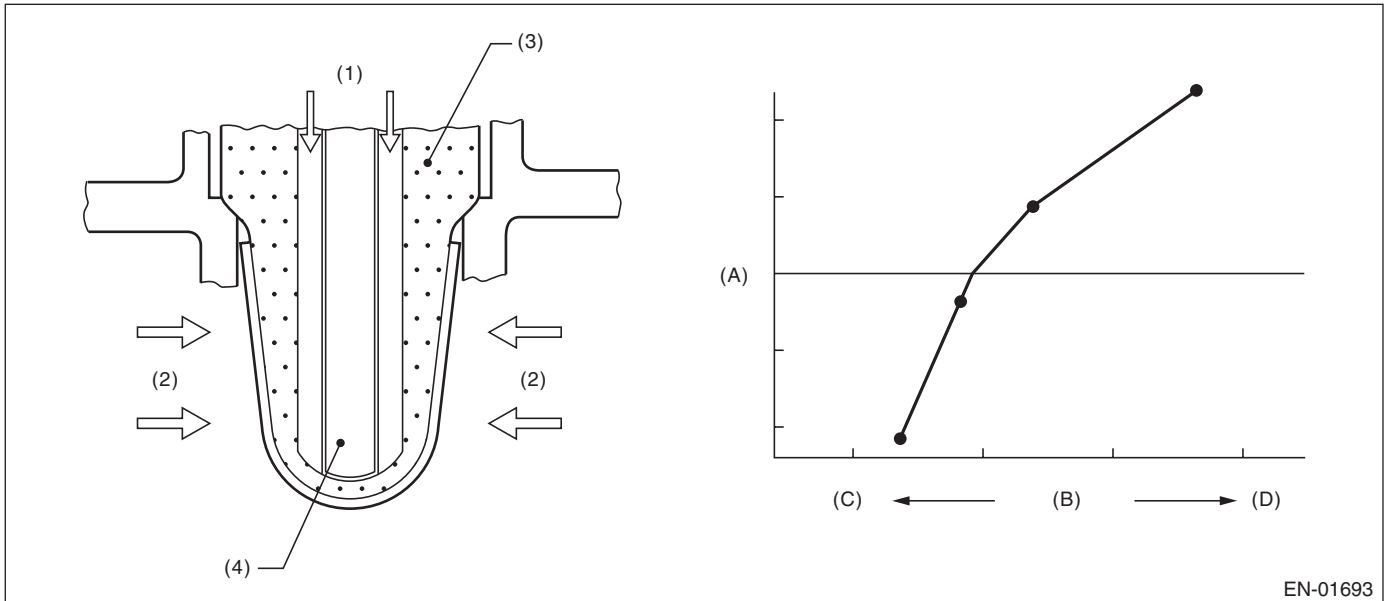
(2) Zirconia

(3) Clogging

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

2. COMPONENT DESCRIPTION



(1) Atmosphere	(A) Electromotive force
(2) Exhaust gas	(B) Air fuel ratio
(3) ZrO ₂	(C) Lean
(4) Ceramic heater	(D) Rich

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
All secondary parameters enable conditions	1 second or more
Battery voltage	> 10.9 V
Atmospheric pressure	> 75.1 kPa (563 mmHg, 22.2 inHg)
Closed loop control with main feedback	Operating
Front oxygen (A/F) sensor impedance	0 — 50 Ω
After engine starting	120 seconds or more
Engine coolant temperature	≥ 75°C (167°F)
Engine speed	1000 — 3200 rpm
Vehicle speed	10 — 120 km/h (6.21 — 74.6 MPH)
Amount of intake air	10 — 40 g (0.35 — 1.41 oz)/s
Engine load change during 0.5 engine revs.	≤ 0.02 g (0.001 oz)/rev
Learning value of EVAP conc. during purge	≤ 0.2
Total time of operating canister purge	20 seconds or more

4. GENERAL DRIVING CYCLE

Perform diagnosis only once at a constant speed of 10 to 120 km/h (6.21 to 74.6 MPH) after 120 seconds or more have passed after the engine starting.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Calculate faf difference every 128 milliseconds, and the λ value difference. Calculate the diagnostic value after calculating for 210 seconds.

Judge as NG when the malfunction criteria below are completed. Judge as OK and clear the NG when the malfunction criteria below are not met.

Judgment Value

Malfunction Criteria	Threshold Value
$\text{para} \text{fca} = \text{td}2\text{faf} / \text{td}2\text{lmd}$ where, $\text{td}2\text{faf} (N) = \text{td}2\text{faf} (n-1) + \text{d}2\text{faf} (n) $ $\text{td}2\text{lmd} (N) = \text{td}2\text{lmd} (n-1) + \text{d}2\text{lmd} (n) $ add up to a total of 210 seconds $\text{d}2\text{faf} (n) = (\text{faf} (n) - \text{faf} (n-1)) - (\text{faf} (n-1) - \text{faf} (n-2))$ $\text{d}2\text{lmd} (n) = (\text{lmd} (n) - \text{lmd} (n-1)) - (\text{lmd} (n-1) - \text{lmd} (n-2))$ faf = main feedback compensation coefficient every 128 milliseconds lmd = output lambda every 128 milliseconds	≥ 0.3

Time Needed for Diagnosis: 210 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

- Front oxygen sensor (A/F) sensor main learning compensation: Not allowed to calculate.
- A/F sensor sub learning compensation: Not allowed to calculate.
- Purge control: Not allowed to purge.

9. ECM OPERATION AT DTC SETTING

- Memorize the freeze frame data. (For test mode \$02)
- Memorize the diagnostic value and trouble standard value. (For test mode \$06)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

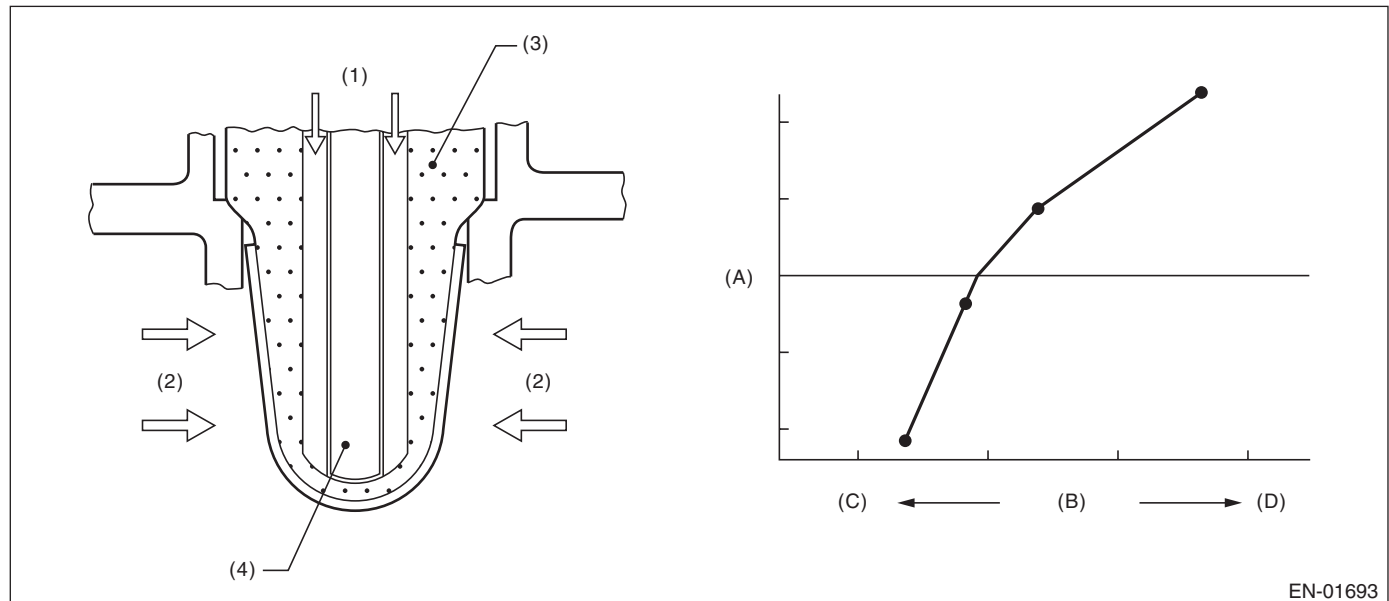
AE:DTC P0134 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK 1 SENSOR 1)

1. OUTLINE OF DIAGNOSIS

Detect open circuits of the sensor.

Judge as NG when the impedance of the element is large.

2. COMPONENT DESCRIPTION



(1) Atmosphere	(A) Electromotive force
(2) Exhaust gas	(B) Air fuel ratio
(3) ZrO ₂	(C) Lean
(4) Ceramic heater	(D) Rich

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than 5 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 10.9 \text{ V}$
Time of heater duty $\geq 70\%$	$\geq 36 \text{ sec.}$
Front oxygen (A/F) sensor impedance.	$\geq 500 \Omega$

Time Needed for Diagnosis: 5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

- Front oxygen (A/F) sensor heater control: Not allowed to turn on the heater.
- A/F main learning: Not allowed to calculate the A/F main learning compensation factor.
- A/F sub learning: Not allowed to calculate the A/F sub learning compensation factor.
- Purge control: Not allowed to purge.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

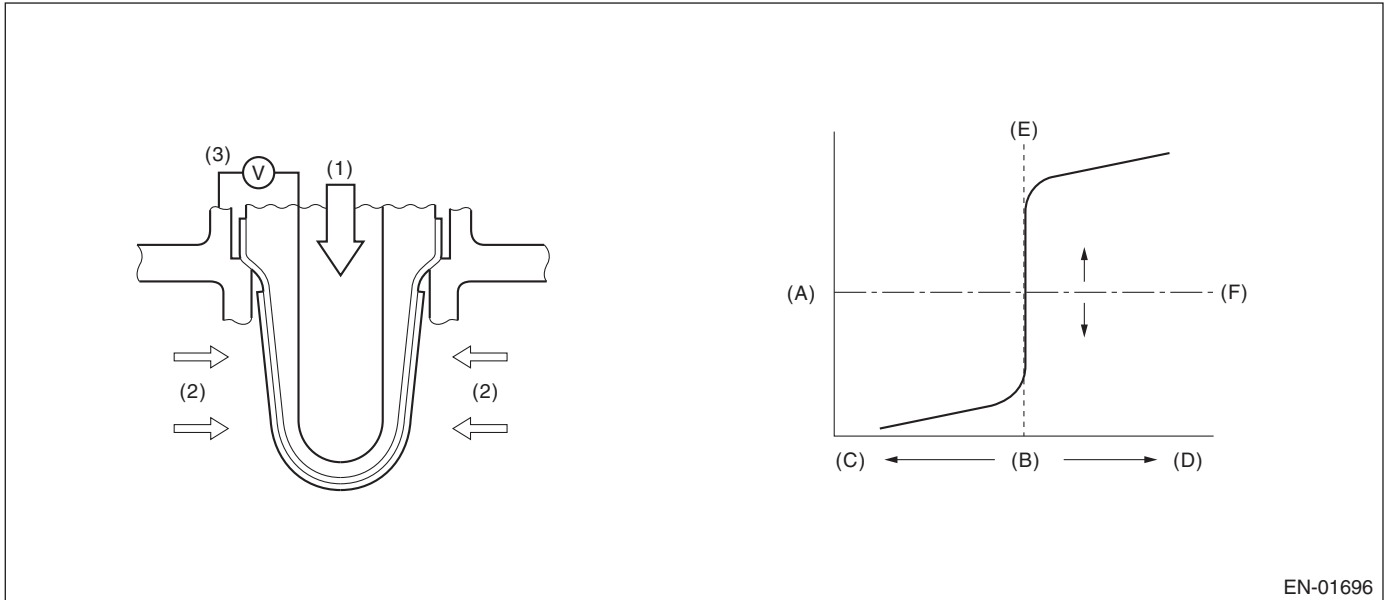
GENERAL DESCRIPTION

AF:DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 2)

1. OUTLINE OF DIAGNOSIS

Detect the continuity NG of oxygen sensor. If the oxygen sensor voltage reading is not within the probable range considering the operating conditions, judge as NG.

2. COMPONENT DESCRIPTION



EN-01696

(A) Electromotive force

(B) Air fuel ratio

(1) Atmosphere

(C) Rich

(D) Lean

(2) Exhaust gas

(E) Theoretical air fuel ratio

(F) Comparative voltage

(3) Electromotive force

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

3. ENABLE CONDITION

(Used only for malfunction judgment)

Secondary Parameters	Enable Conditions
[High side judgment] Closed loop control at the oxygen sensor Misfire detection every 200 rotations Front oxygen (A/F) sensor compensation coefficient Battery voltage	In operation < 5 times Not in limit value > 10.9 V
[Low side 1 judgment] Closed loop control at the oxygen sensor Misfire detection every 200 rotations Front oxygen (A/F) sensor compensation coefficient Battery voltage Amount of intake air	In operation < 5 times Not in limit value > 10.9 V ≥ 10 g/second
[Low side 2 judgment] Closed loop control at the oxygen sensor Misfire detection every 200 rotations Front oxygen (A/F) sensor compensation coefficient Battery voltage Amount of intake air Current continuation time of the rear oxygen sensor heater	In operation < 5 times Not in limit value > 10.9 V < 10 g/second 30 seconds or more
[Low side 3 judgment] Closed loop control at the oxygen sensor Misfire detection every 200 rotations Front oxygen (A/F) sensor compensation coefficient Battery voltage Amount of intake air Current continuation time of the rear oxygen sensor heater Fuel cut	In operation < 5 times Not in limit value > 10.9 V < 10 g/second 30 seconds or more Experienced

(Used only for normality judgment)

Secondary Parameters	Enable Conditions
Closed loop control at the oxygen sensor Misfire detection every 200 rotations Front oxygen (A/F) sensor compensation coefficient Battery voltage	In operation < 5 times Not in limit value > 10.9 V

4. GENERAL DRIVING CYCLE

After starting the engine, perform the diagnosis in series while the engine is in a constant operating condition.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG if the continuous time during which the following conditions are established exceeds the pre-determined time, and judge as OK if it doesn't.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
High side Maximum output voltage without continuity	$\geq 1200 \text{ mV}$	P0138
Low side Minimum output voltage without continuity	$< 30 \text{ mV}$	P0137

Time Needed for Diagnosis

High side: 2.5 seconds

Low side 1: 20 seconds

Low side 2: 40 seconds

Low side 3: Value from Map

Map

Fuel Cut Time (Seconds)	Time Needed for Diagnosis (Seconds)
0	40
2	40
10	60

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

Sub feedback control: Not allowed.

9. ECM OPERATION AT DTC SETTING

- Memorize the freeze frame data. (For test mode \$02)
- Memorize the diagnostic value and trouble standard value. (For test mode \$06)

AG:DTC P0138 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 2)

NOTE:

For the diagnostic procedure, refer to DTC P0137. <Ref. to GD(H4SO U5)-66, DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

AH:DTC P0139 O2 SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 2)

1. OUTLINE OF DIAGNOSIS

Detect the slow response of the oxygen sensor.

Judge as NG if either the rich to lean response diagnosis or lean to rich response diagnosis is NG, and Judge as OK if both are OK.

[Rich → lean diagnosis response]

1. Measure the response time for oxygen sensor output changes when the A/F ratio changes to rich to lean. If the measured response time is larger than the threshold value, it is NG. If it is smaller, it is OK.

2. Judge as NG when the oxygen sensor voltage is large (rich) when recovering from a deceleration fuel cut.

[Lean → rich diagnosis response]

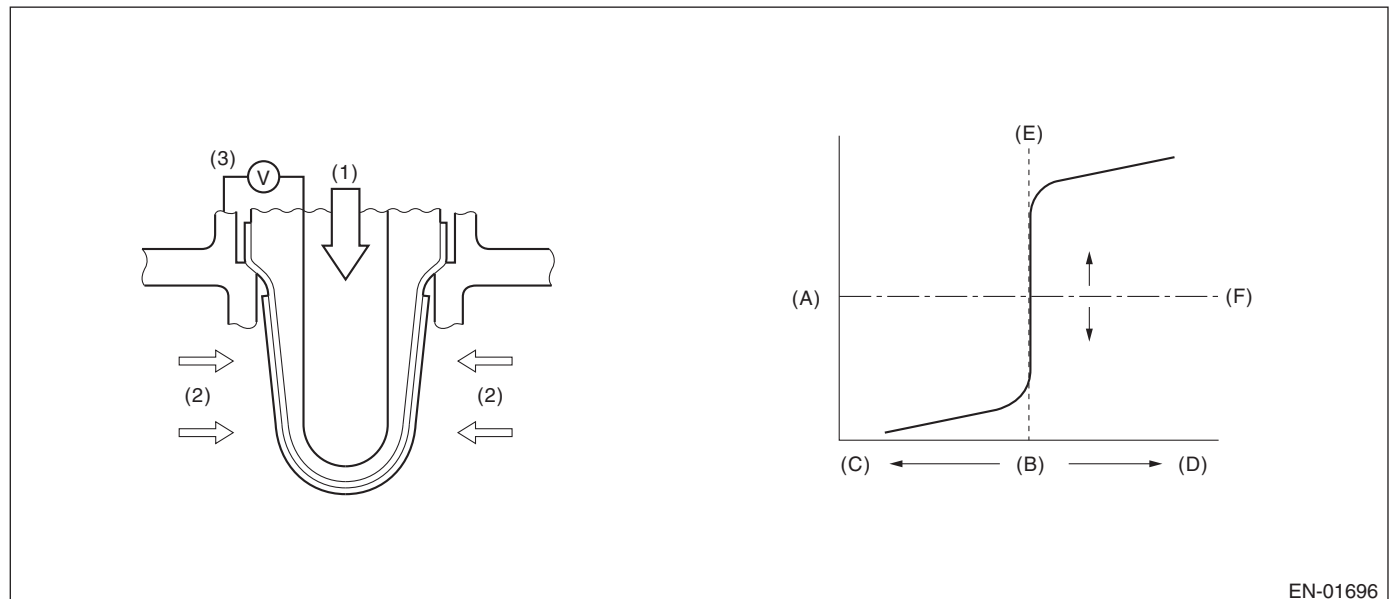
1. Measure the response time for oxygen sensor output changes when the A/F ratio changes to lean to rich. If the measured response time is larger than the threshold value, it is NG.

2. Judge as NG when the oxygen sensor voltage remains small when recovering from a deceleration fuel cut.

Diagnostic method

Measure the response time of the output change of the oxygen sensor when the A/F ratio changes to rich to lean. And Judge as NG when the measured response time is larger than the threshold value.

2. COMPONENT DESCRIPTION



EN-01696

- (1) Atmosphere
- (2) Exhaust gas
- (3) Electromotive force

- (A) Electromotive force
- (B) Air fuel ratio
- (C) Rich

- (D) Lean
- (E) Theoretical air fuel ratio
- (F) Comparative voltage

3. ENABLE CONDITION

Rich → lean diagnosis response

Secondary Parameters	Enable Conditions
Battery voltage	> 10.9 V
A/F sub feedback control condition	Completed
Deceleration fuel cut time is 6 seconds or more.	Experienced
After fuel cut	≥ 2 sec.
Rear oxygen heater current calculation time	≥ 60 sec.
Rear oxygen heater current continuous time	≥ 30 sec.
Catalyst warm-up counter	≥ 9000

Diagnostic Trouble Code (DTC) Detecting Criteria

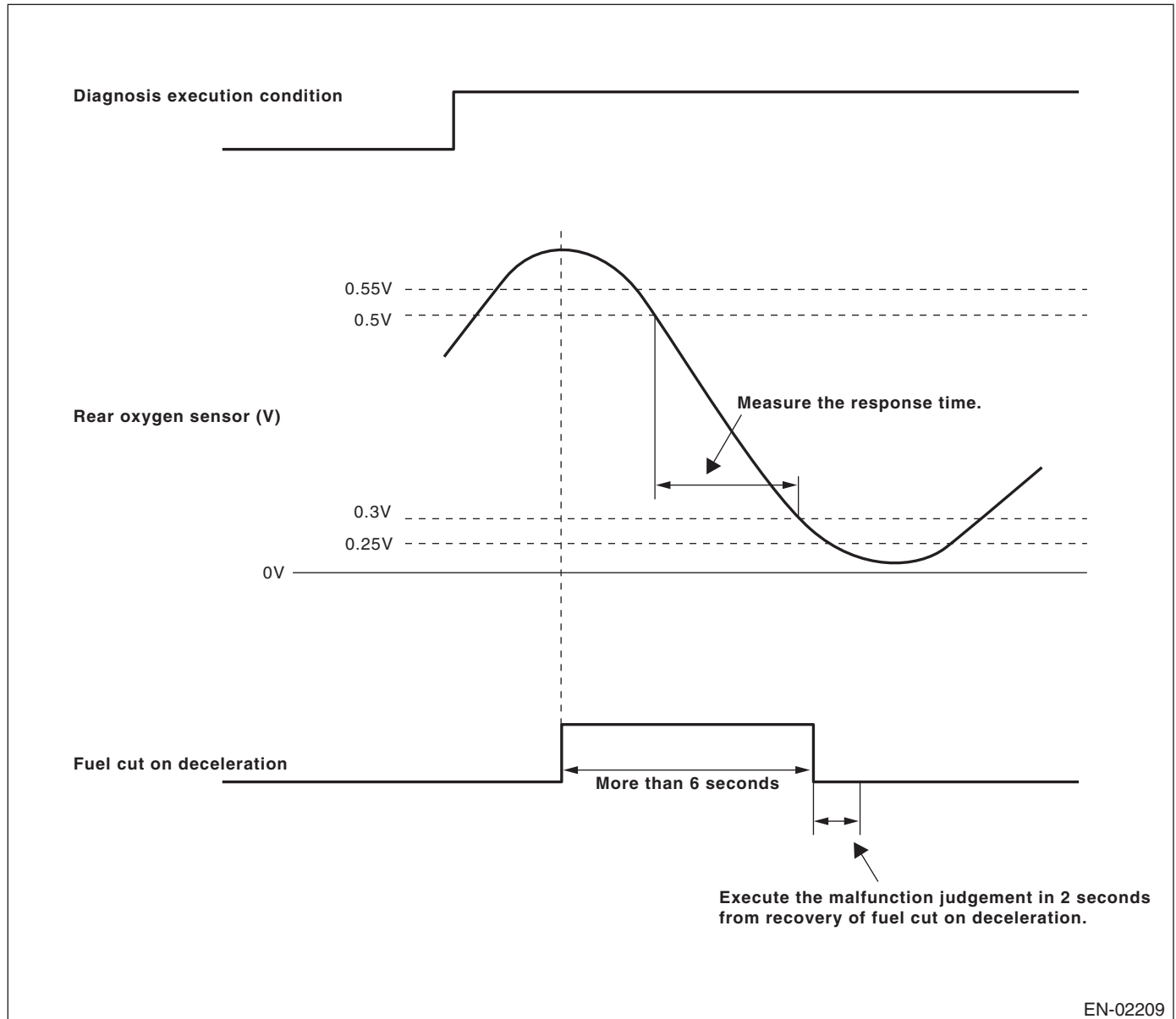
GENERAL DESCRIPTION

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once when deceleration fuel cut occurs after rapid acceleration. (Pay attention to the oxygen sensor voltage for the timing of the deceleration.)

5. DIAGNOSTIC METHOD

When the oxygen sensor output voltage changes from 0.55 V (rich) to 0.25 V (lean), calculate the minimum response time for output change between 0.5V and 0.3V for the judgment criteria.



Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Abnormality Judgment

1. Judge as NG when the judgment value is larger than the threshold value after deceleration fuel cut.
Response time (diagnosis value) > threshold value → abnormal

NOTE:

Variation time of rear oxygen sensor output voltage is short during fuel shut-off in deceleration. Carry out the NG judgment only after the fuel shut-off in deceleration. Even without deceleration fuel cut, judge as OK if the value is below the threshold.

When the deceleration fuel cut off time is more than 6 seconds, judge as NG if the following criteria are met 2 seconds after recovering from the deceleration fuel cut.

2. Judge as NG when the oxygen sensor voltage at recovery from a deceleration fuel cut, is large.

If the fuel cut time in a deceleration fuel cut is long (more than 6 s), and even after recovering from a deceleration fuel cut, the oxygen sensor voltage is high (0.55 V or more), judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Shortest time change from rich (500 mV O ₂ output) to lean (300 mV) if voltage reduces from 550 mV to 250 mV.	> 327 milliseconds
Time at over 550 mV	> 2 sec.

Time Needed for Diagnosis: 1 time

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

1. Regardless of a deceleration fuel cut, if the response time (diagnosis value) when the oxygen sensor voltage has changed from rich to lean is shorter than the threshold value (judgment value), judge as a normal condition.

Response time (diagnosis value) ≤ threshold value → normal

2. Do not judge as a normal condition.

Judge as OK when the criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Shortest time change from rich (500 mV O ₂ output) to lean (300 mV) if voltage reduces from 550 mV to 250 mV.	≤ 327 milliseconds

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

Sub feedback control: Not allowed.

9. ECM OPERATION AT DTC SETTING

- Memorize the freeze frame data. (For test mode \$02)
- Memorize the diagnostic value and trouble standard value. (For test mode \$06)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

10.ENABLE CONDITION

Lean → rich response diagnosis

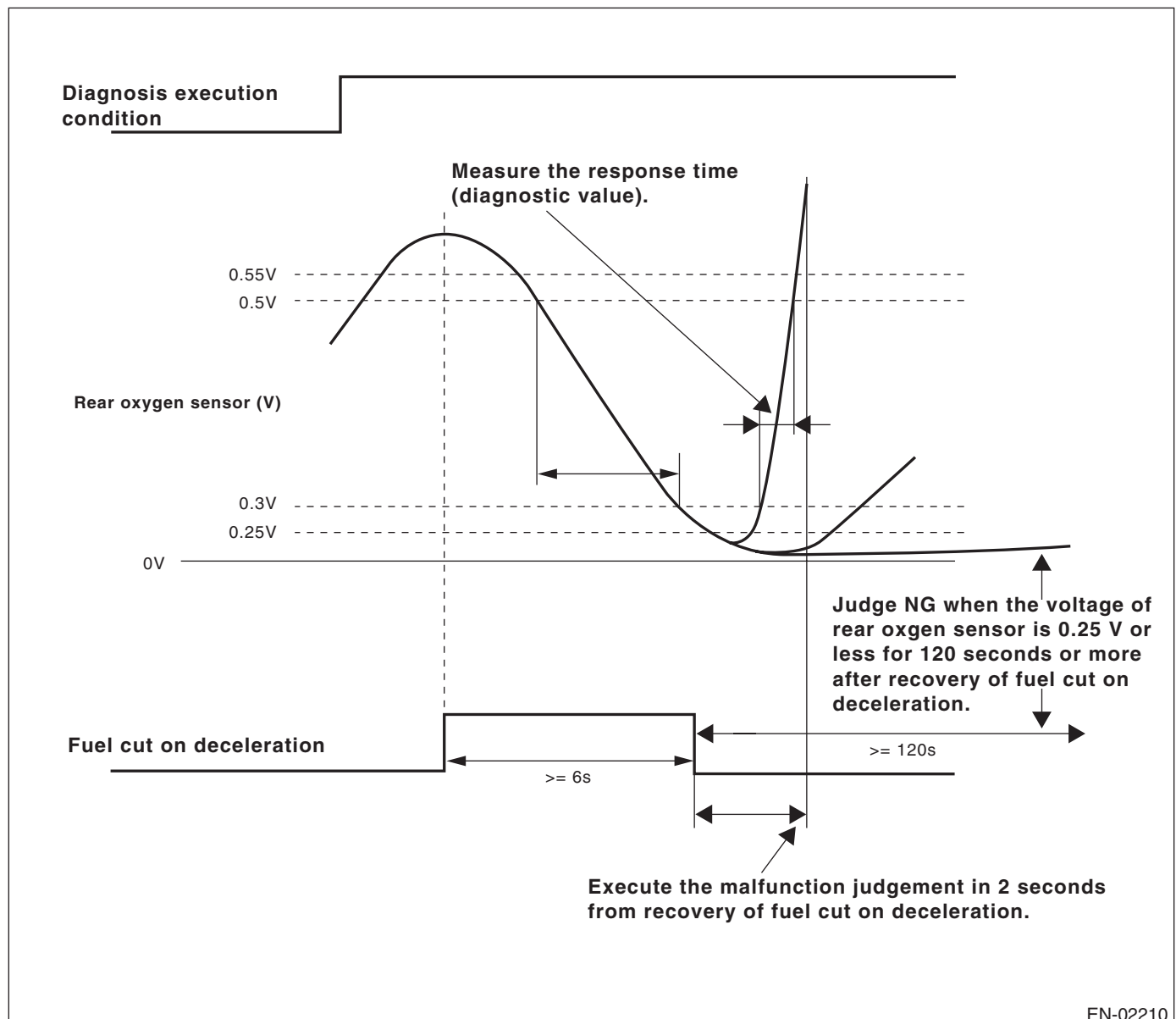
Secondary Parameters	Enable Conditions
Battery voltage	> 10.9 V
A/F main feedback control condition	Completed
Deceleration fuel cut ≥ 6 seconds	Experienced
After fuel cut	≥ 2 sec.

11.GENERAL DRIVING CYCLE

Perform the diagnosis only once when deceleration fuel cut occurs after rapid acceleration. (Pay attention to the oxygen sensor voltage for the timing of the deceleration.)

12.DIAGNOSTIC METHOD

Calculate the minimum value of 0.3 V to 0.5 V output change response time as judgment value, when the oxygen sensor output voltage changes from 0.25 V (lean) to 0.55 V (rich).



Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Abnormality Judgment

1. Judge as NG when the judgment value is larger than the threshold value after deceleration fuel cut.
Response time (diagnosis value) > threshold value → abnormal
2. If the oxygen sensor voltage is small after recovering from a deceleration fuel cut, and remains small, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Shortest time change from lean (300 mV O ₂ output) to rich (500 mV) when voltage drops from 500 mV to 250 mV.	> 2 sec.
Time at less than 250 mv	> 120 sec.

Time Needed for Diagnosis: 1 time

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

1. Regardless of a deceleration fuel cut, if the response time (diagnosis value) when the oxygen sensor voltage has changed from rich to lean is shorter than the threshold value (judgment value), judge as a normal condition.
Response time (diagnosis value) ≤ threshold value → normal
2. Do not judge as a normal condition.
Judge as OK when the criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Shortest time change from lean (300 mV O ₂ output) to rich (500 mV) when voltage drops from 550 mV to 250 mV.	≤ 2 sec.

13.DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

14.MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

15.FAIL SAFE

Sub feedback control: Not allowed.

16.ECM OPERATION AT DTC SETTING

- Memorize the freeze frame data. (For test mode \$02)
- Memorize the diagnostic value and trouble standard value. (For test mode \$06)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

AI: DTC P0140 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK1 SENSOR2)

1. OUTLINE OF DIAGNOSIS

Detect abnormalities in the rear oxygen sensor output characteristics.

By referring to the intake air amount, engine coolant temperature, main feedback control, deceleration fuel cut and other operating conditions, if the rear oxygen sensor voltage should be moving under these conditions but is showing a low voltage, this is judged as a Low side NG. If the voltage is showing a high voltage, it is judged as a High side NG.

When either Low side or High side is NG, judged as rear oxygen sensor property NG.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Engine coolant temperature	$\geq 75^{\circ}\text{C}$ (167°F)
Target output voltage of rear oxygen sensor	$\geq 0.6\text{ V}$
Air intake amount	10 g (0.35 oz)/seconds or more
Battery voltage	$> 10.9\text{ V}$
Closed loop at the oxygen sensor	In operation
Misfire detection every 200 rotations	5 times or more
Front oxygen (A/F) sensor compensation coefficient	Not in limit value
Deceleration fuel cut of 5 seconds or more.	Experienced

3. GENERAL DRIVING CYCLE

Perform the diagnosis only once after engine warm-up.

4. DIAGNOSTIC METHOD

Abnormality Judgment

When one of the following conditions is established, judged as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Maximum output voltage low side diagnosis	$< 0.55\text{ V}$
Minimum output voltage high side diagnosis	$> 0.25\text{ V}$

Time Needed for Diagnosis: 200 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

When the following conditions are established, judged as OK.

Judgment Value

Malfunction Criteria	Threshold Value
Maximum output voltage low side diagnosis	$\geq 0.55\text{ V}$
Minimum output voltage high side diagnosis	$\leq 0.25\text{ V}$

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

Sub feedback control: Not allowed.

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

AJ:DTC P0171 SYSTEM TOO LEAN (BANK 1)

1. OUTLINE OF DIAGNOSIS

Detect fuel system malfunction by the amount of main feedback control.

Diagnostic method

Fuel system is diagnosed by comparing the target air fuel ratio calculated by ECM with the actual air fuel ratio measured by sensor.

2. ENABLE CONDITION

- Lean side

Secondary Parameters	Enable Conditions
A/F main learning system	In operation
Engine coolant temperature	$\geq 75^{\circ}\text{C}$ (167°F)
Amount of intake air	$\geq$ Value from Map 5
Intake air change during 0.5 engine revs.	≤ 0.02 g (0.001 oz)/rev

Map 5

Engine speed (rpm)	Idling	650	1000	1500	2000	2500	3000	3500	4000	4500
Measured value (g(oz)/rev)	Non-turbo	0.203 (0.0072)	0.183 (0.0065)	0.155 (0.0055)	0.149 (0.0053)	0.157 (0.0055)	0.162 (0.0057)	0.18 (0.0063)	0.193 (0.0068)	0.205 (0.0072)

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously at idling or at a constant speed after warming up the engine.

4. DIAGNOSTIC METHOD

Abnormality Judgment

Compare the diagnosed value (fsobd) with the threshold value, and if a condition where the malfunction criteria below are met continues for more than 50 seconds, judge that there is a fault in the fuel system.

Judgment Value

Malfunction Criteria	Threshold Value
$\text{fsobd} = (\text{sglmd} - \text{tglmda}) + \text{faf} + \text{flaf}$ where, sglmd = measured lambda tglmda = per target lambda faf = main feedback compensation coefficient every 64 milliseconds flaf = main feedback learning compensation coefficient	$\geq \text{fsobdL1}$ See Map 4 fsobdL1 = lean side threshold value of fsobd

Map 4 Threshold value for fuel system malfunction criteria

Amount of air (g(oz)/s)	0 (0)	3.2 (0.113)	6.4 (0.226)	9.6 (0.339)	12.8 (0.451)	16 (0.564)	19.2 (0.677)
fsobdL1 (%)	40	40	33.2	26.5	26.5	26.5	26.5

Time Needed for Diagnosis: 10 seconds $\times$ 5 times

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK when the malfunction criteria below are completed for 10 seconds or more.

Judgment Value

Malfunction Criteria	Threshold Value
$\text{fsobd} = (\text{sglmd} - \text{tglmda}) + \text{faf} + \text{flaf}$	$< 19\%$

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When similar driving conditions are repeated 3 times and the result is OK.
- When "Clear Memory" is performed

7. FAIL SAFE

None

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

AK:DTC P0172 SYSTEM TOO RICH (BANK 1)

1. OUTLINE OF DIAGNOSIS

Detect fuel system malfunction by the amount of main feedback control.

Diagnostic method

Fuel system is diagnosed by comparing the target air fuel ratio calculated by ECM with the actual air fuel ratio measured by sensor.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
A/F main learning system	In operation
Engine coolant temperature	$\geq 75^{\circ}\text{C}$ (168°F)
Amount of intake air	$\geq$ Value from Map 5
Intake air change during 0.5 engine revs.	≤ 0.02 g (0.001 oz)/rev
Learning value of EVAP conc. during purge	< 0.1
Cumulative time of canister purge after engine start	20 seconds or more
Continuous period after canister purge starting	30 seconds or more

Map 5

Engine speed (rpm)	Idling	650	1000	1500	2000	2500	3000	3500	4000	4500
Measured value (g(oz)/rev)	Non-turbo	0.203 (0.0072)	0.183 (0.0065)	0.155 (0.0055)	0.149 (0.0053)	0.157 (0.0055)	0.162 (0.0057)	0.18 (0.0063)	0.193 (0.0068)	0.205 (0.0072)

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously at idling or at a constant speed after warming up the engine.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

4. DIAGNOSTIC METHOD

Abnormality Judgment

Compare the diagnosed value (fsobd) with the threshold value, and if a condition where the malfunction criteria below are met continues for more than 50 seconds, judge that there is a fault in the fuel system.

Judgment Value

Malfunction Criteria	Threshold Value
$fsobd = (sglmd - tglmda) + faf + flaf$ where, sglmd = measured lambda tglmda = target lambda faf = main feedback compensation coefficient every 64 milliseconds flaf = main feedback learning compensation coefficient	$\leq fsobdR1$ See Map 4 fsobdR1 = rich side threshold value of fsobd

Map 4 Threshold value for fuel system malfunction criteria

Amount of air (g(oz)/s)	0 (0)	3.2 (0.113)	6.4 (0.226)	9.6 (0.339)	12.8 (0.451)	16 (0.564)	19.2 (0.677)
fsobdR1 (%)	-40	-40	-33.2	-26.5	-26.5	-26.5	-26.5

Time Needed for Diagnosis: 10 seconds $\times$ 5 times

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK when the malfunction criteria below continues for 10 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
$fsobd = (sglmd - tglmda) + faf + flaf$	$\geq -20\%$

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When similar driving conditions are repeated 3 times and the result is OK.
- When "Clear Memory" is performed

7. FAIL SAFE

Purge control solenoid valve control: Not allowed to purge.

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

AL:DTC P0181 FUEL TEMPERATURE SENSOR “A” CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

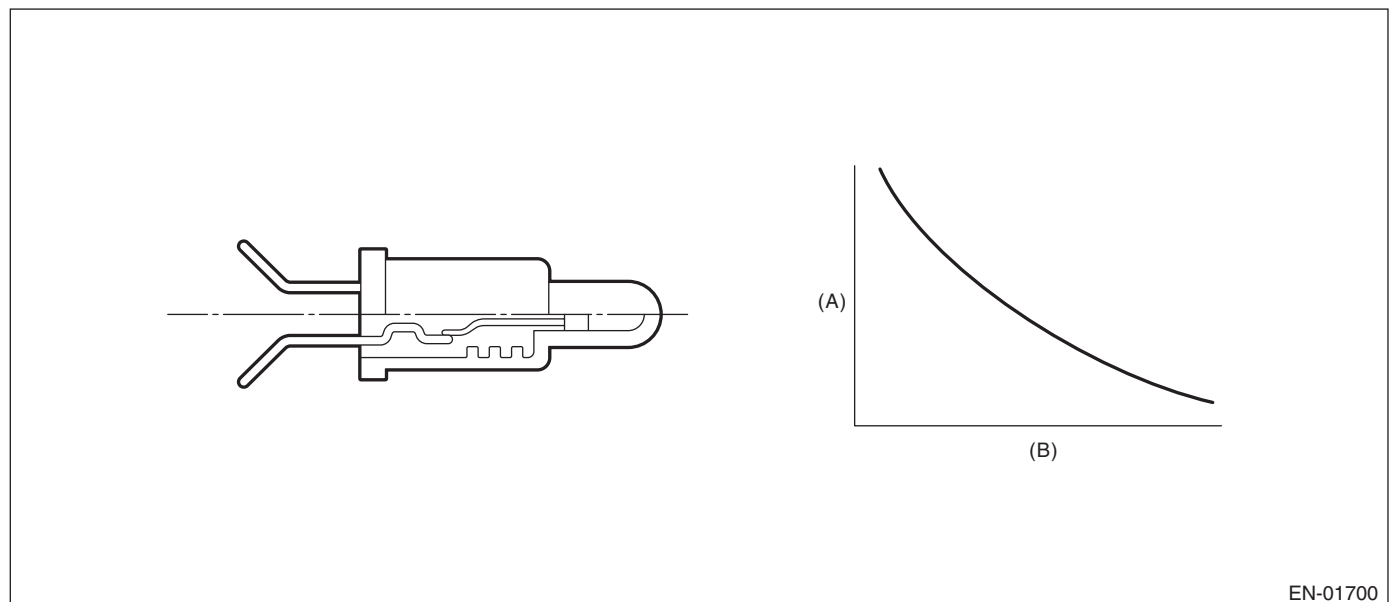
Detect faults in the fuel temperature sensor output properties.

Diagnosis is performed in two methods; drift diagnosis and stuck diagnosis. If either is NG, judge as NG. If both are OK, Judge as OK and clear the NG.

Drift Diagnosis

Normally fuel temperature is lower than engine coolant temperature. When the fuel temperature becomes higher than the engine coolant temperature, the range is considered to be shifted, and judged as NG.

2. COMPONENT DESCRIPTION



EN-01700

(A) Resistance value (Ω)

(B) Fuel temperature $^{\circ}\text{C}$ ($^{\circ}\text{F}$)

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes 120 seconds or more.

Judgment Value

Malfunction Criteria	Threshold Value
Fuel level	$\geq 9.6 \text{ } \ell$ (2.54 US gal, 2.11 Imp gal)
After engine starting	20 seconds or more
Engine coolant temperature – engine coolant temperature at engine start	$> 10^{\circ}\text{C}$ (18°F)
Fuel temperature – Engine coolant temperature	$\geq 10^{\circ}\text{C}$ (18°F)
Battery voltage	$> 10.9 \text{ V}$

Time Needed for Diagnosis: 120 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK when the criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Fuel level	$\geq 9.6 \text{ } \ell$ (2.54 US gal, 2.11 Imp gal)
After engine starting	20 seconds or more
Engine coolant temperature – engine coolant temperature at engine start	$> 10^{\circ}\text{C}$ (18°F)
Fuel temperature – Engine coolant temperature	$< 10^{\circ}\text{C}$ (18°F)
Engine coolant temperature	$< 75^{\circ}\text{C}$ (167°F)
Battery voltage	$> 10.9 \text{ V}$

Stuck Diagnosis

As the engine warms up (cumulative amount of intake air after starting is large), if the fuel temperature which should rise does not, determine as being stuck and NG.

6. ENABLE CONDITION

Secondary Parameters	Enable Conditions
After engine starting	20 seconds or more
Battery voltage	$> 10.9 \text{ V}$

7. GENERAL DRIVING CYCLE

Always perform diagnosis after 20 seconds have passed since the engine started.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

8. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Accumulated amount of intake air	≥ 551 kg (1215 lb)
Fuel temperature difference between Max. and Min.	$< 2^{\circ}\text{C}$ (3.6°F)

Time Needed for Diagnosis: Undecided

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK when the criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Accumulated amount of intake air	≥ 551 kg (1215 lb)
Fuel temperature difference between Max. and Min.	$\geq 2^{\circ}\text{C}$ (3.6°F)

9. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

10.MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

11.FAIL SAFE

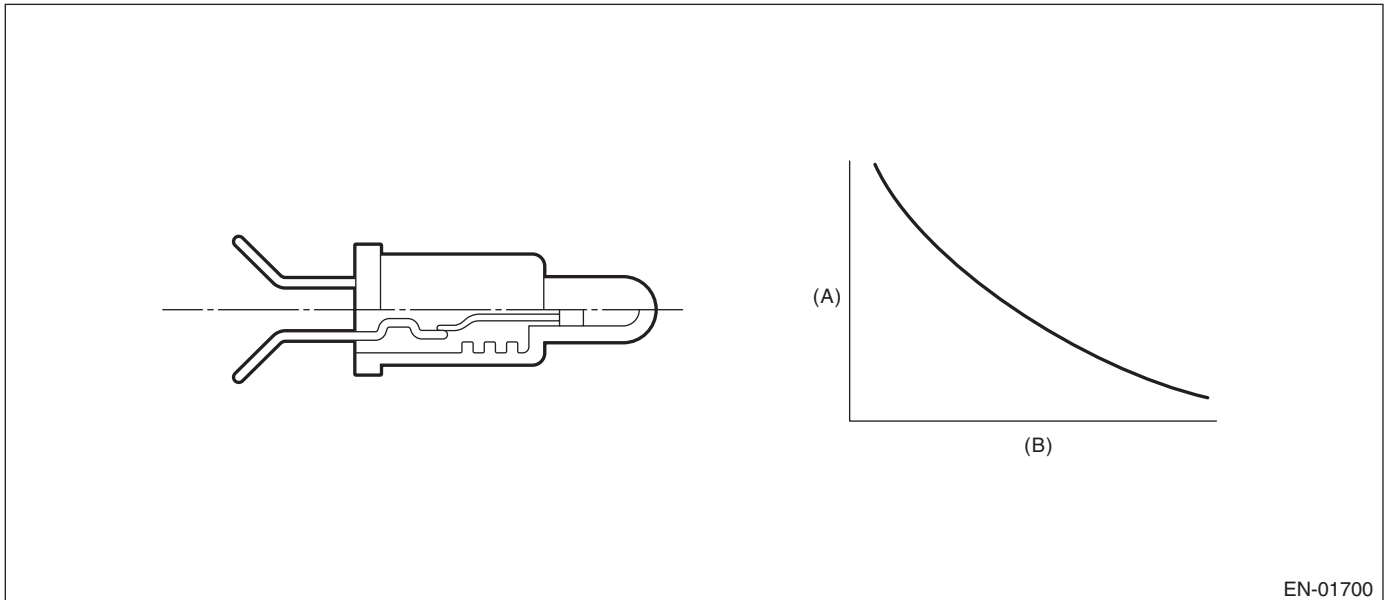
None

12.ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

AM:DTC P0182 FUEL TEMPERATURE SENSOR “A” CIRCUIT LOW INPUT**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of fuel temperature sensor.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

EN-01700

(A) Resistance value (Ω)(B) Fuel temperature $^{\circ}\text{C}$ ($^{\circ}\text{F}$)**3. ENABLE CONDITION**

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD**Abnormality Judgment**

Judge as NG when the continuous time of completing the malfunction criteria below becomes 2.5 seconds or more.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	$< 0.166 \text{ V}$
Battery voltage	$\geq 10.9 \text{ V}$

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	$\geq 0.166 \text{ V}$
Battery voltage	$\geq 10.9 \text{ V}$

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

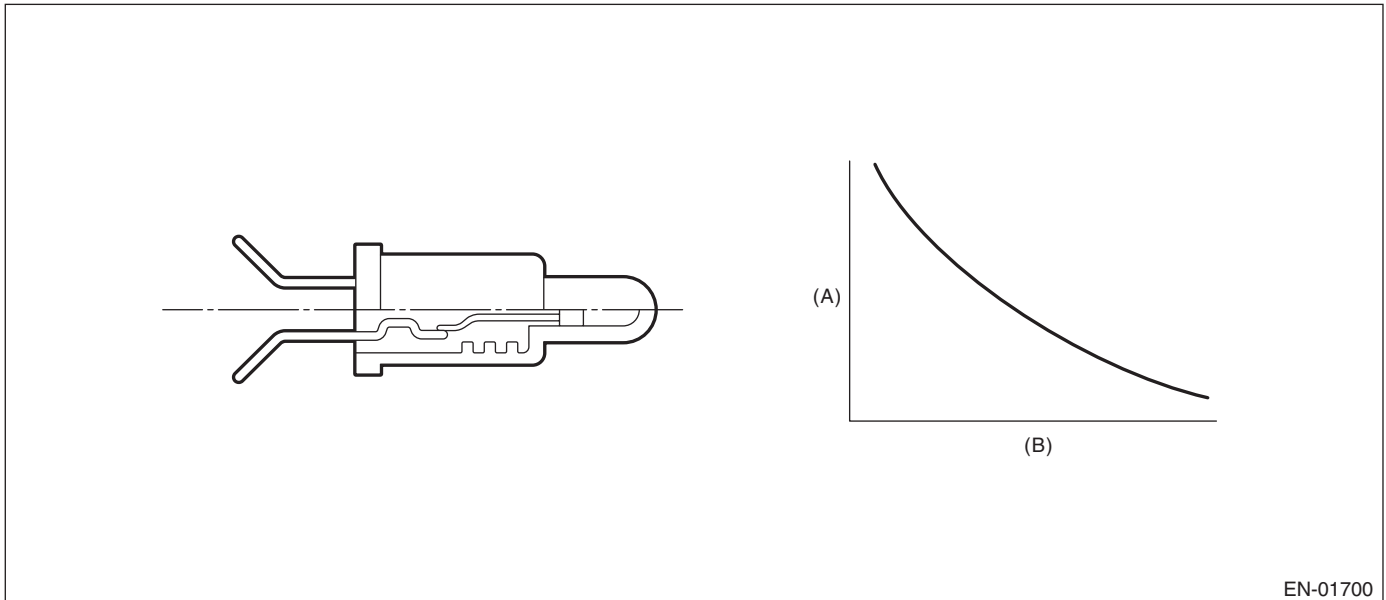
None

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

AN:DTC P0183 FUEL TEMPERATURE SENSOR “A” CIRCUIT HIGH INPUT**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of fuel temperature sensor.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

EN-01700

(A) Resistance value (Ω)(B) Fuel temperature $^{\circ}\text{C}$ ($^{\circ}\text{F}$)**3. ENABLE CONDITION**

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD**Abnormality Judgment**

Judge as NG when the continuous time of completing the malfunction criteria below becomes 2.5 seconds or more.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	$\geq 4.716 \text{ V}$
Battery voltage	$\geq 10.9 \text{ V}$

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	$< 4.716 \text{ V}$
Battery voltage	$\geq 10.9 \text{ V}$

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

None

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

AO:DTC P0196 ENGINE OIL TEMPERATURE SENSOR CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect for abnormal values in the oil temperature sensor output properties.

Judge as NG when the oil temperature does not rise even though the engine is running under a condition where it should rise.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Engine speed	$\geq 500 \text{ rpm}$

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

4. DIAGNOSTIC METHOD

Abnormality Judgment

When the following conditions are established, judged as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Engine oil temperature	$< 15^{\circ}\text{C} (59^{\circ}\text{F})$
After engine start oil temperature sensor characteristic diagnosis timer.	$\geq$ Judgment value for after engine start oil temperature sensor characteristic diagnosis timer

After engine start oil temperature sensor characteristic diagnosis timer (timer for diagnosis).

a. Timer stop at fuel cut mode.

b. During the driving conditions except a) above, timer count up by 64 milliseconds + TCILCNT milliseconds at every 64 milliseconds.

Where, TOILCNT is determined as follows,

TOILCNT = 0 at idle switch ON

For TOILCNT at Idle switch off, refer to the following table.

		Vehicle speed km/h (MPH)							
		0 (0)	8 (5)	16 (10)	24 (15)	32 (20)	40 (25)	48 (30)	56 (35)
Temperature °C (°F)	-30 (-22)	64 ms	73.2 ms	83.9 ms	96.3 ms	113.2 ms	133.9 ms	160.2 ms	194.6 ms
	-20 (-4)	64 ms	73.3 ms	84 ms	96.6 ms	113.7 ms	135 ms	162 ms	197.4 ms
	-10 (14)	64 ms	73.4 ms	84.2 ms	96.9 ms	114.5 ms	136.4 ms	164.4 ms	201.5 ms
	0 (32)	64 ms	73.5 ms	84.5 ms	97.4 ms	115.6 ms	138.5 ms	168 ms	207.6 ms
	10(50)	102.2 ms	114.8 ms	129.4 ms	146.7 ms	171.7 ms	203.4 ms	245.1 ms	302.1 ms

After engine start oil temperature characteristic diagnosis timer judgment value (t).

$t = 1882940 - 43302 \times Ti$ ($t \geq 1882940$)

Ti = The lowest coolant temperature after starting the engine.

Time Needed for Diagnosis: Undecided

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

When the following conditions are established, judged as OK.

Judgment Value

Malfunction Criteria	Threshold Value
Engine oil temperature	$\geq 15^{\circ}\text{C} (59^{\circ}\text{F})$

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

Oil temperature sensor process: Engine oil temperature is fixed at 70°C (158°F)

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

AP:DTC P0197 ENGINE OIL TEMPERATURE SENSOR LOW**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of the oil temperature sensor.
Judge as NG when outside of the possible range.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Judge as NG when the continuous time when the following conditions are established is more than 0.5 seconds. Judge as OK and clear the NG when the following conditions are not established.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≤ 0.166 V

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

Oil temperature sensor process: Engine oil temperature is fixed at 70°C (158°F)

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

AQ:DTC P0198 ENGINE OIL TEMPERATURE SENSOR HIGH

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the oil temperature sensor.
Judge as NG when outside of the judgment value.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Judge as NG when the continuous time when the following conditions are established is more than 0.5 seconds. Judge as OK and clear the NG when the following conditions are not established.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	$\geq 4.716 \text{ V}$

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

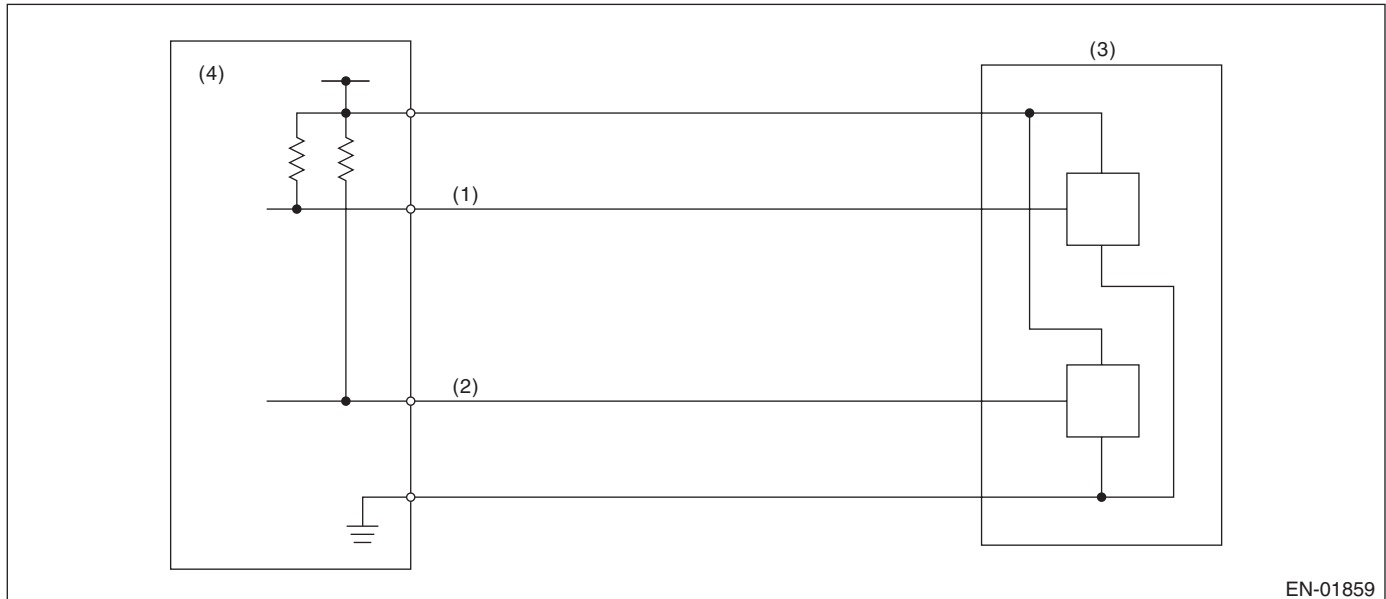
Oil temperature sensor process: Engine oil temperature is fixed at 70°C (158°F)

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

AR:DTC P0222 THROTTLE/PEDAL POSITION SENSOR/SWITCH “B” CIRCUIT LOW**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of throttle position sensor 2.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

- (1) Throttle position sensor 1 signal (3) Throttle position sensor (4) Engine control module (ECM)
(2) Throttle position sensor 2 signal

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 2 input voltage	≥ 0.224 V

Time Needed for Diagnosis: 24 milliseconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed (Only with engine stopped)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

8. FAIL SAFE

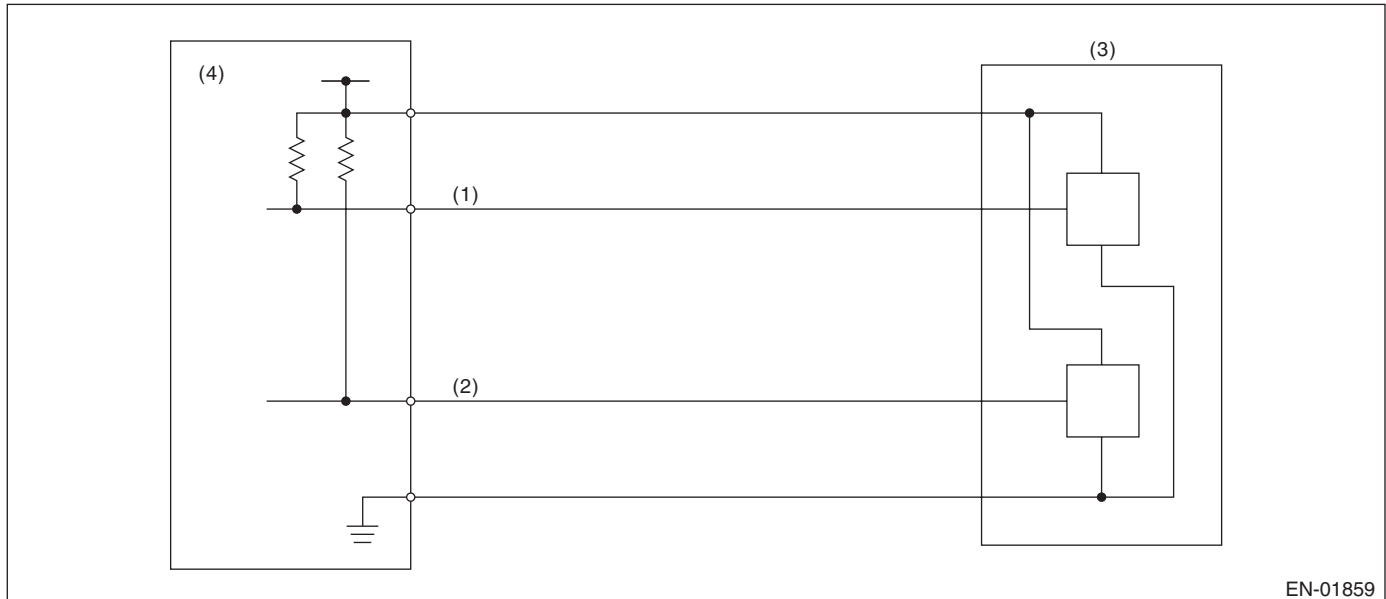
Stop the continuity to the electronic control throttle motor. (Throttle opening is fixed to 6°.)

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

AS:DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH “B” CIRCUIT HIGH**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of throttle position sensor 2.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

(1) Throttle position sensor 1 signal
(2) Throttle position sensor 2 signal

(3) Throttle position sensor

(4) Engine control module (ECM)

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 2 input voltage	≤ 4.851 V

Time Needed for Diagnosis: 24 milliseconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed (Only with engine stopped)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

8. FAIL SAFE

Stop the continuity to the electronic control throttle motor. (Throttle opening is fixed to 6°.)

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

AT:DTC P0301 CYLINDER 1 MISFIRE DETECTED

1. OUTLINE OF DIAGNOSIS

Detect the presence of misfire occurrence. (Revolution fluctuation method)

Monitoring Misfire which influences exhaust deterioration (1.5 times of FTP) and catalyst damage is made obligatory by the law. Misfire affecting these two has three patterns below.

- Intermittent misfire (The same cylinder misfires in random, or different cylinders misfire in random.): FTP 1.5 times misfire
- Every time misfire (The same cylinder misfires every time.): FTP 1.5 times misfire, Catalyst damage misfire

The following detecting methods are adopted for these detection.

1) Intermittent misfire: FTP 1.5 times misfire

- 180° Interval Difference Method (MT: 1,800 rpm or less; AT: None)
- 360° Interval Difference Method (whole range)
- 720° Interval Difference Method (3,000 rpm or less)

2) Misfire every time: FTP 1.5 times misfire, Catalyst damage misfire

- 360° Interval Difference Method

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
All secondary parameters enable conditions	1 second or more
Intake manifold pressure change during 0.5 engine revs.	< 13.3 kPa (100 mmHg, 3.94 inHg)
Throttle position change during 16 milliseconds	< 21°
Fuel shut-off function	Not in operation
Atmospheric pressure	≥ 75.0 kPa (563 mmHg, 22.2 inHg)
Fuel level	≥ 9.6 ℓ (2.54 US gal, 2.11 Imp gal)
AT torque control	Not in operation
Evaporative system leak check	Not in operation
Engine speed	460 — 6400 rpm
Intake manifold pressure	> Value of Map 3
Battery voltage	≥ 8 V
Fuel parameter determination	Not extremely low volatility

Map 3

MT (Vehicle speed < 64.4km/h (40 MPH))

rpm	650	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6400
kPa	25.6	23.1	20.0	20.0	20.0	21.6	26.4	28.0	29.5	32.4	36.4	39.9	44.5
(mmHg, inHg)	(192, 7.56)	(173, 6.82)	(150, 5.91)	(150, 5.91)	(150, 5.91)	(162, 6.38)	(198, 7.80)	(210, 8.27)	(221, 8.71)	(243, 9.57)	(273, 10.75)	(299, 11.78)	(324, 13.14)

MT (Vehicle speed ≥ 64.4km/h (40 MPH))

rpm	650	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6400
kPa	31.6	31.6	31.6	31.1	31.3	33.1	33.9	28.8	30.1	33.3	36.9	40.1	44.5
(mmHg, inHg)	(237, 9.33)	(237, 9.33)	(237, 9.33)	(233, 9.19)	(235, 9.24)	(248, 9.78)	(254, 10.01)	(216, 8.51)	(226, 8.89)	(250, 9.84)	(277, 10.90)	(301, 11.84)	(324, 13.14)

AT

rpm	700	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6400
kPa	25.6	24.4	22.0	22.4	22.8	23.9	29.9	31.3	29.9	35.6	39.3	43.3	44.5
(mmHg, inHg)	(192, 7.56)	(183, 7.21)	(165, 6.50)	(168, 6.62)	(171, 6.73)	(179, 7.06)	(224, 8.83)	(235, 9.24)	(244, 8.83)	(267, 10.51)	(295, 11.61)	(325, 12.79)	(334, 13.14)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

3. GENERAL DRIVING CYCLE

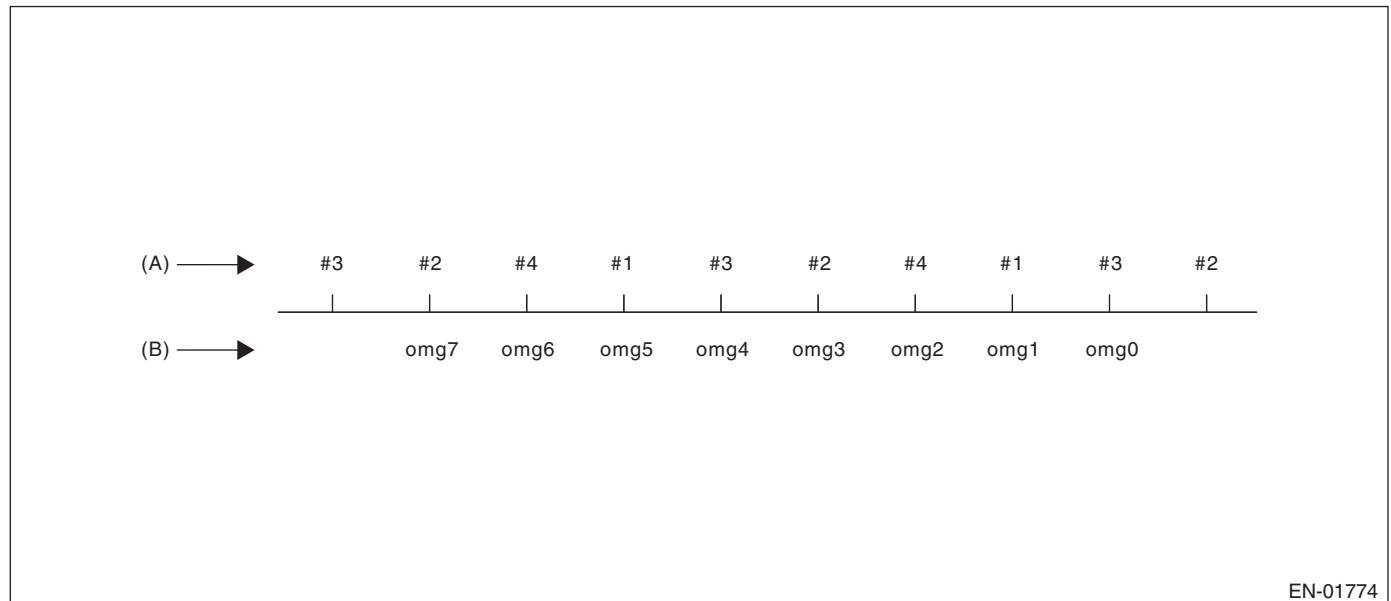
- Detect misfires from idling to high rpm.
- Perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

When a misfire occurs, the engine speed will decreased and the crankshaft position speed will change. Calculate the interval difference value (diagnostic value) from crankshaft position speed by the following formula, and judge whether a misfire is occurring or not comparing the calculated result with judgment value. Counting the number of misfires, if the misfire ratio is higher during 1000 rpm or 2000 rpm, judge corresponding cylinders as NG.

Diagnostic value calculation (Calculate from angle speed)	→	Misfire detection every single ignition (Compare diagnostic value with judgment value)	→	NG judgment (Misfire occurrence judgment required by the law) (Compare number of misfire with judgment)
		• 180° Interval Difference Method • 360° Interval Difference Method • 720° Interval Difference Method		• FTP1.5 times misfire NG judgment • Catalyst damage misfire NG judgment

As shown in the following figure, pick a cylinder as the standard and name it omg 0. And the former crankshaft position speed is named omg 1, the second former crankshaft position speed is named omg 2, the third is named omg 3, etc.



EN-01774

(A) Ignition order

(B) Crankshaft position speed

Diagnostic Trouble Code (DTC) Detecting Criteria

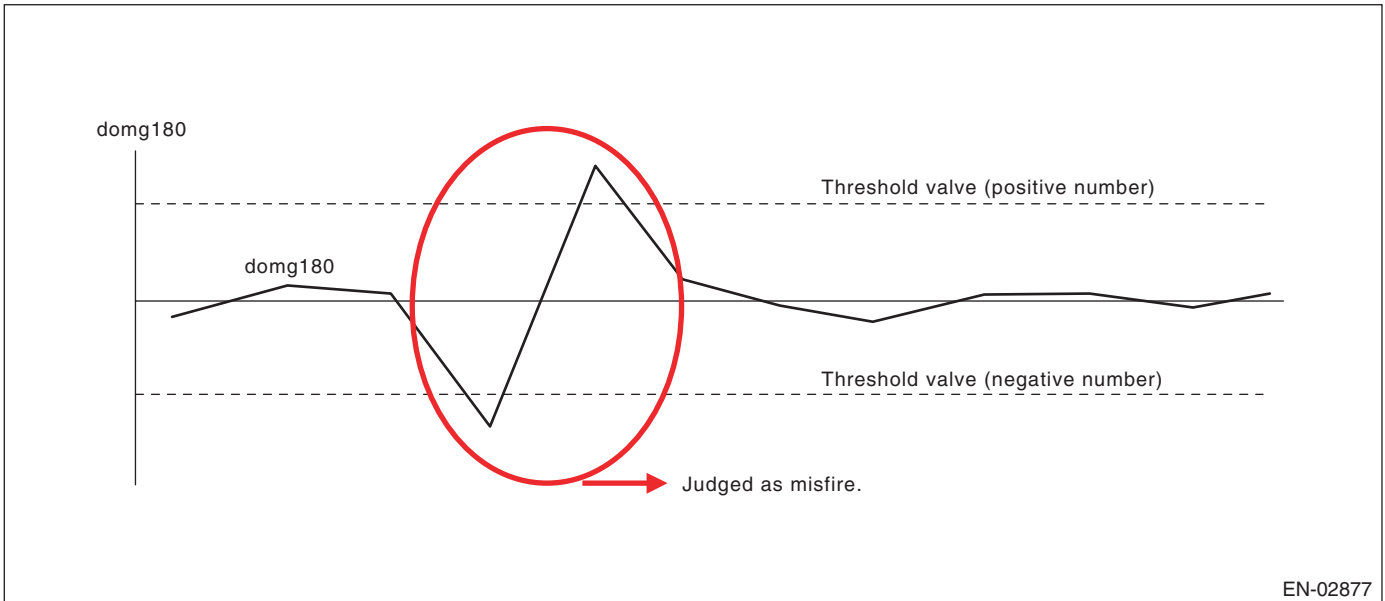
GENERAL DESCRIPTION

180° Interval Difference Method

Diagnostic value	$\text{domg } 180 = (\text{omg } 1 - \text{omg } 0) - (\text{omg } 5 - \text{omg } 1)/4$

Judge as a misfire in the following cases.

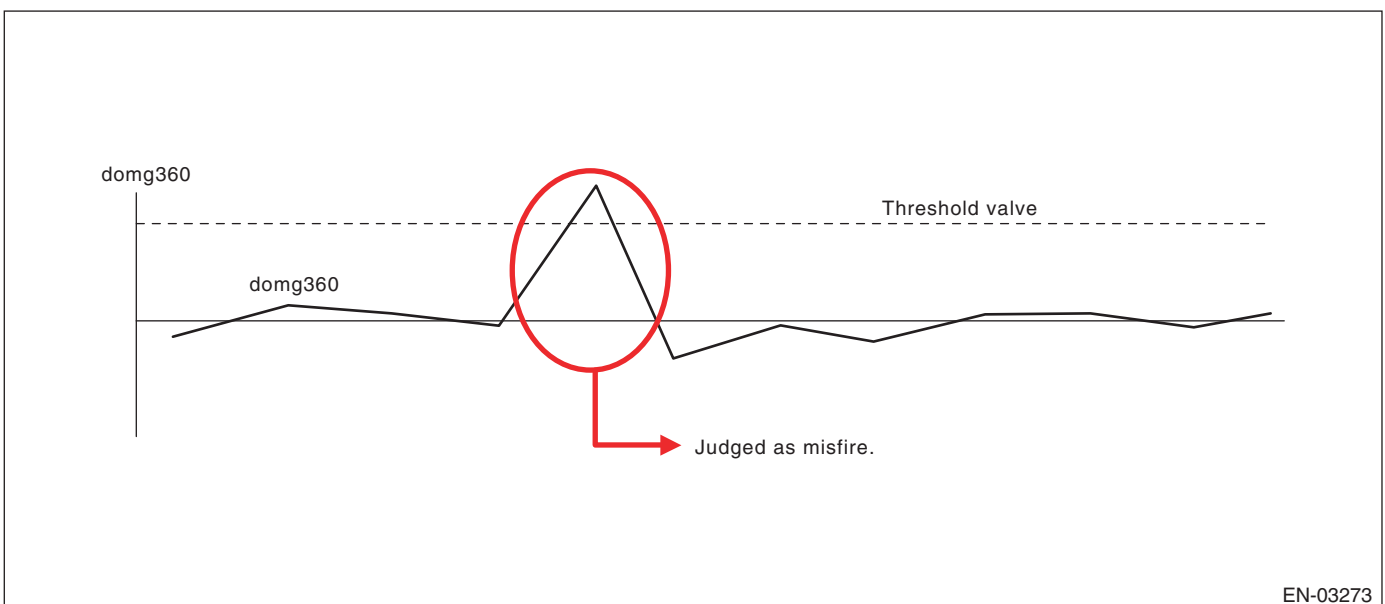
- $\text{domg } 180 > \text{judgment value of positive side}$
- $\text{domg } 180 \leq \text{judgment value of negative side}$
(Judgment value before 180° CA)



360° Interval Difference Method

Diagnostic value	$\text{domg } 360 = (\text{omg } 1 - \text{omg } 0) - (\text{omg } 3 - \text{omg } 2)$

Misfire judgment	$\text{domg } 360 > \text{Judgment value} \rightarrow \text{Judge as misfire}$

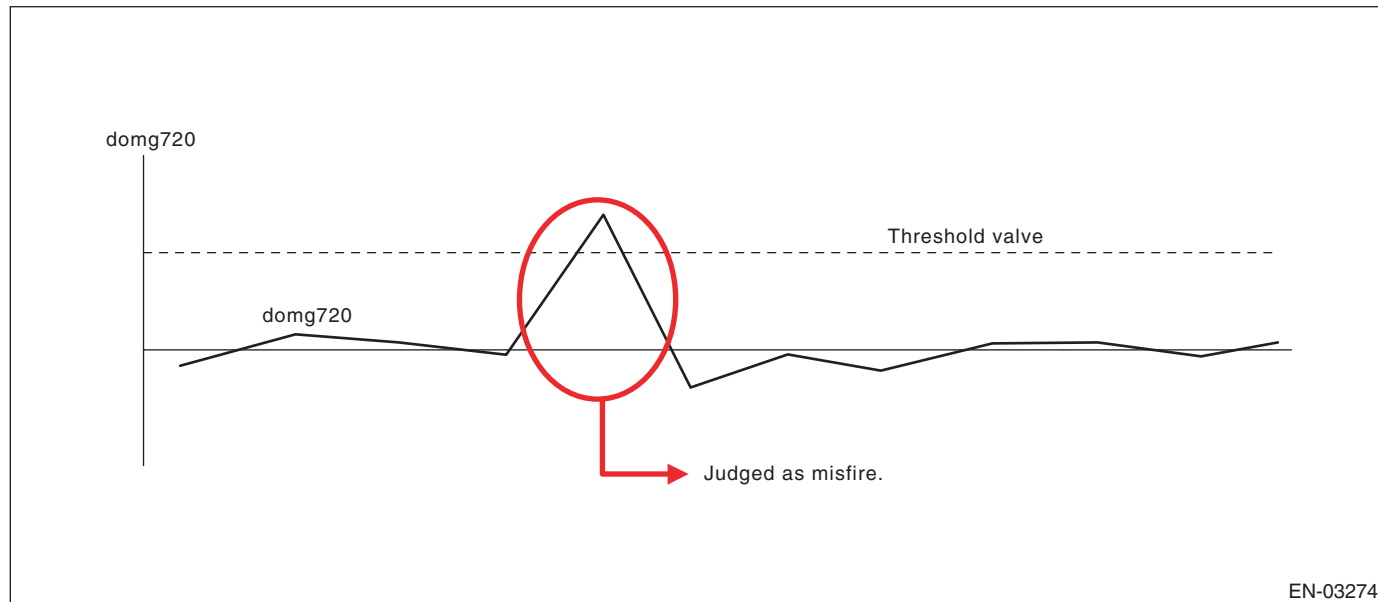


Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

720° Interval Difference Method

Diagnostic value	$\text{domg 720} = (\text{omg 1} - \text{omg 0}) - (\text{omg 5} - \text{omg 4})$
Misfire judgment	$\text{domg 720} > \text{Judgment value} \rightarrow \text{Judge as misfire}$



FTP 1.5 times misfire (Misfire occurrence level which influences exhaust gas)

Judgment Value (Judge that malfunction occurs when the misfire ratio is high in 1000 engine revs.)

Malfunction Criteria	Threshold Value
FTP emission judgment value	> 1.0 % in 1000 revs.

Time Needed for Diagnosis: 1000 engine revs.

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Catalyst damage misfire (Misfire occurrence level damaging catalyst)

Judgment Value (Judge that malfunction occurs when the misfire ratio is high in 200 engine revs. (400 ignitions))

Malfunction Criteria	Threshold Value
Catalyst damage misfire judgment value	See Map 1

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Map 1 Fault criteria threshold for misfire which would result in catalyst damage

percentage		Intake air (g(oz)/rev)									
		0.16 (0.0056)	0.28 (0.010)	0.4 (0.014)	0.52 (0.018)	0.64 (0.023)	0.76 (0.027)	0.92 (0.032)	1.1 (0.039)	1.2 (0.042)	1.3 (0.046)
Engine speed (rpm)	700	25	25	25	25	22.5	20	16	1.2	1.2	1.2
	1000	25	25	25	25	22.5	20	13	6	6	6
	1500	25	25	22.5	20	17.25	14.25	9.75	5.5	5.5	5.5
	2000	20	20	20	20	15.5	11	8.25	5.25	5.25	5.25
	2500	16.75	16.75	14.5	12.5	10	7.75	6.25	5	5	5
	3000	14.25	14.25	12.25	10	7.5	5	5	5	5	5
	3500	11	11	8.5	6	5	5	5	5	5	5
	4000	9	9	7	5	5	5	5	5	5	5
	4500	6.75	6.75	5	5	5	5	5	5	5	5
	5000	5	5	5	5	5	5	5	5	5	5
	5500	5	5	5	5	5	5	5	5	5	5
	6000	5	5	5	5	5	5	5	5	5	5
	6400	5	5	5	5	5	5	5	5	5	5

These figures indicate the misfire rate (%) in 400 ignitions; for example, 22.5 (%) means 400 (ignition) × 22.5 (%) = 90 (ignition) misfires. This value or more is judged as a misfire.

Time Needed for Diagnosis: 200 engine revs.

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When “Clear Memory” is performed

7. FAIL SAFE

None

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

AU:DTC P0302 CYLINDER 2 MISFIRE DETECTED

NOTE:

For the diagnostic procedure, refer to DTC P0301. <Ref. to GD(H4SO U5)-95, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

AV:DTC P0303 CYLINDER 3 MISFIRE DETECTED

NOTE:

For the diagnostic procedure, refer to DTC P0301. <Ref. to GD(H4SO U5)-95, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

AW:DTC P0304 CYLINDER 4 MISFIRE DETECTED

NOTE:

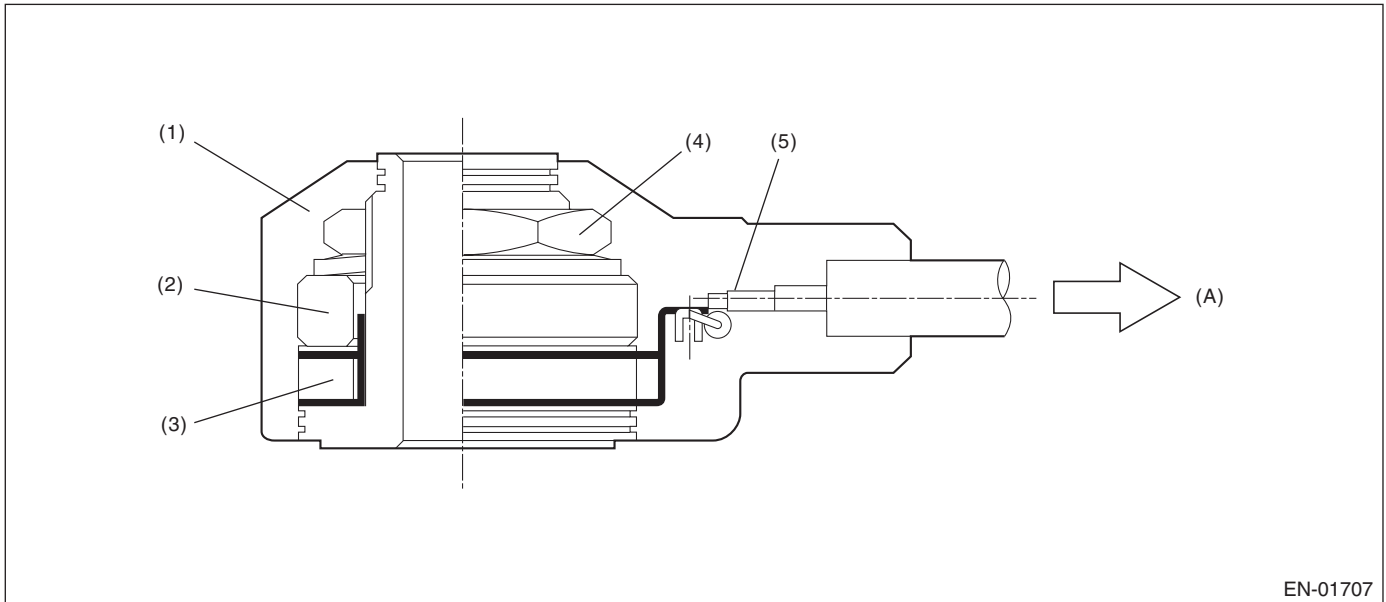
For the diagnostic procedure, refer to DTC P0301. <Ref. to GD(H4SO U5)-95, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

AX:DTC P0327 KNOCK SENSOR 1 CIRCUIT LOW (BANK 1 OR SINGLE SENSOR)

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of knock sensor.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION



- (1) Case
- (2) Weight
- (3) Piezoelectric element

- (4) Nut
- (5) Resistance

- (A) To knock sensor harness

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes 1 second or more.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.238 V
Ignition switch	ON

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 0.238 V
Ignition switch	ON

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

None

9. ECM OPERATION AT DTC SETTING

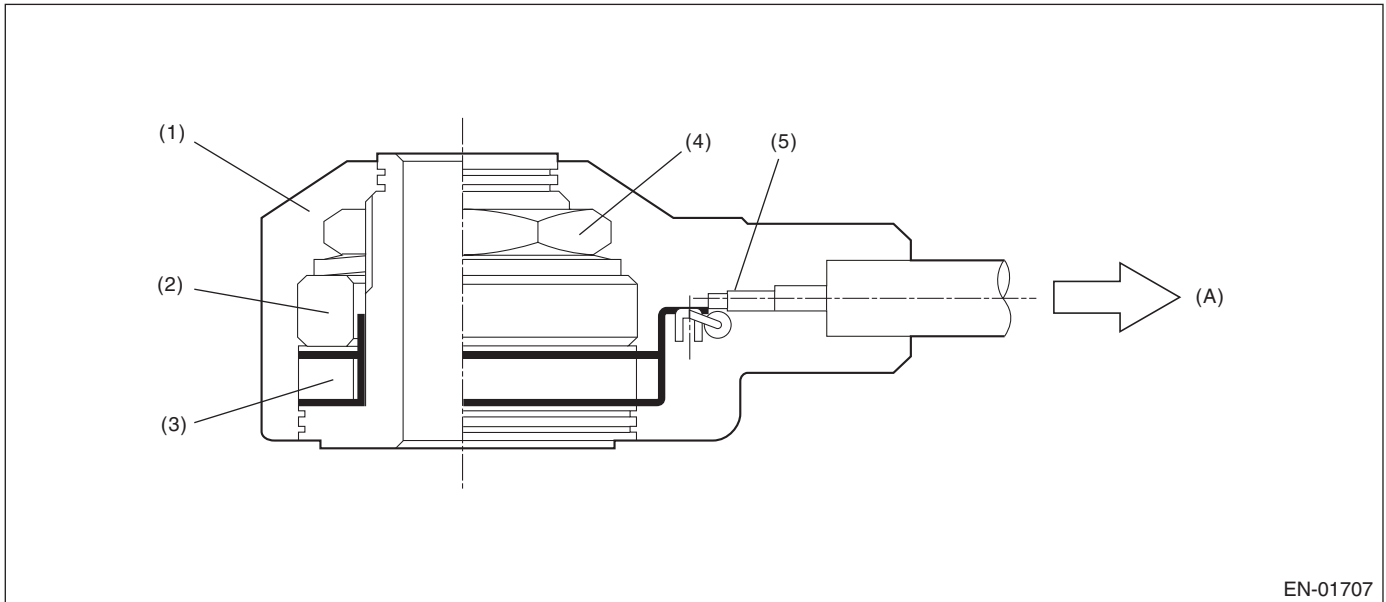
Memorize the freeze frame data. (For test mode \$02)

AY:DTC P0328 KNOCK SENSOR 1 CIRCUIT HIGH (BANK 1 OR SINGLE SENSOR)

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of knock sensor.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION



- (1) Case
- (2) Weight
- (3) Piezoelectric element

- (4) Nut
- (5) Resistance

- (A) To knock sensor harness

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes 1 second or more.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.714 V
Ignition switch	ON

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 4.714 V
Ignition switch	ON

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

None

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

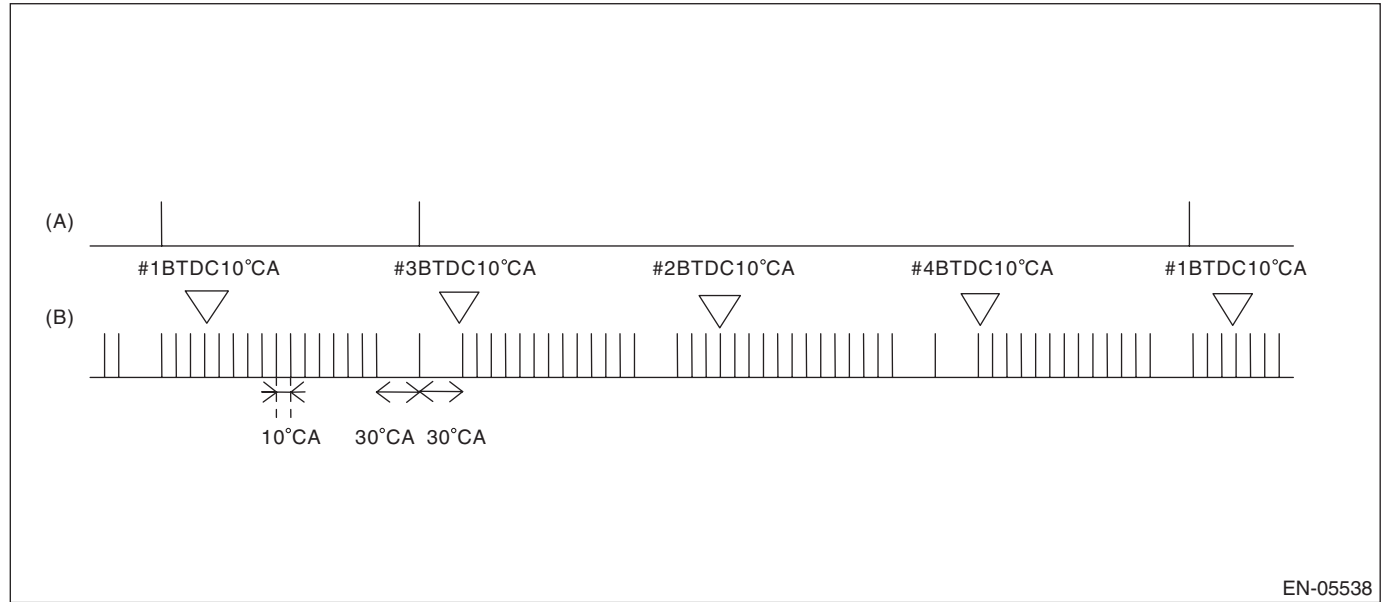
AZ:DTC P0335 CRANKSHAFT POSITION SENSOR “A” CIRCUIT

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the crankshaft position sensor.

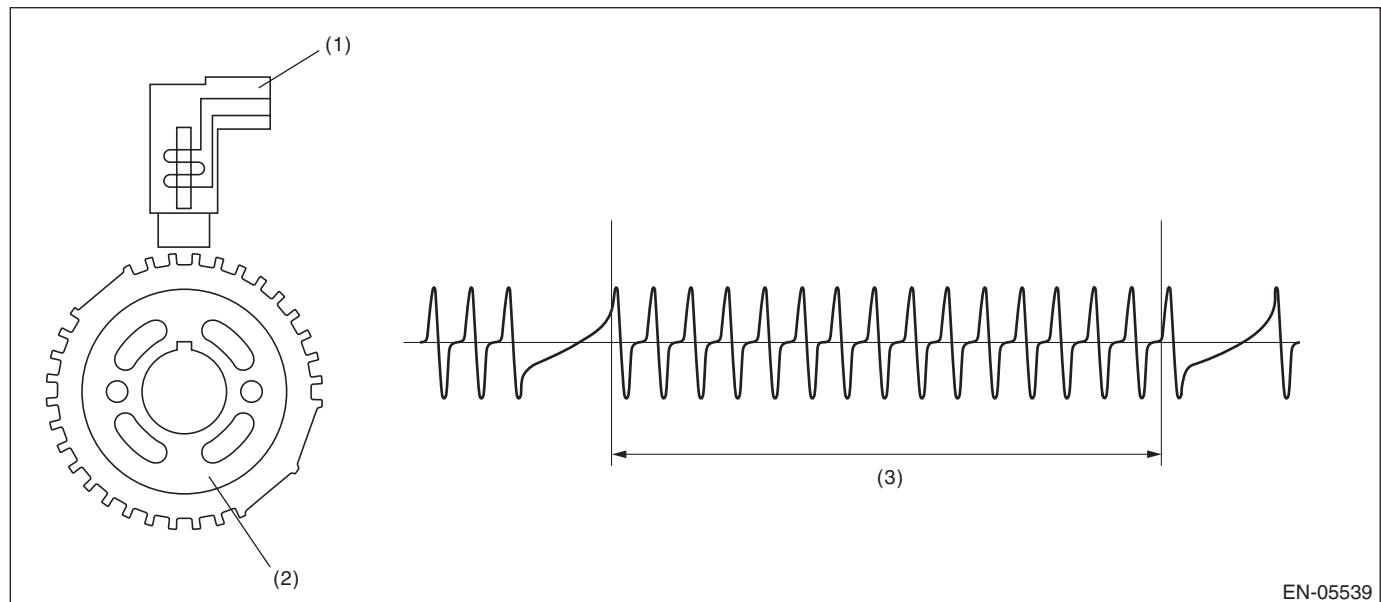
Judge as NG when the crank signal is not input even though the starter was rotated.

2. COMPONENT DESCRIPTION



(A) Camshaft signal

(B) Crankshaft signal



(1) Crankshaft position sensor

(2) Crank sprocket

(3) Crankshaft half-turn

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than 3 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
Starter switch	ON
Crankshaft position sensor signal	Not detected
Battery voltage	$\geq 8 \text{ V}$

Time Needed for Diagnosis: 3 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Crankshaft position sensor signal	Input exists
Battery voltage	$\geq 8 \text{ V}$

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

None

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

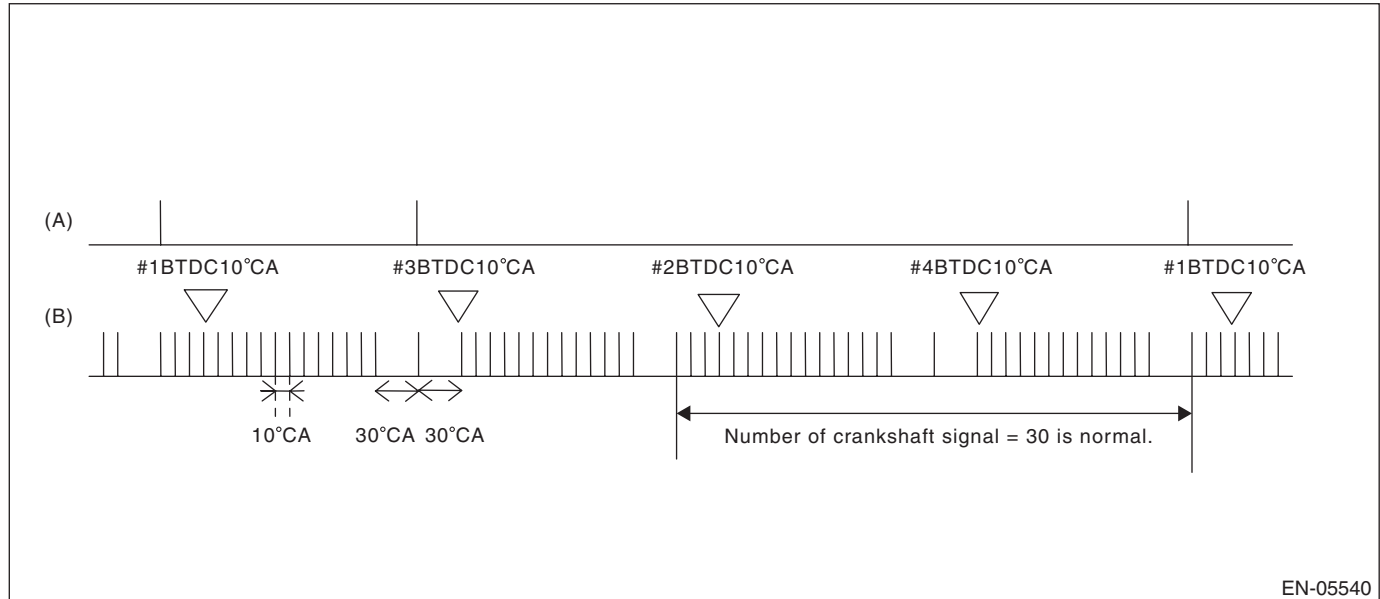
BA:DTC P0336 CRANKSHAFT POSITION SENSOR “A” CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect for faults in crankshaft position sensor output properties.

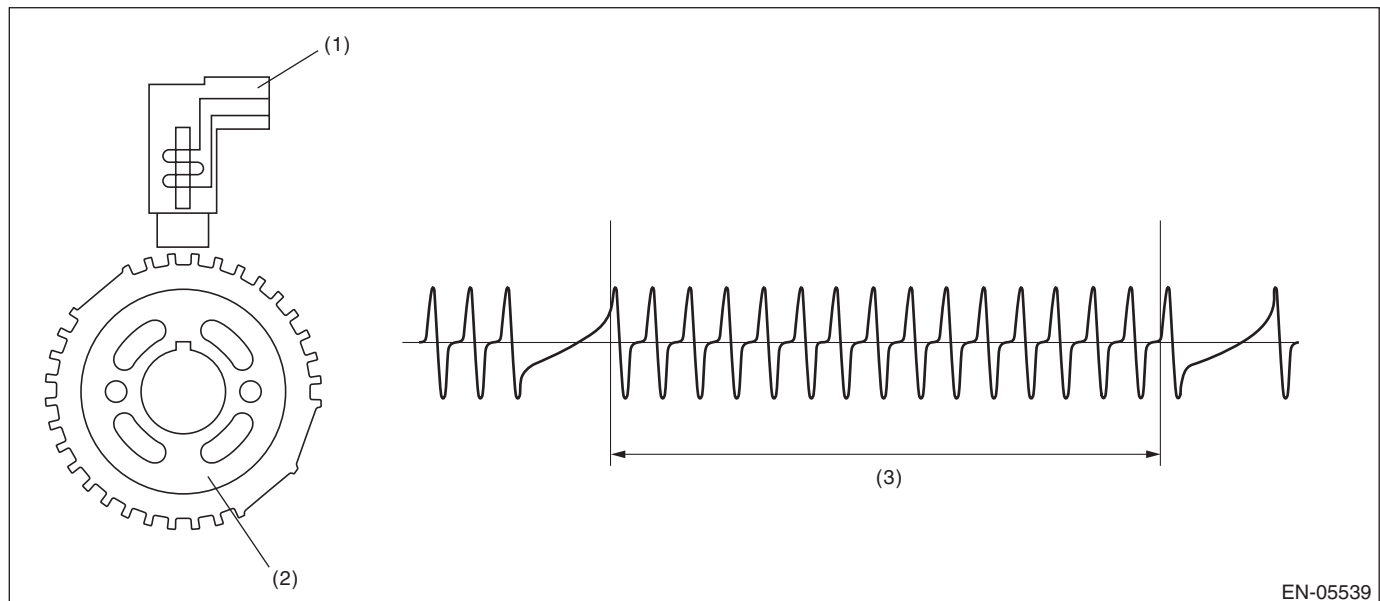
Judge as NG when there is a problem in the number of crankshaft signals for every revolution.

2. COMPONENT DESCRIPTION



(A) Camshaft signal

(B) Crankshaft signal



(1) Crankshaft position sensor

(2) Crank sprocket

(3) Crankshaft half-turn

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 8 \text{ V}$
Engine speed	$< 4000 \text{ rpm}$

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously under 4000 rpm engine speed.

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when all the malfunction criteria below are completed more than 10 times in a row.

Judgment Value

Malfunction Criteria	Threshold Value
Cylinder number identification	Completed
Amount of crank sensor signal during 1 rev.	Not = 30

Time Needed for Diagnosis: 10 engine rotations

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Cylinder number distinction	Completed
Amount of crank sensor signal during 1 rev.	30

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

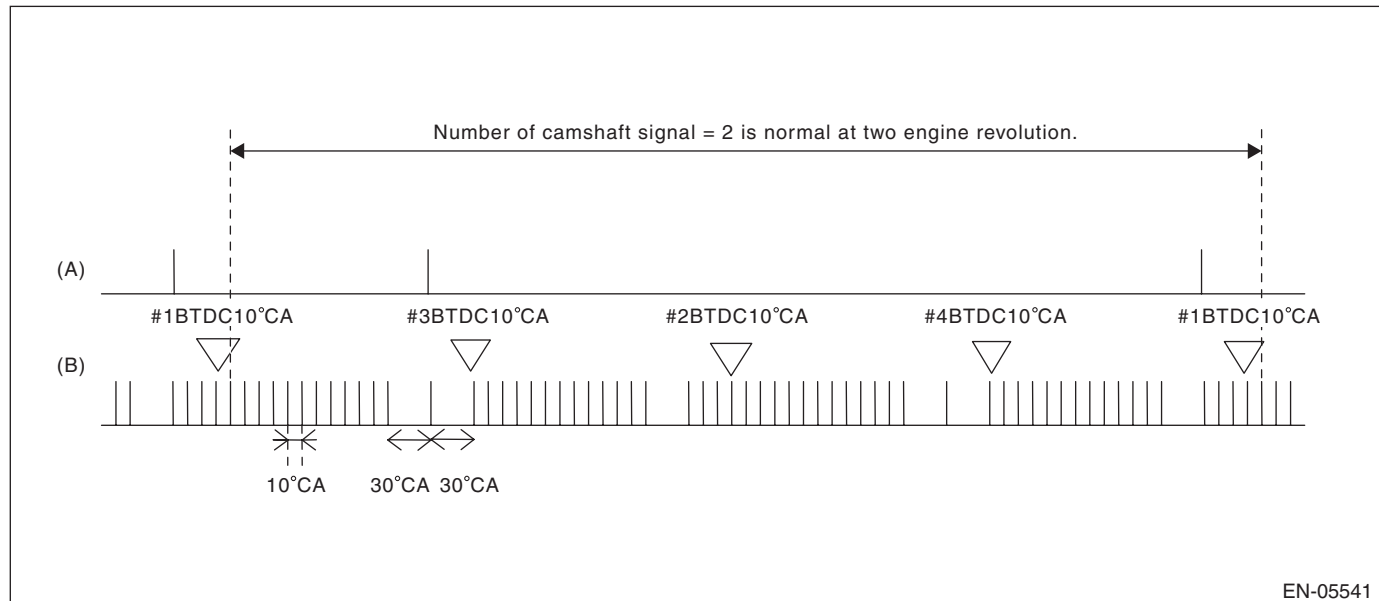
None

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

BB:DTC P0340 CAMSHAFT POSITION SENSOR “A” CIRCUIT (BANK 1 OR SINGLE SENSOR)**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of the camshaft position sensor.
Judge as NG when the number of camshaft signals remains abnormal.

2. COMPONENT DESCRIPTION

(A) Camshaft signal

(B) Crankshaft signal

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the following malfunction criteria continues for 8 engine revolutions or more.

Judgment Value

Malfunction Criteria	Threshold Value
Voltage	$\geq 8 \text{ V}$
Number of camshaft sensor signals during 2 revs.	Not = 2

Time Needed for Diagnosis: 8 engine revs.

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the following criteria are established.

Judgment Value

Malfunction Criteria	Threshold Value
Voltage	$\geq 8 \text{ V}$
Amount of camshaft sensor signal during 2 revs.	2

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

None

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

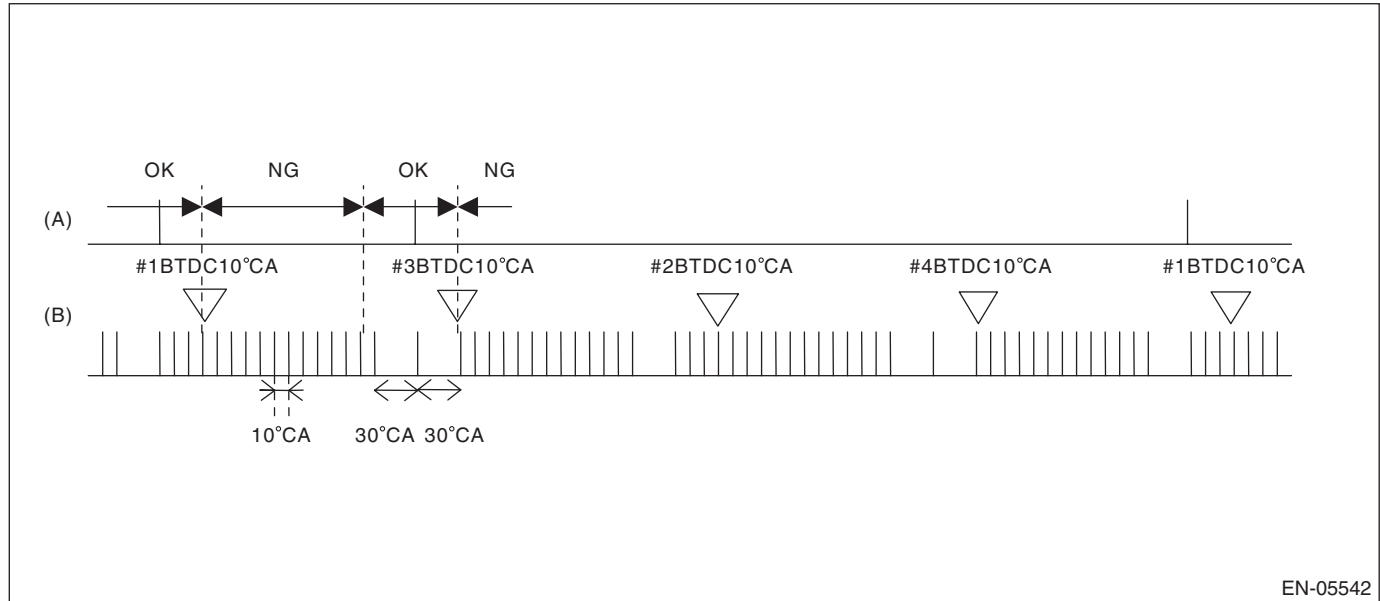
BC:DTC P0341 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 1 OR SINGLE SENSOR)

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of camshaft position sensor output property.

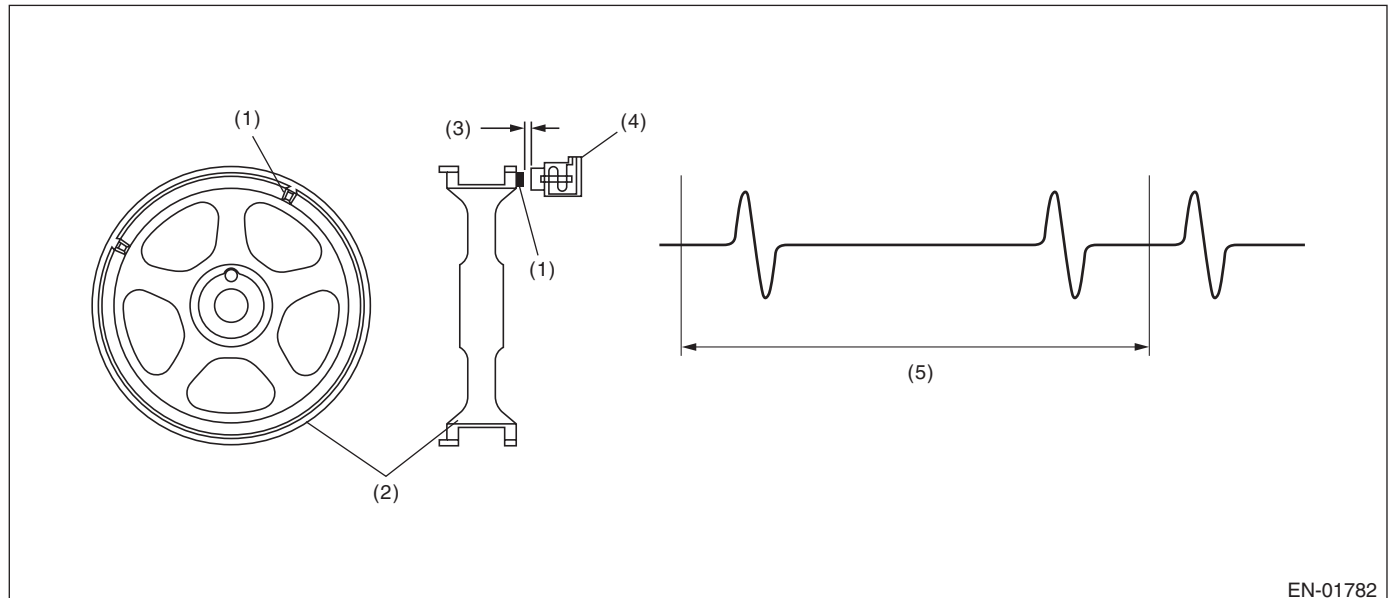
Judge as NG when the camshaft line signal input timing is shifted from the crankshaft signal because of timing belt tooth chip etc.

2. COMPONENT DESCRIPTION



(A) Camshaft signal

(B) Crankshaft signal



(1) Boss
(2) Cam sprocket

(3) Air gap
(4) Camshaft position sensor

(5) Camshaft one revolution (Engine two revolutions)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Cylinder number identification	Completed
Battery voltage	$\geq 8 \text{ V}$
Engine speed	550 — 1000 rpm
Engine operation	In idle
Misfire	Not detected

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously at idle speed.

5. DIAGNOSTIC METHOD

Judge as NG when the engine speed continues 10 revolutions for the malfunction criteria below. Judge as OK and clear the NG when the malfunction criteria below are not met.

Judgment Value

Malfunction Criteria	Threshold Value
Position of camshaft position sensor signal	Not between BTDC 10°CA and BTDC 80°CA

Time Needed for Diagnosis: 10 engine revs.

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

None

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

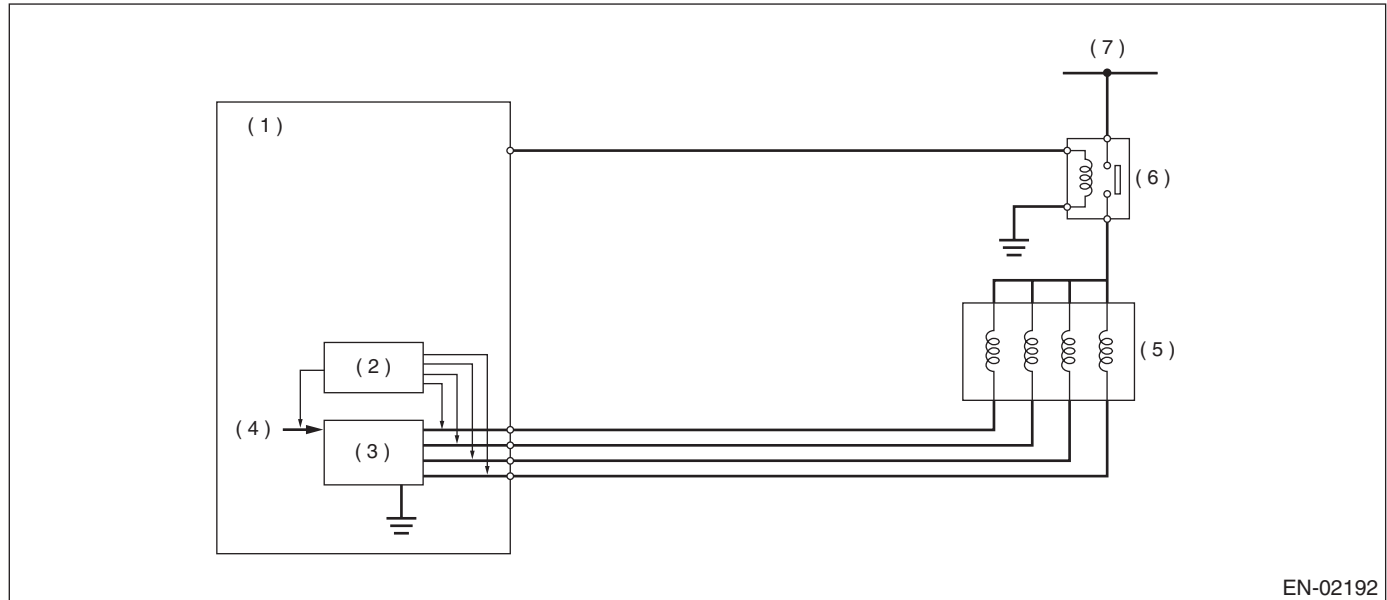
BD:DTC P0400 EXHAUST GAS RECIRCULATION FLOW

1. OUTLINE OF DIAGNOSIS

Detect EGR system malfunction.

Intake manifold pressure (negative pressure) is constant because the throttle valve is fully closed during deceleration fuel cut. At this time, when the EGR valve is opened/closed, the intake manifold pressure will change. EGR System OK/NG is judged by the range of this change.

2. COMPONENT DESCRIPTION



EN-02192

(1) ECM	(4) CPU	(6) Main relay
(2) Detecting circuit	(5) EGR valve	(7) Battery power supply
(3) Switching circuit		

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
After engine starting	40 seconds or more
Engine coolant temperature	$\geq 75^{\circ}\text{C}$ (167°F)
Engine speed	1200 — 2950 rpm
Intake manifold pressure (absolute pressure)	$< 40.0 \text{ kPa}$ (300 mmHg, 11.81 inHg)
Ambient air temperature	$\geq 5^{\circ}\text{C}$ (41°F)
Throttle position	$< 0.25^{\circ}$
Battery voltage	$> 10.9 \text{ V}$
Atmospheric pressure	$\geq 75.0 \text{ kPa}$ (563 mmHg, 22.17 inHg)
Vehicle speed	$\geq 53 \text{ km/h}$ (33 MPH)
Fuel shut-off function	In operation
Neutral switch	Over 1 second after changing from OFF and ON to OFF.
Load (A/C, power steering, lighting, rear defogger, heater fan and radiator fan)	No change for over 5 seconds.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

4. GENERAL DRIVING CYCLE

During deceleration fuel cut from more than 53km/h (approx. 33MPH), perform diagnosis once.
Be careful of vehicle speed and engine speed. (Diagnosis will not be completed if the vehicle speed and engine speed conditions become out of specification due to deceleration.)

5. DIAGNOSTIC METHOD

Measure the pressure values when the enable conditions are established, and perform diagnosis by calculating those results.

1. Label the intake manifold pressure value as PMOF1, which is observed when enable conditions are established, and set the EGR target step to 50 steps (nearly full open).
2. Label the intake manifold pressure value as PMON, which is observed after one second has passed since EGR target step was set to 50 steps (when the enable conditions were established), and set the EGR target step to 0.
3. Label the intake manifold pressure as PMOF2, which is observed after one second has passed since EGR target step was set to 0 (after two seconds have passed since the enable conditions were established).

Abnormality Judgment

Judge as NG when the following conditions are established, and judge as OK when not.

Judgment Value

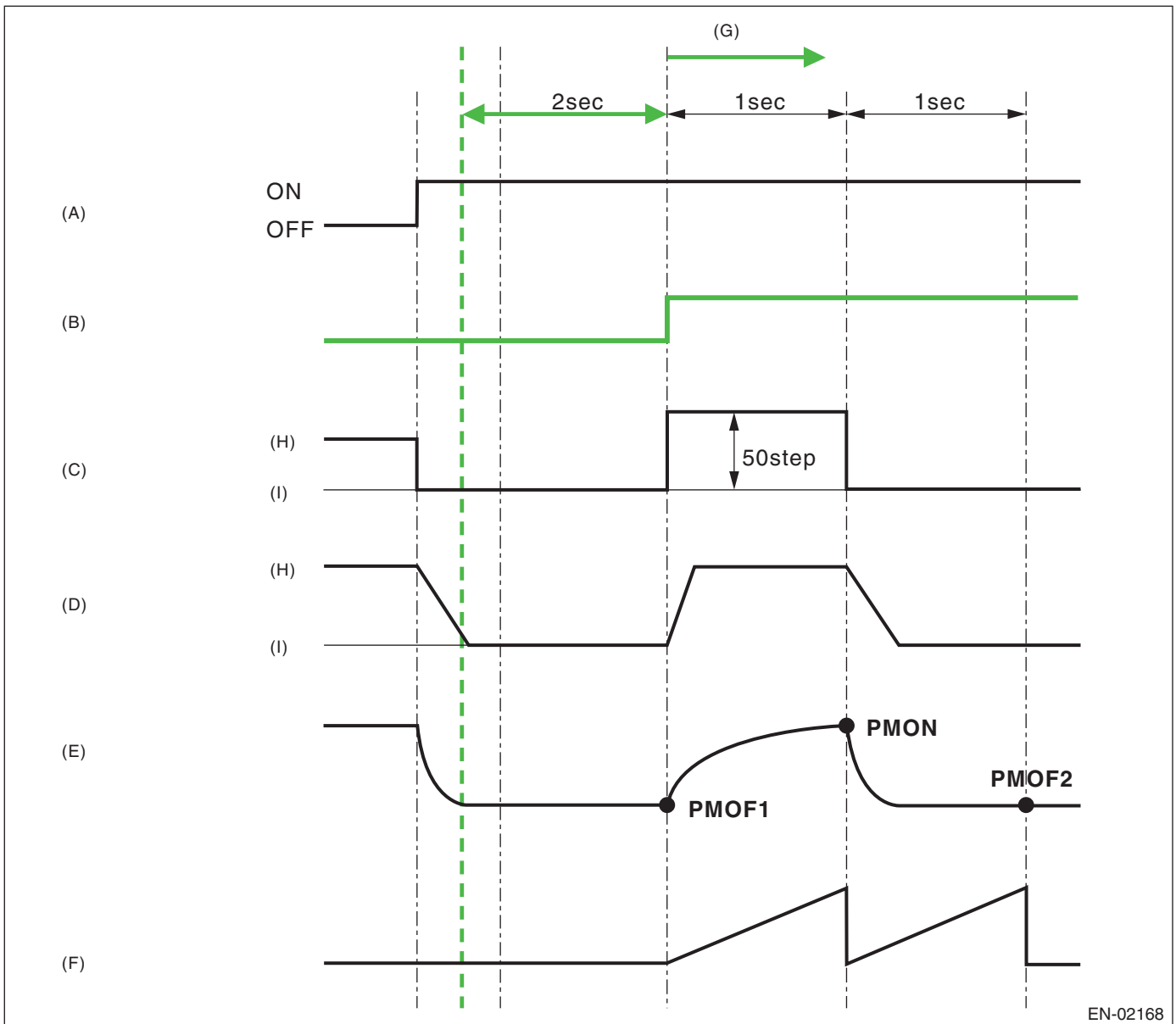
Malfunction Criteria	Threshold Value
$PMON - (PMOF1 + PMOF2) / 2$	< 2.48 kPa (18.63 mmHg, 0.733 inHg)

Time Needed for Diagnosis: 1 time

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION



EN-02168

- (A) Deceleration fuel cut
- (B) Diagnosis enable condition
- (C) EGR target step
- (D) EGR actual step

- (E) Intake manifold pressure (During normal condition)
- (F) Diagnostic mode timer

- (G) Start diagnosis.
- (H) Open
- (I) Close

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

A/F main learning = Not allowed.

Knock learning = Not allowed.

EGR control: Operation prohibited.

9. ECM OPERATION AT DTC SETTING

- Memorize the freeze frame data. (For test mode \$02)
- Memorize the diagnostic value and trouble standard value. (For test mode \$06)

BE:DTC P0420 CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (BANK 1)

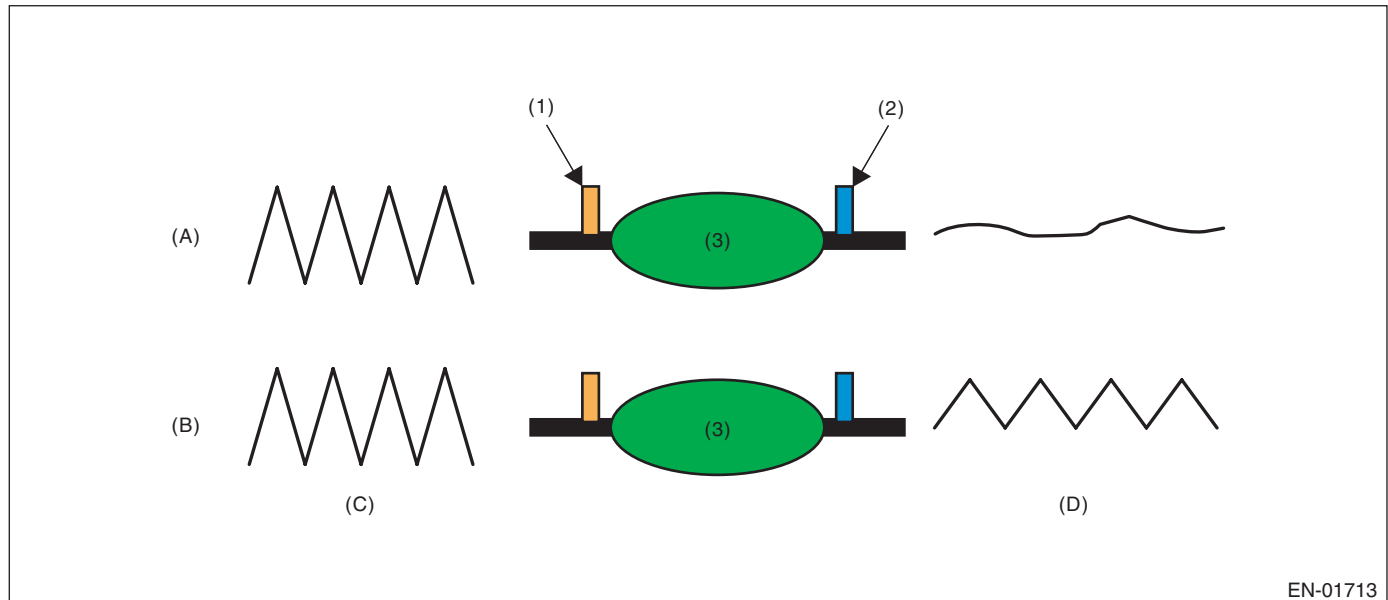
1. OUTLINE OF DIAGNOSIS

Detect the deterioration of the catalyst function.

Though the front oxygen sensor output would change slowly with a new catalyst, the sensor output with a deteriorated catalyst becomes high and the inversion time is shortened.

For this reason, the catalyst diagnosis is carried out by monitoring the front oxygen sensor output and comparing it with the front oxygen (A/F) sensor output.

2. COMPONENT DESCRIPTION



EN-01713

- (1) Front oxygen (A/F) sensor
- (2) Front oxygen sensor
- (3) Catalytic converter
- (A) Normal

- (B) Deterioration
- (C) Output waveform from the front oxygen (A/F) sensor

- (D) Output waveform from the rear oxygen sensor

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	> 10.9 V
Atmospheric pressure	> 75.1 kPa (563 mmHg, 22.2 inHg)
Engine coolant temperature	≥ 70°C (158°F)
Catalyst warm-up counter (Map 2)	≥ 8000
Misfire detection every 200 rotations	< 5 times
Learning value of evaporation gas density	≤ 0.20
Sub feedback	In operation
Amount of intake air	10 — 40 g (0.35 — 1.41 oz)/s
Time after fuel cut	≥ Value of Map 3
Evaporative system diagnosis	Not in operation
Time of difference (< 0.10) between actual and target lambda	1 seconds or more
Vehicle speed	> 70 km/h (43.5 MPH)
Engine load change every 0.5 engine revs.	< 0.02 g/rev
Rear oxygen output change from lower than 660 mV to higher than 660 mV	Experienced after fuel cut
After engine starting	≥ 205 sec.
Purge execution calculated time	5 seconds or more

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Map 2

Add the following value every 512 milliseconds.

Intake amount of air (g(oz)/s)	0 (0)	3.2 (0.113)	6.4 (0.226)	9.6 (0.339)	12.8 (0.451)	16 (0.564)	19.2 (0.677)	22.4 (0.790)	25.6 (0.903)	28.8 (1.016)	32 (1.129)	35.2 (1.242)
Total value for warm-up counter	-5	-5	15	31	46	62	77	92	108	123	127	127

Map 3

Total fuel cut time (seconds)	5	30	60	180
Time after fuel cut (seconds)	0	60	180	300

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once at a constant speed of 70 km/h (43 MPH).

5. DIAGNOSTIC METHOD

After establishing the execution conditions, calculate the front oxygen (A/F) sensor lambda deviation cumulative value per 128 milliseconds ($\sum |(sglmd_n - sglmd_{n-1})|$) and rear oxygen sensor output voltage deviation cumulative value ($\sum |(ro2sad_n - ro2sad_{n-1})|$), and when the front oxygen (A/F) sensor lambda deviation cumulative value ($\sum |(sglmd_n - sglmd_{n-1})|$) becomes higher than the predetermined value, calculate the diagnostic value.

Judge as NG when the malfunction criteria below are met. Judge as OK if the criteria below are not met.

Judgment Value

Malfunction Criteria	Threshold Value
$\sum (ro2sad_n - ro2sad_{n-1}) / \sum (sglmd_n - sglmd_{n-1}) $	> 8.5

Time Needed for Diagnosis: 30 — 55 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

None

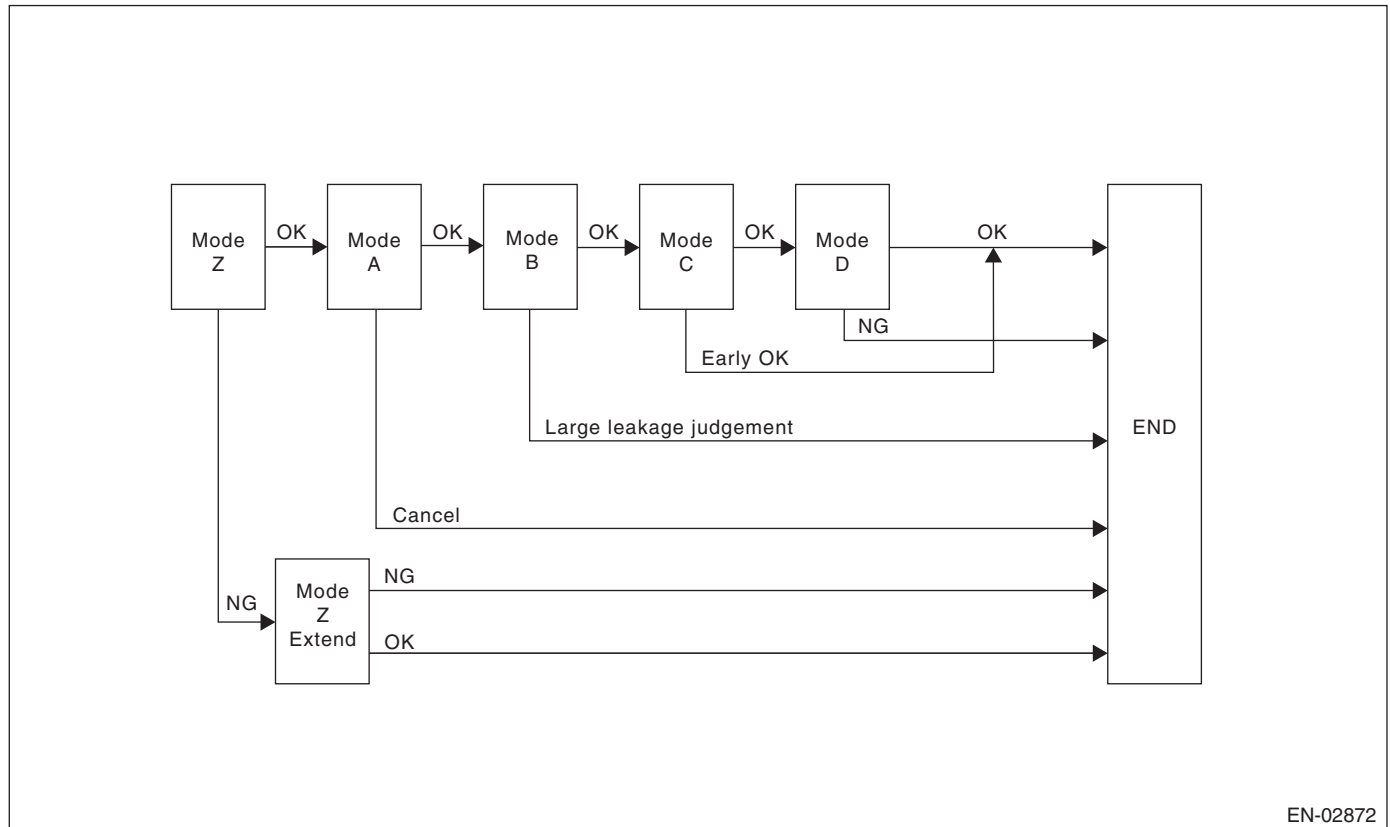
9. ECM OPERATION AT DTC SETTING

- Memorize the freeze frame data. (For test mode \$02)
- Memorize the diagnostic value and trouble standard value. (For test mode \$06)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

0.04-inch Diagnosis



EN-02872

Mode	Mode Description	Diagnosis Period
Mode Z (Purge control solenoid valve opening failure diagnosis)	Perform purge control solenoid valve opening failure diagnosis from the size of tank pressure variation from diagnosis start.	3 — 16 seconds
Mode A (Estimated evaporation amount)	Calculate the tank pressure change amount (P1).	10 seconds
Mode B (Sealed negative pressure, large leakage judgment)	Decrease the pressure in the tank to the target value by introducing the intake manifold pressure to the fuel tank. If the tank pressure cannot be reduced, it is diagnosed as large leak.	5 — 25 seconds
Mode C (Pressure increase check, advanced OK judgment)	Wait until the tank pressure returns to the target (start level of P2 calculation). If the tank pressure does not become the value, make advanced OK judgment.	1 — 15 seconds
Mode D (Negative pressure variation measurement, evaporation leakage diagnosis)	Calculate the tank pressure variation (P2), and obtain the diagnostic value using P1 found in Mode A. Perform the evaporation diagnosis using the diagnostic value.	10 seconds

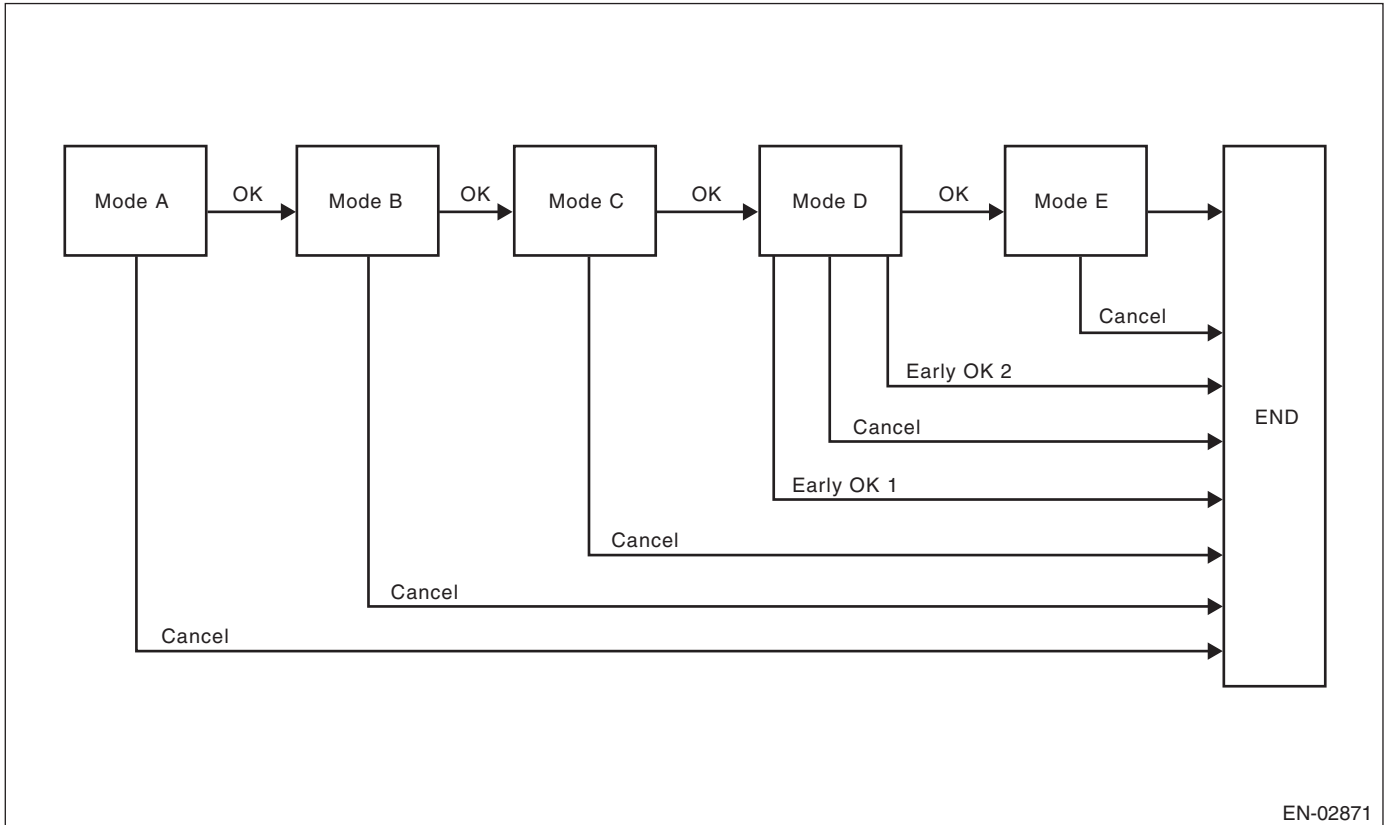
Mode Table for Evaporative Emission Control System Diagnosis

Mode	Behavior of tank internal pressure under normal conditions	Diagnostic item	DTC
Mode Z	Roughly the same as atmospheric pressure (Same as 0 kPa (0 mmHg, 0 inHg))	Purge control solenoid valve is judged to be open.	P0457
Mode A	Pressure is in proportion to amount of evaporative emission.		
Mode B	Negative pressure is formed due to intake manifold negative pressure	Large leak	P0457
Mode C	Reaches target pressure		None
Mode D	Pressure change is small.	EVAP system large leak determination. [1.0 mm (0.04 in)]	P0442

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

0.02-inch Diagnosis



Mode	Mode Description	Diagnosis Period
Mode A (0 point compensation)	When the pressure in the tank is high, wait until it returns to 0 point (Near 0 mmHg.).	0 — 12 seconds
Mode B (Negative pressure introduced)	Decrease the pressure in the tank to the target value by introducing the intake manifold pressure to the fuel tank.	0 — 27 seconds
Mode C (Negative pressure maintained)	Wait until the tank pressure returns to the target (start level of P2 calculation).	0 — 20 seconds
Mode D (Negative pressure change calculated)	Calculate the time it takes for the tank pressure to return to the P2 calculation complete pressure. If the tank pressure does not return to the P2 calculation complete pressure, make advanced OK judgment.	0 — 200 seconds
Mode E (Evaporation generated amount calculation)	Calculate the amount of evaporation (P1).	0 — 280 seconds

Diagnostic Trouble Code (DTC) Detecting Criteria

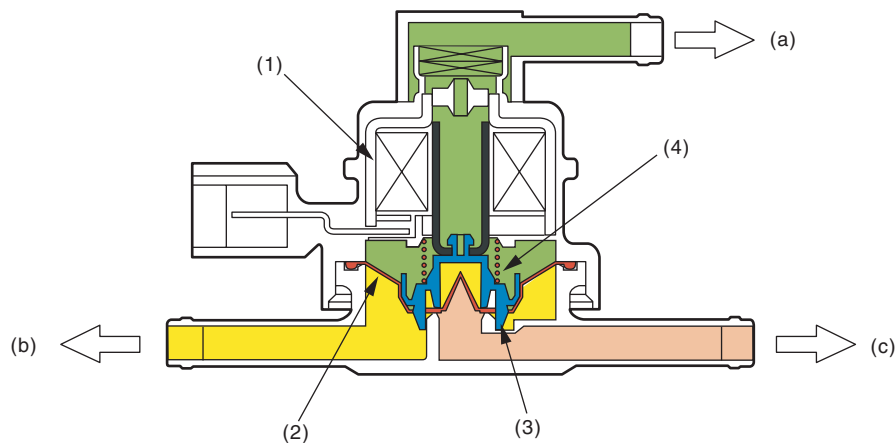
GENERAL DESCRIPTION

2. COMPONENT DESCRIPTION

Pressure control solenoid valve

PCV controls the fuel tank pressure to be equal to the atmospheric air pressure. Normally, the solenoid is set to OFF. The valve opens and closes mechanically in accordance with the pressure difference between tank and atmospheric air, or tank and canister.

The valve is forcibly opened by setting the solenoid to ON at the time of diagnosis.



EN-01715

- (1) Solenoid
- (2) Diaphragm

- (3) Valve
- (4) Spring

- (a) Atmospheric pressure
- (b) Fuel tank
- (c) Canister

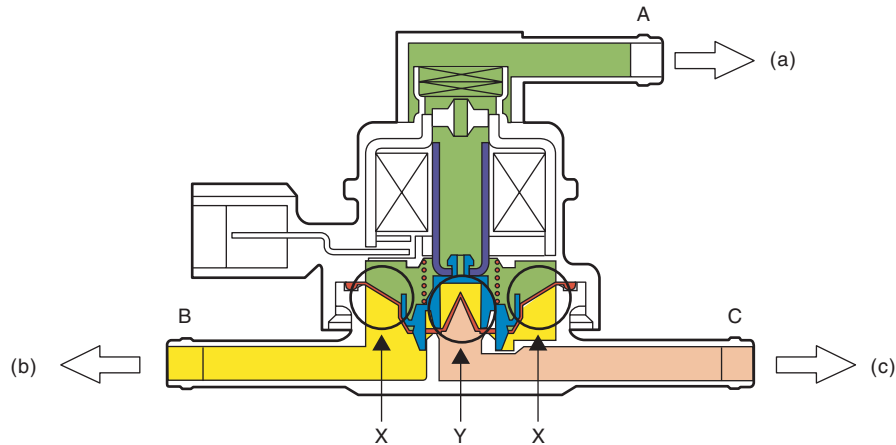
Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Valve Operation and Air Flow

In the figure below, divided by the diaphragm, the part above X is charged with atmospheric air pressure, and the part below X is charged with tank pressure. Also, the part above Y is charged with tank pressure, and the part below Y is charged with canister pressure.

If the atmospheric air pressure port is A, tank pressure port is B, and canister pressure port is C, the air flows according to pressure difference from each port as shown in the table below.



EN-01716

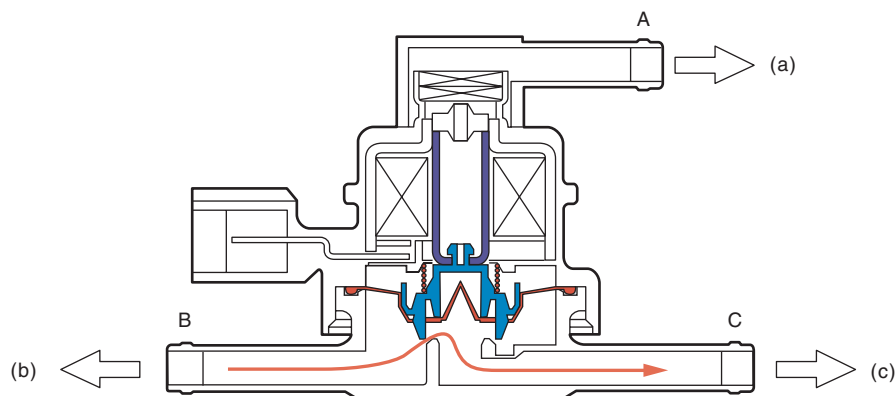
(a) Atmospheric pressure

(b) Fuel tank

(c) Canister

Condition of pressure	Flow
$A < B$ (solenoid OFF)	$B \rightarrow C$
$B < C$ (solenoid OFF)	$C \rightarrow B$
Solenoid ON	$B \leftrightarrow C$

When $A < B$ (solenoid OFF)



EN-01717

(a) Atmospheric pressure

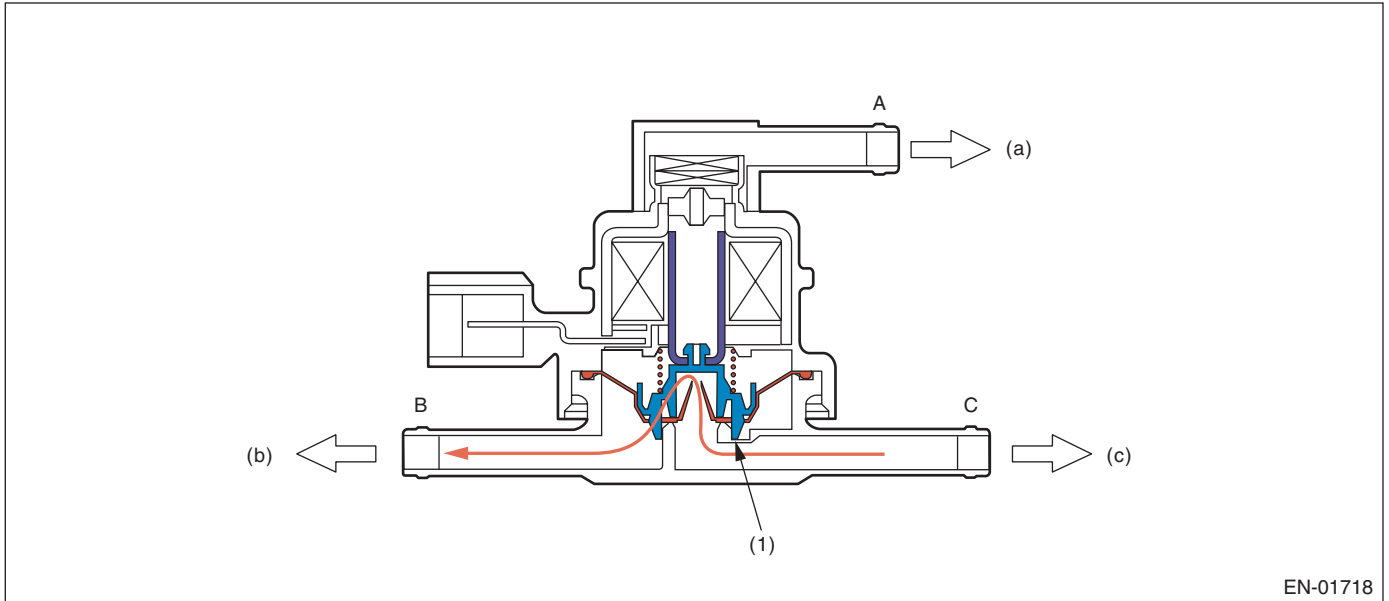
(b) Fuel tank

(c) Canister

Diagnostic Trouble Code (DTC) Detecting Criteria

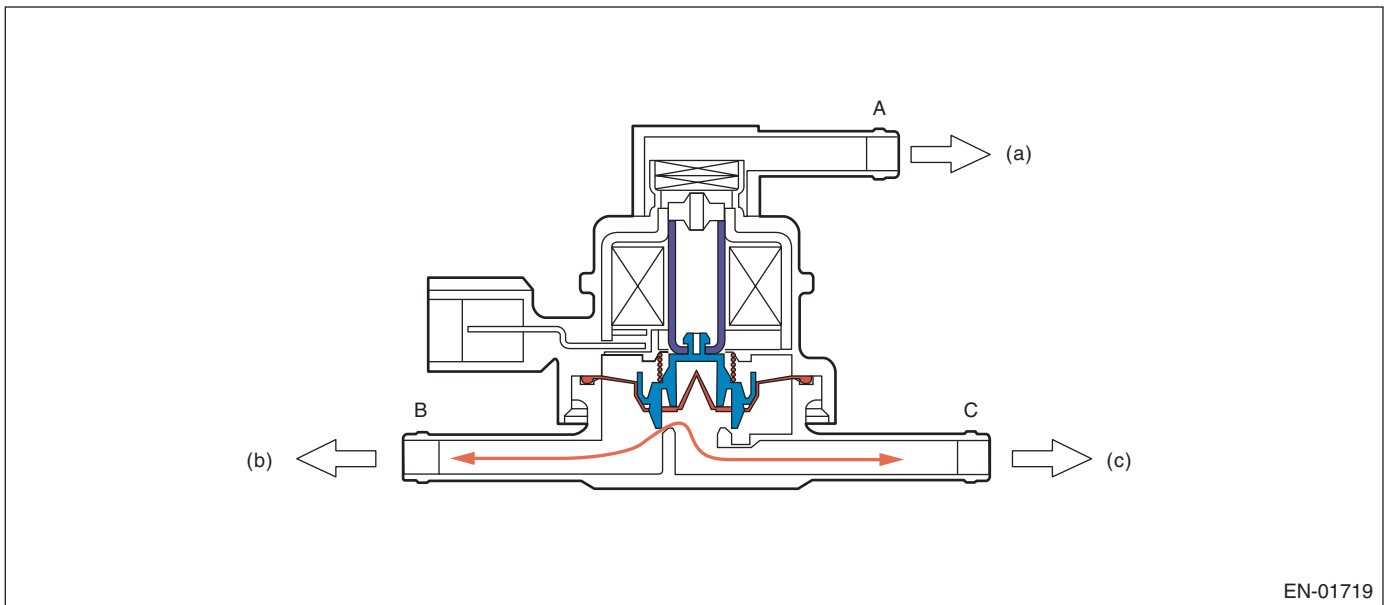
GENERAL DESCRIPTION

When $B < C$ (solenoid OFF)



- (1) Valve
- (a) Atmospheric pressure
- (b) Fuel tank
- (c) Canister

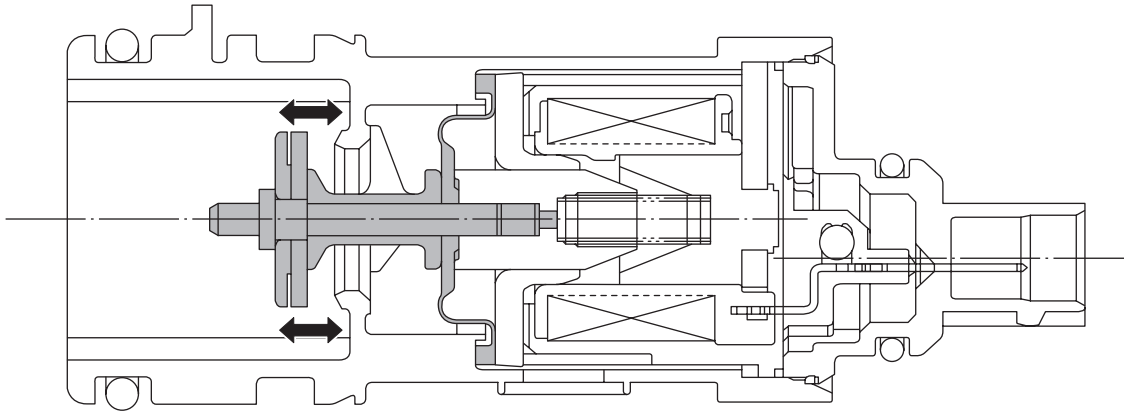
When Solenoid is ON



- (a) Atmospheric pressure
- (b) Fuel tank
- (c) Canister

Drain valve

Drain valve controls the ambient air to be introduced to the canister.



EN-02293

3. ENABLE CONDITION

0.04-inch Diagnosis

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Barometric pressure	$\geq 75.1 \text{ kPa}$ (563 mmHg, 22.17 inHg)
Total time of canister purge operation	120 seconds or more
After engine starting	856 seconds or more
Learning value of evaporation gas density	≤ 0.08
Engine speed	1050 — 6000 rpm
Fuel tank pressure	$\geq -4.00 \text{ kPa}$ (-30 mmHg, -1.18 inHg)
Intake manifold relative vacuum (relative pressure)	$< -26.7 \text{ kPa}$ (-200 mmHg, -7.87 inHg)
Vehicle speed	$\geq 32 \text{ km/h}$ (20 MPH)
Fuel level	9.6 — 54.4 ℓ (2.54 — 14.37 US gal, 2.11 — 11.97 Imp gal)
Closed air/fuel ratio control	In operation
Fuel temperature	-10 — 45°C (14 — 113°F)
Intake air temperature	$\geq -10^\circ\text{C}$ (14°F)
Pressure change per second	$< 0.23 \text{ kPa}$ (1.7 mmHg, 0.07 inHg)
Minimum pressure change value every one second — Maximum pressure change value every one second	$< 0.23 \text{ kPa}$ (1.7 mmHg, 0.07 inHg)
Change of fuel level	$< 2 \text{ ℓ/128 milliseconds}$ (0.53 US gal/128 milliseconds, 0.44 Imp gal/128 milliseconds)
Air fuel ratio	0.76 — 1.25

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

0.02-inch Diagnosis

Secondary Parameters	Enable Conditions
(At starting a diagnosis)	
Evap. diagnosis	Incomplete
Battery voltage	≥ 10.9 V
Atmospheric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)
Time since last incomplete diagnosis event of 0.02-inch leakage	
When cancelling in mode A	> 120 sec.
When cancelling in other than mode A	> 600 sec.
Total time of canister purge operation	120 seconds or more
After engine starting	120 seconds or more
Fuel temperature	−10 — 70°C (14 — 158°F)
Fuel level	9.6 — 54.4 ℓ (2.54 — 14.37 US gal, 2.11 — 11.97 Imp gal)
Intake manifold relative vacuum (relative pressure)	< −8.0 kPa (−60 mmHg, −2.36 inHg)
Fuel tank pressure	−0.43 — 1.43 kPa (−3.2 — 10.7 mmHg, −0.12 — 0.42 inHg)
Vehicle speed	≥ 30 km/h (19 MPH)
Closed air/fuel ratio control	In operation
Engine speed	550 — 6000 rpm
(During diagnosis)	
Change of fuel level	≤ Value from Map
Pressure change every one second	< 0.06 kPa (0.44 mmHg, 0.02 inHg)
Minimum pressure change value every one second — Maximum pressure change value every one second	< 0.07 kPa (0.51 mmHg, 0.02 inHg)
Pressure change in tank every second	≤ 0.1 kPa (0.75 mmHg, 0.03 inHg)
Atmospheric pressure change (Mode D)	−0.48 — 0.32 kPa (−3.6 — 2.4 mmHg, −0.14 — 0.09 inHg)
Atmospheric pressure change (Mode E)	−0.32 — 0.32 kPa (−2.4 — 2.4 mmHg, −0.09 — 0.09 inHg)

Map

Fuel level (ℓ , US gal, Imp gal)	0	10, 2.64, 2.2	20, 5.28, 4.4	30, 7.93, 6.6	40, 10.57, 8.8	50, 13.21, 11	60, 15.85, 13.2
Change (ℓ , US gal, Imp gal)	5, 1.3, 1.1	5, 1.3, 1.1	5, 1.3, 1.1	5, 1.3, 1.1	5, 1.3, 1.1	5, 1.3, 1.1	5, 1.3, 1.1

4. GENERAL DRIVING CYCLE

0.04-inch Diagnosis

- Perform the diagnosis only once in 856 seconds or more after starting the engine, at a constant speed of 32 km/h (20 MPH) or more.
- Pay attention to the fuel temperature and fuel level.

0.02-inch Diagnosis

- Perform the diagnosis after 770 seconds or more after starting the engine, at a constant engine speed of 68 km/h (42 MPH) or higher, to judge as NG or OK.
- If judgment cannot be made, repeat the diagnosis.
- Be careful of the remaining fuel level.

5. DIAGNOSTIC METHOD

Purge control solenoid valve stuck open fault diagnosis

DTC

P0457 Evaporative Emission Control System Leak Detected (Fuel Cap Loose/Off)

Purpose of Mode Z

When performing the leakage diagnosis of EVAP system, the purge control solenoid valve must operate normally. Therefore, mode Z is used to diagnose the purge control solenoid valve stuck open condition. Note that if a purge control solenoid valve stuck open fault is detected, the EVAP system leakage diagnosis is cancelled.

Diagnostic method

Purge control solenoid valve functional diagnosis is performed by monitoring the tank pressure in mode Z.

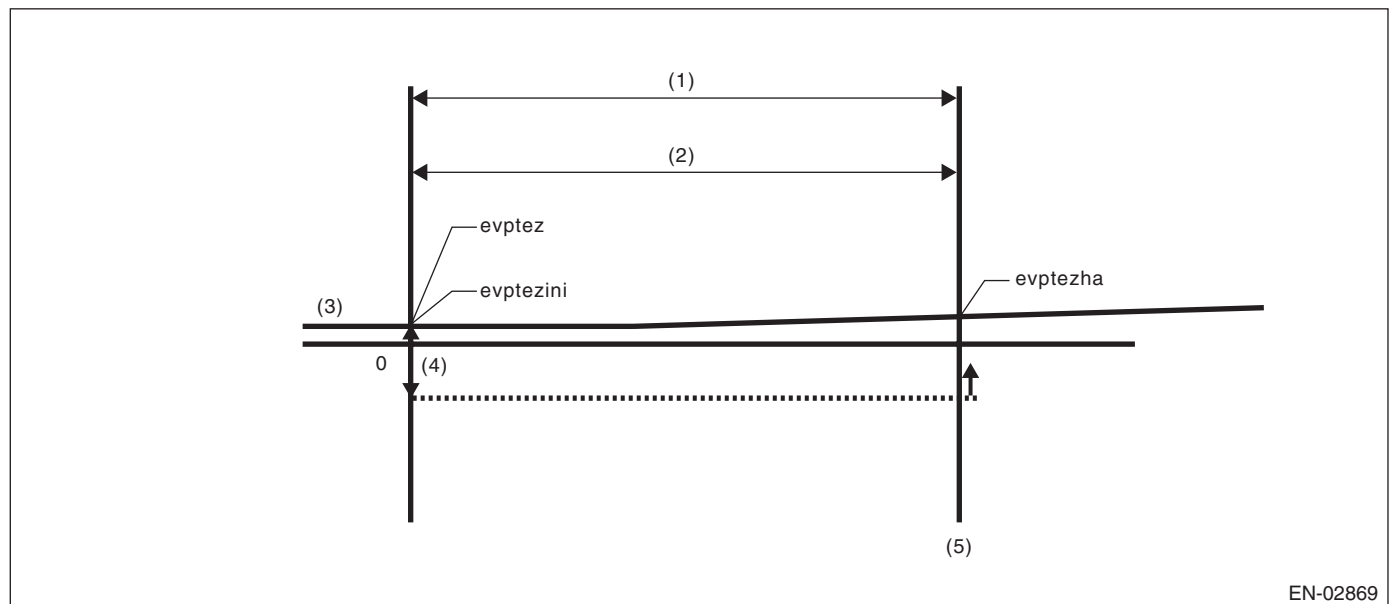
Normality Judgment

Judge as OK and change to Mode A when the criteria below are completed in 3 seconds after Mode Z started.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
(Tank pressure when Mode Z started) – (Tank pressure when Mode Z finished)	$\leq 0.4 \text{ kPa}$ (3 mmHg, 0.12 inHg)	P0457

Normal



EN-02869

(1) Mode Z	(3) Fuel tank pressure	(5) OK judgment
(2) 3 seconds	(4) 0.4 kPa (3.0 mmHg, 0.12 inHg)	

- $evptez - evptezha \leq 0.4 \text{ kPa}$ (3.0 mmHg, 0.12 inHg)
- $evptezini - evptezha \leq 0.4 \text{ kPa}$ (3.0 mmHg, 0.12 inHg)

Judge as normal when both calculations are established.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Abnormality Judgment

If OK judgment cannot be made, extend Mode Z 16 seconds more, and Judge as NG when all the criteria below are completed in 16 seconds.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
(Tank pressure when Mode Z started) – (Tank pressure when Mode Z finished)	> 0.6 kPa (4.5 mmHg, 0.18 inHg)	P0457
Tank pressure when Mode Z started	≤ 1.43 kPa (10.7 mmHg, 0.42 inHg)	
Time of 2 ℓ or more fuel no sloshing	≥ 40 sec.	

Time Needed for Diagnosis: 16 seconds

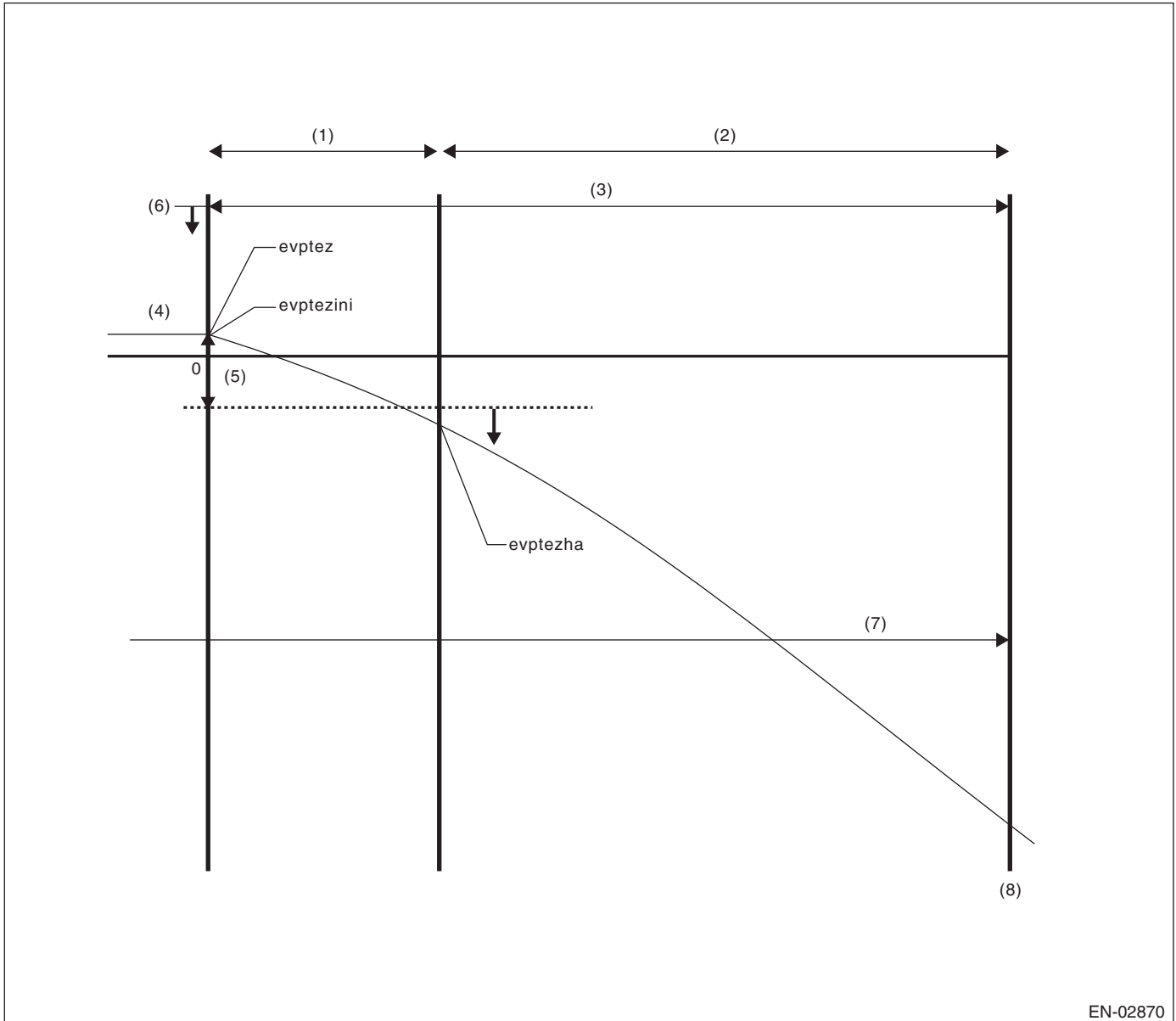
Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

When judgment for purge control solenoid valve stuck open NG is made, end the evaporative diagnosis.
Cancel the evaporative diagnosis when the OK/NG judgment for purge control solenoid valve stuck open cannot be made in Mode Z.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Purge control solenoid valve Open Fixation



EN-02870

(1) Mode Z	(4) Fuel tank pressure	(7) No fuel sloshing for 40 seconds
(2) Extended mode Z	(5) 0.87 kPa (6.5 mmHg, 0.26 inHg)	(8) NG judgment
(3) 16 seconds	(6) 1.43 kPa (10.7 mmHg, 0.42 inHg)	

- $evptezini, evptez \leq 1.43 \text{ kPa (10.7 mmHg, 0.42 inHg)}$
 - $evptez - evptezha \leq 0.87 \text{ kPa (6.5 mmHg, 0.26 inHg)}$
 - $evptezini - evptezha \leq 0.87 \text{ kPa (6.5 mmHg, 0.26 inHg)}$
 - No fuel sloshing of over 2 $\varnothing$ (0.53 US gal, 0.44 Imp gal) for 40 seconds or more.
- Judge as normal when all are established.

Leak Diagnosis

DTC

P0442 Evaporative Emission Control System Leak Detected (Small Leak)

P0457 Evaporative Emission Control System Leak Detected (Fuel Cap Loose/Off)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Diagnostic method

- The diagnostic method consists of creating a sealed vacuum in the fuel tank and then determining the presence of leakage from the speed at which the tank internal pressure returns to atmospheric pressure.
- The diagnosis is divided into the following five phases.

Mode A: (Estimated evaporation gas amount)

Calculate the tank pressure change amount (P1) when using mode A. After calculating P1, switch to mode B.

Mode B: (Negative pressure sealed)

Introduce negative pressure in the intake manifold to the tank.

Approximately 0 → -1.4 kPa (0 → -10.5 mmHg, 0 → -0.41 inHg)

When the pressure above (desired negative pressure) is reached, enters Mode C.

In this case, if the tank pressure does not reach the target negative pressure, judge that there is a large leakage (10 seconds or 25 seconds) in the system and terminate the evaporative emission control system diagnosis.

Abnormality Judgment

Judge as NG (large leak) when the criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Time to reach target negative pressure Or mode B time (Min. pressure value in tank when in mode B) – (Tank pressure when mode B started)	≥ 25 sec. ≥ 10 sec. < -0.33 kPa (-2.5 mmHg, -0.097 inHg)	P0457

Mode C: (Check pressure rise)

Stop the introduction of negative pressure. (Wait until the tank pressure returns to the start level of P2 calculation.)

Change to Mode D when the tank pressure returns to the start level of P2 calculation.

Judge immediate OK and change to Mode E when it does not return in spite of spending the specified time.

Tank pressure when starting calculation of P2	Time for advanced OK judgment
-1.3 kPa (-9.75 mmHg, -0.38 inHg)	15 seconds

Mode D: (Measure amount of negative pressure change)

Monitor the tank pressure change amount when using mode D. In this case, the tank pressure increases, (nears atmospheric pressure) because evaporation occurs. However, if any leakage exists, the pressure increases additionally in proportion to this leakage. The pressure variation of this tank is P2.

After calculating P2, perform a small leak diagnosis according to the items below.

When Mode D is ended

Assign tank variations measured in Mode A and Mode D; P1 and P2, to the formula below, judge small leaks in the system. If the measured judgment value exceeds the threshold value, it is judged to be a malfunction.

Abnormality Judgment

Judge as NG when the criteria below are met and judge as OK when not met, and clear NG.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
P2 – 1.5 × P1 P2: Tank pressure that changes every 10 seconds in mode D P1: Tank pressure that changes every 10 seconds in mode A	> Value from Map 7 * Threshold value: Map (Remaining Fuel vs Tank temperature)	P0442

* 1.5: Evaporation amount compensation value when below negative pressure (Amount of evaporation occurrence increases as a vacuum condition increases.)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Map 7 Malfunction criteria limit for evaporation diagnosis

Fuel temperature & Fuel level	25°C (77°F)	30°C (86°F)	35°C (95°F)	40°C (104°F)	45°C (113°F)
10 L (2.6 US gal, 2.2 Imp gal)	0.28 kPa (2.1 mmHg, 0.083 inHg)	0.29 kPa (2.2 mmHg, 0.086 inHg)	0.31 kPa (2.3 mmHg, 0.092 inHg)	0.313 kPa (2.35 mmHg, 0.0924 inHg)	0.32 kPa (2.4 mmHg, 0.095 inHg)
20 L (5.3 US gal, 4.4 Imp gal)	0.31 kPa (2.3 mmHg, 0.092 inHg)	0.32 kPa (2.4 mmHg, 0.095 inHg)	0.33 kPa (2.5 mmHg, 0.097 inHg)	0.35 kPa (2.6 mmHg, 0.103 inHg)	0.36 kPa (2.7 mmHg, 0.106 inHg)
30 L (7.9 US gal, 6.6 Imp gal)	0.39 kPa (2.9 mmHg, 0.115 inHg)	0.407 kPa (3.05 mmHg, 0.12 inHg)	0.42 kPa (3.15 mmHg, 0.124 inHg)	0.43 kPa (3.25 mmHg, 0.127 inHg)	0.447 kPa (3.35 mmHg, 0.132 inHg)
40 L (10.6 US gal, 8.8 Imp gal)	0.39 kPa (2.9 mmHg, 0.115 inHg)	0.42 kPa (3.15 mmHg, 0.124 inHg)	0.44 kPa (3.3 mmHg, 0.13 inHg)	0.45 kPa (3.4 mmHg, 0.133 inHg)	0.47 kPa (3.5 mmHg, 0.139 inHg)
50 L (13.2 US gal, 11.0 Imp gal)	0.427 kPa (3.2 mmHg, 0.126 inHg)	0.44 kPa (3.3 mmHg, 0.13 inHg)	0.47 kPa (3.5 mmHg, 0.139 inHg)	0.48 kPa (3.6 mmHg, 0.142 inHg)	0.49 kPa (3.7 mmHg, 0.145 inHg)

Time Needed for Diagnosis: 30 — 100 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Leak Diagnosis

DTC

P0456 Evaporative Emission Control System Leak Detected (very small leak)

Diagnostic method

- The diagnostic method consists of creating a sealed vacuum in the fuel tank and then determining the presence of leakage from the speed at which the tank internal pressure returns to atmospheric pressure.
- The diagnosis is divided into the following five phases.

Mode A: (0 point compensation)

When the pressure in the tank is high, wait until it returns to 0 point (Near 0 mmHg.). Shift to mode B when returned to the 0 point. Cancel the diagnosis when 0 point does not return in the specified time.

Mode B: (Negative pressure introduced)

Introduce negative pressure in the intake manifold to the tank.

Approximately 0 → -2.0 kPa (0 → -15 mmHg, 0 → -0.59 inHg)

When the pressure above (desired negative pressure) is reached, enters Mode C.

When the tank internal pressure does not reach the target negative pressure, the diagnosis is cancelled.

Mode C: (Negative pressure maintained)

Stop the introduction of negative pressure. (Wait until the tank pressure returns to the start level of P2 calculation.)

Change to Mode D either when the tank pressure returns to the start level of P2 calculation, or when the predetermined amount of time has passed.

Mode D: (Calculate the amount of negative pressure change)

Monitor the tank pressure in mode D, calculate (P2) the pressure change in the tank, and measure the time (evpdset) for the tank pressure to return when calculation of P2 is completed. Change to Mode E when the tank pressure returns to the end level of P2 calculation. If it does not return to the P2 calculation end tank internal pressure after the predetermined amount of time has passed, make advanced OK judgment or cancel the diagnosis.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Normality Judgment

Judge as OK when the criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Advanced OK judgment 1 Mode D time Tank internal pressure	≥ 30 sec. ≤ -1.8 kPa (-13.4 mmHg, -0.53 inHg)
Advanced OK judgment 2 Mode D time P2	≥ 200 sec. ≤ 0.9 — 1.3 kPa (7 — 9.6 mmHg, 0.28 — 0.38 inHg)

Mode E: (Evaporation occurrence amount calculation)

Calculate the change of tank pressure (P1) with the time evpdset to judge as NG/OK according to the value of P1. (ambiguous determination acceptable).

Abnormality Judgment

Judge as NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
P1	< Value from Map 7 * Threshold value : Map (Fuel level vs. evpdset)

Map 7 Malfunction criteria limit for evaporation diagnosis

Time (evpdset) vs Fuel level	0 seconds	30 seconds	50 seconds	100 seconds	160 seconds	200 seconds
10 L (2.6 US gal, 2.2 Imp gal)	0 kPa (0 mmHg, 0 inHg)	0.07 kPa (0.5 mmHg, 0.02 inHg)	0.23 kPa (1.7 mmHg, 0.068 inHg)	0.36 kPa (2.7 mmHg, 0.106 inHg)	0.36 kPa (2.7 mmHg, 0.106 inHg)	0.36 kPa (2.7 mmHg, 0.106 inHg)
20 L (5.3 US gal, 4.4 Imp gal)	0 kPa (0 mmHg, 0 inHg)	0.07 kPa (0.5 mmHg, 0.02 inHg)	0.23 kPa (1.7 mmHg, 0.068 inHg)	0.36 kPa (2.7 mmHg, 0.106 inHg)	0.36 kPa (2.7 mmHg, 0.106 inHg)	0.36 kPa (2.7 mmHg, 0.106 inHg)
30 L (7.9 US gal, 6.6 Imp gal)	0 kPa (0 mmHg, 0 inHg)	0.07 kPa (0.5 mmHg, 0.02 inHg)	0.23 kPa (1.7 mmHg, 0.068 inHg)	0.36 kPa (2.7 mmHg, 0.106 inHg)	0.36 kPa (2.7 mmHg, 0.106 inHg)	0.36 kPa (2.7 mmHg, 0.106 inHg)
40 L (10.6 US gal, 8.8 Imp gal)	0 kPa (0 mmHg, 0 inHg)	0.07 kPa (0.5 mmHg, 0.02 inHg)	0.25 kPa (1.85 mmHg, 0.074 inHg)	0.33 kPa (2.5 mmHg, 0.097 inHg)	0.33 kPa (2.5 mmHg, 0.097 inHg)	0.33 kPa (2.5 mmHg, 0.097 inHg)
50 L (13.2 US gal, 11.0 Imp gal)	0 kPa (0 mmHg, 0 inHg)	0.07 kPa (0.5 mmHg, 0.02 inHg)	0.27 kPa (2 mmHg, 0.09 inHg)	0.31 kPa (2.3 mmHg, 0.092 inHg)	0.31 kPa (2.3 mmHg, 0.092 inHg)	0 kPa (0 mmHg, 0 inHg)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Normality Judgment

Judge as OK when the criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
P1	> Value from Map 8 * Threshold value : Map (Fuel level vs. evpdset)

Map 8 Malfunction criteria limit for evaporation diagnosis

Time (evpdset) vs. Fuel level	0 seconds	30 seconds	50 seconds	100 seconds	160 seconds	200 seconds
10 L (2.6 US gal, 2.2 Imp gal)	0.1 kPa (1 mmHg, 0.03 inHg)	0.47 kPa (3.5 mmHg, 0.139 inHg)	0.56 kPa (4.2 mmHg, 0.165 inHg)	0.56 kPa (4.2 mmHg, 0.165 inHg)	0.56 kPa (4.2 mmHg, 0.165 inHg)	0.56 kPa (4.2 mmHg, 0.165 inHg)
20 L (5.3 US gal, 4.4 Imp gal)	0.1 kPa (1 mmHg, 0.03 inHg)	0.43 kPa (3.25 mmHg, 0.127 inHg)	0.55 kPa (4.1 mmHg, 0.162 inHg)	0.55 kPa (4.1 mmHg, 0.162 inHg)	0.55 kPa (4.1 mmHg, 0.162 inHg)	0.55 kPa (4.1 mmHg, 0.162 inHg)
30 L (7.9 US gal, 6.6 Imp gal)	0.1 kPa (1 mmHg, 0.03 inHg)	0.4 kPa (3 mmHg, 0.12 inHg)	0.52 kPa (3.9 mmHg, 0.154 inHg)	0.52 kPa (3.9 mmHg, 0.154 inHg)	0.52 kPa (3.9 mmHg, 0.154 inHg)	0.52 kPa (3.9 mmHg, 0.154 inHg)
40 L (10.6 US gal, 8.8 Imp gal)	0.1 kPa (1 mmHg, 0.03 inHg)	0.3 kPa (2.25 mmHg, 0.09 inHg)	0.45 kPa (3.4 mmHg, 0.133 inHg)	0.45 kPa (3.4 mmHg, 0.133 inHg)	0.45 kPa (3.4 mmHg, 0.133 inHg)	0.45 kPa (3.4 mmHg, 0.133 inHg)
50 L (13.2 US gal, 11.0 Imp gal)	0.1 kPa (1 mmHg, 0.03 inHg)	0.2 kPa (1.5 mmHg, 0.06 inHg)	0.39 kPa (2.9 mmHg, 0.115 inHg)	0.39 kPa (2.9 mmHg, 0.115 inHg)	0.39 kPa (2.9 mmHg, 0.115 inHg)	0.39 kPa (2.9 mmHg, 0.115 inHg)

Time Needed for Diagnosis: 65 — 514 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When “Clear Memory” is performed

8. FAIL SAFE

None

9. ECM OPERATION AT DTC SETTING

- Memorize the freeze frame data. (For test mode \$02)
- Memorize the diagnostic value and trouble standard value. (For test mode \$06)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

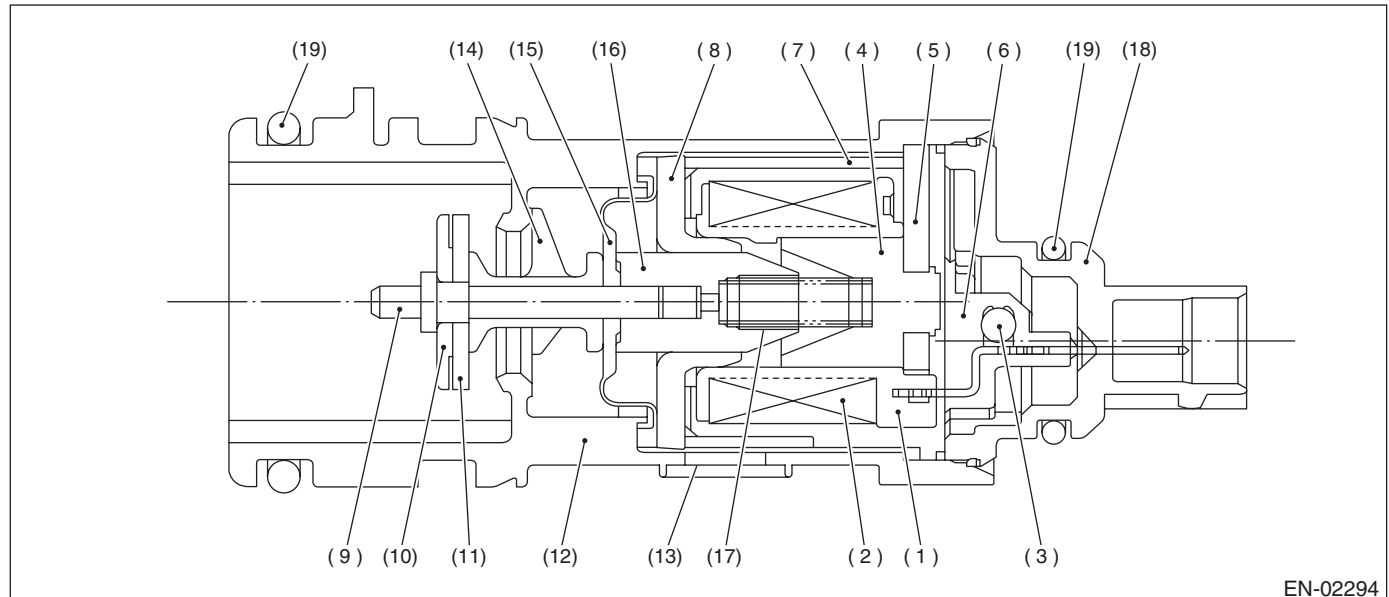
BG:DTC P0447 EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL CIRCUIT OPEN

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the drain valve.

Judge as NG when the ECM output level differs from the actual terminal level.

2. COMPONENT DESCRIPTION



(1) Bobbin	(8) Magnetic plate	(14) Retainer
(2) Coil	(9) Shaft	(15) Diaphragm
(3) Diode	(10) Plate	(16) Movable core
(4) Stator core	(11) Valve	(17) Spring
(5) End plate	(12) Housing	(18) Cover
(6) Body	(13) Filter	(19) O-ring
(7) Yoke		

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than 2.5 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Battery voltage	≥ 10.9 V
After engine starting	1 second or more
Terminal output voltage when ECM outputs OFF signal	Low

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Battery voltage	≥ 10.9 V
After engine starting	1 second or more
Terminal output voltage when ECM outputs OFF signal	High

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

Pressure control solenoid valve control: Open the pressure control solenoid valve.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

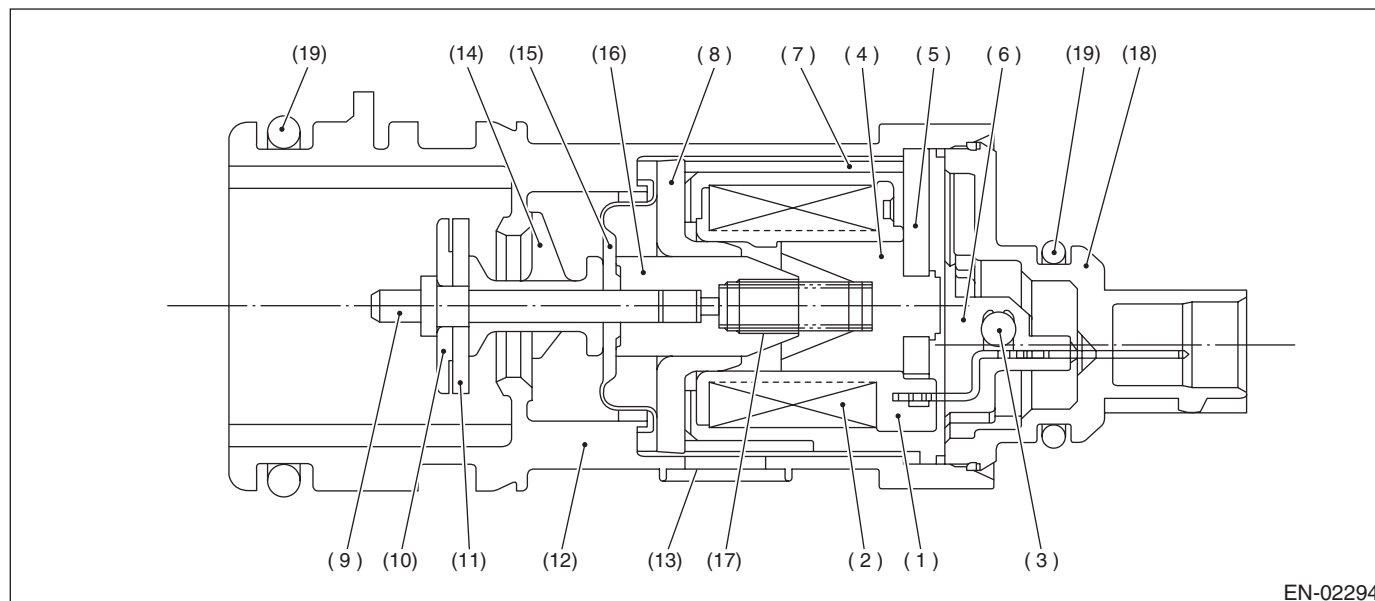
BH:DTC P0448 EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL CIRCUIT SHORTED

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the drain valve.

Judge as NG when the ECM output level differs from the actual terminal level.

2. COMPONENT DESCRIPTION



(1) Bobbin	(8) Magnetic plate	(14) Retainer
(2) Coil	(9) Shaft	(15) Diaphragm
(3) Diode	(10) Plate	(16) Movable core
(4) Stator core	(11) Valve	(17) Spring
(5) End plate	(12) Housing	(18) Cover
(6) Body	(13) Filter	(19) O-ring
(7) Yoke		

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than 2.5 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Battery voltage	$\geq 10.9 \text{ V}$
After engine starting	1 second or more
Terminal output voltage when ECM outputs ON signal	High

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Battery voltage	$\geq 10.9 \text{ V}$
After engine starting	1 second or more
Terminal output voltage when ECM outputs ON signal	Low

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

Pressure control solenoid valve control: Open the pressure control solenoid valve.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

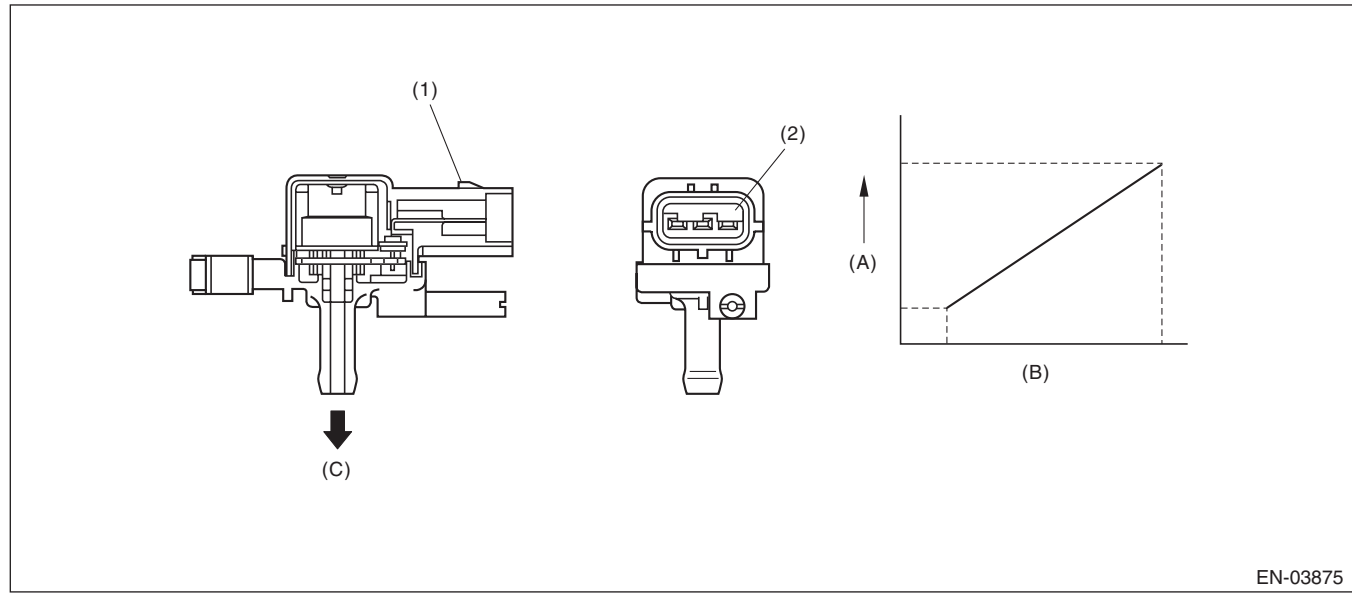
BI: DTC P0451 EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR

1. OUTLINE OF DIAGNOSIS

Detect the tank pressure sensor output property abnormality.

Judge as NG when there is no pressure variation, which should exist in the tank, considering the engine status.

2. COMPONENT DESCRIPTION



EN-03875

- (1) Connector
(2) Terminal

- (A) Output voltage
(B) Input voltage

- (C) To fuel tank

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
After engine starting	60 seconds or more
Fuel level	$\geq 9.6 \text{ } \ell$ (2.54 US gal, 2.11 Imp gal)
Fuel temperature	$< 35^{\circ}\text{C}$ (95°F)
Battery voltage	$\geq 10.9 \text{ V}$
Atmospheric pressure	$> 75.1 \text{ kPa}$ (563 mmHg, 22.2 inHg)

4. GENERAL DRIVING CYCLE

- Perform the diagnosis continuously after 60 seconds or more have passed since the engine started.
- Be sure to check the fuel level and fuel temperature.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Number of times that the difference between the Max. fuel level and Min. fuel level every 60 seconds is 2 ℓ (0.53 US gal, 0.44 Imp gal) or more (with enable condition completed)	≥ 16 times
Maximum – Minimum tank pressure (with enable condition completed)	< 0.05 kPa (0.375 mmHg, 0.01 inHg)
Maximum – Minimum fuel temperature (with enable condition completed)	≥ 7°C (12.6°F)

If the maximum value – minimum value for the fuel level every 60 seconds is less than 2 liters, extend 60 seconds and make judgment with the maximum and minimum values for the fuel level in 120 seconds. If a difference does not appear though the time was extended 60 seconds, extend the time (180, 240, 300 seconds) and continue the judgment. If the maximum value – minimum value for the fuel level is more than 2 ℓ, the diagnosis counter counts up.

Time Needed for Diagnosis: 1 minute × 16 times or more

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Maximum – Minimum tank pressure	≥ 0.05 kPa (0.375 mmHg, 0.01 inHg)

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When “Clear Memory” is performed

8. FAIL SAFE

Purge control solenoid valve control: Purge fixed mode is prohibited.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

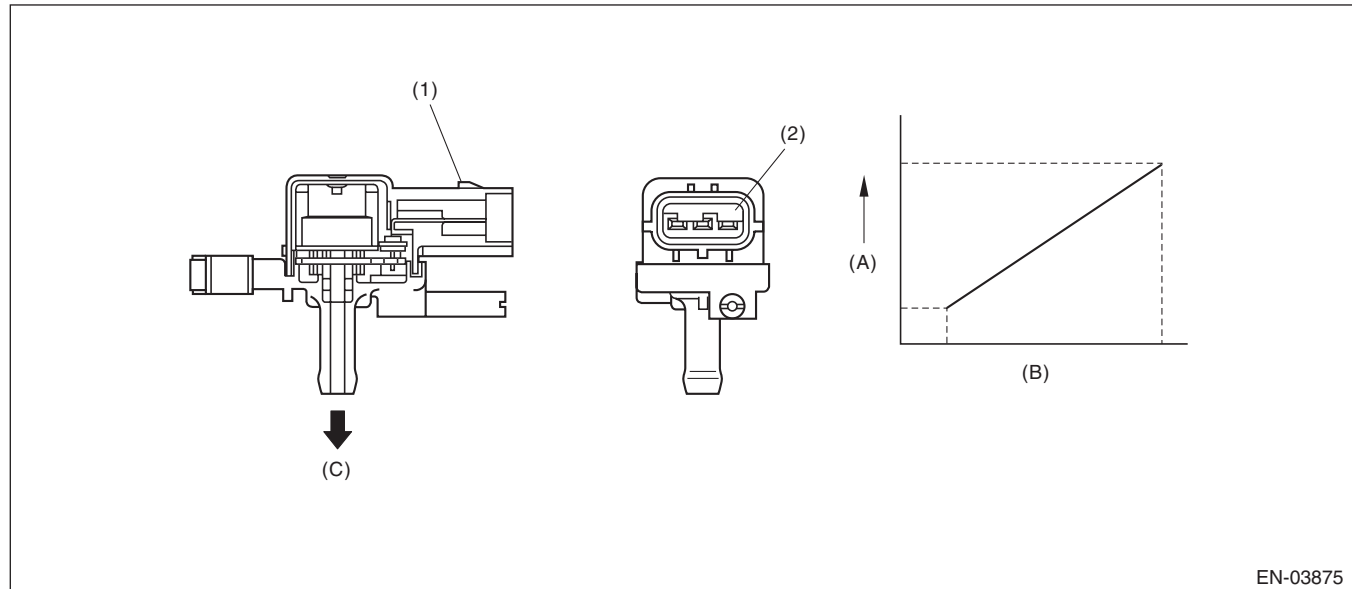
GENERAL DESCRIPTION

BJ:DTC P0452 EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR LOW INPUT

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the fuel tank pressure sensor.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION



- (1) Connector
- (2) Terminal

- (A) Output voltage
- (B) Input voltage

- (C) To fuel tank

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes 15 seconds or more.

Judgment Value

Malfunction Criteria	Threshold Value
Fuel tank pressure	≤ -7.44 kPa (-55.85 mmHg, -2.197 inHg)

Time Needed for Diagnosis: 15 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK when the criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Fuel tank pressure	> -7.44 kPa (-55.85 mmHg, -2.197 inHg)

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

Purge control solenoid valve control: Purge fixed mode is prohibited.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

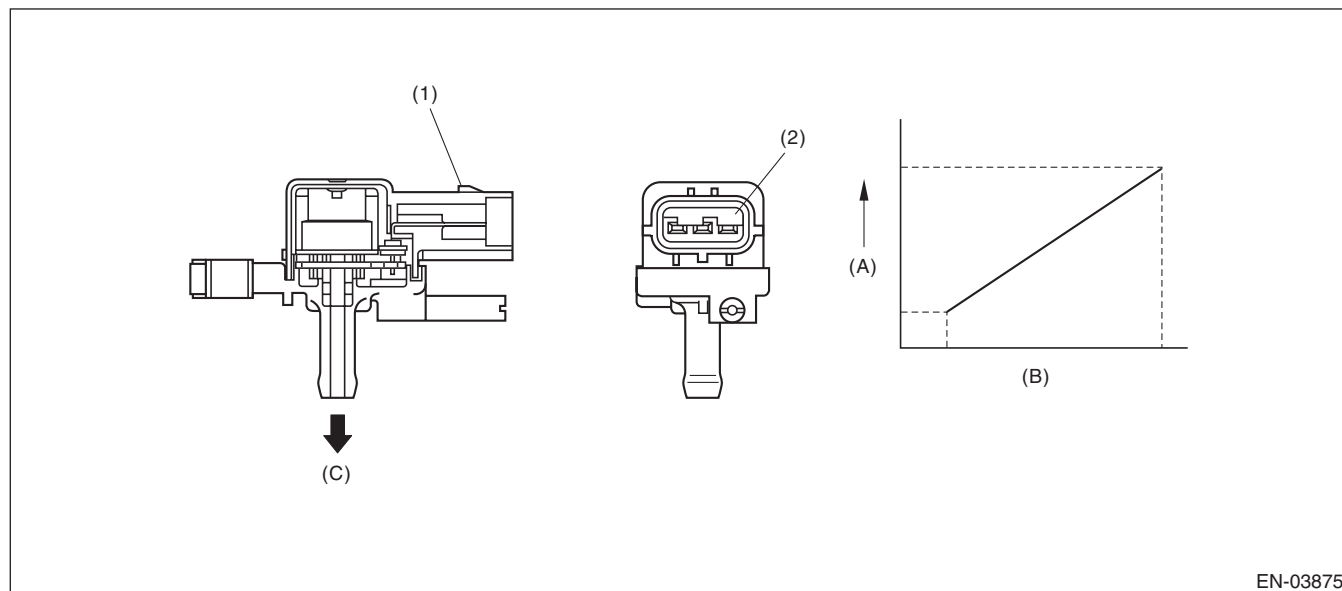
GENERAL DESCRIPTION

BK:DTC P0453 EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR HIGH INPUT

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the fuel tank pressure sensor.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION



EN-03875

- (1) Connector
(2) Terminal

- (A) Output voltage
(B) Input voltage

- (C) To fuel tank

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Vehicle speed	≥ 2 km/h (1.24 MPH)
All conditions of EVAP canister purge	Completed
Learning value of evaporation gas density	≤ 0.08
Main feedback compensation coefficient	≥ 0.9
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continually when purging.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes 15 seconds or more.

Judgment Value

Malfunction Criteria	Threshold Value
Fuel tank pressure	> 7.98 kPa (59.85 mmHg, 2.36 inHg)
Fuel temperature	< 35°C (95°F)
Atmospheric pressure	≥ 75.1 kPa (563 mmHg, 22.2 inHg)

Time Needed for Diagnosis: 15 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK when the criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Fuel tank pressure	≤ 7.98 kPa (59.85 mmHg, 2.36 inHg)

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

Purge control solenoid valve control: Purge fixed mode is prohibited.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

BL:DTC P0456 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (VERY SMALL LEAK)

NOTE:

For the detection standard, refer to DTC P0442 Evaporative system (Small leak). <Ref. to GD(H4SO U5)-119, DTC P0442 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (SMALL LEAK), Diagnostic Trouble Code (DTC) Detecting Criteria.>

BM:DTC P0457 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (FUEL CAP LOOSE/OFF)

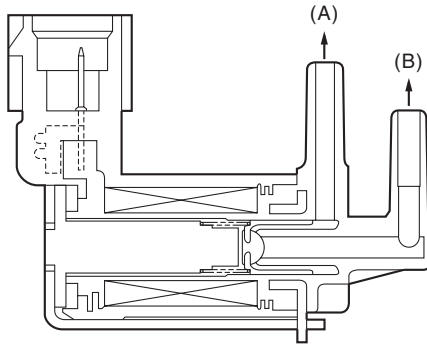
NOTE:

For the detection standard, refer to DTC P0442 Evaporative system (Small leak). <Ref. to GD(H4SO U5)-119, DTC P0442 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (SMALL LEAK), Diagnostic Trouble Code (DTC) Detecting Criteria.>

BN:DTC P0458 EVAPORATIVE EMISSION SYSTEM PURGE CONTROL VALVE CIRCUIT LOW**1. OUTLINE OF DIAGNOSIS**

Detect open or short circuit of the purge control solenoid valve.

Judge as NG when the ECM output level differs from the actual terminal level.

2. COMPONENT DESCRIPTION

EN-01733

(A) To canister

(B) To intake manifold

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	$\geq 10.9 \text{ V}$
After engine starting	1 second or more

4. GENERAL DRIVING CYCLE

Always perform the diagnosis after starting the engine.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Continuous time with the following conditions established:	≥ 2.5 sec.
Duty ratio of "ON"	$< 75\%$
Terminal output voltage	Low

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal output voltage	High

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

None

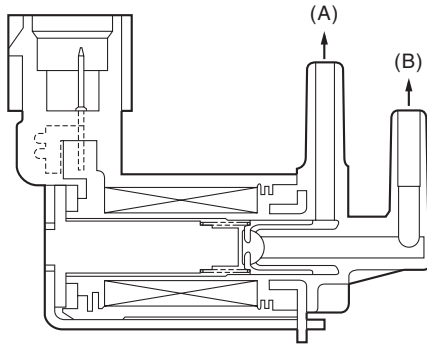
9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

BO:DTC P0459 EVAPORATIVE EMISSION SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH**1. OUTLINE OF DIAGNOSIS**

Detect open or short circuit of the purge control solenoid valve.

Judge as NG when the ECM output level differs from the actual terminal level.

2. COMPONENT DESCRIPTION

EN-01733

(A) To canister

(B) To intake manifold

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	$\geq 10.9 \text{ V}$
After engine starting	1 second or more

4. GENERAL DRIVING CYCLE

Always perform the diagnosis after starting the engine.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Continuous time with the following conditions established:	≥ 2.5 sec.
Duty ratio of "ON"	$\geq 25\%$
Terminal output voltage	High

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal output voltage	Low

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

None

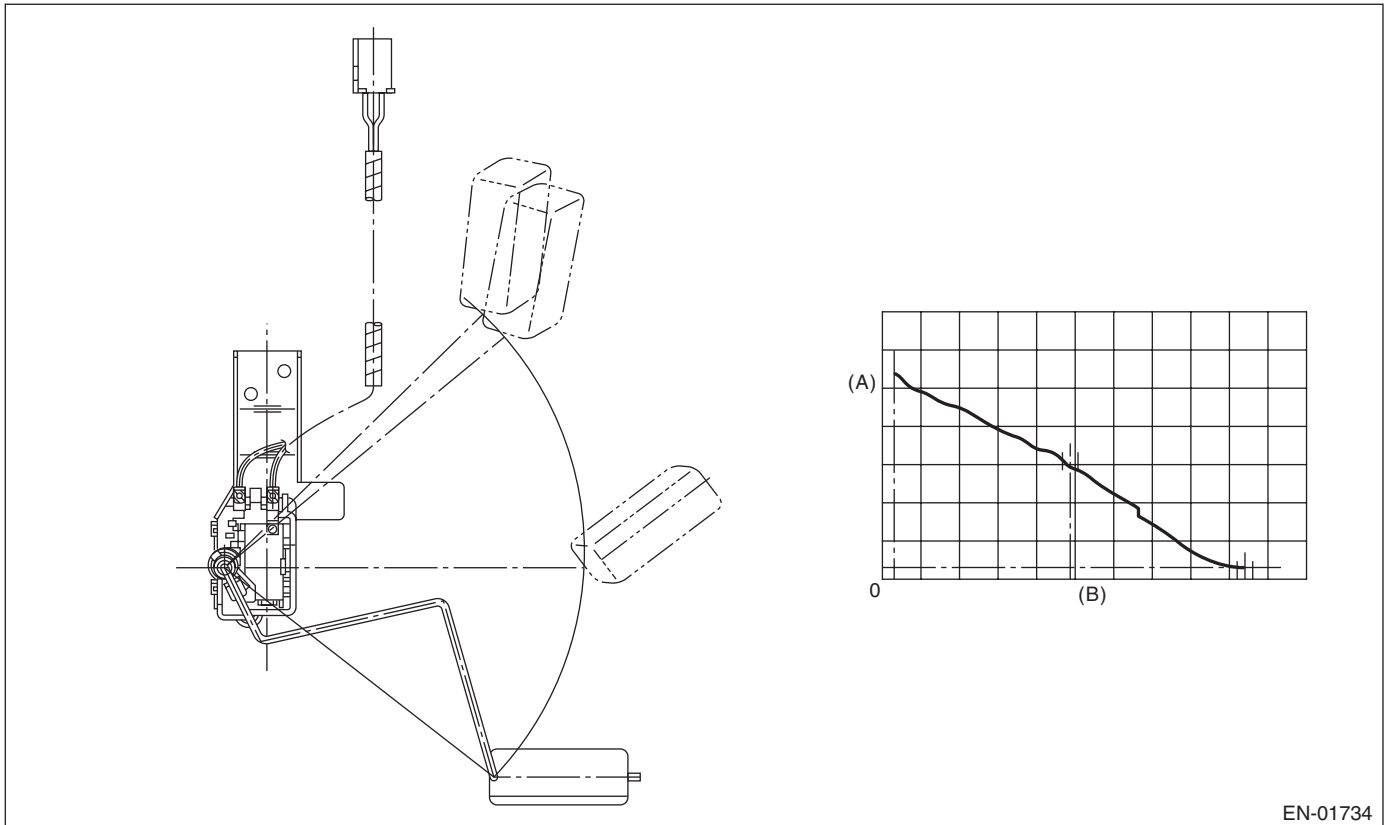
9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

BP:DTC P0461 FUEL LEVEL SENSOR “A” CIRCUIT RANGE/PERFORMANCE**1. OUTLINE OF DIAGNOSIS**

Detect malfunctions of the fuel level sensor output property.

If the fuel level does not vary in a particular driving condition / engine condition where it should, judge as NG.

2. COMPONENT DESCRIPTION

EN-01734

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Accumulated amount of intake air	> 331 kg (729.9 lb)
Max. – min. values of fuel level output	< 2.6 ℓ (0.69 US gal, 0.57 Imp gal)
Battery voltage	≥ 10.9 V
After engine starting	5 seconds or more

Time Needed for Diagnosis: Undecided

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Accumulated amount of intake air	> 331 kg (729.9 lb)
Max. – min. values of fuel level output	≥ 2.6 ℓ (0.69 US gal, 0.57 Imp gal)
Battery voltage	≥ 10.9 V
After engine starting	5 seconds or more

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When “Clear Memory” is performed

8. FAIL SAFE

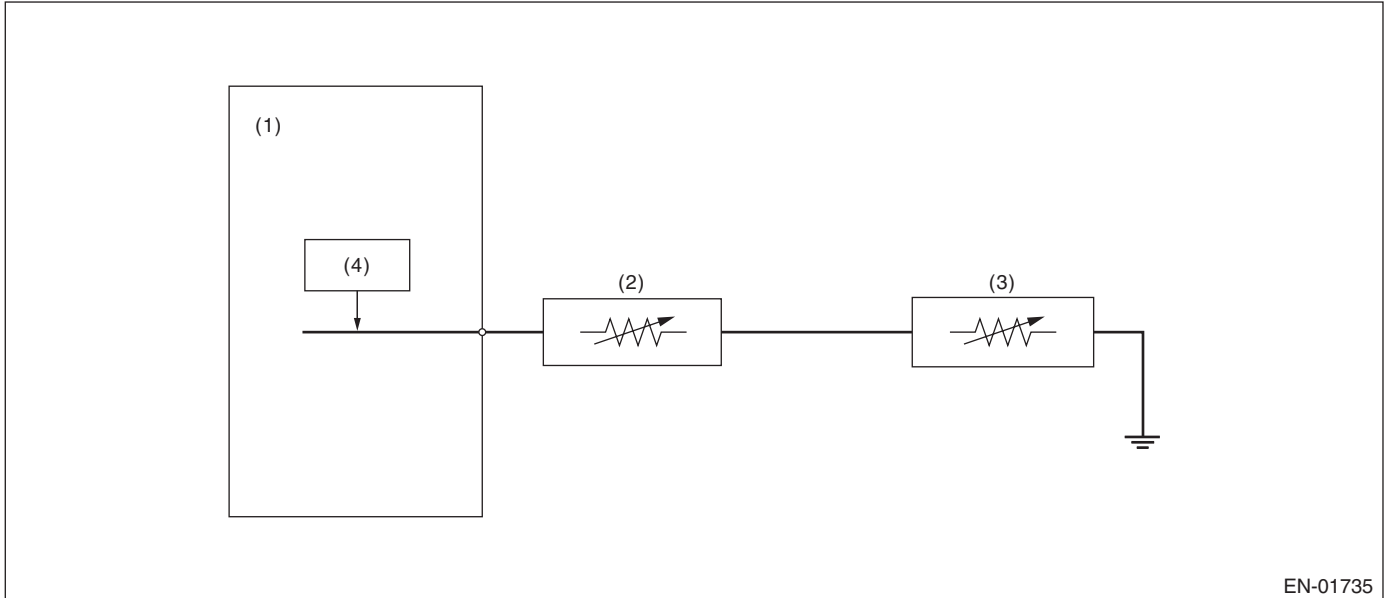
None

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

BQ:DTC P0462 FUEL LEVEL SENSOR “A” CIRCUIT LOW**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of fuel level sensor. Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

EN-01735

(1) Engine control module (ECM)

(3) Fuel sub level sensor

(4) Detecting circuit

(2) Fuel level sensor

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than time needed for diagnosis (2.5 seconds).

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Battery voltage	$\geq 10.9 \text{ V}$
After engine starting	3 seconds or more
Output voltage	$\leq 0.173 \text{ V}$

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Battery voltage	$\geq 10.9 \text{ V}$
After engine starting	3 seconds or more
Output voltage	$> 0.173 \text{ V}$

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

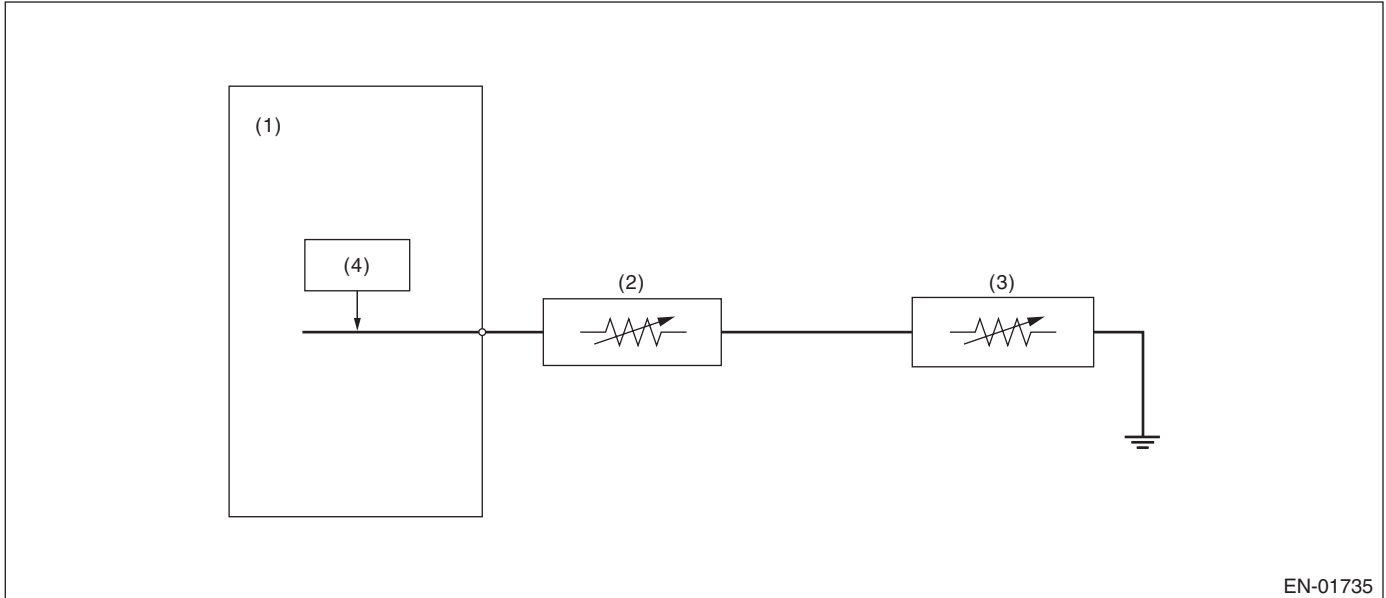
None

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

BR:DTC P0463 FUEL LEVEL SENSOR “A” CIRCUIT HIGH**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of fuel level sensor. Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

(1) Engine control module (ECM)

(3) Fuel sub level sensor

(4) Detecting circuit

(2) Fuel level sensor

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below exceeds the time required for diagnosis (2.5 seconds).

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Battery voltage	$\geq 10.9 \text{ V}$
After engine starting	3 seconds or more
Output voltage	$\geq 7.213 \text{ V}$

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Battery voltage	$\geq 10.9 \text{ V}$
After engine starting	3 seconds or more
Output voltage	$< 7.213 \text{ V}$

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

None

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

BS:DTC P0464 FUEL LEVEL SENSOR CIRCUIT INTERMITTENT**1. OUTLINE OF DIAGNOSIS**

Detect the unstable output faults from the fuel level sensor caused by noise. Judge as NG when the max. value and cumulative value of output voltage variation of the fuel level sensor is larger than the threshold value.

2. ENABLE CONDITION

Malfunction Criteria	Threshold Value
Engine speed	≥ 500 rpm
After engine starting	1 second or more
Ignition switch	ON
Battery voltage	> 10.9 V
Idle switch	ON
Fuel level	9.6 — 54.4 ℓ (2.54 — 14.37 US gal, 2.11 — 11.97 Imp gal)
Vehicle speed = 0 km/h (0 MPH)	10 seconds or more

3. GENERAL DRIVING CYCLE

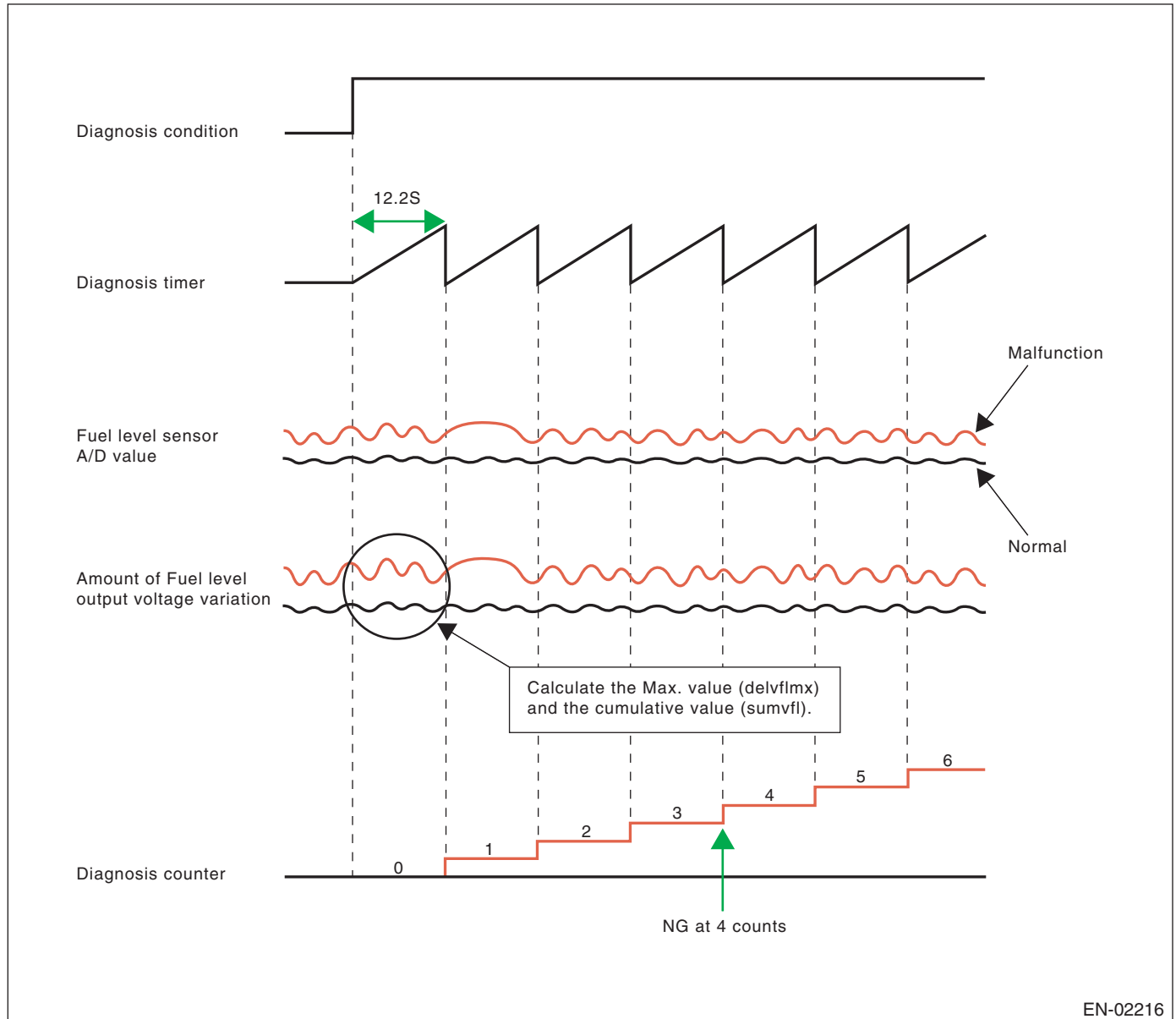
- Always perform the diagnosis continuously at idle speed.
- Pay attention to the fuel level.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

4. DIAGNOSTIC METHOD

Calculate the Max. value (delflmax) and cumulative value (sumfl) of output voltage variation of fuel level sensor during 12.2 seconds. Judge it normal when both max. and cumulative values are not over the threshold value. Otherwise, when either of them is over the threshold value, the diagnosis counter counts up. Judge as NG if the counter indicated 4 counts.



Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Abnormality Judgment

Judge as NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Integrated times of the condition reaching follows, DELFLMAX $\geq 0.2 - 0.26$ V or SUMFL ≥ 16 V At that time, DELFLMAX: Maximum difference of sensor output for 12.2 seconds; SUMFL: Integrated value of the sensor output deviation for 12.2 seconds	≥ 4 times

The diagnosis counter does not count up when the following conditions are completed within 12.2 seconds.

Maximum value – minimum value of change of tank pressure during 12.2 seconds	≥ 0.05 kPa (0.375 mmHg, 0.02 inHg)
Maximum value – minimum value of battery voltage during 12.2 seconds	≥ 1.65 V

Time Needed for Diagnosis: 12.2 seconds $\times$ 4 times

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
DELFLMAX SUMFL At that time, DELFLMAX: Maximum difference of sensor output for 12.2 seconds; SUMFL: Integrated value of the sensor output deviation for 12.2 seconds	$< 0.2 - 0.26$ V < 16 V

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When “Clear Memory” is performed

7. FAIL SAFE

None

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

BT:DTC P0483 FAN RATIONALITY CHECK

1. OUTLINE OF DIAGNOSIS

Detect the function abnormality of the radiator fan.

Judge as NG when the engine coolant temperature slowly decreases even when the radiator fan is rotating.

2. ENABLE CONDITION

Diagnostic enable condition is established if the radiator fan changes from OFF → ON when all of the conditions below are met.

When one of the conditions below is not met, the diagnostic enable condition is not established.

Secondary Parameters	Enable Conditions
Engine speed	560 — 900 rpm
Idle switch	ON
Vehicle speed	< 2 km/h (1.2 MPH)
Battery voltage	≥ 10.9 V

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously when the radiator fan changes from OFF → ON when idling.

4. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than 5 minutes.

Judgment Value

Malfunction Criteria	Threshold Value
Engine coolant temperature	≥ 100°C (212°F)
Radiator fan signal change	OFF to ON
Engine coolant temperature	Does not decrease

Time Needed for Diagnosis: 5 minutes

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Radiator fan signal change	OFF to ON
Engine coolant temperature	Decreased

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

None

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

BU:DTC P0500 VEHICLE SPEED SENSOR “A”**1. OUTLINE OF DIAGNOSIS**

Judge as NG when outside of standard value. Judge NG when the received data from ABSCM&H/U is abnormal, and the vehicle speed data is impossible.

2. COMPONENT DESCRIPTION

Vehicle speed signals are taken in to the ABSCM&H/U, and OK/NG data of the vehicle speed, ABS wheel speed sensor is received by CAN communication from the ABSCM&H/U.

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Elapsed time after engine starting	≥ 2 sec.
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after 2 seconds or more have passed since the engine started.

5. DIAGNOSTIC METHOD**Abnormality Judgment**

Judge as NG when the continuous time of completing the malfunction criteria below becomes 2.5 seconds or more.

Judgment Value

Malfunction Criteria	Threshold Value
Front ABS wheel speed sensor status When either of the following is established	Abnormal
Front left wheel speed	≥ 300 km/h (186 MPH)
Front right wheel speed	≥ 300 km/h (186 MPH)

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when all of the following criteria are established.

Malfunction Criteria	Threshold Value
Front left wheel speed	> 0 km/h (0 MPH) and < 300 km/h (186 MPH)
Front right wheel speed	> 0 km/h (0 MPH) and < 300 km/h (186 MPH)

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When Clear Memory is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When Clear Memory is performed

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

8. FAIL SAFE

- Accelerator sensor signal process: Not allowed fully closed point learning. (Hold previous value)
- Vehicle speed sensor signal process: Vehicle speed = 10 km/h (6 MPH)
- Fuel cut control: Not allowed vehicle speed 0 km/h (0 MPH) fuel cut. Normally the high vehicle speed fuel cut performs on vehicle speed condition and engine speed, but perform the fuel cut only on engine speed condition (4,400 rpm or more).
- ISC control: Open loop compensation is set to specified value (1 g (0.04 oz)/s). Not allowed ISC feedback volume calculation.
- Air conditioner control: Not allowed air conditioner cut at accelerating.
- Radiator fan control: Both main and sub fan ON
- Gear ratio judgment: Control as fixed in sixth gear

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

BV:DTC P0506 IDLE AIR CONTROL SYSTEM RPM LOWER THAN EXPECTED

1. OUTLINE OF DIAGNOSIS

Detect the malfunction that actual engine speed is not close to target engine speed during idling. Judge as NG when actual engine speed is not close to target engine speed during idling.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Engine coolant temperature	$\geq 75^{\circ}\text{C}$ (167°F)
Battery voltage	$\geq 10.9\text{ V}$
Atmospheric pressure	$> 75.1\text{ kPa}$ (563 mmHg , 22.2 inHg)
Fuel level	$\geq 9.0\text{ l}$ (2.38 US gal , 1.98 Imp gal)
After engine starting	$\geq 10.5\text{ sec.}$
Feedback in ISC	In operation
Lambda value	$0.81 - 1.1$
After air condition switching ON-OFF, OFF-ON	$> 5.1\text{ sec.}$
After intake manifold pressure changes more than 4 kPa (30 mmHg , 1.2 inHg).	$> 5.1\text{ sec.}$
After neutral switch ON/OFF change	$> 5.1\text{ sec.}$
Vehicle speed	0 km/h (0 MPH)

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously at idling after warming up engine.

4. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criterion below is 10 seconds $\times$ 3 times.

Judgment Value

Malfunction Criteria	Threshold Value
Actual – Target engine speed	$< -100\text{ rpm}$
Feedback value for ISC	Max.

Time Needed for Diagnosis: 10 seconds $\times$ 3 times

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the continuous time of completing the malfunction criterion below becomes more than the time needed for diagnosis (10 seconds).

Judgment Value

Malfunction Criteria	Threshold Value
Actual – Target engine speed	$\geq -100\text{ rpm}$

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

None

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

BW:DTC P0507 IDLE AIR CONTROL SYSTEM RPM HIGHER THAN EXPECTED

1. OUTLINE OF DIAGNOSIS

Detect the malfunction that actual engine speed is not close to target engine speed during idling. Judge as NG when actual engine speed is not close to target engine speed during idling.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Engine coolant temperature	$\geq 75^{\circ}\text{C}$ (167°F)
Battery voltage	$\geq 10.9\text{ V}$
Atmospheric pressure	$> 75.1\text{ kPa}$ (563 mmHg , 22.2 inHg)
Fuel level	$\geq 9.0\text{ l}$ (2.38 US gal , 1.98 Imp gal)
After engine starting	$\geq 10.5\text{ sec.}$
Feedback in ISC	In operation
Lambda value	$0.81 - 1.1$
After air condition switching ON-OFF, OFF-ON	$> 5.1\text{ sec.}$
After intake manifold pressure changes more than 4 kPa (30 mmHg , 1.2 inHg).	$> 5.1\text{ sec.}$
After neutral switch ON/OFF change	$> 5.1\text{ sec.}$
Vehicle speed	0 km/h (0 MPH)

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously at idling after warming up engine.

4. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criterion below is $10\text{ seconds} \times 3$ times.

Judgment Value

Malfunction Criteria	Threshold Value
Actual – Target engine speed	$\geq 200\text{ rpm}$
Feedback value for ISC	Min.

Time Needed for Diagnosis: $10\text{ seconds} \times 3$ times

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the continuous time of completing the malfunction criterion below becomes more than the time needed for diagnosis (10 seconds).

Judgment Value

Malfunction Criteria	Threshold Value
Actual – Target engine speed	$< 200\text{ rpm}$

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

None

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

BX:DTC P0512 STARTER REQUEST CIRCUIT**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of starter SW.

Judge as ON NG when the starter SW signal remains ON.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD**Abnormality Judgment**

Judge as ON NG when the continuous time of completing the malfunction criteria below becomes more than 3 minutes.

Judgment Value

Malfunction Criteria	Threshold Value
Engine speed	> 500 rpm
Starter OFF signal	Not detected
Battery voltage	> 8 V

Time Needed for Diagnosis: 180 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as ON OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Starter OFF signal	Detected
Battery voltage	> 8 V

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

None

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

BY:DTC P0513 INCORRECT IMMOBILIZER KEY

1. OUTLINE OF DIAGNOSIS

DTC	Item	OUTLINE OF DIAGNOSIS
P0513	Incorrect Immobilizer Key	Incorrect immobilizer key (Use of unregistered key in body integrated unit)
P1570	Antenna	Faulty antenna
P1571	Reference Code Incompatibility	Reference code incompatibility between body integrated unit and ECM
P1572	IMM Circuit Failure (Except Antenna Circuit)	Communication failure between body integrated unit and ECM
P1574	Key Communication Failure	Failure of body integrated unit to verify key (transponder) ID code or transponder failure
P1576	EGI Control Module EEPROM	ECM malfunctioning
P1577	IMM Control Module EEPROM	Body integrated unit malfunctioning
P1578	Meter Failure	Reference code incompatibility between body integrated unit and combination meter

2. ENABLE CONDITION

When starting the engine.

3. GENERAL DRIVING CYCLE

Perform the diagnosis only after starting the engine.

4. DIAGNOSTIC METHOD

Judge as NG when the conditions for the outline of the diagnosis of the top are established.

BZ:DTC P0519 IDLE AIR CONTROL SYSTEM PERFORMANCE**1. OUTLINE OF DIAGNOSIS**

Detect the malfunction that engine speed increases more than that in normal condition during idling.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	≥ 10.9 V
Feedback in ISC	In operation
Vehicle speed	< 4 km/h (2.49 MPH)
After engine starting	1 second or more

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously if the vehicle speed is at less than 4 km/h (2.49 MPH).

4. DIAGNOSTIC METHOD

Judge as NG when the continuous time of completing the all malfunction criteria below becomes more than the time needed for diagnosis (2 seconds).

Judgment Value

Malfunction Criteria	Threshold Value
Engine speed – targeted engine speed	> 2000 rpm
Feedback value for ISC	≤ 0
Engine speed change every 180 degree engine rev.	≥ -5 rpm

Time Needed for Diagnosis: 2 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the continuous time of completing the malfunction criteria below becomes more than the time needed for diagnosis (5 seconds).

Judgment Value

Malfunction Criteria	Threshold Value
Engine speed – targeted engine speed	< 200 rpm

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When “Clear Memory” is performed

7. FAIL SAFE

Fuel cut: Cuts off fuel only #1 and #2 cylinders, or for all cylinders according to vehicle speed, engine speed, and throttle position.

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

CA:DTC P0600 SERIAL COMMUNICATION LINK

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.

When CAN communications is not possible, and CAN communications with AT is not possible, judge as NG if data from the AT is not normal.

2. COMPONENT DESCRIPTION

ECM and TCM are connected by high speed CAN.

(Common Specifications)

CAN Protocol 2.0 B (Active)

Frame Format: 11 Bit ID Frame (Standard Frame)

(High speed CAN)

Conforms to ISO11898

Communication Speed: 500 kbps

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Starter switch	OFF
Engine	run

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

5. DIAGNOSTIC METHOD

Abnormality Judgment

When either of the following conditions are established, it is judged NG.

Judge as OK and clear the NG when the continuous time when all of the following criteria are established is more than the predetermined time (1 s).

Judgment Value

Malfunction Criteria	Threshold Value
bus off flag or warning flag	set
ID is not received from the TCM, ECM, VDCCM or ABSCM.	= 500 milliseconds
Data from ECM is not updated.	= 500 milliseconds

Time Needed for Diagnosis: 1 time

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

None

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

CB:DTC P0602 CONTROL MODULE PROGRAMMING ERROR**1. OUTLINE OF DIAGNOSIS**

Detect the malfunction of catalytic converter initial warm-up retard angle control.

Judge as NG if the ECM is not operating properly when performing catalytic converter initial warm-up retard angle control.

Judge as NG when either the intake air amount diagnosis or the idle speed diagnosis becomes NG.

- Intake air amount diagnosis

The amount of intake air should increase when performing catalytic converter initial warm-up retard angle control. If it remains low, judge as NG.

- Idle speed diagnosis

Judge as NG when actual engine speed is not close to the target engine speed after stopping the retard angle control.

2. ENABLE CONDITION

- Intake air amount diagnosis

Secondary Parameters	Enable Conditions
Atmospheric pressure	> 75.1 kPa (563 mmHg, 22.2 inHg)
Battery voltage	> 10.9 V
Cold start diagnosis	Incomplete
Engine	Run
Vehicle speed	≤ 3 km/h (2 MPH)
After ISC control	≥ 1.5 sec.
Low limit revolution counter	< 2000
After the neutral switch ON - OFF operation	> 3 sec.
Catalytic converter initial warm-up retard angle control 1	Under control
Catalytic converter warm-up	In warm-up mode
After load (A/C, power steering, lighting, rear defogger, heater fan and radiator fan) operation	≥ 3.5 sec.
Misfire in 200 engine revs.	< 5
Cold start (when the following conditions are established)	
[Engine coolant temperature — Intake air temperature]	≤ 5°C (41°F)
[Engine coolant temperature — Fuel temperature]	≤ 2°C (36°F)
Time after warm-up mode changes	≥ 6 sec.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

- Idle speed diagnosis

Secondary Parameters	Enable Conditions
Atmospheric pressure	> 75.1 kPa (563 mmHg, 22.2 inHg)
Battery voltage	> 10.9 V
Cold start diagnosis	Incomplete
Engine	Run
Vehicle speed	≤ 3 km/h (2 MPH)
After ISC control	≥ 1.5 sec.
Low limit revolution counter	< 2000
After the neutral switch ON - OFF operation	> 3 sec.
Catalytic converter initial warm-up retard angle control 1	Under control
Catalytic converter warm-up	In warm-up mode
After load (A/C, power steering, lighting, rear defogger, heater fan and radiator fan) operation	≥ 3.5 sec.
Misfire in 200 engine revs.	< 5
Intake air amount diagnosis	Not judged
Cold start (when the following conditions are established)	
Engine coolant temperature — Intake air temperature	≤ 5°C (41°F)
Engine coolant temperature — Fuel temperature	≤ 2°C (36°F)
Time after warm-up mode changes	≥ 6 sec.

3. GENERAL DRIVING CYCLE

Perform diagnosis when controlling the catalytic converter initial warm-up retard angle.

4. Diagnostic method

- Intake air amount diagnosis

Abnormality Judgment

Calculate the average amount of intake air and total retard angle when diagnosis enable conditions are met. If the following conditions are established after predetermined amount of time has passed, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Average amount of intake air	< Value from Map 1
Average amount of total retard angle	> Value from Map 2

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Map 1

MT					
Engine coolant temperature at engine starting	5°C (41°F)	10°C (50°F)	20°C (68°F)	30°C (86°F)	40°C (104°F)
Average amount of intake air	9.5 g/s (0.097 lb/m)	9.5 g/s (0.097 lb/m)	9.5 g/s (0.097 lb/m)	8.5 g/s (0.087 lb/m)	6 g/s (0.06 lb/m)
AT (N range)					
Engine coolant temperature at engine starting	5°C (41°F)	10°C (50°F)	20°C (68°F)	30°C (86°F)	40°C (104°F)
Average amount of intake air	10.8 g/s (0.11 lb/m)	10.8 g/s (0.11 lb/m)	9.8 g/s (0.099 lb/m)	9.2 g/s (0.094 lb/m)	6 g/s (0.06 lb/m)
AT (D range)					
Engine coolant temperature at engine starting	5°C (41°F)	10°C (50°F)	20°C (68°F)	30°C (86°F)	40°C (104°F)
Average amount of intake air	5 g/s (0.05 lb/m)	5 g/s (0.05 lb/m)	5 g/s (0.05 lb/m)	4 g/s (0.04 lb/m)	3 g/s (0.03 lb/m)

Map 2

AT/MT	Range	Average amount of total retard angle (crank angle)
MT	N	19°
AT	N	19°
AT	Other than N	19°

Time Needed for Diagnosis: 6 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

If the following conditions are established after predetermined amount of time has passed, judge as OK.

Judgment Value

Malfunction Criteria	Threshold Value
Average amount of intake air	> Value from Map 1

• Idle speed diagnosis

After the diagnosis enable conditions are met, judge as NG if the continuous time during which the following conditions are met exceeds the predetermined time, and judge as OK if it doesn't.

Judgment Value

Malfunction Criteria	Threshold Value
Target engine speed – Actual engine speed	> Value from Map 3

Map 3

Engine coolant temperature at engine starting	5°C (41°F)	10°C (50°F)	20°C (68°F)	30°C (86°F)	40°C (104°F)
Engine speed (rpm)	300	300	300	300	300

Time Needed for Diagnosis: 6 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. Malfunction Indicator Light Clear Condition

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

None

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data.(For test mode \$02)

CC:DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR**1. OUTLINE OF DIAGNOSIS**

Detect the malfunction of microcomputer (RAM).

When there is a problem in the main CPU normal RAM, or the sub CPU normal RAM, judge as NG. Judge as OK when both are operating properly.

If it is possible to write data to the whole area of RAM in the initial routine, and is possible to read the same data, it is judged as OK, and if not, NG.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

Diagnosis with the initial routine.

3. GENERAL DRIVING CYCLE

Perform the diagnosis as soon as the ignition switch is turned to ON.

4. DIAGNOSTIC METHOD**Abnormality Judgment**

Judge as NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Main CPU normal RAM abnormal Write 5AA5A55A and then read. (Whole area of RAM)	5AA5A55A cannot be read.
Write A55A5AA5 and then read. (Whole area of RAM)	A55A5AA5 cannot be read.
Sub CPU normal RAM abnormal Write 5AA5 and then read. (Whole area of RAM)	5AA5 cannot be read.
Write A55A and then read. (Whole area of RAM)	A55A cannot be read.

Time Needed for Diagnosis: Undecided

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Main CPU normal RAM abnormal Write 5AA5A55A and then read. (Whole area of RAM)	5AA5A55A can be read.
And write A55A5AA5 and then read. (Whole area of RAM)	A55A5AA5 can be read.
Sub CPU normal RAM abnormal Write 5AA5 and then read. (Whole area of RAM)	5AA5 can be read.
And write A55A and then read. (Whole area of RAM)	A55A can be read.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

None

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

CD:DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR**1. OUTLINE OF DIAGNOSIS**

Judge as NG when SUM value of ROM is outside the standard value.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD**Abnormality Judgment**

Judge as NG when the continuous time of completing the malfunction criteria below becomes 0.5 seconds or more.

Judgment Value

Malfunction Criteria	Threshold Value
SUM value of ROM	Specification

Time Needed for Diagnosis: Undecided

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

7. FAIL SAFE

Stop the continuity to the electronic control throttle motor. (Throttle opening is fixed to 6°.)

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

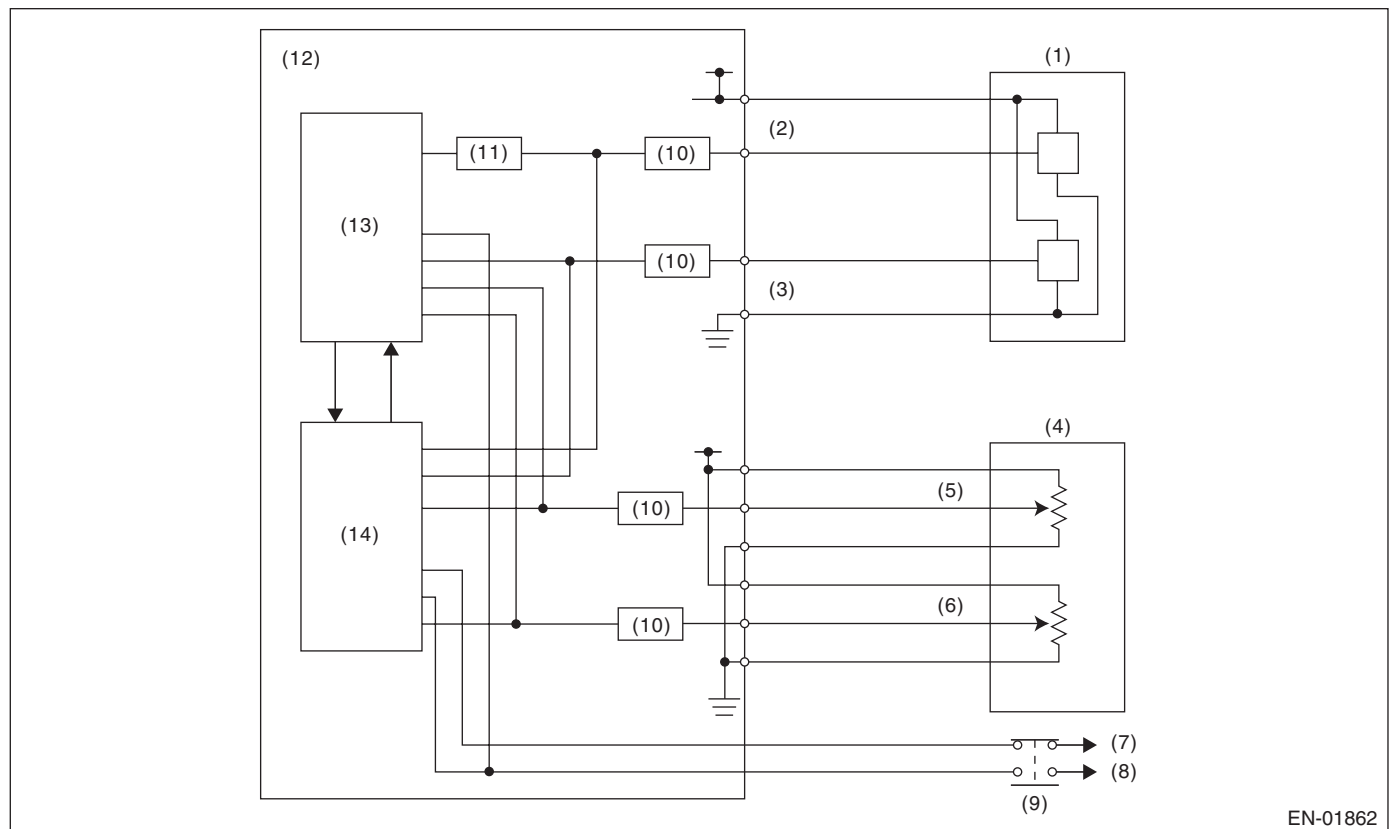
CE:DTC P0607 CONTROL MODULE PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Judge as NG when either the following is completed.

- When the read value of throttle position sensor 1 signal is mismatched between main CPU and sub CPU.
- When the read value of accelerator pedal position sensor 1 signal is mismatched between main CPU and sub CPU.
- When the sub CPU operates abnormally.
- When the communication between main CPU $\longleftrightarrow$ sub CPU is abnormal.
- When the input amplifier circuit of throttle position sensor 1 is abnormal.
- When the cruise control cannot be canceled correctly.
- When the signal of brake SW1 and 2 is mismatched.
- When the directed angle from the main CPU is abnormal.

2. COMPONENT DESCRIPTION



EN-01862

(1) Throttle position sensor	(6) Accelerator pedal position sensor 2	(11) Amplifier circuit
(2) Throttle position sensor 1	(7) Battery	(12) Engine control module (ECM)
(3) Throttle position sensor 2	(8) Stop light	(13) Sub CPU
(4) Accelerator pedal position sensor	(9) Brake switch	(14) Main CPU
(5) Accelerator pedal position sensor 1	(10) I/F circuit	

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
(1) Ignition switch	ON
(2) Ignition switch	ON
(3) None	—
(4) None	—
(5) Throttle opening angle	
(6) Brake switch (only with cruise control)	ON
(7) None	—
(8) Cruise control	OFF

4. GENERAL DRIVING CYCLE

- (1) — (4): Always perform the diagnosis continuously.
(5): Always perform the diagnosis continuously when idling.
(6): Perform the diagnosis when the brake pedal is depressed.
(7): Always perform the diagnosis continuously.
(8): Always perform the diagnosis continuously when the cruise control pedal is not operating.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
(1) Difference of CPU reading value of the throttle position sensor signal	0.0858 V
(2) Difference of CPU read value of the accelerator position sensor signal	0.039 V
(3) WD pulse from sub CPU	WD pulse occur
(4) Communication between CPU	Possible to communicate
(5) Throttle position sensor 1 opening angle — (Throttle position sensor 1 opening angle after the amplifier)1/4	< 3°
(6) Cruise control cancel signal at brake ON	Cruise control cancel signal ON
(7) Brake switch 1, 2 signal	SW 1 and 2 are matched

Time Needed for Diagnosis:

1. 250 milliseconds
2. 250 milliseconds
3. 200 milliseconds
4. 200 milliseconds
5. 24 milliseconds
6. 250 milliseconds
7. 200 milliseconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

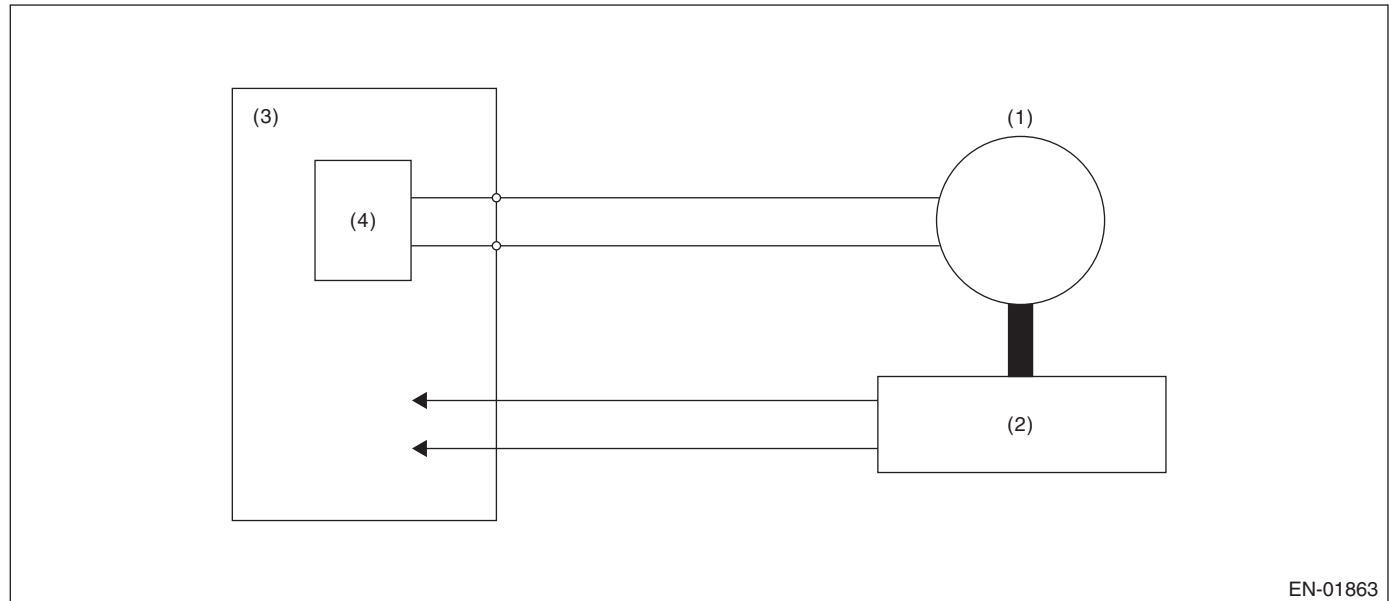
Stop the continuity to the electronic control throttle motor. (Throttle opening is fixed to 6°.)

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

**CF:DTC P0638 THROTTLE ACTUATOR CONTROL RANGE/PERFORMANCE
(BANK 1)****1. OUTLINE OF DIAGNOSIS**

Judge as NG when the target opening angle and actual opening angle is mismatched or the current to motor is more than specified duty for specified time continuously.

2. COMPONENT DESCRIPTION

EN-01863

- (1) Motor (2) Throttle position sensor (3) Engine control module (ECM) (4) Drive circuit

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON
Normal operation of electric throttle control	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously when the electric throttle control is operating.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Difference between target opening angle and actual opening angle	3.5° or less
Output duty to drive circuit	95% or less

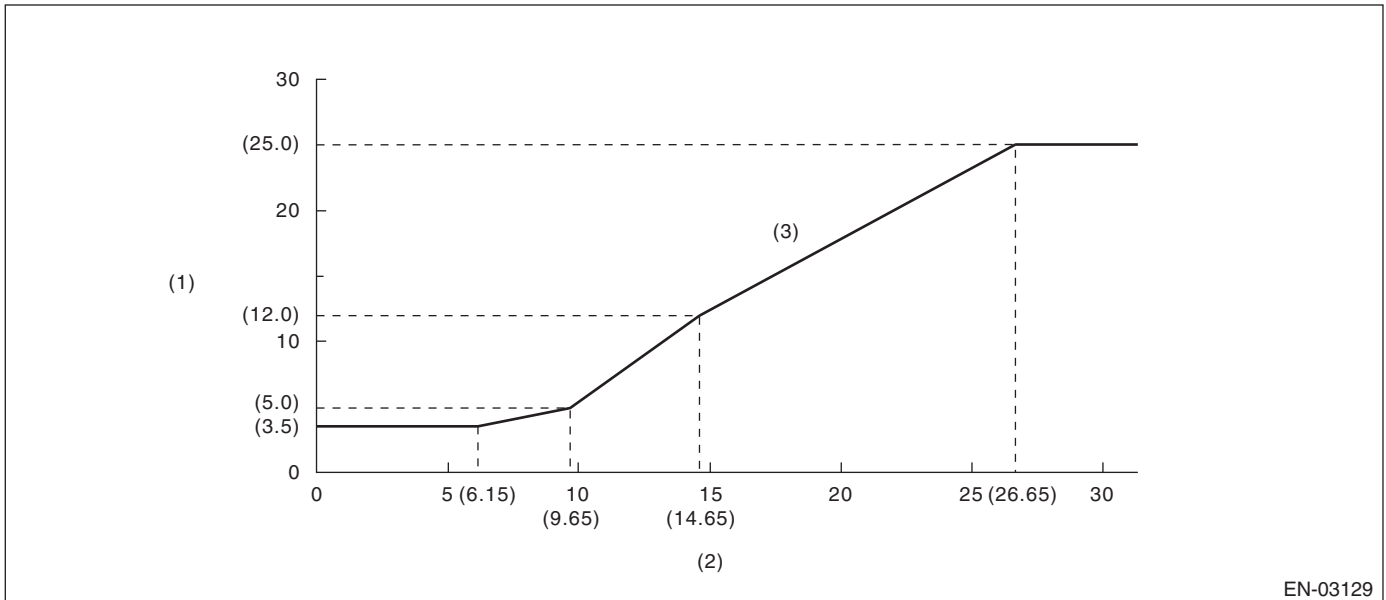
Time Needed for Diagnosis:

- Target opening angle and actual opening angle: 250 milliseconds (For NG) 2000 milliseconds (For OK)
- Output duty to drive circuit: 2000 milliseconds

Diagnostic Trouble Code (DTC) Detecting Criteria

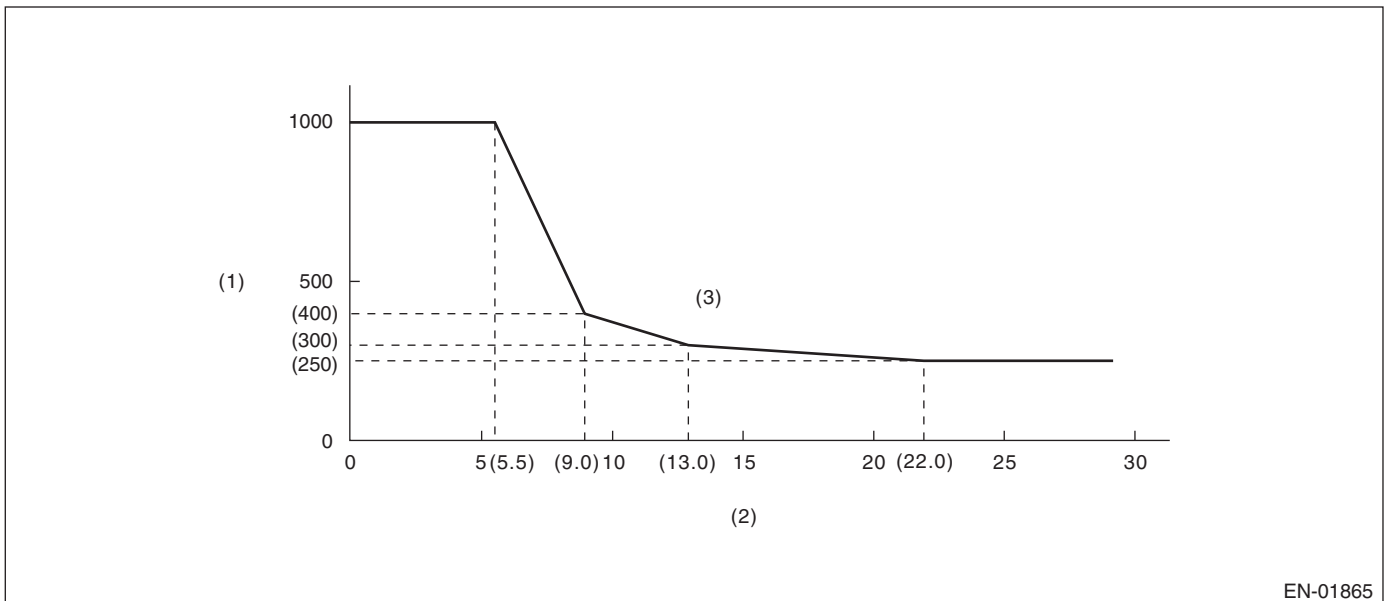
GENERAL DESCRIPTION

Details of Judgment Value



- (1) Difference between target opening angle and actual opening angle (°) (2) Target throttle opening angle (°) (3) NG area

Details of Judgment (The actual opening angle ≤ target opening angle is always 1000 milliseconds)



- (1) Judgment time (milliseconds) (2) Throttle position sensor 1 opening angle (3) NG area

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

8. FAIL SAFE

Stop the continuity to the electronic control throttle motor. (Throttle opening is fixed to 6°.)

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

CG:DTC P0691 FAN 1 CONTROL CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the open/short circuit of radiator fan circuit.

Judge as NG when the ECM output level differs from the actual terminal level.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than 2.5 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
After engine starting	1 second or more
Engine speed	≥ 500 rpm
Ignition switch	ON
Battery voltage	≥ 10.9 V
Terminal voltage level when ECM outputs OFF signal	Low level

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
After engine starting	1 second or more
Engine speed	≥ 500 rpm
Ignition switch	ON
Battery voltage	≥ 10.9 V
Terminal voltage level when ECM outputs OFF signal	High level

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

None

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

CH:DTC P0692 FAN 1 CONTROL CIRCUIT HIGH**1. OUTLINE OF DIAGNOSIS**

Detect the open/short circuit of radiator fan circuit.

Judge as NG when the ECM output level differs from the actual terminal level.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD**Abnormality Judgment**

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than 2.5 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
After engine starting	1 second or more
Engine speed	≥ 500 rpm
Ignition switch	ON
Battery voltage	≥ 10.9 V
Terminal voltage level when ECM outputs ON signal	High level

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
After engine starting	1 second or more
Engine speed	≥ 500 rpm
Ignition switch	ON
Battery voltage	≥ 10.9 V
Terminal voltage level when ECM outputs ON signal	Low level

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

None

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

CI: DTC P0700 TRANSMISSION CONTROL SYSTEM (MIL REQUEST)

1. OUTLINE OF DIAGNOSIS

Judge as NG when there is CAN communication with the AT and there is a MIL lighting request.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	≥ 10.9 V

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Judge as NG when the continuous time with the following conditions established is longer than predetermined amount of time (2.5 seconds).

Judge as OK when the following conditions are not established, and clear the NG.

Judgment Value

Malfunction Criteria	Threshold Value
MIL lighting request from TCM	set

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

None

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

CJ:DTC P0851 PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW (AT MODEL)**1. OUTLINE OF DIAGNOSIS**

Judge the open or short circuit of the neutral SW.

Judge as NG when the ECM neutral terminal input differs from the reception data from TCM.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	≥ 10.9 V
After engine starting	2 seconds or more
Starter switch	OFF

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously in 2 seconds after starting the engine.

4. DIAGNOSTIC METHOD

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than 2.56 seconds. Judge as OK and clear the NG when the malfunction criteria below are not met.

Judgment Value

Malfunction Criteria	Threshold Value
Neutral switch signal when park/neutral = "OFF" and any other switches = "ON" on AT	LOW (ON)

Time Needed for Diagnosis: 2.56 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

Control of cruise control: Control prohibited

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

CK:DTC P0851 NEUTRAL SWITCH INPUT CIRCUIT LOW (MT MODEL)

1. OUTLINE OF DIAGNOSIS

Judge the open or short circuit of the neutral SW.

Judge as NG when there is no change in the neutral SW even if the driving shift was applied. (There is neutral SW ON/OFF inversion from the vehicle speed and engine speed.)

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	≥ 10.9 V
After engine starting	2 seconds or more
Starter switch	OFF

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously in 2 seconds after starting the engine.

4. DIAGNOSTIC METHOD

Judge as NG when the malfunction criteria below are completed 3 time or more after the neutral SW change.

Judge as OK and clear the NG when there is change in the neutral SW.

Judgment Value

Malfunction Criteria	Threshold Value
Neutral switch signal (while changing from a to b below)	LOW (ON)
Driving condition change	a) to b)
a) Vehicle speed = 0 km/h (0 MPH) & engine speed 600 — 900 rpm	
b) Vehicle speed ≥ 64 km/h (40 MPH) & engine speed 1600 — 2550 rpm	

Time Needed for Diagnosis: Monitoring 3 times

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

Control of cruise control: Control prohibited

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

CL:DTC P0852 PARK/NEUTRAL SWITCH INPUT CIRCUIT HIGH (AT MODEL)**1. OUTLINE OF DIAGNOSIS**

Judge the open or short circuit of the neutral SW.

Judge as NG when the ECM neutral terminal input differs from the reception data from TCM.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	$\geq 10.9 \text{ V}$
After engine starting	2 seconds or more
Starter switch	OFF

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously in 2 seconds after starting the engine.

4. DIAGNOSTIC METHOD

Judge as NG when the continuous time until meeting the malfunction criteria below becomes more than 2.56 seconds. Judge as OK and clear the NG when the malfunction criteria below are not met.

Judgment Value

Malfunction Criteria	Threshold Value
Neutral switch signal when park/neutral = "ON" and any other switches = "OFF" on AT	HIGH (OFF)

Time Needed for Diagnosis: 2.56 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

Control of cruise control: Control prohibited

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

CM:DTC P0852 NEUTRAL SWITCH INPUT CIRCUIT HIGH (MT MODEL)

1. OUTLINE OF DIAGNOSIS

Judge the open or short circuit of the neutral SW.

Judge as NG when there is no change in the neutral SW even if the driving shift was applied. (There is neutral SW ON/OFF inversion from the vehicle speed and engine speed.)

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	≥ 10.9 V
After engine starting	2 seconds or more
Starter switch	OFF

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously in 2 seconds after starting the engine.

4. DIAGNOSTIC METHOD

Judge as NG when the malfunction criteria below are completed 3 time or more after the neutral SW change.

Judge as OK and clear the NG when there is change in the neutral SW.

Judgment Value

Malfunction Criteria	Threshold Value
Neutral switch signal (while changing from a to b below)	HIGH (OFF)
Driving condition change	a) to b)
a) Vehicle speed = 0 km/h (0 MPH) & engine speed 600 — 900 rpm	
b) Vehicle speed ≥ 64 km/h (40 MPH) & engine speed 1600 — 2550 rpm	

Time Needed for Diagnosis: Monitoring 3 times

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

Control of cruise control: Control prohibited

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

CN:DTC P1152 O2 SENSOR CIRCUIT RANGE/PERFORMANCE (LOW) (BANK1 SENSOR1)

1. OUTLINE OF DIAGNOSIS

Detect that λ value remains low.

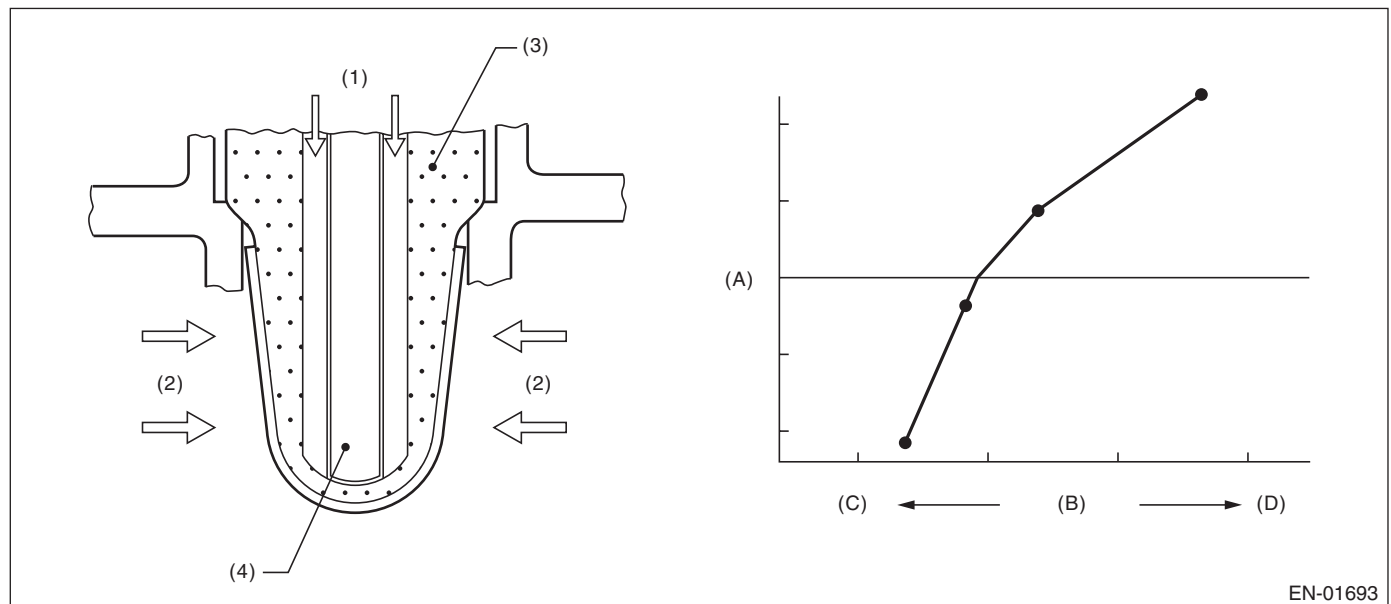
Judge as NG when lambda value is abnormal in accordance with λ value of front oxygen (A/F) sensor and running conditions such as vehicle speed, amount of intake air, engine coolant temperature, sub feedback control, etc.

λ value = Actual air fuel ratio/Theoretical air fuel ratio

$\lambda > 1$: Lean

$\lambda < 1$: Rich

2. COMPONENT DESCRIPTION



EN-01693

- (1) Atmosphere
- (2) Exhaust gas
- (3) ZrO₂
- (4) Ceramic heater

- (A) Electromotive force
- (B) Air fuel ratio
- (C) Lean
- (D) Rich

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
All secondary parameters enable conditions	4 seconds or more
Battery voltage	> 10.9 V
Atmospheric pressure	> 75.1 kPa (563 mmHg, 22.2 inHg)
Rear oxygen sensor sub feedback	Execution
Rear oxygen sensor output voltage – Feedback target voltage	–0.2 V — 0.1 V
or rear oxygen sensor sub feedback compensation coefficient	On Min.
or rear oxygen sensor sub feedback compensation coefficient	On Max.
After engine starting	60 seconds or more
Engine coolant temperature	≥ 75°C (167°F)
Vehicle speed	≥ 20 km/h (12 MPH)
Amount of intake air	≥ 6 g (0.21 oz)/s
Load change during 0.5 engine revs.	≤ 0.02 g (0.001 oz)/rev
Front oxygen (A/F) sensor impedance	0 — 50 Ω
Learning value of evaporation gas density	≤ 0.2
Total time of operating canister purge	20 seconds or more
Target lambda load compensation coefficient	–0.03 — 0

4. GENERAL DRIVING CYCLE

Perform diagnosis continuously at a constant speed of 20 km/h (12 MPH) or more after 60 seconds have passed since the engine started.

5. DIAGNOSTIC METHOD

Judge as NG when the continuous time of meeting the malfunction criteria below becomes more than the time needed for diagnosis (10 seconds). Judge as OK and clear the NG when the malfunction criteria below are not met.

Judgment Value

Malfunction Criteria	Threshold Value
Output λ value when rear oxygen sensor sub feedback compensation coefficient is not at maximum limit	≤ 0.85

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

- Front oxygen (A/F) sensor main learning compensation: Not allowed to calculate.
- Front oxygen (A/F) sensor sub learning compensation: Not allowed to calculate.
- Purge control: Not allowed to purge.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

CO:DTC P1153 O2 SENSOR CIRCUIT RANGE/PERFORMANCE (HIGH) (BANK1 SENSOR1)

1. OUTLINE OF DIAGNOSIS

Detect that λ value remains high.

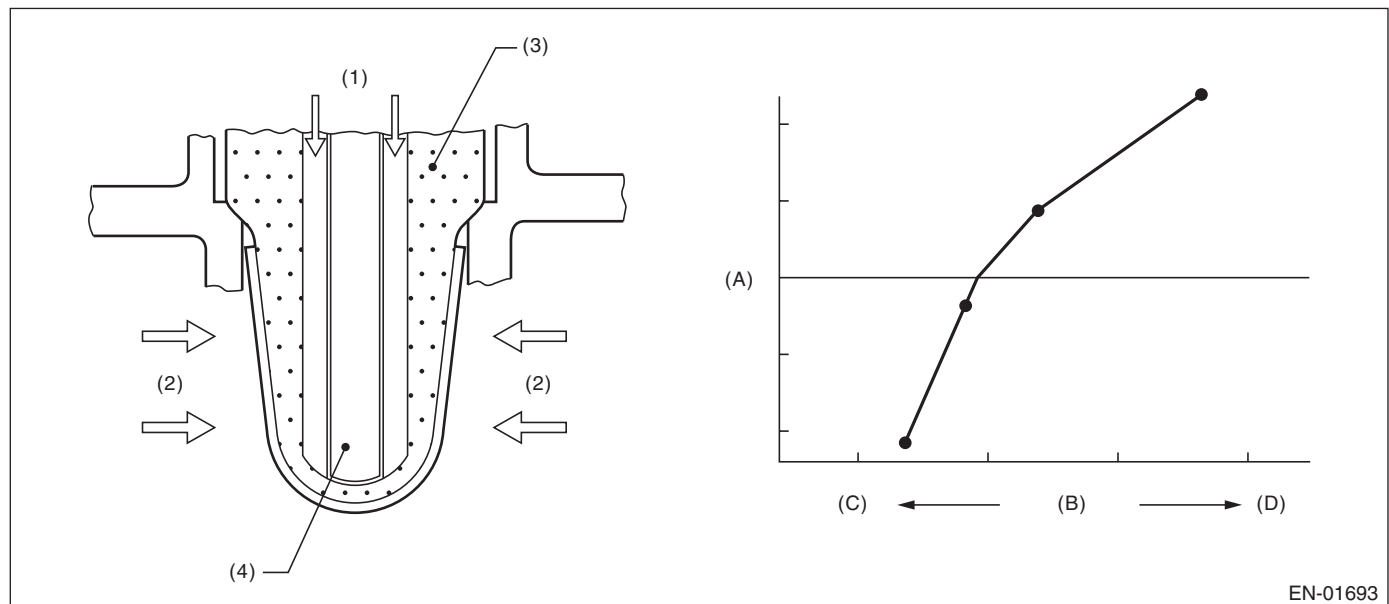
Judge as NG when lambda value is abnormal in accordance with λ value of front oxygen (A/F) sensor and running conditions such as vehicle speed, amount of intake air, engine coolant temperature, sub feedback control, etc.

λ value = Actual air fuel ratio/Theoretical air fuel ratio

$\lambda > 1$: Lean

$\lambda < 1$: Rich

2. COMPONENT DESCRIPTION



- (1) Atmosphere
- (2) Exhaust gas
- (3) ZrO₂
- (4) Ceramic heater

- (A) Electromotive force
- (B) Air fuel ratio
- (C) Lean
- (D) Rich

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
All secondary parameters enable conditions	4 seconds or more
Battery voltage	> 10.9 V
Atmospheric pressure	> 75.1 kPa (563 mmHg, 22.2 inHg)
Rear oxygen sensor sub feedback	Execution
Rear oxygen sensor output voltage – Feedback target voltage	–0.2 V — 0.1 V
or rear oxygen sensor sub feedback compensation coefficient	On Min.
or rear oxygen sensor sub feedback compensation coefficient	On Max.
After engine starting	60 seconds or more
Engine coolant temperature	≥ 75°C (167°F)
Vehicle speed	≥ 20 km/h (12 MPH)
Amount of intake air	≥ 6 g (0.21 oz)/s
Load change during 0.5 engine revs.	≤ 0.02 g (0.001 oz)/rev
Front oxygen (A/F) sensor impedance	0 — 50 Ω
Learning value of evaporation gas density	≤ 0.2
Total time of operating canister purge	20 seconds or more
Target lambda load compensation coefficient	–0.03 — 0

4. GENERAL DRIVING CYCLE

Perform diagnosis continuously at a constant vehicle speed of 20 km/h (12 MPH) or more after 60 seconds have passed since the engine started.

5. DIAGNOSTIC METHOD

Judge as NG when the continuous time of meeting the malfunction criteria below becomes more than the time needed for diagnosis (10 seconds). Judge as OK and clear the NG when the malfunction criteria below are not met.

Judgment Value

Malfunction Criteria	Threshold Value
Output λ value when rear oxygen sensor sub feedback compensation coefficient cannot be at minimum limit	≥ 1.15

Time Needed for Diagnosis: 10 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When “Clear Memory” is performed

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

8. FAIL SAFE

- Front oxygen (A/F) sensor main learning compensation: Not allowed to calculate.
- Front oxygen (A/F) sensor sub learning compensation: Not allowed to calculate.
- Purge control: Not allowed to purge.

9. ECM OPERATION AT DTC SETTING

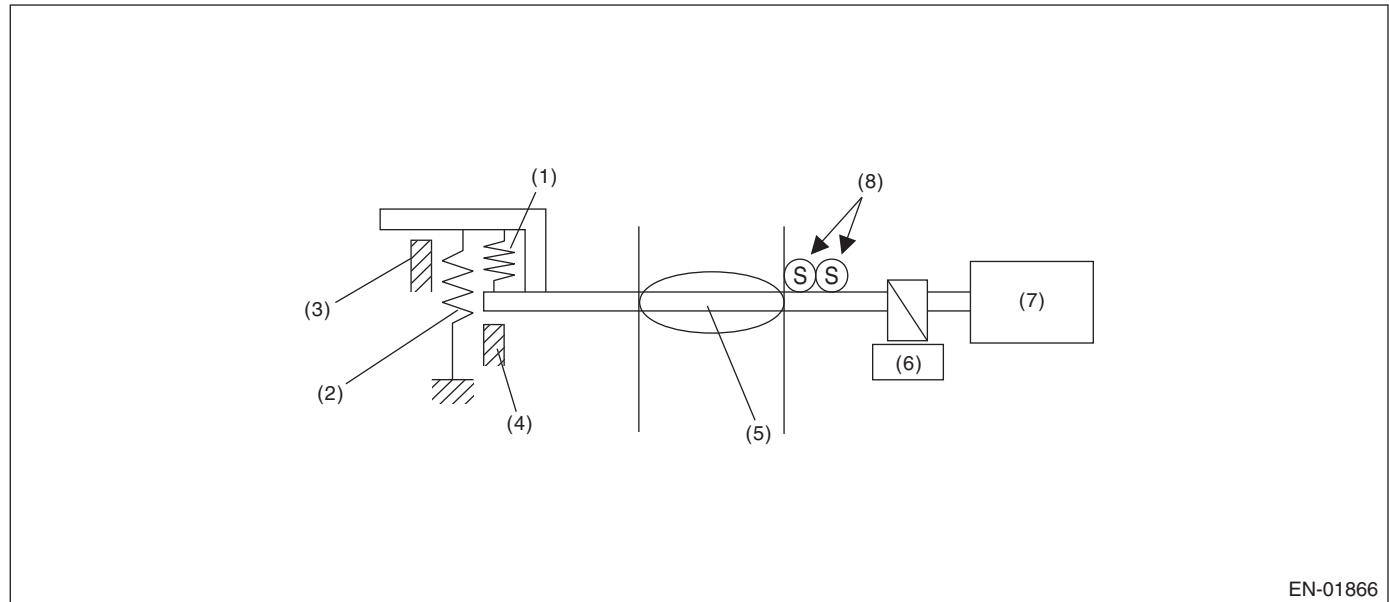
Memorize the freeze frame data. (For test mode \$02)

CP:DTC P1160 RETURN SPRING FAILURE

1. OUTLINE OF DIAGNOSIS

Judge as NG when the valve is opened more than the default opening angle, but does not move to the close direction with the motor power stopped.

2. COMPONENT DESCRIPTION



EN-01866

(1) Opener spring	(4) Full closed stopper	(7) DC motor
(2) Return spring	(5) Throttle valve	(8) Main and sub throttle sensor
(3) Intermediate stopper	(6) Gear	

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Throttle opening angle	OFF
Motor continuity	OFF

4. GENERAL DRIVING CYCLE

- Ignition switch ON → OFF
- Ignition switch OFF → ON (Only after clearing memory)

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Opening variation after continuity is set to OFF	$\geq 2^\circ$

Time Needed for Diagnosis: 1880 milliseconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

8. FAIL SAFE

Throttle opening is fixed to 6°.

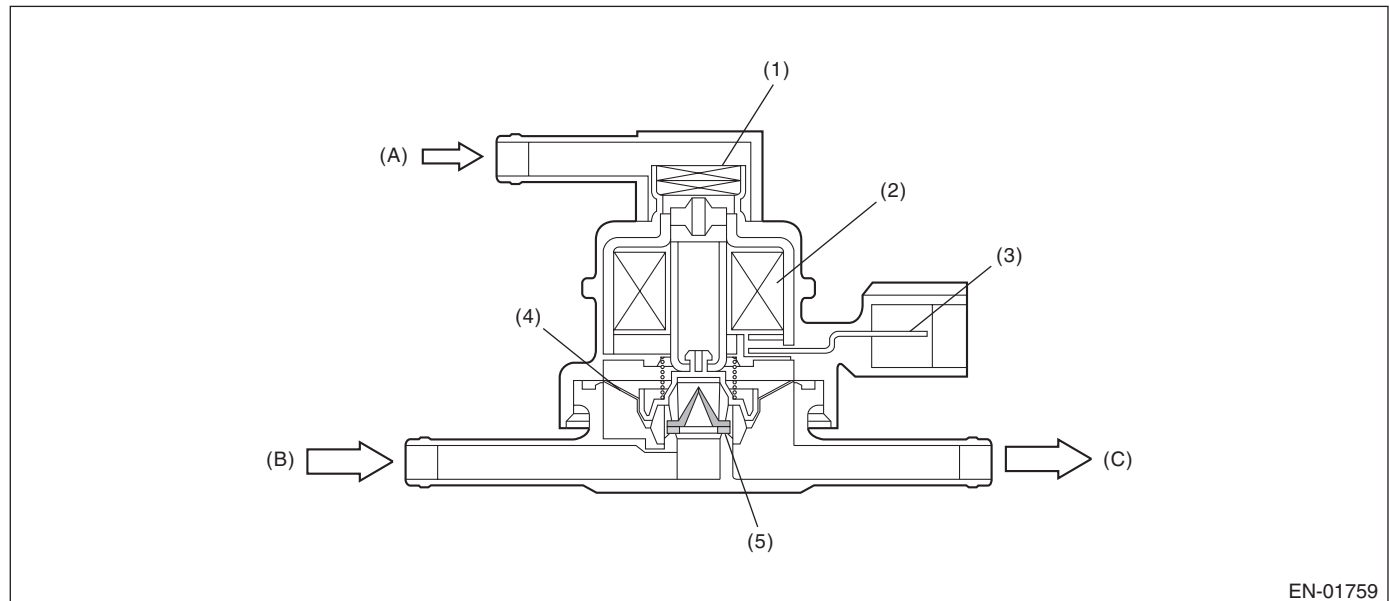
9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

CQ:DTC P1400 FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT LOW**1. OUTLINE OF DIAGNOSIS**

Detect the open/short circuit of pressure control solenoid valve.

Judge as NG when ECM output level is different from actual terminal level.

2. COMPONENT DESCRIPTION

EN-01759

(1) Filter	(4) Diaphragm	(A) Atmospheric pressure
(2) Coil	(5) Valve	(B) Shut-off valve
(3) Connector terminal		(C) To fuel tank

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	$\geq 10.9 \text{ V}$
After engine starting	1 second or more

4. GENERAL DRIVING CYCLE

Always perform the diagnosis after starting the engine.

5. DIAGNOSTIC METHOD

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than time needed for diagnosis (2.5 seconds). Judge as OK and clear the NG when the malfunction criteria below are not met.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal output voltage when ECM outputs OFF signal	Low

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

None

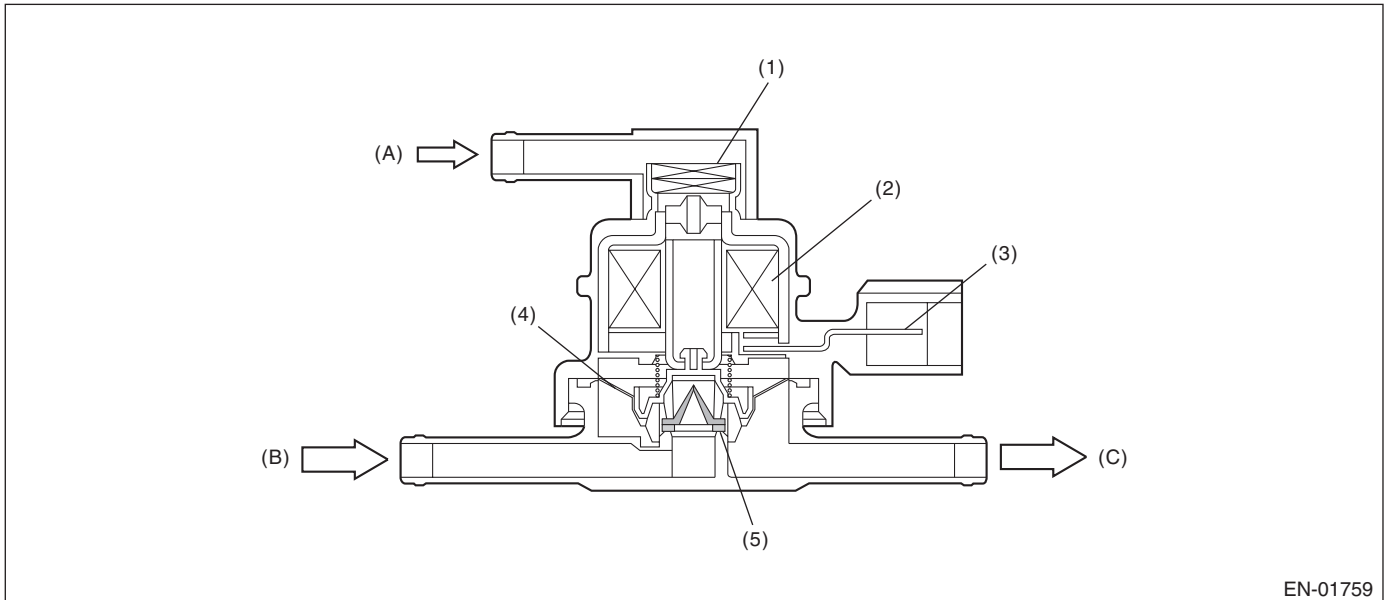
9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

CR:DTC P1420 FUEL TANK PRESSURE CONTROL SOL. VALVE CIRCUIT HIGH**1. OUTLINE OF DIAGNOSIS**

Detect the open/short circuit of pressure control solenoid valve.

Judge as NG when ECM output level is different from actual terminal level.

2. COMPONENT DESCRIPTION

EN-01759

(1) Filter	(4) Diaphragm	(A) Atmospheric pressure
(2) Coil	(5) Valve	(B) Shut-off valve
(3) Connector terminal		(C) To fuel tank

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	$\geq 10.9 \text{ V}$
After engine starting	1 second or more

4. GENERAL DRIVING CYCLE

Always perform the diagnosis after starting the engine.

5. DIAGNOSTIC METHOD

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than time needed for diagnosis (2.5 seconds). Judge as OK and clear the NG when the malfunction criteria below are not met.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal output voltage when ECM outputs ON signal	High

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

None

9. ECM OPERATION AT DTC SETTING

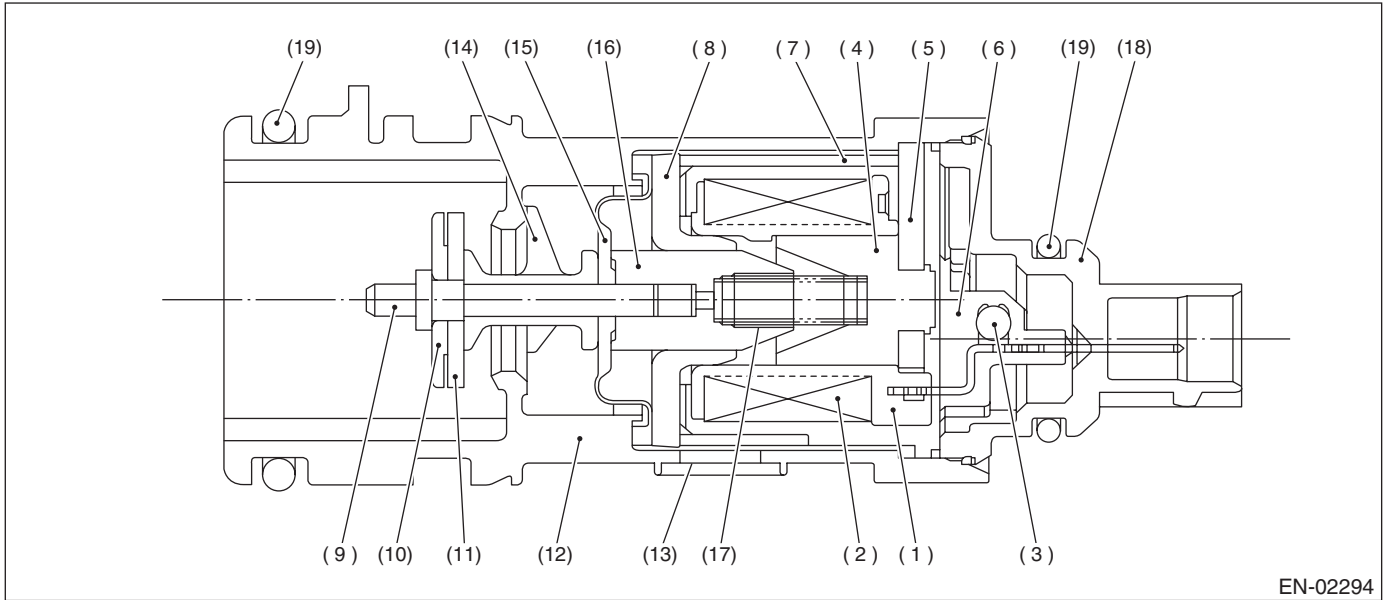
Memorize the freeze frame data. (For test mode \$02)

CS:DTC P1443 VENT CONTROL SOLENOID VALVE FUNCTION PROBLEM

1. OUTLINE OF DIAGNOSIS

Detect the abnormal function (stuck closed) of the drain valve.
Judge as NG when fuel tank pressure is low.

2. COMPONENT DESCRIPTION



(1) Bobbin	(8) Magnetic plate	(14) Retainer
(2) Coil	(9) Shaft	(15) Diaphragm
(3) Diode	(10) Plate	(16) Movable core
(4) Stator core	(11) Valve	(17) Spring
(5) End plate	(12) Housing	(18) Cover
(6) Body	(13) Filter	(19) O-ring
(7) Yoke		

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Drain valve	Open
Battery voltage	$\geq 10.9 \text{ V}$
Atmospheric pressure	$\geq 75.0 \text{ kPa}$ (563 mmHg, 22.17 inHg)
Tank pressure when starter is OFF → ON	$-0.43 \sim 1.4 \text{ kPa}$ ($-3.2 \sim 10.7 \text{ mmHg}$, $-0.13 \sim 0.42 \text{ inHg}$)

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than 3 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
Tank pressure	≤ -4.0 kPa (-30 mmHg, -1.18 inHg)

Time Needed for Diagnosis: 3 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Tank pressure	> -4.0 kPa (-30 mmHg, -1.18 inHg)
Cumulative time when all of the malfunction criteria below is completed.	≥ 30 sec.
Purge control solenoid valve duty ratio	Not = 0
Fuel temperature	$-10 \sim 45^{\circ}\text{C}$ ($14 \sim 113^{\circ}\text{F}$)
Intake manifold relative pressure	≤ -26.7 kPa (-200 mmHg, -7.87 inHg)

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

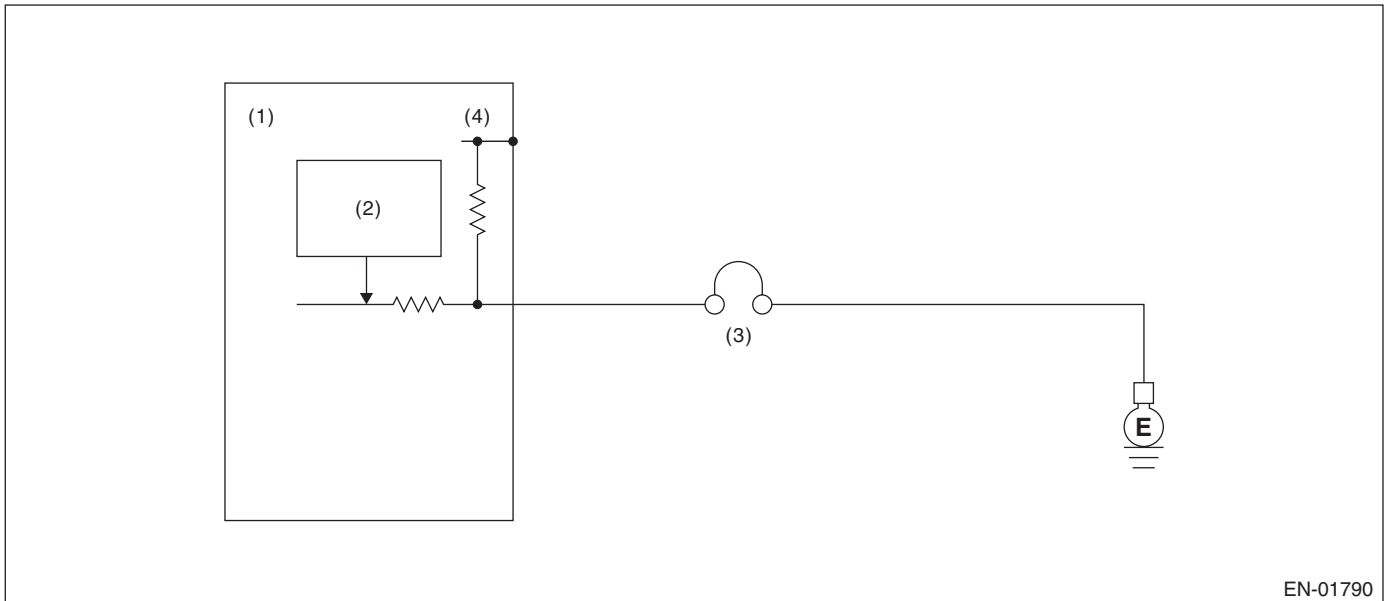
Pressure control solenoid valve control: Open the pressure control solenoid valve.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

CT:DTC P1491 POSITIVE CRANKCASE VENTILATION (BLOW-BY) FUNCTION PROBLEM**1. OUTLINE OF DIAGNOSIS**

Detect the blow-by hose release abnormality.
Judge as NG when the diagnosis terminal voltage is high.

2. COMPONENT DESCRIPTION

EN-01790

- (1) Engine control module (ECM) (3) PCV diagnosis connector (4) 5 V
(2) Detecting circuit

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than 2.5 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	> 10.9 V
Engine speed	≥ 500 rpm
Positive crankcase ventilation diagnosis voltage	High

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

If the following conditions are established after predetermined amount of time has passed, judged as OK.
Judge as OK and clear the NG when the following criteria are met.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	> 10.9 V
Engine speed	≥ 500 rpm
Positive crankcase ventilation diagnosis voltage	Low

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

None

9. ECM OPERATION AT DTC SETTING

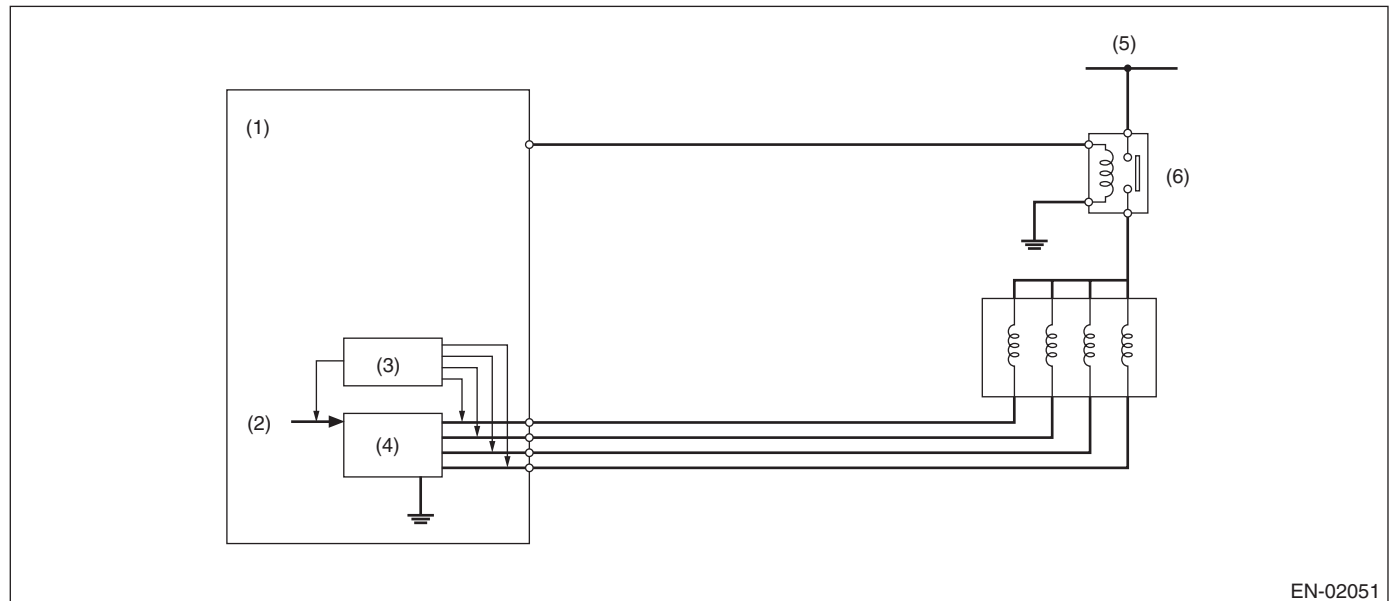
Memorize the freeze frame data. (For test mode \$02)

CU:DTC P1492 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (LOW INPUT)

1. OUTLINE OF DIAGNOSIS

- Detects open or short circuit of EGR.
- Judge as NG when the ECM output level differs from the actual terminal level.

2. COMPONENT DESCRIPTION



EN-02051

(1) Engine control module (ECM)	(3) Detecting circuit	(5) Battery voltage
(2) Computer unit (CPU)	(4) Switch circuit	(6) Main relay

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
EGR valve target position	> 0 step
Battery voltage	> 10.9 V

4. GENERAL DRIVING CYCLE

Perform diagnosis continuously during EGR operation.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal voltage level when ECM outputs OFF signal	Low level

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal voltage level when ECM outputs OFF signal	High level

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

- Front oxygen (A/F) sensor main learning compensation: Not allowed to calculate.
- Knock sensor learning compensation: Calculation prohibited.
- EGR control: Operation prohibited.

9. ECM OPERATION AT DTC SETTING

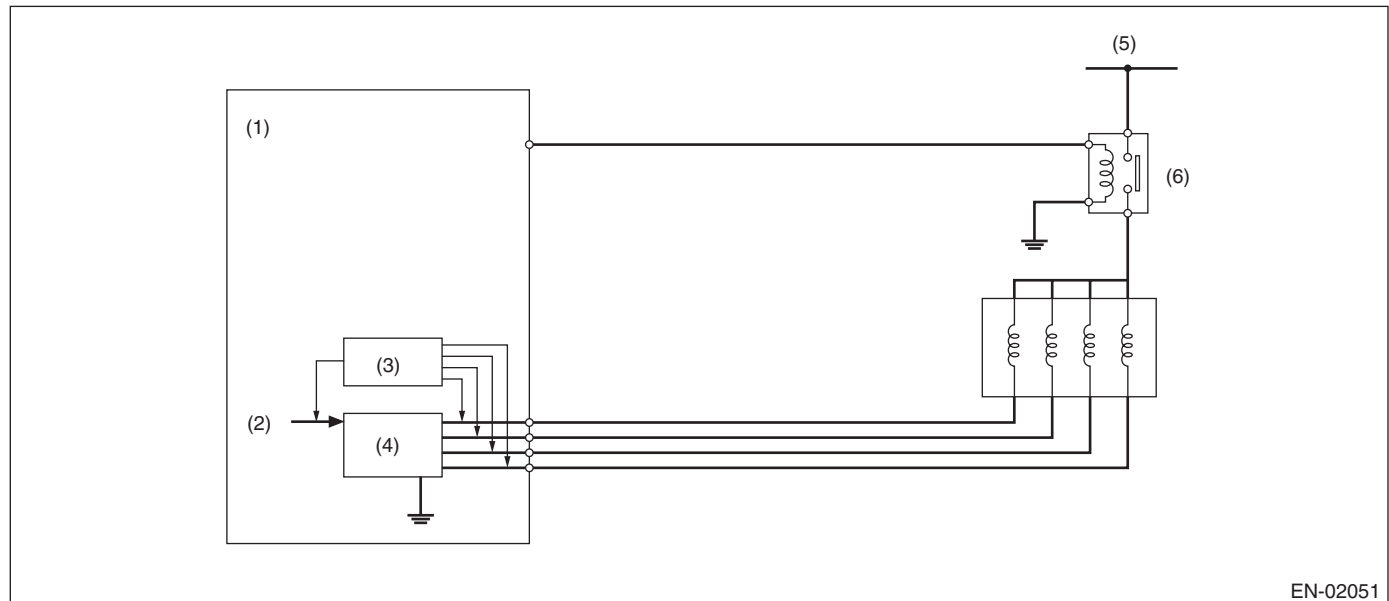
Memorize the freeze frame data. (For test mode \$02)

CV:DTC P1493 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (HIGH INPUT)

1. OUTLINE OF DIAGNOSIS

- Detects open or short circuit of EGR.
- Judge as NG when the ECM output level differs from the actual terminal level.

2. COMPONENT DESCRIPTION



EN-02051

(1) Engine control module (ECM)	(3) Detecting circuit	(5) Battery voltage
(2) Computer unit (CPU)	(4) Switch circuit	(6) Main relay

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Battery voltage	> 10.9 V
EGR valve target position	> 0 step

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal voltage level when ECM outputs ON signal	High level

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal voltage level when ECM outputs ON signal	Low level

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

- Front oxygen sensor (A/F) sensor main learning compensation: Not allowed to calculate.
- Knock sensor learning compensation: Calculation prohibited.
- EGR control: Operation prohibited.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

CW:DTC P1494 EGR SOLENOID VALVE SIGNAL #2 CIRCUIT MALFUNCTION (LOW INPUT)

NOTE:

For the diagnostic procedure, refer to DTC P1492. <Ref. to GD(H4SO U5)-205, DTC P1492 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CX:DTC P1495 EGR SOLENOID VALVE SIGNAL #2 CIRCUIT MALFUNCTION (HIGH INPUT)

NOTE:

For the diagnostic procedure, refer to DTC P1493. <Ref. to GD(H4SO U5)-207, DTC P1493 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CY:DTC P1496 EGR SOLENOID VALVE SIGNAL #3 CIRCUIT MALFUNCTION (LOW INPUT)

NOTE:

For the diagnostic procedure, refer to DTC P1492. <Ref. to GD(H4SO U5)-205, DTC P1492 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CZ:DTC P1497 EGR SOLENOID VALVE SIGNAL #3 CIRCUIT MALFUNCTION (HIGH INPUT)

NOTE:

For the diagnostic procedure, refer to DTC P1493. <Ref. to GD(H4SO U5)-207, DTC P1493 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>

DA:DTC P1498 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (LOW INPUT)

NOTE:

For the diagnostic procedure, refer to DTC P1492. <Ref. to GD(H4SO U5)-205, DTC P1492 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>

DB:DTC P1499 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (HIGH INPUT)

NOTE:

For the diagnostic procedure, refer to DTC P1493. <Ref. to GD(H4SO U5)-207, DTC P1493 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

DC:DTC P1518 STARTER SWITCH CIRCUIT LOW INPUT

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of starter SW.

Judge as OFF NG when the engine starts without starter ON experience.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as OFF NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Vehicle speed	< 1 km/h (0.62 MPH)
Starter ON signal	Not detected
Engine speed, after engine speed of less than 500 rpm continues for more than 0.8 seconds.	≥ 500 rpm

Time Needed for Diagnosis: 1 second

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OFF OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Starter ON	Experienced
Battery voltage	> 8 V

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

None

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

DD:DTC P1560 BACK-UP VOLTAGE CIRCUIT MALFUNCTION**1. OUTLINE OF DIAGNOSIS**

Detect the open/short circuit of back-up power supply circuit.

Judge as NG when the backup voltage becomes smaller than the battery voltage.

2. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD**Abnormality Judgment**

Judge as NG when the continuous time of completing the malfunction criteria below becomes more than 2.5 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
Voltage of back-up power supply	Low
Battery voltage	$\geq 10.9 \text{ V}$
Engine speed	$\geq 500 \text{ rpm}$

Time Needed for Diagnosis: 2.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Voltage of back-up power supply	High
Battery voltage	$\geq 10.9 \text{ V}$
Engine speed	$\geq 500 \text{ rpm}$

5. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

6. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

7. FAIL SAFE

None

8. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

DE:DTC P1570 ANTENNA

1. OUTLINE OF DIAGNOSIS

For the detection standard, refer to DTC P0513 INCORRECT IMMOBILIZER KEY. <Ref. to GD(H4SO U5)-166, DTC P0513 INCORRECT IMMOBILIZER KEY, Diagnostic Trouble Code (DTC) Detecting Criteria.>

DF:DTC P1571 REFERENCE CODE INCOMPATIBILITY

1. OUTLINE OF DIAGNOSIS

For the detection standard, refer to DTC P0513 INCORRECT IMMOBILIZER KEY. <Ref. to GD(H4SO U5)-166, DTC P0513 INCORRECT IMMOBILIZER KEY, Diagnostic Trouble Code (DTC) Detecting Criteria.>

DG:DTC P1572 IMM CIRCUIT FAILURE (EXCEPT ANTENNA CIRCUIT)

1. OUTLINE OF DIAGNOSIS

For the detection standard, refer to DTC P0513 INCORRECT IMMOBILIZER KEY. <Ref. to GD(H4SO U5)-166, DTC P0513 INCORRECT IMMOBILIZER KEY, Diagnostic Trouble Code (DTC) Detecting Criteria.>

DH:DTC P1574 KEY COMMUNICATION FAILURE

1. OUTLINE OF DIAGNOSIS

For the detection standard, refer to DTC P0513 INCORRECT IMMOBILIZER KEY. <Ref. to GD(H4SO U5)-166, DTC P0513 INCORRECT IMMOBILIZER KEY, Diagnostic Trouble Code (DTC) Detecting Criteria.>

DI: DTC P1576 EGI CONTROL MODULE EEPROM

1. OUTLINE OF DIAGNOSIS

For the detection standard, refer to DTC P0513 INCORRECT IMMOBILIZER KEY. <Ref. to GD(H4SO U5)-166, DTC P0513 INCORRECT IMMOBILIZER KEY, Diagnostic Trouble Code (DTC) Detecting Criteria.>

DJ:DTC P1577 IMM CONTROL MODULE EEPROM

1. OUTLINE OF DIAGNOSIS

For the detection standard, refer to DTC P0513 INCORRECT IMMOBILIZER KEY. <Ref. to GD(H4SO U5)-166, DTC P0513 INCORRECT IMMOBILIZER KEY, Diagnostic Trouble Code (DTC) Detecting Criteria.>

DK:DTC P1578 METER FAILURE

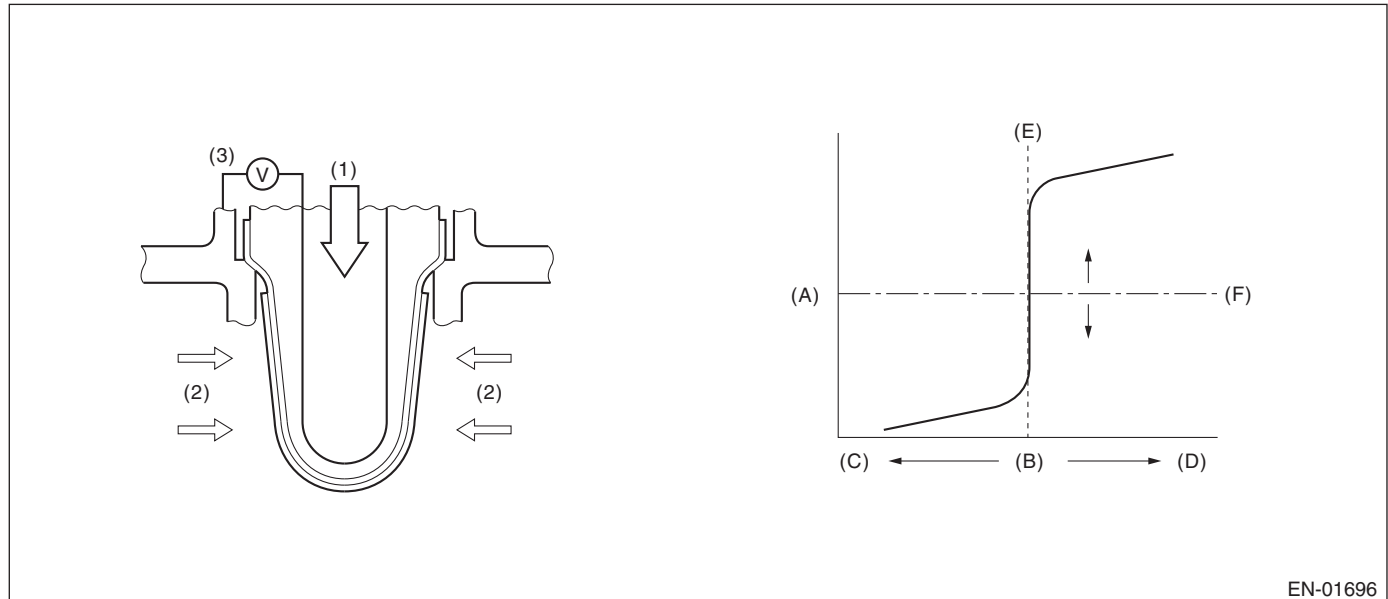
1. OUTLINE OF DIAGNOSIS

For the detection standard, refer to DTC P0513 INCORRECT IMMOBILIZER KEY. <Ref. to GD(H4SO U5)-166, DTC P0513 INCORRECT IMMOBILIZER KEY, Diagnostic Trouble Code (DTC) Detecting Criteria.>

DL:DTC P2096 POST CATALYST FUEL TRIM SYSTEM TOO LEAN BANK 1**1. OUTLINE OF DIAGNOSIS**

Detect the malfunction of fuel system from the amount of sub feedback control.

Sub feedback learning control is being performed and when the learning value goes to the lean side, judge as NG.

2. COMPONENT DESCRIPTION

EN-01696

- (1) Atmosphere
- (2) Exhaust gas
- (3) Electromotive force

- (A) Electromotive force
- (B) Air fuel ratio
- (C) Rich

- (D) Lean
- (E) Theoretical air fuel ratio
- (F) Comparative voltage

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Continuous time when the following conditions are established	1 second or more
Sub feedback learning execution conditions	Completed

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously at a constant speed of 50 — 100 km/h (31 — 62 MPH).

5. DIAGNOSTIC METHOD

Judge as NG when the continuous time with the following criteria established is 5 seconds or more. Judge as OK when the continuous time with the following criteria not established is 5 seconds or more.

Judgment Value

Malfunction Criteria	Threshold Value
Sub feedback learning value	≤ -0.03

Time Needed for Diagnosis: 5 seconds $\times$ 1 time

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When similar driving conditions are repeated 3 times and the result is OK.
- When "Clear Memory" is performed

8. FAIL SAFE

None

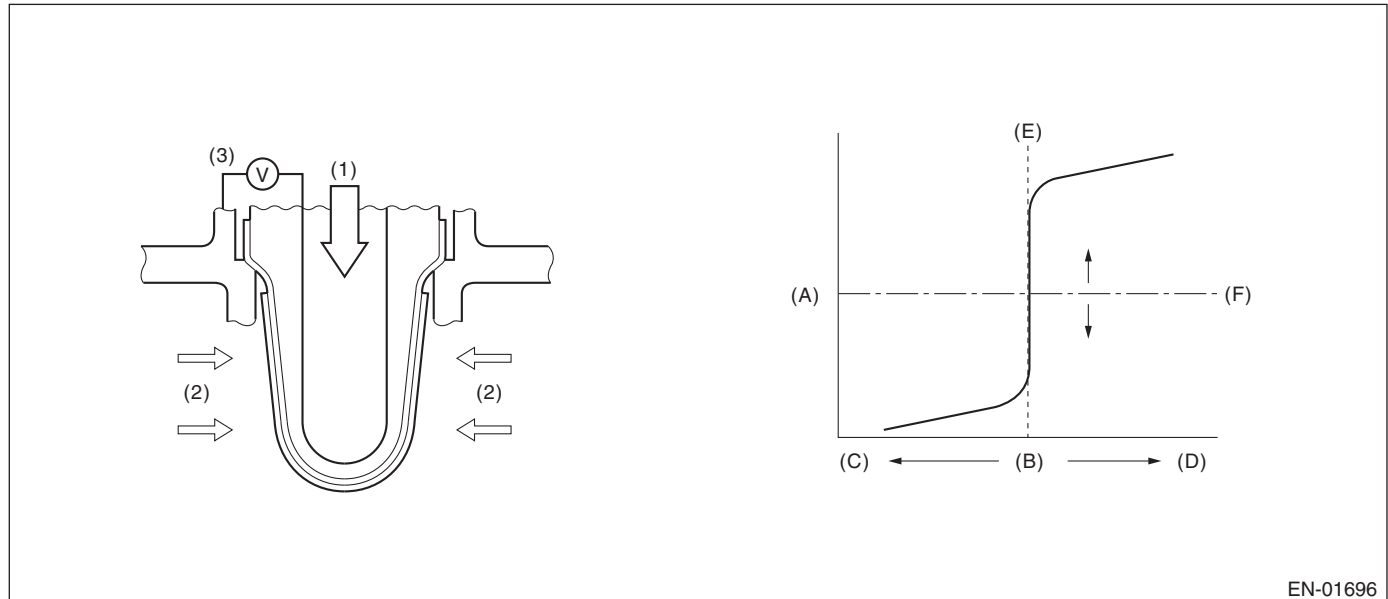
9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

DM:DTC P2097 POST CATALYST FUEL TRIM SYSTEM TOO RICH BANK 1**1. OUTLINE OF DIAGNOSIS**

Detect the malfunction of fuel system from the amount of sub feedback control.

Sub feedback learning control is being performed and when the learning value goes to the rich side, judge as NG.

2. COMPONENT DESCRIPTION

EN-01696

- (1) Atmosphere
- (2) Exhaust gas
- (3) Electromotive force

- (A) Electromotive force
- (B) Air fuel ratio
- (C) Rich

- (D) Lean
- (E) Theoretical air fuel ratio
- (F) Comparative voltage

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Continuous time when the following conditions are established	1 second or more
Sub feedback learning execution conditions	Completed

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously at a constant speed of 50 — 100 km/h (31 — 62 MPH).

5. DIAGNOSTIC METHOD

Judge as NG when the continuous time with the following criteria established is 5 seconds or more. Judge as OK when the continuous time with the following criteria not established is 5 seconds or more.

Judgment Value

Malfunction Criteria	Threshold Value
Sub feedback learning value	≥ 0.038

Time Needed for Diagnosis: 5 seconds $\times$ 1 time

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When similar driving conditions are repeated 3 times and the result is OK.
- When "Clear Memory" is performed

8. FAIL SAFE

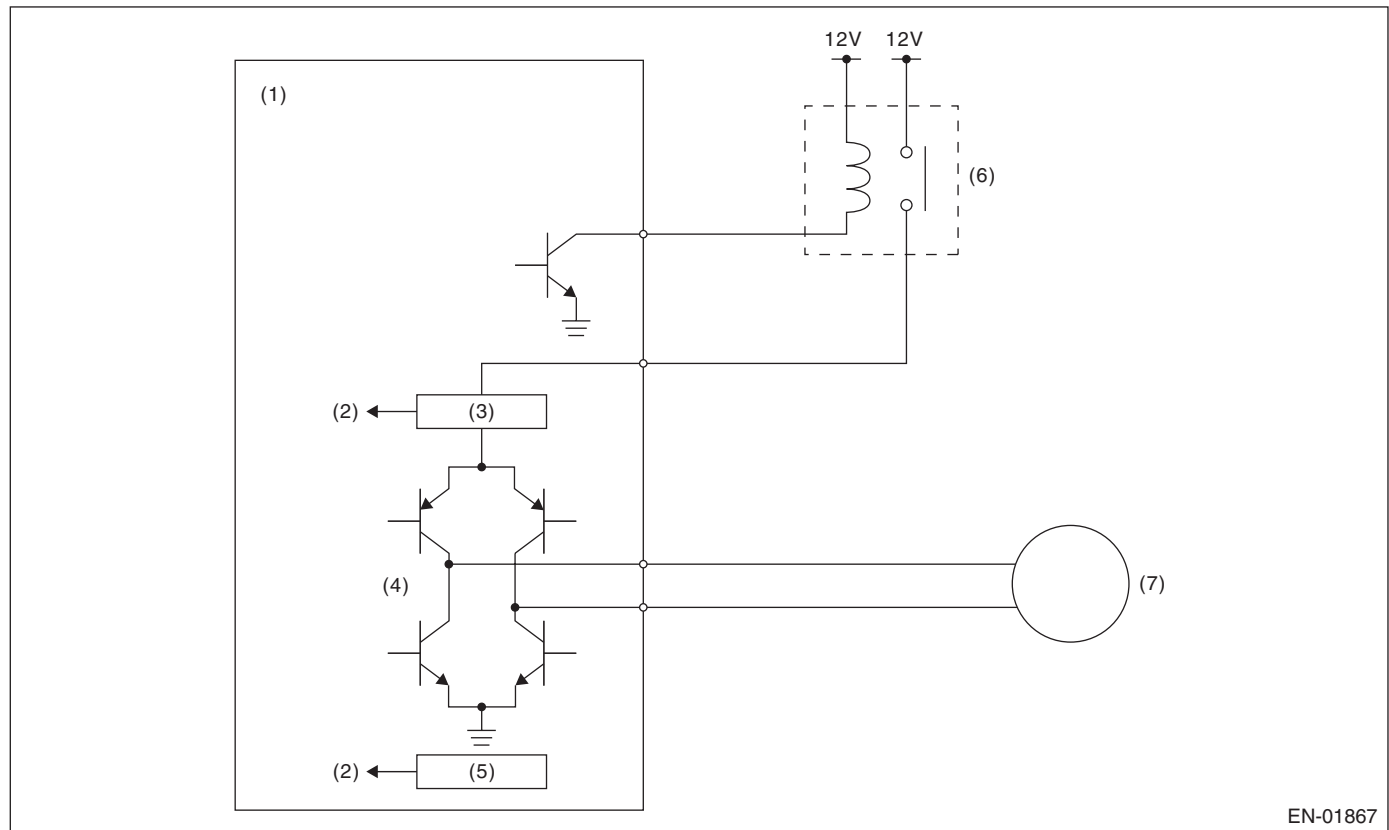
None

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

DN:DTC P2101 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE**1. OUTLINE OF DIAGNOSIS**

Judge as NG when the motor current becomes large or drive circuit is heated.

2. COMPONENT DESCRIPTION

EN-01867

(1) Engine control module (ECM)	(4) Drive circuit	(6) Electronic throttle control relay
(2) Detecting circuit	(5) Temperature detection circuit	(7) Motor
(3) Overcurrent detection circuit		

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Under control of electronic throttle control	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Motor current	$\leq 8 \text{ A}$
Drive circuit inner temperature	$\leq 175^{\circ}\text{C}$ (347°F)

Time Needed for Diagnosis:

- 500 milliseconds (For NG)
- 2000 milliseconds (For OK)

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

8. FAIL SAFE

Stop the continuity to the electronic control throttle motor. (Throttle opening is fixed to 6°.)

9. ECM OPERATION AT DTC SETTING

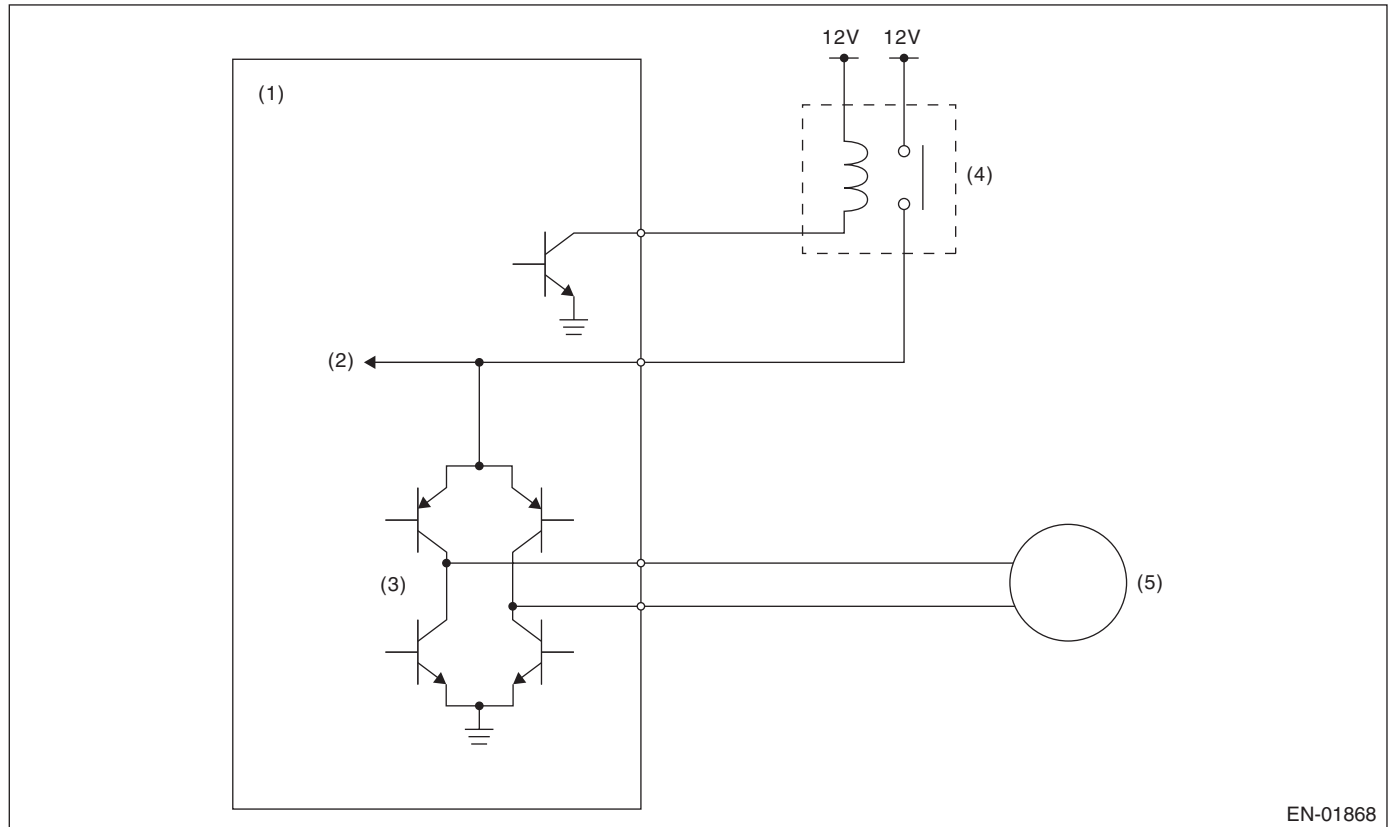
Memorize the freeze frame data. (For test mode \$02)

DO:DTC P2102 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Judge as NG when the electronic throttle control power is not supplied even when ECM sets the electric control throttle relay to ON.

2. COMPONENT DESCRIPTION



EN-01868

(1) Engine control module (ECM)	(3) Drive circuit	(5) Motor
(2) Voltage detection circuit	(4) Electronic throttle control relay	

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Electronic control throttle relay output	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Motor power voltage	≥ 5 V

Time Needed for Diagnosis:

- 400 milliseconds (For NG)
- 2000 milliseconds (For OK)

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

8. FAIL SAFE

Stop the continuity to the electronic control throttle motor. (Throttle opening is fixed to 6°.)

9. ECM OPERATION AT DTC SETTING

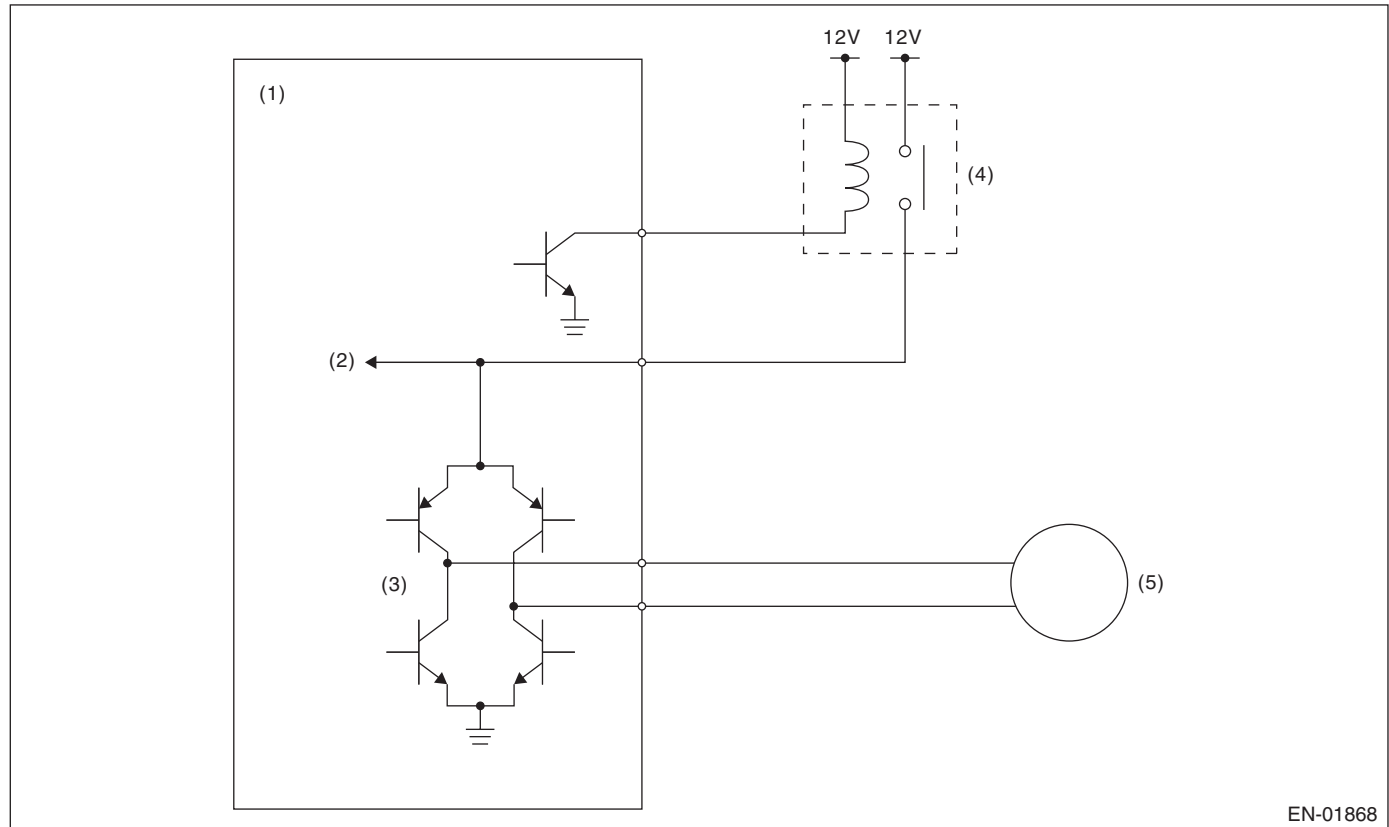
Memorize the freeze frame data. (For test mode \$02)

DP:DTC P2103 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Judge as NG when the electronic throttle control power is supplied even when ECM sets the electric throttle control relay to OFF.

2. COMPONENT DESCRIPTION



EN-01868

(1) Engine control module (ECM)	(3) Drive circuit	(5) Motor
(2) Voltage detection circuit	(4) Electronic throttle control relay	

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Electronic control throttle relay output	OFF

4. GENERAL DRIVING CYCLE

- When ignition switch ON → OFF
- Ignition switch OFF → ON (Only after clearing memory)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Motor power voltage	$\leq 5 \text{ V}$

Time Needed for Diagnosis:

- 600 milliseconds (For NG)
- 400 milliseconds (For OK)

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

8. FAIL SAFE

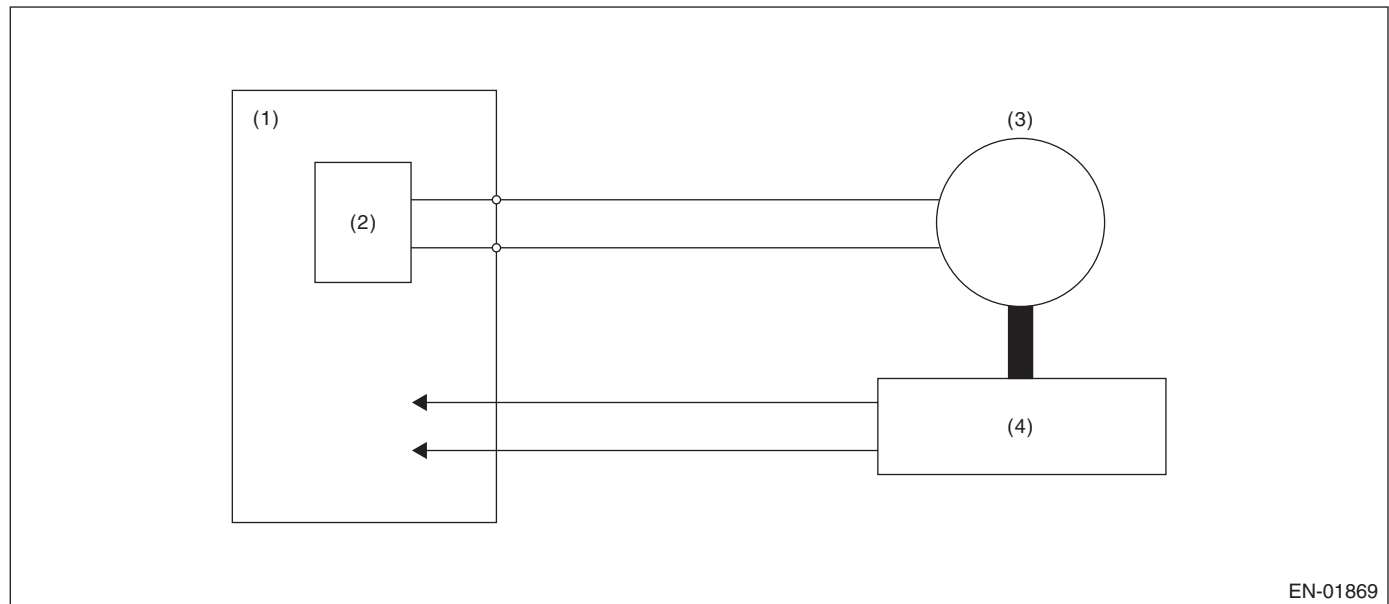
Stop the continuity to the electronic control throttle motor. (Throttle opening is fixed to 6°.)

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

DQ:DTC P2109 THROTTLE/PEDAL POSITION SENSOR “A” MINIMUM STOP PERFORMANCE**1. OUTLINE OF DIAGNOSIS**

Judge as NG when full close point learning cannot conducted or abnormal value is detected.

2. COMPONENT DESCRIPTION

EN-01869

(1) Engine control module (ECM)

(3) Motor

(4) Throttle position sensor

(2) Drive circuit

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON → OFF
Ignition switch (only after clearing the memory)	OFF → ON

4. GENERAL DRIVING CYCLE

Perform the diagnosis at full closed point learning.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Throttle sensor opening angle at full close point learning	10.127° or more, 19.872° or less
Throttle opening angle when the ignition switch is ON – Throttle minimum stop position	≥ 1.683°

Time Needed for Diagnosis: 8 — 80 milliseconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

8. FAIL SAFE

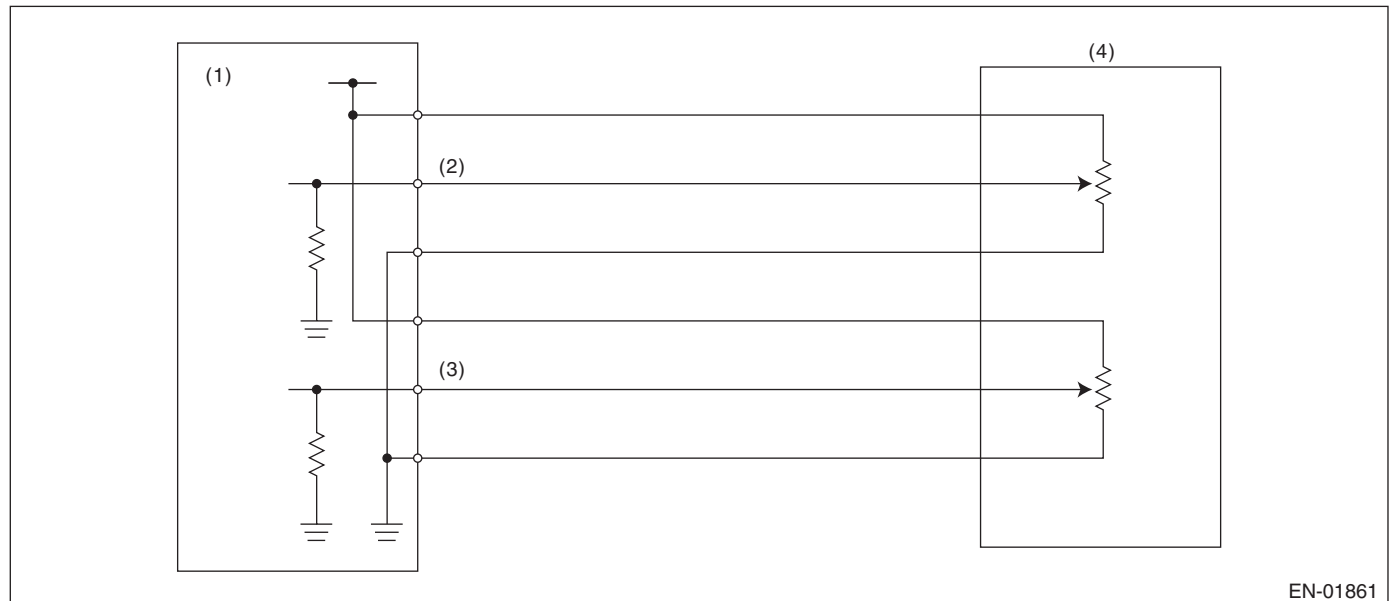
Stop the continuity to the electronic control throttle motor. (Throttle opening is fixed to 6°.)

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

DR:DTC P2122 THROTTLE/PEDAL POSITION SENSOR/SWITCH “D” CIRCUIT LOW INPUT**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of accelerator pedal position sensor 1.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

EN-01861

- (1) Engine control module (ECM) (3) Accelerator pedal position sensor 2 signal (4) Accelerator pedal position sensor 1 signal
- (2) Accelerator pedal position sensor 1 signal

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 1 input voltage	≥ 0.308 V

Time Needed for Diagnosis: 100 milliseconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed (Only with engine stopped)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

8. FAIL SAFE

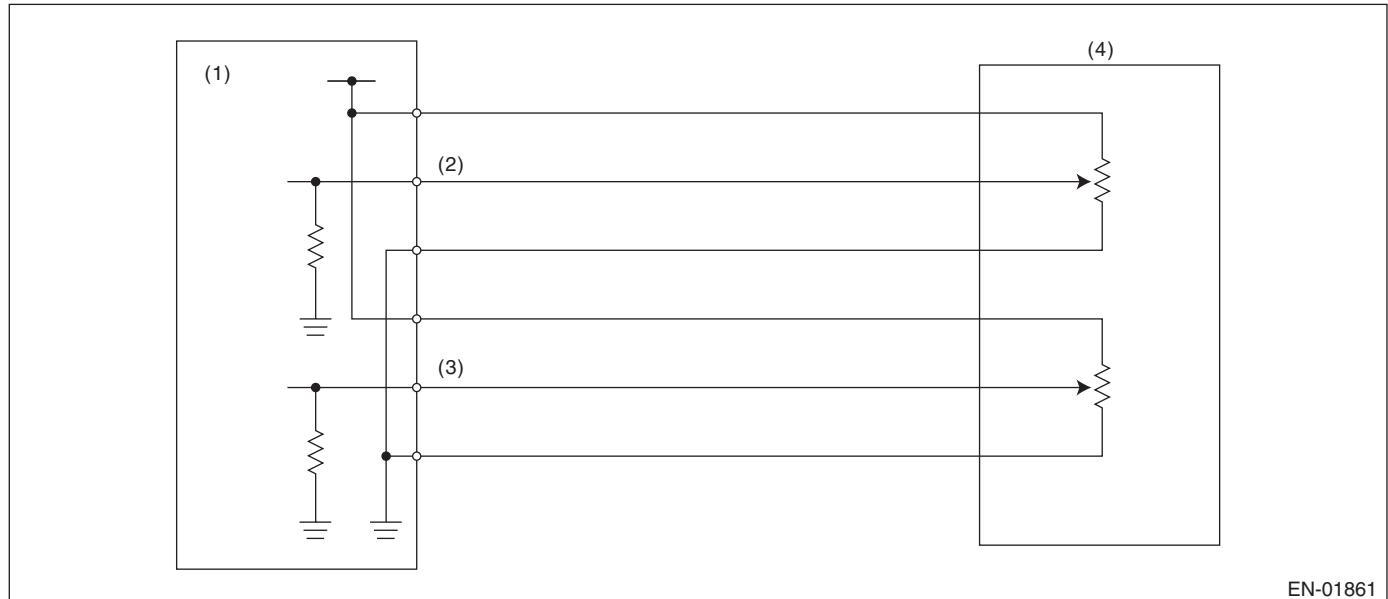
- Single malfunction: Control with normal sensor
- Simultaneous failure: Throttle opening is fixed to 6°.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

DS:DTC P2123 THROTTLE/PEDAL POSITION SENSOR/SWITCH “D” CIRCUIT HIGH INPUT**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of accelerator pedal position sensor 1.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

EN-01861

- (1) Engine control module (ECM) (3) Accelerator pedal position sensor 2 signal (4) Accelerator pedal position sensor 1 signal
- (2) Accelerator pedal position sensor 1 signal

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 1 input voltage	≤ 4.856 V

Time Needed for Diagnosis: 100 milliseconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed (Only with engine stopped)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

8. FAIL SAFE

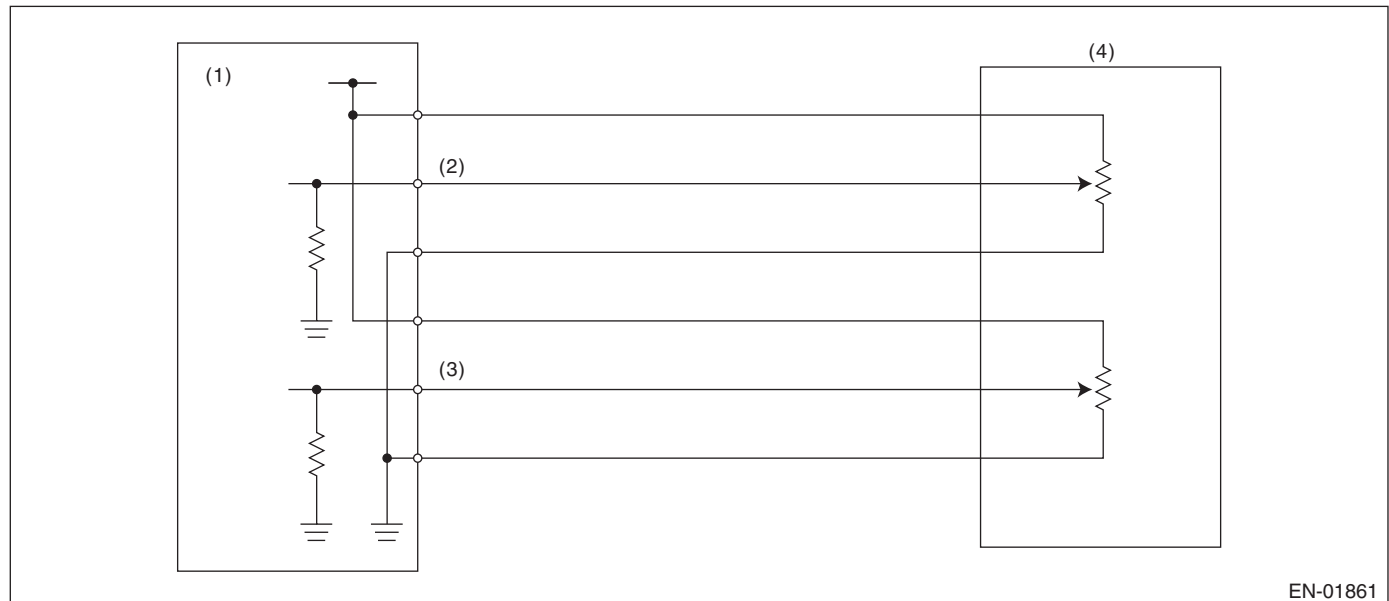
- Single malfunction: Control with normal sensor
- Simultaneous failure: Throttle opening is fixed to 6°.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

DT:DTC P2127 THROTTLE/PEDAL POSITION SENSOR/SWITCH “E” CIRCUIT LOW INPUT**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of accelerator pedal position sensor 2.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

EN-01861

- (1) Engine control module (ECM) (3) Accelerator pedal position sensor 2 signal (4) Accelerator pedal position sensor 2 signal
- (2) Accelerator pedal position sensor 1 signal

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 2 input voltage	≥ 0.308 V

Time Needed for Diagnosis: 100 milliseconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed (Only with engine stopped)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

8. FAIL SAFE

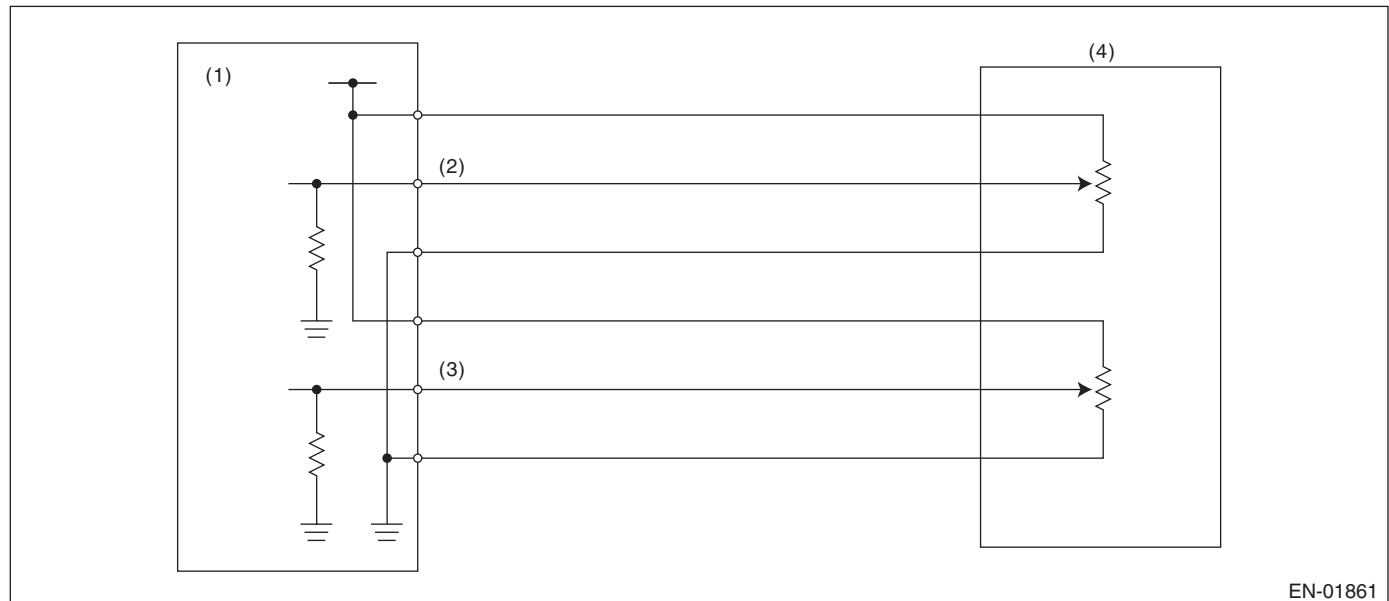
- Single malfunction: Control with normal sensor
- Simultaneous failure: Throttle opening is fixed to 6°.

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

DU:DTC P2128 THROTTLE/PEDAL POSITION SENSOR/SWITCH “E” CIRCUIT HIGH INPUT**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of accelerator pedal position sensor 2.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

- (1) Engine control module (ECM) (3) Accelerator pedal position sensor 2 signal (4) Accelerator pedal position sensor 2 signal
- (2) Accelerator pedal position sensor 1 signal

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 2 input voltage	≤ 4.865 V

Time Needed for Diagnosis: 100 milliseconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed (Only with engine stopped)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

8. FAIL SAFE

- Single malfunction: Control with normal sensor
- Simultaneous failure: Throttle opening is fixed to 6°.

9. ECM OPERATION AT DTC SETTING

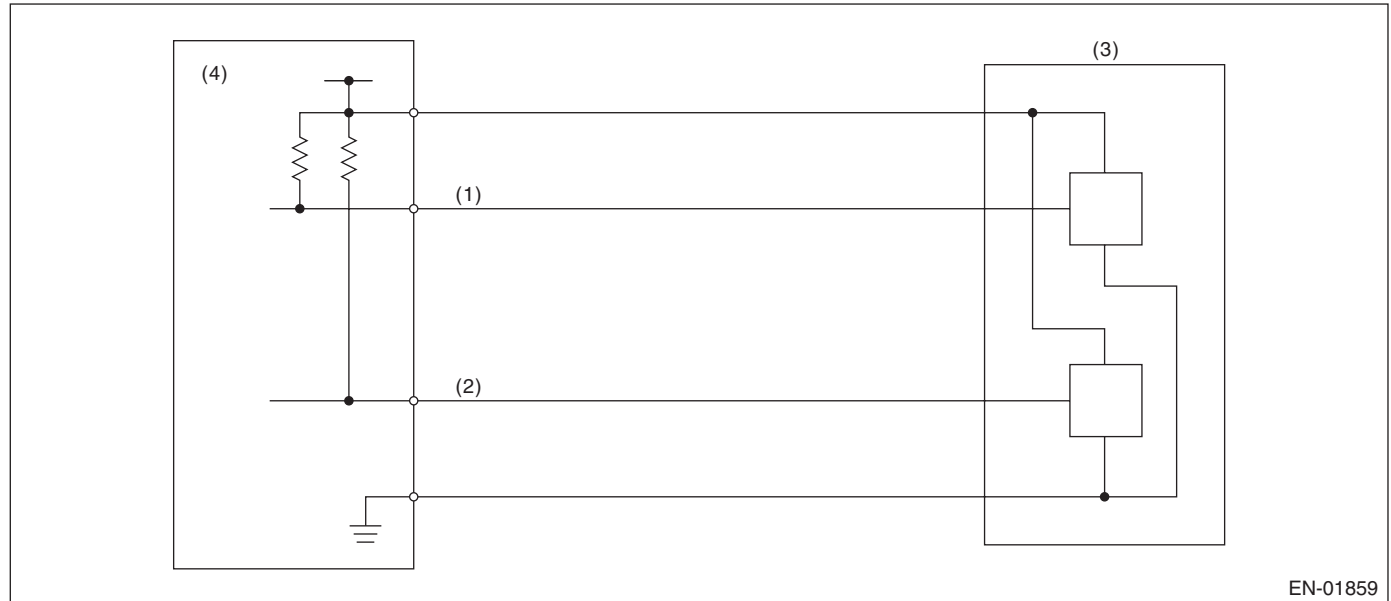
Memorize the freeze frame data. (For test mode \$02)

DV:DTC P2135 THROTTLE/PEDAL POSITION SENSOR/SWITCH “A”/“B” VOLT-AGE CORRELATION

1. OUTLINE OF DIAGNOSIS

Judge as NG when the signal level of throttle position sensor 1 is different from the throttle position sensor 2.

2. COMPONENT DESCRIPTION



- (1) Throttle position sensor 1 signal
(2) Throttle position sensor 2 signal

- (3) Throttle position sensor

- (4) Engine control module (ECM)

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

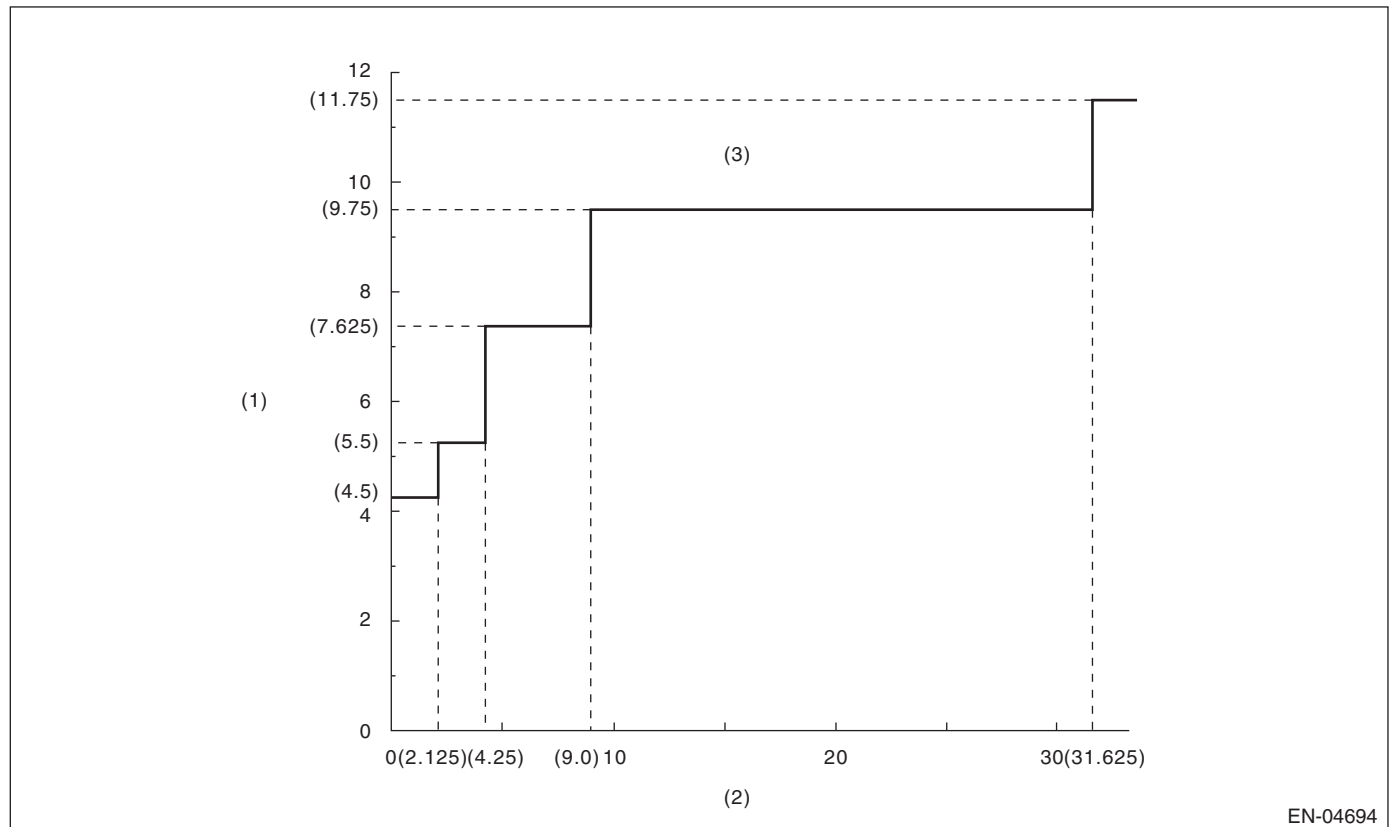
5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Signal difference between two sensors	$\leq 4.5^{\circ}$

Details of Judgment Value



EN-04694

(1) Sensor output difference (°)

(2) Throttle position sensor 1 opening angle (°)

(3) NG area

Time Needed for Diagnosis: 24 milliseconds (For NG), 24 milliseconds (For OK)

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed (Only with engine stopped)

8. FAIL SAFE

Stop the continuity to the electronic control throttle motor. (Throttle opening is fixed to 6°.)

9. ECM OPERATION AT DTC SETTING

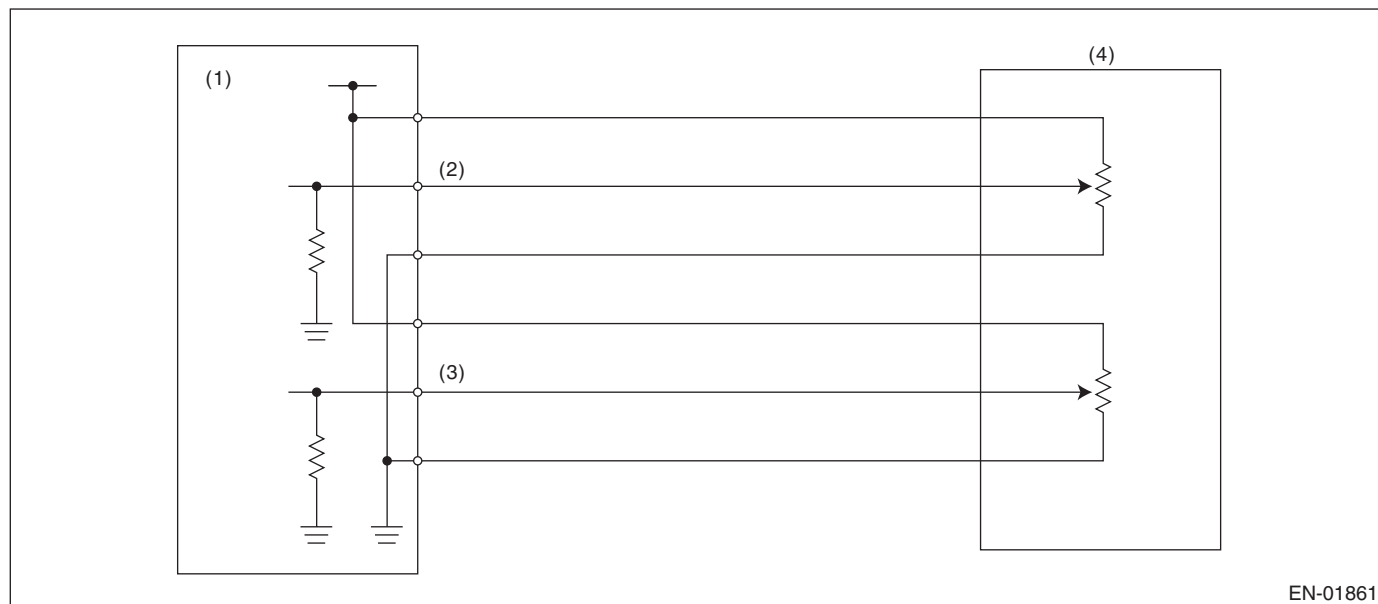
Memorize the freeze frame data. (For test mode \$02)

DW:DTC P2138 THROTTLE/PEDAL POSITION SENSOR/SWITCH “D”/“E” VOLTAGE CORRELATION

1. OUTLINE OF DIAGNOSIS

Judge as NG when the signal level of throttle position sensor 1 is different from the throttle position sensor 2.

2. COMPONENT DESCRIPTION



- (1) Engine control module (ECM) (3) Accelerator pedal position sensor 2 signal (4) Accelerator pedal position sensor 2 signal
- (2) Accelerator pedal position sensor 1 signal

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	≥ 6 (V)

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

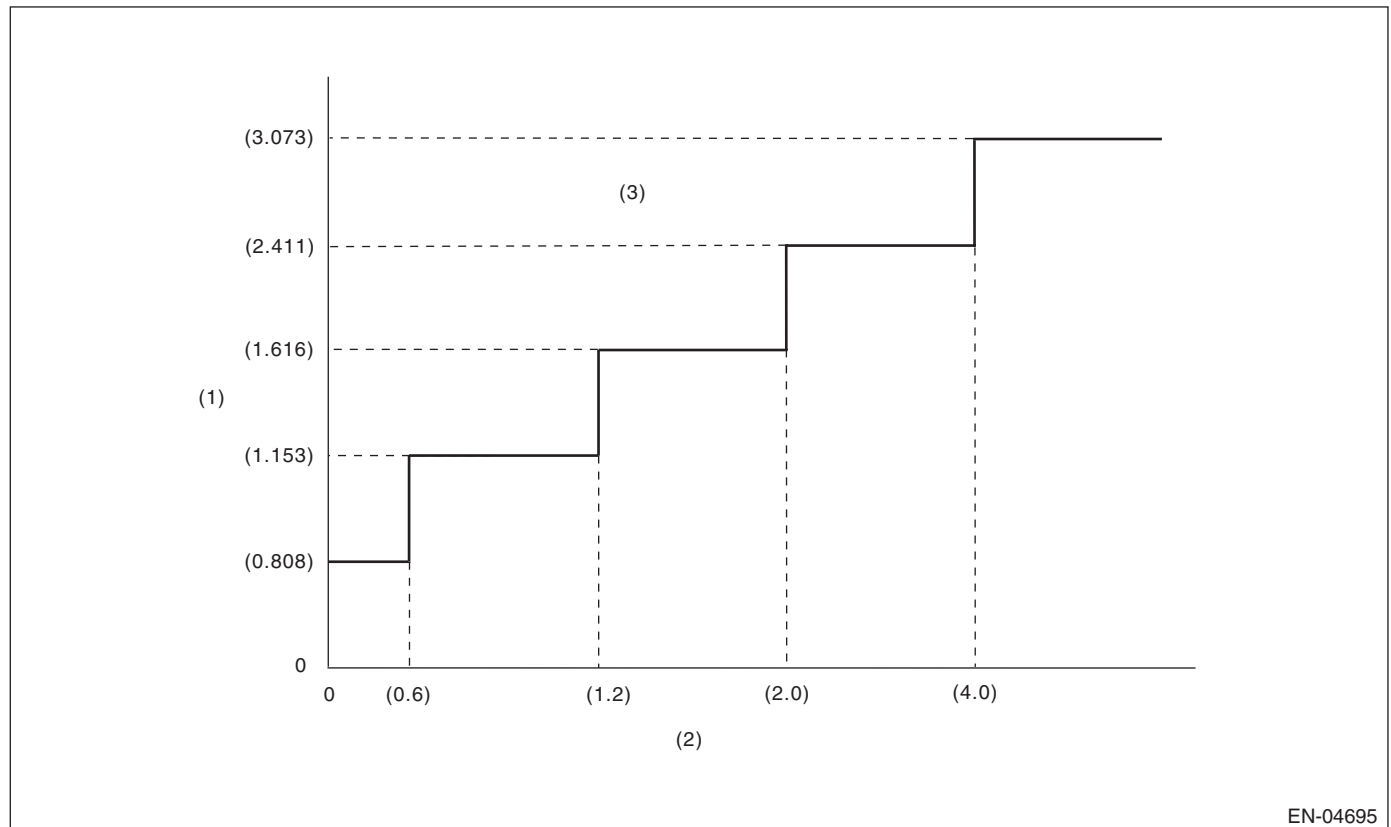
5. DIAGNOSTIC METHOD

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Signal difference between two sensors	$\leq 0.808^\circ$

Details of Judgment Value



EN-04695

(1) Sensor output difference ($^\circ$)

(2) Throttle position sensor 2 opening angle ($^\circ$)

(3) NG area

Time Needed for Diagnosis:

- 116 milliseconds (For NG)
- 1000 milliseconds (For OK)

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

Throttle opening is fixed to 6° .

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

DX:DTC P2227 BAROMETRIC PRESSURE CIRCUIT RANGE/PERFORMANCE**1. OUTLINE OF DIAGNOSIS**

Detect the malfunction of atmospheric pressure sensor output property.

Judge as NG when the atmospheric pressure sensor output is largely different from the intake manifold pressure at engine starting.

2. COMPONENT DESCRIPTION

The atmospheric pressure sensor is built into the ECM.

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
Engine speed	< 300 rpm
Vehicle speed	< 1 km/h (0.62 MPH)

4. GENERAL DRIVING CYCLE

Perform the diagnosis before engine starts with the ignition switch ON.

5. DIAGNOSTIC METHOD**Abnormality Judgment**

Judge as NG when the continuous time of completing the malfunction criteria below becomes 0.3 seconds or more.

Judgment Value

Malfunction Criteria	Threshold Value
Atmospheric pressure – Manifold pressure	≥ 26.7 kPa (200 mmHg, 7.88 inHg)
Intake manifold pressure at engine start-up – Manifold pressure	< 1.33 kPa (10 mmHg, 2.95 inHg)

Time Needed for Diagnosis: 0.3 seconds

Malfunction Indicator Light Illumination: Illuminates when malfunction occurs in 2 continuous driving cycles.

Normality Judgment

Judge as OK and clear the NG when the continuous time of completing the malfunction criteria below becomes more than 0.3 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
Atmospheric pressure – Manifold pressure	< 26.7 kPa (200 mmHg, 7.88 inHg)

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When “Clear Memory” is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When “Clear Memory” is performed

8. FAIL SAFE

Atmospheric pressure sensor process: Fix the atmospheric pressure to 101 kPa (760 mmHg, 29.8 inHg).

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

DY:DTC P2228 BAROMETRIC PRESSURE CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the open/short circuit of the atmospheric pressure sensor.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

The atmospheric pressure sensor is built into the ECM.

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG when the continuous time of completing the malfunction criteria below becomes 0.5 seconds or more.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Output voltage	< 0.118 V

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Output voltage	≥ 0.118 V

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

Atmospheric pressure sensor process: Fix the atmospheric pressure to 101 kPa (760 mmHg, 29.8 inHg).

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

DZ:DTC P2229 BAROMETRIC PRESSURE CIRCUIT HIGH**1. OUTLINE OF DIAGNOSIS**

Detect the open/short circuit of the atmospheric pressure sensor.
Judge as NG if it is out of specification.

2. COMPONENT DESCRIPTION

The atmospheric pressure sensor is built into the ECM.

3. ENABLE CONDITION

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD**Abnormality Judgment**

Judge as NG when the continuous time of completing the malfunction criteria below becomes 0.5 seconds or more.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Output voltage	≥ 4.936 V

Time Needed for Diagnosis: 0.5 seconds

Malfunction Indicator Light: Illuminates as soon as a malfunction occurs.

Normality Judgment

Judge as OK and clear the NG when the malfunction criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Output voltage	< 4.936 V

6. DTC CLEAR CONDITION

- When the OK idling cycle is completed 40 times in a row
- When "Clear Memory" is performed

7. MALFUNCTION INDICATOR LIGHT CLEAR CONDITION

- When the OK driving cycle is completed 3 times in a row
- When "Clear Memory" is performed

8. FAIL SAFE

Atmospheric pressure sensor process: Fix the atmospheric pressure to 101 kPa (760 mmHg, 29.8 inHg).

9. ECM OPERATION AT DTC SETTING

Memorize the freeze frame data. (For test mode \$02)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

ENGINE SECTION 3

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.

This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.

Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUEL INJECTION (FUEL SYSTEMS)

FU(H4DOTC)

EMISSION CONTROL
(AUX. EMISSION CONTROL DEVICES)

EC(H4DOTC)

INTAKE (INDUCTION)

IN(H4DOTC)

MECHANICAL

ME(H4DOTC)

EXHAUST

EX(H4DOTC)

COOLING

CO(H4DOTC)

LUBRICATION

LU(H4DOTC)

SPEED CONTROL SYSTEMS

SP(H4DOTC)

IGNITION

IG(H4DOTC)

STARTING/CHARGING SYSTEMS

SC(H4DOTC)

ENGINE (DIAGNOSTICS)

EN(H4DOTC)
(diag)

GENERAL DESCRIPTION

GD(H4DOTC)

FUEL INJECTION (FUEL SYSTEMS)

FU(H4DOTC)

	Page
1. General Description	2
2. Throttle Body	10
3. Intake Manifold	11
4. Engine Coolant Temperature Sensor	21
5. Crankshaft Position Sensor	22
6. Camshaft Position Sensor	23
7. Knock Sensor	24
8. Throttle Position Sensor	25
9. Mass Air Flow and Intake Air Temperature Sensor	26
10. Manifold Absolute Pressure Sensor	27
11. Fuel Injector	28
12. Tumble Generator Valve Assembly	29
13. Tumble Generator Valve Actuator	30
14. Tumble Generator Valve Position Sensor	31
15. Oil Flow Control Solenoid Valve	32
16. Wastegate Control Solenoid Valve	33
17. Front Oxygen (A/F) Sensor	34
18. Rear Oxygen Sensor	36
19. Exhaust Temperature Sensor	37
20. Engine Control Module (ECM)	38
21. Main Relay	39
22. Fuel Pump Relay	40
23. Electronic Throttle Control Relay	41
24. Fuel Pump Control Unit	42
25. Fuel	43
26. Fuel Tank	44
27. Fuel Filler Pipe	50
28. Fuel Pump	53
29. Fuel Level Sensor	55
30. Fuel Sub Level Sensor	56
31. Fuel Filter	58
32. Fuel Bypass Valve	59
33. Fuel Delivery, Return and Evaporation Lines	60
34. Fuel System Trouble in General	63

1. General Description

A: SPECIFICATION

Specifications for SOHC U5 model are the same as the SOHC model. <Ref. to IG(H4SO)-2, General Description.>

STARTING/CHARGING SYSTEMS

SC(H4SO U5)

	Page
1. General Description	2

1. General Description

A: SPECIFICATION

Removal and installation procedures for SOHC U5 model are the same as the SOHC model. <Ref. to IN(H4SO)-2, General Description.>

MECHANICAL

ME(H4SO U5)

	Page
1. General Description	2



1. General Description

A: SPECIFICATION

Specifications for SOHC U5 model are the same as the SOHC model. <Ref. to LU(H4SO)-2, General Description.>

SPEED CONTROL SYSTEMS

SP(H4SO U5)

	Page
1. General Description	2

1. General Description

A: SPECIFICATION

Specifications for SOHC U5 model are the same as the SOHC model. <Ref. to ME(H4SO)-2, General Description.>

EXHAUST

EX(H4SO U5)

	Page
1. General Description	2



1. General Description

A: SPECIFICATION

Specifications for SOHC U5 model are the same as the SOHC model. <Ref. to SP(H4SO)-2, General Description.>

IG(H4SO U5)

	Page
1. General Description	2



1. General Description

A: SPECIFICATION

Specifications for SOHC U5 model are the same as the SOHC model. <Ref. to SC(H4SO)-2, General Description.>

ENGINE (DIAGNOSTICS)

EN(H4SO U5)(diag)

	Page
1. Basic Diagnostic Procedure	2
2. Check List for Interview	3
3. General Description	5
4. Electrical Component Location	9
5. Engine Control Module (ECM) I/O Signal	18
6. Engine Condition Data	22
7. Data Link Connector	23
8. General Scan Tool	24
9. Subaru Select Monitor	27
10. Read Diagnostic Trouble Code (DTC)	35
11. Inspection Mode	36
12. Drive Cycle	41
13. Clear Memory Mode	46
14. Compulsory Valve Operation Check Mode	47
15. Malfunction Indicator Light	49
16. Diagnostics for Engine Starting Failure	58
17. List of Diagnostic Trouble Code (DTC)	73
18. Diagnostic Procedure with Diagnostic Trouble Code (DTC)	79
19. General Diagnostic Table	326