

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(H4DOTC)(diag)-4, CHECK, Check List for Interview.> 2) Start the engine.	Does the engine start?	Go to step 2.	Inspection using "Diagnostics for Engine Starting Failure". <Ref. to EN(H4DOTC)(diag)-74, 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(H4DOTC)(diag)-471, General Diagnostic Table.>
3 CHECK COMMUNICATION STATUS. 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor or general scan tool to the data link connector. 3) Turn the ignition switch to ON, and run the Subaru Select Monitor or general scan tool. NOTE: - Subaru Select Monitor For detailed procedures, refer to "Subaru Select Monitor". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Does Subaru Select Monitor or general scan tool communicate with vehicle normally?	Go to step 4.	Inspection using "Diagnostic Procedure for Subaru Select Monitor Communication". <Ref. to EN(H4DOTC)(diag)-85, Diagnostic Procedure for Subaru Select Monitor Communication.>
4 CHECK DTC. Read DTC using Subaru Select Monitor or general scan tool. NOTE: - Subaru Select Monitor Refer to "Read Diagnostic Trouble Code (DTC)" for detailed operation procedure. <Ref. to EN(H4DOTC)(diag)-48, Read Diagnostic Trouble Code (DTC).> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is DTC displayed on Subaru Select Monitor or general scan tool?	Record DTC and freeze frame data, then repair the trouble cause. <Ref. to EN(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).> After repair, go to the next step. Go to step 5.	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(H4DOTC)(diag)-67, Malfunction Indicator Light.>

Basic Diagnostic Procedure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5 PERFORM DIAGNOSIS. 1) Perform the Clear Memory Mode. <Ref. to EN(H4DOTC)(diag)-63, Clear Memory Mode.> 2) Perform the Inspection Mode or Drive Cycle. <Ref. to EN(H4DOTC)(diag)-49, Inspection Mode.> <Ref. to EN(H4DOTC)(diag)-55, Drive Cycle.>	Is DTC displayed on Subaru Select Monitor or general scan tool?	Inspect using "Diagnostic Procedure with Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DOTC)(diag)-96, 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 purchase		Fuel type	
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	Rear entertainment system	☐ ON/ ☐ OFF
Radiator fan	☐ ON/ ☐ OFF	Car phone	☐ ON/ ☐ OFF
Front wiper	☐ ON/ ☐ OFF	Wireless device	☐ 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 the malfunction indicator light turns on.

NOTE:

Use copies of this page for interviewing customers.

a) Other warning lights or indicators illuminate: ☐ Yes / ☐ No
☐ Fuel level warning light ☐ Charge warning light ☐ Engine coolant temperature warning light ☐ Oil pressure warning light ☐ ATF temperature warning light or SPORT indicator light ☐ Driver's control center differential indicator light ☐ ABS warning light ☐ VDC warning light ☐ Cruise indicator light ☐ SI-CRUISE warning light ☐ Immobilizer indicator light ☐ STEERING warning light ☐ Electronic parking brake warning light ☐ Glow indicator light ☐ Sedimenter warning light ☐ Others:
b) Fuel level
• Lack of fuel: ☐ Yes / ☐ No • Indicator position of fuel gauge: • Experienced running out of fuel: ☐ Yes / ☐ No
c) Intentional connecting or disconnecting of 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

General Description

ENGINE (DIAGNOSTICS)

3. General Description

A: CAUTION

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

CAUTION:

- Do not use electrical test equipment on the airbag system 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. Doing so will damage the ECM instantly, and other parts will also 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) When disconnecting the connectors of the electrical components, always be sure to turn the ignition switch to OFF. Perform the Clear Memory Mode after connecting the connectors. <Ref. to EN(H4DOTC)(diag)-63, Clear Memory Mode.>

5) When measuring the voltage or resistance of individual sensor or all electrical control modules, use a tapered pin with a diameter of less than 0.6 mm (0.024 in). Do not insert the pin 4 mm (0.16 in) or more into the part.

CAUTION:

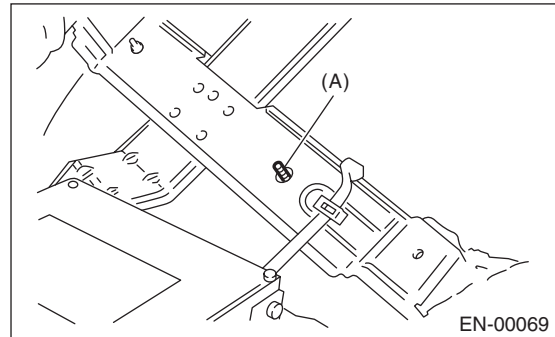
When replacing the ECM, be careful not to use the ECM of wrong specification to avoid any damage on the fuel injection system.

NOTE:

When replacing the ECM of the models with immobilizer, immobilizer system must be registered. For detailed procedures, refer to "REGISTRATION MANUAL FOR IMMOBILIZER".

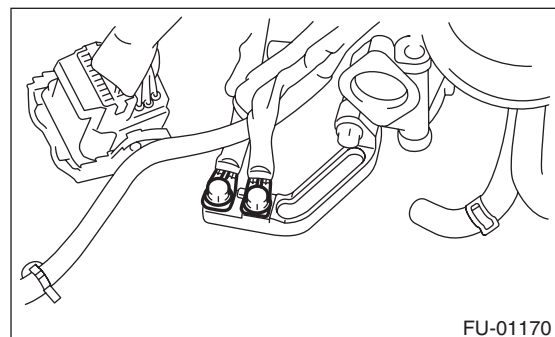
6) Take care not to allow water to get into the connectors when servicing or washing the vehicle in rainy weather. Avoid exposure to water even if the connectors are waterproof.

7) Use ECM mounting stud bolts for the grounding point when measuring voltage and resistance inside the passenger compartment.



(A) Stud bolt

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



9) All parts related to the engine control system are precision parts. Do not drop or otherwise apply impact. Do not reuse the parts that are dropped accidentally.

10) Observe the following cautions when installing a radio in vehicle.

CAUTION:

- The antenna must be kept as far apart as possible from the ECM. <Ref. to EN(H4DOTC)(diag)-9, CONTROL MODULE, LOCATION, Electrical Component Location.>
- The antenna feeder must be placed as far apart as possible from the ECM and engine control system 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.

11) When disconnecting the fuel hose, be sure to release the fuel pressure beforehand. <Ref. to FU(STI)-67, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.> <Ref. to FU(w/o STI)-65, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>

12) Warning lights 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 rotating speed difference between the front and rear wheels. After diagnosis of engine control system, perform the VDC memory clear procedure of self-diagnosis function. <Ref. to VDC(diag)-27, Clear Memory Mode.>

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 the electrolyte.

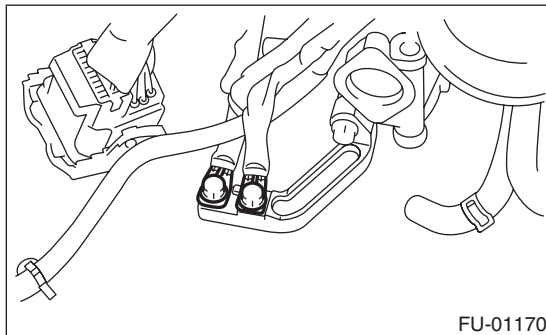
Standard voltage: 12 V

Specific gravity: 1.260 or more

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

2. ENGINE GROUND

Make sure that the engine ground terminal is properly connected to the engine.



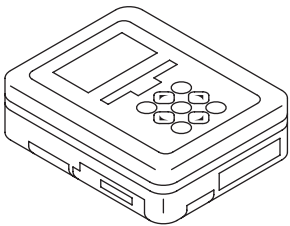
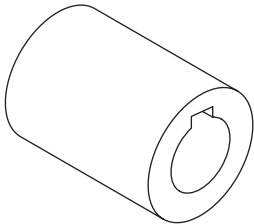
C: NOTE

- The on-board diagnostic (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 of sensors as may disable the drive, the fail-safe function is provided to ensure the minimal drivability.
 - The OBD system incorporated with the vehicles within this type of engine 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 when it detects a malfunction.
 - Freeze frame engine condition data are stored until the DTCs are cleared. However when such malfunctions as fuel trim fault and misfire are detected with the freeze frame engine condition data stored, they are rewritten into those related to the fuel trim fault and 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.
- *: One driving cycle means the period between the ignition switch ON and the ignition switch OFF after driving.
- When performing diagnosis, connect the Subaru Select Monitor or general scan tool to the vehicle.

General Description

ENGINE (DIAGNOSTICS)

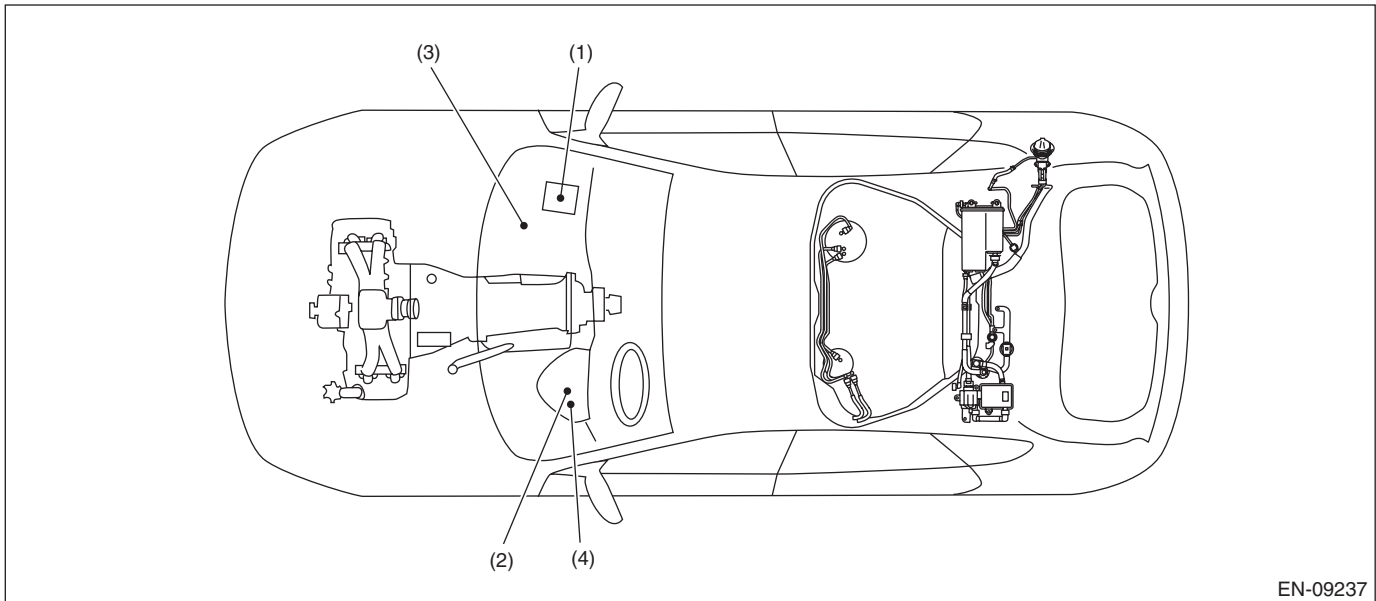
D: PREPARATION TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST1B022XU0	1B022XU0	SUBARU SELECT MONITOR III KIT	Used for troubleshooting the electrical system.
 ST-499987500	499987500	CRANKSHAFT SOCKET	Used for rotating crankshaft.

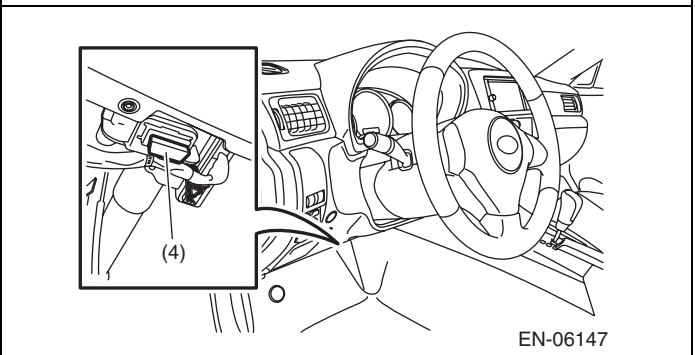
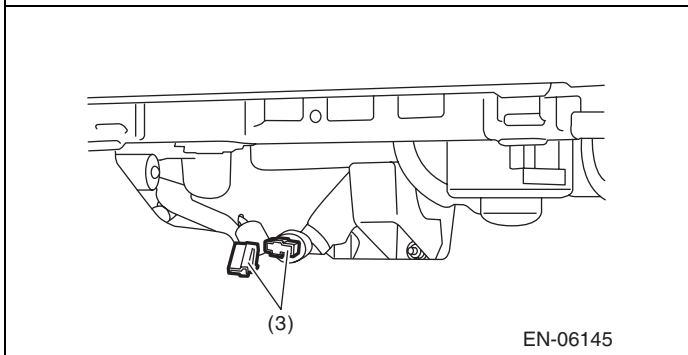
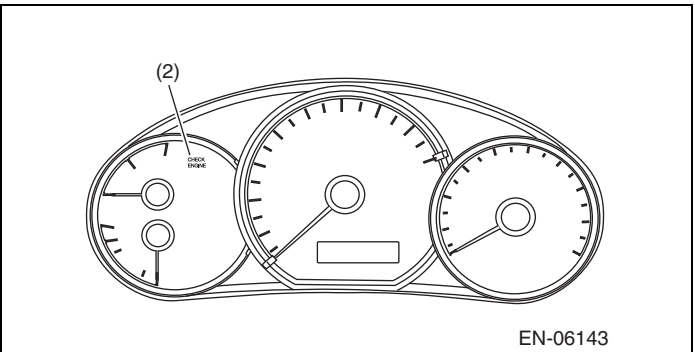
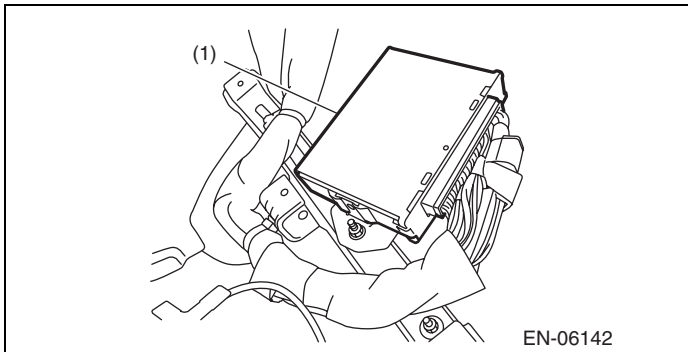
4. Electrical Component Location

A: LOCATION

1. CONTROL MODULE



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

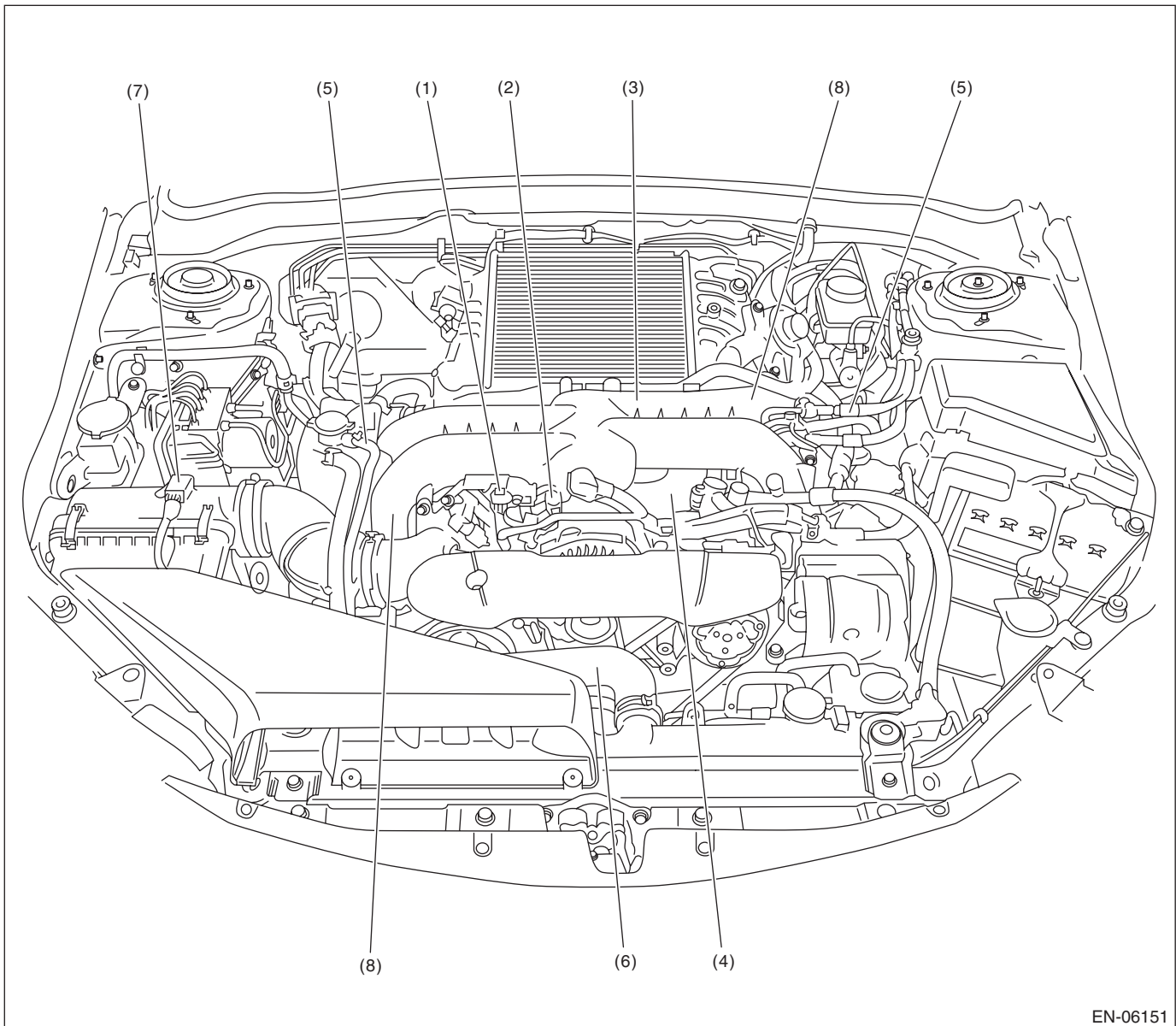


Electrical Component Location

ENGINE (DIAGNOSTICS)

2. SENSOR

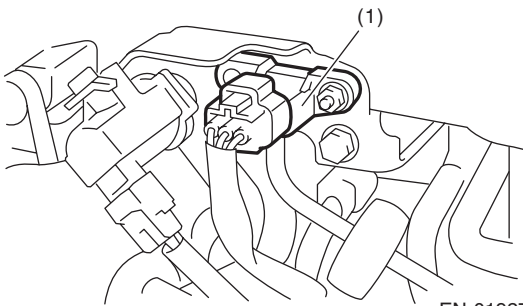
- Models without SI-DRIVE



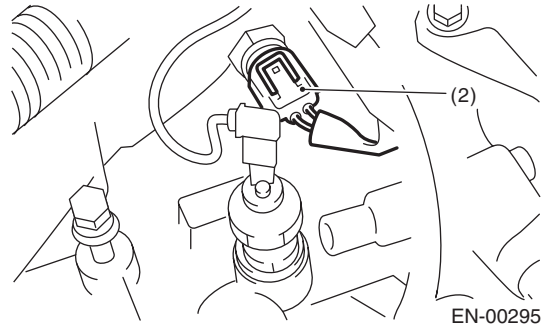
(1) Manifold absolute pressure sensor	(4) Knock sensor	(7) Mass air flow and intake air temperature sensor
(2) Engine coolant temperature sensor	(5) Intake camshaft position sensor	(8) Tumble generator valve ASSY
(3) Electronic throttle control	(6) Crankshaft position sensor	

Electrical Component Location

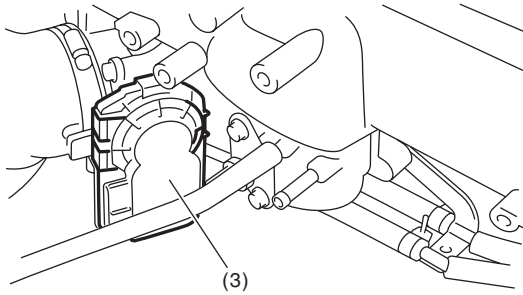
ENGINE (DIAGNOSTICS)



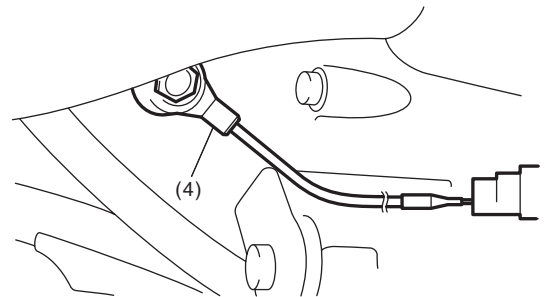
EN-01927



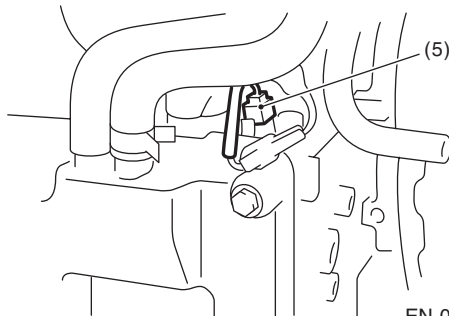
EN-00295



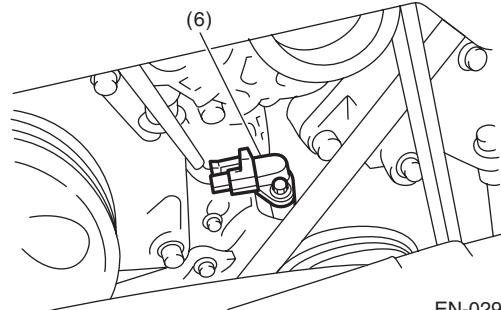
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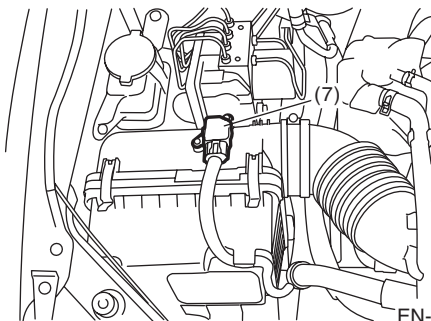
EN-02169



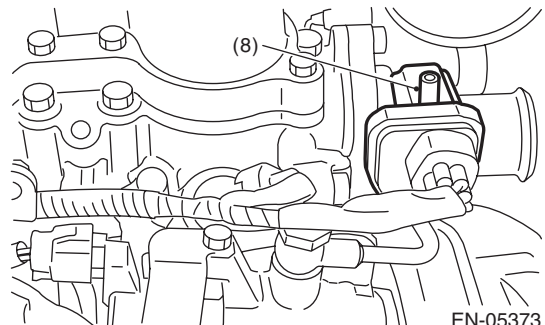
EN-01798



EN-02919



EN-06149

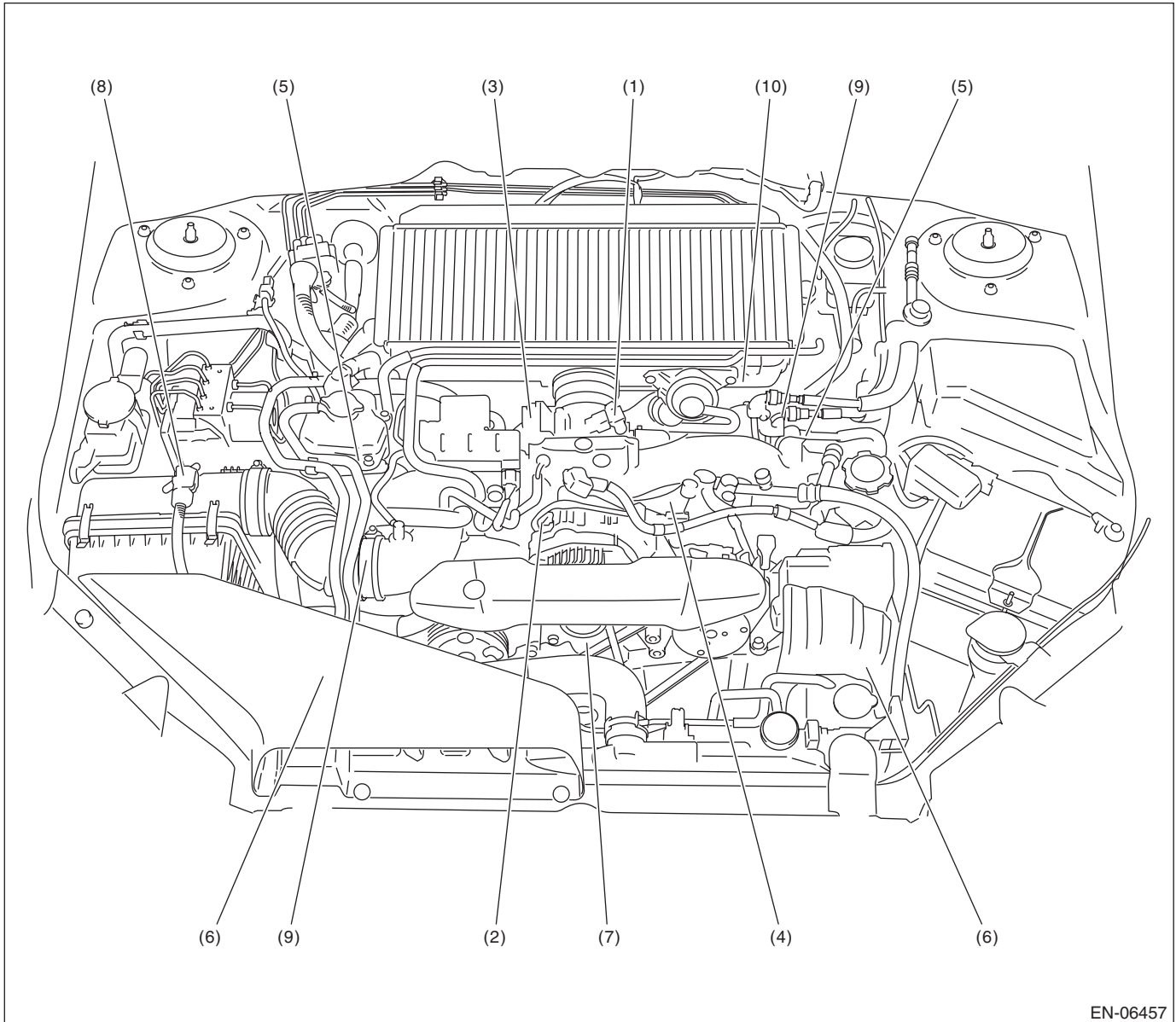


EN-05373

Electrical Component Location

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE

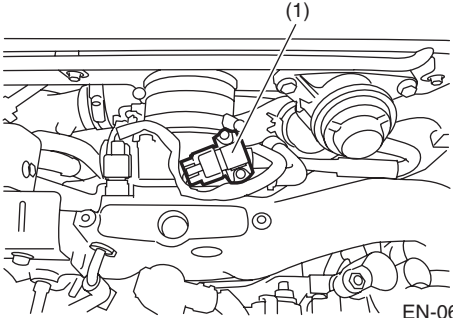
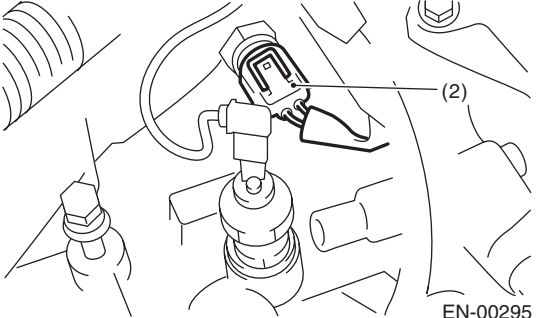
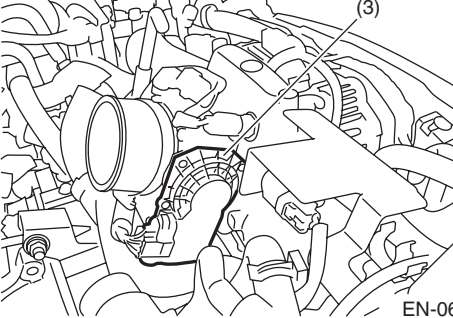
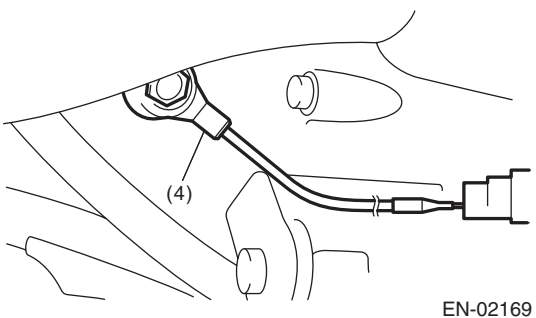
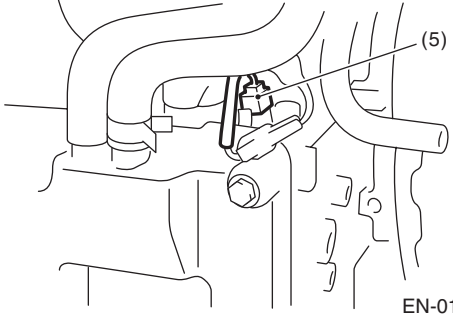
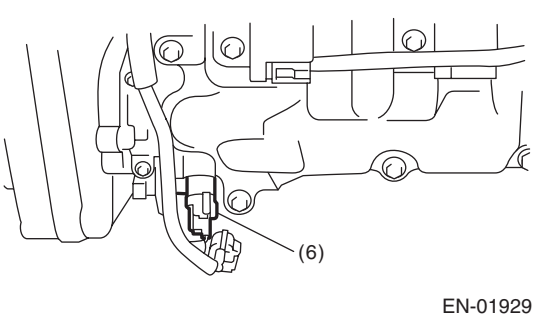
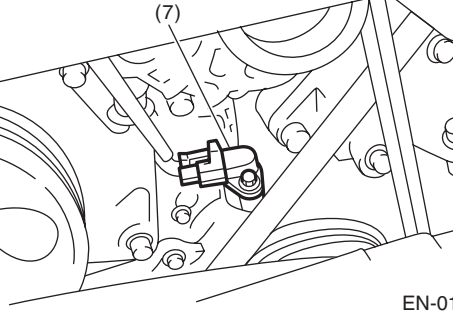
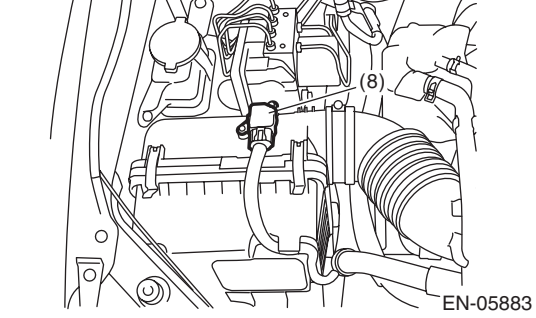
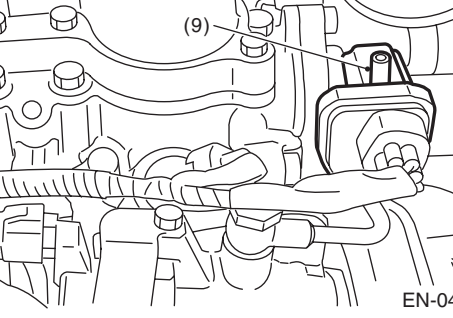
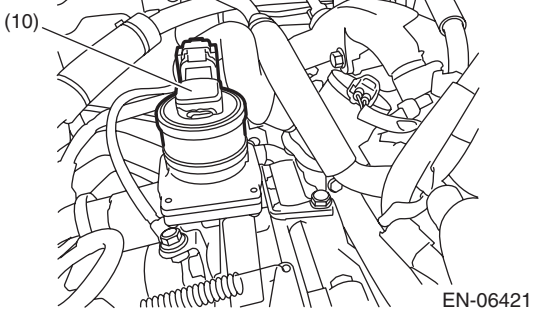


EN-06457

(1) Manifold absolute pressure sensor	(5) Intake camshaft position sensor	(8) Mass air flow and intake air temperature sensor
(2) Engine coolant temperature sensor	(6) Exhaust camshaft position sensor	(9) Tumble generator valve ASSY
(3) Electronic throttle control	(7) Crankshaft position sensor	(10) Secondary air pipe pressure sensor
(4) Knock sensor		

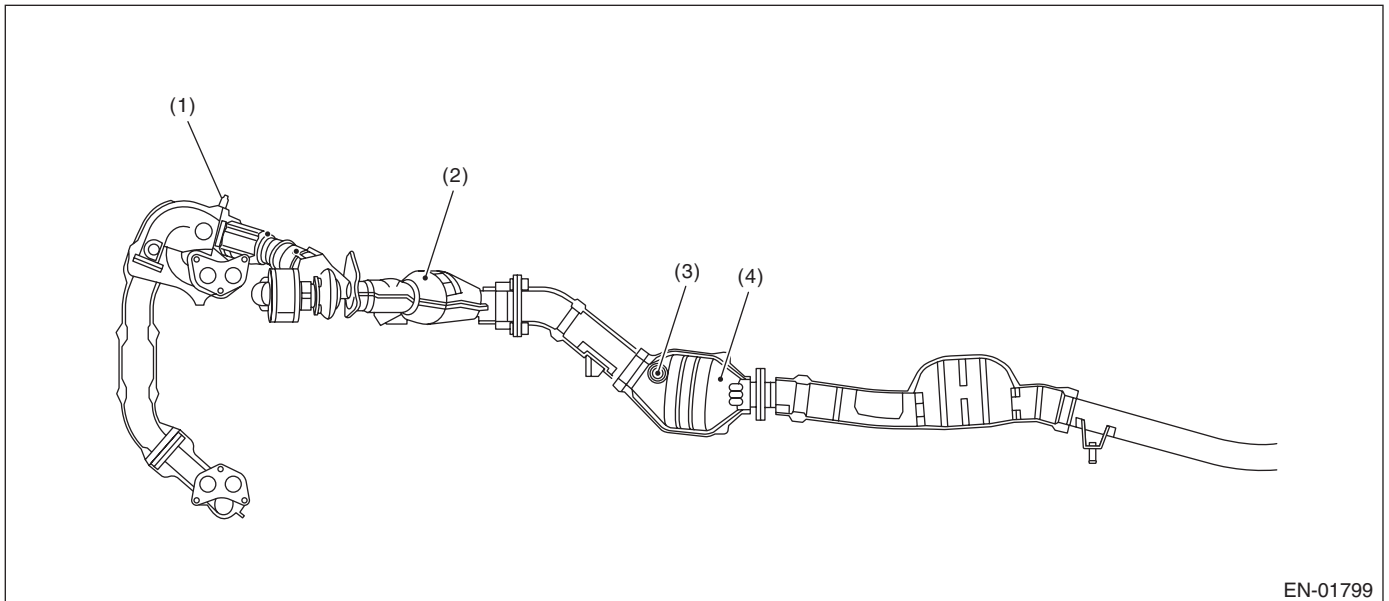
Electrical Component Location

ENGINE (DIAGNOSTICS)

 EN-06418	 EN-00295
 EN-06419	 EN-02169
 EN-01798	 EN-01929
 EN-01930	 EN-05883
 EN-04992	 EN-06421

Electrical Component Location

ENGINE (DIAGNOSTICS)

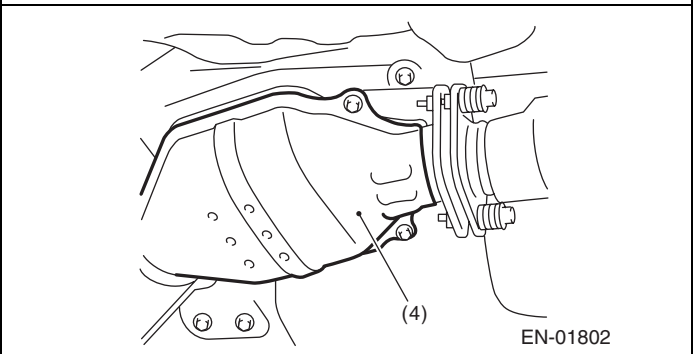
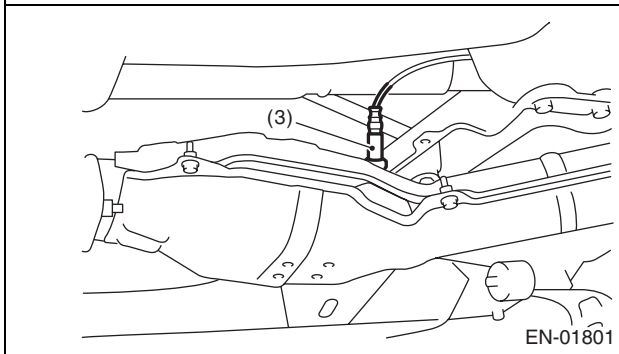
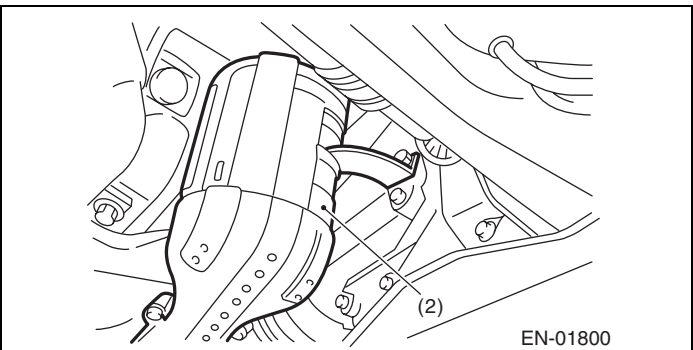
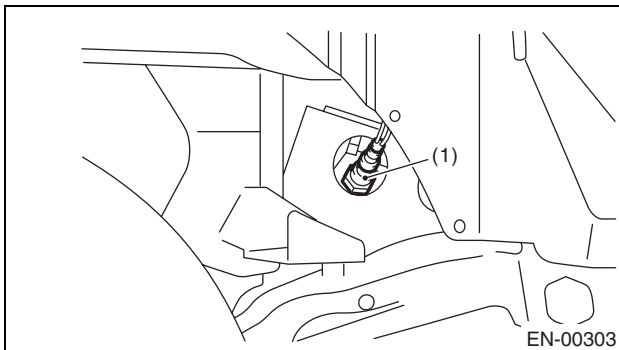


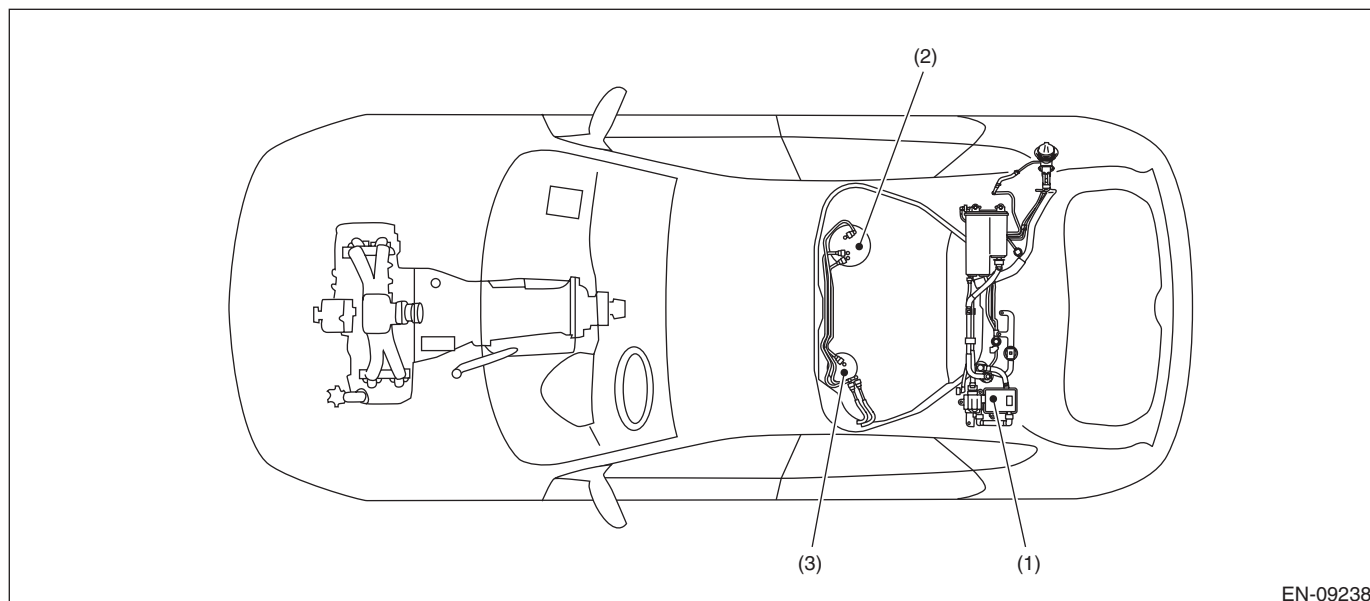
(1) Front oxygen (A/F) sensor

(3) Rear oxygen sensor

(4) Rear catalytic converter

(2) Front catalytic converter

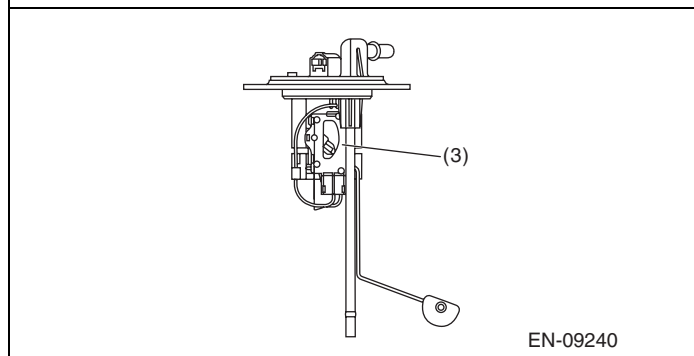
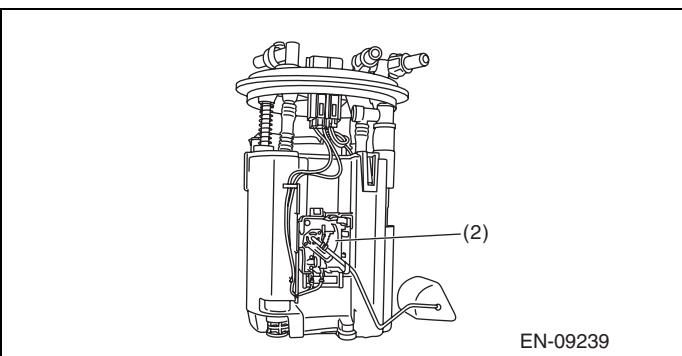
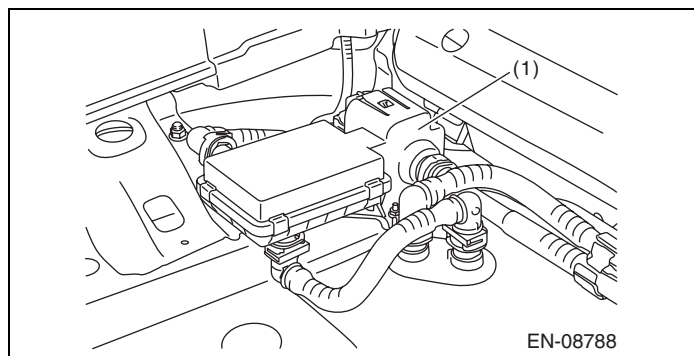




(1) Leak check valve ASSY (with built-in pressure sensor)

(2) Fuel level sensor

(3) Fuel sub level sensor



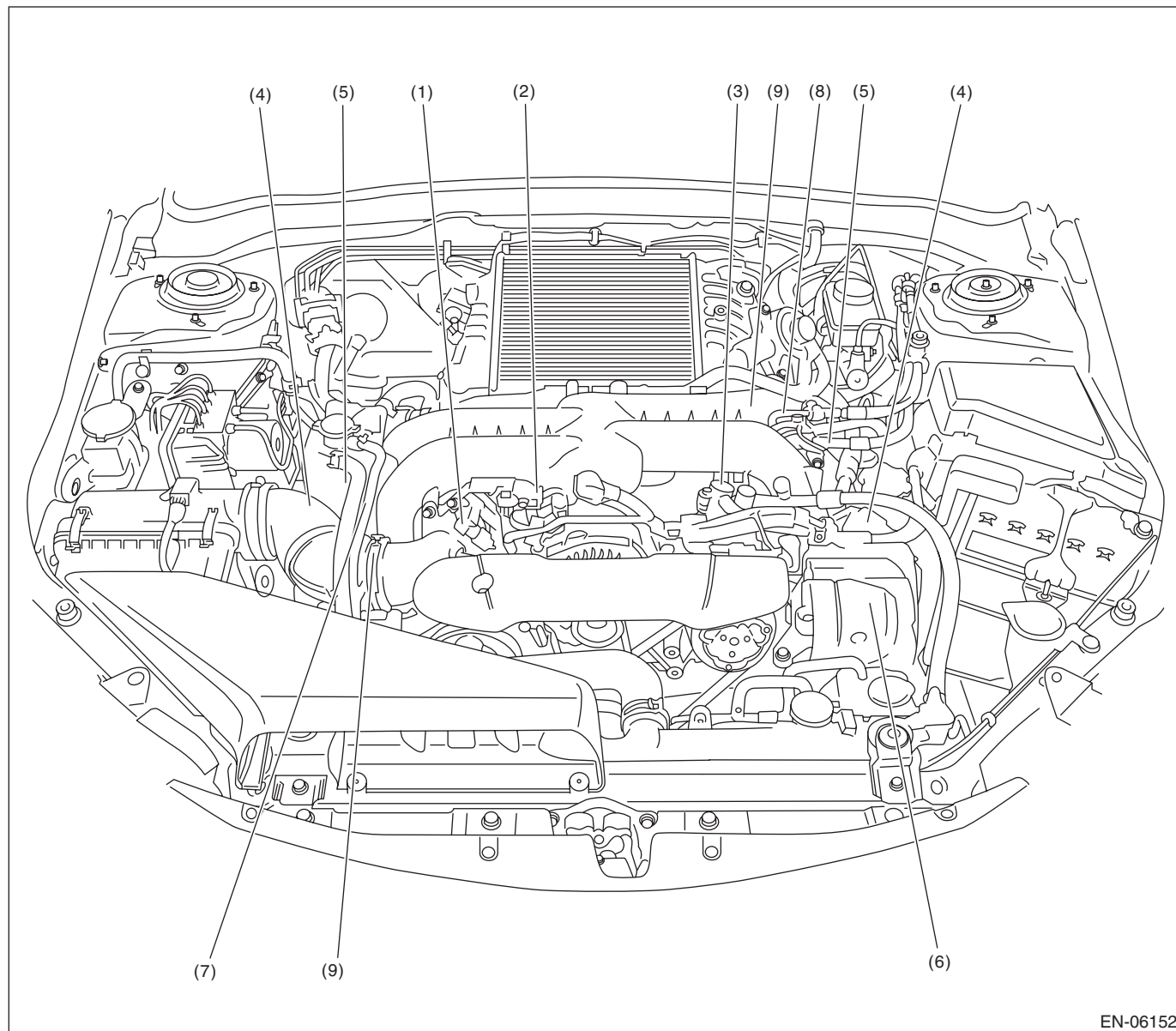
SUBARU.

Electrical Component Location

ENGINE (DIAGNOSTICS)

3. SOLENOID VALVE, ACTUATOR, EMISSION CONTROL SYSTEM PARTS AND IGNITION SYSTEM PARTS

- Models without SI-DRIVE

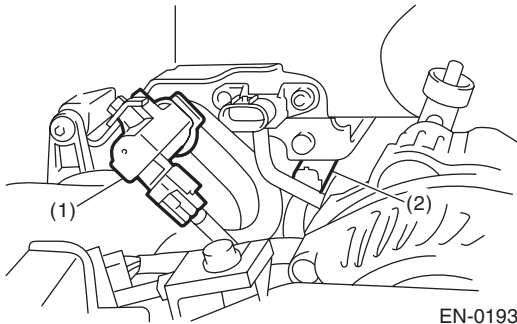


EN-06152

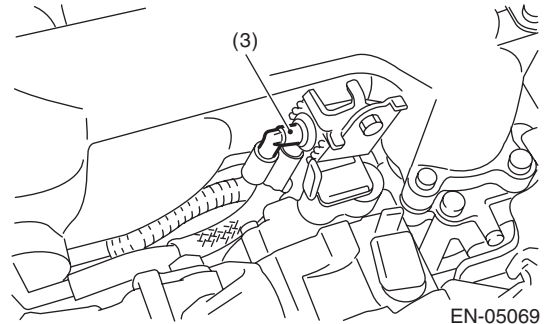
(1) Wastegate control solenoid valve	(4) Ignition coil	(7) Secondary air combination valve RH
(2) Purge control solenoid valve 2	(5) Intake oil flow control solenoid valve	(8) Secondary air combination valve LH
(3) Purge control solenoid valve 1	(6) Secondary air pump	(9) Tumble generator valve ASSY

Electrical Component Location

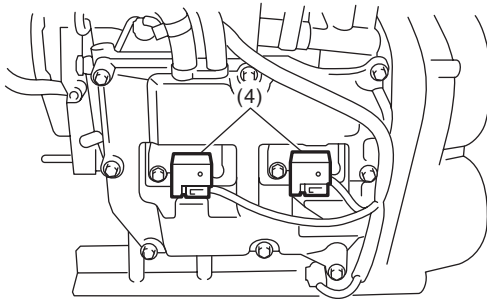
ENGINE (DIAGNOSTICS)



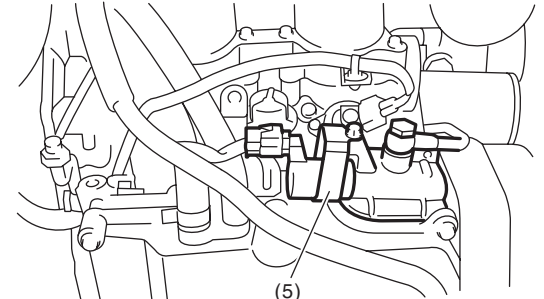
EN-01935



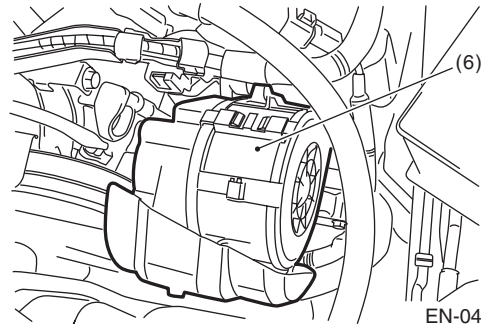
EN-05069



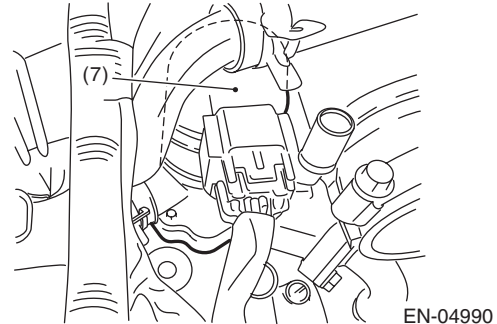
EN-05070



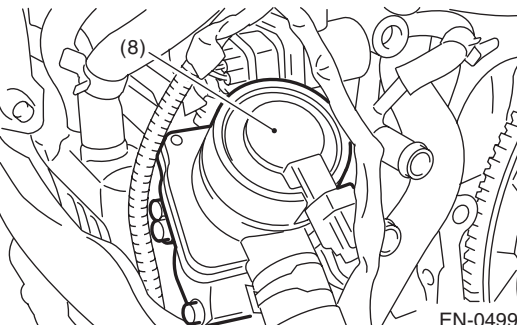
EN-05071



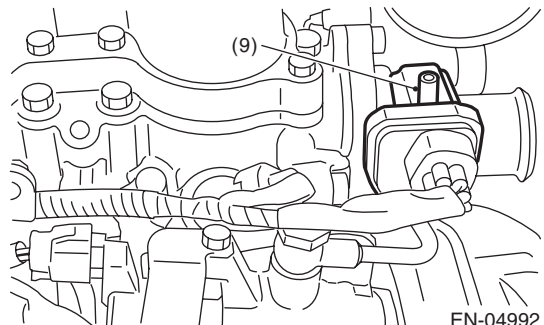
EN-04936



EN-04990



EN-04991

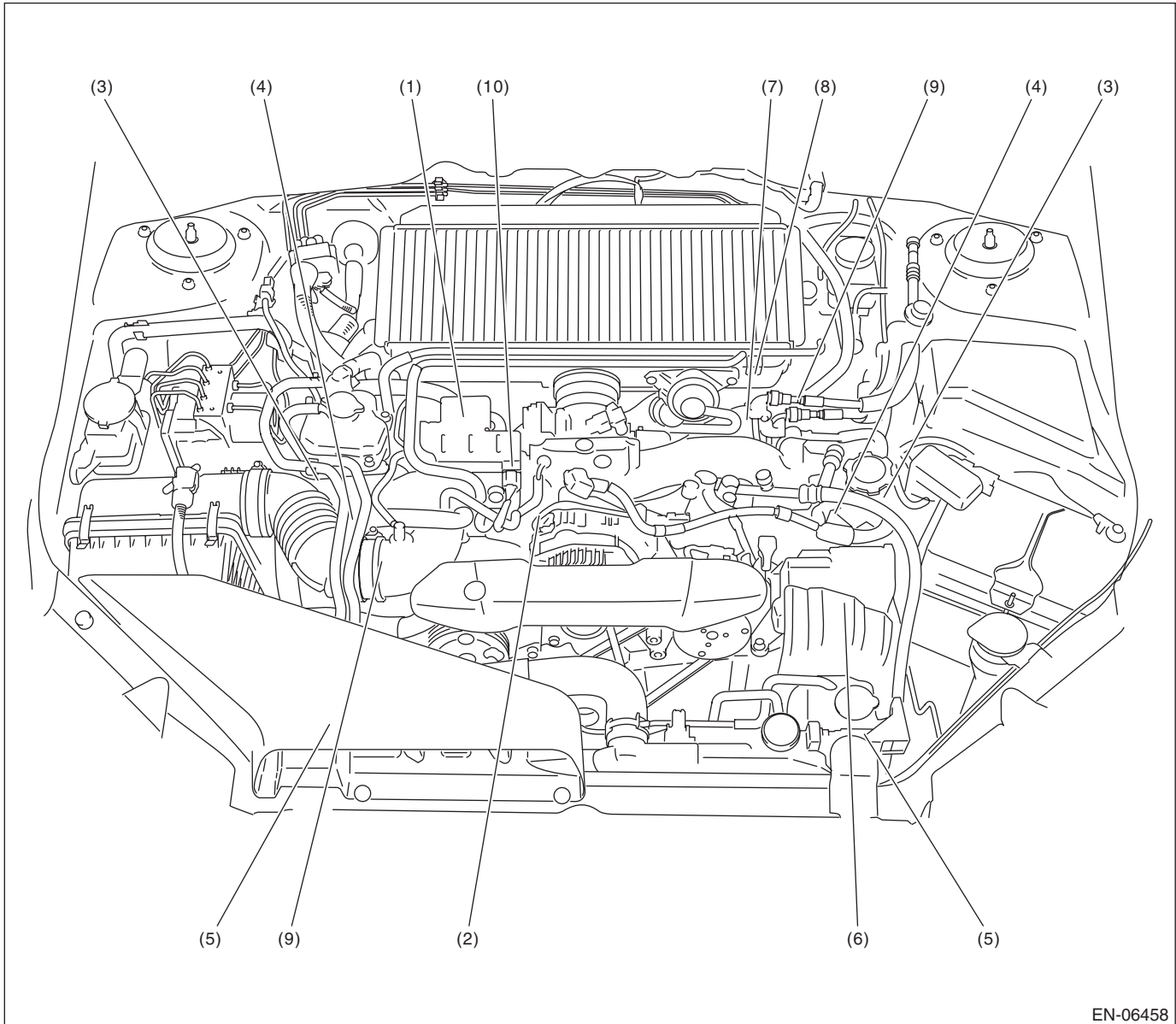


EN-04992

Electrical Component Location

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE

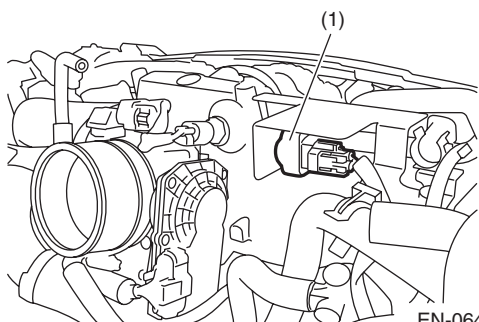


EN-06458

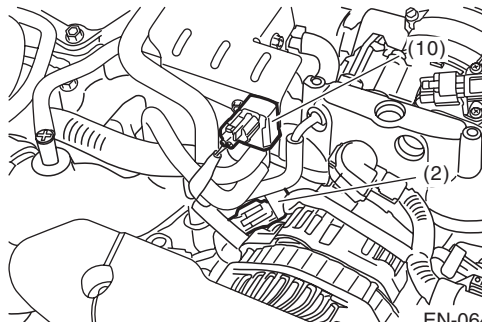
(1) Wastegate control solenoid valve	(5) Exhaust oil flow control solenoid valve	(8) Secondary air combination valve LH
(2) Purge control solenoid valve 1	(6) Secondary air pump	(9) Tumble generator valve ASSY
(3) Ignition coil	(7) Secondary air combination valve RH	(10) Purge control solenoid valve 2
(4) Intake oil flow control solenoid valve		

Electrical Component Location

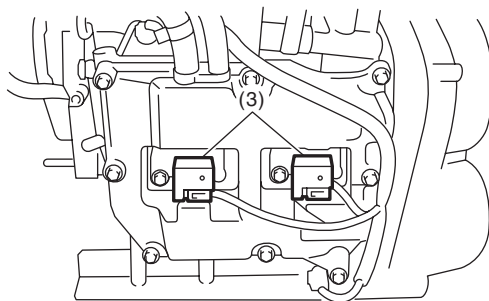
ENGINE (DIAGNOSTICS)



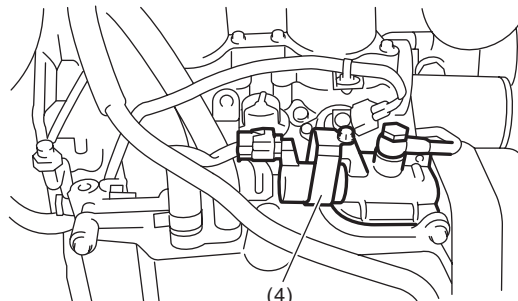
EN-06426



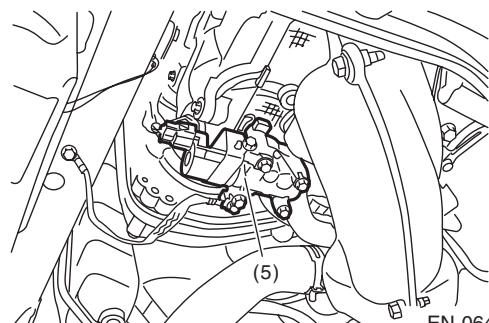
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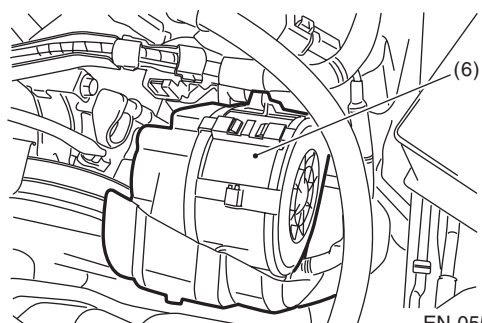
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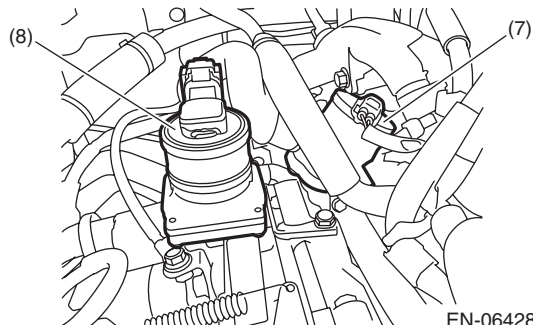
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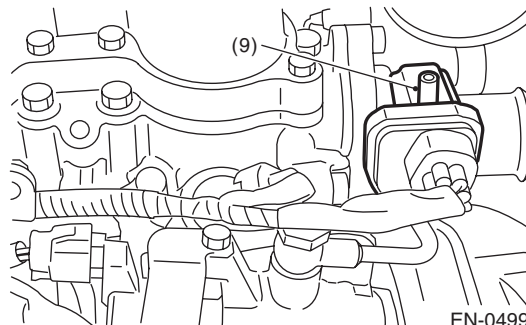
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EN-05586



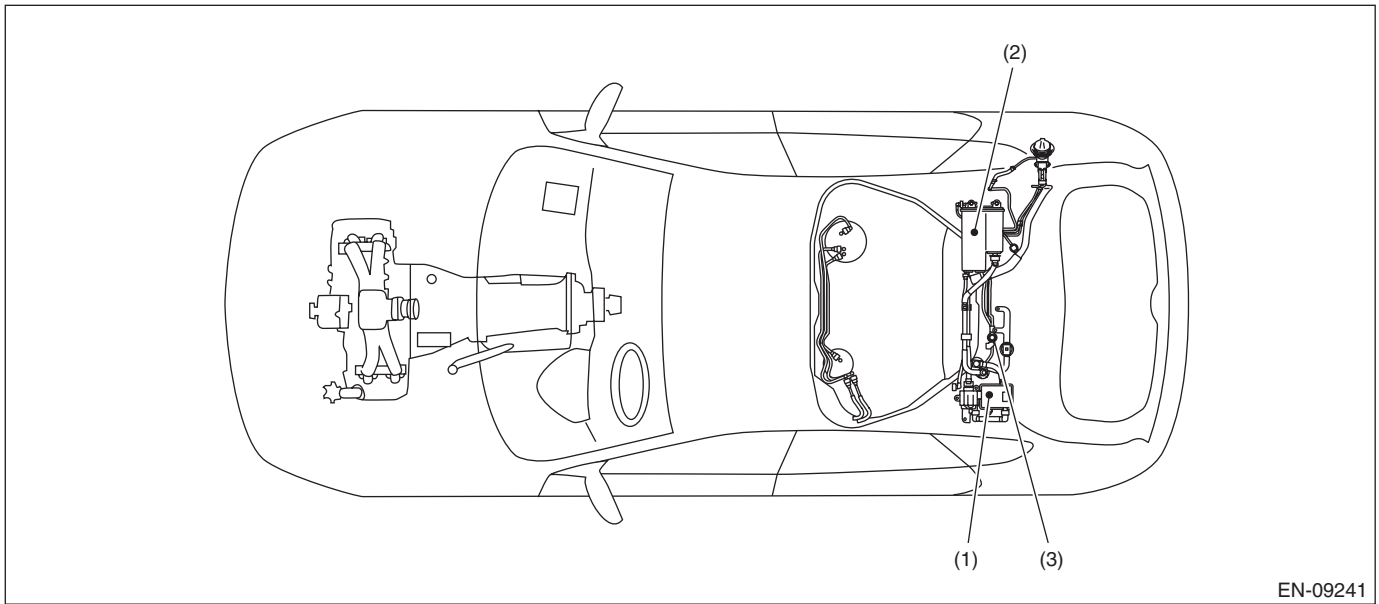
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EN-04992

Electrical Component Location

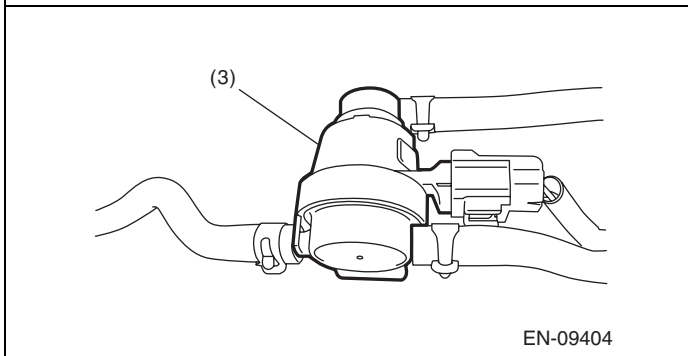
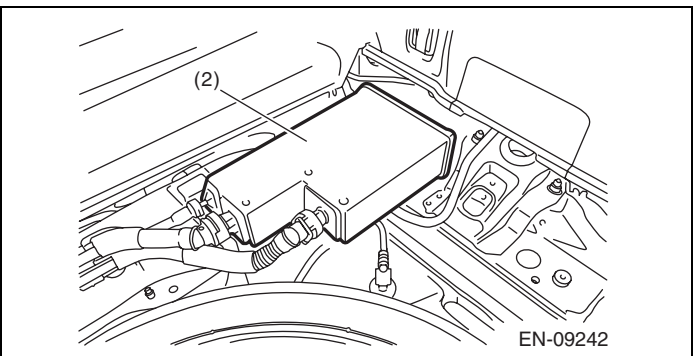
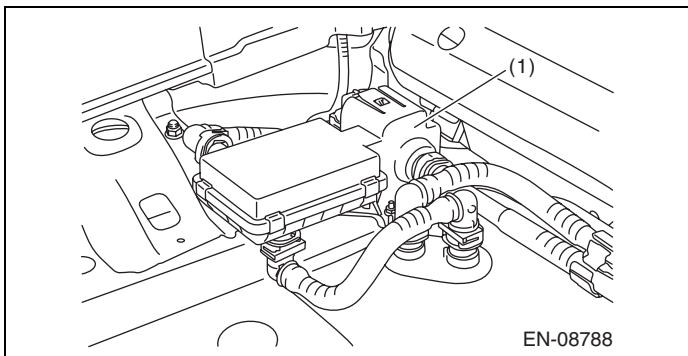
ENGINE (DIAGNOSTICS)



(1) Leak check valve ASSY

(2) Canister

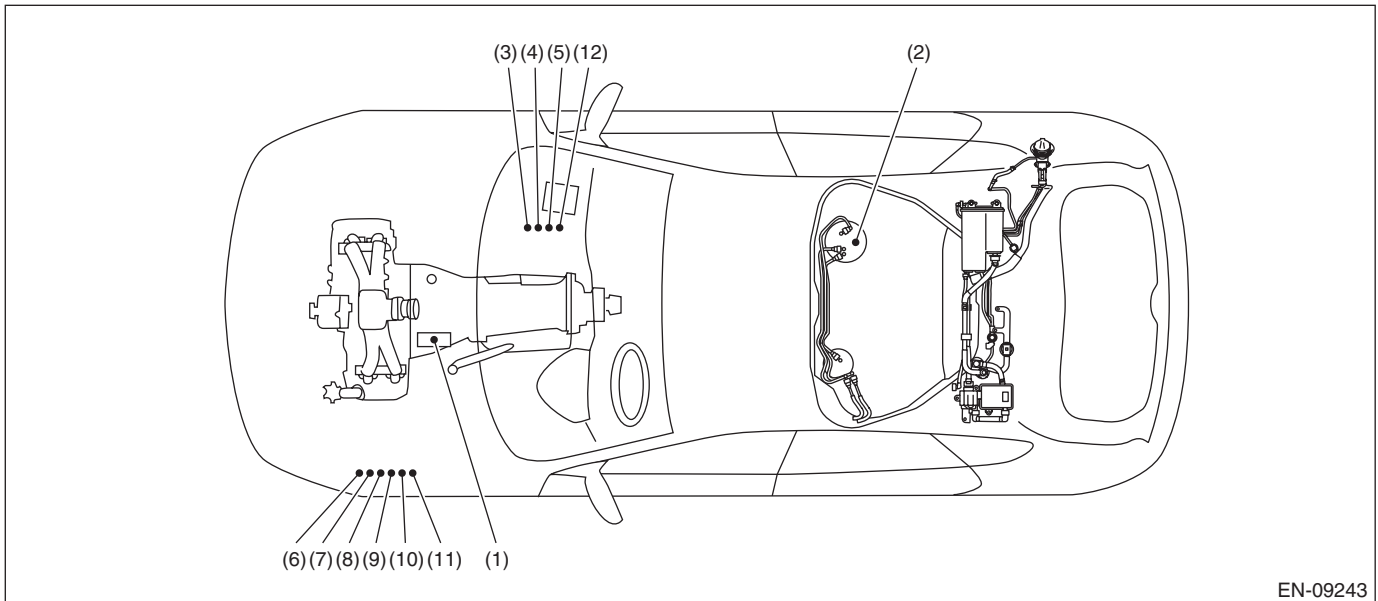
(3) Pressure control solenoid valve ASSY



SUBARU.

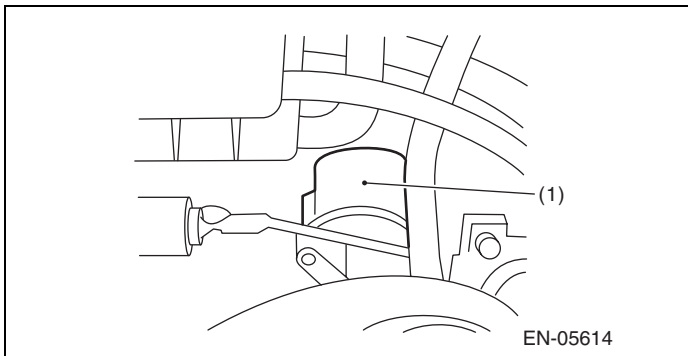
Electrical Component Location

ENGINE (DIAGNOSTICS)

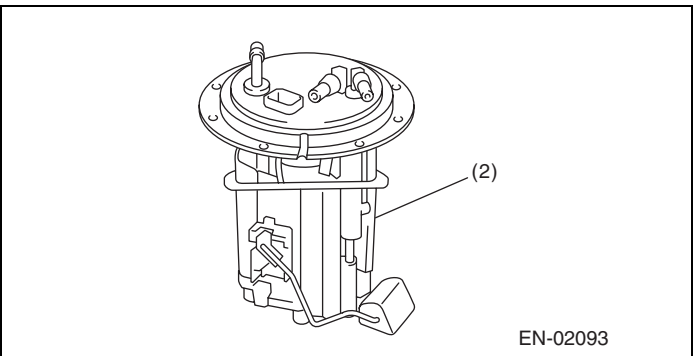


EN-09243

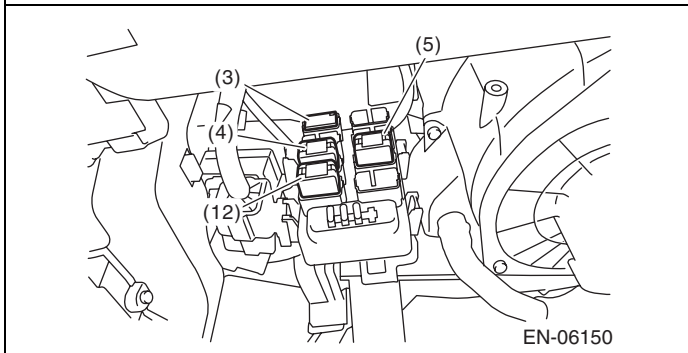
(1) Starter	(5) Electronic throttle control relay	(9) Secondary air combination valve relay 1
(2) Fuel pump	(6) Radiator main fan relay 1	(10) Secondary air combination valve relay 2
(3) Main relay	(7) Radiator sub fan relay	(11) Secondary air pump relay
(4) Fuel pump relay	(8) Radiator main fan relay 2	(12) A/F, oxygen sensor relay



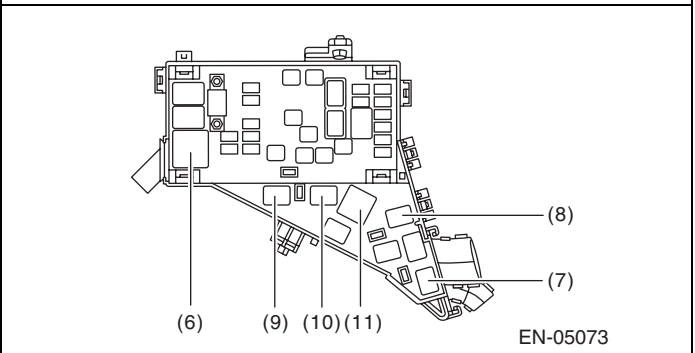
EN-05614



EN-02093



EN-06150



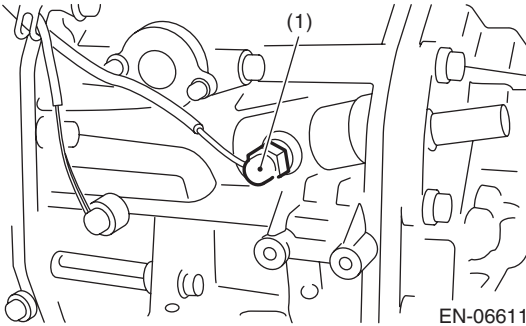
EN-05073

Electrical Component Location

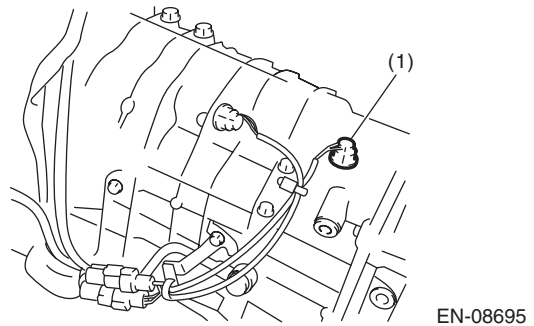
ENGINE (DIAGNOSTICS)

4. TRANSMISSION

- 5MT model

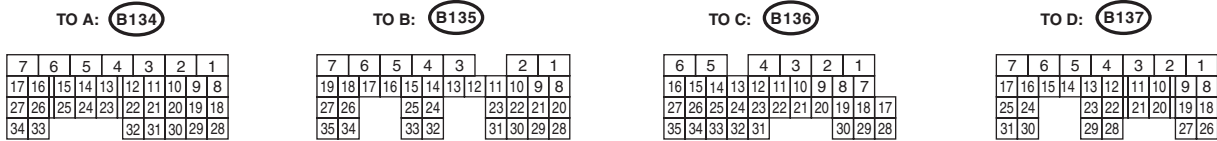


- 6MT model



(1) Neutral position switch

A: ELECTRICAL SPECIFICATION



Description		Con- nector No.	Termi- nal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Crankshaft position sensor	Signal (+)	B137	17	0	-7 — +7	Waveform
	Signal (-)	B137	25	0	0	—
	Shield	B137	31	0	0	—
Front oxy- gen (A/F) sensor	Signal (+)	B136	19	2.8 — 3.2	2.8 — 3.2	—
	Signal (-)	B136	18	2.4 — 2.7	2.4 — 2.7	—
	Shield	B136	9	0	0	—
Rear oxy- gen sensor	Signal	B136	20	0	0 — 0.9	—
	Shield	B136	9	0	0	—
	Ground (sensor)	B135	30	0	0	—
Front oxy- gen (A/F) sensor heater	Signal 1	B136	6	—	—	Waveform
	Signal 2	B136	5	—	—	Waveform
Rear oxygen sensor heater signal		B135	6	0 — 13	12 — 14	Waveform
Engine coolant tempera- ture sensor	Signal	B137	22	1.0 — 1.4	1.0 — 1.4	After engine is warmed up.
	Ground (sensor)	B134	29	0	0	After engine is warmed up.
Air flow sensor	Signal	B136	22	—	0.3 — 4.5	—
	Shield	B136	10	0	0	—
	Ground	B136	11	0	0	—
Intake air temperature sensor signal		B136	31	0.3 — 4.6	0.3 — 4.6	—
Wastegate control sole- noid valve		B134	33	0 or 10 — 13	0 or 12 — 14	Waveform
Starter switch		B136	16	0	0	Cranking: 8 — 14
A/C switch		B136	29	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	—

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description		Con- nector No.	Termi- nal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Ignition switch		B136	30	10 — 13	12 — 14	—
Neutral position switch		B136	35	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	—
Delivery (test) mode connector		B136	34	10 — 13	13 — 14	When connected: 0
Knock sen- sor	Signal	B137	2	2.45 — 2.55	2.45 — 2.55	—
	Shield	B137	8	0	0	—
Back-up power supply		B136	2	10 — 13	12 — 14	Ignition switch "OFF": 10 — 13
Control module power supply		B136	1	10 — 13	12 — 14	—
		B137	7	10 — 13	12 — 14	—
Sensor power supply		B134	19	5	5	—
Ignition control	#1	B134	21	0	0 or 5	Waveform
	#2	B134	22	0	0 or 5	Waveform
	#3	B134	31	0	0 or 5	Waveform
	#4	B134	32	0	0 or 5	Waveform
Fuel injec- tor	#1	B134	10	10 — 13	1 — 14	Waveform
	#2	B134	11	10 — 13	1 — 14	Waveform
	#3	B134	12	10 — 13	1 — 14	Waveform
	#4	B134	13	10 — 13	1 — 14	Waveform
Fuel pump control unit	Control	B136	33	0 or 5	0 or 5	Waveform
	Diagnos- tic signal	B135	10	10 — 13	12 — 14	—
A/C relay control		B135	35	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
Main fan relay control		B135	12	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
Sub fan relay control		B135	11	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
Engine speed output		B135	15	—	0 — 13 or more	Waveform
Purge control solenoid valve 1		B137	6	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	Waveform
Purge control solenoid valve 2		B137	15	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	Waveform
Manifold absolute pressure sensor	Signal	B137	20	1.7 — 2.4	1.1 — 1.6	—
	Power supply	B134	19	5	5	
	Ground (sensor)	B134	29	0	0	
Power steering oil pres- sure switch		B137	28	10 — 13	ON: 0 OFF: 12 — 14	—
SSM/GST communica- tion line		B135	14	1 or less ←→ 4 or more	1 or less ←→ 4 or more	—
Intake camshaft posi- tion sensor (LH)		B137	16	0 or 5	0 or 5	Waveform
Intake camshaft posi- tion sensor (RH)		B137	24	0 or 5	0 or 5	Waveform
Exhaust camshaft posi- tion sensor (LH)		B137	29	0 or 5	0 or 5	Models with SI-DRIVE Waveform
Exhaust camshaft posi- tion sensor (RH)		B137	23	0 or 5	0 or 5	Models with SI-DRIVE Waveform

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description		Con- nector No.	Termi- nal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Camshaft position sen- sor ground		B137	30	0	0	—
Electronic Throttle	Main	B134	18	Approx. 0.9 (After engine is warmed up.)	Approx. 0.6 — 0.7 (After engine is warmed up.)	Fully closed: Approx. 0.6 Fully open: Approx. 4.0
	Sub	B134	28	Approx. 1.7 (After engine is warmed up.)	Approx. 1.5 — 1.6 (After engine is warmed up.)	Fully closed: Approx. 1.5 Fully open: Approx. 4.2
	Power supply	B134	19	5	5	—
	Ground (sensor)	B134	29	0	0	—
Electronic throttle con- trol motor (+)		B134	2	Duty waveform	Duty waveform	Drive frequency: 500 Hz
Electronic throttle con- trol motor (–)		B134	1	Duty waveform	Duty waveform	Drive frequency: 500 Hz
Electronic throttle con- trol motor power supply		B135	7	10 — 13	12 — 14	—
Electronic throttle con- trol motor relay		B135	17	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	When ignition switch is turned to ON: ON
Intake oil flow con- trol sole- noid valve (LH)	Signal (+)	B134	17	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	—
	Signal (–)	B134	16	0	0	—
Intake oil flow con- trol sole- noid valve (RH)	Signal (+)	B134	34	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	—
	Signal (–)	B134	27	0	0	—
Exhaust oil flow con- trol sole- noid valve (LH)	Signal (+)	B134	5	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	Models with SI-DRIVE
	Signal (–)	B134	14	0	0	Models with SI-DRIVE
Exhaust oil flow con- trol sole- noid valve (RH)	Signal (+)	B134	7	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	Models with SI-DRIVE
	Signal (–)	B134	15	0	0	Models with SI-DRIVE

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description		Con- nector No.	Termi- nal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Accelerator pedal position sensor	Main sensor signal	B135	23	Fully closed: 0.4 — 1.0 Fully opened: 2.4 — 3.7	Fully closed: 0.4 — 1.0 Fully opened: 2.4 — 3.7	—
	Main power supply	B135	21	5	5	—
	Ground (main sensor)	B135	29	0	0	—
	Shield	B136	4	0	0	—
	Sub sensor signal	B135	31	Fully closed: 0.3 — 1.1 Fully opened: 2.3 — 3.8	Fully closed: 0.3 — 1.1 Fully opened: 2.3 — 3.8	—
	Sub power supply	B135	22	5	5	—
	Ground (sub sensor)	B135	30	0	0	—
Starter relay		B135	26	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	ON: cranking
A/C middle pressure switch		B136	7	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	—
Blower fan switch		B135	19	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	Manual A/C model
Clutch switch		B135	9	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 (brake switch)		B136	15	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 (stop light switch)		B136	3	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 command switch		B136	12	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	—
Cruise control main switch		B136	13	ON: 0 OFF: 5	ON: 0 OFF: 5	—
Fuel tank pressure sensor		B136	21	2.3 — 2.7	2.3 — 2.7	—
Pressure control solenoid valve assembly		B135	3	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	—
Immobilizer	Signal 1	B135	25	—	—	—
	Signal 2	B135	24	—	—	—
CAN communication (Hi)		B136	17	—	—	—

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description		Con- nector No.	Termi- nal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
CAN communication (Lo)		B136	28	—	—	—
Blow-by leak diagnosis		B137	12	0	0	At the time of open circuit (fault): 5
Tumble generator valve position sensor signal (RH)		B137	11	Fully closed: 0.4 — 1.2 Fully opened: 2.8 — 4.6	Fully closed: 0.4 — 1.2 Fully opened: 2.8 — 4.6	—
Tumble generator valve position sensor signal (LH)		B137	10	Fully closed: 0.4 — 1.2 Fully opened: 2.8 — 4.6	Fully closed: 0.4 — 1.2 Fully opened: 2.8 — 4.6	—
Tumble generator valve (RH closed)		B134	26	0 or 10 — 13	0 or 12 — 14	—
Tumble generator valve (LH closed)		B134	24	0 or 10 — 13	0 or 12 — 14	—
Tumble generator valve (RH open)		B134	25	0 or 10 — 13	0 or 12 — 14	—
Tumble generator valve (LH open)		B134	23	0 or 10 — 13	0 or 12 — 14	—
Secondary air pipe pressure sensor	Signal	B137	9	2.2 — 2.8	2.2 — 2.8	When secondary air is inducted: 3.2 — 4.9
	Power supply	B134	19	5.12	5.12	—
	Ground (sensor)	B134	29	0	0	—
Secondary air combination valve relay 1		B135	8	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	—
Secondary air combination valve relay 2		B135	20	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	—
Secondary air pump relay		B135	27	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	—
Self-shutoff control		B135	13	10 — 13	12 — 14	—
ELCM	Switching valve	B135	4	10 — 13	12 — 14	Operating: 0
	Pressure sensor	B136	21	1 — 4	1 — 4	When ignition switch is turned to ON: atmospheric pressure
	Vacuum pump	B137	27	10 — 13	12 — 14	Operating: 0
Ground (engine 1)		B134	6	0	0	—
Ground (engine 2)		B134	4	0	0	—
Ground (engine 3)		B134	3	0	0	—
Ground (engine 4)		B137	1	0	0	—
Ground (engine 5)		B137	3	0	0	—
Ground (body)		B136	4	0	0	—

Engine Control Module (ECM) I/O Signal

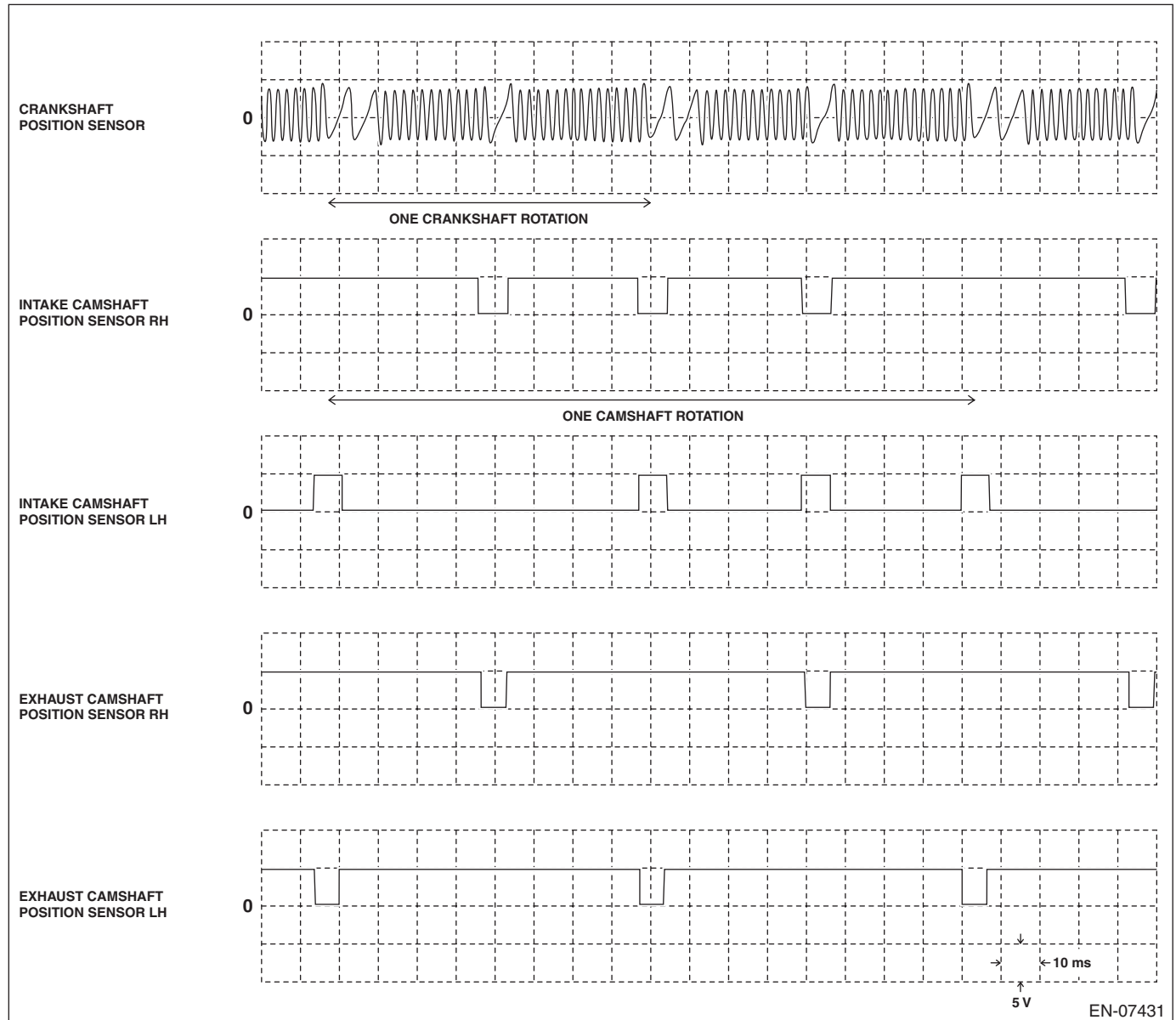
ENGINE (DIAGNOSTICS)

Input/output name:

- Crankshaft position sensor
- Intake camshaft position sensor RH
- Intake camshaft position sensor LH
- Exhaust camshaft position sensor RH (models with SI-DRIVE)
- Exhaust camshaft position sensor LH (models with SI-DRIVE)

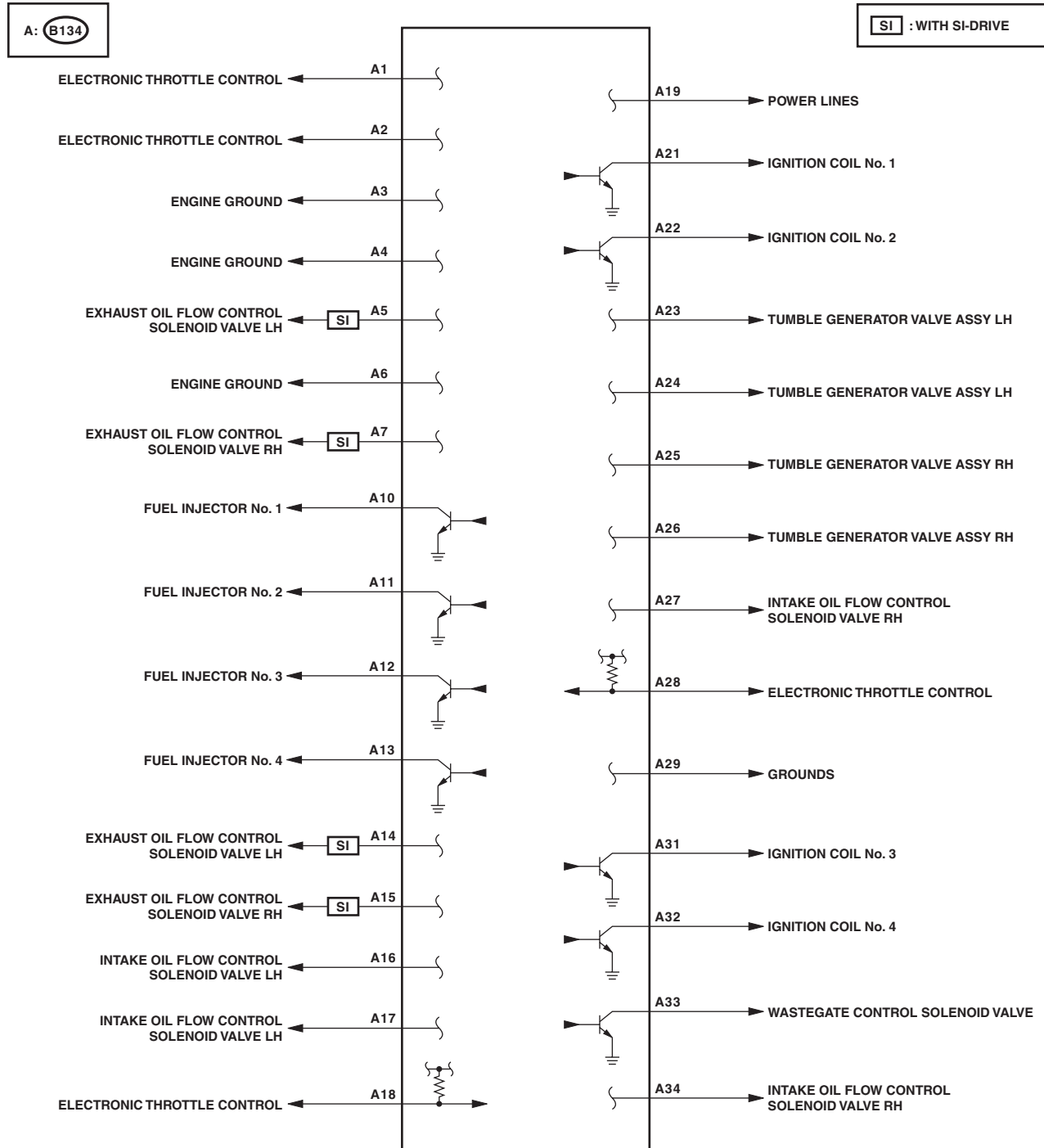
Measuring condition:

- After warming-up
- At idling



Engine Control Module (ECM) I/O Signal

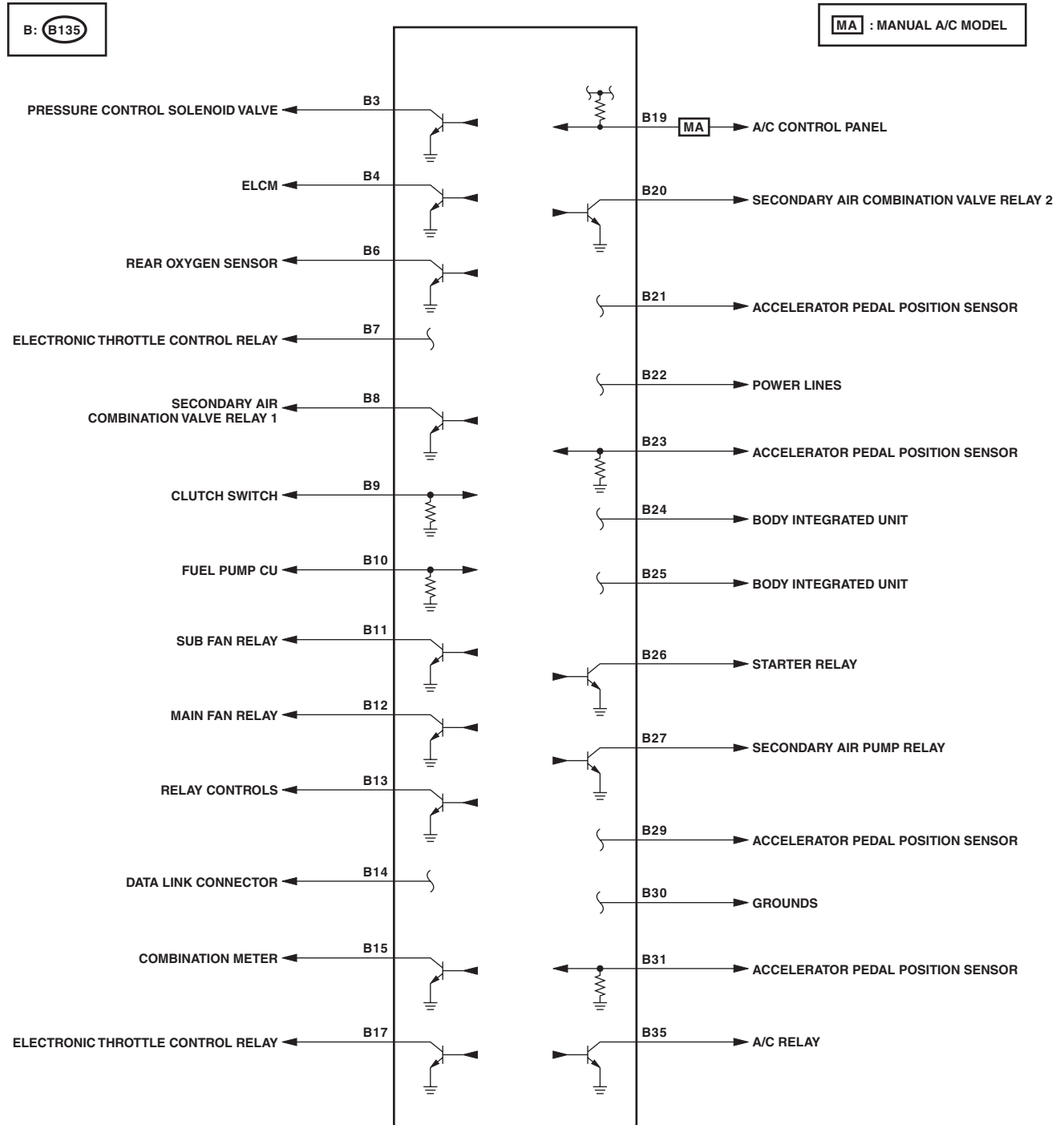
ENGINE (DIAGNOSTICS)



EN-09942

Engine Control Module (ECM) I/O Signal

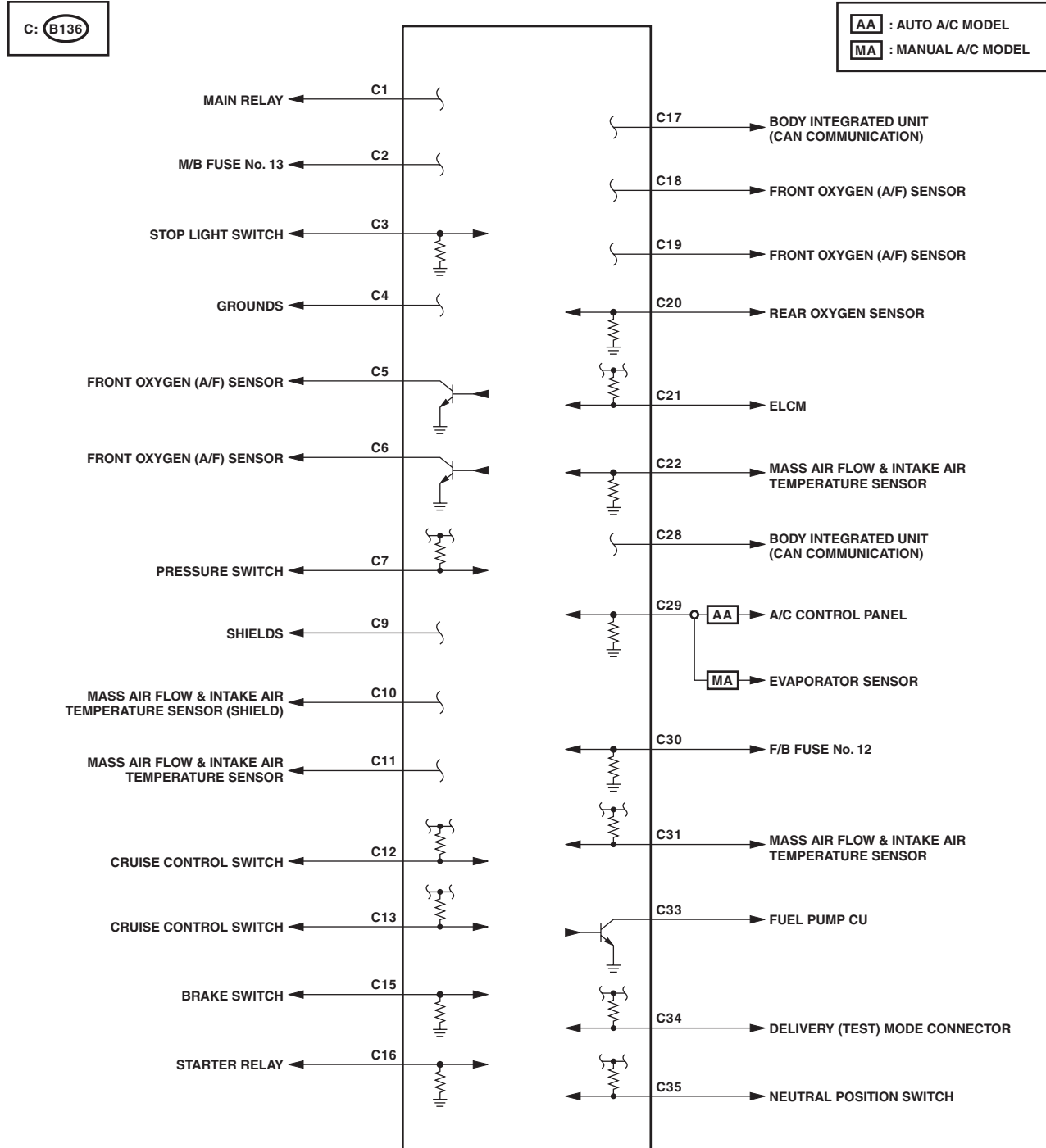
ENGINE (DIAGNOSTICS)



EN-09943

Engine Control Module (ECM) I/O Signal

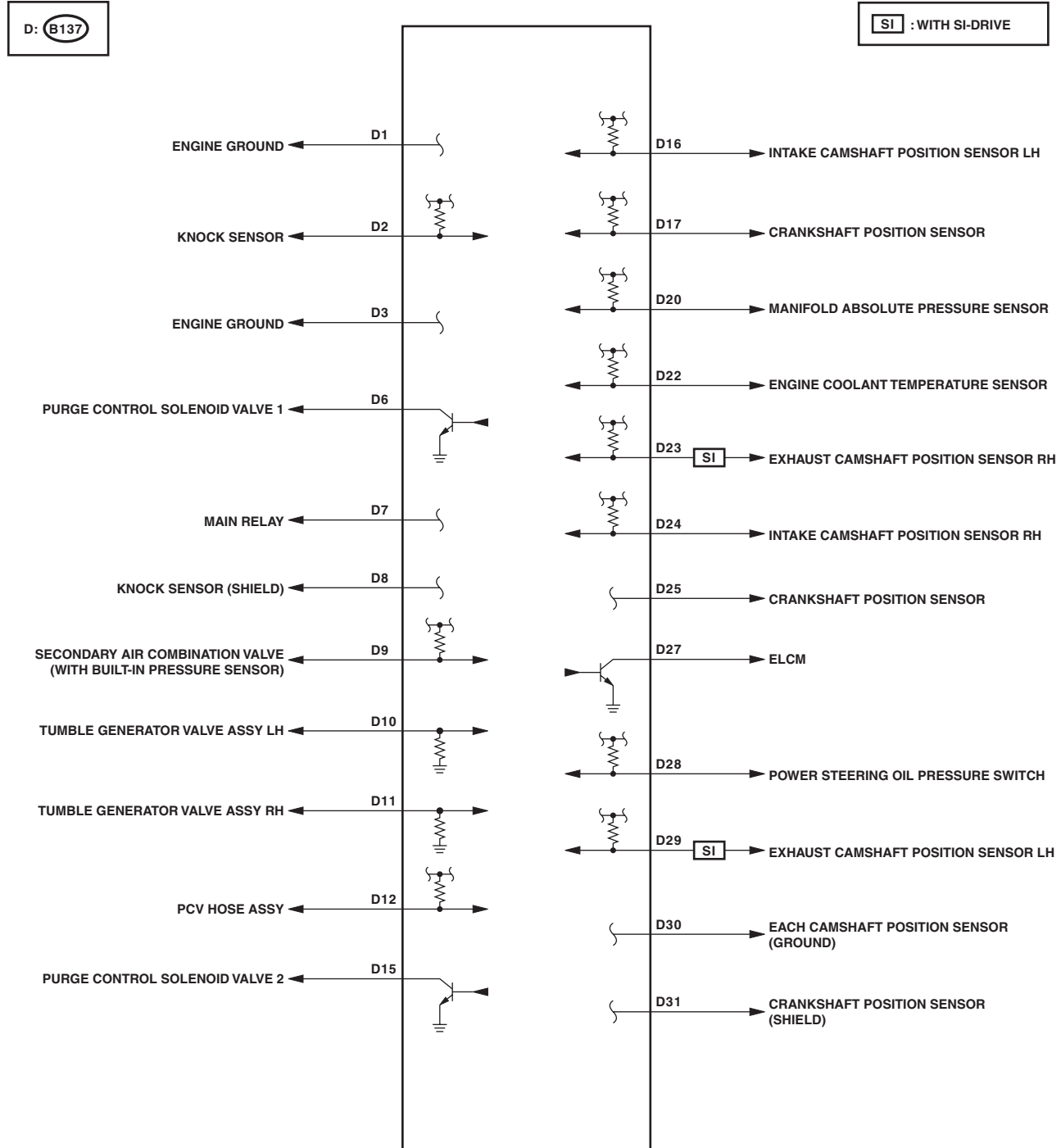
ENGINE (DIAGNOSTICS)



EN-09944

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)



EN-09945

6. Engine Condition Data

A: ELECTRICAL SPECIFICATION

Content	Specifications
Engine load	17.6 — 35.64 (%): Idling
	13.2 — 26.73 (%): 2,500 rpm racing

Measuring condition:

- After engine is warmed up.
- Place the shift lever in neutral position.
- Turn the A/C to OFF.
- Turn all the accessory switches to OFF.

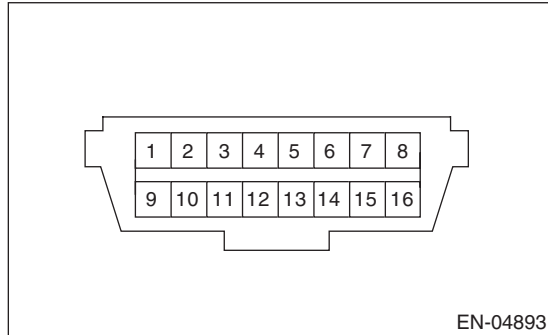
7. Data Link Connector

A: NOTE

This connector is used for Subaru Select Monitor.

CAUTION:

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



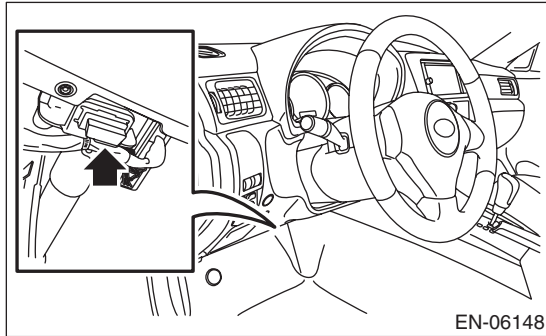
Terminal No.	Content	Terminal No.	Content
1	Blank	9	Blank
2	Blank	10	Blank
3	Blank	11	Blank
4	Ground	12	Blank
5	Ground	13	Blank
6	CAN communication (Hi)	14	CAN communication (Lo)
7	Subaru Select Monitor signal	15	Blank
8	Blank	16	Power supply

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



- 3) Using the general scan tool, call up each 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 intermittently monitored systems
- (6) MODE \$07: Request on-board monitoring test results for continuously monitored systems
- (7) MODE \$08: Request control for on-board system, test, and component
- (8) MODE \$09: Request vehicle information

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

NOTE:

For details concerning DTC, refer to "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>

General Scan Tool

ENGINE (DIAGNOSTICS)

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 speed	rpm
\$0D	Vehicle speed	MPH
\$0E	Ignition timing advance	°
\$0F	Intake air temperature	°C
\$10	Amount of intake air	g/s
\$11	Throttle valve absolute opening angle	%
\$12	Secondary air control status	—
\$13	Check whether oxygen sensor is installed.	—
\$15	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor	V and %
\$1C	Supporting OBD system	—
\$1F	Elapsed time after starting the engine	sec
\$21	Running distance after MIL turns on	miles
\$24	A/F value and A/F sensor output voltage	— and V
\$2E	Evaporative purge	%
\$2F	Fuel level	%
\$30	Number of warm ups after DTC clear	time
\$31	Travel distance after DTC clear	miles
\$33	Atmospheric pressure	kPa
\$34	A/F sensor λ value, current	— and mA
\$3C	Catalyst temperature	°C
\$41	Diagnostic monitor of each drive cycle	—
\$42	ECM power voltage	V
\$43	Absolute load	%
\$44	A/F target lambda	—
\$45	Relative throttle opening angle	%
\$46	Ambient temperature	°C
\$47	Absolute throttle opening angle 2	%
\$49	Absolute accelerator opening angle 1	%
\$4A	Absolute accelerator opening angle 2	%
\$4C	Target throttle opening angle	%
\$4D	Engine operation time during MIL on	min
\$4E	Elapsed time after DTC clear	min
\$51	Fuel used	—
\$5A	Relative accelerator opening angle	%
\$65	Neutral status	—

NOTE:

Refer to general scan tool manufacturer's operation manual to access current powertrain diagnostic data (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 freeze frame data to be stored	—
\$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 speed	rpm
\$0D	Vehicle speed	MPH
\$0E	Ignition timing advance	°
\$0F	Intake air temperature	°C
\$10	Intake air amount	g/s
\$11	Throttle valve absolute opening angle	%
\$12	Secondary air control status	—
\$13	Air fuel ratio sensor	—
\$15	Rear oxygen sensor voltage, compensation value	V and %
\$1C	Supporting OBD system	—
\$1F	Elapsed time after starting the engine	sec
\$2E	Evaporative purge	%
\$2F	Fuel level	%
\$33	Barometric pressure	kPa
\$42	ECM power voltage	V
\$43	Absolute load	%
\$44	A/F target lambda	—
\$45	Relative throttle opening angle	%
\$46	Ambient temperature	°C
\$47	Absolute throttle opening angle 2	%
\$49	Absolute accelerator opening angle 1	%
\$4A	Absolute accelerator opening angle 2	%
\$4C	Target throttle opening angle	%
\$65	Neutral status	—

NOTE:

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

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(H4DOTC)(diag)-87, 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.

NOTE:

Refer to the manufacturer's operation manual for the general scan tool to clear the emission-related diagnostic information (MODE \$04).

General Scan Tool

ENGINE (DIAGNOSTICS)

6. MODE \$06

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

NOTE:

Some items are not displayed according to the specifications.

OBDMID	TID	SID	Diagnostic item
\$01	\$84	\$1E	A/F sensor range failure (Bank 1 Sensor 1)
	\$85	\$1E	
	\$86	\$20	A/F sensor response failure (Bank 1 Sensor 1)
	\$91	\$20	
	\$92	\$10	
	\$A3	\$20	
	\$A4	\$10	
	\$AC	\$10	
	\$AD	\$10	
	\$AE	\$10	
	\$AF	\$10	
	\$CD	\$20	
	\$CF	\$20	
	\$DF	\$10	
\$02	\$07	\$0B	Oxygen sensor drop failure (Bank 1 Sensor 2)
	\$08	\$0B	
	\$A5	\$0B	
	\$05	\$10	Oxygen sensor response failure (Bank 1 Sensor 2)
	\$06	\$10	
	\$BD	\$10	
	\$D1	\$10	Oxygen sensor delay failure (Bank 1 Sensor 2)
	\$D2	\$01	
\$21	\$89	\$20	Catalyst deterioration diagnosis (Bank 1)
\$35	\$8B	\$9D	VVT monitor (Bank 1)
	\$8C	\$9D	
	\$8D	\$9D	
	\$8E	\$9D	
	\$D3	\$9D	
	\$D4	\$9D	
	\$D5	\$9D	
	\$D6	\$9D	
\$36	\$8B	\$9D	VVT monitor (Bank 2)
	\$8C	\$9D	
	\$8D	\$9D	
	\$8E	\$9D	
	\$D3	\$9D	
	\$D4	\$9D	
	\$D5	\$9D	
	\$D6	\$9D	

OBDMID	TID	SID	Diagnostic item
\$3C	\$96	\$FE	Evaporative emission control system (0.02 inch leak)
	\$C1	\$FE	
	\$C2	\$FE	
	\$C3	\$FE	
	\$C4	\$FE	
	\$C5	\$FE	
	\$C6	\$35	
	\$C7	\$FE	
	\$C8	\$FE	
	\$C9	\$FE	
	\$CA	\$FE	
\$3D	\$98	\$FE	Evaporative emission control system (Purge flow)
	\$CB	\$35	ELCM purge flow
	\$CC	\$FE	
\$41	\$9B	\$14	A/F sensor heater characteristics failure (Bank 1 Sensor 1)
\$42	\$A2	\$24	Oxygen sensor heater characteristics failure (Bank 1 Sensor 2)
\$71	\$9E	\$17	Secondary air system (all systems)
	\$9F	\$0B	
	\$A1	\$0B	
	\$B0	\$17	Secondary air system (relay 2 — combination valve 2)
	\$B3	\$0B	
	\$B5	\$0B	
	\$B4	\$0B	
	\$B6	\$0B	
	\$B8	\$0B	
	\$B9	\$31	
	\$BA	\$31	
\$A1	\$0B	\$24	Misfire monitoring (All cylinders)
	\$0C	\$24	
\$A2	\$0B	\$24	Misfire monitoring (#1 cylinder)
	\$0C	\$24	
\$A3	\$0B	\$24	Misfire monitoring (#2 cylinder)
	\$0C	\$24	
\$A4	\$0B	\$24	Misfire monitoring (#3 cylinder)
	\$0C	\$24	
\$A5	\$0B	\$24	Misfire monitoring (#4 cylinder)
	\$0C	\$24	

7. MODE \$07

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

8. MODE \$08 (REQUEST CONTROL FOR ON-BOARD SYSTEM, TEST, AND COMPONENT)

Perform “Active Test” of the on-board system.

9. MODE \$09

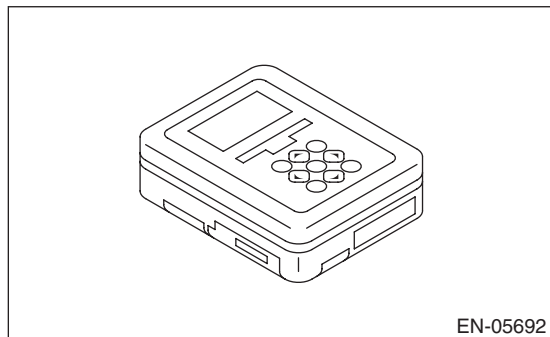
Refer to the data of the vehicle specification.

9. Subaru Select Monitor

A: OPERATION

1. HOW TO USE SUBARU SELECT MONITOR

1) Prepare the Subaru Select Monitor kit. <Ref. to EN(H4DOTC)(diag)-8, PREPARATION TOOL, General Description.>



2) Prepare PC with Subaru Select Monitor installed.

3) Connect the USB cable to SDI (Subaru Diagnosis Interface) and USB port on the personal computer (dedicated port for the Subaru Select Monitor).

NOTE:

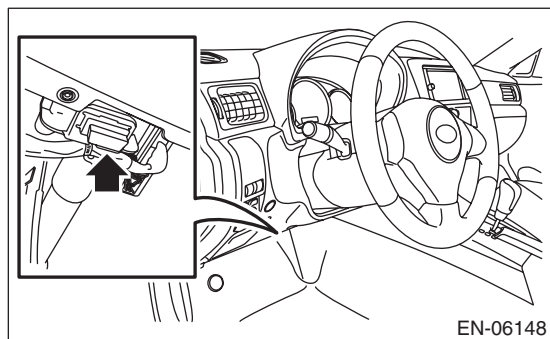
The dedicated port for the Subaru Select Monitor means the USB port which was used to install the Subaru Select Monitor.

4) Connect the diagnosis cable to SDI.

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

CAUTION:

Do not connect the scan tools except for Subaru Select Monitor and general scan tool.



6) Start the PC.

7) Turn the ignition switch to ON (engine OFF) and run the "PC application for Subaru Select Monitor".

8) Call up DTC and data, then record them.

NOTE:

For detailed operation procedures, refer to "PC application help for Subaru Select Monitor".

2. READ CURRENT DATA FOR ENGINE (NORMAL MODE)

- 1) On «Main Menu» display, select {Each System Check}.
 - 2) On «System Selection Menu» display, select {Engine Control System}.
 - 3) Click the [OK] button after the information of engine type has been displayed.
 - 4) On «Engine Diagnosis» display, select {Current Data Display & Save}.
 - 5) On «Current Data Display & Save» display, select {Normal sampling}.
 - 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.

Contents	Display	Unit of measure	Note (at idling)
Engine load	Engine Load	%	21.0%
Engine coolant temperature signal	Coolant Temp.	°C or °F	80 — 100°C or 176 — 212°F
A/F correction #1	A/F Correction #1	%	-10 — +10%
A/F learning #1	A/F Learning #1	%	-15 — +15%
Intake manifold absolute pressure	Mani. Absolute Pressure	mmHg, kPa, inHg or psig	220 — 275 mmHg, 29.5 — 37 kPa, 8.7 — 10 inHg or 4.2 — 5.3 psig
Engine speed signal	Engine Speed	rpm	630 — 770 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	10 — 15 deg
Intake air temperature signal	Intake Air Temp.	°C or °F	20 — 50°C or 68 — 122°F
Intake air amount	Mass Air Flow	g/s or lb/m	2.1 — 3.1 g/s or 0.35 — 0.40 lb/m
Throttle opening angle signal	Throttle Opening Angle	%	2.0 — 2.4%
Rear oxygen sensor voltage	Rear O2 Sensor	V	0 — 1.0 V
Battery voltage	Battery Voltage	V	12 — 15 V
Mass air flow voltage	Air Flow Sensor Voltage	V	1.0 — 1.7 V
Injection 1 pulse width	Fuel Injection #1 Pulse	ms	1.2 — 2.2 ms
Atmospheric pressure	Atmospheric pressure	mmHg, kPa, inHg or psig	—
Intake manifold relative pressure	Mani. Relative Pressure	mmHg, kPa, inHg or psig	Air intake absolute pressure — Atmospheric pressure
Learned value of ignition timing	Learned Ignition Timing	deg	0 deg
Acceleration opening angle signal	Accel opening angle	%	0.0%
Boost control solenoid valve duty ratio	Primary Control	%	0.0%
Purge control solenoid duty ratio	CPC Valve Duty Ratio	%	0 — 25%
Tumble generator valve RH opening signal	TGV Position Sensor R	V	0.81 V
Tumble generator valve LH opening signal	TGV Position Sensor L	V	0.81 V
Fuel pump duty ratio	Fuel Pump Duty	%	30 — 40%
AVCS advance angle amount RH	VVT Adv. Ang. Amount R	deg	±5 deg
AVCS advance angle amount LH	VVT Adv. Ang. Amount L	deg	±5 deg
Oil flow control solenoid valve duty ratio RH	OCV Duty R	%	0 — 20%
Oil flow control solenoid valve duty ratio LH	OCV Duty L	%	0 — 20%
Oil flow control solenoid valve current RH	OCV Current R	mA	40 — 100 mA
Oil flow control solenoid valve current LH	OCV Current L	mA	40 — 100 mA
A/F sensor current value 1	A/F Sensor #1 Current	mA	-20 — 20 mA
A/F sensor resistance value 1	A/F Sensor #1 Resistance	Ω	27 — 35 Ω
A/F sensor output lambda 1	A/F Sensor #1	—	1.0
A/F correction #3	A/F Correction #3	%	0.00%
A/F learning #3	A/F Learning #3	%	0.00%
SI drive mode (model with SI-DRIVE)	SI Drive Mode	—	I, S or S#
Throttle motor duty	Throttle Motor Duty	%	-5%

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

Contents	Display	Unit of measure	Note (at idling)
Throttle motor voltage	Throttle Motor Voltage	V	12 — 15 V
Sub throttle sensor voltage	Sub-Throttle Sensor	V	1.5 V
Main throttle sensor voltage	Main-Throttle Sensor	V	0.6 V
Sub accelerator sensor voltage	Sub-Accelerator Sensor	V	1.1 V
Main acceleration sensor voltage	Main-Accelerator Sensor	V	1.0 V
Secondary air supply piping pressure signal	Sec. Air Piping Pressure	mmHg, kPa, inHg or psig	765 mmHg, 102 kPa, 30.1 inHg or 14.8 psig
Secondary airflow signal	Sec. Air Flow	g/s or lb/m	0.00 g/s or 0.00 lb/m
Memory vehicle speed	Memorized Cruise Speed	km/h or MPH	—
Fuel level sensor resistance	Fuel level resistance	Ω	4 — 96 Ω
Odometer	Odometer	km	—
Exhaust AVCS retard angle amount RH (model with SI-DRIVE)	Exh. VVT Retard Ang. R	deg	± 5 deg
Exhaust AVCS retard angle amount LH (model with SI-DRIVE)	Exh. VVT Retard Ang. L	deg	± 5 deg
Exhaust oil flow control solenoid valve duty ratio RH (model with SI-DRIVE)	Exh. OCV Duty R	%	0 — 20%
Exhaust oil flow control solenoid valve duty ratio LH (model with SI-DRIVE)	Exh. OCV Duty L	%	0 — 20%
Exhaust oil flow control solenoid valve current value RH (model with SI-DRIVE)	Exh. OCV Current R	mA	40 — 100 mA
Exhaust oil flow control solenoid valve current value LH (model with SI-DRIVE)	Exh. OCV Current L	mA	40 — 100 mA
#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
Knock sensor correction	Knocking Correction	deg	0.0 deg
AT/MT identification terminal	AT Vehicle ID Signal	—	OFF
D-check require Flag	D-check Require Flag	—	OFF
Delivery (test) mode terminal	Delivery Mode Connector (Test Mode Connector)	—	OFF
Neutral position switch signal	Neutral Position Switch Signal	—	Neutral
Soft idle switch signal	Idle Switch Signal	—	Idle
Ignition switch signal	Ignition Switch	—	ON
Power steering switch signal	P/S Switch	—	OFF (when OFF)
Air conditioning switch signal	A/C Switch	—	OFF (when OFF)
Starter switch signal	Starter Switch	—	OFF
Rear oxygen monitor	Rear O2 Rich Signal	—	ON/OFF
Knocking signal	Knocking Signal	—	No Support
Crankshaft position sensor signal	Crankshaft Position Sig.	—	Support
Camshaft position sensor signal	Camshaft Position Sig.	—	Support
Rear defogger switch signal	Rear Defogger SW	—	OFF (when OFF)
Blower fan switch signal	Blower Fan SW	—	OFF (when OFF)
Light switch signal	Light Switch	—	OFF (when OFF)
Air conditioner middle pressure switch signal	A/C Mid Pressure Switch	—	OFF (when OFF)
Air conditioner compressor relay output signal	A/C Compressor Signal	—	OFF (when OFF)
Radiator fan relay 1 signal	Radiator Fan Relay #1	—	OFF (when OFF)

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

Contents	Display	Unit of measure	Note (at idling)
Radiator fan relay 2 signal	Radiator Fan Relay #2	—	OFF (when OFF)
PCV hose assembly diagnosis signal	Blow-by leak Connector	—	ON
Pressure control solenoid valve assembly signal	PCV Solenoid Valve	—	OFF (when OFF)
Tumble generator valve output signal	TGV Output	—	No Support
Tumble generator valve driving signal	TGV Drive	—	Close
Purge control solenoid valve 2 signal	CPC Solenoid 2	—	OFF (when OFF)
Vehicle dynamics control (VDC) torque down prohibition output	Ban of Torque Down	—	OK
Vehicle dynamics control (VDC) torque down demand	Request Torque Down VDC	—	No Support
ETC motor relay signal	ETC Motor Relay	—	ON
Clutch switch signal	Clutch Switch	—	OFF (when OFF)
Stop light switch signal	Stop Light SW	—	OFF (when OFF)
SET/COAST switch signal	SET/COAST SW	—	OFF (when OFF)
RES/ACC switch signal	RESUME/ACCEL SW	—	OFF (when OFF)
Brake switch signal*	Brake Switch Signal	—	OFF (when OFF)
Main switch signal	Main Switch Signal	—	OFF (when OFF)
Secondary air combination valve relay 2 signal	Sec. Air Combi V Relay 2	—	OFF (when OFF)
Secondary air pump relay signal	Sec. Air Pump Relay	—	OFF (when OFF)
Secondary air combination valve relay 1 signal	Sec. Air Combi V Relay 1	—	OFF (when OFF)
Cruise control cancel switch signal	Cruise Control Cancel Switch Signal	—	OFF (when OFF)
Malfunction indicator light signal	MIL On Flag	—	OFF (when unlit)
ELCM switching valve drive signal	ELCM switching valve	—	Open
ELCM vacuum pump drive signal	ELCM pump	—	OFF

NOTE:

- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.
- *: For models without cruise control, the brake switch signal does not change.

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

3. READ CURRENT DATA FOR ENGINE (OBD MODE)

- 1) On «Main Menu» display, select {Each System Check}.
 - 2) On «System Selection Menu» display, select {Engine Control System}.
 - 3) Click the [OK] button after the information of engine type has been displayed.
 - 4) On «Engine Diagnosis» display, select {OBD System}.
 - 5) On «OBD Menu» display, select {Current Data Display & Save}.
 - 6) On «Current Data Display & Save» display, select {All data display}.
 - 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.

Contents	Display	Note (at idling)	Unit of measure
Number of diagnosis code	Number of DTCs	0	—
Condition of malfunction indicator light	MI(MIL)	OFF	—
Monitoring test of misfire	Misfire monitoring(Supp)	YES	—
Monitoring test of misfire	Misfire monitoring(Rdy)	YES	—
Monitoring test of fuel system	Fuel system monitoring(Supp)	YES	—
Monitoring test of fuel system	Fuel system monitoring(Rdy)	YES	—
Monitoring test of comprehensive component	Component monitoring(Supp)	YES	—
Monitoring test of comprehensive component	Component monitoring(Rdy)	YES	—
Test of catalyst	Catalyst Diagnosis(Supp)	YES	—
Test of catalyst	Catalyst Diagnosis(Rdy)	NO	—
Test of heating-type catalyst	Heated catalyst(Supp)	NO	—
Test of heating-type catalyst	Heated catalyst(Rdy)	N/A	—
Test of evaporative emission purge control system	Evaporative purge system(Supp)	YES	—
Test of evaporative emission purge control system	Evaporative purge system(Rdy)	NO	—
Secondary air system test	Secondary air system(Supp)	YES	—
Secondary air system test	Secondary air system(Rdy)	NO	—
Test of air conditioning system refrigerant	A/C system refrigerant(Supp)	NO	—
Test of air conditioning system refrigerant	A/C system refrigerant(Rdy)	N/A	—
Test of oxygen sensor	Oxygen sensor (Supp)	YES	—
Test of oxygen sensor	Oxygen sensor (Rdy)	NO	—
Test of oxygen sensor heater	O2 Heater Diagnosis(Supp)	YES	—
Test of oxygen sensor heater	O2 Heater Diagnosis(Rdy)	YES	—
Test of EGR system	EGR system(Supp)	NO	—
Test of EGR system	EGR system(Rdy)	N/A	—
Air fuel ratio control system for bank 1	Fuel system for Bank 1	CI_normal	—
Engine load data	Calculated load value	19.2	%
Engine coolant temperature signal	Coolant Temp.	96	°C
Short term fuel trim by front oxygen (A/F) sensor (bank 1)	Short term fuel trim B1	17.2	%
Long term fuel trim by front oxygen (A/F) sensor (bank 1)	Long term fuel trim B1	5.5	%
Intake manifold absolute pressure signal	Mani. Absolute Pressure	248	mmHg
Engine speed signal	Engine Speed	846	rpm
Vehicle speed signal	Vehicle speed	0	km/h
#1 Cylinder ignition timing	Ignition timing adv. #1	13.5	°
Intake air temperature signal	Intake Air Temp.	44	°C

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

Contents	Display	Note (at idling)	Unit of measure
Intake air amount	Mass Air Flow	3.6	g/s
Throttle position signal	Throttle Opening Angle	13	%
Secondary air control status	Secondary air system	Stop	—
Oxygen sensor (bank 1 sensor 2)	Oxygen sensor #12	0.1 — 0.7	V
A/F correction (bank 1 sensor 2)	Short term fuel trim #12	0.0	%
On-board diagnostic system	OBD System	OBD/OBD2	—
Front oxygen (A/F) sensor (Bank 1 sensor 1)	Oxygen sensor #11	Support	—
Oxygen sensor (Bank 1 Sensor 2)	Oxygen sensor #12	Support	—
Elapsed time after engine start	Time Since Engine Start	—	sec
Travel distance after the malfunction indicator light illuminates	Lighted MI lamp history	—	km
A/F lambda signal (Bank 1 Sensor 1)	A/F Sensor #11	0.951	—
A/F sensor output signal (Bank 1 Sensor 1)	A/F Sensor #11	2.468	V
Evaporative purge	Evap Purge	0	%
Fuel level signal	Fuel Level	—	%
Number of warm ups after DTC clear	Number of warm-ups	—	times
Travel distance after DTC clear	Meter since DTC cleared	—	km
Atmospheric pressure signal	Atmospheric pressure	Atmospheric pressure	mmHg
A/F lambda signal (Bank 1 Sensor 1)	A/F Sensor #11	0.957	—
A/F sensor output signal (Bank 1 Sensor 1)	A/F Sensor #11	−0.18	mA
Catalyst temperature #1	Catalyst Temperature #11	—	°C
Monitoring test of misfire	Misfire monitoring(Enable)	YES	—
Monitoring test of misfire	Misfire monitoring(Comp)	YES	—
Monitoring test of fuel system	Fuel system monitoring(Enable)	YES	—
Monitoring test of fuel system	Fuel system monitoring(Comp)	NO	—
Monitoring test of comprehensive component	Component monitoring(Enable)	NO	—
Monitoring test of comprehensive component	Component monitoring(Comp)	NO	—
Test of catalyst	Catalyst Diagnosis(Enable)	YES	—
Test of catalyst	Catalyst Diagnosis(Comp)	NO	—
Test of heating-type catalyst	Heated catalyst(Enable)	N/A	—
Test of heating-type catalyst	Heated catalyst(Comp)	N/A	—
Test of evaporative emission purge control system	Evaporative purge system(Enable)	YES	—
Test of evaporative emission purge control system	Evaporative purge system(Comp)	NO	—
Secondary air system test	Secondary air system(Enable)	YES	—
Secondary air system test	Secondary air system(Comp)	NO	—
Test of air conditioning system refrigerant	A/C system refrigerant(Enable)	N/A	—
Test of air conditioning system refrigerant	A/C system refrigerant(Comp)	N/A	—
Test of oxygen sensor	Oxygen sensor(Enable)	YES	—
Test of oxygen sensor	Oxygen sensor(Comp)	NO	—
Test of oxygen sensor heater	O2 Heater Diagnosis(Enable)	YES	—

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

Contents	Display	Note (at idling)	Unit of measure
Test of oxygen sensor heater	O2 Heater Diagnosis(Comp)	YES	—
Test of EGR system	EGR system(Enable)	N/A	—
Test of EGR system	EGR system(Comp)	N/A	—
ECM power supply voltage	ECU ACC	13.848	V
Absolute load	Absolute Load Value	21	%
A/F target lambda	Target Equivalence Ratio	0.993	—
Relative throttle opening angle	Relative Throttle Pos.	2	%
Ambient temperature	Ambient Temperature	Ambient Temperature	°C
Absolute throttle opening angle 2	Absolute Throttle Pos.#2	31	%
Absolute accelerator opening angle 1	Accelerator Pedal Pos.#1	13	%
Absolute accelerator opening angle 2	Accelerator Pedal Pos.#2	13	%
Target throttle opening angle	Target Throttle Opening Angle	0	%
Engine operating time while malfunction indicator light lit	Time while MIL lighted	—	min
Elapsed time after DTC clear	Time since DTC cleared	—	min
Type of fuel	Type of fuel	GAS	—
Relative acceleration opening angle	Relative Acceleration Pos.	0	%
Neutral condition	MT gear status	NEUT	—

NOTE:

For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

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

- 1) On «Main Menu» display, select {Each System Check}.
 - 2) On «System Selection Menu» display, select {Engine Control System}.
 - 3) Click the [OK] button after the information of engine type has been displayed.
 - 4) On «Engine Diagnosis» display, select {OBD System}.
 - 5) On «OBD Menu» display, select {Freeze Frame Data Display}.
- 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	—
Air fuel ratio control system for bank 1	Fuel system for Bank 1	—
Engine load data	Calculated load value	%
Engine coolant temperature signal	Coolant Temp.	°C or °F
Short term fuel trim by front oxygen (A/F) sensor (bank 1)	Short term fuel trim B1	%
Long term fuel trim by front oxygen (A/F) sensor (bank 1)	Long term fuel trim B1	%
Intake manifold absolute pressure signal	Mani. Absolute Pressure	mmHg, kPa, inHg or psi
Engine speed signal	Engine Speed	rpm
Vehicle speed signal	Vehicle speed	km/h or MPH
Ignition timing adv. #1	Ignition timing adv. #1	°
Intake air temperature	Intake Air Temp.	°C
Amount of intake air	Mass Air Flow	g/s
Throttle valve angle	Throttle Opening Angle	%
Secondary air control status	Secondary air system	—
Oxygen sensor #12	Oxygen sensor #12	V
A/F correction #12	Short term fuel trim #12	%
OBD system	OBD System	—
Oxygen sensor #11	Oxygen sensor #11	—
Oxygen sensor #12	Oxygen sensor #12	—
Elapsed time after starting engine	Time Since Engine Start	sec
Evaporative purge	Evap Purge	%
Fuel level	Fuel Level	%
Atmospheric pressure	Atmospheric pressure	mmHg, kPa, inHg or psig
ECM power supply voltage	ECU ACC	V
Absolute load	Absolute Load Value	%
A/F target lambda	Target Equivalence Ratio	—
Relative throttle opening angle	Relative Throttle Pos.	%
Ambient temperature	Ambient Temperature	°C or °F
Absolute throttle opening angle 2	Absolute Throttle Pos.#2	%
Absolute accelerator opening angle 1	Accelerator Pedal Pos.#1	%
Absolute accelerator opening angle 2	Accelerator Pedal Pos.#2	%
Target throttle opening angle	Target Throttle Opening Angle	%
Neutral condition	MT gear status	—

NOTE:

For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

5. V.I.N REGISTRATION

- 1) On «Main Menu» display, select {Each System Check}.
- 2) On «System Selection Menu» display, select {Engine Control System}.
- 3) Click the [OK] button after the information of engine type has been displayed.
- 4) On the «Engine Diagnosis» display, select {Entry VIN}.
- 5) Perform the procedures shown on the display screen.

Read Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

10. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1. SUBARU SELECT MONITOR (NORMAL MODE)

- 1) On «Main Menu» display, select {Each System Check}.
- 2) On «System Selection Menu» display, select {Engine Control System}.
- 3) Click the [OK] button after the information of engine type has been displayed.
- 4) On «Engine Diagnosis» display, select {Diagnostic Code(s) Display}.
- 5) On «Diagnostic Code(s) Display» display, select {Temporary Diagnostic Code(s)} or {Memorized Diagnostic Code(s)}.

NOTE:

- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.
- For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>

2. SUBARU SELECT MONITOR (OBD MODE)

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

NOTE:

- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.
- For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DOTC)(diag)-87, 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>

NOTE:

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

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 to the item on the drive cycle. <Ref. to EN(H4DOTC)(diag)-55, Drive Cycle.>

DTC	Item	Condition
B1570	Antenna	—
B1571	Reference Code Incompatibility	—
B1572	IMM Circuit Failure (Except Antenna Circuit)	—
B1574	Key Communication Failure	—
B1575	Incorrect Immobilizer Key	—
B1576	EGI Control Module EEPROM	—
B1577	IMM Control Module EEPROM	—
B1578	Meter Failure	—
P0011	Intake Camshaft Position - Timing Over-Advanced or System Performance (Bank 1)	—
P0014	Exhaust AVCS System 1 (Range/Performance)	—
P0016	Crankshaft Position - Camshaft Position Correlation (Bank1)	—
P0017	Crank and Cam Timing B System Failure (Bank 1)	—
P0018	Crankshaft Position - Camshaft Position Correlation (Bank2)	—
P0019	Crank and Cam Timing B System Failure (Bank 2)	—
P0021	Intake Camshaft Position - Timing Over-Advanced or System Performance (Bank 2)	—
P0024	Exhaust AVCS System 2 (Range/Performance)	—
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)	—
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)	—
P0201	Cylinder 1 - Injector Circuit	—
P0202	Cylinder 2 - Injector Circuit	—
P0203	Cylinder 3 - Injector Circuit	—
P0204	Cylinder 4 - Injector Circuit	—
P0222	Throttle/Pedal Position Sensor/Switch “B” Circuit Low	—
P0223	Throttle/Pedal Position Sensor/Switch “B” Circuit High	—
P0230	Fuel Pump Primary Circuit	—
P0245	Turbo/Super Charger Wastegate Solenoid “A” Low	—
P0327	Knock Sensor 1 Circuit Low (Bank 1 or Single Sensor)	—

Inspection Mode

ENGINE (DIAGNOSTICS)

DTC	Item	Condition
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)	—
P0345	Camshaft Position Sensor "A" Circuit (Bank 2)	—
P0346	Camshaft Position Sensor "A" Circuit Range/Performance (Bank 2)	—
P0351	Ignition Coil A Primary/Secondary Circuit	—
P0352	Ignition Coil B Primary/Secondary Circuit	—
P0353	Ignition Coil C Primary/Secondary Circuit	—
P0354	Ignition Coil D Primary/Secondary Circuit	—
P0365	Camshaft Position Sensor "B" Circuit (Bank 1)	—
P0366	Camshaft Position Sensor B Circuit Range/Performance (Bank 1)	—
P0390	Camshaft Position Sensor "B" Circuit (Bank 2)	—
P0391	Camshaft Position Sensor B Circuit Range/Performance (Bank 2)	—
P0413	Secondary Air Injection System Switching Valve "A" Circuit Open	—
P0416	Secondary Air Injection System Switching Valve "B" Circuit Open	—
P0451	Evaporative Emission System Pressure Sensor/Switch Range/Performance	—
P0452	Evaporative Emission System Pressure Sensor/Switch Low	—
P0453	Evaporative Emission System Pressure Sensor/Switch High	—
P0458	Evaporative Emission System Purge Control Valve Circuit Low	—
P0462	Fuel Level Sensor "A" Circuit Low	—
P0463	Fuel Level Sensor "A" Circuit High	—
P04AC	Evap System Purge Control Valve "B" Circuit Low	—
P04AD	Evap System Purge Control Valve "B" Circuit High	—
P04DB	Crankcase Ventilation System Disconnected	—
P0500	Vehicle Speed Sensor "A"	—
P0560	System Voltage	—
P0604	Internal Control Module Random Access Memory (RAM) Error	—
P0605	Internal Control Module Read Only Memory (ROM) Error	—
P0606	Control Module Processor	—
P060A	Internal Control Module Monitoring Processor Performance	—
P060B	Internal Control Module A/D Processing Performance	—
P0616	Starter Relay Circuit Low	—
P0617	Starter Relay Circuit High	—
P062F	Internal Control Module EEPROM Error	—
P0851	Park/Neutral Switch Input Circuit Low	—
P0852	Park/Neutral Switch Input Circuit High	—
P1160	Return Spring Failure	—
P1400	Fuel Tank Pressure Control Solenoid Valve Circuit Low	—
P1410	Secondary Air Injection System Switching Valve Stuck Open	—
P1420	Fuel Tank Pressure Control Sol. Valve Circuit High	—
P2006	Intake Manifold Runner Control Stuck Closed (Bank 1)	—
P2007	Intake Manifold Runner Control Stuck Closed (Bank 2)	—
P2008	Intake Manifold Runner Control Circuit / Open (Bank 1)	—
P2009	Intake Manifold Runner Control Circuit Low (Bank 1)	—
P2011	Intake Manifold Runner Control Circuit / Open (Bank 2)	—
P2012	Intake Manifold Runner Control Circuit Low (Bank 2)	—
P2016	Tumble Generated Valve Position Sensor 1 Circuit Low	—
P2017	Intake Manifold Runner Position Sensor / Switch Circuit High (Bank 1)	—

Inspection Mode

ENGINE (DIAGNOSTICS)

DTC	Item	Condition
P2021	Tumble Generated Valve Position Sensor 2 Circuit Low	—
P2022	Intake Manifold Runner Position Sensor / Switch Circuit High (Bank 2)	—
P2088	Intake Camshaft Position Actuator Control Circuit Low (Bank 1)	—
P2089	Intake Camshaft Position Actuator Control Circuit High (Bank 1)	—
P2090	Exhaust Camshaft Position Actuator Control Circuit Low (Bank 1)	—
P2091	Exhaust Camshaft Position Actuator Control Circuit High (Bank 1)	—
P2092	Intake Camshaft Position Actuator Control Circuit Low (Bank 2)	—
P2093	Intake Camshaft Position Actuator Control Circuit High (Bank 2)	—
P2094	Exhaust Camshaft Position Actuator Control Circuit Low (Bank 2)	—
P2095	Exhaust Camshaft Position Actuator Control Circuit High (Bank 2)	—
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	—
P2119	Throttle Actuator Control Throttle Body Range/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	—
P2195	O2 Sensor Signal Biased/Stuck Lean (Bank 1 Sensor 1)	—
P2196	O2 Sensor Signal Biased/Stuck Rich (Bank 1 Sensor 1)	—
P2257	Air System Control "A" Circuit Low	—
P2401	Evaporative Emission System Leak Detection Pump Control Circuit Low	—
P2419	Evaporative Emission System Switching Valve Control Circuit Low	—
P2431	Secondary Air Injection System Air Flow /Pressure Sensor Circuit Range/Performance	—
P2432	Secondary Air Injection System Air Flow /Pressure Sensor Circuit Low	—
P2433	Secondary Air Injection System Air Flow /Pressure Sensor Circuit High	—
P2444	Secondary Air Injection System Pump Stuck On	—
U0073	CAN Failure, Bus 'Off' Detection	—
U0122	CAN (VDC) Data Not Loaded	—
U0140	CAN (BCU) Data Not Loaded	—
U0416	CAN (VDC) Data Abnormal	—
U0422	CAN (BCU) Data Abnormal	—

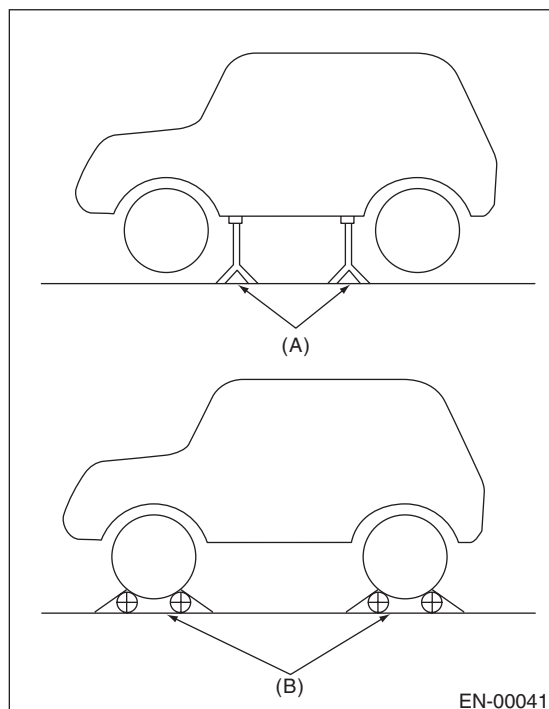
1. PREPARATION FOR THE INSPECTION MODE

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 brake is 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.
- Before rotating the wheels, make sure that there is no one in front of the vehicle. Besides while the wheels are rotating, make sure that no one approaches the vehicle front side.
- Make sure that there is nothing around the wheels. For AWD model, pay attention to all four wheels.
- While servicing, do not depress or release the clutch pedal or accelerator pedal quickly regardless of the engine speed. Quick operation may cause the vehicle to drop off the free roller.
- To prevent the vehicle from slipping due to vibration, do not place anything between rigid rack and the vehicle.



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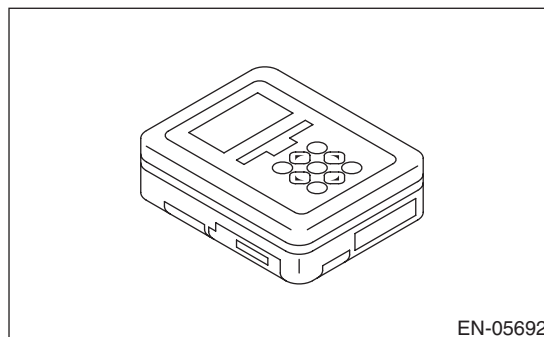
- (A) Rigid rack
(B) Free roller

2. SUBARU SELECT MONITOR

1) Check that no DTC remains after clearing memory. <Ref. to EN(H4DOTC)(diag)-63, Clear Memory Mode.>

2) Warm up the engine.

3) Prepare the Subaru Select Monitor kit. <Ref. to EN(H4DOTC)(diag)-8, PREPARATION TOOL, General Description.>



4) Prepare PC with Subaru Select Monitor installed.

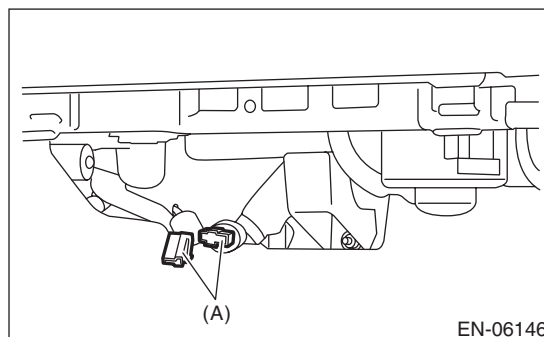
5) Connect the USB cable to SDI (Subaru Diagnosis Interface) and USB port on the personal computer (dedicated port for the Subaru Select Monitor).

NOTE:

The dedicated port for the Subaru Select Monitor means the USB port which was used to install the Subaru Select Monitor.

6) Connect the diagnosis cable to SDI.

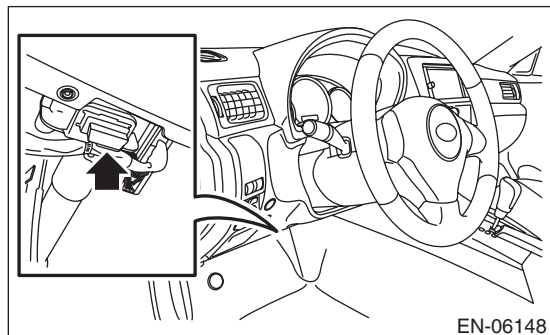
7) Connect the delivery (test) mode connector (A) located under the glove box.



8) Connect SDI to data link connector located in the lower portion of the instrument panel (on the driver's side).

CAUTION:

Do not connect the scan tools except for Subaru Select Monitor and general scan tool.



9) Start the PC.

10) Turn the ignition switch to ON (engine OFF) and run the "PC application for Subaru Select Monitor".

11) On «Main Menu» display, select {Each System Check}.

12) On «System Selection Menu» display, select {Engine Control System}.

13) Click the [OK] button after the information of engine type has been displayed.

14) On «Engine Diagnosis» display, select {Dealer Check Mode Procedure}.

15) When the "Perform Inspection (Dealer Check) Mode ?" is shown on the screen, click the [Next] button.

16) 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:

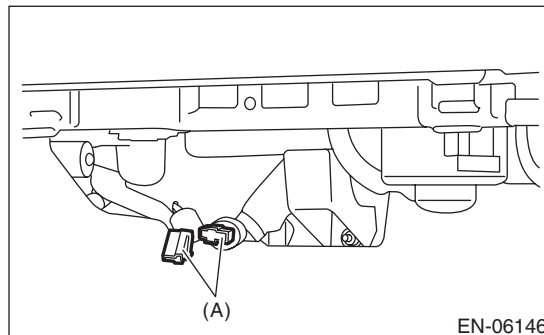
- For detailed operation procedures, refer to "PC application help for Subaru Select Monitor".
- For details concerning DTC, refer to "List of Diagnostic Trouble Code (DTC)".
<Ref. to EN(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>
- Release the parking brake.
- The rotating speed difference between front and rear wheels may illuminate the ABS warning light, but this does not indicate a malfunction. When engine control system diagnosis is finished, perform the VDC memory clearance procedure of self-diagnosis function. <Ref. to VDC(diag)-27, Clear Memory Mode.>

3. GENERAL SCAN TOOL

1) Check that no DTC remains after clearing memory. <Ref. to EN(H4DOTC)(diag)-63, Clear Memory Mode.>

2) Warm up the engine.

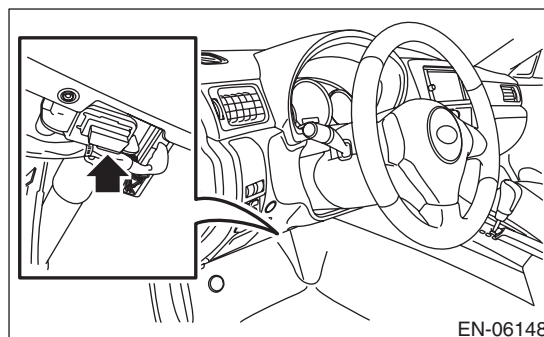
3) Connect the delivery (test) mode connector (A) located under the glove box.



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 the scan tools except for Subaru Select Monitor and general scan tool.



5) Start the engine.

NOTE:

Depress the clutch pedal when starting engine.

6) Turn the neutral position switch to ON by operating shift lever.

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

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8) Place the shift lever in 1st gear and drive the vehicle at 5 to 10 km/h (3 to 6 MPH).

NOTE:

- For AWD model, release the parking brake.
- The rotating speed difference between front and rear wheels may illuminate the ABS warning light, but this does not indicate a malfunction. When engine control system diagnosis is finished, perform the VDC memory clearance procedure of self-diagnosis function. <Ref. to VDC(diag)-27, Clear Memory Mode.>

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

NOTE:

- For detailed operation procedures, refer to the general scan tool operation manual.
 - For details concerning DTC, refer to “List of Diagnostic Trouble Code (DTC)”.
- <Ref. to EN(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>

12. Drive Cycle

A: PROCEDURE

It is necessary to perform the drive cycle listed below if DTC is not found in the Inspection Mode. It is possible to complete diagnosis of the DTC by performing the indicated drive cycle. After the repair for the DTC, perform a necessary drive cycle and make sure the function recovers and the DTC is recorded.

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 Clear Memory Mode, check that no DTC remains. <Ref. to EN(H4DOTC)(diag)-63, Clear Memory Mode.>
- 3) Check the delivery (test) mode connector is disconnected.

NOTE:

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

2. DRIVE CYCLE A

DTC	Item	Condition
*P0116	Engine Coolant Temp. Sensor Circuit Range/Performance	—
*P0128	Coolant Thermostat (Engine Coolant Temperature Below Thermostat Regulating Temperature)	—
*P014C	O2 Sensor Slow Response - Rich to Lean (Bank 1 Sensor 1)	—
*P014D	O2 Sensor Slow Response - Lean to Rich (Bank 1 Sensor 1)	—
*P015A	O2 Sensor Delayed Response - Rich to Lean (Bank 1 Sensor 1)	—
*P015B	O2 Sensor Delayed Response - Lean to Rich (Bank 1 Sensor 1)	—
*P0141	O2 Sensor Heater Circuit (Bank1 Sensor2)	—
*P0171	System Too Lean (Bank 1)	Complete diagnosis with drive cycle B or C as well.
*P0172	System Too Rich (Bank 1)	Complete diagnosis with drive cycle B or C as well.
*P0300	Random/Multiple Cylinder Misfire Detected	Complete diagnosis with drive cycle B or C as well.
*P0301	Cylinder 1 Misfire Detected	Complete diagnosis with drive cycle B or C as well.
*P0302	Cylinder 2 Misfire Detected	Complete diagnosis with drive cycle B or C as well.
*P0303	Cylinder 3 Misfire Detected	Complete diagnosis with drive cycle B or C as well.
*P0304	Cylinder 4 Misfire Detected	Complete diagnosis with drive cycle B or C as well.
*P0420	Catalyst System Efficiency Below Threshold (Bank 1)	—
*P0459	Evaporative Emission System Purge Control Valve Circuit High	—
*P2096	Post Catalyst Fuel Trim System Too Lean (Bank 1)	Complete diagnosis with drive cycle B or C as well.
*P2097	Post Catalyst Fuel Trim System Too Rich (Bank 1)	Complete diagnosis with drive cycle B or C as well.

Diagnostic procedure:

- 1) Drive for 20 minutes or more at a constant speed of 80 km/h (50 MPH) or more.
- 2) Stop the vehicle and idle for one minute.

Drive Cycle

ENGINE (DIAGNOSTICS)

3. DRIVE CYCLE B

DTC	Item	Condition
*P0125	Insufficient Coolant Temperature for Closed Loop Fuel Control	«Coolant Temp.» at engine start: Less than 15°C (5°F)
*P0171	System Too Lean (Bank 1)	Complete diagnosis with drive cycle A or C as well.
*P0172	System Too Rich (Bank 1)	Complete diagnosis with drive cycle A or C as well.
*P0300	Random/Multiple Cylinder Misfire Detected	Complete diagnosis with drive cycle A or C as well.
*P0301	Cylinder 1 Misfire Detected	Complete diagnosis with drive cycle A or C as well.
*P0302	Cylinder 2 Misfire Detected	Complete diagnosis with drive cycle A or C as well.
*P0303	Cylinder 3 Misfire Detected	Complete diagnosis with drive cycle A or C as well.
*P0304	Cylinder 4 Misfire Detected	Complete diagnosis with drive cycle A or C as well.
*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 with drive cycle A or C as well.
*P2097	Post Catalyst Fuel Trim System Too Rich (Bank 1)	Complete diagnosis with drive cycle A or C as well.
*P219A	Bank 1 Air-Fuel Ratio Imbalance	Complete diagnosis with drive cycle C as well.

Diagnostic procedure:

- 1) Drive at 10 km/h (6 MPH) or more.
- 2) Stop the vehicle and idle for ten minutes.

4. DRIVE CYCLE C

DTC	Item	Condition
*P0030	HO2S Heater Control Circuit (Bank 1 Sensor 1)	—
*P0068	MAP/MAF - Throttle Position Correlation	—
*P0101	Mass or Volume Air Flow Circuit Range/Performance	—
P0134	O2 Sensor Circuit No Activity Detected (Bank 1 Sensor 1)	—
*P013A	O2 Sensor Slow Response - Rich to Lean (Bank 1 Sensor 2)	—
*P013B	O2 Sensor Slow Response - Lean to Rich (Bank 1 Sensor 2)	—
*P013E	O2 Sensor Delayed Response - Rich to Lean (Bank 1 Sensor 2)	—
*P013F	O2 Sensor Delayed Response - Lean to Rich (Bank 1 Sensor 2)	—
*P0171	System Too Lean (Bank 1)	Complete diagnosis with drive cycle A or B as well.
*P0172	System Too Rich (Bank 1)	Complete diagnosis with drive cycle A or B as well.
P0244	Turbo/Super Charger Wastegate Solenoid "A" Range/Performance	—
P0246	Turbo/Super Charger Wastegate Solenoid "A" High	—
*P0300	Random/Multiple Cylinder Misfire Detected	Complete diagnosis with drive cycle A or B as well.
*P0301	Cylinder 1 Misfire Detected	Complete diagnosis with drive cycle A or B as well.
*P0302	Cylinder 2 Misfire Detected	Complete diagnosis with drive cycle A or B as well.

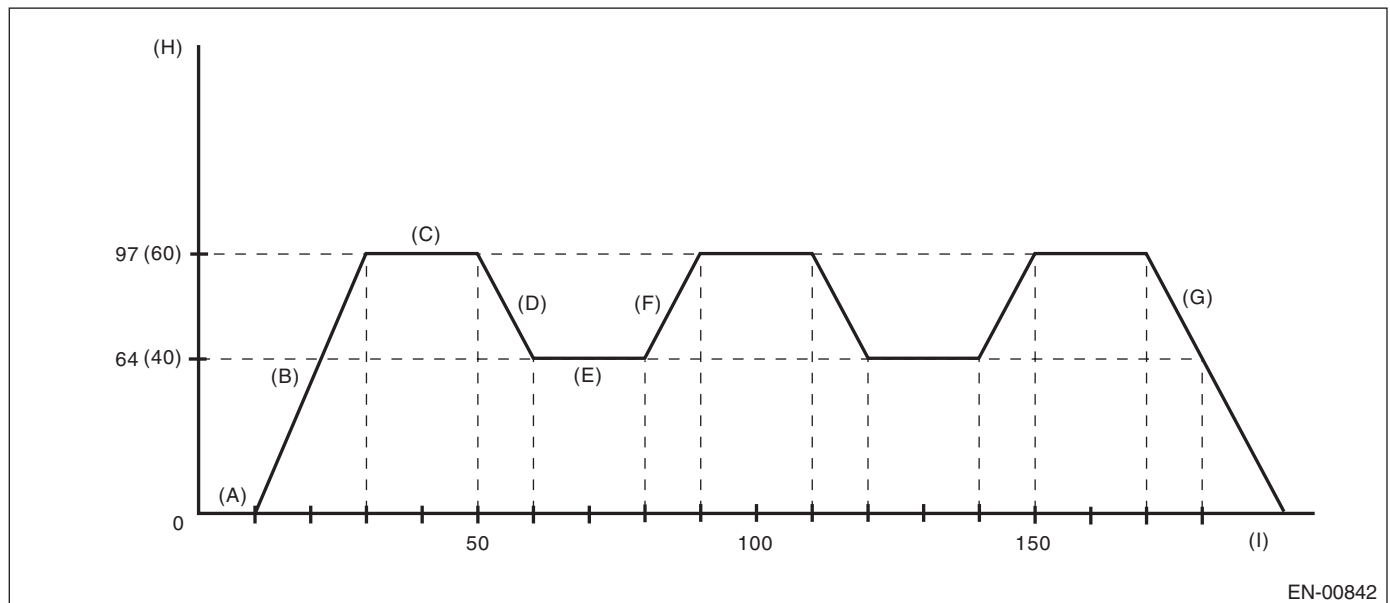
Drive Cycle

ENGINE (DIAGNOSTICS)

DTC	Item	Condition
*P0303	Cylinder 3 Misfire Detected	Complete diagnosis with drive cycle A or B as well.
*P0304	Cylinder 4 Misfire Detected	Complete diagnosis with drive cycle A or B as well.
*P0441	Evaporative Emission Cont. Sys. Incorrect Purge Flow	—
*P1449	Evaporative Emission Cont. Sys. Air Filter Clog	—
P2004	Intake Manifold Runner Control Stuck Open (Bank 1)	—
P2005	Intake Manifold Runner Control Stuck Open (Bank 2)	—
*P2096	Post Catalyst Fuel Trim System Too Lean (Bank 1)	Complete diagnosis with drive cycle A or B as well.
*P2097	Post Catalyst Fuel Trim System Too Rich (Bank 1)	Complete diagnosis with drive cycle A or B as well.
*P219A	Bank 1 Air-Fuel Ratio Imbalance	Complete diagnosis with drive cycle B as well.

Diagnostic procedure:

Drive according to the drive pattern described below.



(A) Place the shift lever in neutral position, and let the engine idle for 10 seconds or more.	(D) Decelerate with fully closed throttle to 64 km/h (40 MPH) or less.	(G) Stop the vehicle with throttle fully closed.
(B) Accelerate to 97 km/h (60 MPH) or more within 20 seconds.	(E) Drive for 20 seconds or more at 64 km/h (40 MPH) or less.	(H) Vehicle speed km/h (MPH)
(C) Drive for 20 seconds or more at 97 km/h (60 MPH) or more.	(F) Accelerate to 97 km/h (60 MPH) or more within 10 seconds.	(I) Sec.

Drive Cycle

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5. DRIVE CYCLE E

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

Diagnostic procedure:

- 1) Make sure that the battery voltage is 10.9 V or more.
- 2) Perform the Clear Memory Mode. <Ref. to EN(H4DOTC)(diag)-63, Clear Memory Mode.>
- 3) Drive for approximately 30 L (7.9 US gal, 6.6 Imp gal) of fuel.

NOTE:

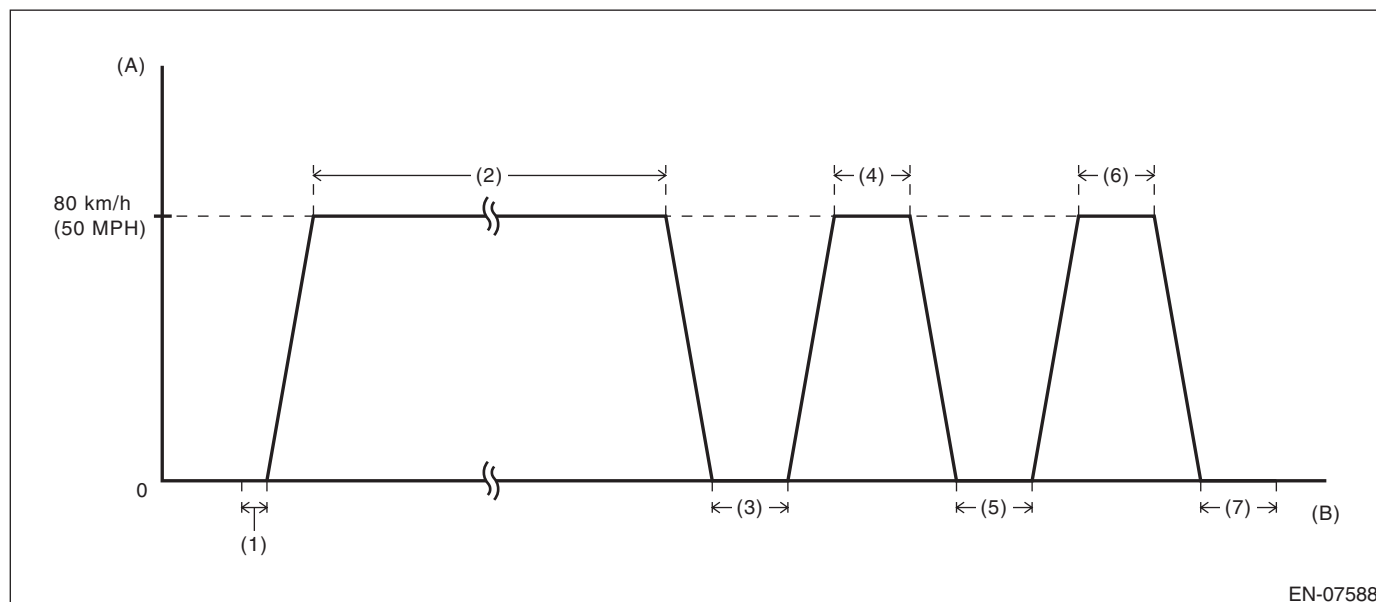
- It is acceptable to drive the vehicle intermittently.
- Do not disconnect the battery terminals while diagnosing. (Data will be cleared by disconnecting the battery terminals.)

6. DRIVE CYCLE F

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

Diagnostic procedure:

- 1) Make sure that the engine coolant temperature is less than 30°C (86°F).
- 2) Drive according to the drive pattern described below.



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(A) Vehicle speed

(B) Elapsed time

(1) Idle the engine for 10 seconds or more after engine start.	(4) Drive for 30 seconds or more at a constant speed of 80 km/h (50 MPH) or more.	(6) Drive for 30 seconds or more at a constant speed of 80 km/h (50 MPH) or more.
(2) Drive for 8 minutes or more at a constant speed of 80 km/h (50 MPH) or more.	(5) Stop the vehicle and idle for 30 seconds or more.	(7) Stop the vehicle and idle for 30 seconds.
(3) Stop the vehicle and idle for 30 seconds or more.		

NOTE:

- There is no given transition time between idling and cruising.
- Driving at constant speed only on a downhill causes smaller engine load and may result in failure to obtain a right diagnostic result.
- When the engine stops while performing drive cycle F, perform it again from the state of procedure 1).

7. DRIVE CYCLE G

DTC	Item	Condition
*P0410	Secondary Air Injection System	—
*P0411	Secondary Air Injection System Incorrect Flow Detected	—
P0414	Secondary Air Injection System Switching Valve "A" Circuit Shorted	—
P0417	Secondary Air Injection System Switching Valve "B" Circuit Shorted	—
P2258	Air System Control "A" Circuit High	—
*P2440	Secondary Air Injection System Switching Valve Stuck Open (Bank1)	—
*P2441	Secondary Air Injection System Switching Valve Stuck Closed (Bank1)	—
*P2442	Secondary Air Injection System Switching Valve Stuck Open (Bank2)	—
*P2443	Secondary Air Injection System Switching Valve Stuck Closed (Bank2)	—

Diagnostic procedure:

- 1) Disconnect the battery negative terminal, and reconnect after at least 10 seconds have passed.
- 2) Idle the engine until engine coolant temperature is 80°C (176°F) more.
- 3) Stop the engine to decrease the engine coolant temperature down to 40°C (104°F) or less.

NOTE:

Do not let engine coolant temperature drop to 5°C (41°F) or less.

- 4) Idle the engine until engine coolant temperature is 80°C (176°F) more.
- 5) Stop the engine to decrease the engine coolant temperature down to 40°C (104°F) or less.

NOTE:

Do not let engine coolant temperature drop to 5°C (41°F) or less.

- 6) Idle the engine.

8. DRIVE CYCLE H

DTC	Item	Condition
*P050A	Cold Start Idle Air Control System Performance	—
*P050B	Cold Start Ignition Timing Performance	—

Diagnostic procedure:

- 1) Perform the Clear Memory Mode. <Ref. to EN(H4DOTC)(diag)-63, Clear Memory Mode.>
- 2) With the ignition switch ON (engine stopped), read the value in «Coolant Temp.» and «Mass Air Flow».
<Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>
- 3) If the values from step 2) satisfy the following conditions, idle the engine for one minute.

Condition:

$$| \text{Engine coolant temperature} - \text{Intake air temperature} | \leq 5^{\circ}\text{C} (9^{\circ}\text{F})$$

NOTE:

- If the conditions are not satisfied, turn the ignition switch to OFF and wait until the parameters are satisfied.
- Do not move the shift lever from neutral position during idling.

Drive Cycle

ENGINE (DIAGNOSTICS)

9. DRIVE CYCLE I

DTC	Item	Condition
*P0455	Evaporative Emission System Leak Detected (Large Leak)	«Coolant Temp.»: 5 — 45°C (41 — 113°F) «Intake Air Temp.»: 5 — 50°C (41 — 122°F)
*P0456	Evaporative Emission Control System Leak Detected (Very Small Leak)	
*P1451	Evaporative Emission Cont. Sys.	
*P2402	Evaporative Emission System Leak Detection Pump Control Circuit High	
*P2404	Evaporative Emission System Leak Detection Pump Sense Circuit Range/Performance	
*P2420	Evaporative Emission System Switching Valve Control Circuit High	

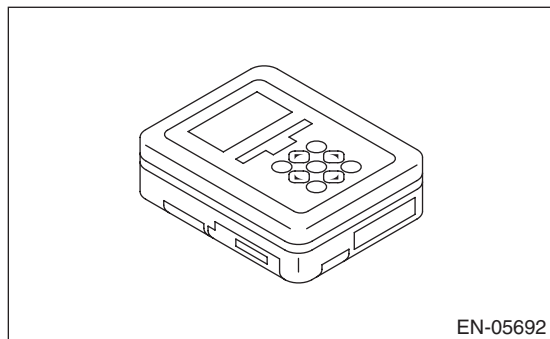
CAUTION:

Be careful of the state of the battery when performing the DRIVE CYCLE I consecutively. Performing the DRIVE CYCLE I consecutively without the engine running may cause a low battery voltage and battery discharge.

NOTE:

- If it is necessary to perform DRIVE CYCLE I consecutively, drive the vehicle under the following conditions to release accumulated evaporating gas. Performing the DRIVE CYCLE I consecutively without starting the engine causes a large amount of evaporating gas to accumulate in the canister, which hinders an accurate diagnosis.
 - After engine is warmed up
 - Drive for 10 minutes or more at a speed of 48 km/h (30 MPH) or more (duration of drive can be an accumulation)
- To obtain an accurate diagnostic result, perform the procedures according to the following points.
 - Do not refuel gas immediately before performing DRIVE CYCLE I. There will be a large amount of evaporating gas immediately after refuel, which may cause a less accurate diagnostic performance.
 - Do not shake the vehicle while performing DRIVE CYCLE I. Shaking the vehicle causes evaporating gas to increase inside the fuel tank, which may cause a less accurate diagnostic performance.
 - Do not perform any service operation including installation or removal of parts or connectors while performing DRIVE CYCLE I. Performing service operation could affect on the functions of related parts, which may cause a less accurate diagnostic performance.

1) Prepare the Subaru Select Monitor kit. <Ref. to EN(H4DOTC)(diag)-8, PREPARATION TOOL, General Description.>



2) Prepare PC with Subaru Select Monitor installed.

3) Connect the USB cable to SDI (Subaru Diagnosis Interface) and USB port on the personal computer (dedicated port for the Subaru Select Monitor).

NOTE:

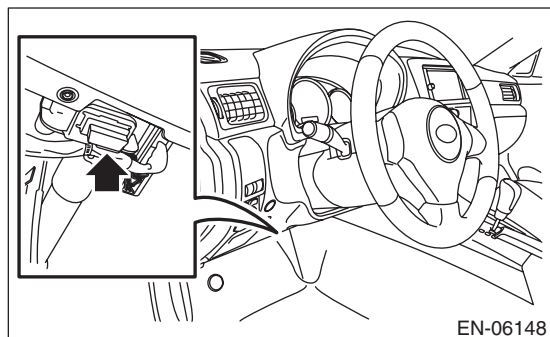
The dedicated port for the Subaru Select Monitor means the USB port which was used to install the Subaru Select Monitor.

4) Connect the diagnosis cable to SDI.

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

CAUTION:

Do not connect the scan tools except for Subaru Select Monitor and general scan tool.



6) Start the PC.

7) Turn the ignition switch to ON (engine OFF) and run the "PC application for Subaru Select Monitor".

8) On «Main Menu» display, select {Each System Check}.

9) On «System Selection Menu» display, select {Engine Control System}.

10) Click the [OK] button after the information of engine type has been displayed.

11) On «Engine Diagnosis» display, select {OBD System}.

12) On «OBD Menu» display, select {Evaporative System Leak Test}.

13) On «Evaporative System Leak Test» display, select {Evaporative System Leak Test}.

14) On «Evaporative System Leak Test is running. Press Cancel to exit this function.» display, click the [OK] button to perform evaporative system leak test.

15) When «Conditions have been enabled to control this function. Turn the ignition switch off to terminate the test.» display appears, wait for 30 minutes without clicking the [OK] button.

CAUTION:

Do not leave the vehicle for an extended period of time after the test is complete. This may cause early deterioration of the battery or discharged battery.

NOTE:

- Clicking the [OK] button bring the «Evaporative System Leak Test» display back, although the test is continuing.
- The Subaru Select Monitor screen does not change after the evaporative system leak test is complete or when the test is aborted by turning off the ignition switch.
- If «Test conditions are not correct» display appears, check that the values in «Coolant Temp.» and «Intake Air Temp.» are within the specified range using Subaru Select Monitor. If the conditions are satisfied, make the necessary preparation for the drive cycle again. <Ref. to EN(H4DOTC)(diag)-55, PREPARATION FOR DRIVE CYCLE, PROCEDURE, Drive Cycle.>

16) After 30 minutes passed from the start of step 14), click the [OK] button to return to the «Evaporative System Leak Test» display.

17) Click buttons until the «OBD Menu» display appears, then select {Result of on-board monitor test}.

18) In the {Result of on-board monitor test}, check TID \$C1 — \$CA of MID \$3C.

Result of on-board monitor test

Display	Details	Remarks
\$0000 is stored in all Val.	During the evaporative system leak test, the test conditions were not met and the test was canceled.	Once the test conditions are met, perform the test again.
All Val. are stored with values and OK is set to all the results.	Evaporative system leak test is completed correctly.	While the ignition switch is ON, read temporary codes using the Subaru Select Monitor.
Some results were no good.	The evaporative system leak test completed successfully but the results were faulty.	While the ignition switch is ON, read temporary codes using the Subaru Select Monitor.

Drive Cycle

ENGINE (DIAGNOSTICS)

19) When the evaporative system leak test is completed correctly, read the temporary codes with the ignition switch turned to ON position. If the DTC is recorded, check the appropriate DTC. <Ref. to EN(H4DOTC)(diag)-48, OPERATION, Read Diagnostic Trouble Code (DTC).>

NOTE:

The temporary code will be cleared by turning ignition switch to OFF.

10.DRIVE CYCLE J

DTC	Item	Condition
P2610	ECM/PCM Internal Engine Off Timer Performance	—

1) Idle the engine for 15 minutes or more.

2) Turn the ignition switch to OFF.

3) After 10 hours passed from the start of step 2), read the temporary code using the Subaru Select Monitor. <Ref. to EN(H4DOTC)(diag)-48, OPERATION, Read Diagnostic Trouble Code (DTC).>

13. Clear Memory Mode

A: OPERATION

1. SUBARU SELECT MONITOR (NORMAL MODE)

- 1) On «Main Menu» display, select {Each System Check}.
- 2) On «System Selection Menu» display, select {Engine Control System}.
- 3) Click the [OK] button after the information of engine type has been displayed.
- 4) On «Engine Diagnosis» display, select {Clear Memory}.
- 5) When the “Clear Memory?” is shown on the screen, click the [YES] button.
- 6) When “Done” and “Turn off the ignition switch.” are shown on the display screen, turn the ignition switch to OFF.

NOTE:

- Initial diagnosis of electronic throttle control is performed after memory clearance. Wait for 10 seconds or more after turning the ignition switch to ON, and then start the engine.
- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

2. SUBARU SELECT MONITOR (OBD MODE)

- 1) On «Main Menu» display, select {Each System Check}.
- 2) On «System Selection Menu» display, select {Engine Control System}.
- 3) Click the [OK] button after the information of engine type has been displayed.
- 4) On «Engine Diagnosis» display, select {OBD System}.
- 5) On «OBD Menu» display, select {Clear Diagnostic Code(s)}.
- 6) When the “Clear Diagnostic Code?” is shown on the screen, click the [Yes] button.
- 7) When “Done” and “Turn off the ignition switch.” are shown on the display screen, turn the ignition switch to OFF.

NOTE:

- Initial diagnosis of electronic throttle control is performed after memory clearance. Wait for 10 seconds or more after turning the ignition switch to ON, and then start the engine.
- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

3. GENERAL SCAN TOOL

For procedures clearing memory using the general scan tool, refer to the general scan tool operation manual.

NOTE:

Initial diagnosis of electronic throttle control is performed after memory clearance. Wait for 10 seconds or more after turning the ignition switch to ON, and then start the engine.

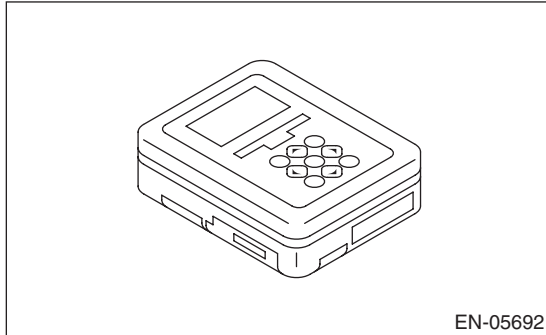
Compulsory Valve Operation Check Mode

ENGINE (DIAGNOSTICS)

14. Compulsory Valve Operation Check Mode

A: OPERATION

1) Prepare the Subaru Select Monitor kit. <Ref. to EN(H4DOTC)(diag)-8, PREPARATION TOOL, General Description.>



2) Prepare PC with Subaru Select Monitor installed.

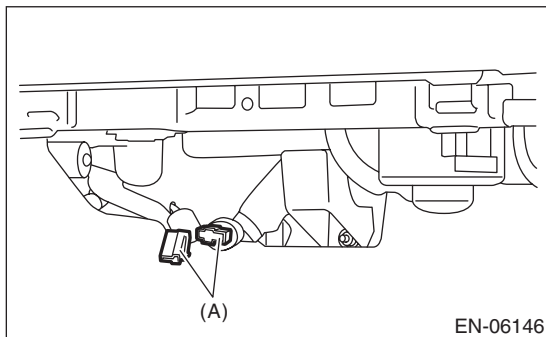
3) Connect the USB cable to SDI (Subaru Diagnosis Interface) and USB port on the personal computer (dedicated port for the Subaru Select Monitor).

NOTE:

The dedicated port for the Subaru Select Monitor means the USB port which was used to install the Subaru Select Monitor.

4) Connect the diagnosis cable to SDI.

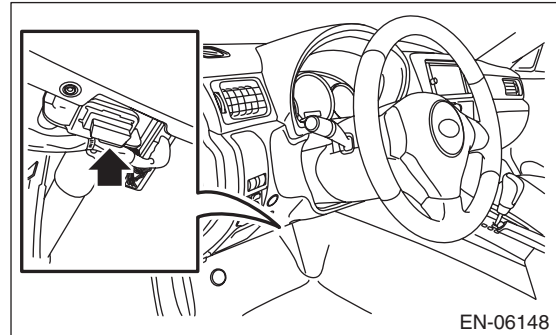
5) Connect the delivery (test) mode connector (A) located under the glove box.



6) Connect SDI to data link connector located in the lower portion of the instrument panel (on the driver's side).

CAUTION:

Do not connect the scan tools except for Subaru Select Monitor and general scan tool.



7) Start the PC.

8) Turn the ignition switch to ON (engine OFF) and run the "PC application for Subaru Select Monitor".

9) On «Main Menu» display, select {Each System Check}.

10) On «System Selection Menu» display, select {Engine Control System}.

11) Click the [OK] button after the information of engine type has been displayed.

12) On «Engine Diagnosis» display, select {System Operation Check Mode}.

13) On «System Operation Check Mode» display, select {Actuator ON/OFF Operation}.

14) Select the actuator to be forcibly driven on the «Actuator ON/OFF Operation» display screen and click the [Next] button.

15) Clicking the [Finished] button completes the compulsory drive mode of actuator. The display will then return to the «Actuator ON/OFF Operation» screen.

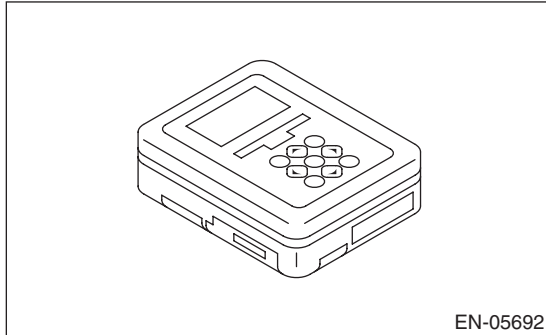
NOTE:

For detailed operation procedures, refer to "PC application help for Subaru Select Monitor".

15. System Operation Check Mode

A: OPERATION

1) Prepare the Subaru Select Monitor kit. <Ref. to EN(H4DOTC)(diag)-8, PREPARATION TOOL, General Description.>



2) Prepare PC with Subaru Select Monitor installed.

3) Connect the USB cable to SDI (Subaru Diagnosis Interface) and USB port on the personal computer (dedicated port for the Subaru Select Monitor).

NOTE:

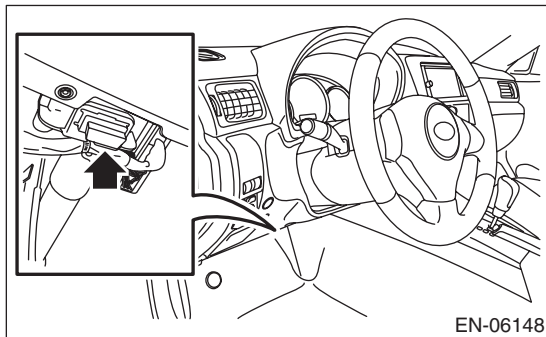
The dedicated port for the Subaru Select Monitor means the USB port which was used to install the Subaru Select Monitor.

4) Connect the diagnosis cable to SDI.

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

CAUTION:

Do not connect the scan tools except for Subaru Select Monitor and general scan tool.



6) Start the PC.

7) Turn the ignition switch to ON (engine OFF) and run the "PC application for Subaru Select Monitor".

8) On «Main Menu» display, select {Each System Check}.

9) On «System Selection Menu» display, select {Engine Control System}.

10) Click the [OK] button after the information of engine type has been displayed.

11) On «Engine Diagnosis» display, select {System Operation Check Mode}.

12) The following items are displayed on the monitor.

Display
Actuator ON/OFF Operation
Immobilizer System
Fuel Pump Control
Fixed Idle Ignition Timing
Idle Speed Control
Injector Control

1. FUEL PUMP CONTROL (OFF DRIVE)

CAUTION:

After executing the system operation check mode, execute the Clear Memory Mode. <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>

1) On «System Operation Check Mode» display, select {Fuel Pump Control}.

2) On «Fuel Pump Control» display, select {OFF Drive}.

3) On «Start the Engine» display, start the engine and click the [OK] button.

4) On «OFF Drive» display, click the [Execution] button and execute the OFF drive.

5) Click the [Cancel] button to stop the OFF drive.

6) Click the [Exit] button to end the OFF drive. The screen will return to the «Fuel Pump Control» screen.

NOTE:

For detailed operation procedures, refer to "PC application help for Subaru Select Monitor".

2. FUEL PUMP CONTROL (ON/OFF DRIVE)

CAUTION:

After executing the system operation check mode, execute the Clear Memory Mode. <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>

1) On «System Operation Check Mode» display, select {Fuel Pump Control}.

2) On «Fuel Pump Control» display, select {ON/OFF Dr.}.

3) On «Turn Ignition Switch ON with Engine OFF» display, turn the ignition switch to ON and click the [OK] button.

4) On «ON/OFF Dr.» display, click the [Execution] button and execute the ON/OFF drive.

5) Click the [Cancel] button to stop the ON/OFF drive.

System Operation Check Mode

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6) Click the [F12 Exit] button to end the ON/OFF drive. The screen will return to the «Fuel Pump Control» screen.

NOTE:

For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

3. IDLING IGNITION TIMING FIXED

CAUTION:

After executing the system operation check mode, execute the Clear Memory Mode. <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>

- 1) On «System Operation Check Mode» display, select {Fixed Idle Ignition Timing}.
- 2) On «Start the Engine» display, start the engine and click the [OK] button.
- 3) On «Fixed Idle Ignition Timing» display, click the [Execution] button and execute the idling ignition timing fixed.
- 4) Click the [Cancel] button to stop the idling ignition timing fixed.
- 5) Click the [F12 Exit] button to end the idle ignition timing fixed. The screen will return to the «System Operation Check Mode» screen.

NOTE:

For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

4. IDLE SPEED CONTROL

CAUTION:

After executing the system operation check mode, execute the Clear Memory Mode. <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>

- 1) On «System Operation Check Mode» display, select {Idle Speed Control}.
- 2) On «Start the Engine» display, start the engine and click the [OK] button.
- 3) In the «Idle Speed Control» display, click the [△] button or the [▽] button to change the setting values, then click the [OK] button.
Setting is possible in a range between 500 rpm — 2,000 rpm, in increments of 50 rpm. However, the engine speed that can actually be controlled will vary depending on the vehicle.
- 4) Click the [Cancel] button to stop the idle speed control.
- 5) Click the [F12 Exit] button to end the idle speed control. The screen will return to the «System Operation Check Mode» screen.

NOTE:

For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

5. INJECTOR CONTROL (INJECTION STOP MODE)

CAUTION:

After executing the system operation check mode, execute the Clear Memory Mode. <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>

- 1) On «System Operation Check Mode» display, select {Injector Control}.
- 2) On «Injector Control» display, select {Injection Stop Mode}.
- 3) On «Injection Stop Mode» display, select the fuel injector to be stopped.
- 4) On «Start the Engine» display, start the engine and click the [OK] button.
- 5) On «Fuel Injector #» display, click the [Execution] button and execute the injection stop mode.
- 6) Click the [Cancel] button to stop the injection stop mode.
- 7) Click the [F12 Exit] button to return the «Injection Stop Mode» display screen.
- 8) On the «Injection Stop Mode» display, click the [Return] button to end the «Injection Stop Mode». The screen will return to the «Injector Control» screen.

NOTE:

For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

6. INJECTOR CONTROL (INJECTION QUANTITY CONTROL)

CAUTION:

After executing the system operation check mode, execute the Clear Memory Mode. <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>

- 1) On «System Operation Check Mode» display, select {Injector Control}.
- 2) On «Injector Control» display, select {Injection Quantity Control}.
- 3) On «Start the Engine» display, start the engine and click the [OK] button.
- 4) In the «Injection Quantity Control» display, click the [△] button or the [▽] button to change the setting values, then click the [OK] button.
Setting is possible in a range between 0 — 20%, in increments of 1%.
- 5) Click the [Cancel] button to stop the injection quantity control.
- 6) Click the [F12 Exit] button to end the injection quantity control. The screen will return to the «Injector Control» screen.

NOTE:

For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

16.Malfunction Indicator Light

A: PROCEDURE

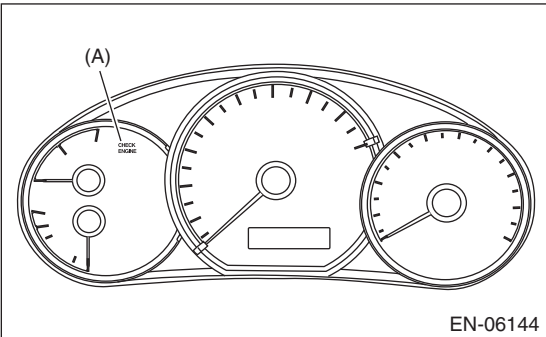
1. Activation of malfunction indicator light. <Ref. to EN(H4DOTC)(diag)-67, ACTIVATION OF MALFUNCTION INDICATOR LIGHT, Malfunction Indicator Light.>
↓
2. Malfunction indicator light does not come on. <Ref. to EN(H4DOTC)(diag)-69, MALFUNCTION INDICATOR LIGHT DOES NOT COME ON, Malfunction Indicator Light.>
↓
3. Malfunction indicator light does not go off <Ref. to EN(H4DOTC)(diag)-69, MALFUNCTION INDICATOR LIGHT DOES NOT GO OFF, Malfunction Indicator Light.>
↓
4. Malfunction indicator light does not blink <Ref. to EN(H4DOTC)(diag)-70, MALFUNCTION INDICATOR LIGHT DOES NOT BLINK, Malfunction Indicator Light.>
↓
5. Malfunction indicator light remains blinking <Ref. to EN(H4DOTC)(diag)-72, MALFUNCTION INDICATOR LIGHT REMAINS BLINKING, Malfunction Indicator Light.>

B: ACTIVATION OF MALFUNCTION INDICATOR LIGHT

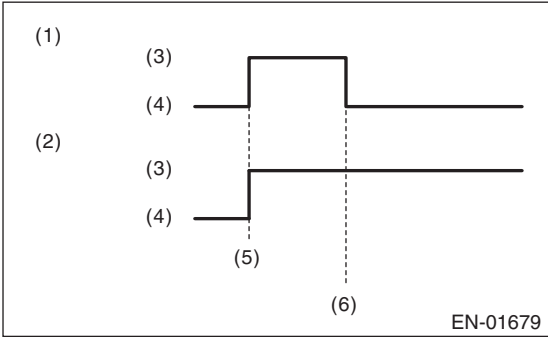
1) When the ignition switch is turned to ON (engine OFF), the malfunction indicator light (A) in the combination meter illuminates.

NOTE:

If the malfunction indicator light does not illuminate, perform diagnostics of the malfunction indicator light circuit or the combination meter circuit. <Ref. to EN(H4DOTC)(diag)-69, 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, any of the engine and emission control system has malfunction.

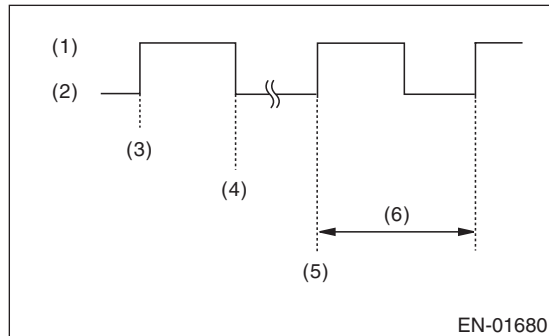


- (1) No DTC
- (2) Trouble occurs
- (3) ON
- (4) OFF
- (5) Ignition switch ON
- (6) Engine start

Malfunction Indicator Light

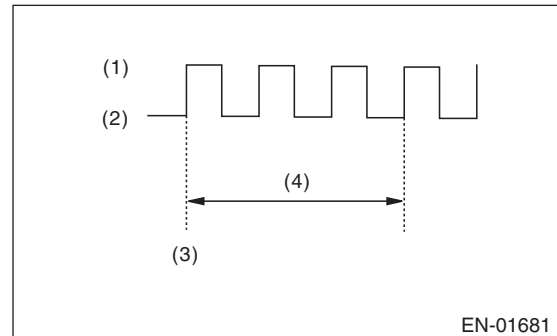
ENGINE (DIAGNOSTICS)

3) If the diagnostic system detects a misfire which could damage the catalyst, the malfunction indicator light will blink at a cycle of 1 Hz.



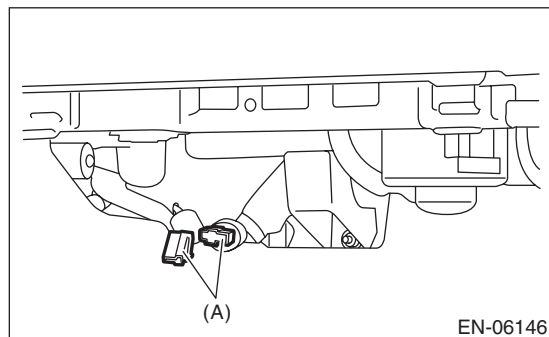
- (1) ON
- (2) OFF
- (3) Ignition switch ON
- (4) Engine start
- (5) Misfire start
- (6) 1 second

(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

4) Turn the ignition switch to OFF and connect the delivery (test) mode connector (A) located under the glove box.



- (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)

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

C: MALFUNCTION INDICATOR LIGHT DOES NOT COME ON

TROUBLE SYMPTOM:

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

Step	Check	Yes	No
1 CHECK DTC.	Is DTC of LAN system displayed? <Ref. to LAN(diag)-28, OPERATION, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to LAN(diag)-32, List of Diagnostic Trouble Code (DTC).>	Replace the meter case assembly of combination meter. <Ref. to IDI-16, Combination Meter.>

D: MALFUNCTION INDICATOR LIGHT DOES NOT GO OFF

TROUBLE SYMPTOM:

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

Step	Check	Yes	No
1 CHECK DTC.	Is DTC of engine or LAN system displayed? <Ref. to EN(H4DOTC)(diag)-48, OPERATION, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(diag)-32, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK COMBINATION METER. Perform the self-diagnosis for combination meter system. <Ref. to IDI-5, SELF-DIAGNOSIS, INSPECTION, Combination Meter System.>	Does the malfunction indicator light illuminate and go off normally?	Replace the ECM. <Ref. to FU(STI)-59, Engine Control Module (ECM).> <Ref. to FU(w/o STI)-57, Engine Control Module (ECM).>	Replace the meter case assembly of combination meter. <Ref. to IDI-16, Combination Meter.>

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

E: MALFUNCTION INDICATOR LIGHT DOES NOT BLINK

DIAGNOSIS:

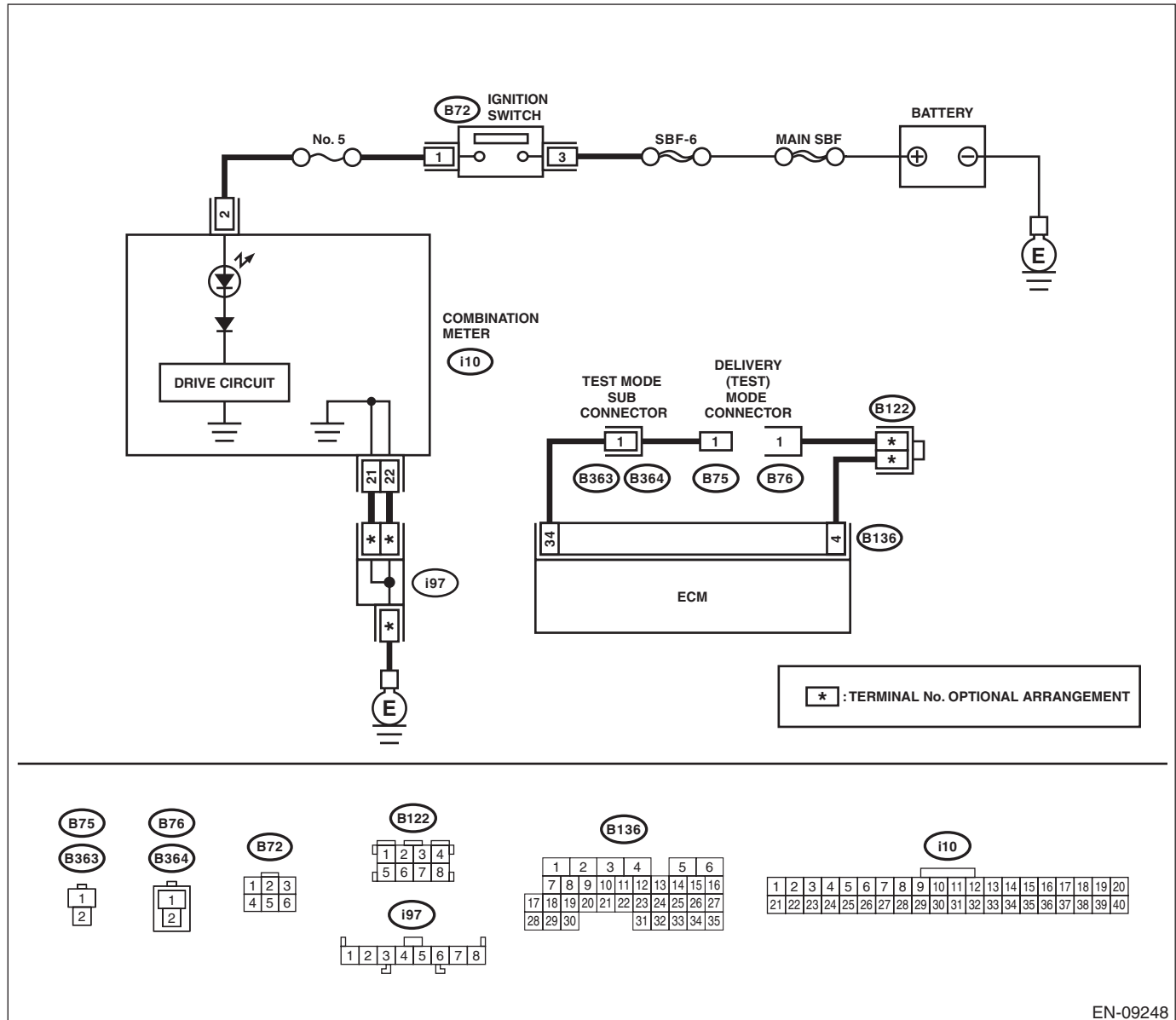
- The malfunction indicator light circuit is open or shorted.
- The delivery (test) mode connector circuit is open.

TROUBLE SYMPTOM:

Malfunction indicator light does not blink during Inspection Mode.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



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Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK STATUS OF MALFUNCTION INDICATOR LIGHT. 1) Turn the ignition switch to OFF. 2) Check the delivery (test) mode connector is disconnected. 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(H4DOTC)(diag)-69, MALFUNCTION INDICATOR LIGHT DOES NOT COME ON, Malfunction Indicator Light.>
2 CHECK HARNESS BETWEEN ECM AND DELIVERY (TEST) MODE CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Connect the delivery (test) mode connector. 4) Measure the resistance of harness between ECM connectors. Connector & terminal (B136) No. 34 — (B136) No. 4:	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 connector • Poor contact of each connector between ECM connector
3 CHECK FOR POOR CONTACT. Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Replace the ECM. <Ref. to FU(STI)-59, Engine Control Module (ECM).> <Ref. to FU(w/o STI)-57, Engine Control Module (ECM).>

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

F: MALFUNCTION INDICATOR LIGHT REMAINS BLINKING

DIAGNOSIS:

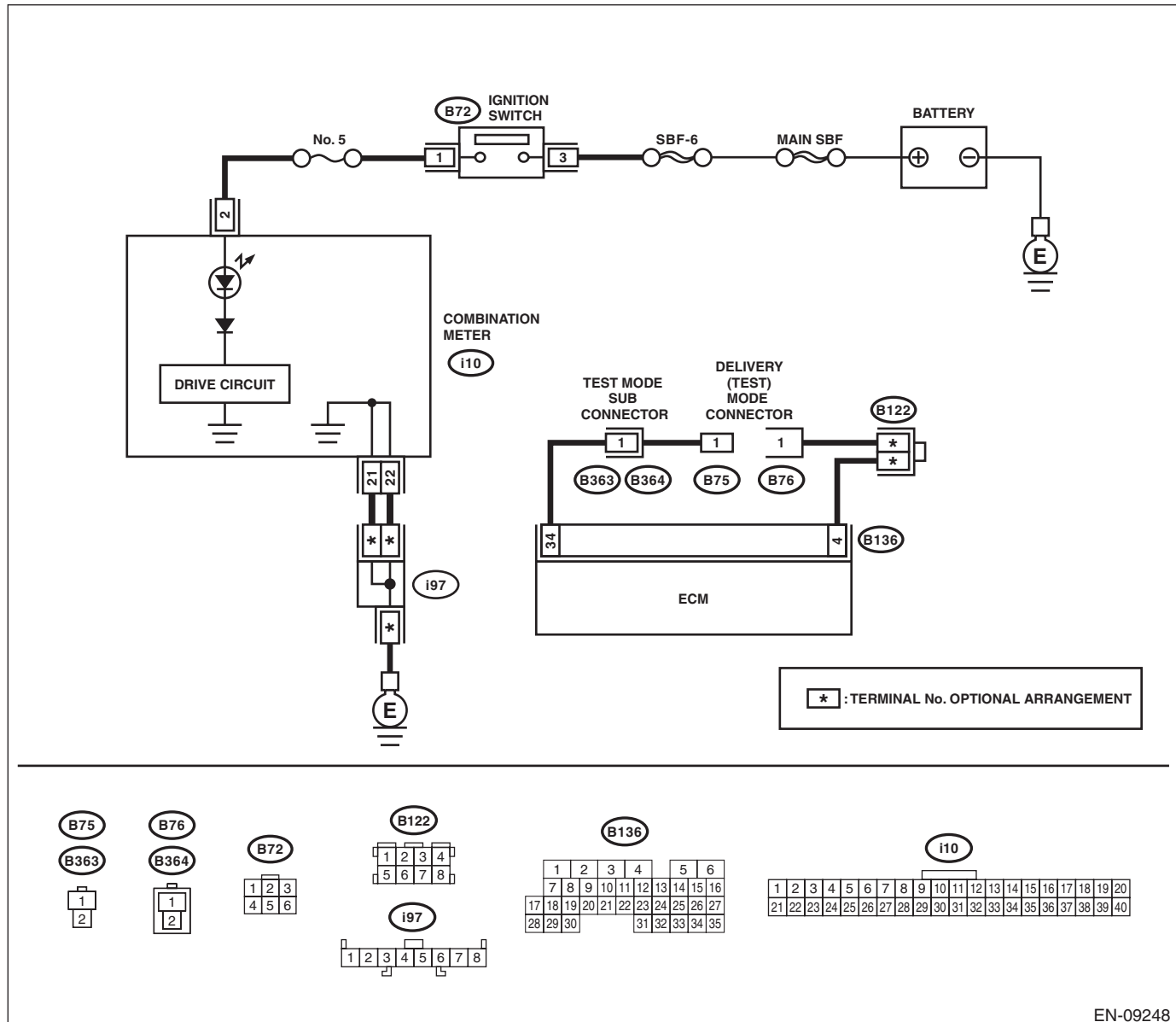
The delivery (test) mode connector circuit is short-circuited to ground.

TROUBLE SYMPTOM:

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

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



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Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK DELIVERY (TEST) MODE CONNECTOR. 1) Check the delivery (test) mode connector is disconnected. 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 at a cycle of 3 Hz when delivery (test) mode connector is connected.
2 CHECK HARNESS BETWEEN ECM AND DELIVERY (TEST) MODE CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B136) No. 34 — Chassis ground:	Is the resistance 1 MΩ or more?	Replace the ECM. <Ref. to FU(STI)-59, Engine Control Module (ECM).> <Ref. to FU(w/o STI)-57, Engine Control Module (ECM).>	Repair the short circuit to ground in harness between ECM connector and delivery (test) mode connector.

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

17.Diagnostics for Engine Starting Failure

A: PROCEDURE

1. Check of the fuel amount
↓
2. Inspection of starter motor circuit <Ref. to EN(H4DOTC)(diag)-75, STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
3. Inspection of ECM power supply and ground line <Ref. to EN(H4DOTC)(diag)-78, 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(H4DOTC)(diag)-80, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>
↓
5. Inspection of fuel pump circuit <Ref. to EN(H4DOTC)(diag)-82, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
6. Inspection of fuel injector circuit <Ref. to EN(H4DOTC)(diag)-83, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

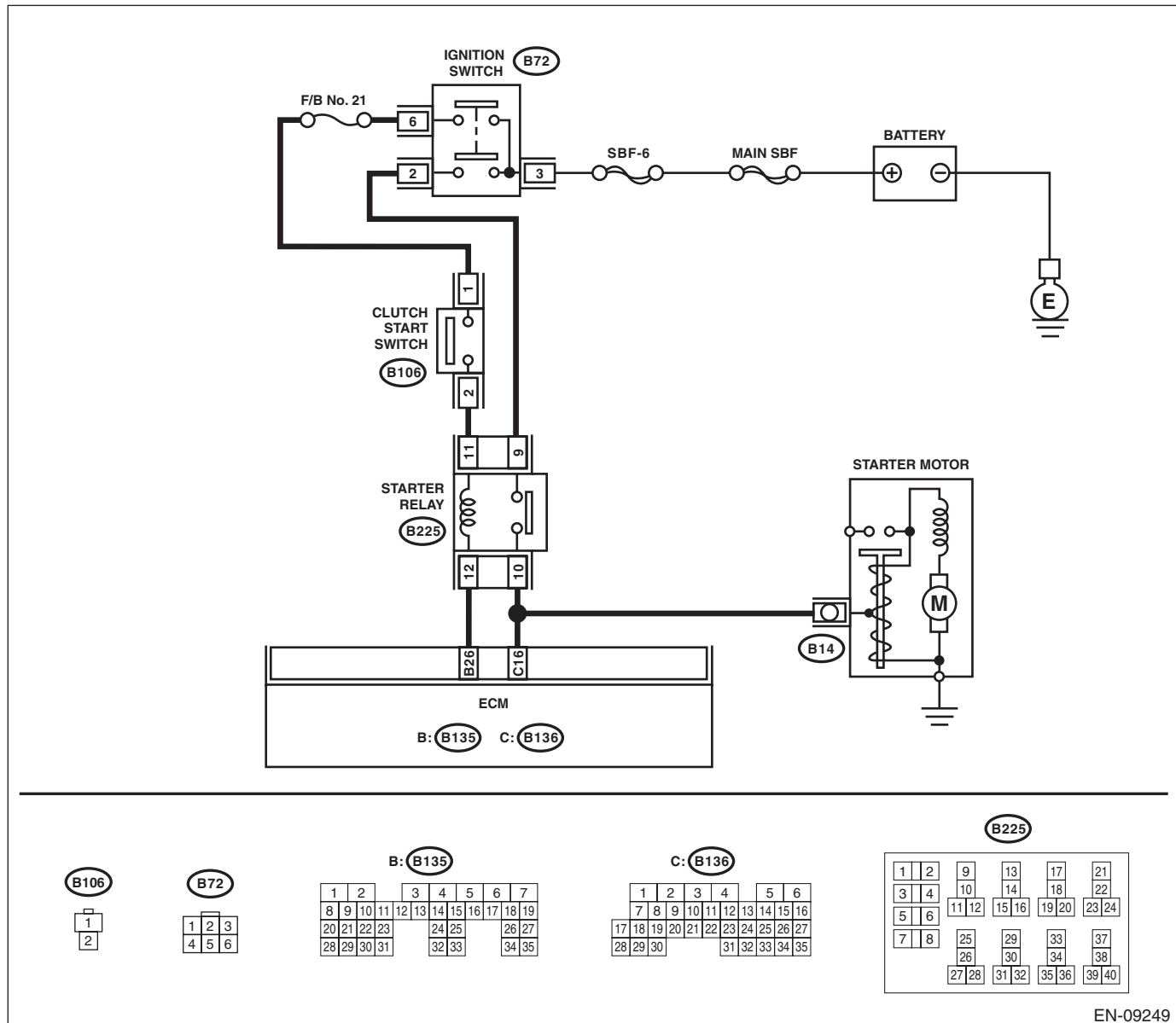
B: STARTER MOTOR CIRCUIT

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09249

Step	Check	Yes	No
1	CHECK BATTERY. Check the battery. <Ref. to SC(STI)-27, Battery.>	Go to step 2.	Charge or replace the battery. <Ref. to SC(STI)-27, Battery.>
2	CHECK OPERATION OF STARTER MOTOR.	Go to step 3.	Go to step 4.

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
3 CHECK DTC.	Is DTC displayed? <Ref. to EN(H4DOTC)(diag)-48, OPERATION, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Check ignition control system. <Ref. to EN(H4DOTC)(diag)-80, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>
4 CHECK INPUT SIGNAL FOR STARTER MOTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from starter motor. 3) Depress the clutch pedal. 4) Turn the ignition switch to START. 5) Measure the voltage between the starter motor connector and the engine ground. Connector & terminal (B14) No. 1 (+) — Engine ground (-):	Is the voltage 10 V or more?	Check the starter motor. <Ref. to SC(STI)-8, Starter.>	Go to step 5.
5 CHECK INPUT SIGNAL FOR STARTER MOTOR. 1) Depress the clutch pedal. 2) Turn the ignition switch to START. 3) Measure the voltage between starter relay connector and chassis ground. Connector & terminal (B225) No. 10 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the open circuit of the harness between starter relay connector and starter motor.	Go to step 6.
6 CHECK HARNESS BETWEEN BATTERY AND IGNITION SWITCH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ignition switch. 3) Measure the voltage between ignition switch connector and chassis ground. Connector & terminal (B72) No. 3 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 7.	Repair the power supply circuit.
7 CHECK IGNITION SWITCH. Measure the resistance between ignition switch terminals after turning the ignition switch to START position. Terminals No. 2 — No. 3: No. 6 — No. 3:	Is the resistance less than 1 Ω ?	Go to step 8.	Replace the ignition switch. <Ref. to SL-42, REPLACEMENT, Ignition Key Lock.>
8 CHECK INPUT VOLTAGE OF CLUTCH START SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the clutch start switch connector. 3) Connect the connector to ignition switch. 4) Turn the ignition switch to START. 5) Measure the voltage between the clutch start switch connector and chassis ground. Connector & terminal (B106) No. 1 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 9.	Check the following item and repair if necessary. • Blown out of fuse (F/B No. 21) • Open or short circuit to ground in harness between ignition switch connector and clutch start switch connector

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
9 CHECK HARNESS BETWEEN STARTER RELAY CONNECTOR AND CLUTCH START SWITCH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Remove the starter relay. 3) Measure the resistance of harness between starter relay connector and clutch start switch connector. Connector & terminal (B225) No. 11 — (B106) No. 2:	Is the resistance less than 1 Ω ?	Go to step 10.	Repair the open circuit in harness between starter relay connector and clutch start switch connector.
10 CHECK INPUT VOLTAGE OF STARTER RELAY. 1) Connect the connector to the clutch start switch. 2) Depress the clutch pedal. 3) Turn the ignition switch to START. 4) Measure the voltage between starter relay connector and chassis ground. Connector & terminal (B225) No. 11 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 11.	Replace the clutch start switch. <Ref. to CL-33, Clutch Switch.>
11 CHECK INPUT VOLTAGE OF STARTER RELAY. 1) Turn the ignition switch to START. 2) Measure the voltage between starter relay connector and chassis ground. Connector & terminal (B225) No. 9 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 12.	Repair the open circuit of harness between starter relay connector and ignition switch connector.
12 CHECK STARTER RELAY. 1) Connect the battery to starter relay terminals No. 11 and No. 12. 2) Measure the resistance between starter relay terminals. Terminals No. 9 — No. 10:	Is the resistance less than 1 Ω ?	Go to step 13.	Replace the starter relay.
13 CHECK HARNESS BETWEEN ECM AND STARTER RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and starter relay connector. Connector & terminal (B136) No. 16 — (B225) No. 10:	Is the resistance less than 1 Ω ?	Go to step 14.	Repair the open circuit of harness between ECM connector and starter relay connector.
14 CHECK ECM INPUT VOLTAGE. 1) Install the starter relay. 2) Depress the clutch pedal. 3) Turn the ignition switch to START. 4) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 26 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Check the ECM power supply and ground line. <Ref. to EN(H4DOTC)(diag)-78, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>	Repair the open circuit of harness between ECM connector and starter relay connector.

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

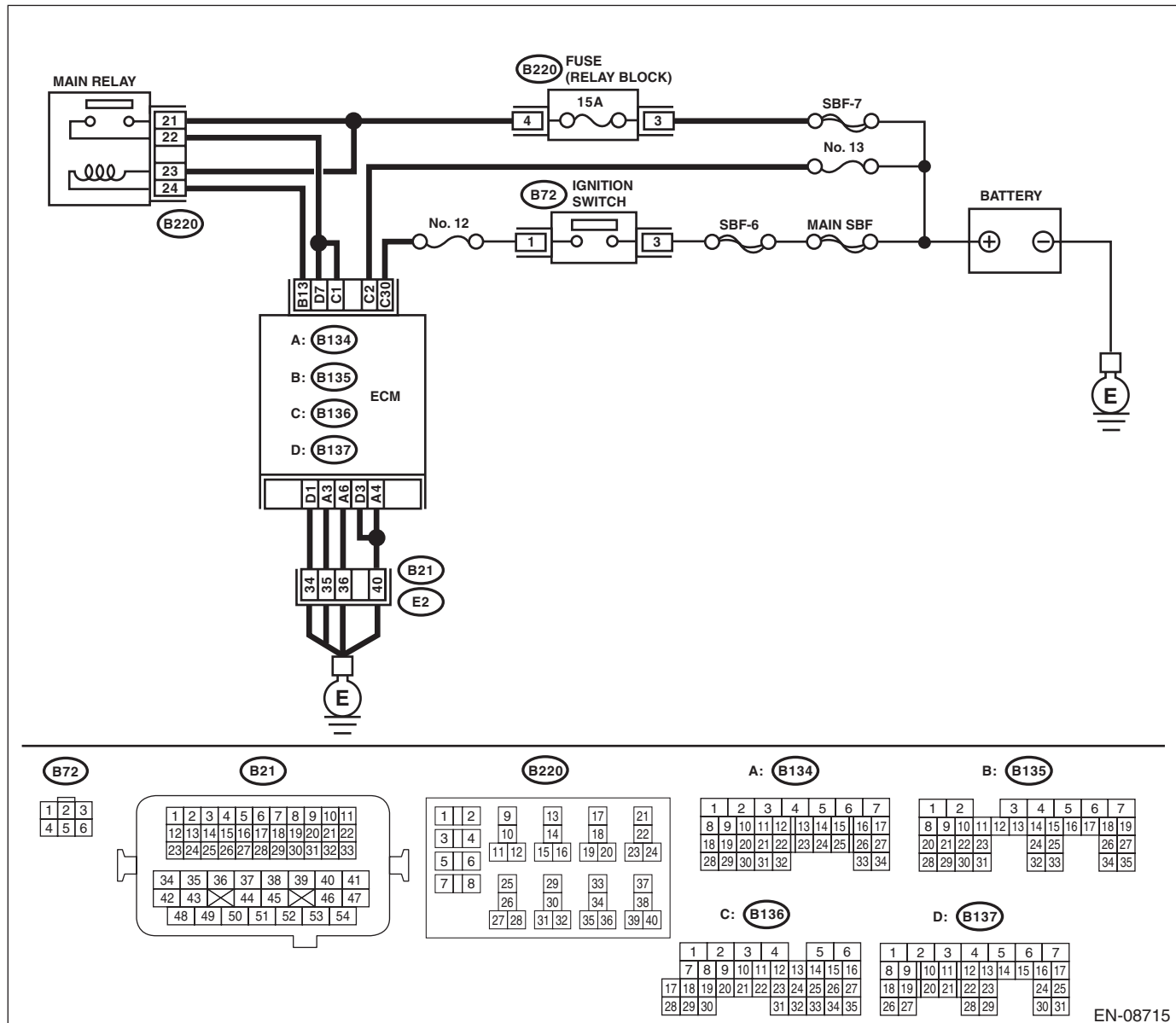
C: CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM)

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08715

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. 23 and No. 24. 4) Measure the resistance between main relay terminals. Terminals No. 21 — No. 22:	Is the resistance less than 1 Ω ?	Go to step 2.	Replace the main relay. <Ref. to FU(STI)-60, Main Relay.> <Ref. to FU(w/o STI)-58, Main Relay.>
2 CHECK GROUND CIRCUIT FOR ECM. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and chassis ground. Connector & terminal (B134) No. 3 — Chassis ground: (B134) No. 4 — Chassis ground: (B134) No. 6 — Chassis ground: (B137) No. 1 — Chassis ground: (B137) No. 3 — 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 of harness between ECM connector and engine ground • Poor contact of coupling connector
3 CHECK INPUT VOLTAGE 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. 30 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 4.	Repair the open or ground short circuit of harness of power supply circuit.
4 CHECK INPUT VOLTAGE OF MAIN RELAY. Measure the voltage between main relay connector and chassis ground. Connector & terminal (B220) No. 21 (+) — Chassis ground (-): (B220) No. 23 (+) — Chassis ground (-):	Is the voltage 10 V or more?	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 OFF. 2) Install the main relay. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 13 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 6.	Repair the open or ground short circuit of harness between ECM connector and main relay connector.
6 CHECK INPUT VOLTAGE OF ECM. 1) Turn the ignition switch to OFF. 2) Connect the connector to ECM. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 1 (+) — Chassis ground (-): (B137) No. 7 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Check ignition control system. <Ref. to EN(H4DOTC)(diag)-80, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and main relay connector • Poor contact of main relay connector • Poor contact of ECM connector

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

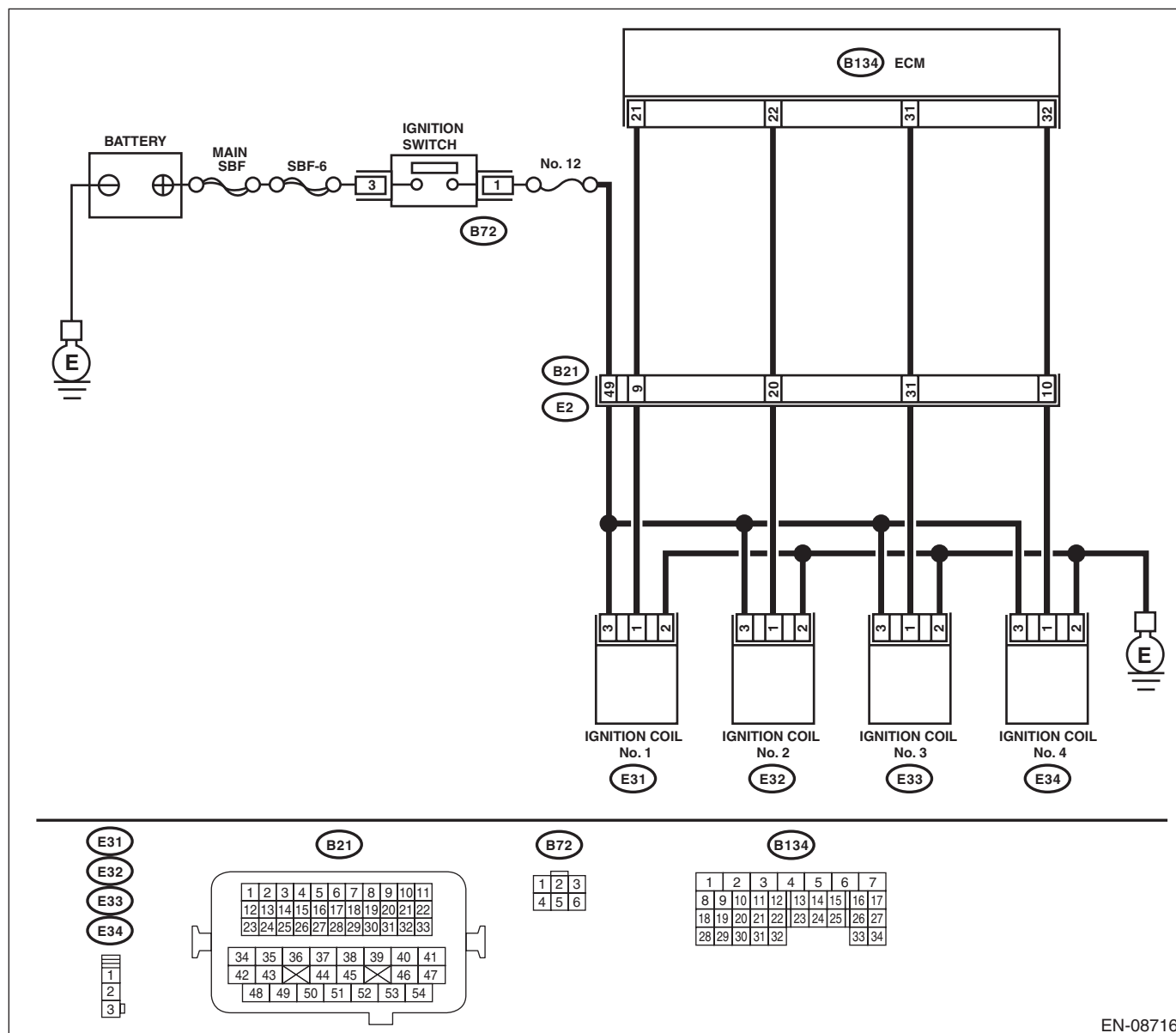
D: IGNITION CONTROL SYSTEM

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08716

Step	Check	Yes	No
1	CHECK SPARK PLUG CONDITION. 1) Remove the spark plug. <Ref. to IG(STI)-4, REMOVAL, Spark Plug.> <Ref. to IG(w/o STI)-5, REMOVAL, Spark Plug.> 2) Check the spark plug condition. <Ref. to IG(STI)-5, INSPECTION, Spark Plug.> <Ref. to IG(w/o STI)-6, INSPECTION, Spark Plug.>	Go to step 2.	Replace the spark plug. <Ref. to IG(STI)-4, Spark Plug.> <Ref. to IG(w/o STI)-5, Spark Plug.>

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK IGNITION SYSTEM FOR SPARKS. 1) Connect the spark plug to ignition coil. 2) Release the fuel pressure. <Ref. to FU(STI)-67, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.> <Ref. to FU(w/o STI)-65, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.> 3) Contact the spark plug thread portion to 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(H4DOTC)(diag)-82, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step 3.
3 CHECK IGNITION COIL POWER SUPPLY CIRCUIT. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ignition coil. 3) Turn the ignition switch to ON. 4) Measure the power supply voltage between ignition coil connector and engine ground. Connector & terminal <i>(E31) No. 3 (+) — Engine ground (-):</i> <i>(E32) No. 3 (+) — Engine ground (-):</i> <i>(E33) No. 3 (+) — Engine ground (-):</i> <i>(E34) No. 3 (+) — Engine ground (-):</i>	Is the voltage 10 V or more?	Go to step 4.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in power supply circuit • Poor contact of coupling connector • Blown out of fuse
4 CHECK HARNESS OF IGNITION COIL GROUND CIRCUIT. 1) Turn the ignition switch to OFF. 2) Measure the resistance between ignition coil connector and engine ground. Connector & terminal <i>(E31) No. 2 — Engine ground:</i> <i>(E32) No. 2 — Engine ground:</i> <i>(E33) No. 2 — Engine ground:</i> <i>(E34) No. 2 — Engine ground:</i>	Is the resistance less than 1 Ω ?	Go to step 5.	Repair the open circuit in harness between ignition coil connector and engine ground.
5 CHECK HARNESS BETWEEN ECM AND IGNITION COIL CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and ignition coil. 3) Measure the resistance of harness between ECM connector and ignition coil connector. Connector & terminal <i>(B134) No. 21 — (E31) No. 1:</i> <i>(B134) No. 22 — (E32) No. 1:</i> <i>(B134) No. 31 — (E33) No. 1:</i> <i>(B134) No. 32 — (E34) No. 1:</i>	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and the ignition coil connector • Poor contact of coupling connector
6 CHECK HARNESS BETWEEN ECM AND IGNITION COIL CONNECTOR. Measure the resistance of harness between ECM connector and engine ground. Connector & terminal <i>(B134) No. 21 — Engine ground:</i> <i>(B134) No. 22 — Engine ground:</i> <i>(B134) No. 31 — Engine ground:</i> <i>(B134) No. 32 — Engine ground:</i>	Is the resistance 1 M Ω or more?	Go to step 7.	Repair the ground short circuit of harness between ECM connector and ignition coil connector.

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK FOR POOR CONTACT. Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Replace the ignition coil. <Ref. to IG(STI)-7, Ignition Coil.> <Ref. to IG(w/o STI)-8, Ignition Coil.>

E: FUEL PUMP CIRCUIT

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK OPERATING SOUND OF FUEL PUMP. Make sure that the fuel pump operates for two seconds when turning the ignition switch to ON. NOTE: Fuel pump operation can be executed using the Subaru Select Monitor. For the procedures, refer to "Compulsory Valve Operation Check Mode". <Ref. to EN(H4DOTC)(diag)-64, Compulsory Valve Operation Check Mode.>	Does the fuel pump emit operating sound?	Check the fuel injector circuit. <Ref. to EN(H4DOTC)(diag)-83, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>	Display the DTC. <Ref. to EN(H4DOTC)(diag)-48, OPERATION, Read Diagnostic Trouble Code (DTC).>

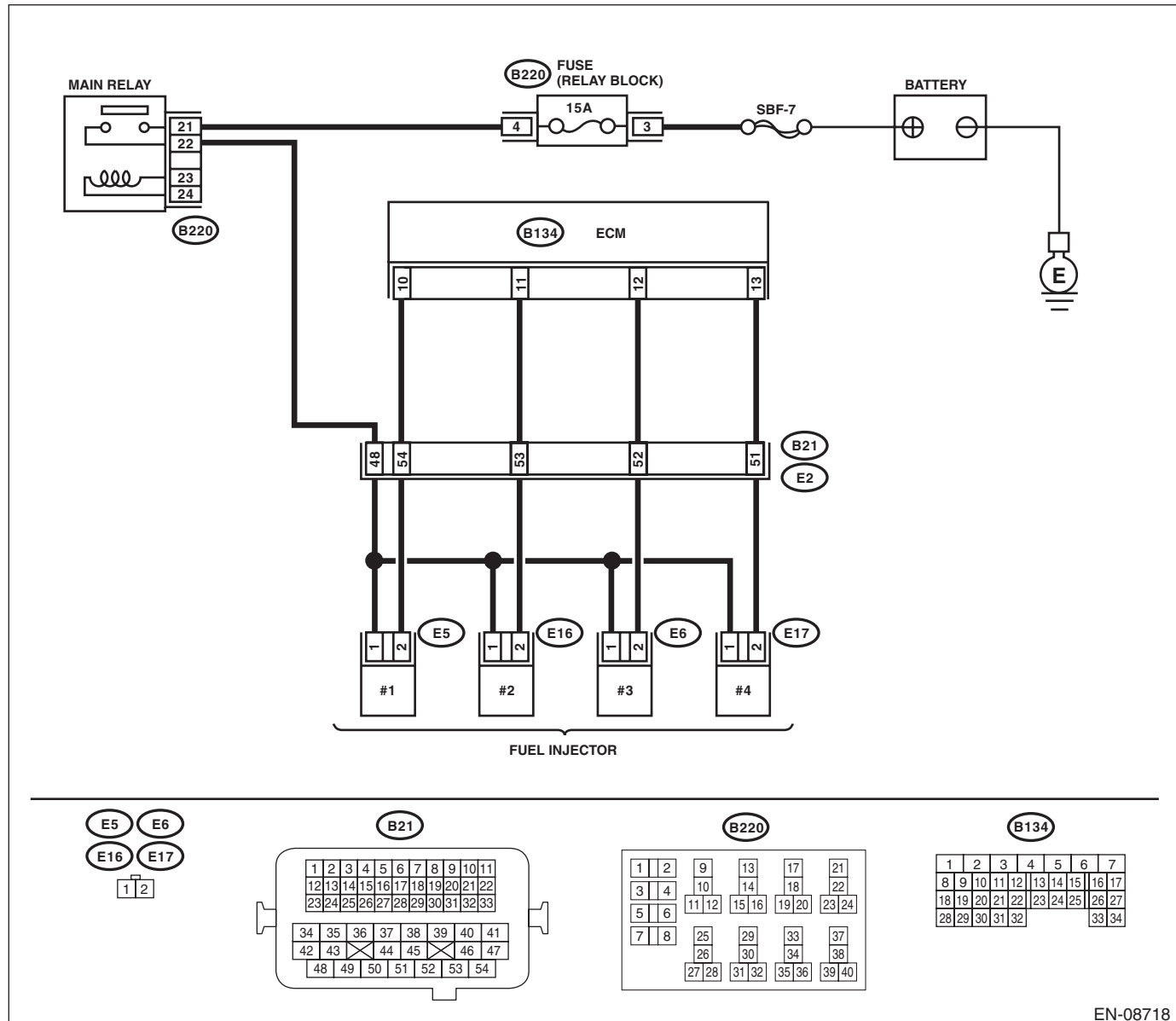
F: FUEL INJECTOR CIRCUIT

CAUTION:

- Check or repair only faulty parts.
- After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



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 injector emit operating sound?	Check the fuel pressure. <Ref. to ME(STI)-25, INSPECTION, Fuel Pressure.> <Ref. to ME(w/o STI)-24, 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 connector and the engine ground. 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 voltage 10 V or more?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between main relay connector and fuel injector connector • Poor contact of main relay connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and fuel injector connector. Connector & terminal <i>#1 (B134) No. 10 — (E5) No. 2:</i> <i>#2 (B134) No. 11 — (E16) No. 2:</i> <i>#3 (B134) No. 12 — (E6) No. 2:</i> <i>#4 (B134) No. 13 — (E17) No. 2:</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 in harness between ECM connector 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 connector and chassis ground. Connector & terminal <i>#1 (B134) No. 10 — Chassis ground:</i> <i>#2 (B134) No. 11 — Chassis ground:</i> <i>#3 (B134) No. 12 — Chassis ground:</i> <i>#4 (B134) No. 13 — Chassis ground:</i>	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
5 CHECK EACH FUEL INJECTOR. Measure the resistance between each fuel injector terminals. Terminals <i>No. 1 — No. 2:</i>	Is the resistance 5 — 20 Ω ?	Go to step 6.	Replace the faulty fuel injector. <Ref. to FU(STI)-45, Fuel Injector.> <Ref. to FU(w/o STI)-45, Fuel Injector.>
6 CHECK FOR POOR CONTACT. Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Inspection using "General Diagnostic Table". <Ref. to EN(H4DOTC)(diag)-471, INSPECTION, General Diagnostic Table.>

18. Diagnostic Procedure for Subaru Select Monitor Communication

A: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

DIAGNOSIS:

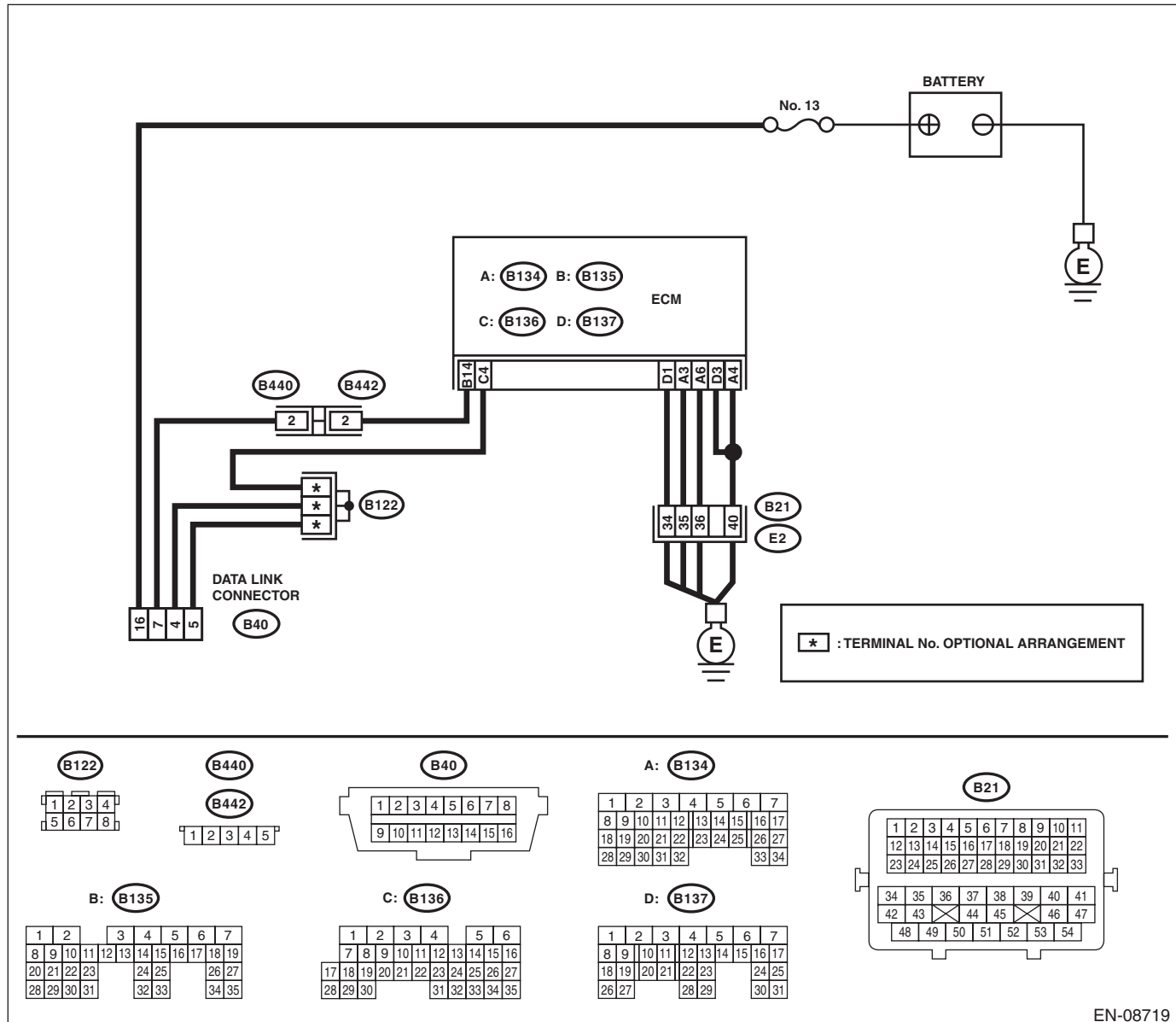
Open or short circuit in data link connector

TROUBLE SYMPTOM:

Subaru Select Monitor communication failure

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08719

Step	Check	Yes	No
1 CHECK POWER SUPPLY CIRCUIT. Connect the SDI (Subaru Diagnosis Interface) or general scan tool to data link connector.	Does SDI or general scan tool turn ON?	Go to step 4.	Go to step 2.

Diagnostic Procedure for Subaru Select Monitor Communication

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK POWER SUPPLY CIRCUIT. Measure the voltage between data link connector and chassis ground. Connector & terminal (B40) No. 16 (+) — Chassis ground (—):	Is the voltage 10 V or more?	Go to step 3.	Repair the power supply circuit. NOTE: In this case, repair the following item: • Open or ground short circuit of harness between battery and data link connector • Blown out of fuse (M/B No. 13)
3 CHECK HARNESS BETWEEN DATA LINK CONNECTOR AND CHASSIS GROUND. 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between data link connector and chassis ground. Connector & terminal (B40) No. 4 — Chassis ground: (B40) No. 5 — Chassis ground:	Is the resistance less than 5 Ω ?	Repair the poor contact of data link connector.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and data link connector • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN ECM AND DATA LINK CONNECTOR. 1) Disconnect the connectors from ECM, DCCD CM (6MT model only), VDC CM, airbag CM, impact sensor, TPMS & keyless entry CM, and body integrated unit. CAUTION: When disconnecting the connector from airbag CM, always follow the precautions on AB section. <Ref. to AB-5, CAUTION, General Description.> 2) Measure the resistance of harness between ECM connector and data link connector. Connector & terminal (B135) No. 14 — (B40) No. 7:	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 connector and data link connector • Poor contact of coupling connector
5 CHECK HARNESS BETWEEN ECM AND DATA LINK CONNECTOR. Measure the resistance between data link connector and chassis ground. Connector & terminal (B40) No. 7 — Chassis ground:	Is the resistance 1 M Ω or more?	Repair the poor contact of the ECM or data link connector.	Repair the short circuit to ground in harness between ECM connector and data link connector.

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

19. List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Note
B1570	Antenna	<Ref. to IM(diag)-15, DTC B1570 ANTENNA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1571	Reference Code Incompatibility	<Ref. to IM(diag)-17, DTC B1571 REFERENCE CODE INCOMPATIBILITY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1572	IMM Circuit Failure (Except Antenna Circuit)	<Ref. to IM(diag)-18, DTC B1572 IMM CIRCUIT FAILURE (EXCEPT ANTENNA CIRCUIT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1574	Key Communication Failure	<Ref. to IM(diag)-21, DTC B1574 KEY COMMUNICATION FAILURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1575	Incorrect Immobilizer Key	<Ref. to IM(diag)-22, DTC B1575 INCORRECT IMMOBILIZER KEY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1576	EGI Control Module EEPROM	<Ref. to IM(diag)-23, DTC B1576 EGI CONTROL MODULE EEPROM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1577	IMM Control Module EEPROM	<Ref. to IM(diag)-24, DTC B1577 IMM CONTROL MODULE EEPROM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1578	Meter Failure	<Ref. to IM(diag)-25, DTC B1578 METER FAILURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0011	Intake Camshaft Position - Timing Over-Advanced or System Performance (Bank 1)	<Ref. to EN(H4DOTC)(diag)-96, DTC P0011 INTAKE CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0014	Exhaust AVCS System 1 (Range/Performance)	<Ref. to EN(H4DOTC)(diag)-97, DTC P0014 EXHAUST AVCS SYSTEM 1 (RANGE/PERFORMANCE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0016	Crankshaft Position - Camshaft Position Correlation (Bank1)	<Ref. to EN(H4DOTC)(diag)-98, DTC P0016 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION (BANK1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0017	Crank and Cam Timing B System Failure (Bank 1)	<Ref. to EN(H4DOTC)(diag)-99, DTC P0017 CRANK AND CAM TIMING B SYSTEM FAILURE (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0018	Crankshaft Position - Camshaft Position Correlation (Bank2)	<Ref. to EN(H4DOTC)(diag)-100, DTC P0018 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION (BANK2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0019	Crank and Cam Timing B System Failure (Bank 2)	<Ref. to EN(H4DOTC)(diag)-101, DTC P0019 CRANK AND CAM TIMING B SYSTEM FAILURE (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0021	Intake Camshaft Position - Timing Over-Advanced or System Performance (Bank 2)	<Ref. to EN(H4DOTC)(diag)-102, DTC P0021 INTAKE CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0024	Exhaust AVCS System 2 (Range/Performance)	<Ref. to EN(H4DOTC)(diag)-103, DTC P0024 EXHAUST AVCS SYSTEM 2 (RANGE/PERFORMANCE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0030	HO2S Heater Control Circuit (Bank 1 Sensor 1)	<Ref. to EN(H4DOTC)(diag)-104, 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(H4DOTC)(diag)-107, 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(H4DOTC)(diag)-110, 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(H4DOTC)(diag)-113, 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(H4DOTC)(diag)-116, DTC P0038 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Note
P0068	MAP/MAF - Throttle Position Correlation	<Ref. to EN(H4DOTC)(diag)-119, DTC P0068 MAP/MAF - THROTTLE POSITION CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0101	Mass or Volume Air Flow Circuit Range/Performance	<Ref. to EN(H4DOTC)(diag)-120, 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(H4DOTC)(diag)-121, 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(H4DOTC)(diag)-124, 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(H4DOTC)(diag)-126, 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(H4DOTC)(diag)-129, DTC P0108 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0111	Intake Air Temperature Sensor Range/Performance Problem	<Ref. to EN(H4DOTC)(diag)-132, DTC P0111 INTAKE AIR TEMPERATURE SENSOR RANGE/PERFORMANCE PROBLEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0112	Intake Air Temperature Sensor 1 Circuit Low	<Ref. to EN(H4DOTC)(diag)-133, 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(H4DOTC)(diag)-135, DTC P0113 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0116	Engine Coolant Temp. Sensor Circuit Range/Performance	<Ref. to EN(H4DOTC)(diag)-137, DTC P0116 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0117	Engine Coolant Temperature Circuit Low	<Ref. to EN(H4DOTC)(diag)-138, DTC P0117 ENGINE COOLANT TEMPERATURE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0118	Engine Coolant Temperature Circuit High	<Ref. to EN(H4DOTC)(diag)-140, 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(H4DOTC)(diag)-142, 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(H4DOTC)(diag)-145, 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(H4DOTC)(diag)-148, DTC P0125 INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0128	Coolant Thermostat (Engine Coolant Temperature Below Thermostat Regulating Temperature)	<Ref. to EN(H4DOTC)(diag)-149, 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(H4DOTC)(diag)-150, 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(H4DOTC)(diag)-153, DTC P0132 O2 SENSOR CIRCUIT HIGH VOLTAGE (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(H4DOTC)(diag)-155, 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(H4DOTC)(diag)-158, DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

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DTC	Item	Note
P0138	O2 Sensor Circuit High Voltage (Bank 1 Sensor 2)	<Ref. to EN(H4DOTC)(diag)-161, DTC P0138 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P013A	O2 Sensor Slow Response - Rich to Lean (Bank 1 Sensor 2)	<Ref. to EN(H4DOTC)(diag)-164, DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P013B	O2 Sensor Slow Response - Lean to Rich (Bank 1 Sensor 2)	<Ref. to EN(H4DOTC)(diag)-166, DTC P013B O2 SENSOR SLOW RESPONSE - LEAN TO RICH (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P013E	O2 Sensor Delayed Response - Rich to Lean (Bank 1 Sensor 2)	<Ref. to EN(H4DOTC)(diag)-166, DTC P013E O2 SENSOR DELAYED RESPONSE - RICH TO LEAN (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P013F	O2 Sensor Delayed Response - Lean to Rich (Bank 1 Sensor 2)	<Ref. to EN(H4DOTC)(diag)-166, DTC P013F O2 SENSOR DELAYED RESPONSE - LEAN TO RICH (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0140	O2 Sensor Circuit No Activity Detected (Bank1 Sensor2)	<Ref. to EN(H4DOTC)(diag)-167, DTC P0140 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK1 SENSOR2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0141	O2 Sensor Heater Circuit (Bank1 Sensor2)	<Ref. to EN(H4DOTC)(diag)-169, DTC P0141 O2 SENSOR HEATER CIRCUIT (BANK1 SENSOR2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P014C	O2 Sensor Slow Response - Rich to Lean (Bank 1 Sensor 1)	<Ref. to EN(H4DOTC)(diag)-170, DTC P014C O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P014D	O2 Sensor Slow Response - Lean to Rich (Bank 1 Sensor 1)	<Ref. to EN(H4DOTC)(diag)-170, DTC P014D O2 SENSOR SLOW RESPONSE - LEAN TO RICH (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P015A	O2 Sensor Delayed Response - Rich to Lean (Bank 1 Sensor 1)	<Ref. to EN(H4DOTC)(diag)-170, DTC P015A O2 SENSOR DELAYED RESPONSE - RICH TO LEAN (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P015B	O2 Sensor Delayed Response - Lean to Rich (Bank 1 Sensor 1)	<Ref. to EN(H4DOTC)(diag)-170, DTC P015B O2 SENSOR DELAYED RESPONSE - LEAN TO RICH (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0171	System Too Lean (Bank 1)	<Ref. to EN(H4DOTC)(diag)-170, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0172	System Too Rich (Bank 1)	<Ref. to EN(H4DOTC)(diag)-171, DTC P0172 SYSTEM TOO RICH (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0201	Cylinder 1 - Injector Circuit	<Ref. to EN(H4DOTC)(diag)-174, DTC P0201 INJECTOR #1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0202	Cylinder 2 - Injector Circuit	<Ref. to EN(H4DOTC)(diag)-176, DTC P0202 INJECTOR #2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0203	Cylinder 3 - Injector Circuit	<Ref. to EN(H4DOTC)(diag)-176, DTC P0203 INJECTOR #3, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0204	Cylinder 4 - Injector Circuit	<Ref. to EN(H4DOTC)(diag)-176, DTC P0204 INJECTOR #4, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0222	Throttle/Pedal Position Sensor/ Switch "B" Circuit Low	<Ref. to EN(H4DOTC)(diag)-177, 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(H4DOTC)(diag)-180, DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0230	Fuel Pump Primary Circuit	<Ref. to EN(H4DOTC)(diag)-183, DTC P0230 FUEL PUMP PRIMARY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0244	Turbo/Super Charger Waste-gate Solenoid "A" Range/Performance	<Ref. to EN(H4DOTC)(diag)-186, DTC P0244 TURBO/SUPER CHARGER WASTE-GATE SOLENOID "A" RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

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DTC	Item	Note
P0245	Turbo/Super Charger Waste-gate Solenoid "A" Low	<Ref. to EN(H4DOTC)(diag)-187, DTC P0245 TURBO/SUPER CHARGER WASTE-GATE SOLENOID "A" LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0246	Turbo/Super Charger Waste-gate Solenoid "A" High	<Ref. to EN(H4DOTC)(diag)-190, DTC P0246 TURBO/SUPER CHARGER WASTE-GATE SOLENOID "A" HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0300	Random/Multiple Cylinder Misfire Detected	<Ref. to EN(H4DOTC)(diag)-192, DTC P0300 RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0301	Cylinder 1 Misfire Detected	<Ref. to EN(H4DOTC)(diag)-197, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0302	Cylinder 2 Misfire Detected	<Ref. to EN(H4DOTC)(diag)-197, DTC P0302 CYLINDER 2 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0303	Cylinder 3 Misfire Detected	<Ref. to EN(H4DOTC)(diag)-197, DTC P0303 CYLINDER 3 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0304	Cylinder 4 Misfire Detected	<Ref. to EN(H4DOTC)(diag)-198, 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(H4DOTC)(diag)-204, 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(H4DOTC)(diag)-206, 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(H4DOTC)(diag)-208, 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(H4DOTC)(diag)-210, 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(H4DOTC)(diag)-211, 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(H4DOTC)(diag)-213, DTC P0341 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 1 OR SINGLE SENSOR), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0345	Camshaft Position Sensor "A" Circuit (Bank 2)	<Ref. to EN(H4DOTC)(diag)-214, DTC P0345 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0346	Camshaft Position Sensor "A" Circuit Range/Performance (Bank 2)	<Ref. to EN(H4DOTC)(diag)-216, DTC P0346 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0351	Ignition Coil A Primary/Secondary Circuit	<Ref. to EN(H4DOTC)(diag)-217, DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0352	Ignition Coil B Primary/Secondary Circuit	<Ref. to EN(H4DOTC)(diag)-219, DTC P0352 IGNITION COIL B PRIMARY/SECONDARY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0353	Ignition Coil C Primary/Secondary Circuit	<Ref. to EN(H4DOTC)(diag)-219, DTC P0353 IGNITION COIL C PRIMARY/SECONDARY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0354	Ignition Coil D Primary/Secondary Circuit	<Ref. to EN(H4DOTC)(diag)-219, DTC P0354 IGNITION COIL D PRIMARY/SECONDARY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0365	Camshaft Position Sensor "B" Circuit (Bank 1)	<Ref. to EN(H4DOTC)(diag)-220, DTC P0365 CAMSHAFT POSITION SENSOR "B" CIRCUIT (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0366	Camshaft Position Sensor B Circuit Range/Performance (Bank 1)	<Ref. to EN(H4DOTC)(diag)-222, DTC P0366 CAMSHAFT POSITION SENSOR B CIRCUIT RANGE/PERFORMANCE (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0390	Camshaft Position Sensor "B" Circuit (Bank 2)	<Ref. to EN(H4DOTC)(diag)-223, DTC P0390 CAMSHAFT POSITION SENSOR "B" CIRCUIT (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0391	Camshaft Position Sensor B Circuit Range/Performance (Bank 2)	<Ref. to EN(H4DOTC)(diag)-225, DTC P0391 CAMSHAFT POSITION SENSOR B CIRCUIT RANGE/PERFORMANCE (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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DTC	Item	Note
P0410	Secondary Air Injection System	<Ref. to EN(H4DOTC)(diag)-226, DTC P0410 SECONDARY AIR INJECTION SYSTEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0411	Secondary Air Injection System Incorrect Flow Detected	<Ref. to EN(H4DOTC)(diag)-232, DTC P0411 SECONDARY AIR INJECTION SYSTEM INCORRECT FLOW DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0413	Secondary Air Injection System Switching Valve "A" Circuit Open	<Ref. to EN(H4DOTC)(diag)-233, DTC P0413 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE "A" CIRCUIT OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0414	Secondary Air Injection System Switching Valve "A" Circuit Shorted	<Ref. to EN(H4DOTC)(diag)-237, DTC P0414 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE "A" CIRCUIT SHORTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0416	Secondary Air Injection System Switching Valve "B" Circuit Open	<Ref. to EN(H4DOTC)(diag)-241, DTC P0416 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE "B" CIRCUIT OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0417	Secondary Air Injection System Switching Valve "B" Circuit Shorted	<Ref. to EN(H4DOTC)(diag)-245, DTC P0417 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE "B" CIRCUIT SHORTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0420	Catalyst System Efficiency Below Threshold (Bank 1)	<Ref. to EN(H4DOTC)(diag)-249, DTC P0420 CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0441	Evaporative Emission Cont. Sys. Incorrect Purge Flow	<Ref. to EN(H4DOTC)(diag)-255, DTC P0441 EVAPORATIVE EMISSION CONT. SYS. INCORRECT PURGE FLOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0451	Evaporative Emission System Pressure Sensor/Switch Range/Performance	<Ref. to EN(H4DOTC)(diag)-256, DTC P0451 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/SWITCH RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0452	Evaporative Emission System Pressure Sensor/Switch Low	<Ref. to EN(H4DOTC)(diag)-257, DTC P0452 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/SWITCH LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0453	Evaporative Emission System Pressure Sensor/Switch High	<Ref. to EN(H4DOTC)(diag)-259, DTC P0453 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/SWITCH HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0455	Evaporative Emission System Leak Detected (Large Leak)	<Ref. to EN(H4DOTC)(diag)-261, DTC P0455 EVAPORATIVE EMISSION SYSTEM LEAK DETECTED (LARGE LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0456	Evaporative Emission Control System Leak Detected (Very Small Leak)	<Ref. to EN(H4DOTC)(diag)-262, DTC P0456 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (VERY SMALL LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0458	Evaporative Emission System Purge Control Valve Circuit Low	<Ref. to EN(H4DOTC)(diag)-263, 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(H4DOTC)(diag)-266, 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(H4DOTC)(diag)-268, 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(H4DOTC)(diag)-268, 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(H4DOTC)(diag)-269, DTC P0463 FUEL LEVEL SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P04AC	Evap System Purge Control Valve "B" Circuit Low	<Ref. to EN(H4DOTC)(diag)-270, DTC P04AC EVAP SYSTEM PURGE CONTROL VALVE "B" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P04AD	Evap System Purge Control Valve "B" Circuit High	<Ref. to EN(H4DOTC)(diag)-273, DTC P04AD EVAP SYSTEM PURGE CONTROL VALVE "B" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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DTC	Item	Note
P04DB	Crankcase Ventilation System Disconnected	<Ref. to EN(H4DOTC)(diag)-275, DTC P04DB CRANKCASE VENTILATION SYSTEM DISCONNECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0500	Vehicle Speed Sensor "A"	<Ref. to EN(H4DOTC)(diag)-277, 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(H4DOTC)(diag)-278, 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(H4DOTC)(diag)-279, DTC P0507 IDLE AIR CONTROL SYSTEM RPM HIGHER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P050A	Cold Start Idle Air Control System Performance	<Ref. to EN(H4DOTC)(diag)-280, DTC P050A COLD START IDLE AIR CONTROL SYSTEM PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P050B	Cold Start Ignition Timing Performance	<Ref. to EN(H4DOTC)(diag)-289, DTC P050B COLD START IGNITION TIMING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0560	System Voltage	<Ref. to EN(H4DOTC)(diag)-290, DTC P0560 SYSTEM VOLTAGE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0604	Internal Control Module Random Access Memory (RAM) Error	<Ref. to EN(H4DOTC)(diag)-292, 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(H4DOTC)(diag)-292, DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0606	Control Module Processor	<Ref. to EN(H4DOTC)(diag)-293, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P060A	Internal Control Module Monitoring Processor Performance	<Ref. to EN(H4DOTC)(diag)-294, DTC P060A INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P060B	Internal Control Module A/D Processing Performance	<Ref. to EN(H4DOTC)(diag)-294, DTC P060B INTERNAL CONTROL MODULE A/D PROCESSING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0616	Starter Relay Circuit Low	<Ref. to EN(H4DOTC)(diag)-295, DTC P0616 STARTER RELAY CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0617	Starter Relay Circuit High	<Ref. to EN(H4DOTC)(diag)-297, DTC P0617 STARTER RELAY CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P062F	Internal Control Module EEPROM Error	<Ref. to EN(H4DOTC)(diag)-298, DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0851	Neutral Switch Input Circuit Low (MT Model)	<Ref. to EN(H4DOTC)(diag)-299, DTC P0851 NEUTRAL SWITCH INPUT CIRCUIT LOW (MT MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0852	Neutral Switch Input Circuit High (MT Model)	<Ref. to EN(H4DOTC)(diag)-301, DTC P0852 NEUTRAL SWITCH INPUT CIRCUIT HIGH (MT MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1160	Return Spring Failure	<Ref. to EN(H4DOTC)(diag)-302, DTC P1160 RETURN SPRING FAILURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1400	Fuel Tank Pressure Control Solenoid Valve Circuit Low	<Ref. to EN(H4DOTC)(diag)-303, DTC P1400 FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1410	Secondary Air Injection System Switching Valve Stuck Open	<Ref. to EN(H4DOTC)(diag)-306, DTC P1410 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1420	Fuel Tank Pressure Control Sol. Valve Circuit High	<Ref. to EN(H4DOTC)(diag)-307, DTC P1420 FUEL TANK PRESSURE CONTROL SOL. VALVE CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1449	Evaporative Emission Cont. Sys. Air Filter Clog	<Ref. to EN(H4DOTC)(diag)-309, DTC P1449 EVAPORATIVE EMISSION CONT. SYS. AIR FILTER CLOG, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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DTC	Item	Note
P1451	Evaporative Emission Cont. Sys.	<Ref. to EN(H4DOTC)(diag)-310, DTC P1451 EVAPORATIVE EMISSION CONT. SYS., Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2004	Intake Manifold Runner Control Stuck Open (Bank 1)	<Ref. to EN(H4DOTC)(diag)-311, DTC P2004 INTAKE MANIFOLD RUNNER CONTROL STUCK OPEN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2005	Intake Manifold Runner Control Stuck Open (Bank 2)	<Ref. to EN(H4DOTC)(diag)-312, DTC P2005 INTAKE MANIFOLD RUNNER CONTROL STUCK OPEN (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2006	Intake Manifold Runner Control Stuck Closed (Bank 1)	<Ref. to EN(H4DOTC)(diag)-313, DTC P2006 INTAKE MANIFOLD RUNNER CONTROL STUCK CLOSED (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2007	Intake Manifold Runner Control Stuck Closed (Bank 2)	<Ref. to EN(H4DOTC)(diag)-314, DTC P2007 INTAKE MANIFOLD RUNNER CONTROL STUCK CLOSED (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2008	Intake Manifold Runner Control Circuit / Open (Bank 1)	<Ref. to EN(H4DOTC)(diag)-315, DTC P2008 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT / OPEN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2009	Intake Manifold Runner Control Circuit Low (Bank 1)	<Ref. to EN(H4DOTC)(diag)-317, DTC P2009 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT LOW (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2011	Intake Manifold Runner Control Circuit / Open (Bank 2)	<Ref. to EN(H4DOTC)(diag)-319, DTC P2011 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT / OPEN (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2012	Intake Manifold Runner Control Circuit Low (Bank 2)	<Ref. to EN(H4DOTC)(diag)-321, DTC P2012 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT LOW (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2016	Tumble Generated Valve Position Sensor 1 Circuit Low	<Ref. to EN(H4DOTC)(diag)-323, DTC P2016 TUMBLE GENERATED VALVE POSITION SENSOR 1 CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2017	Intake Manifold Runner Position Sensor / Switch Circuit High (Bank 1)	<Ref. to EN(H4DOTC)(diag)-327, DTC P2017 TUMBLE GENERATED VALVE POSITION SENSOR 1 CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2021	Tumble Generated Valve Position Sensor 2 Circuit Low	<Ref. to EN(H4DOTC)(diag)-330, DTC P2021 TUMBLE GENERATED VALVE POSITION SENSOR 2 CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2022	Intake Manifold Runner Position Sensor / Switch Circuit High (Bank 2)	<Ref. to EN(H4DOTC)(diag)-334, DTC P2022 TUMBLE GENERATED VALVE POSITION SENSOR 2 CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2088	Intake Camshaft Position Actuator Control Circuit Low (Bank 1)	<Ref. to EN(H4DOTC)(diag)-337, DTC P2088 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2089	Intake Camshaft Position Actuator Control Circuit High (Bank 1)	<Ref. to EN(H4DOTC)(diag)-339, DTC P2089 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2090	Exhaust Camshaft Position Actuator Control Circuit Low (Bank 1)	<Ref. to EN(H4DOTC)(diag)-341, DTC P2090 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2091	Exhaust Camshaft Position Actuator Control Circuit High (Bank 1)	<Ref. to EN(H4DOTC)(diag)-343, DTC P2091 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2092	Intake Camshaft Position Actuator Control Circuit Low (Bank 2)	<Ref. to EN(H4DOTC)(diag)-345, DTC P2092 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2093	Intake Camshaft Position Actuator Control Circuit High (Bank 2)	<Ref. to EN(H4DOTC)(diag)-347, DTC P2093 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Note
P2094	Exhaust Camshaft Position Actuator Control Circuit Low (Bank 2)	<Ref. to EN(H4DOTC)(diag)-349, DTC P2094 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2095	Exhaust Camshaft Position Actuator Control Circuit High (Bank 2)	<Ref. to EN(H4DOTC)(diag)-351, DTC P2095 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2096	Post Catalyst Fuel Trim System Too Lean (Bank 1)	<Ref. to EN(H4DOTC)(diag)-353, 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(H4DOTC)(diag)-362, 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(H4DOTC)(diag)-371, 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(H4DOTC)(diag)-377, 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(H4DOTC)(diag)-379, 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(H4DOTC)(diag)-380, DTC P2109 THROTTLE/PEDAL POSITION SENSOR "A" MINIMUM STOP PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2119	Throttle Actuator Control Throttle Body Range/Performance	<Ref. to EN(H4DOTC)(diag)-380, DTC P2119 THROTTLE ACTUATOR CONTROL THROTTLE BODY RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2122	Throttle/Pedal Position Sensor/Switch "D" Circuit Low Input	<Ref. to EN(H4DOTC)(diag)-381, 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(H4DOTC)(diag)-383, 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(H4DOTC)(diag)-385, 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(H4DOTC)(diag)-387, 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(H4DOTC)(diag)-389, 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(H4DOTC)(diag)-392, DTC P2138 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D"/"E" VOLTAGE CORRELATION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2195	O2 Sensor Signal Biased/Stuck Lean (Bank 1 Sensor 1)	<Ref. to EN(H4DOTC)(diag)-394, DTC P2195 O2 SENSOR SIGNAL BIASED/STUCK LEAN (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2196	O2 Sensor Signal Biased/Stuck Rich (Bank 1 Sensor 1)	<Ref. to EN(H4DOTC)(diag)-397, DTC P2196 O2 SENSOR SIGNAL BIASED/STUCK RICH (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P219A	Bank 1 Air-Fuel Ratio Imbalance	<Ref. to EN(H4DOTC)(diag)-400, DTC P219A BANK 1 AIR-FUEL RATIO IMBALANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2257	Air System Control "A" Circuit Low	<Ref. to EN(H4DOTC)(diag)-414, DTC P2257 AIR SYSTEM CONTROL "A" CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2258	Air System Control "A" Circuit High	<Ref. to EN(H4DOTC)(diag)-418, DTC P2258 AIR SYSTEM CONTROL "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Note
P2401	Evaporative Emission System Leak Detection Pump Control Circuit Low	<Ref. to EN(H4DOTC)(diag)-422, DTC P2401 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2402	Evaporative Emission System Leak Detection Pump Control Circuit High	<Ref. to EN(H4DOTC)(diag)-425, DTC P2402 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2404	Evaporative Emission System Leak Detection Pump Sense Circuit Range/Performance	<Ref. to EN(H4DOTC)(diag)-427, DTC P2404 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP SENSE CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2419	Evaporative Emission System Switching Valve Control Circuit Low	<Ref. to EN(H4DOTC)(diag)-431, DTC P2419 EVAPORATIVE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2420	Evaporative Emission System Switching Valve Control Circuit High	<Ref. to EN(H4DOTC)(diag)-434, DTC P2420 EVAPORATIVE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2431	Secondary Air Injection System Air Flow /Pressure Sensor Circuit Range/Performance	<Ref. to EN(H4DOTC)(diag)-436, DTC P2431 SECONDARY AIR INJECTION SYSTEM AIR FLOW /PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2432	Secondary Air Injection System Air Flow /Pressure Sensor Circuit Low	<Ref. to EN(H4DOTC)(diag)-437, DTC P2432 SECONDARY AIR INJECTION SYSTEM AIR FLOW /PRESSURE SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2433	Secondary Air Injection System Air Flow /Pressure Sensor Circuit High	<Ref. to EN(H4DOTC)(diag)-442, DTC P2433 SECONDARY AIR INJECTION SYSTEM AIR FLOW /PRESSURE SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2440	Secondary Air Injection System Switching Valve Stuck Open (Bank1)	<Ref. to EN(H4DOTC)(diag)-446, DTC P2440 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN (BANK1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2441	Secondary Air Injection System Switching Valve Stuck Closed (Bank1)	<Ref. to EN(H4DOTC)(diag)-452, DTC P2441 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK CLOSED (BANK1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2442	Secondary Air Injection System Switching Valve Stuck Open (Bank2)	<Ref. to EN(H4DOTC)(diag)-453, DTC P2442 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN (BANK2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2443	Secondary Air Injection System Switching Valve Stuck Closed (Bank2)	<Ref. to EN(H4DOTC)(diag)-459, DTC P2443 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK CLOSED (BANK2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2444	Secondary Air Injection System Pump Stuck On	<Ref. to EN(H4DOTC)(diag)-460, DTC P2444 SECONDARY AIR INJECTION SYSTEM PUMP STUCK ON, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2610	ECM/PCM Internal Engine Off Timer Performance	<Ref. to EN(H4DOTC)(diag)-465, DTC P2610 ECM/PCM INTERNAL ENGINE OFF TIMER PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0073	CAN Failure, Bus 'Off' Detection	<Ref. to EN(H4DOTC)(diag)-465, DTC U0073 CAN FAILURE, BUS 'OFF' DETECTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	CAN (VDC) Data Not Loaded	<Ref. to EN(H4DOTC)(diag)-465, DTC U0122 CAN (VDC) DATA NOT LOADED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0140	CAN (BCU) Data Not Loaded	<Ref. to EN(H4DOTC)(diag)-465, DTC U0140 CAN (BCU) DATA NOT LOADED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	CAN (VDC) Data Abnormal	<Ref. to EN(H4DOTC)(diag)-465, DTC U0416 CAN (VDC) DATA ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0422	CAN (BCU) Data Abnormal	<Ref. to EN(H4DOTC)(diag)-465, DTC U0422 CAN (BCU) DATA ABNORMAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

20. Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC P0011 INTAKE CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 1)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-13, DTC P0011 INTAKE CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine stalls.
- Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine and let it idle. 2) Read the value of «VVT Adv. Ang. Amount R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «VVT Adv. Ang. Amount R» approx. 0 deg?	Go to step 2.	Check the following item and repair or replace if necessary. • Oil pipe (clog) • Oil flow control solenoid valve (clog or dirt of oil routing, setting of spring) • Intake camshaft (dirt, damage of camshaft)
2 CHECK CURRENT DATA. 1) Drive with acceleration and deceleration at 80 km/h (50 MPH) or less. NOTE: Drive to an extent that the duty output of oil flow control solenoid valve increases. 2) Read the values of «OCV Duty R» and «VVT Adv. Ang. Amount R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	When the value of «OCV Duty R» increases more than 10%, is the value of «VVT Adv. Ang. Amount R» approx. 0 deg?	Check the following item and repair or replace if necessary. • Oil pipe (clog) • Oil flow control solenoid valve (clog or dirt of oil routing, setting of spring) • Intake camshaft (dirt, damage of camshaft)	Perform the following procedures, and clean the oil routing. Replace the engine oil and idle the engine for 5 minutes, and then replace the oil filter and engine oil. <Ref. to LU(STI)-11, REPLACEMENT, Engine Oil.> <Ref. to LU(STI)-31, Engine Oil Filter.>

B: DTC P0014 EXHAUST AVCS SYSTEM 1 (RANGE/PERFORMANCE)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-15, DTC P0014 EXHAUST AVCS SYSTEM 1 (RANGE/PERFORMANCE), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine stalls.
- Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine and let it idle. 2) Read the value of «Exh. VVT Retard Ang. R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «Exh. VVT Retard Ang. R» approx. 0 deg?	Go to step 2.	Check the following item and repair or replace if necessary. • Oil pipe (clog) • Oil flow control solenoid valve (clog or dirt of oil routing, setting of spring) • Exhaust camshaft (dirt, damage of camshaft)
2 CHECK CURRENT DATA. 1) Drive with acceleration and deceleration at 80 km/h (50 MPH) or less. NOTE: Drive to an extent that the duty output of oil flow control solenoid valve increases. 2) Read the values of «Exh. OCV Duty R» and «Exh. VVT Retard Ang. R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	When the value of «Exh. OCV Duty R» increases more than 10%, is the value of «Exh. VVT Retard Ang. R» approx. 0 deg?	Check the following item and repair or replace if necessary. • Oil pipe (clog) • Oil flow control solenoid valve (clog or dirt of oil routing, setting of spring) • Exhaust camshaft (dirt, damage of camshaft)	Perform the following procedures, and clean the oil routing. Replace the engine oil and idle the engine for 5 minutes, and then replace the oil filter and engine oil. <Ref. to LU(STI)-11, REPLACEMENT, Engine Oil.> <Ref. to LU(STI)-31, Engine Oil Filter.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

C: DTC P0016 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION (BANK1)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-17, DTC P0016 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION (BANK1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine stalls.
- Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine and let it idle. 2) Read the values of «VVT Adv. Ang. Amount R» and «OCV Duty R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «VVT Adv. Ang. Amount R» approx. 0 deg, and the value of «OCV Duty R» approx. 10%?	Perform the following procedures, and clean the oil routing. Replace the engine oil and idle the engine for 5 minutes, and then replace the oil filter and engine oil. <Ref. to LU(STI)-11, REPLACE-MENT, Engine Oil.> <Ref. to LU(STI)-31, Engine Oil Filter.>	Check the following item and repair or replace if necessary. • Oil pipe (clog) • Oil flow control solenoid valve (clog or dirt of oil routing, setting of spring) • Intake camshaft (dirt, damage of camshaft) • Timing belt (matching of timing mark)

D: DTC P0017 CRANK AND CAM TIMING B SYSTEM FAILURE (BANK 1)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-19, DTC P0017 CRANK AND CAM TIMING B SYSTEM FAILURE (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine stalls.
- Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine and let it idle. 2) Read the values of «Exh. VVT Retard Ang. R» and «Exh. OCV Duty R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «Exh. VVT Retard Ang. R» approx. 0 deg, and the value of «Exh. OCV Duty R» approx. 10%?	Perform the following procedures, and clean the oil routing. Replace the engine oil and idle the engine for 5 minutes, and then replace the oil filter and engine oil. <Ref. to LU(STI)-11, REPLACE-MENT, Engine Oil.> <Ref. to LU(STI)-31, Engine Oil Filter.>	Check the following item and repair or replace if necessary. • Oil pipe (clog) • Oil flow control solenoid valve (clog or dirt of oil routing, setting of spring) • Exhaust camshaft (dirt, damage of camshaft) • Timing belt (matching of timing mark)

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

E: DTC P0018 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION (BANK2)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-21, DTC P0018 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION (BANK2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine stalls.
- Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine and let it idle. 2) Read the values of «VVT Adv. Ang. Amount L» and «OCV Duty L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «VVT Adv. Ang. Amount L» approx. 0 deg, and the value of «OCV Duty L» approx. 10%?	Perform the following procedures, and clean the oil routing. Replace the engine oil and idle the engine for 5 minutes, and then replace the oil filter and engine oil. <Ref. to LU(STI)-11, REPLACE-MENT, Engine Oil.> <Ref. to LU(STI)-31, Engine Oil Filter.>	Check the following item and repair or replace if necessary. • Oil pipe (clog) • Oil flow control solenoid valve (clog or dirt of oil routing, setting of spring) • Intake camshaft (dirt, damage of camshaft) • Timing belt (matching of timing mark)

F: DTC P0019 CRANK AND CAM TIMING B SYSTEM FAILURE (BANK 2)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-21, DTC P0019 CRANK AND CAM TIMING B SYSTEM FAILURE (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine stalls.
- Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine and let it idle. 2) Read the values of «Exh. VVT Retard Ang. L» and «Exh. OCV Duty L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «Exh. VVT Retard Ang. L» approx. 0 deg, and the value of «Exh. OCV Duty L» approx. 10%?	Perform the following procedures, and clean the oil routing. Replace the engine oil and idle the engine for 5 minutes, and then replace the oil filter and engine oil. <Ref. to LU(STI)-11, REPLACE-MENT, Engine Oil.> <Ref. to LU(STI)-31, Engine Oil Filter.>	Check the following item and repair or replace if necessary. • Oil pipe (clog) • Oil flow control solenoid valve (clog or dirt of oil routing, setting of spring) • Exhaust camshaft (dirt, damage of camshaft) • Timing belt (matching of timing mark)

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

G: DTC P0021 INTAKE CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 2)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-21, DTC P0021 INTAKE CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine stalls.
- Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine and let it idle. 2) Read the value of «VVT Adv. Ang. Amount L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «VVT Adv. Ang. Amount L» approx. 0 deg?	Go to step 2.	Check the following item and repair or replace if necessary. • Oil pipe (clog) • Oil flow control solenoid valve (clog or dirt of oil routing, setting of spring) • Intake camshaft (dirt, damage of camshaft)
2 CHECK CURRENT DATA. 1) Drive with acceleration and deceleration at 80 km/h (50 MPH) or less. NOTE: Drive to an extent that the duty output of oil flow control solenoid valve increases. 2) Read the values of «OCV Duty L» and «VVT Adv. Ang. Amount L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	When the value of «OCV Duty L» increases more than 10%, is the value of «VVT Adv. Ang. Amount L» approx. 0 deg?	Check the following item and repair or replace if necessary. • Oil pipe (clog) • Oil flow control solenoid valve (clog or dirt of oil routing, setting of spring) • Intake camshaft (dirt, damage of camshaft)	Perform the following procedures, and clean the oil routing. Replace the engine oil and idle the engine for 5 minutes, and then replace the oil filter and engine oil. <Ref. to LU(STI)-11, REPLACEMENT, Engine Oil.> <Ref. to LU(STI)-31, Engine Oil Filter.>

H: DTC P0024 EXHAUST AVCS SYSTEM 2 (RANGE/PERFORMANCE)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-21, DTC P0024 EXHAUST AVCS SYSTEM 2 (RANGE/PERFORMANCE), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine stalls.
- Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine and let it idle. 2) Read the value of «Exh. VVT Retard Ang. L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «Exh. VVT Retard Ang. L» approx. 0 deg?	Go to step 2.	Check the following item and repair or replace if necessary. • Oil pipe (clog) • Oil flow control solenoid valve (clog or dirt of oil routing, setting of spring) • Exhaust camshaft (dirt, damage of camshaft)
2 CHECK CURRENT DATA. 1) Drive with acceleration and deceleration at 80 km/h (50 MPH) or less. NOTE: Drive to an extent that the duty output of oil flow control solenoid valve increases. 2) Read the values of «Exh. OCV Duty L» and «Exh. VVT Retard Ang. L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	When the value of «Exh. OCV Duty L» increases more than 10%, is the value of «Exh. VVT Retard Ang. L» approx. 0 deg?	Check the following item and repair or replace if necessary. • Oil pipe (clog) • Oil flow control solenoid valve (clog or dirt of oil routing, setting of spring) • Exhaust camshaft (dirt, damage of camshaft)	Perform the following procedures, and clean the oil routing. Replace the engine oil and idle the engine for 5 minutes, and then replace the oil filter and engine oil. <Ref. to LU(STI)-11, REPLACEMENT, Engine Oil.> <Ref. to LU(STI)-31, Engine Oil Filter.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

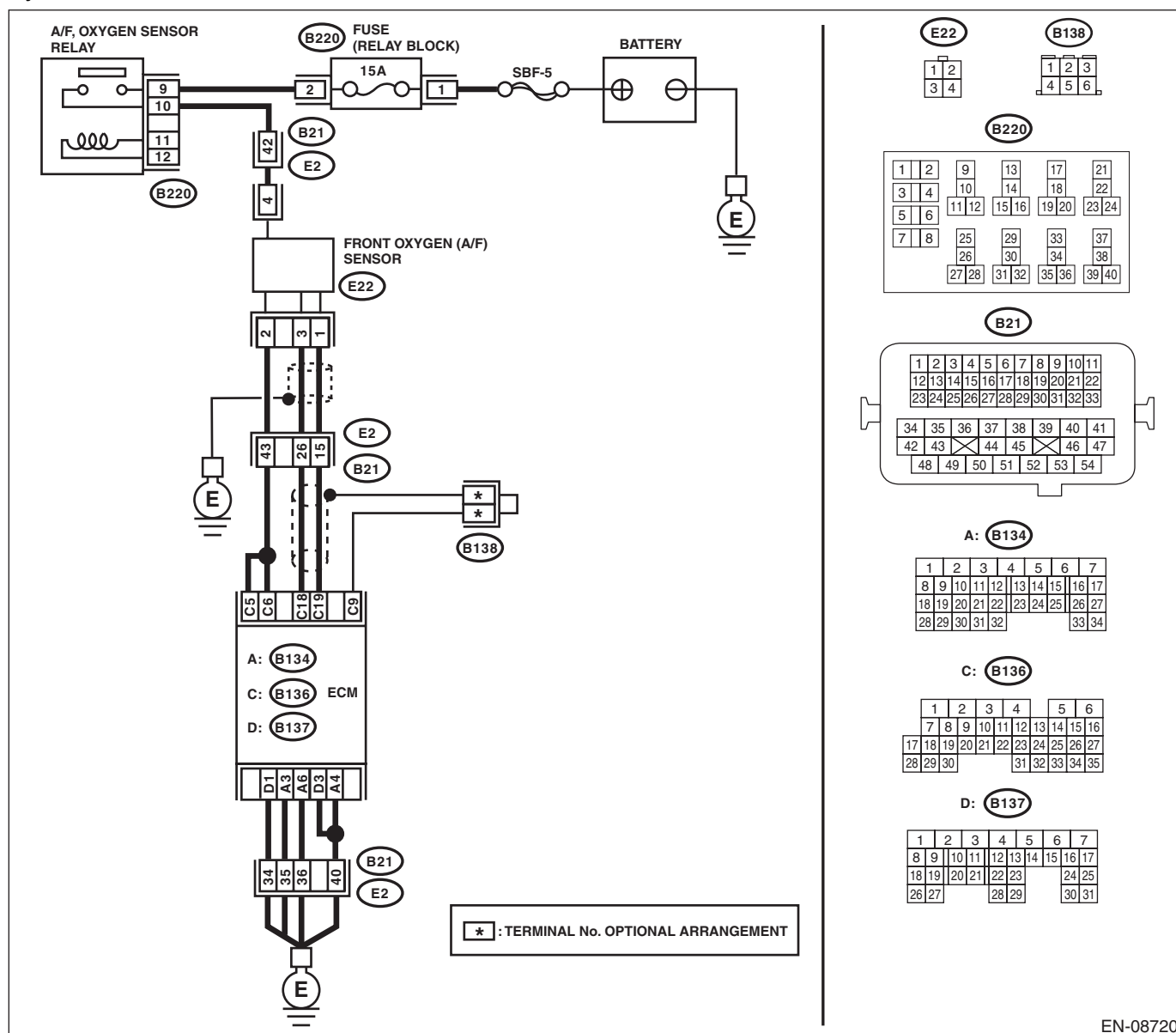
- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-22, DTC P0030 HO2S HEATER CONTROL CIRCUIT (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>

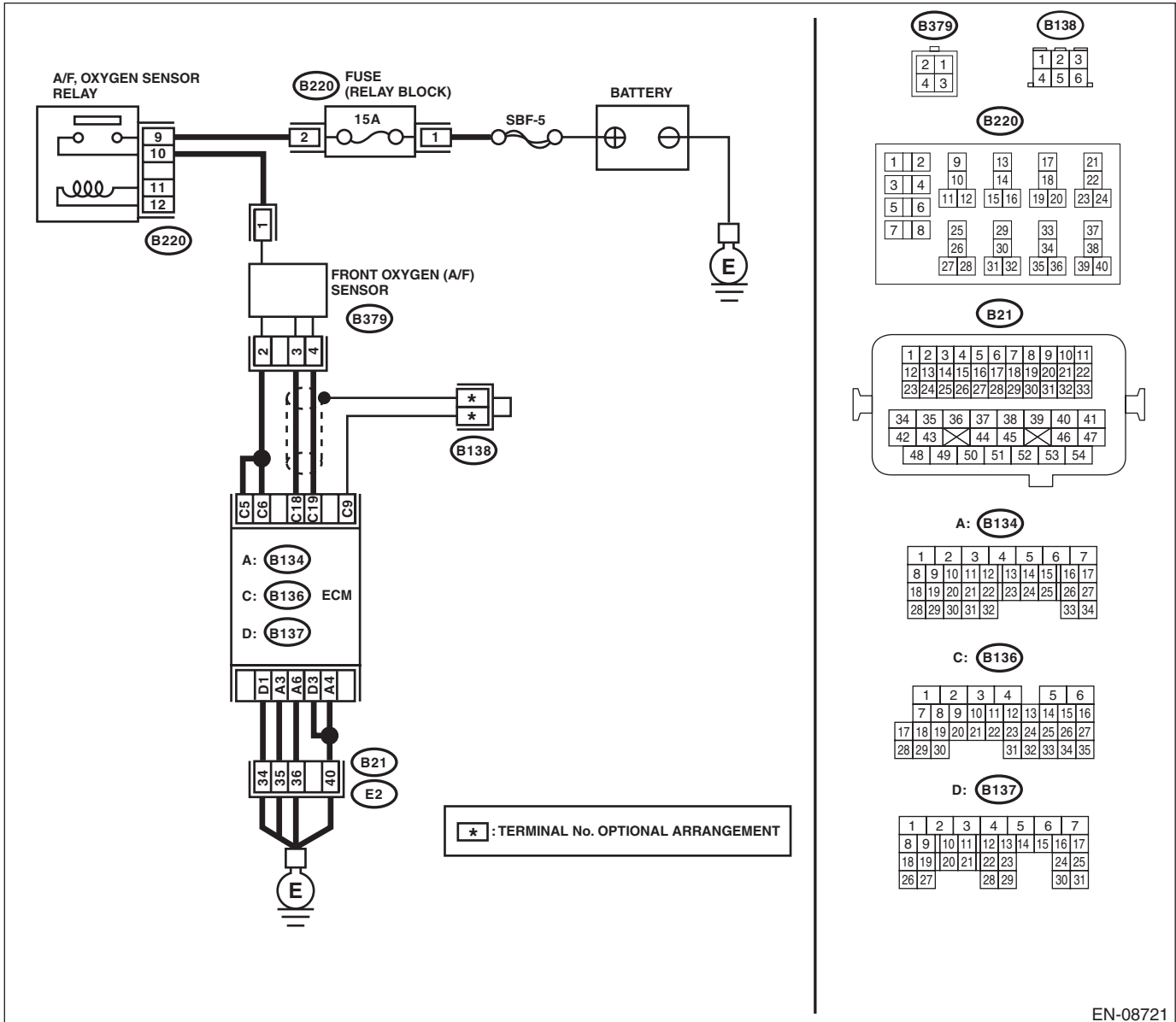


EN-08720

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08721

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 connector and front oxygen (A/F) sensor connector. Connector & terminal Models without SI-DRIVE (B136) No. 6 — (E22) No. 2: (B136) No. 5 — (E22) No. 2: (B136) No. 19 — (E22) No. 1: (B136) No. 18 — (E22) No. 3: Models with SI-DRIVE (B136) No. 6 — (B379) No. 2: (B136) No. 5 — (B379) No. 2: (B136) No. 19 — (B379) No. 4: (B136) No. 18 — (B379) No. 3:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the open circuit of harness between ECM connector and front oxygen (A/F) sensor connector.
2 CHECK FRONT OXYGEN (A/F) SENSOR. Measure the resistance between front oxygen (A/F) sensor terminals. Terminals Models without SI-DRIVE No. 4 — No. 2: Models with SI-DRIVE No. 2 — No. 1:	Is the resistance less than 2 — 3 Ω ?	Go to step 3.	Replace the front oxygen (A/F) sensor. <Ref. to FU(STI)-54, Front Oxygen (A/F) Sensor.> <Ref. to FU(w/o STI)-53, Front Oxygen (A/F) Sensor.>
3 CHECK FOR POOR CONTACT. Check for poor contact of ECM and front oxygen (A/F) sensor connector.	Is there poor contact of 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(STI)-54, Front Oxygen (A/F) Sensor.> <Ref. to FU(w/o STI)-53, Front Oxygen (A/F) Sensor.>

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

DTC DETECTING CONDITION:

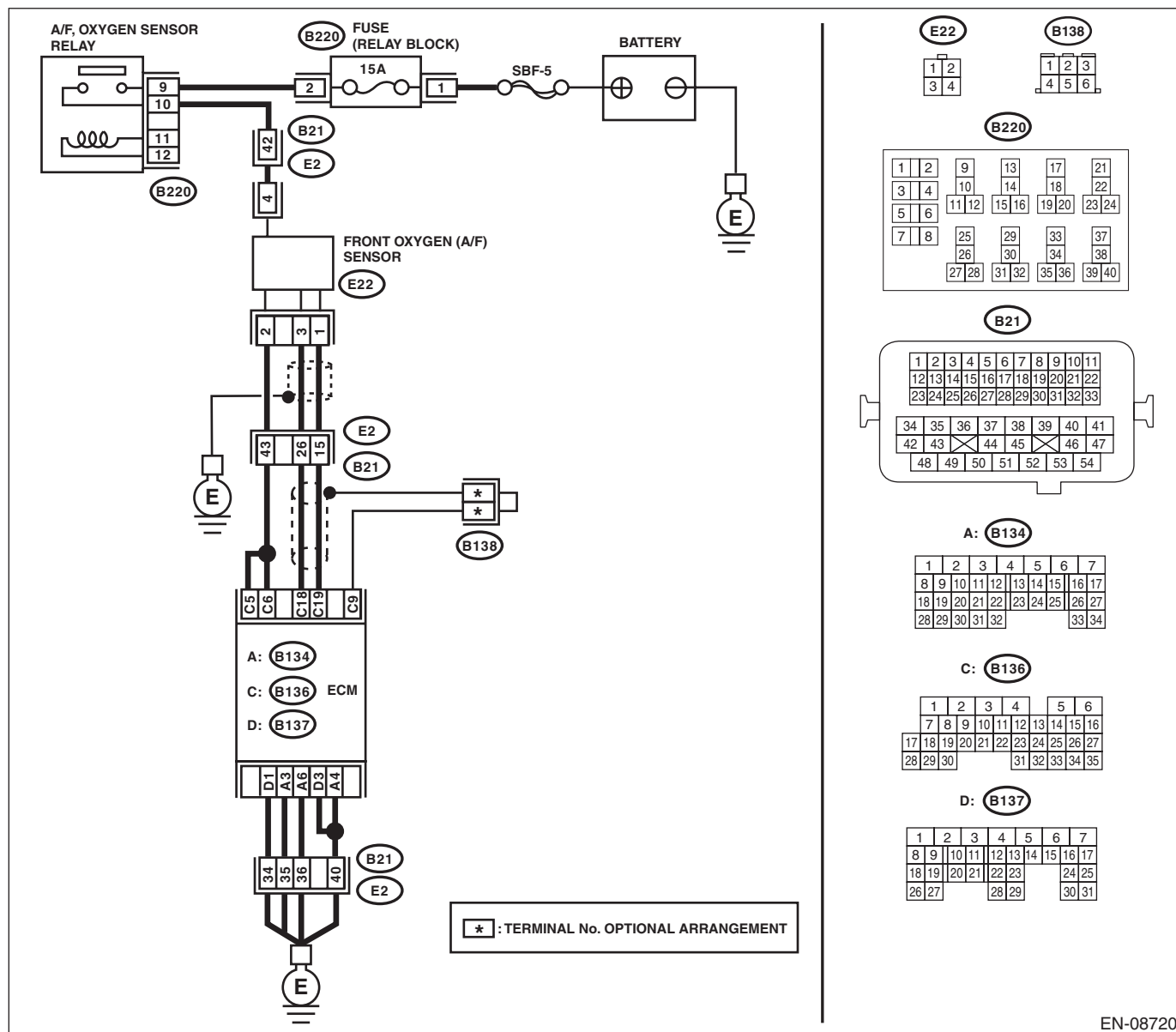
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-24, DTC P0031 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>

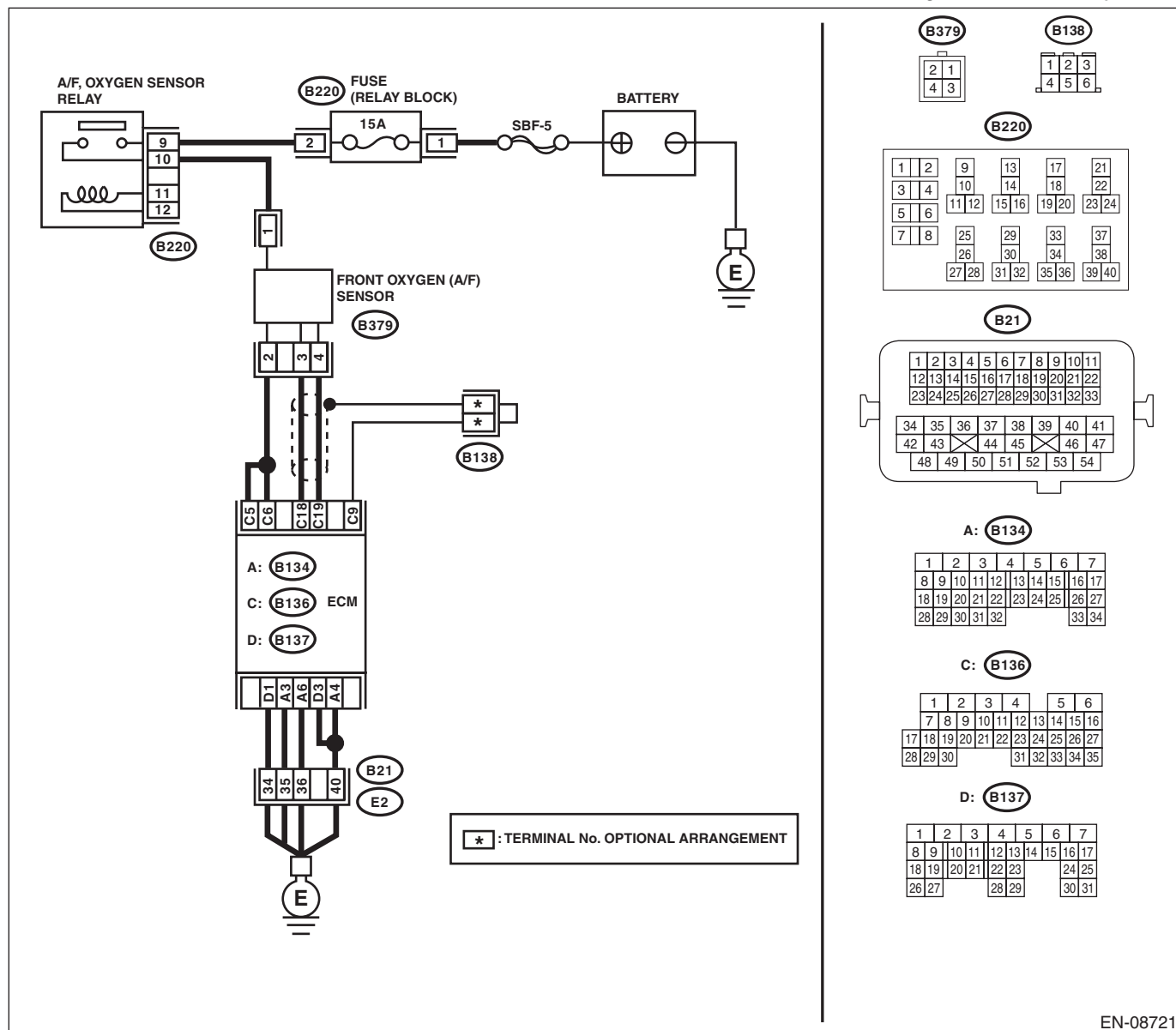


EN-08720

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08721

Step	Check	Yes	No
1 CHECK POWER SUPPLY TO FRONT OXYGEN (A/F) SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors 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 Models without SI-DRIVE (E22) No. 4 (+) — Engine ground (—): Models with SI-DRIVE (B379) No. 1 (+) — Engine ground (—):	Is the voltage 10 V or more?	Go to step 2.	Repair the power supply line. NOTE: In this case, repair the following item: • Open circuit in harness between A/F, oxygen sensor relay and front oxygen (A/F) sensor connector • Poor contact of A/F, oxygen sensor relay connector • Malfunction of A/F, oxygen sensor relay

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 connector from ECM. 3) Measure the resistance between ECM connector and front oxygen (A/F) sensor connector. Connector & terminal Models without SI-DRIVE (B136) No. 6 — (E22) No. 2: (B136) No. 5 — (E22) No. 2: Models with SI-DRIVE (B136) No. 6 — (B379) No. 2: (B136) No. 5 — (B379) No. 2:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit of harness between ECM connector and front oxygen (A/F) sensor connector.
3 CHECK GROUND CIRCUIT FOR ECM. Measure the resistance of harness between ECM connector and chassis ground. Connector & terminal (B134) No. 3 — Chassis ground: (B134) No. 4 — Chassis ground: (B134) No. 6 — Chassis ground: (B137) No. 1 — Chassis ground: (B137) No. 3 — Chassis 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 ECM connector and engine ground • Poor contact of coupling connector
4 CHECK FRONT OXYGEN (A/F) SENSOR. Measure the resistance between front oxygen (A/F) sensor terminals. Terminals Models without SI-DRIVE No. 4 — No. 2: Models with SI-DRIVE No. 2 — No. 1:	Is the resistance 2 — 3 Ω ?	Repair the poor contact of ECM connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(STI)-54, Front Oxygen (A/F) Sensor.> <Ref. to FU(w/o STI)-53, Front Oxygen (A/F) Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

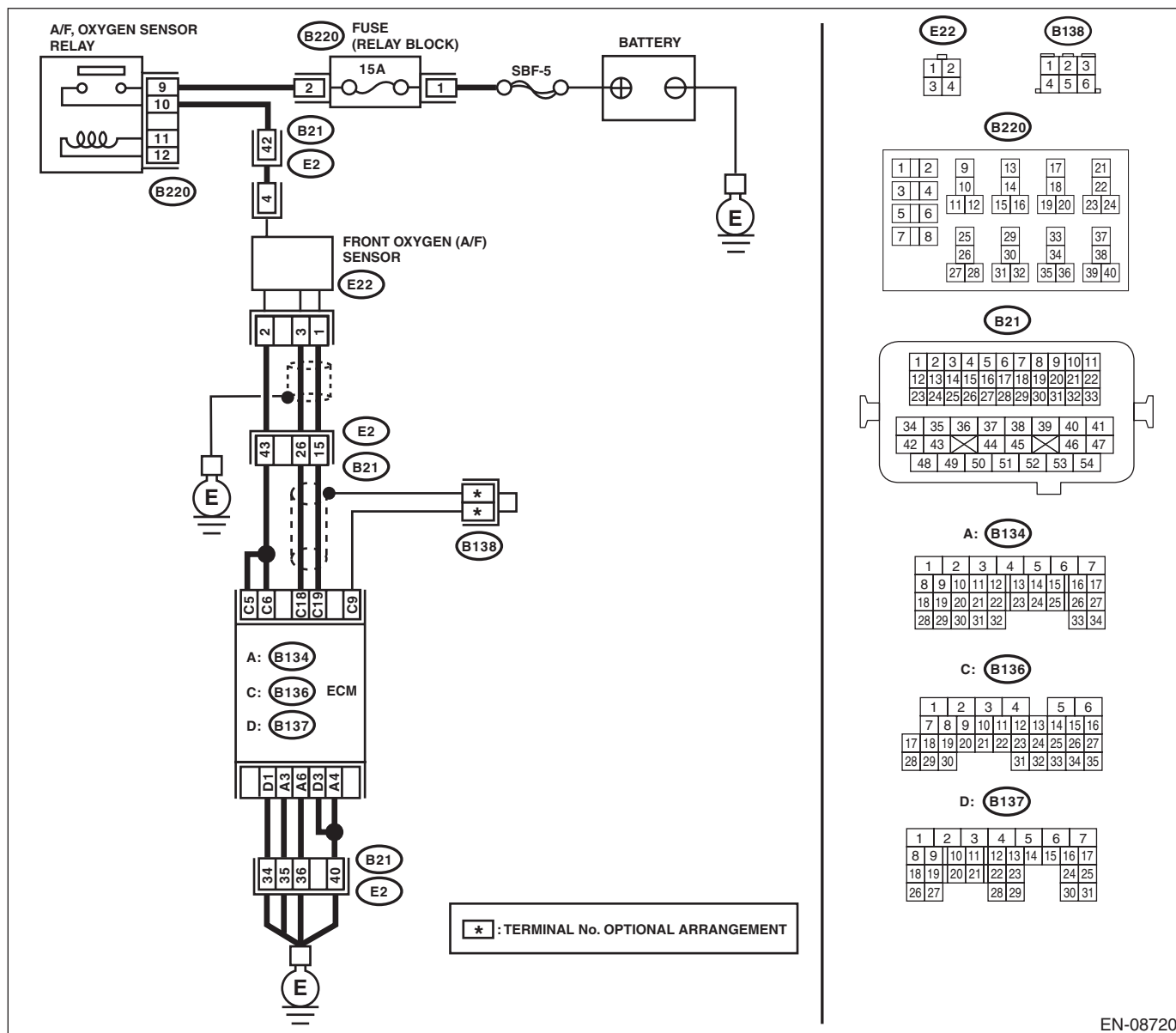
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-26, DTC P0032 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>

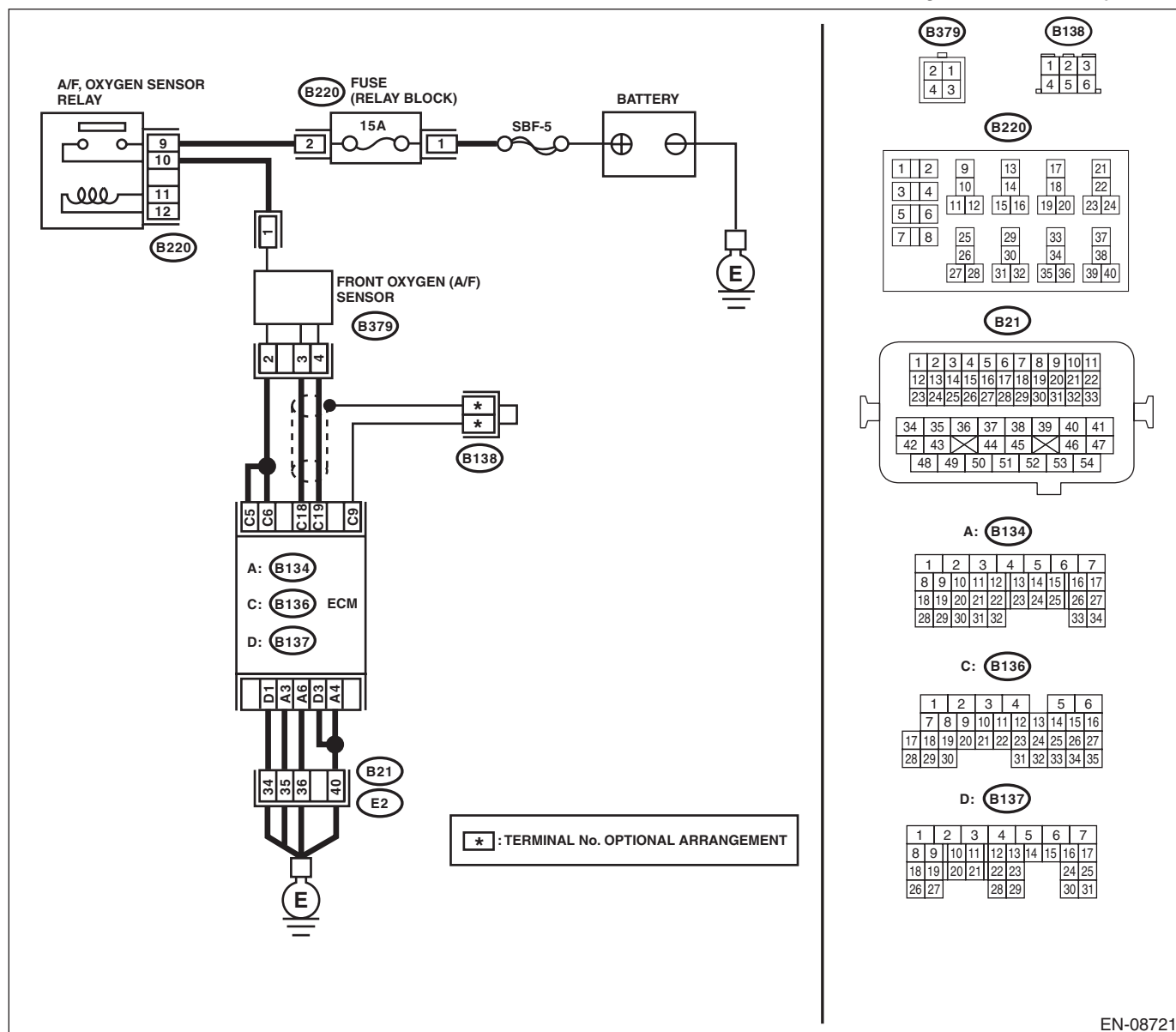


EN-08720

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08721

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 6 (+) — Chassis ground (-): (B136) No. 5 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector.	Go to step 2.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK GROUND CIRCUIT FOR ECM. 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM connector and chassis ground. Connector & terminal <i>(B134) No. 3 — Chassis ground:</i> <i>(B134) No. 4 — Chassis ground:</i> <i>(B134) No. 6 — Chassis ground:</i> <i>(B137) No. 1 — Chassis ground:</i> <i>(B137) No. 3 — Chassis ground:</i>	Is the resistance less than 5 Ω ?	Repair the poor contact of ECM connector.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of coupling connector

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

DTC DETECTING CONDITION:

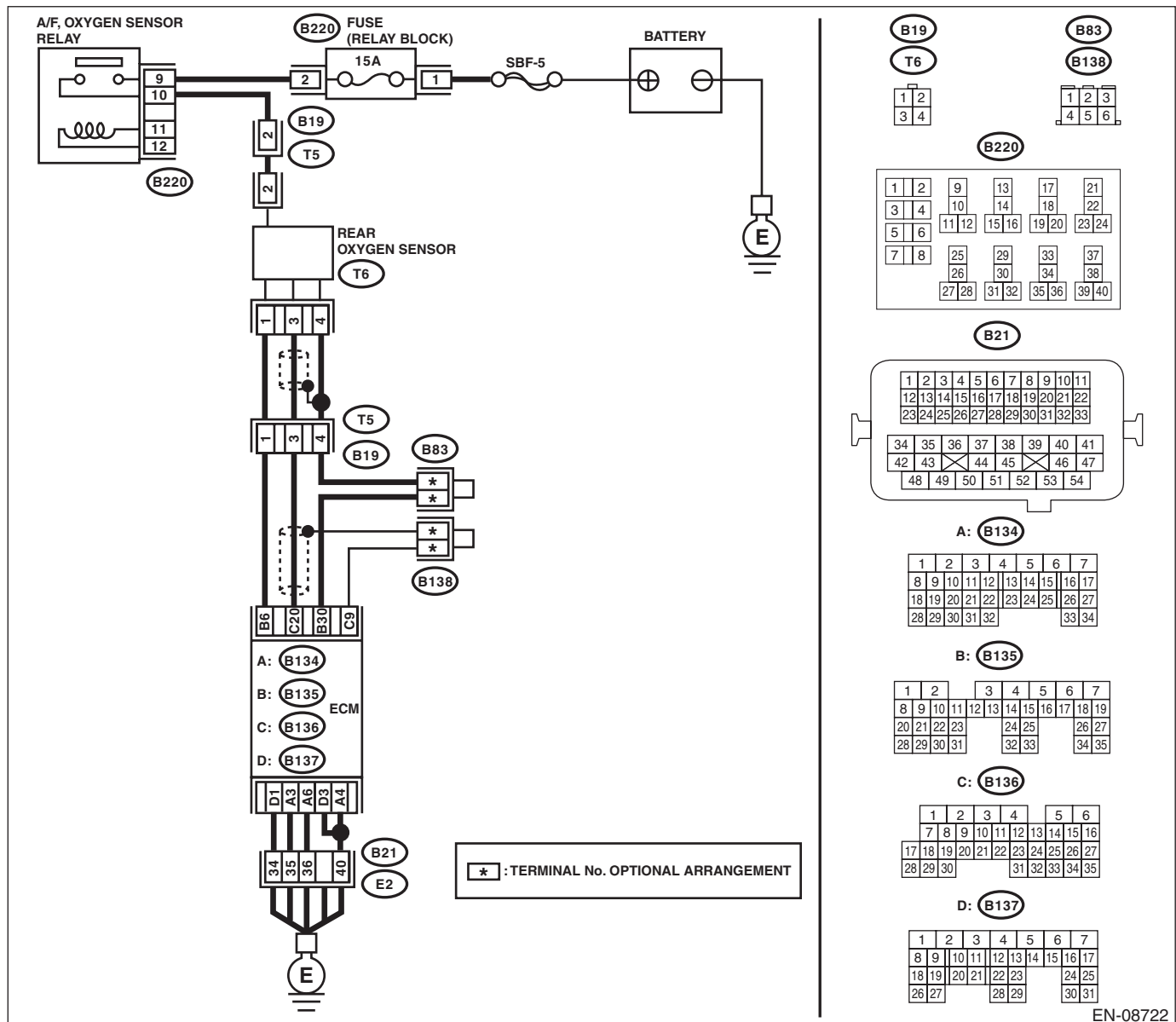
- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-28, DTC P0037 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>

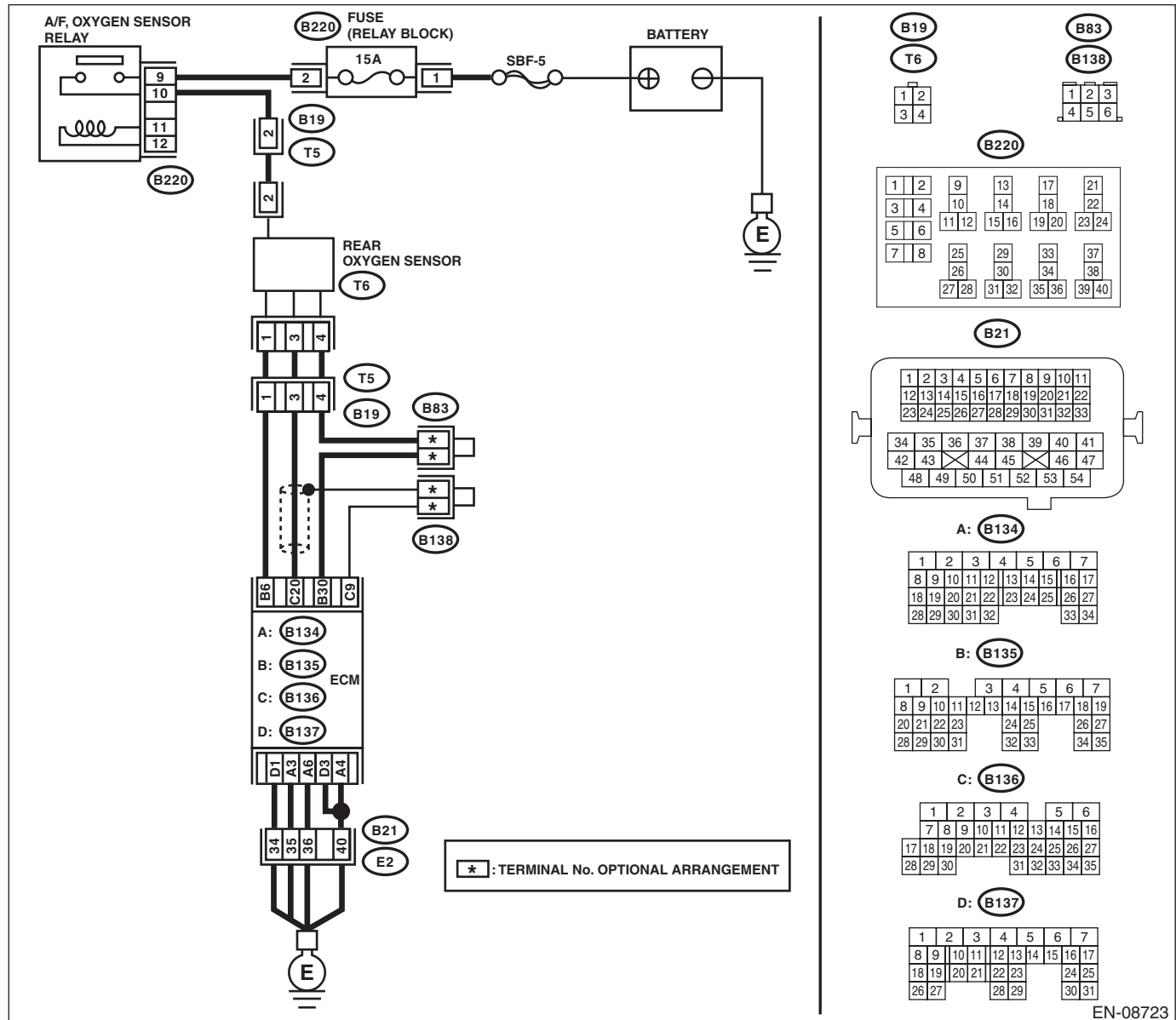


EN-08722

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08723

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK POWER SUPPLY TO REAR OXYGEN SENSOR. 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 connector and engine ground. Connector & terminal (T6) No. 2 (+) — Engine ground (-):	Is the voltage 10 V or more?	Go to step 2.	Repair the power supply line. NOTE: In this case, repair the following item: • Open circuit in harness between A/F, oxygen sensor relay and rear oxygen sensor connector • Poor contact of A/F, oxygen sensor relay connector • Poor contact of coupling connector • Malfunction of A/F, oxygen sensor relay
2 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and rear oxygen sensor connector. Connector & terminal (B135) No. 6 — (T6) 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 connector and rear oxygen sensor connector • Poor contact of coupling connector
3 CHECK GROUND CIRCUIT FOR ECM. Measure the resistance of harness between ECM connector and chassis ground. Connector & terminal (B134) No. 3 — Chassis ground: (B134) No. 4 — Chassis ground: (B134) No. 6 — Chassis ground: (B137) No. 1 — Chassis ground: (B137) No. 3 — Chassis 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 ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
4 CHECK REAR OXYGEN SENSOR. Measure the resistance between rear oxygen sensor terminals. Terminals No. 1 — No. 2:	Is the resistance 5 — 6.4 Ω ?	Repair the poor contact of ECM connector.	Replace the rear oxygen sensor. <Ref. to FU(STI)-56, Rear Oxygen Sensor.> <Ref. to FU(w/o STI)-55, Rear Oxygen Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

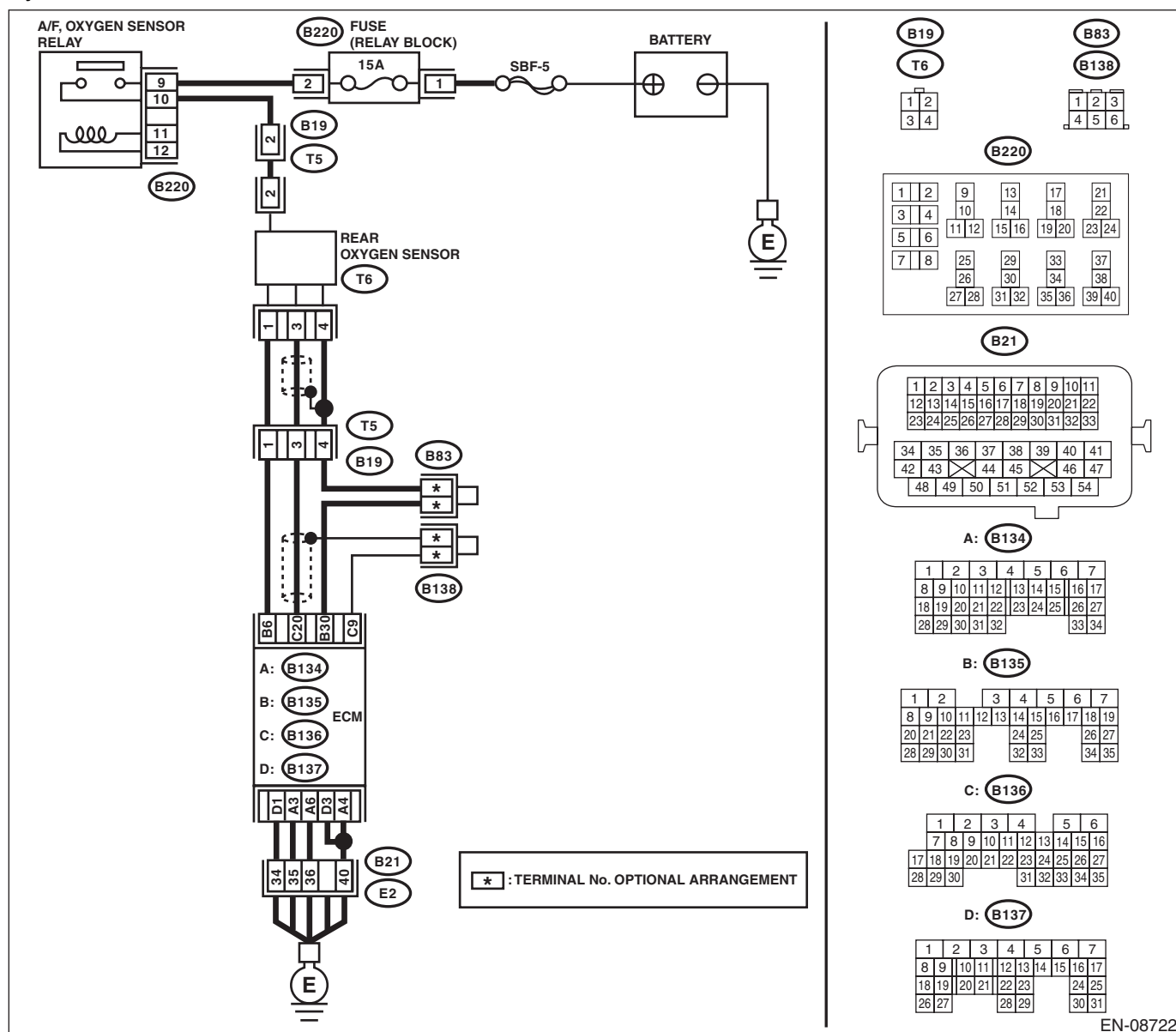
- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-30, DTC P0038 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

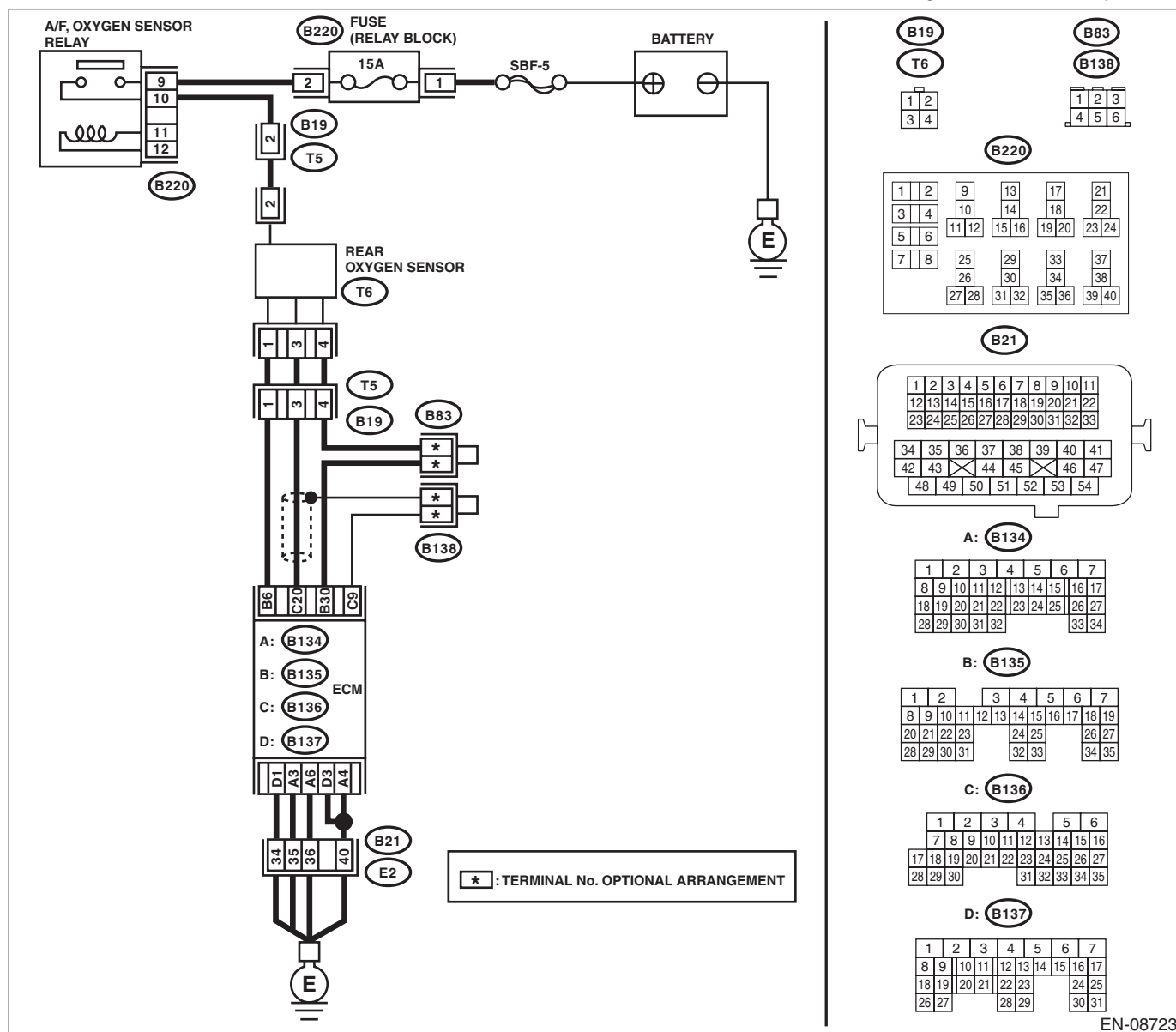
- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08723

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 6 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and rear oxygen sensor connector.	Go to step 2.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK GROUND CIRCUIT FOR ECM. 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 3 — Chassis ground: (B134) No. 4 — Chassis ground: (B134) No. 6 — Chassis ground: (B137) No. 1 — Chassis ground: (B137) No. 3 — Chassis ground:	Is the resistance less than 5 Ω ?	Repair the poor contact of ECM connector.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of coupling connector

N: DTC P0068 MAP/MAF - THROTTLE POSITION CORRELATION

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-32, DTC P0068 MAP/MAF - THROTTLE POSITION CORRELATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 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 2.
2 CHECK MANIFOLD ABSOLUTE PRESSURE SENSOR. 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°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 value of «Mani. Absolute Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the "General Scan Tool Instruction Manual".	Is the value in «Mani. Absolute Pressure» 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 3.	Replace the manifold absolute pressure sensor. <Ref. to FU(STI)-43, Manifold Absolute Pressure Sensor.> <Ref. to FU(w/o STI)-43, Manifold Absolute Pressure Sensor.>
3 CHECK THROTTLE OPENING ANGLE. Using the Subaru Select Monitor or a general scan tool, read the value in «Throttle Opening Angle». NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the "General Scan Tool Instruction Manual".	Is the value in «Throttle Opening Angle» with the throttle fully closed less than 5%?	Go to step 4.	Replace the electronic throttle control. <Ref. to FU(STI)-15, Throttle Body.> <Ref. to FU(w/o STI)-15, Throttle Body.>
4 CHECK THROTTLE OPENING ANGLE.	Is the value in «Throttle Opening Angle» with the throttle fully open 85% or more?	Replace the manifold absolute pressure sensor. <Ref. to FU(STI)-43, Manifold Absolute Pressure Sensor.> <Ref. to FU(w/o STI)-43, Manifold Absolute Pressure Sensor.>	Replace the electronic throttle control. <Ref. to FU(STI)-15, Throttle Body.> <Ref. to FU(w/o STI)-15, Throttle Body.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

O: 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(H4DOTC)-34, DTC P0101 MASS OR VOLUME AIR FLOW CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(STI)-42, Mass Air Flow and Intake Air Temperature Sensor.> <Ref. to FU(w/o STI)-42, Mass Air Flow and Intake Air Temperature Sensor.>

P: DTC P0102 MASS OR VOLUME AIR FLOW CIRCUIT LOW INPUT**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-36, DTC P0102 MASS OR VOLUME AIR FLOW CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

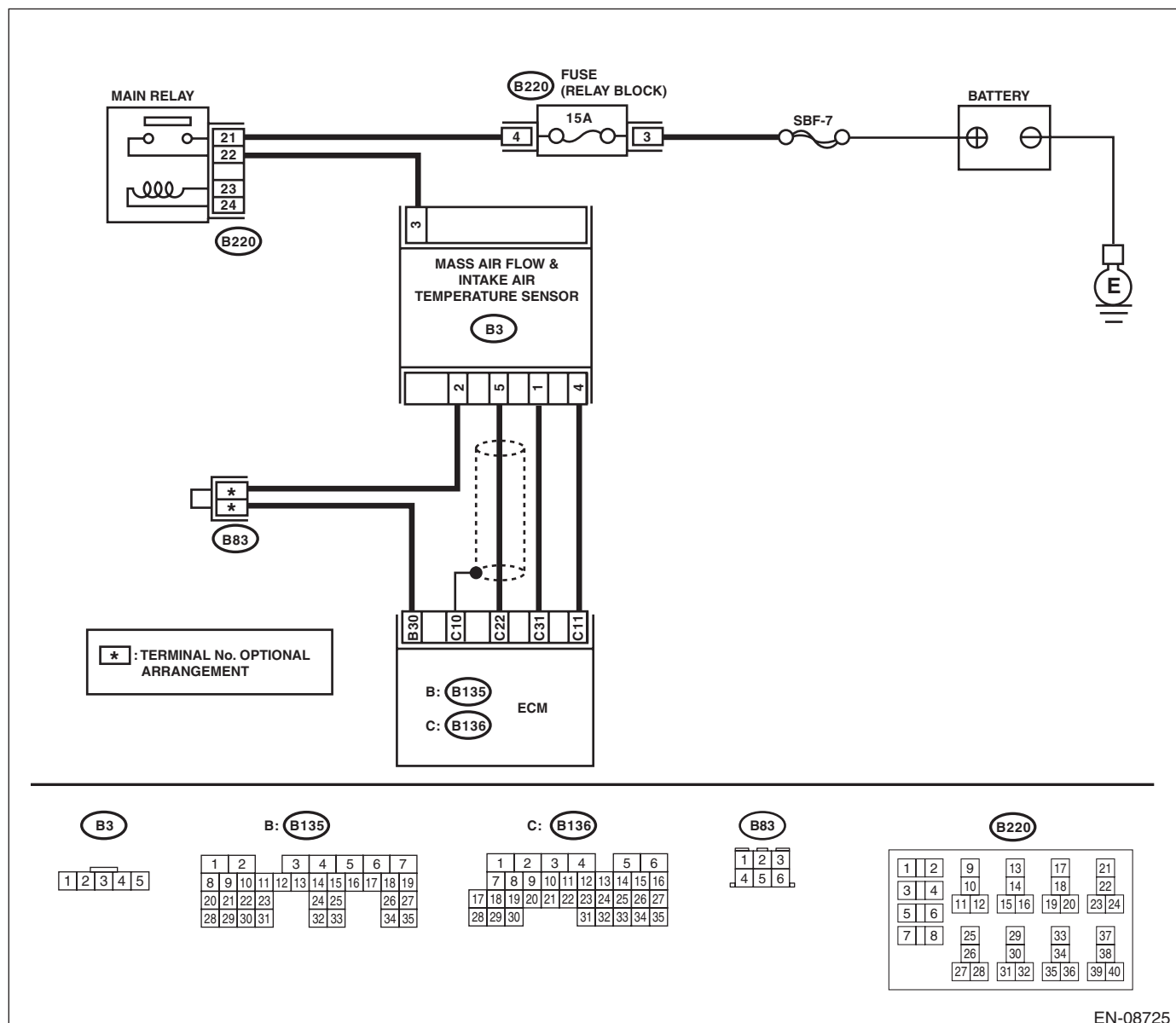
- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08725

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

	Step	Check	Yes	No
1	CHECK CURRENT DATA. 1) Start the engine. 2) Read the value of «Air Flow Sensor Voltage» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «Air Flow Sensor Voltage» less than 0.2 V?	Go to step 2.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	CHECK POWER SUPPLY OF MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the mass air flow and intake air temperature sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between mass air flow and intake air temperature sensor connector and engine ground. Connector & terminal (B3) No. 3 (+) — Engine ground (–):	Is the voltage 10 V or more?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between main relay connector and mass air flow and intake air temperature sensor connector • Poor contact of main relay connector
3	CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and the mass air flow and intake air temperature sensor connector. Connector & terminal (B136) No. 22 — (B3) No. 5:	Is the resistance less than 1 Ω?	Go to step 4.	Repair the open circuit of harness between ECM connector and the mass air flow and intake air temperature sensor connector.
4	CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B136) No. 22 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 5.	Repair the ground short circuit of harness between ECM connector and the mass air flow and intake air temperature sensor connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK FOR POOR CONTACT. Check for poor contact of ECM and mass air flow and intake air temperature sensor connector.	Is there poor contact of ECM or mass air flow and intake air temperature sensor connector?	Repair the poor contact of ECM or mass air flow and intake air temperature sensor connector.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(STI)-42, Mass Air Flow and Intake Air Temperature Sensor.> <Ref. to FU(w/o STI)-42, Mass Air Flow and Intake Air Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-38, DTC P0103 MASS OR VOLUME AIR FLOW CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

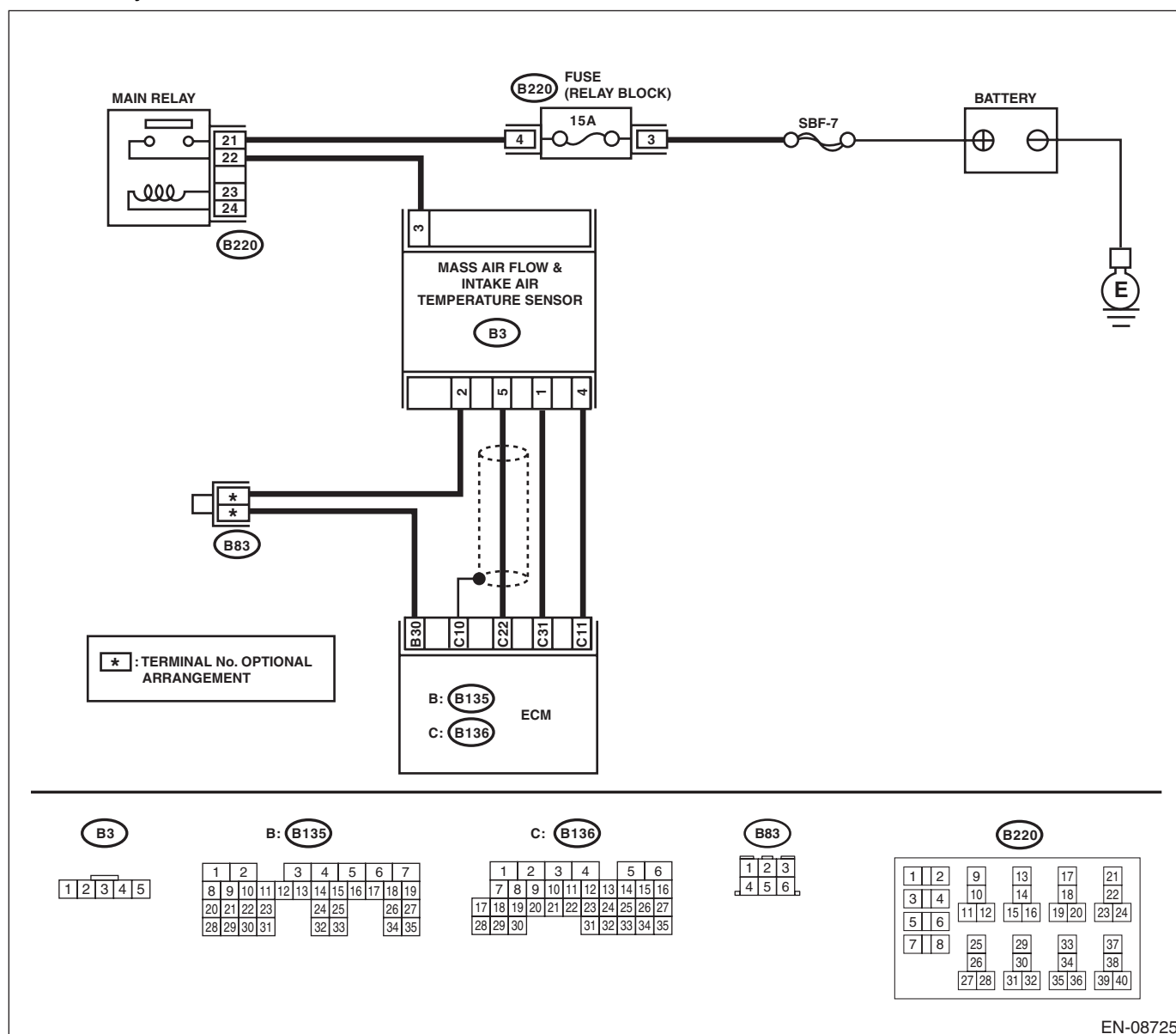
- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08725

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the value of «Air Flow Sensor Voltage» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «Air Flow Sensor Voltage» 5 V or more?	Go to step 2.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2 CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the mass air flow and intake air temperature sensor. 3) Start the engine. 4) Read the value of «Air Flow Sensor Voltage» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «Air Flow Sensor Voltage» 5 V or more?	Repair the short circuit of harness to power supply between ECM connector and the mass air flow and intake air temperature sensor connector.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between mass air flow and intake air temperature sensor connector and engine ground. Connector & terminal (B3) No. 4 — 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 ECM connector and the mass air flow and intake air temperature sensor connector • Poor contact of ECM connector
4 CHECK FOR POOR CONTACT. Check for poor contact of mass air flow and intake air temperature sensor connector.	Is there poor contact of mass air flow and intake air temperature sensor connector?	Repair the poor contact of mass air flow and intake air temperature sensor connector.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(STI)-42, Mass Air Flow and Intake Air Temperature Sensor.> <Ref. to FU(w/o STI)-42, Mass Air Flow and Intake Air Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

R: DTC P0107 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT LOW INPUT

DTC DETECTING CONDITION:

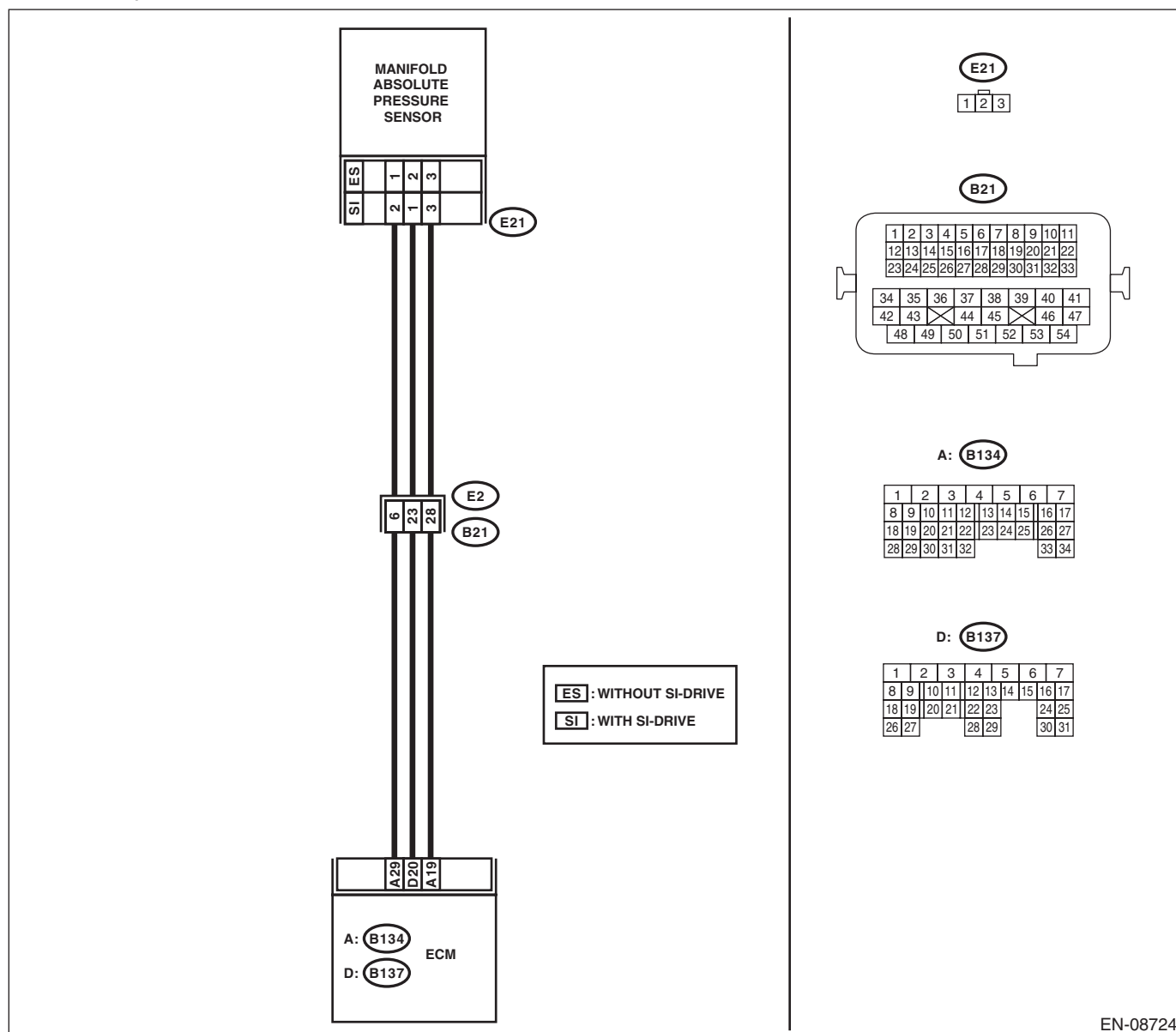
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-40, DTC P0107 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08724

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the value of «Mani. Absolute Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: - Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mani. Absolute Pressure» less than 13.3 kPa (100 mmHg, 3.94 inHg)?	Go to step 2.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2 CHECK POWER SUPPLY OF MANIFOLD ABSOLUTE PRESSURE SENSOR. 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 4.5 V or more?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following item: - Open circuit of harness between ECM connector and manifold absolute pressure sensor connector - Poor contact of ECM connector - Poor contact of coupling connector
3 CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and manifold absolute pressure sensor connector. Connector & terminal Models without SI-DRIVE (B137) No. 20 — (E21) No. 2: Models with SI-DRIVE (B137) No. 20 — (E21) 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 of harness between ECM connector and manifold absolute pressure sensor connector - Poor contact of coupling connector
4 CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B137) No. 20 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 5.	Repair short circuit to ground in harness between ECM connector and manifold absolute pressure sensor connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK FOR POOR CONTACT. Check for poor contact of ECM and manifold absolute pressure sensor connector.	Is there poor contact of ECM or manifold absolute pressure sensor connector?	Repair the poor contact of ECM or manifold absolute pressure sensor connector.	Replace the manifold absolute pressure sensor. <Ref. to FU(STI)-43, Manifold Absolute Pressure Sensor.> <Ref. to FU(w/o STI)-43, Manifold Absolute Pressure Sensor.>

S: DTC P0108 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT HIGH INPUT**DTC DETECTING CONDITION:**

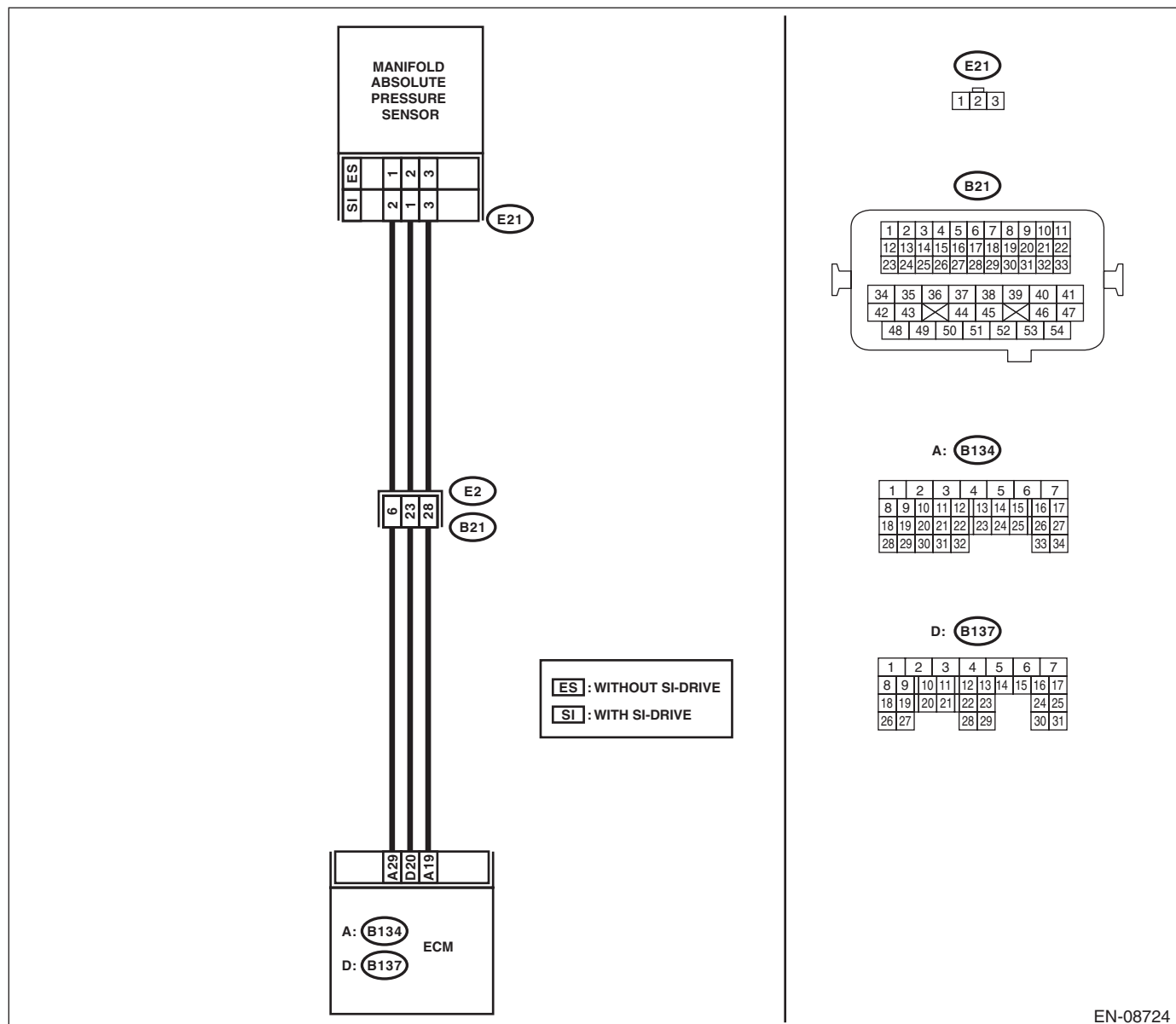
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-42, DTC P0108 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08724

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the value of «Mani. Absolute Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: - Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mani. Absolute Pressure» 119.5 kPa (896.5 mmHg, 35.29 inHg) or more?	Go to step 2.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2 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) Start the engine. 4) Read the value of «Mani. Absolute Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: - Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mani. Absolute Pressure» 119.5 kPa (896.5 mmHg, 35.29 inHg) or more?	Repair the short circuit to power in harness between ECM connector and manifold absolute pressure sensor connector.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between manifold absolute pressure sensor connector and engine ground. Connector & terminal Models without SI-DRIVE (E21) No. 1 — Engine ground: Models with SI-DRIVE (E21) 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 ECM connector and manifold absolute pressure sensor connector - Poor contact of ECM connector - Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
4 CHECK FOR POOR CONTACT. Check for poor contact of manifold absolute pressure sensor connector.	Is there poor contact of manifold absolute pressure sensor connector?	Repair the poor contact of manifold absolute pressure sensor connector.	Replace the manifold absolute pressure sensor. <Ref. to FU(STI)-43, Manifold Absolute Pressure Sensor.> <Ref. to FU(w/o STI)-43, Manifold Absolute Pressure Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

T: DTC P0111 INTAKE AIR TEMPERATURE SENSOR RANGE/PERFORMANCE PROBLEM

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-44, DTC P0111 INTAKE AIR TEMPERATURE SENSOR RANGE/PERFORMANCE PROBLEM, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step		Check	Yes	No
1	CHECK ENGINE COOLANT TEMPERATURE. 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(STI)-42, Mass Air Flow and Intake Air Temperature Sensor.> <Ref. to FU(w/o STI)-42, Mass Air Flow and Intake Air Temperature Sensor.>	Check for DTC P0125. <Ref. to EN(H4DOTC)(diag)-148, DTC P0125 INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

U: DTC P0112 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-47, DTC P0112 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

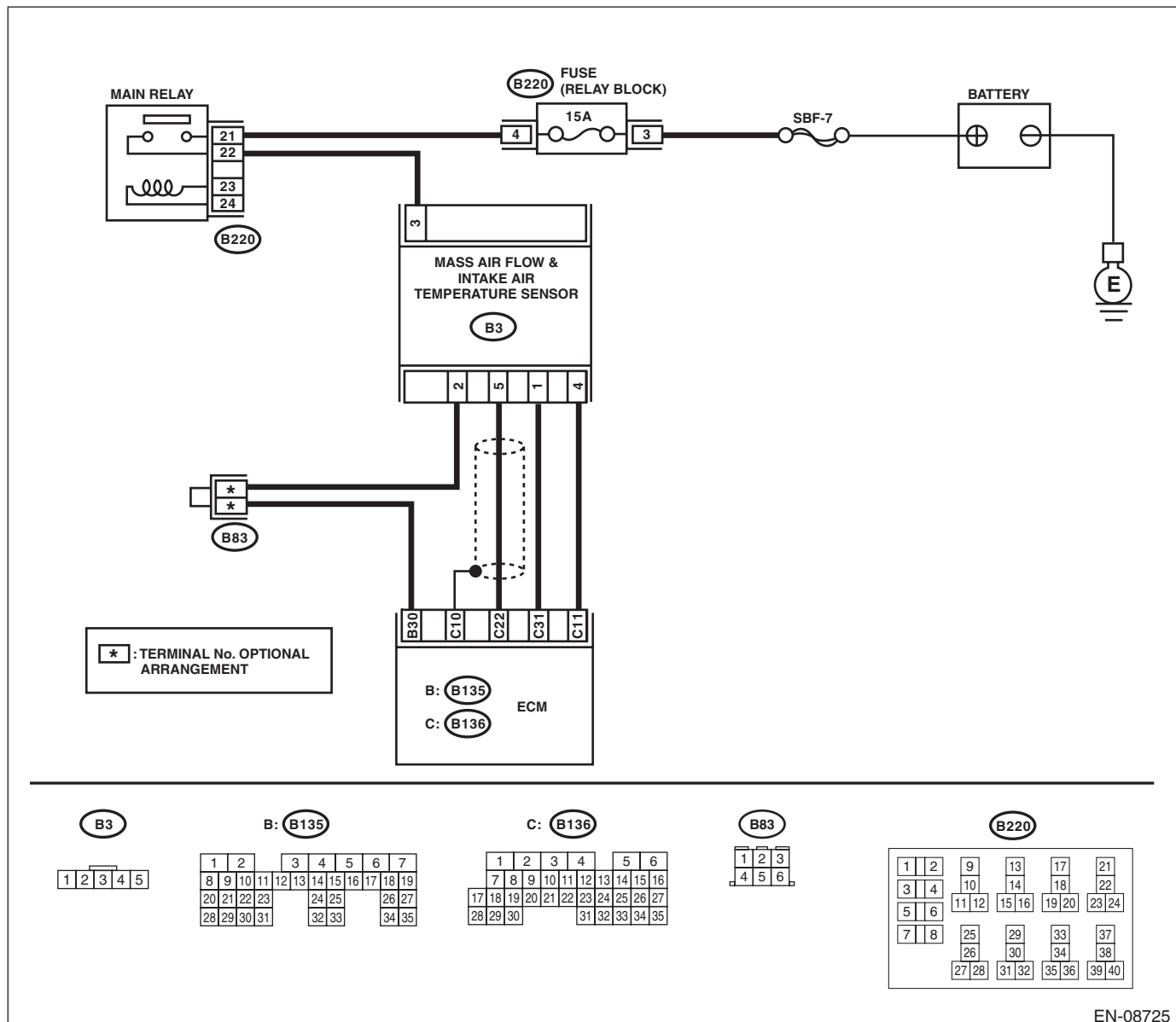
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

	Step	Check	Yes	No
1	CHECK CURRENT DATA. 1) Start the engine. 2) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Intake Air Temp.» 120°C (248°F) or more?	Go to step 2.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and the mass air flow and intake air temperature sensor. 3) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B136) No. 31 — Chassis ground:	Is the resistance 1 MΩ or more?	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(STI)-42, Mass Air Flow and Intake Air Temperature Sensor.> <Ref. to FU(w/o STI)-42, Mass Air Flow and Intake Air Temperature Sensor.>	Repair the ground short circuit of harness between ECM connector and the mass air flow and intake air temperature sensor connector.

V: DTC P0113 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-49, DTC P0113 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

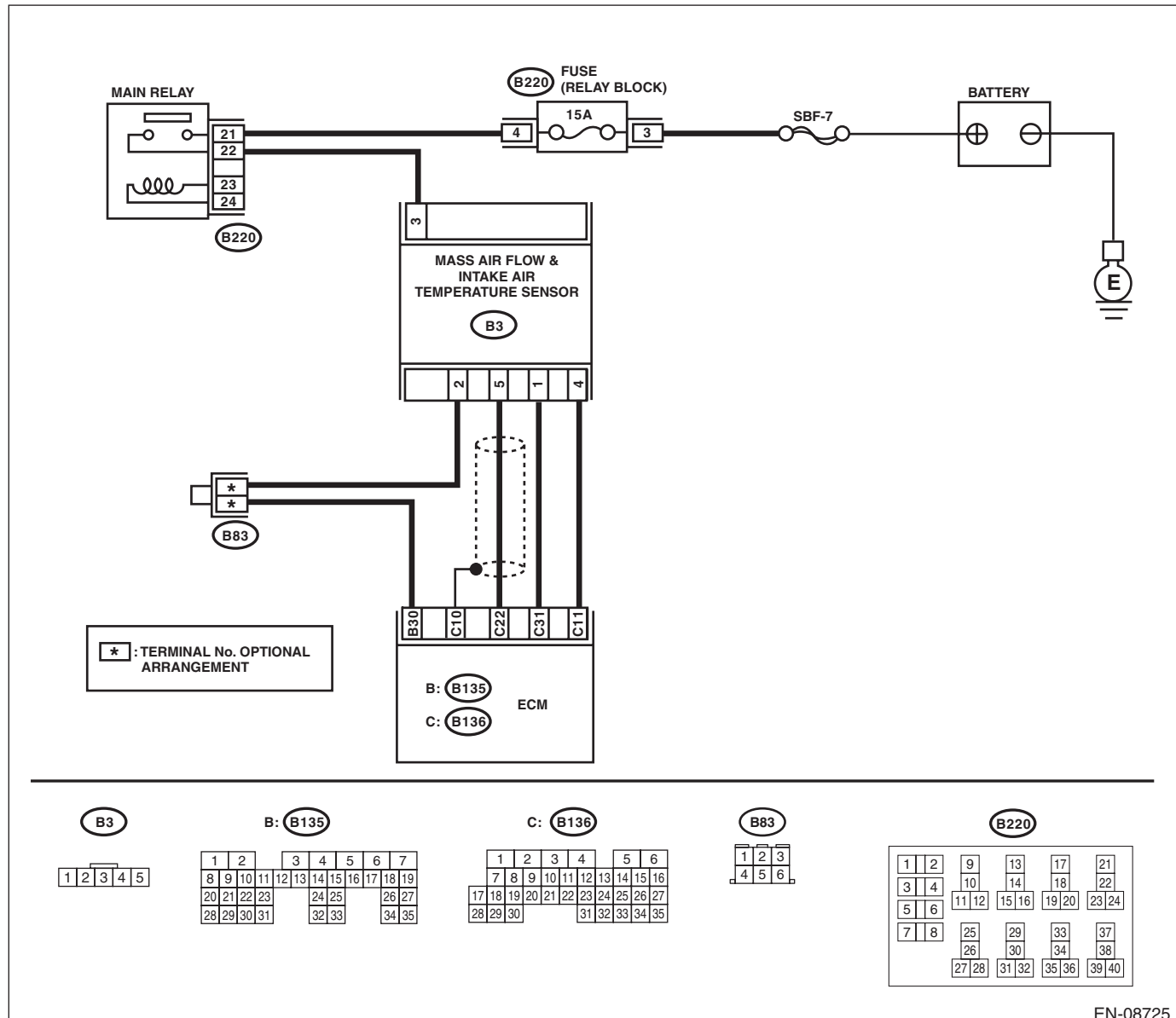
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Intake Air Temp.» less than -40°C (-40°F)?	Go to step 2.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2 CHECK FOR POOR CONTACT. Check for poor contact of ECM and mass air flow and intake air temperature sensor connector.	Is there poor contact of ECM or mass air flow and intake air temperature sensor connector?	Repair the poor contact of ECM or mass air flow and intake air temperature sensor connector.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and the mass air flow and intake air temperature sensor. 3) Measure the resistance of harness between ECM connector and the mass air flow and intake air temperature sensor connector. Connector & terminal (B136) No. 31 — (B3) No. 1: (B135) No. 30 — (B3) No. 2:	Is the resistance less than $1\ \Omega$?	Go to step 4.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the mass air flow and intake air temperature sensor connector • Poor contact of joint connector
4 CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR. 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 31 (+) — Chassis ground (-):	Is the voltage 5 V or more?	Repair the short circuit of harness to power supply between ECM connector and the mass air flow and intake air temperature sensor connector.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(STI)-42, Mass Air Flow and Intake Air Temperature Sensor.> <Ref. to FU(w/o STI)-42, Mass Air Flow and Intake Air Temperature Sensor.>

W: DTC P0116 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE**DTC DETECTING CONDITION:**

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-51, DTC P0116 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Hard to start
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK ENGINE COOLANT TEMPERATURE SENSOR. 1) Disconnect the connectors from the engine coolant temperature sensor. 2) 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?	Repair the poor contact of ECM connector.	Replace the engine coolant temperature sensor. <Ref. to FU(STI)-34, Engine Coolant Temperature Sensor.> <Ref. to FU(w/o STI)-34, Engine Coolant Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

X: DTC P0117 ENGINE COOLANT TEMPERATURE CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-53, DTC P0117 ENGINE COOLANT TEMPERATURE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

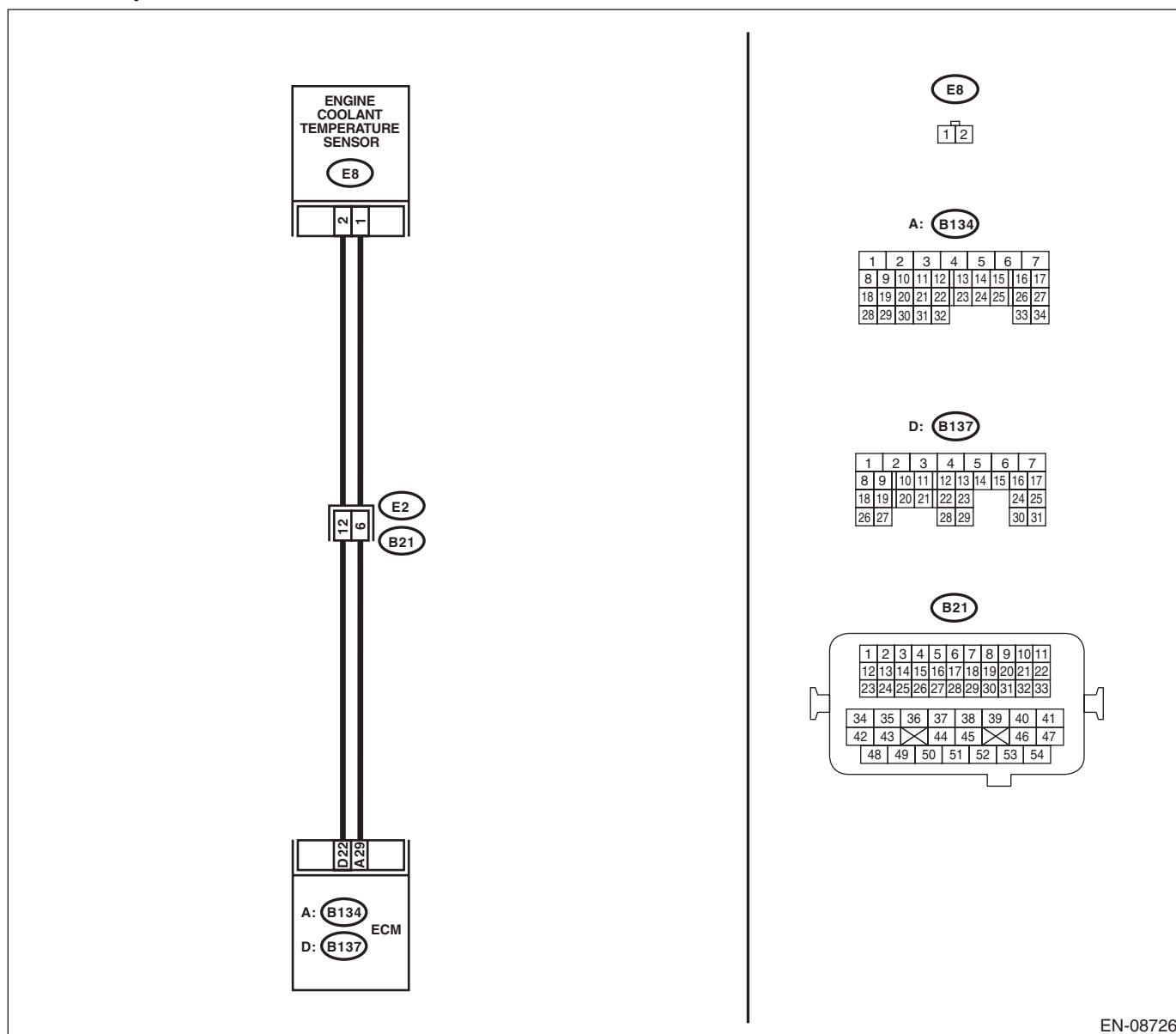
- Hard to start
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08726

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

	Step	Check	Yes	No
1	CHECK CURRENT DATA. 1) Start the engine. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: - Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 150°C (302°F) or more?	Go to step 2.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	CHECK HARNESS BETWEEN ECM AND ENGINE COOLANT TEMPERATURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and engine coolant temperature sensor. 3) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B137) No. 22 — Chassis ground:	Is the resistance 1 MΩ or more?	Replace the engine coolant temperature sensor. <Ref. to FU(STI)-34, Engine Coolant Temperature Sensor.> <Ref. to FU(w/o STI)-34, Engine Coolant Temperature Sensor.>	Repair the short circuit to ground in harness between ECM connector and engine coolant temperature sensor connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Y: DTC P0118 ENGINE COOLANT TEMPERATURE CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-55, DTC P0118 ENGINE COOLANT TEMPERATURE CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

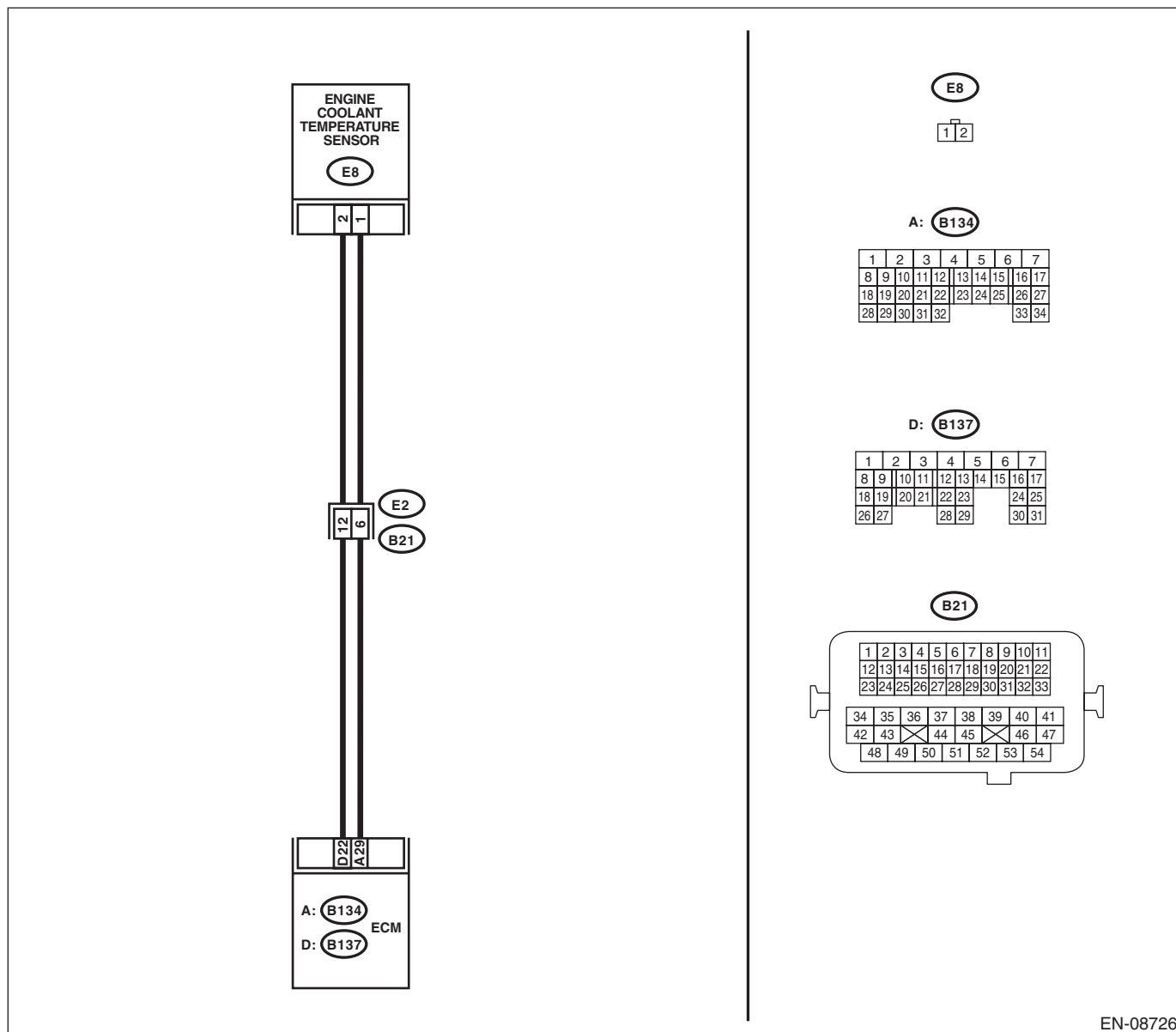
- Hard to start
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08726

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» less than -40°C (-40°F)?	Go to step 2.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2 CHECK FOR POOR CONTACT. Check for poor contact of ECM and engine coolant temperature sensor connector.	Is there poor contact of ECM or engine coolant temperature sensor connector?	Repair the poor contact of ECM or engine coolant temperature sensor connector.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND ENGINE COOLANT TEMPERATURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and engine coolant temperature sensor. 3) Measure the resistance of harness between ECM connector and engine coolant temperature sensor connector. Connector & terminal (B137) No. 22 — (E8) No. 2: (B134) No. 29 — (E8) 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 connector and engine coolant temperature sensor connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN ECM AND ENGINE COOLANT TEMPERATURE SENSOR CONNECTOR. 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B137) No. 22 (+) — Chassis ground (-):	Is the voltage 5 V or more?	Repair the short circuit of harness to power supply between ECM connector and engine coolant temperature sensor connector.	Replace the engine coolant temperature sensor. <Ref. to FU(STI)-34, Engine Coolant Temperature Sensor.> <Ref. to FU(w/o STI)-34, Engine Coolant Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Z: DTC P0122 THROTTLE/PEDAL POSITION SENSOR/SWITCH “A” CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-57, DTC P0122 THROTTLE/PEDAL POSITION SENSOR/SWITCH “A” CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:

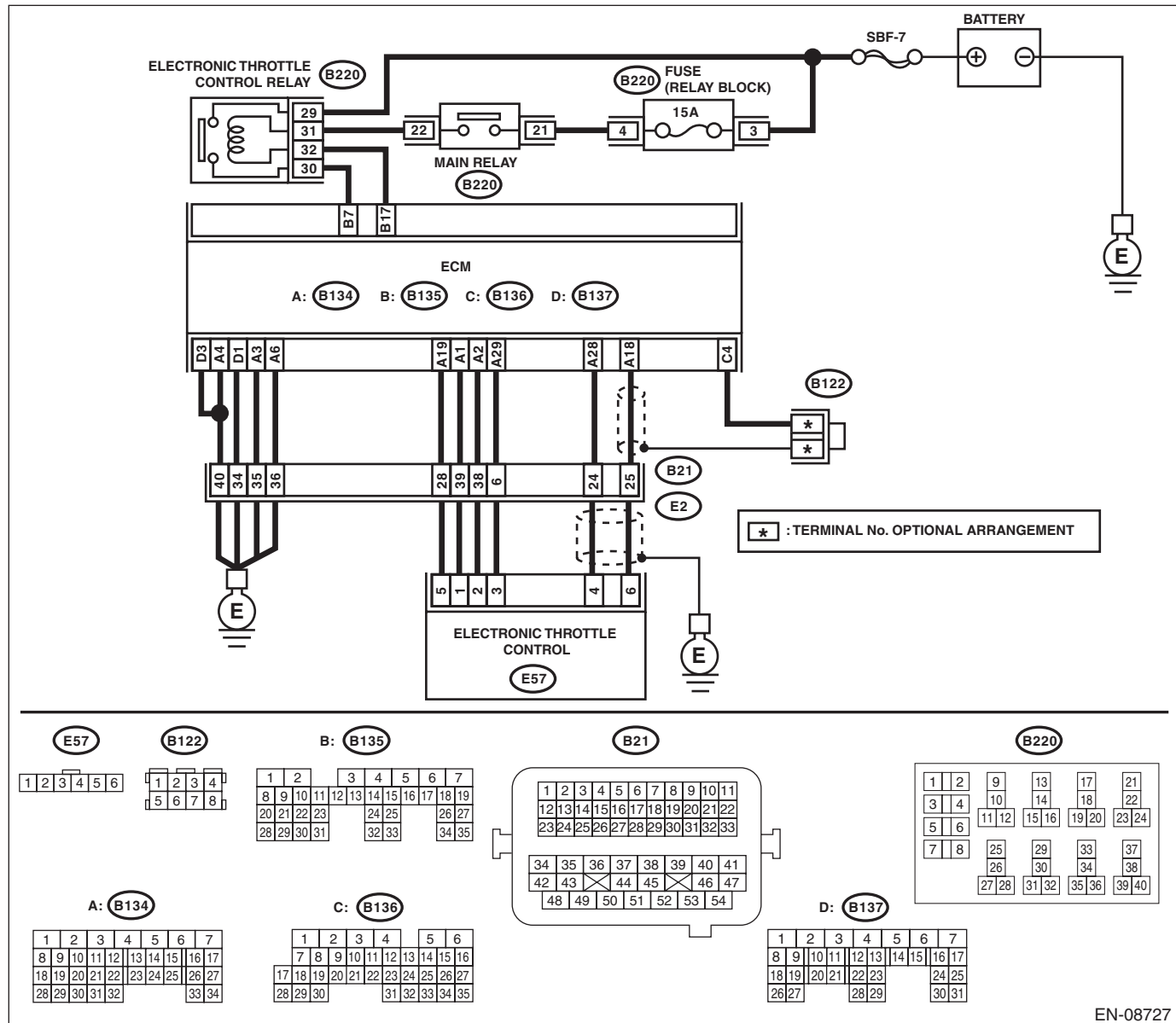
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08727

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 19 — Chassis ground: (B134) No. 18 — Chassis ground: (B134) No. 18 — (B136) No. 4:	Is the resistance 1 MΩ or more?	Go to step 2.	Repair the ground 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
2 CHECK SHORT CIRCUIT INSIDE THE ECM. 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 6 — Engine ground:	Is the resistance 1 M Ω or more?	Replace the electronic throttle control. <Ref. to FU(STI)-15, Throttle Body.> <Ref. to FU(w/o STI)-15, Throttle Body.>	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(STI)-59, Engine Control Module (ECM).> <Ref. to FU(w/o STI)-57, Engine Control Module (ECM).>

AA:DTC P0123 THROTTLE/PEDAL POSITION SENSOR/SWITCH “A” CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-59, DTC P0123 THROTTLE/PEDAL POSITION SENSOR/SWITCH “A” CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:

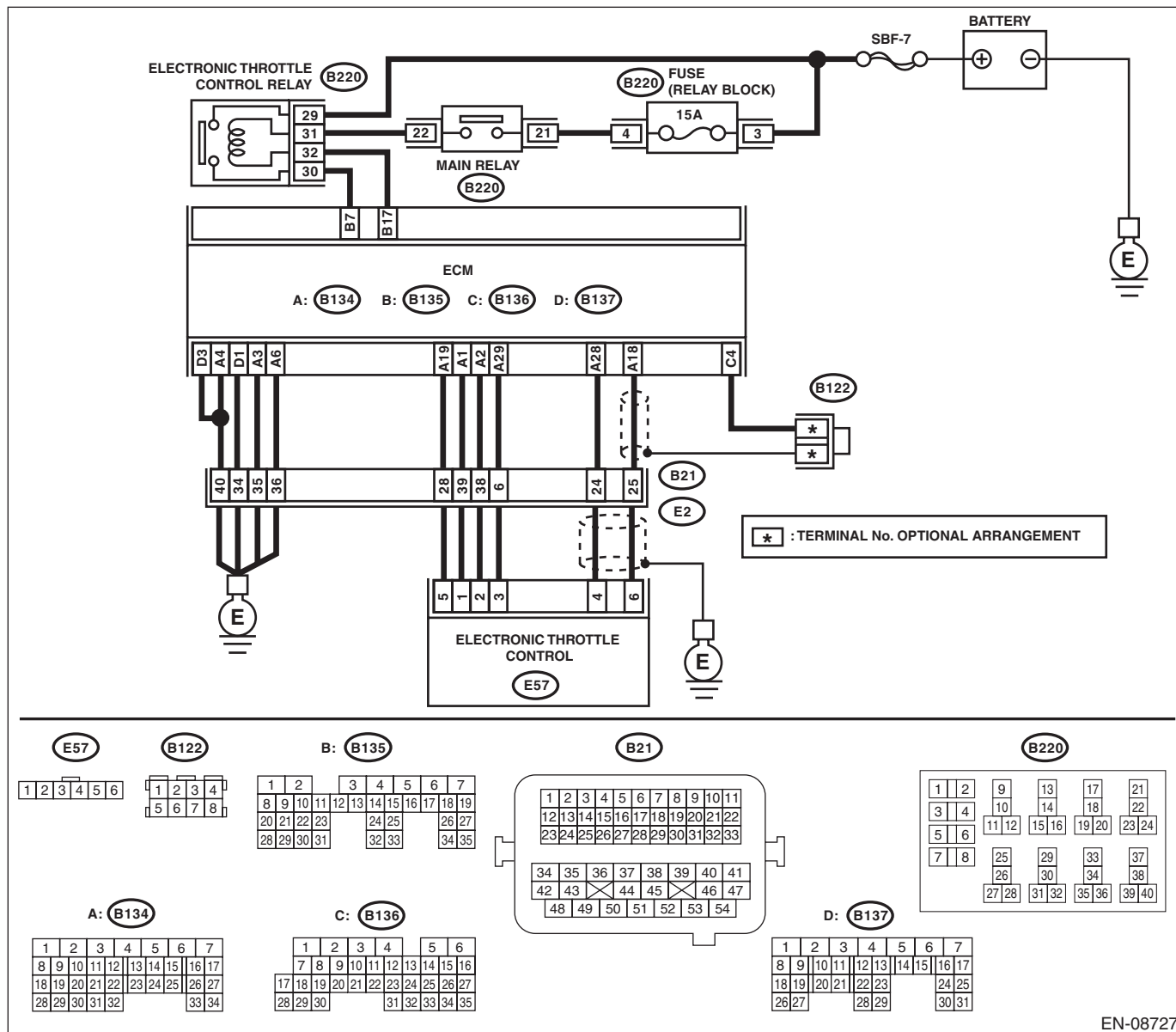
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08727

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance of harness 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 2.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Connect the connector to ECM. 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 3.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 6 (+) — Engine ground (-):	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step 4.
4 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. Connector & terminal (B134) No. 19 — (B134) No. 18:	Is the resistance 1 M Ω or more?	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(STI)-15, Throttle Body.> <Ref. to FU(w/o STI)-15, Throttle Body.>	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AB: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(H4DOTC)-61, 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 servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK TIRE SIZE.	Is the tire size as specified and the same size as three other wheels?	Go to step 2.	Replace the tire.
2 CHECK ENGINE COOLANT. Check the following items: • Amount of engine coolant • Engine coolant freeze • Contamination of engine coolant	Is the engine coolant normal?	Go to step 3.	Fill or replace the engine coolant. <Ref. to CO(STI)-13, Engine Coolant.> <Ref. to CO(w/o STI)-13, Engine Coolant.>
3 CHECK THERMOSTAT.	Does the thermostat remain opened?	Replace the thermostat. <Ref. to CO(STI)-17, Thermostat.> <Ref. to CO(w/o STI)-17, Thermostat.>	Replace the engine coolant temperature sensor. <Ref. to FU(STI)-34, Engine Coolant Temperature Sensor.> <Ref. to FU(w/o STI)-34, Engine Coolant Temperature Sensor.>

AC: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(H4DOTC)-63, DTC P0128 COOLANT THERMOSTAT (ENGINE COOLANT TEMPERATURE BELOW THERMOSTAT REGULATING TEMPERATURE), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Thermostat remains open.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK ENGINE COOLANT.	Is the engine coolant amount normal?	Go to step 3.	Refill the engine coolant. <Ref. to CO(STI)-13, Engine Coolant.> <Ref. to CO(w/o STI)-13, Engine Coolant.>
3 CHECK RADIATOR FAN. 1) Start the engine. 2) Check the radiator fan operation.	Does the radiator fan continuously rotate for 3 minutes or more during idling?	Repair radiator fan circuit. <Ref. to CO(STI)-23, Radiator Main Fan and Fan Motor.> <Ref. to CO(w/o STI)-23, Radiator Main Fan and Fan Motor.> <Ref. to CO(STI)-25, Radiator Sub Fan and Fan Motor.> <Ref. to CO(w/o STI)-25, Radiator Sub Fan and Fan Motor.>	Replace the thermostat. <Ref. to CO(STI)-17, Thermostat.> <Ref. to CO(w/o STI)-17, Thermostat.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

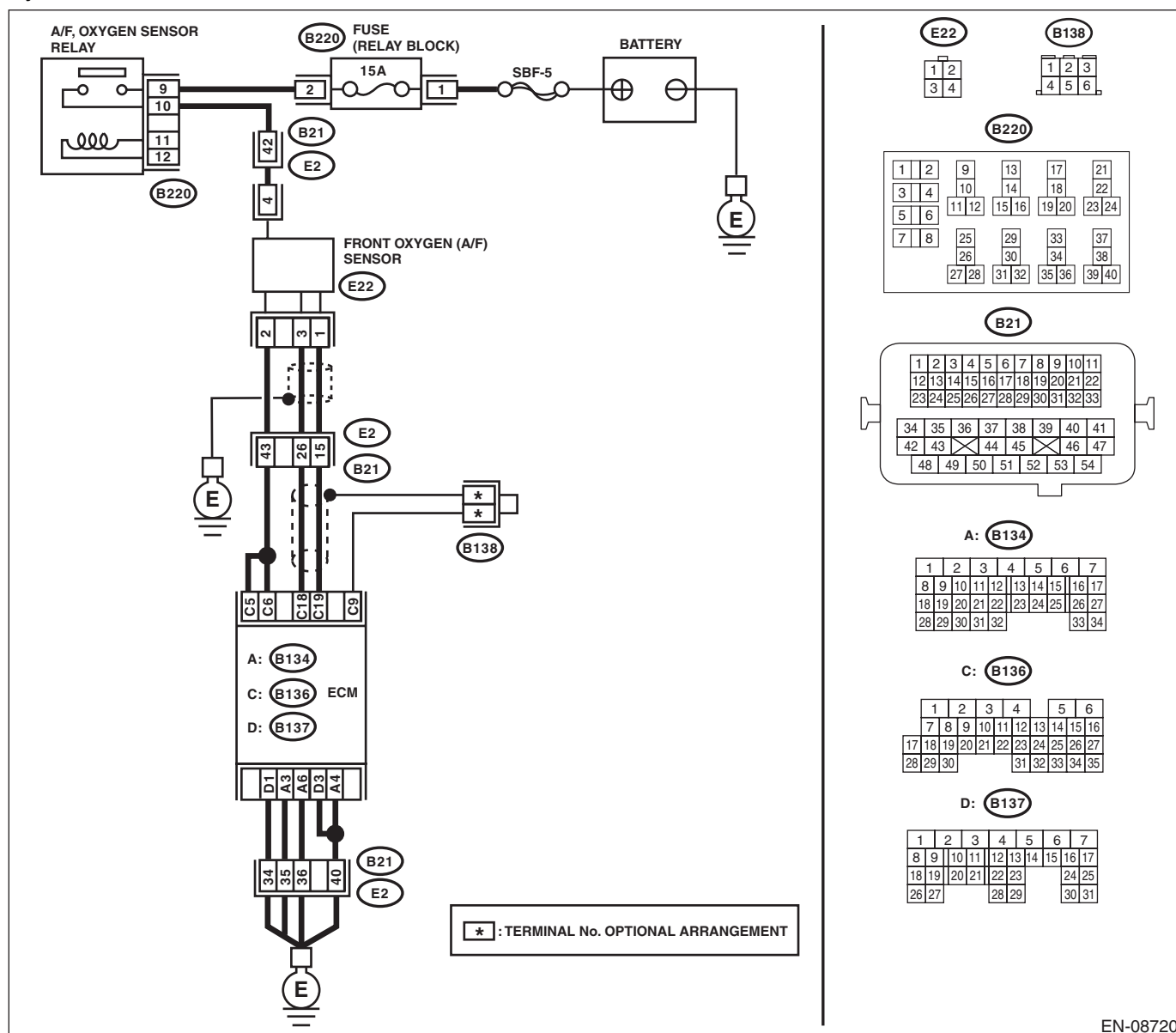
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-67, DTC P0131 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>

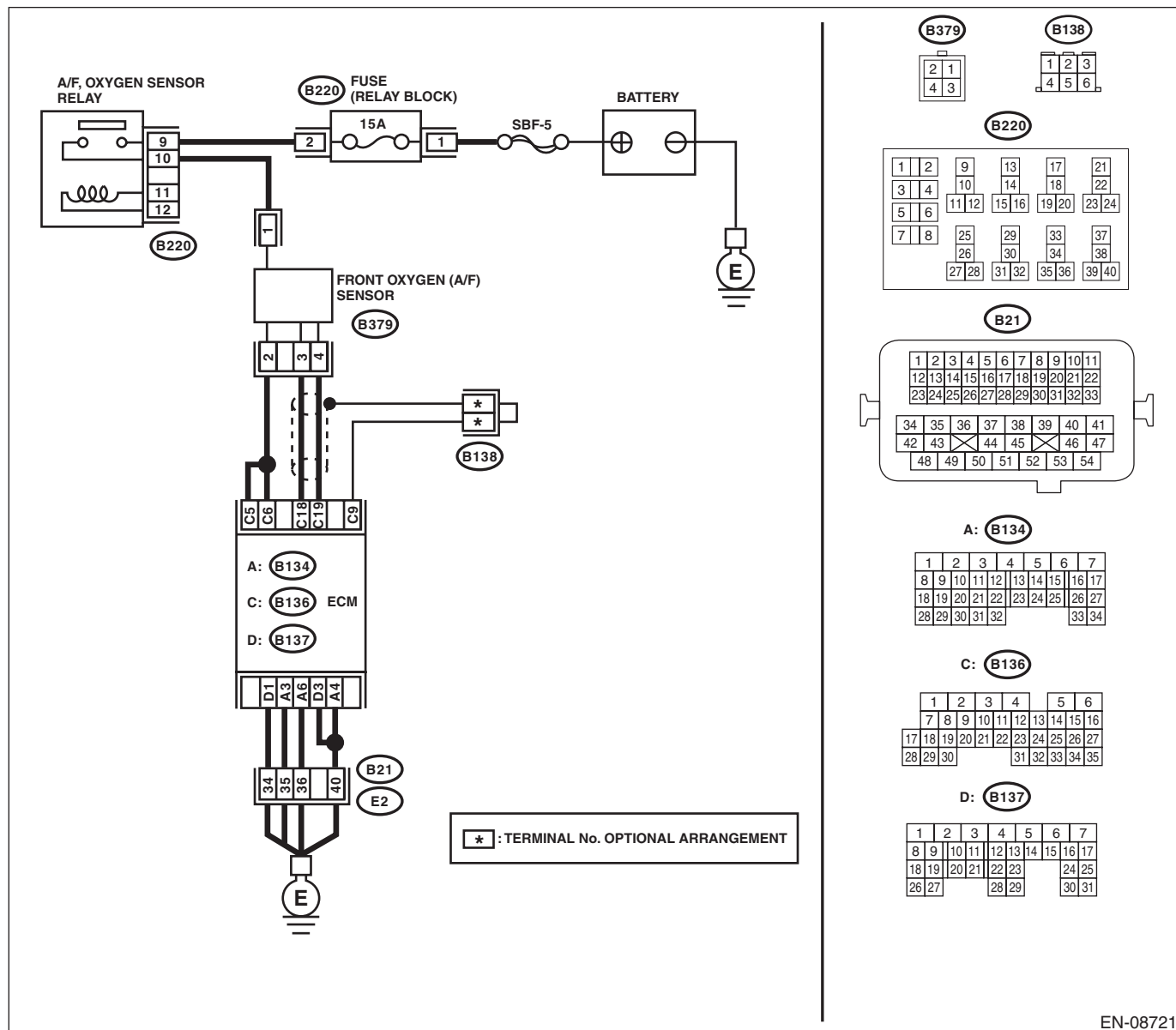


EN-08720

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08721

Step	Check	Yes	No
1	CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.	Has water entered the connector?	Completely remove any water inside.
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 and front oxygen (A/F) sensor connector. 3) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B136) No. 19 — Chassis ground: (B136) No. 18 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.
			Repair the short circuit to ground in harness between ECM connector and front oxygen (A/F) sensor connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
3 CHECK FOR POOR CONTACT. Check for poor contact of the front oxygen (A/F) sensor connector.	Is there poor contact of front oxygen (A/F) sensor connector?	Repair the poor contact of front oxygen (A/F) sensor connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(STI)-54, Front Oxygen (A/F) Sensor.> <Ref. to FU(w/o STI)-53, Front Oxygen (A/F) Sensor.>

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

DTC DETECTING CONDITION:

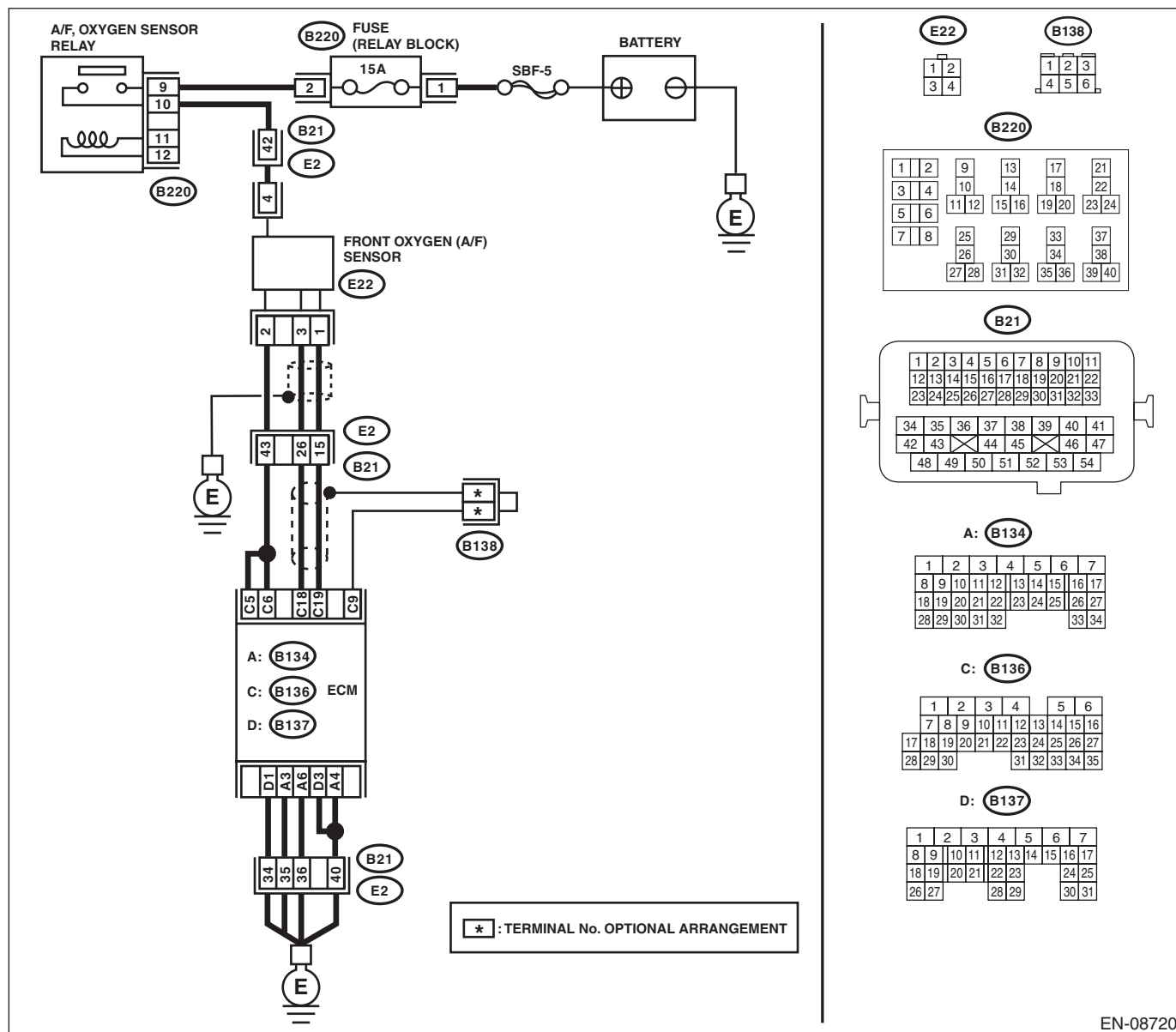
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-69, DTC P0132 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>

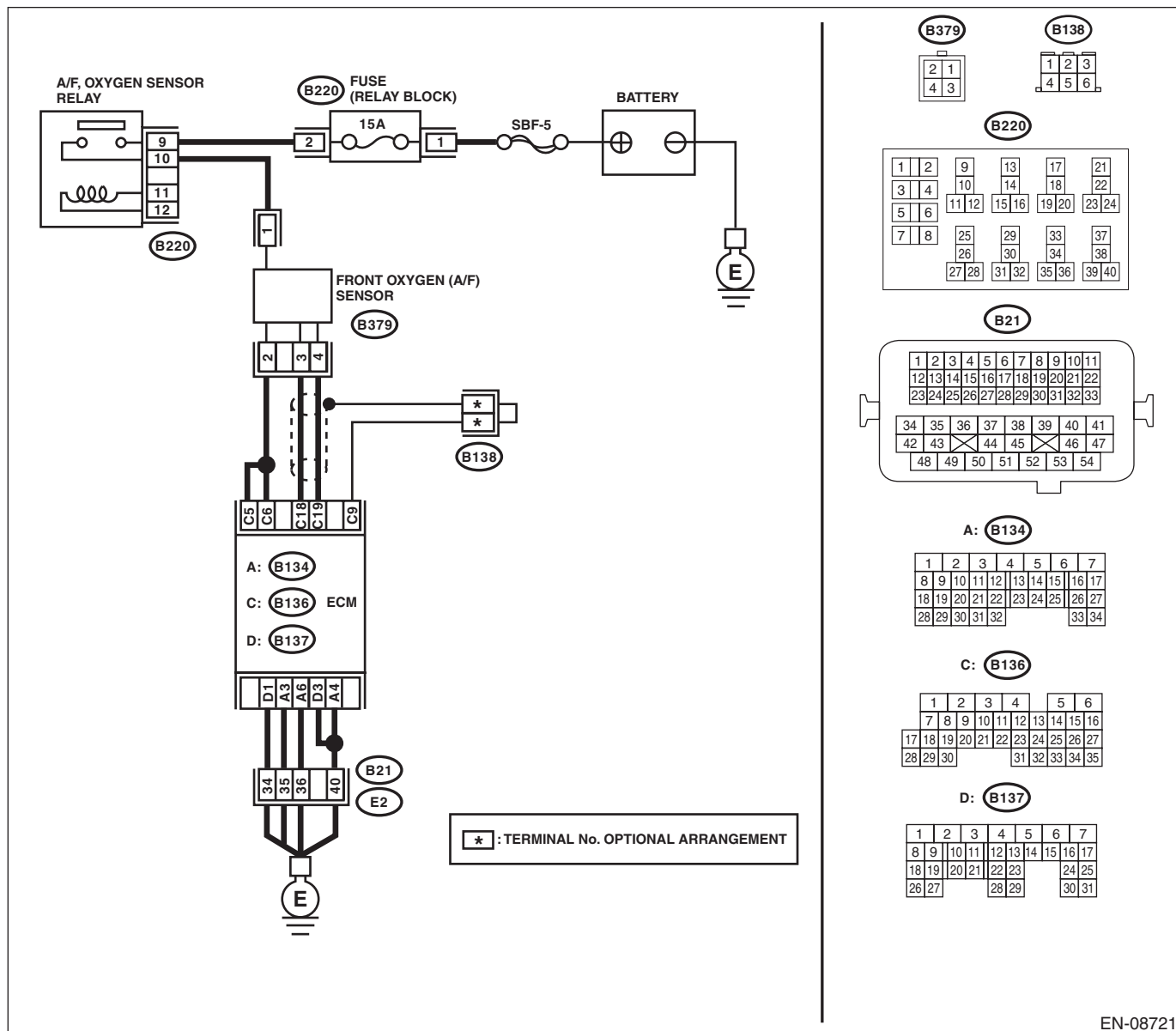


EN-08720

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08721

Step	Check	Yes	No
1	CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.	Has water entered the connector?	Completely remove any water inside.
2	CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from front oxygen (A/F) sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 19 (+) — Chassis ground (-): (B136) No. 18 (+) — Chassis ground (-):	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector.
			Replace the front oxygen (A/F) sensor. <Ref. to FU(STI)-54, Front Oxygen (A/F) Sensor.> <Ref. to FU(w/o STI)-53, Front Oxygen (A/F) Sensor.>

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

DTC DETECTING CONDITION:

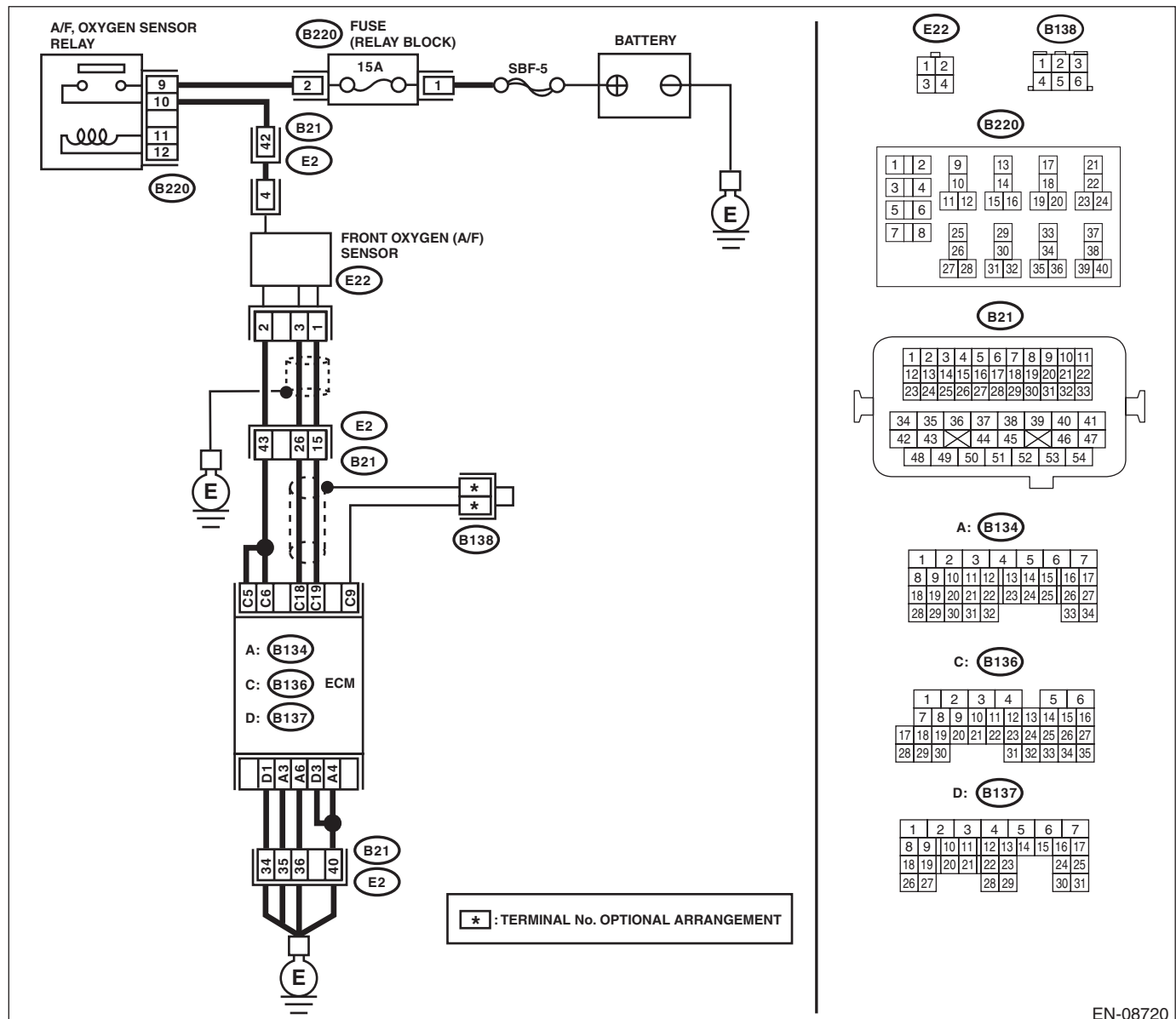
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-71, DTC P0134 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>

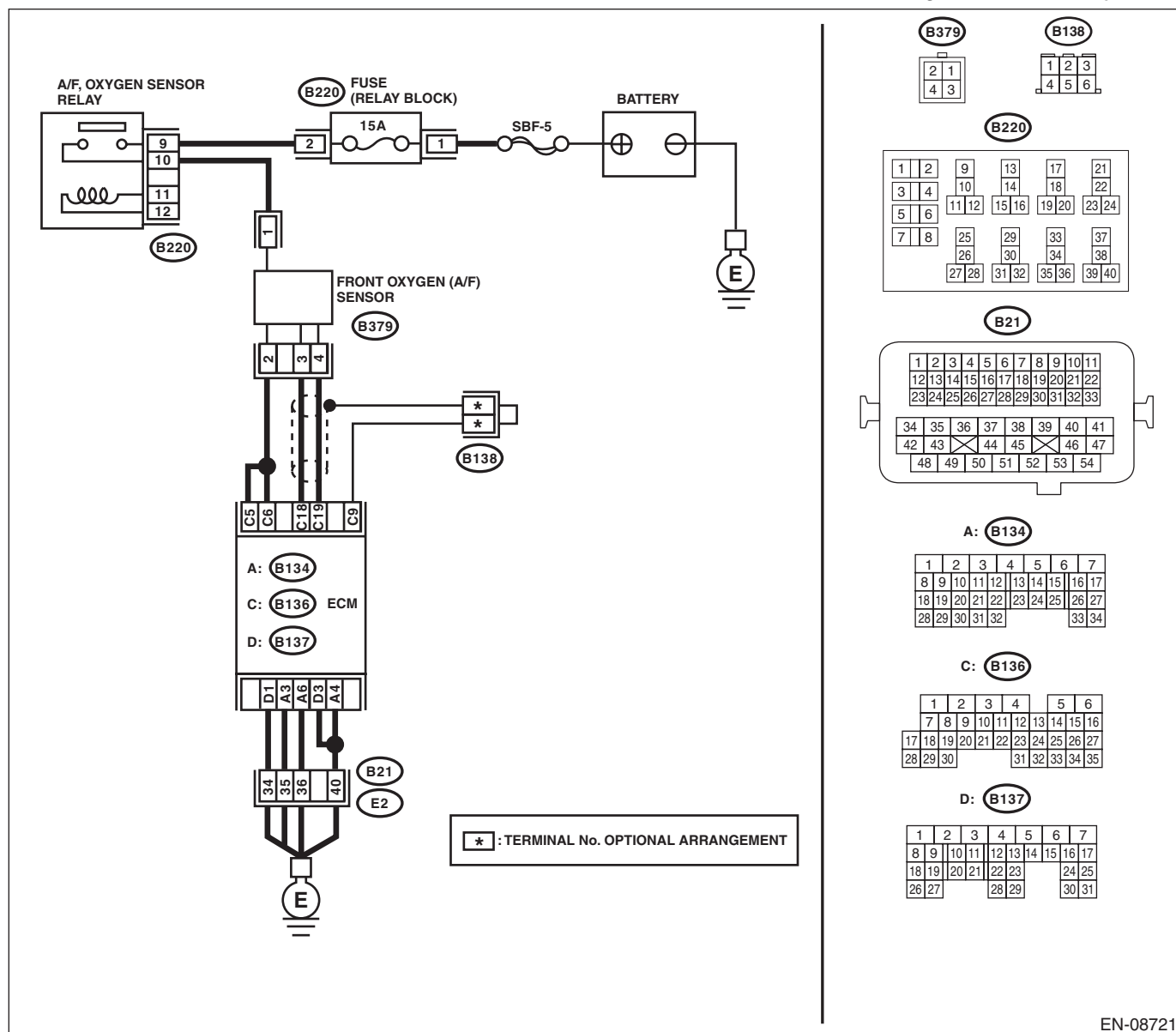


EN-08720

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08721

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 connectors from ECM and front oxygen (A/F) sensor connector. 3) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. Connector & terminal Models without SI-DRIVE (B136) No. 19 — (E22) No. 1: (B136) No. 18 — (E22) No. 3: Models with SI-DRIVE (B136) No. 19 — (B379) No. 4: (B136) No. 18 — (B379) No. 3:	Is the resistance less than 1 Ω?	Go to step 2.	Repair the open circuit of harness between ECM connector and front oxygen (A/F) sensor connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK FOR POOR CONTACT. Check for poor contact of ECM and front oxygen (A/F) sensor connector.	Is there poor contact of 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(STI)-54, Front Oxygen (A/F) Sensor.> <Ref. to FU(w/o STI)-53, Front Oxygen (A/F) Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

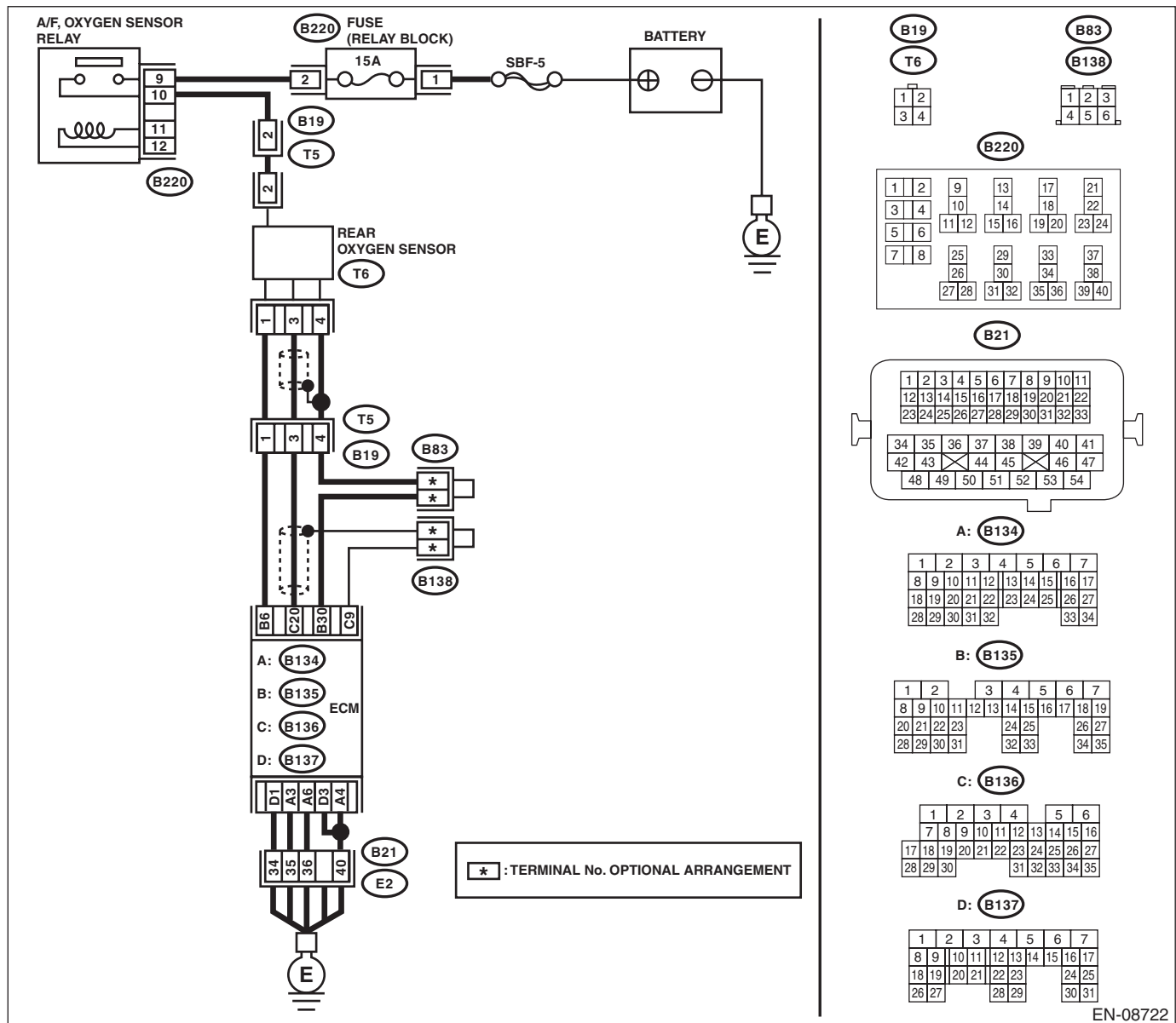
- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-73, DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>

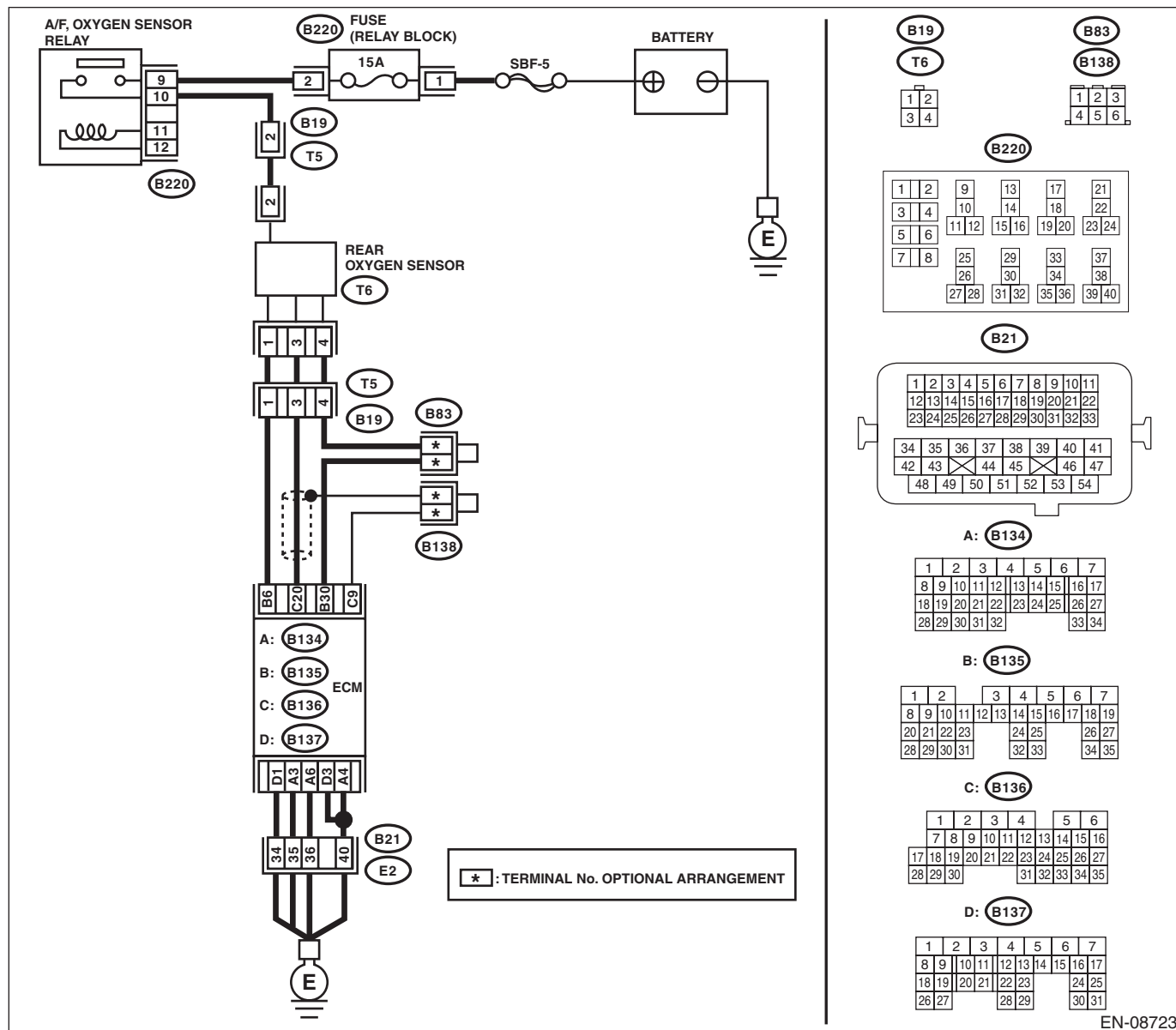


EN-08722

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08723

Step	Check	Yes	No
1 CHECK REAR OXYGEN SENSOR DATA. 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and keep the engine speed at 3,000 rpm. (2 minutes maximum) 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.490 V or more?	Go to step 5.	Go to step 2.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.	Has water entered the connector?	Completely remove any water inside.	Go to step 3.
3 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 connector and rear oxygen sensor connector. Connector & terminal (B136) No. 20 — (T6) No. 3: (B135) No. 30 — (T6) No. 4:	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 connector and rear oxygen sensor connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and chassis ground. Connector & terminal (T6) No. 3 (+) — Chassis ground (-):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(STI)-56, Rear Oxygen Sensor.> <Ref. to FU(w/o STI)-55, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of ECM connector • Poor contact of coupling connector
5 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 • Loose part and improper installation 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(STI)-56, Rear Oxygen Sensor.> <Ref. to FU(w/o STI)-55, Rear Oxygen Sensor.>

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

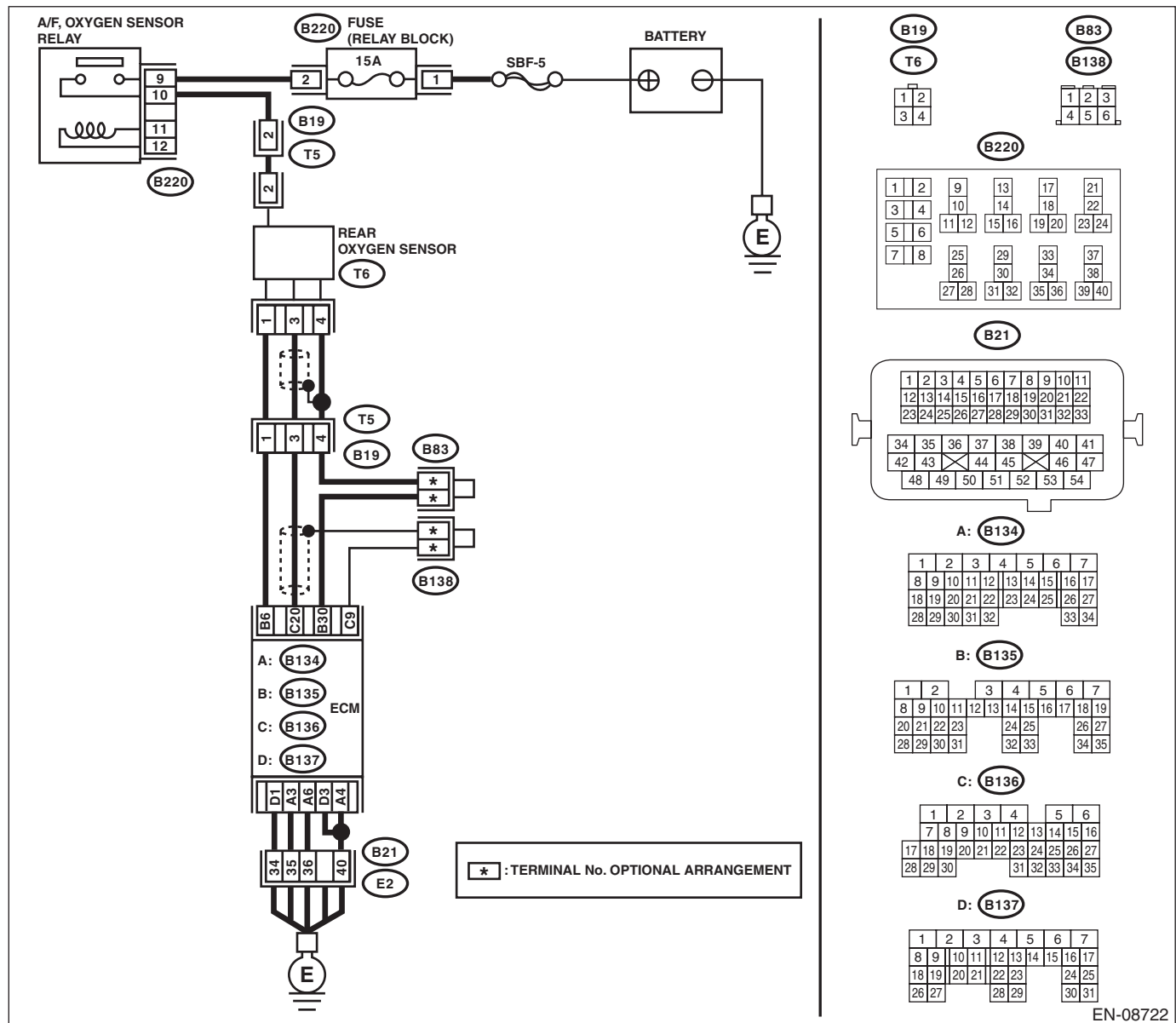
- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-75, DTC P0138 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>

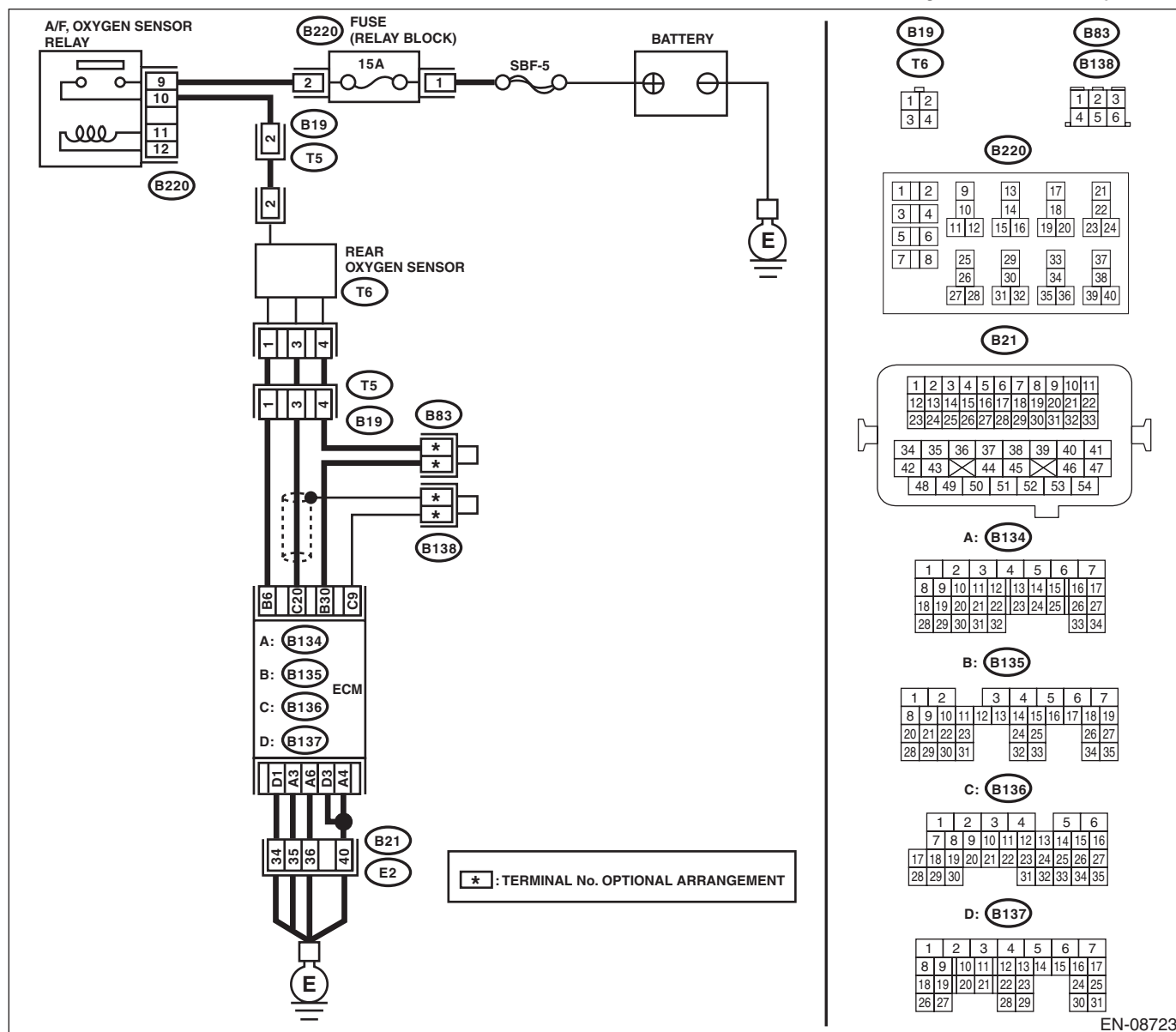


EN-08722

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



Step	Check	Yes	No
1 CHECK REAR OXYGEN SENSOR DATA. 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.250 V or less?	Go to step 5.	Go to step 2.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

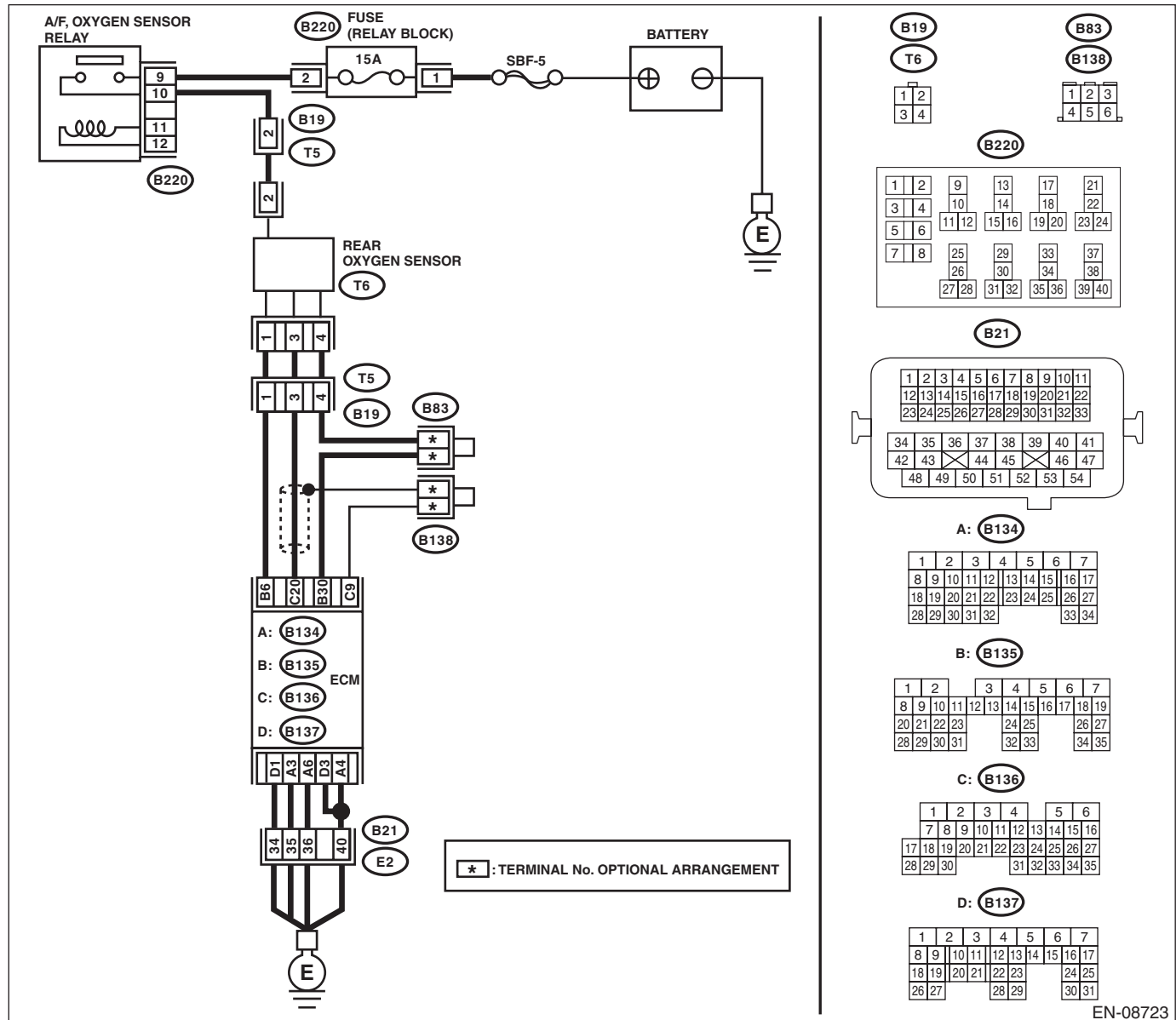
Step	Check	Yes	No
2 CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.	Has water entered the connector?	Completely remove any water inside.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM connector and rear oxygen sensor connector. Connector & terminal (B136) No. 20 — (T6) No. 3: (B135) No. 30 — (T6) No. 4:	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 connector and rear oxygen sensor connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and chassis ground. Connector & terminal (T6) No. 3 (+) — Chassis ground (-):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(STI)-56, Rear Oxygen Sensor.> <Ref. to FU(w/o STI)-55, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of ECM connector • Poor contact of coupling connector
5 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 • Loose part and improper installation 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(STI)-56, Rear Oxygen Sensor.> <Ref. to FU(w/o STI)-55, Rear Oxygen Sensor.>

ENGINE (DIAGNOSTICS)

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08723

Step	Check	Yes	No
1 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 connector and rear oxygen sensor connector. Connector & terminal (B136) No. 20 — (T6) 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 in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. Measure the resistance between rear oxygen sensor connector and chassis ground. Connector & terminal (T6) No. 3 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 3.	Repair the short circuit to ground in harness between ECM connector and rear oxygen sensor connector.
3 CHECK REAR OXYGEN SENSOR. Measure the resistance between rear oxygen sensor terminals. Terminals No. 3 — No. 4	Is the resistance less than 1 Ω ?	Replace the rear oxygen sensor. <Ref. to FU(STI)-56, Rear Oxygen Sensor.> <Ref. to FU(w/o STI)-55, Rear Oxygen Sensor.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

AJ:DTC P013B O2 SENSOR SLOW RESPONSE - LEAN TO RICH (BANK 1 SENSOR 2)

NOTE:

For the diagnostic procedure, refer to DTC P013A. <Ref. to EN(H4DOTC)(diag)-164, DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AK:DTC P013E O2 SENSOR DELAYED RESPONSE - RICH TO LEAN (BANK 1 SENSOR 2)

NOTE:

For the diagnostic procedure, refer to DTC P013A. <Ref. to EN(H4DOTC)(diag)-164, DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AL:DTC P013F O2 SENSOR DELAYED RESPONSE - LEAN TO RICH (BANK 1 SENSOR 2)

NOTE:

For the diagnostic procedure, refer to DTC P013A. <Ref. to EN(H4DOTC)(diag)-164, DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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

DTC DETECTING CONDITION:

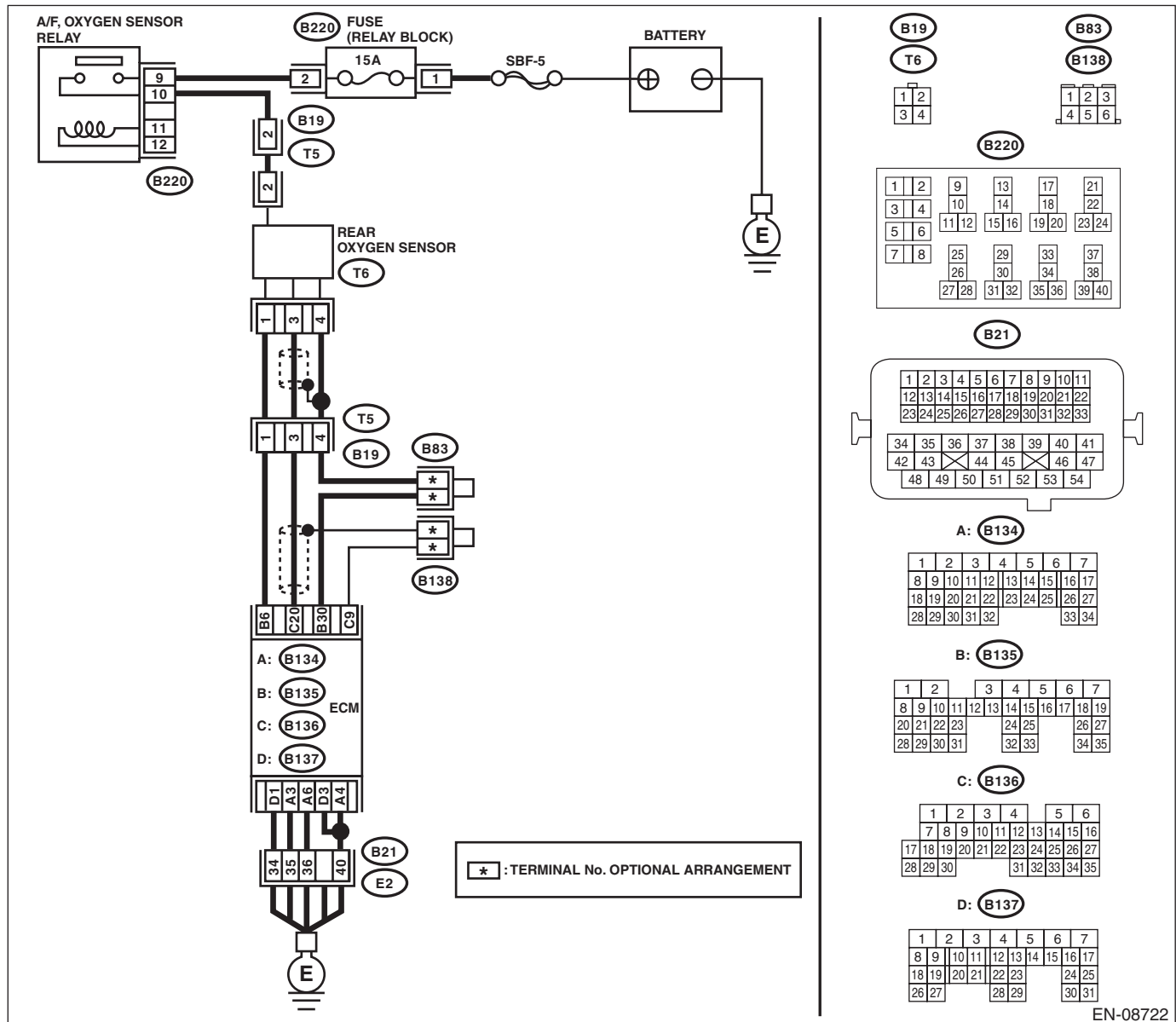
- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-84, DTC P0140 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK1 SENSOR2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

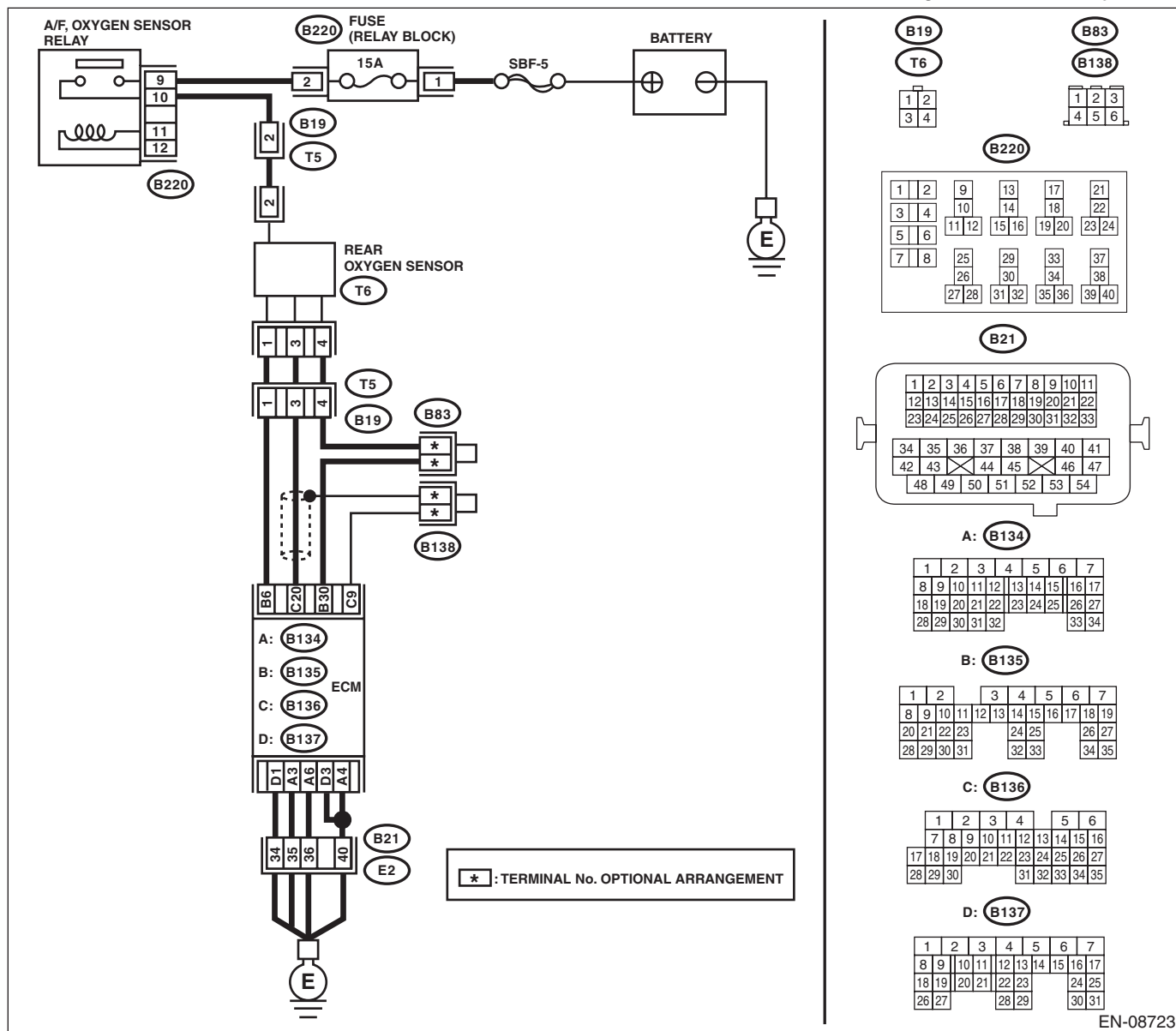
- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08723

Step	Check	Yes	No
1 CHECK REAR OXYGEN SENSOR DATA. 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and keep the engine speed at 3,000 rpm. (2 minutes maximum) 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.490 V or more?	Go to step 6.	Go to step 2.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK REAR OXYGEN SENSOR DATA. 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.250 V or less?	Go to step 6.	Go to step 3.
3 CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.	Has water entered the connector?	Completely remove any water inside.	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 connector and rear oxygen sensor connector. Connector & terminal (B136) No. 20 — (T6) No. 3: (B135) No. 30 — (T6) No. 4:	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 connector and rear oxygen sensor connector • Poor contact of coupling connector
5 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and chassis ground. Connector & terminal (T6) No. 3 (+) — Chassis ground (-):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(STI)-56, Rear Oxygen Sensor.> <Ref. to FU(w/o STI)-55, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of ECM connector • Poor contact of coupling connector
6 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 • Loose part and improper installation 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(STI)-56, Rear Oxygen Sensor.> <Ref. to FU(w/o STI)-55, Rear Oxygen Sensor.>

AN:DTC P0141 O2 SENSOR HEATER CIRCUIT (BANK1 SENSOR2)

For the diagnostic procedure, refer to DTC P0037. <Ref. to EN(H4DOTC)(diag)-113, DTC P0037 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AO:DTC P014C O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 1)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-88, DTC P014C O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 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(STI)-54, Front Oxygen (A/F) Sensor.> <Ref. to FU(w/o STI)-53, Front Oxygen (A/F) Sensor.>

AP:DTC P014D O2 SENSOR SLOW RESPONSE - LEAN TO RICH (BANK 1 SENSOR 1)

NOTE:

For the diagnostic procedure, refer to DTC P014C. <Ref. to EN(H4DOTC)(diag)-170, DTC P014C O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AQ:DTC P015A O2 SENSOR DELAYED RESPONSE - RICH TO LEAN (BANK 1 SENSOR 1)

NOTE:

For the diagnostic procedure, refer to DTC P014C. <Ref. to EN(H4DOTC)(diag)-170, DTC P014C O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AR:DTC P015B O2 SENSOR DELAYED RESPONSE - LEAN TO RICH (BANK 1 SENSOR 1)

NOTE:

For the diagnostic procedure, refer to DTC P014C. <Ref. to EN(H4DOTC)(diag)-170, DTC P014C O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AS:DTC P0171 SYSTEM TOO LEAN (BANK 1)

For the diagnostic procedure, refer to DTC P0172. <Ref. to EN(H4DOTC)(diag)-171, DTC P0172 SYSTEM TOO RICH (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AT:DTC P0172 SYSTEM TOO RICH (BANK 1)**DTC DETECTING CONDITION:**

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-99, DTC P0172 SYSTEM TOO RICH (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, 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 OPEN FLAMES" signs near the working area. CAUTION: Be careful not to spill fuel. Measure the fuel pressure while disconnecting pressure regulator vacuum hose from intake manifold. <Ref. to ME(STI)-25, INSPECTION, Fuel Pressure.> <Ref. to ME(w/o STI)-24, INSPECTION, Fuel Pressure.> CAUTION: Release fuel pressure before removing the fuel pressure gauge. NOTE: If fuel pressure does not increase, squeeze the fuel return hose 2 to 3 times, then measure fuel pressure again.	Is the measured value 284 — 314 kPa (2.9 — 3.2 kg/cm ² , 41 — 46 psi)?	Go to step 4.	Check the fuel pump and fuel delivery line. • Models without SI-DRIVE <Ref. to FU(w/o STI)-79, INSPECTION, Fuel Pump.> <Ref. to FU(w/o STI)-93, INSPECTION, Fuel Delivery, Return and Evaporation Lines.> • Models with SI-DRIVE <Ref. to FU(STI)-81, INSPECTION, Fuel Pump.> <Ref. to FU(STI)-97, INSPECTION, Fuel Delivery, Return and Evaporation Lines.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
4 CHECK FUEL PRESSURE. After connecting the pressure regulator vacuum hose, measure fuel pressure. <Ref. to ME(STI)-25, INSPECTION, Fuel Pressure.> <Ref. to ME(w/o STI)-24, INSPECTION, Fuel Pressure.> CAUTION: Release fuel pressure before removing the fuel pressure gauge. NOTE: - If fuel pressure does not increase, squeeze fuel return hose 2 to 3 times, then measure fuel pressure again. - If the measured value at this step is out of specification, check or replace pressure regulator and pressure regulator vacuum hose.	Is the measured value 230 — 260 kPa (2.4 — 2.7 kg/cm ² , 33 — 38 psi)?	Go to step 5.	Check the fuel pump and fuel delivery line. - Models without SI-DRIVE <Ref. to FU(w/o STI)-79, INSPECTION, Fuel Pump.> <Ref. to FU(w/o STI)-93, INSPECTION, Fuel Delivery, Return and Evaporation Lines.> - Models with SI-DRIVE <Ref. to FU(STI)-81, INSPECTION, Fuel Pump.> <Ref. to FU(STI)-97, INSPECTION, Fuel Delivery, Return and Evaporation Lines.>
5 CHECK ENGINE COOLANT TEMPERATURE SENSOR. 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: - Subaru Select Monitor For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Go to step 6.	Replace the engine coolant temperature sensor. <Ref. to FU(STI)-34, Engine Coolant Temperature Sensor.> <Ref. to FU(w/o STI)-34, Engine Coolant Temperature Sensor.>
6 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°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 value of «Mass Air Flow» using the Subaru Select Monitor or a general scan tool. NOTE: - Subaru Select Monitor For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mass Air Flow» 2.0 — 5.0 g/s (0.26 — 0.66 lb/m)?	Go to step 7.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(STI)-42, Mass Air Flow and Intake Air Temperature Sensor.> <Ref. to FU(w/o STI)-42, Mass Air Flow and Intake Air Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°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 value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Subtract ambient temperature from «Intake Air Temp.». Is the obtained value -10 — 50°C (-18 — 90°F)?	Repair the poor contact of ECM connector.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(STI)-42, Mass Air Flow and Intake Air Temperature Sensor.> <Ref. to FU(w/o STI)-42, Mass Air Flow and Intake Air Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AU:DTC P0201 INJECTOR #1

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-100, DTC P0201 INJECTOR #1, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

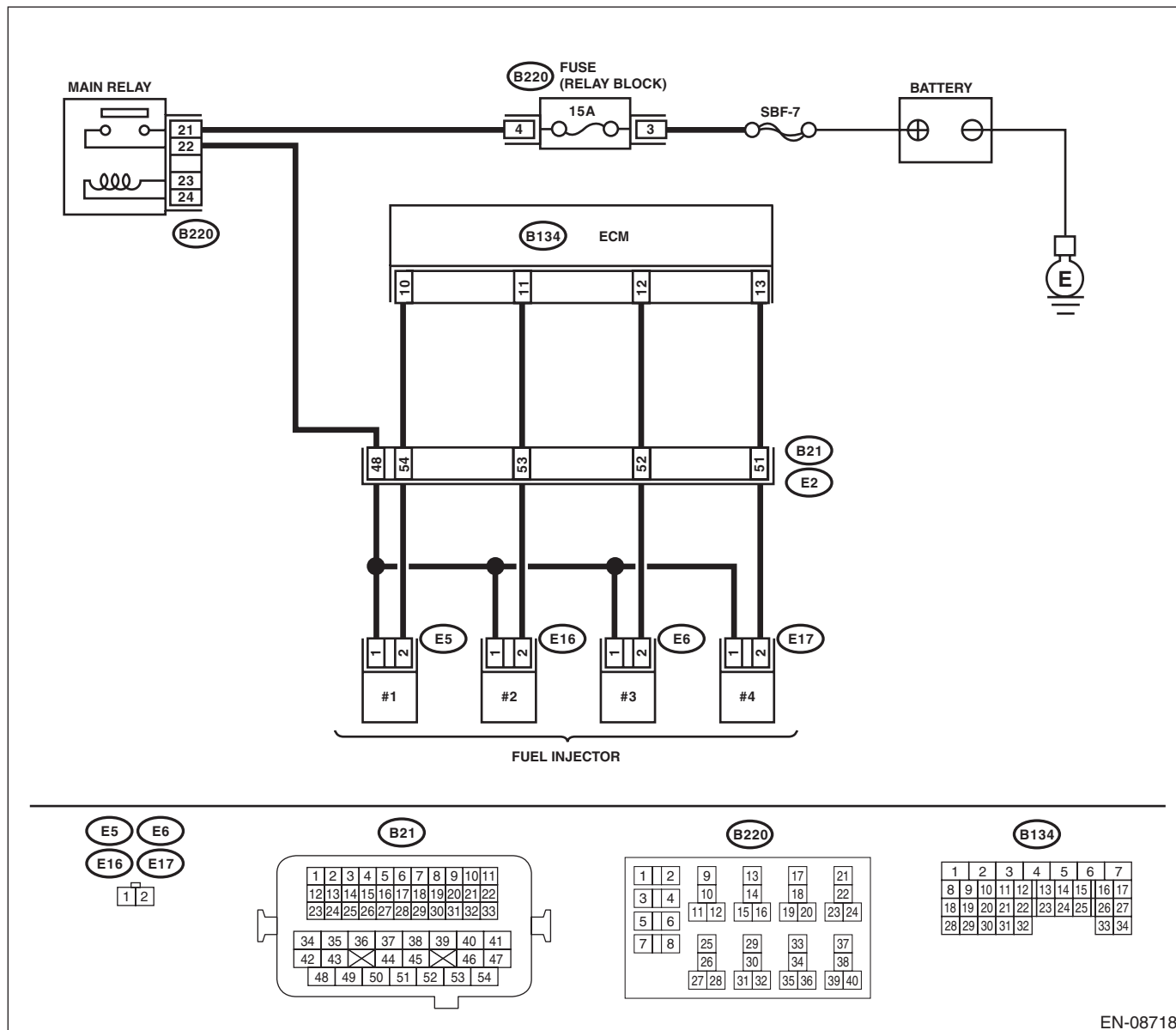
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08718

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK POWER SUPPLY TO 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 voltage between fuel injector connector and the engine ground. Connector & terminal DTC P0201; (E5) No. 1 (+) — Engine ground (-): DTC P0202; (E16) No. 1 (+) — Engine ground (-): DTC P0203; (E6) No. 1 (+) — Engine ground (-): DTC P0204; (E17) No. 1 (+) — Engine ground (-):	Is the voltage 10 V or more?	Go to step 2.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between main relay and fuel injector connector • Poor contact of main relay connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between fuel injector connector and engine ground. Connector & terminal DTC P0201; (E5) No. 2 — Engine ground: DTC P0202; (E16) No. 2 — Engine ground: DTC P0203; (E6) No. 2 — Engine ground: DTC P0204; (E17) No. 2 — Engine ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
3 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. Measure the resistance of harness between ECM connector and fuel injector connector. Connector & terminal DTC P0201; (B134) No. 10 — (E5) No. 2: DTC P0202; (B134) No. 11 — (E16) No. 2: DTC P0203; (B134) No. 12 — (E6) No. 2: DTC P0204; (B134) No. 13 — (E17) No. 2:	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 connector and fuel injector connector • Poor contact of coupling connector
4 CHECK FUEL INJECTOR. Measure the resistance between fuel injector terminals on the corresponding cylinder. Terminals No. 1 — No. 2:	Is the resistance 5 — 20 Ω?	Go to step 5.	Replace the fuel injector. <Ref. to FU(STI)-45, Fuel Injector.> <Ref. to FU(w/o STI)-45, Fuel Injector.>
5 CHECK FOR POOR CONTACT. Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Go to step 6.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK FUEL INJECTOR OPERATION. 1) Connect all connectors. 2) Start the engine. 3) Check if the corresponding fuel injector emits operating sound. NOTE: Use a sound scope to check the operating sound.	Does the fuel injector emit operating sound?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Repair the poor contact of fuel injector connector.

AV:DTC P0202 INJECTOR #2

NOTE:

For the diagnostic procedure, refer to DTC P0201. <Ref. to EN(H4DOTC)(diag)-174, DTC P0201 INJECTOR #1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AW:DTC P0203 INJECTOR #3

NOTE:

For the diagnostic procedure, refer to DTC P0201. <Ref. to EN(H4DOTC)(diag)-174, DTC P0201 INJECTOR #1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AX:DTC P0204 INJECTOR #4

NOTE:

For the diagnostic procedure, refer to DTC P0201. <Ref. to EN(H4DOTC)(diag)-174, DTC P0201 INJECTOR #1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-102, DTC P0222 THROTTLE/PEDAL POSITION SENSOR/SWITCH “B” CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Improper idling
- Poor driving performance
- Engine stalls.

CAUTION:

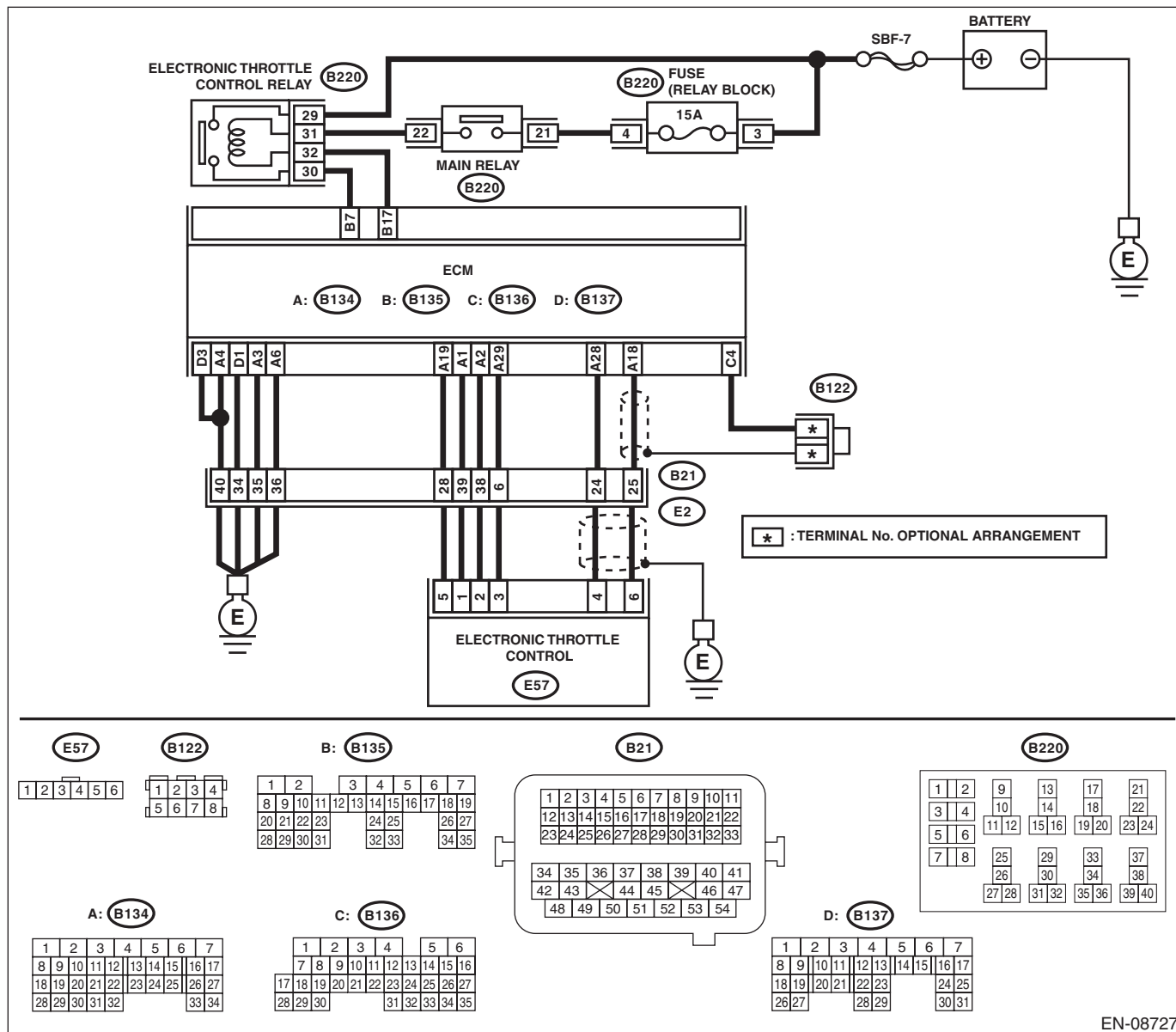
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08727

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 19 — Chassis ground: (B134) No. 28 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 2.	Repair the ground 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
2 CHECK SHORT CIRCUIT INSIDE THE ECM. 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 4 — Engine ground:	Is the resistance 1 M Ω or more?	Replace the electronic throttle control. <Ref. to FU(STI)-15, Throttle Body.> <Ref. to FU(w/o STI)-15, Throttle Body.>	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(STI)-59, Engine Control Module (ECM).> <Ref. to FU(w/o STI)-57, Engine Control Module (ECM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-104, DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH “B” CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Improper idling
- Poor driving performance
- Engine stalls.

CAUTION:

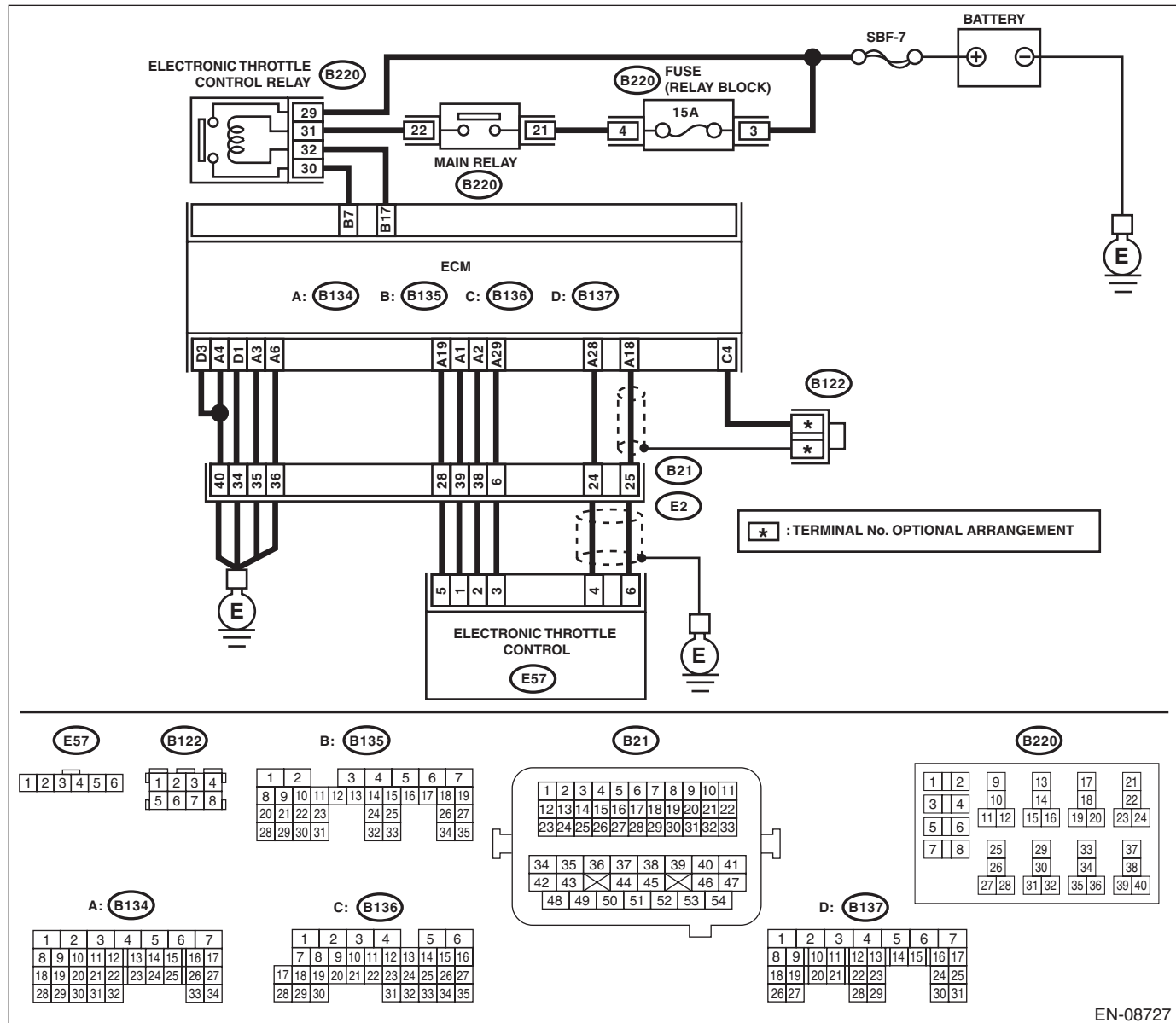
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08727

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance of harness between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 28 — (E57) No. 4: (B134) No. 29 — (E57) 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 in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Connect the connector to ECM. 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 3.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to ON. 2) Measure the voltage between electronic throttle control connector and engine ground. Connector & terminal (E57) No. 4 (+) — Engine ground (-):	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step 4.
4 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. Connector & terminal (B134) No. 19 — (B134) No. 28:	Is the resistance 1 M Ω or more?	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(STI)-15, Throttle Body.> <Ref. to FU(w/o STI)-15, Throttle Body.>	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.

BA:DTC P0230 FUEL PUMP PRIMARY CIRCUIT

DTC DETECTING CONDITION:

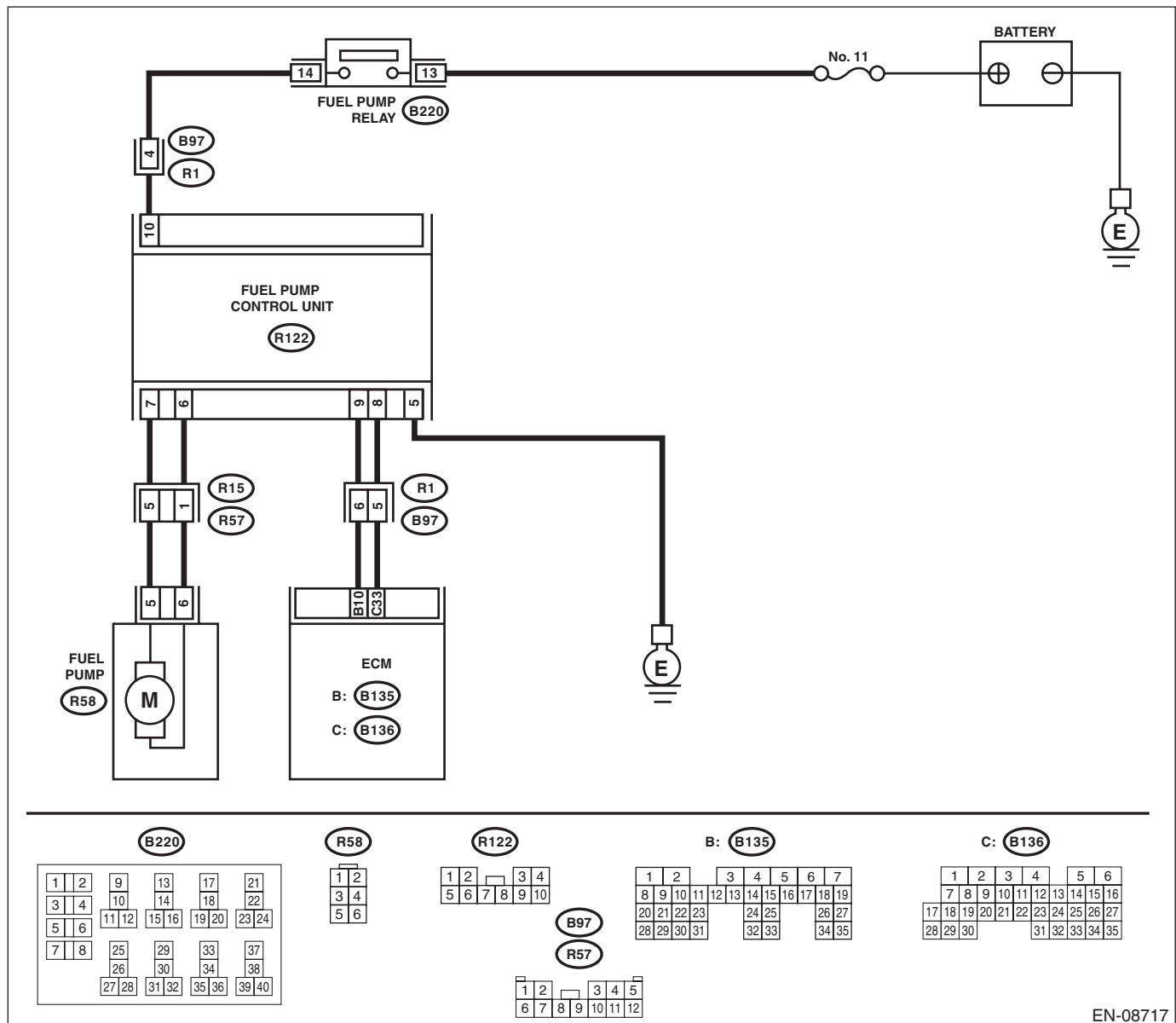
- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-106, DTC P0230 FUEL PUMP PRIMARY CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08717

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK POWER SUPPLY CIRCUIT TO FUEL PUMP CONTROL UNIT. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel pump control unit. 3) Turn the ignition switch to ON. 4) Measure the voltage between fuel pump control unit connector and chassis ground. Connector & terminal (R122) No. 10 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 2.	Repair the power supply circuit. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness between fuel pump relay connector and fuel pump control unit connector • Poor contact of fuel pump relay connector • Poor contact of coupling connector
2 CHECK GROUND CIRCUIT OF FUEL PUMP CONTROL UNIT. 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between fuel pump control unit connector and chassis ground. Connector & terminal (R122) No. 5 — Chassis ground:	Is the resistance less than 5 Ω ?	Go to step 3.	Repair the open circuit in harness between fuel pump control unit connector and chassis ground.
3 CHECK HARNESS BETWEEN FUEL PUMP CONTROL UNIT AND FUEL PUMP CONNECTOR. 1) Disconnect the connector from fuel pump. 2) Measure the resistance of harness between fuel pump control unit and fuel pump connector. Connector & terminal (R122) No. 7 — (R58) No. 5: (R122) No. 6 — (R58) 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 in harness between fuel pump control unit connector and fuel pump connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN FUEL PUMP CONTROL UNIT AND FUEL PUMP CONNECTOR. Measure the resistance between fuel pump control unit connector and chassis ground. Connector & terminal (R122) No. 7 — Chassis ground: (R122) No. 6 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the short circuit to ground in harness between fuel pump control unit connector and fuel pump connector.
5 CHECK HARNESS BETWEEN ECM AND FUEL PUMP CONTROL UNIT CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and fuel pump control unit connector. Connector & terminal (B135) No. 10 — (R122) No. 9: (B136) No. 33 — (R122) No. 8:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and fuel pump control unit connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK HARNESS BETWEEN ECM AND FUEL PUMP CONTROL UNIT CONNECTOR. Measure the resistance between fuel pump control unit connector and chassis ground. <i>Connector & terminal</i> <i>(R122) No. 9 — Chassis ground:</i> <i>(R122) No. 8 — Chassis ground:</i>	Is the resistance 1 MΩ or more?	Go to step 7.	Repair the short circuit to ground in harness between ECM connector and fuel pump control unit connector.
7 CHECK FOR POOR CONTACT. Check for poor contact of ECM and fuel pump control unit connector.	Is there poor contact of ECM or fuel pump control unit connector?	Repair the poor contact of ECM or fuel pump control unit connector.	Go to step 8.
8 CHECK EXPERIENCE OF RUNNING OUT OF FUEL.	Has the vehicle experienced running out of fuel?	Finish the diagnosis. NOTE: DTC may be recorded as a result of fuel pump idling while running out of fuel.	Replace the fuel pump control unit. <Ref. to FU(STI)-66, Fuel Pump Control Unit.> <Ref. to FU(w/o STI)-64, Fuel Pump Control Unit.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BB:DTC P0244 TURBO/SUPER CHARGER WASTEGATE SOLENOID “A” RANGE/PERFORMANCE

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-108, DTC P0244 TURBO/SUPER CHARGER WASTEGATE SOLENOID “A” RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK WASTEGATE ACTUATOR PIPING AND WASTEGATE CONTROL SOLENOID VALVE PIPING.	Are there any damage or disconnection of hose in wastegate actuator piping or wastegate control solenoid valve piping?	Connect the wastegate actuator pipe or wastegate control solenoid valve pipe properly. If defective, replace the hose.	Replace the wastegate control solenoid valve. <Ref. to FU(STI)-52, Wastegate Control Solenoid Valve.> <Ref. to FU(w/o STI)-51, Wastegate Control Solenoid Valve.>

BC:DTC P0245 TURBO/SUPER CHARGER WASTEGATE SOLENOID "A" LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-110, DTC P0245 TURBO/SUPER CHARGER WASTEGATE SOLENOID "A" LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

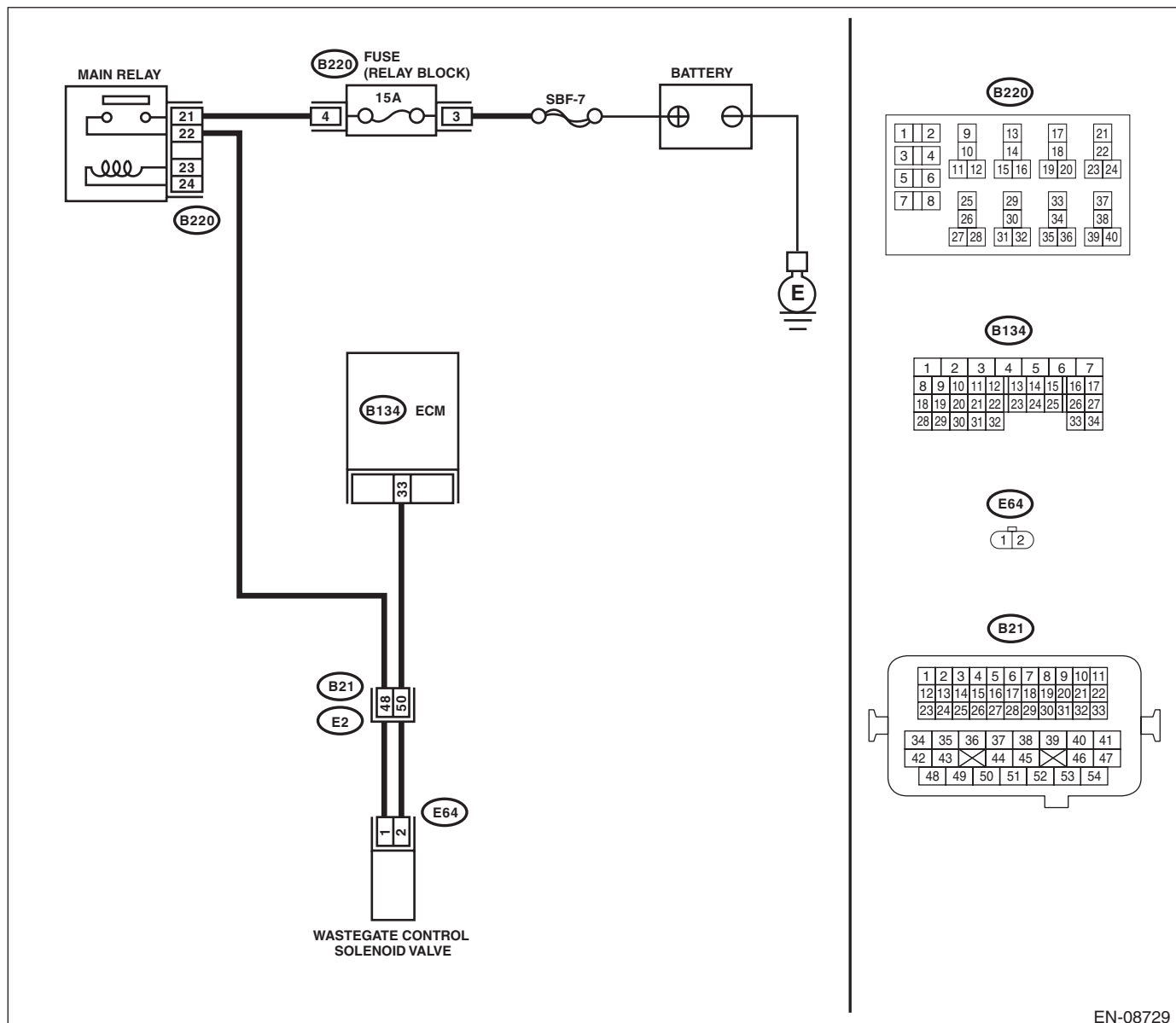
Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08729

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 (B134) No. 33 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 2.	Go to step 3.
2 CHECK FOR POOR CONTACT. Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary open or short circuit of harness or temporary poor contact of connector may be the cause.
3 CHECK POWER SUPPLY TO WASTEGATE CONTROL SOLENOID VALVE. Measure the voltage between wastegate control solenoid valve connector and engine ground. Connector & terminal (E64) No. 1 (+) — Engine ground (-):	Is the voltage 10 V or more?	Go to step 4.	Repair the power supply circuit.
4 CHECK HARNESS BETWEEN ECM AND WASTEGATE CONTROL SOLENOID VALVE CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and wastegate control solenoid valve. 3) Measure the resistance between wastegate control solenoid valve connector and engine ground. Connector & terminal (E64) No. 2 — Engine ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair ground short circuit of harness between ECM connector and wastegate control solenoid valve connector.
5 CHECK HARNESS BETWEEN ECM AND WASTEGATE CONTROL SOLENOID VALVE CONNECTOR. Measure the resistance of harness between ECM connector and wastegate control solenoid valve connector. Connector & terminal (B134) No. 33 — (E64) No. 2:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and wastegate control solenoid valve connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK WASTEGATE CONTROL SOLENOID VALVE. 1) Remove the wastegate control solenoid valve. 2) Measure the resistance between wastegate control solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance 10 — 100 Ω ?	Repair poor contact of wastegate control solenoid valve connector.	Replace the wastegate control solenoid valve. <Ref. to FU(STI)-52, Wastegate Control Solenoid Valve.> <Ref. to FU(w/o STI)-51, Wastegate Control Solenoid Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BD:DTC P0246 TURBO/SUPER CHARGER WASTEGATE SOLENOID "A" HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-112, DTC P0246 TURBO/SUPER CHARGER WASTEGATE SOLENOID "A" HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

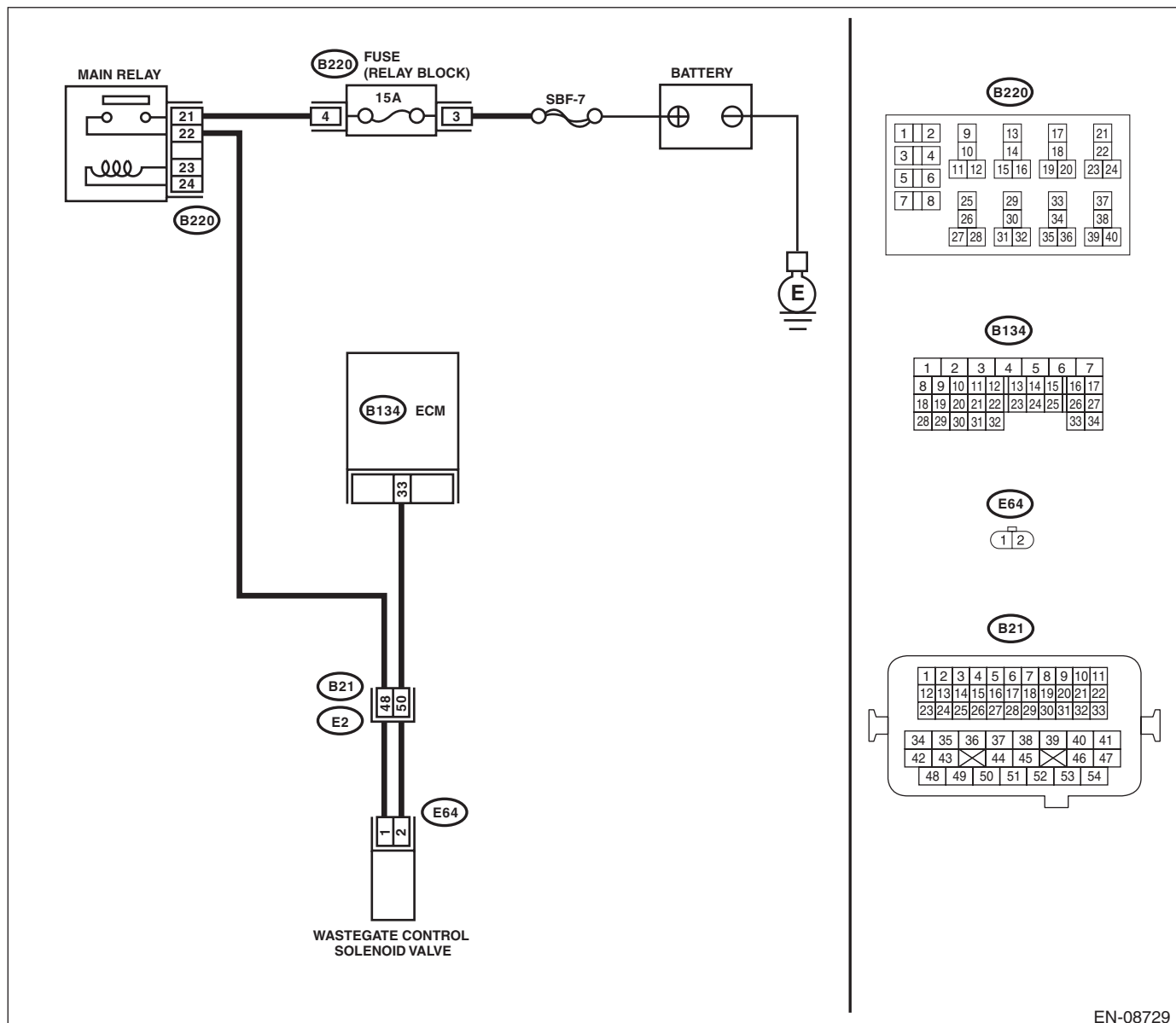
Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08729

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND WASTEGATE CONTROL SOLENOID VALVE CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and wastegate control solenoid valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B134) No. 33 (+) — Chassis ground (–):	Is the voltage 10 V or more?	Repair short circuit to power in harness between ECM connector and wastegate control solenoid valve connector.	Go to step 2.
2 CHECK WASTEGATE CONTROL SOLENOID VALVE. 1) Turn the ignition switch to OFF. 2) Measure the resistance between wastegate control solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance less than 1 Ω ?	Replace the wastegate control solenoid valve. <Ref. to FU(STI)-52, Wastegate Control Solenoid Valve.> <Ref. to FU(w/o STI)-51, Wastegate Control Solenoid Valve.>	Repair the poor contact of ECM connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BE:DTC P0300 RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- Immediately at fault recognition (A misfire which could damage catalyst occurs.)
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-113, DTC P0300 RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine stalls.
- Improper idling
- Rough driving

CAUTION:

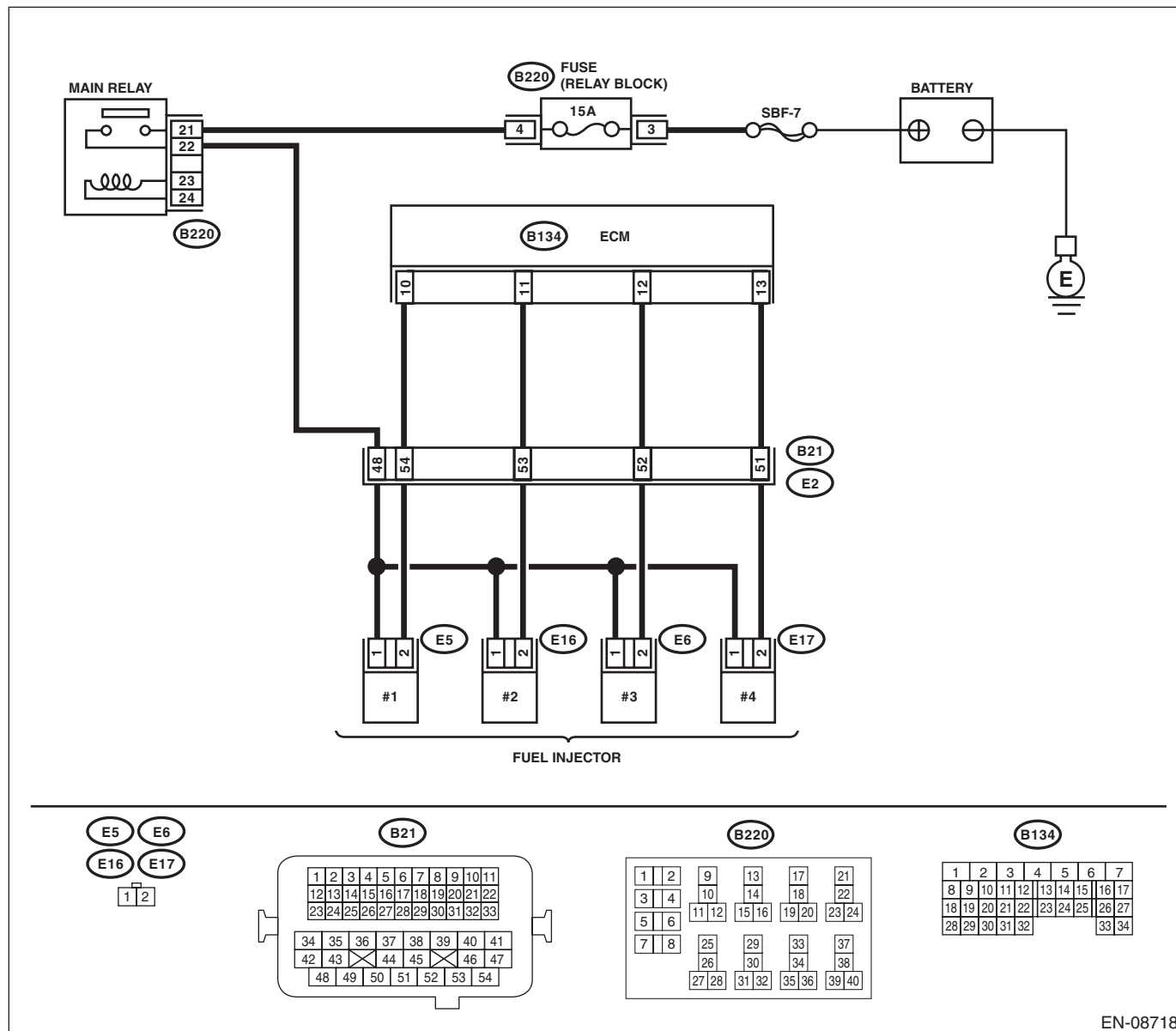
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08718

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 on all 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 10 V or more?	Go to step 6.	Go to step 2.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from all fuel injectors. 3) Measure the resistance between all fuel injector connectors and engine ground. 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 1 MΩ or more?	Go to step 3.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
3 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. Measure the resistance of harness between ECM and fuel injector connector on all 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 4.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and fuel injector connector • Poor contact of coupling connector
4 CHECK FUEL INJECTOR. Measure the resistance between all fuel injector terminals. Terminals No. 1 — No. 2:	Is the resistance 5 — 20 Ω?	Go to step 5.	Replace the faulty fuel injector. <Ref. to FU(STI)-45, Fuel Injector.> <Ref. to FU(w/o STI)-45, Fuel Injector.>
5 CHECK POWER SUPPLY LINE. 1) Turn the ignition switch to ON. 2) Measure the voltage between all fuel injector connectors and the engine ground. 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 10 V or more?	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 the main relay connector and fuel injector connector on faulty cylinders • Poor contact of coupling connector • Poor contact of main relay connector
6 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from all fuel injectors. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground on all 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 10 V or more?	Repair the short circuit to power in harness between ECM connector and fuel injector connectors.	Go to step 7.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK FUEL INJECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance between all fuel injector terminals. Terminals No. 1 — No. 2:	Is the resistance 5 — 20 Ω?	Go to step 8.	Replace the faulty fuel injector. <Ref. to FU(STI)-45, Fuel Injector.> <Ref. to FU(w/o STI)-45, Fuel Injector.>
8 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. <Ref. to FU(STI)-37, Camshaft Position Sensor.> <Ref. to FU(STI)-35, Crankshaft Position Sensor.> <Ref. to FU(w/o STI)-37, Camshaft Position Sensor.> <Ref. to FU(w/o STI)-35, Crankshaft Position Sensor.>	Go to step 9.
9 CHECK CRANK SPROCKET. Remove the timing belt cover.	Is the crank sprocket rusted or does it have broken teeth?	Replace the crank sprocket. <Ref. to ME(STI)-60, Crank Sprocket.> <Ref. to ME(w/o STI)-58, Crank Sprocket.>	Go to step 10.
10 CHECK INSTALLATION CONDITION OF TIMING BELT. Turn the crankshaft, and align alignment mark on crank sprocket with alignment mark on cylinder block. ST 499987500 CRANKSHAFT SOCKET	Is the timing belt dislocated from its proper position?	Repair the installation condition of timing belt. <Ref. to ME(STI)-50, Timing Belt.> <Ref. to ME(w/o STI)-48, Timing Belt.>	Go to step 11.
11 CHECK FUEL LEVEL.	Is the fuel meter indication higher than the “Lower” level?	Go to step 12.	Refill the fuel so that the fuel meter indication is higher than the “Lower” level, and proceed to the next step. Go to step 12.
12 CHECK STATUS OF MALFUNCTION INDICATOR LIGHT. 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DOTC)(diag)-63, Clear Memory Mode.> 2) Start the engine, and drive the vehicle 10 minutes or more.	Does the malfunction indicator light illuminate or blink?	Go to step 14.	Go to step 13.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
13 CHECK CAUSE OF MISFIRE.	Was the cause of misfire identified when the engine is running?	Finish diagnostics operation, if the engine has no abnormality.	Repair the poor contact of connector. NOTE: In this case, repair the following item: • Poor contact of ignition coil connector • Poor contact of fuel injector connector on faulty cylinders • Poor contact of ECM connector • Poor contact of coupling connector
14 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 15.
15 CHECK ALL CYLINDERS.	Is there a fault in any cylinder?	Repair or replace the faulty part of the faulty cylinder. NOTE: Check the following items. • Spark plug • Fuel injector • Ignition coil • Compression ratio • Skipping timing belt teeth	Go to DTC P0171. <Ref. to EN(H4DOTC)(diag)-170, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BF:DTC P0301 CYLINDER 1 MISFIRE DETECTED

NOTE:

For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(H4DOTC)(diag)-198, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BG:DTC P0302 CYLINDER 2 MISFIRE DETECTED

NOTE:

For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(H4DOTC)(diag)-198, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BH:DTC P0303 CYLINDER 3 MISFIRE DETECTED

NOTE:

For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(H4DOTC)(diag)-198, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BI: DTC P0304 CYLINDER 4 MISFIRE DETECTED

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- Immediately at fault recognition (A misfire which could damage catalyst occurs.)
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-123, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine stalls.
- Improper idling
- Rough driving

CAUTION:

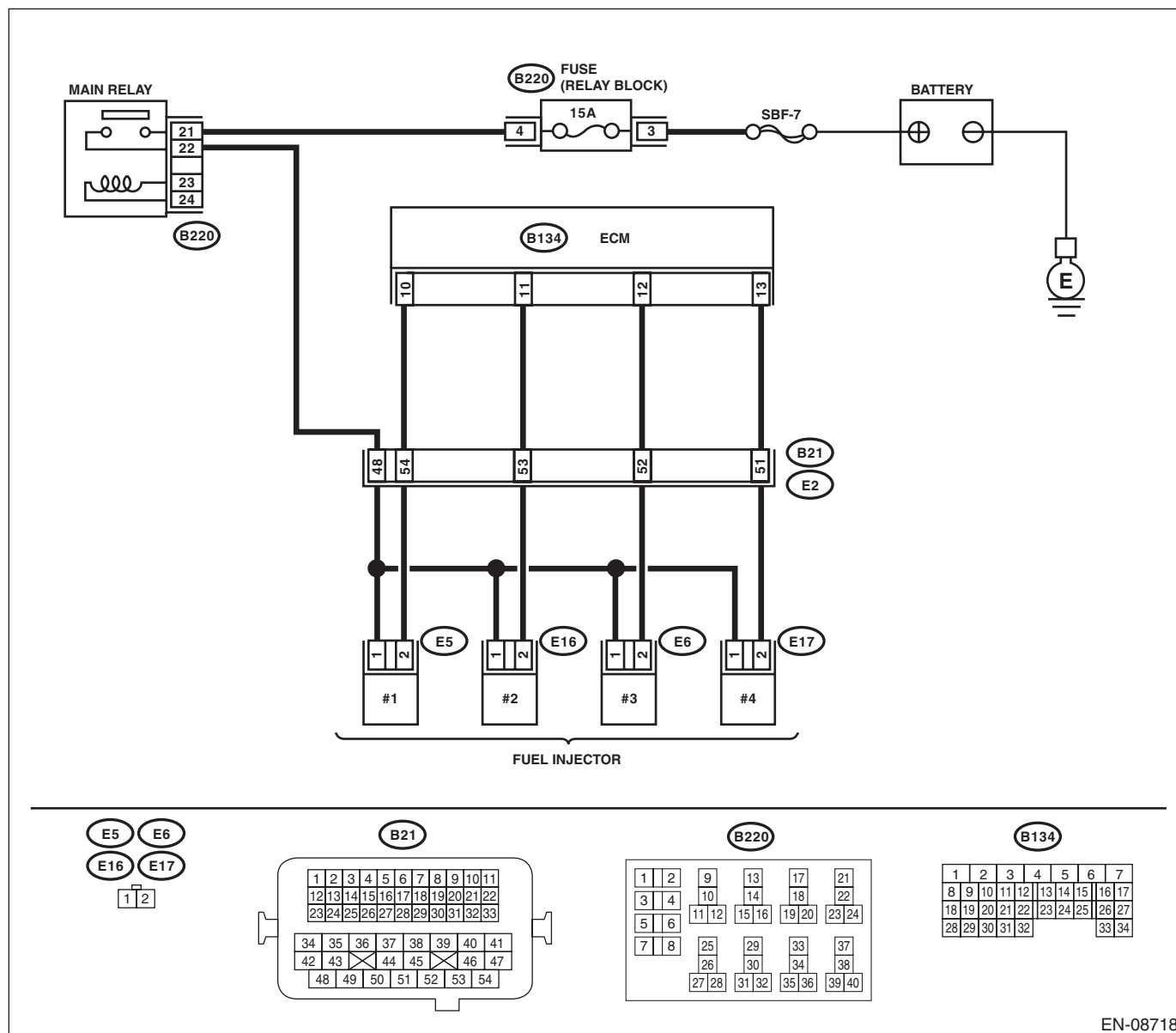
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08718

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 on faulty cylinders. Connector & terminal #1 (B134) No. 10 (+) — Chassis ground (-): #2 (B134) No. 11 (+) — Chassis ground (-): #3 (B134) No. 12 (+) — Chassis ground (-): #4 (B134) No. 13 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 6.	Go to step 2.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Measure the resistance between fuel injector connector 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 resistance 1 M Ω or more?	Go to step 3.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
3 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. Measure the resistance of harness between ECM and fuel injector connector on faulty cylinders. Connector & terminal #1 (B134) No. 10 — (E5) No. 2: #2 (B134) No. 11 — (E16) No. 2: #3 (B134) No. 12 — (E6) No. 2: #4 (B134) No. 13 — (E17) No. 2:	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 connector and fuel injector connector • Poor contact of coupling connector
4 CHECK FUEL INJECTOR. Measure the resistance between fuel injector terminals on faulty cylinder. Terminals No. 1 — No. 2:	Is the resistance 5 — 20 Ω ?	Go to step 5.	Replace the faulty fuel injector. <Ref. to FU(STI)-45, Fuel Injector.> <Ref. to FU(w/o STI)-45, Fuel Injector.>
5 CHECK POWER SUPPLY LINE. 1) Turn the ignition switch to ON. 2) Measure the voltage between fuel injector connector of faulty cylinders and engine ground. 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 voltage 10 V or more?	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 the main relay connector and fuel injector connector on faulty cylinders • Poor contact of coupling connector • Poor contact of main relay connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR 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 and chassis ground on faulty cylinders. Connector & terminal #1 (B134) No. 10 (+) — Chassis ground (-): #2 (B134) No. 11 (+) — Chassis ground (-): #3 (B134) No. 12 (+) — Chassis ground (-): #4 (B134) No. 13 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and fuel injector connectors.	Go to step 7.
7 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 5 — 20 Ω ?	Go to step 8.	Replace the faulty fuel injector. <Ref. to FU(STI)-45, Fuel Injector.> <Ref. to FU(w/o STI)-45, Fuel Injector.>
8 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. <Ref. to FU(STI)-37, Camshaft Position Sensor.> <Ref. to FU(STI)-35, Crankshaft Position Sensor.> <Ref. to FU(w/o STI)-37, Camshaft Position Sensor.> <Ref. to FU(w/o STI)-35, Crankshaft Position Sensor.>	Go to step 9.
9 CHECK CRANK SPROCKET. Remove the timing belt cover.	Is the crank sprocket rusted or does it have broken teeth?	Replace the crank sprocket. <Ref. to ME(STI)-60, Crank Sprocket.> <Ref. to ME(w/o STI)-58, Crank Sprocket.>	Go to step 10.
10 CHECK INSTALLATION CONDITION OF TIMING BELT. Turn the crankshaft, and align alignment mark on crank sprocket with alignment mark on cylinder block. ST 499987500 CRANKSHAFT SOCKET	Is the timing belt dislocated from its proper position?	Repair the installation condition of timing belt. <Ref. to ME(STI)-50, Timing Belt.> <Ref. to ME(w/o STI)-48, Timing Belt.>	Go to step 11.
11 CHECK FUEL LEVEL.	Is the fuel meter indication higher than the "Lower" level?	Go to step 12.	Refill the fuel so that the fuel meter indication is higher than the "Lower" level, and proceed to the next step. Go to step 12.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
12 CHECK STATUS OF MALFUNCTION INDICATOR LIGHT. 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DOTC)(diag)-63, Clear Memory Mode.> 2) Start the engine, and drive the vehicle 10 minutes or more.	Does the malfunction indicator light illuminate or blink?	Go to step 14.	Go to step 13.
13 CHECK CAUSE OF MISFIRE.	Was the cause of misfire identified when the engine is running?	Finish diagnostics operation, if the engine has no abnormality.	Repair the poor contact of connector. NOTE: In this case, repair the following item: • Poor contact of ignition coil connector • Poor contact of fuel injector connector on faulty cylinders • Poor contact of ECM connector • Poor contact of coupling connector
14 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 15.
15 CHECK MISFIRE SYMPTOM. 1) Turn the ignition switch to ON. 2) Check for DTC. <Ref. to EN(H4DOTC)(diag)-48, Read Diagnostic Trouble Code (DTC).>	Does the Subaru Select Monitor or general scan tool indicate only one DTC?	Go to step 18.	Go to step 16.
16 CHECK DTC.	Is DTC P0301 and P0303 displayed on the Subaru Select Monitor or general scan tool?	Go to step 19.	Go to step 17.
17 CHECK DTC.	Is DTC P0302 and P0304 displayed on the Subaru Select Monitor or general scan tool?	Go to step 20.	Go to step 21.
18 ONLY ONE CYLINDER.	Is there any fault in the cylinder?	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Ignition coil • Fuel injector • Compression ratio	Go to DTC P0171. <Ref. to EN(H4DOTC)(diag)-170, 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
19 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 • Ignition coil • Fuel injector • Compression ratio • Skipping timing belt teeth	Go to DTC P0171. <Ref. to EN(H4DOTC)(diag)-170, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
20 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 • Ignition coil • Fuel injector • Compression ratio • Skipping timing belt teeth	Go to DTC P0171. <Ref. to EN(H4DOTC)(diag)-170, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
21 CYLINDER AT RANDOM.	Is the engine idle rough?	Go to DTC P0171. <Ref. to EN(H4DOTC)(diag)-170, 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 • Ignition coil • Fuel injector • Compression ratio

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BJ:DTC P0327 KNOCK SENSOR 1 CIRCUIT LOW (BANK 1 OR SINGLE SENSOR)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-124, DTC P0327 KNOCK SENSOR 1 CIRCUIT LOW (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

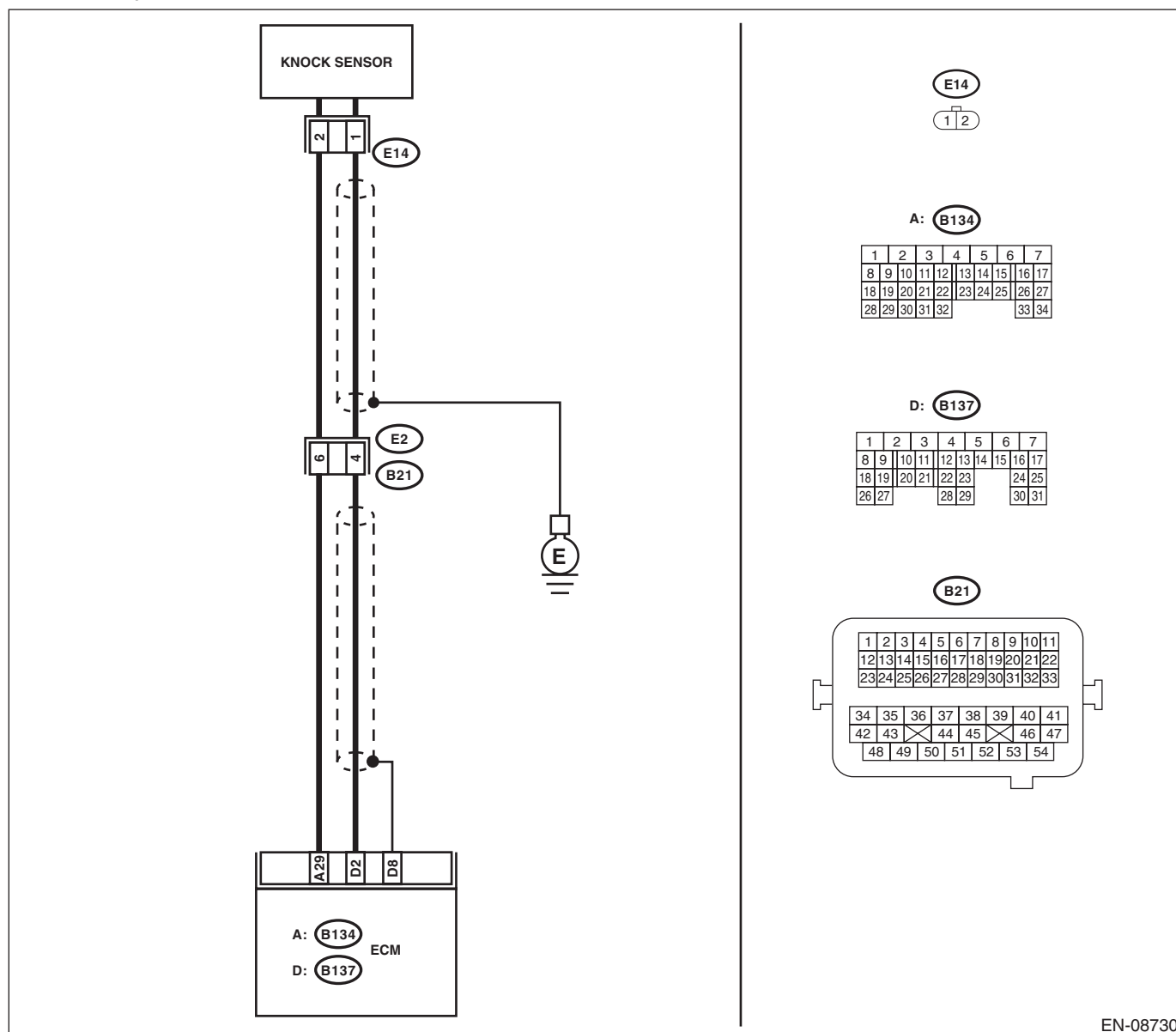
- Poor driving performance
- Knocking occurs

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08730

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND KNOCK SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. Connector & terminal (B137) No. 2 — (B134) No. 29:	Is the resistance less than 500 k Ω ?	Go to step 2.	Go to step 3.
2 CHECK KNOCK SENSOR. 1) Disconnect the connector from the knock sensor. 2) Measure the resistance between knock sensor connectors. Terminals No. 1 — No. 2:	Is the resistance less than 500 k Ω ?	Replace the knock sensor. <Ref. to FU(STI)-40, Knock Sensor.> <Ref. to FU(w/o STI)-39, Knock Sensor.>	Repair the short circuit to ground in harness between ECM connector and knock sensor connector. NOTE: The harness between both connectors are shielded. Remove the shield and repair the short circuit of harness.
3 CHECK INPUT SIGNAL OF 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 (B137) No. 2 (+) — Chassis ground (-):	Is the voltage 2 V or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Repair the short circuit to ground in harness between ECM connector and knock sensor connector. NOTE: The harness between both connectors are shielded. Remove the shield and repair the short circuit of harness.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-126, DTC P0328 KNOCK SENSOR 1 CIRCUIT HIGH (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

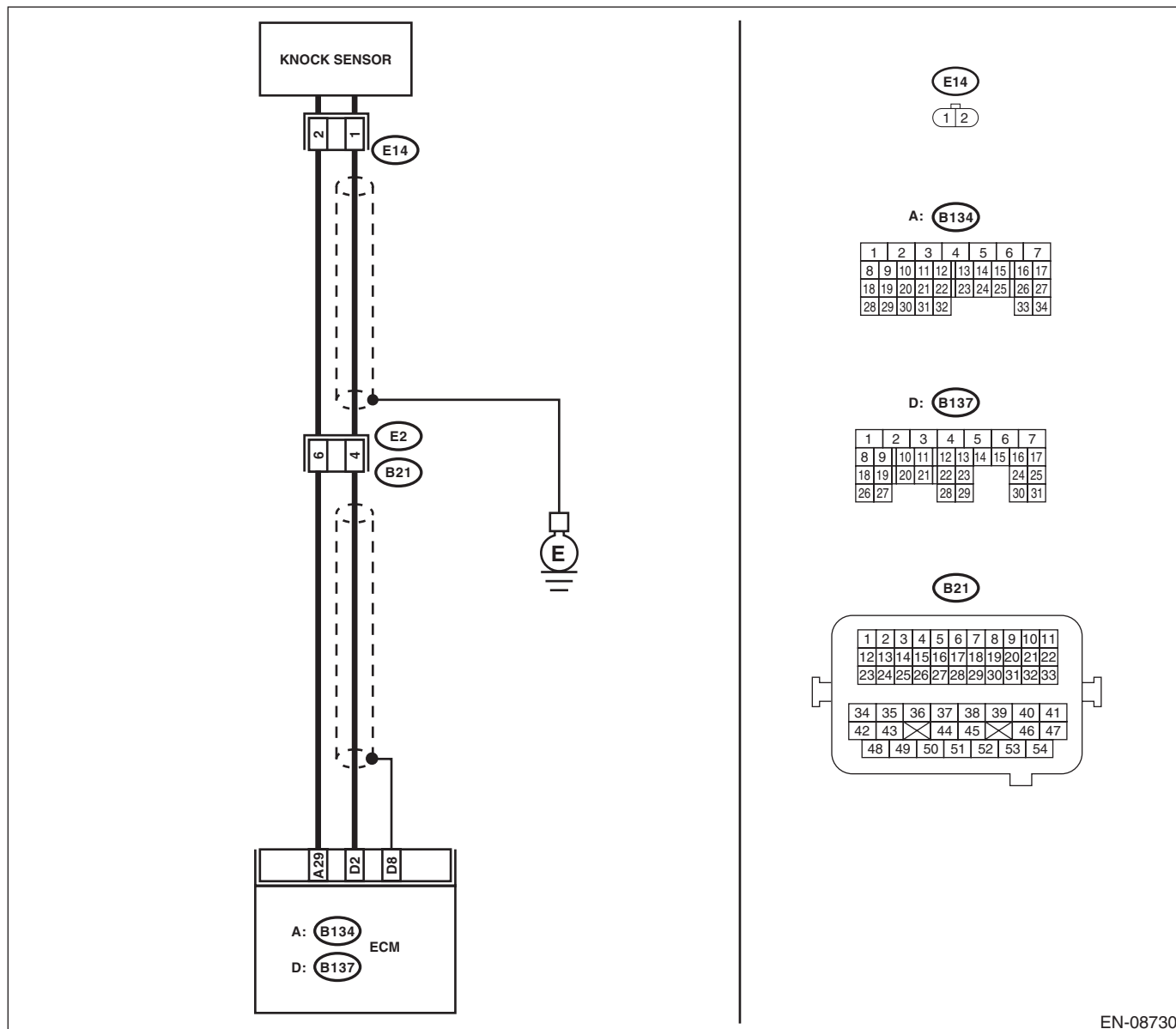
- Poor driving performance
- Knocking occurs

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08730

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND KNOCK SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. <i>Connector & terminal</i> <i>(B137) No. 2 — (B134) No. 29:</i>	Is the resistance 600 kΩ or more?	Go to step 2.	Repair the poor contact of ECM connector.
2 CHECK KNOCK SENSOR. 1) Disconnect the connector from the knock sensor. 2) Measure the resistance between knock sensor terminals. <i>Terminals</i> <i>No. 1 — No. 2:</i>	Is the resistance 600 kΩ or more?	Replace the knock sensor. <Ref. to FU(STI)-40, Knock Sensor.> <Ref. to FU(w/o STI)-39, Knock Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and knock sensor connector • Poor contact of knock sensor connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BL:DTC P0335 CRANKSHAFT POSITION SENSOR “A” CIRCUIT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-128, DTC P0335 CRANKSHAFT POSITION SENSOR “A” CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

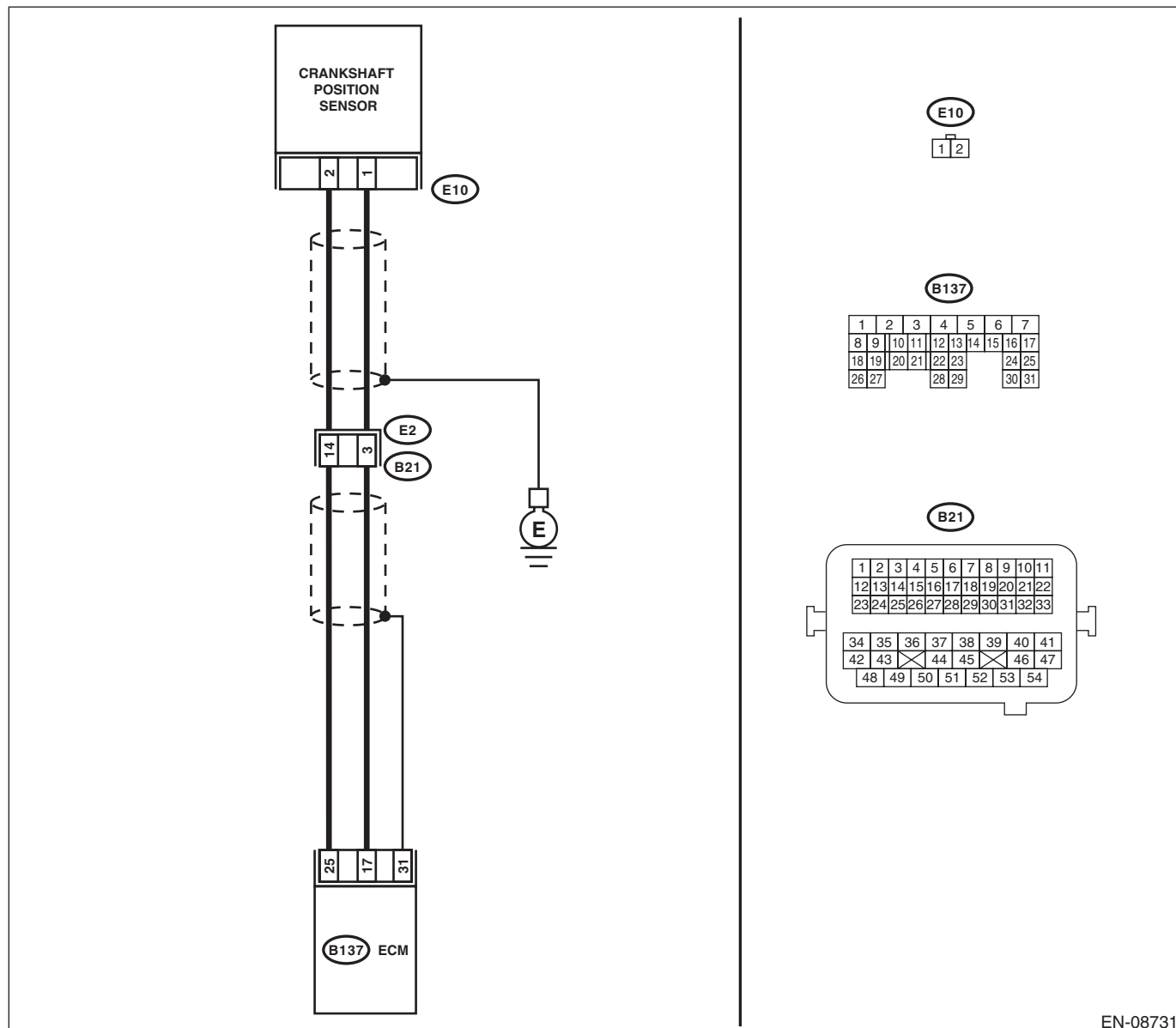
- Engine stalls.
- Failure of engine to start

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08731

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CONDITION OF CRANKSHAFT POSITION SENSOR.	Is the crankshaft position sensor installation bolt tightened securely?	Go to step 2.	Tighten the crankshaft position sensor installation bolt securely. <Ref. to FU(STI)-35, Crankshaft Position Sensor.> <Ref. to FU(w/o STI)-35, Crankshaft Position Sensor.>
2 CHECK CRANKSHAFT POSITION SENSOR. 1) Turn the ignition switch to OFF. 2) Remove the crankshaft position sensor. 3) Measure the resistance between terminals of crankshaft position sensor. Terminals No. 1 — No. 2:	Is the resistance between 1 and 4 k Ω ?	Go to step 3.	Replace the crankshaft position sensor. <Ref. to FU(STI)-35, Crankshaft Position Sensor.> <Ref. to FU(w/o STI)-35, Crankshaft Position Sensor.>
3 CHECK HARNESS BETWEEN ECM AND CRANKSHAFT POSITION SENSOR CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and crankshaft position sensor connector. Connector & terminal (B137) No. 17 — (E10) No. 1: (B137) No. 25 — (E10) No. 2:	Is the resistance less than 1 Ω ?	Repair the poor contact of ECM and crankshaft position sensor connector.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and crankshaft position sensor connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BM:DTC P0336 CRANKSHAFT POSITION SENSOR “A” CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-130, 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 servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK CONDITION OF CRANKSHAFT POSITION SENSOR. Turn the ignition switch to OFF.	Is the crankshaft position sensor installation bolt tightened securely?	Go to step 2.	Tighten the crankshaft position sensor installation bolt securely. <Ref. to FU(STI)-35, Crankshaft Position Sensor.> <Ref. to FU(w/o STI)-35, Crankshaft Position Sensor.>
2 CHECK CRANK SPROCKET. Remove the timing belt cover.	Are crank sprocket teeth cracked or damaged?	Replace the crank sprocket. <Ref. to ME(STI)-60, Crank Sprocket.> <Ref. to ME(w/o STI)-58, Crank Sprocket.>	Go to step 3.
3 CHECK INSTALLATION CONDITION OF TIMING BELT. Turn the crankshaft, and align alignment mark on crank sprocket with alignment mark on cylinder block. ST 499987500 CRANKSHAFT SOCKET	Is the timing belt dislocated from its proper position?	Repair the installation condition of timing belt. <Ref. to ME(STI)-50, Timing Belt.> <Ref. to ME(w/o STI)-48, Timing Belt.>	Replace the crankshaft position sensor. <Ref. to FU(STI)-35, Crankshaft Position Sensor.> <Ref. to FU(w/o STI)-35, Crankshaft Position Sensor.>

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-132, DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

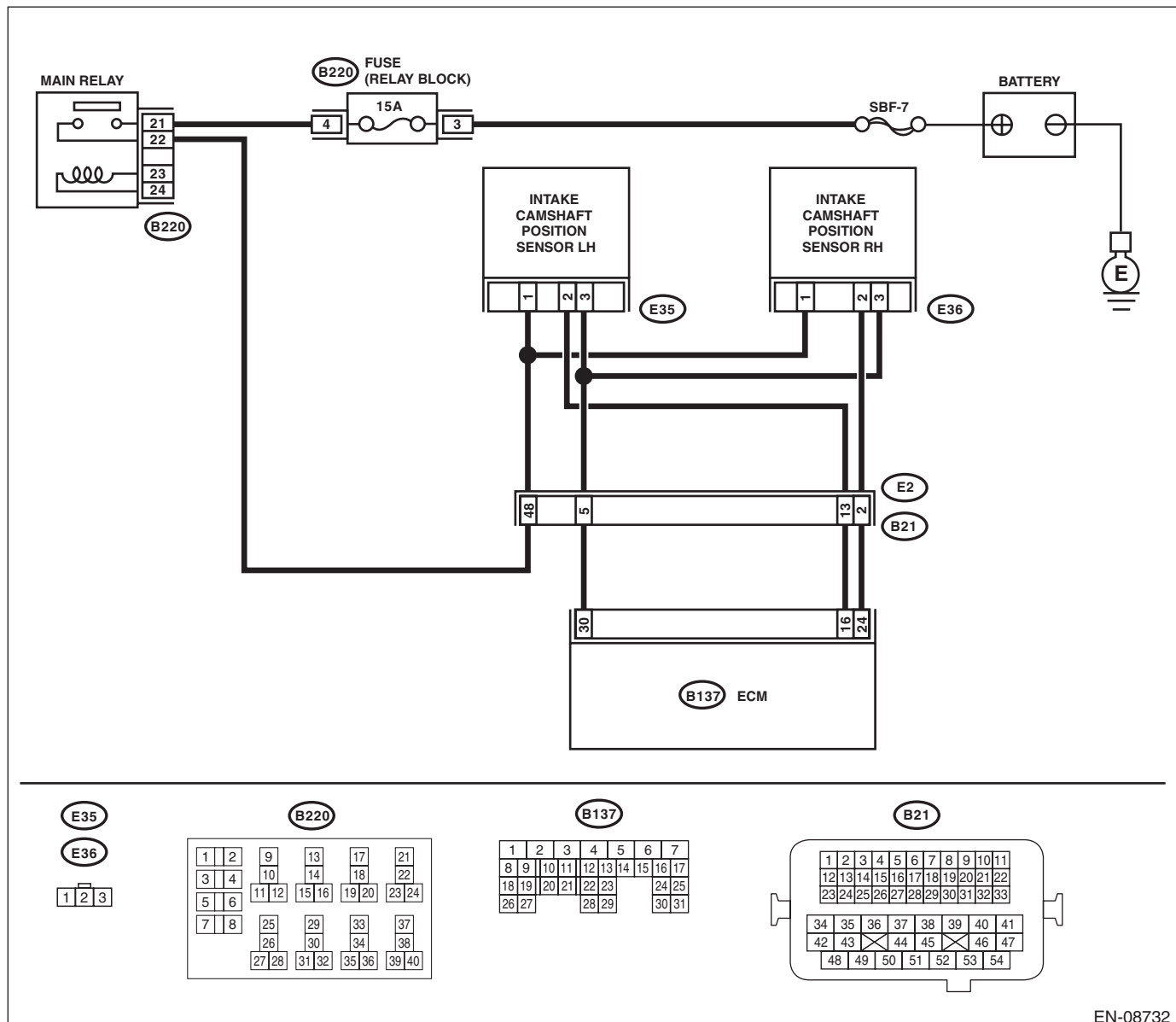
- Engine stalls.
- Failure of engine to start

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK POWER SUPPLY OF CAMSHAFT POSITION SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from camshaft position sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between camshaft position sensor connector and engine ground. Connector & terminal (E36) No. 1 (+) — Engine ground (-):	Is the voltage 10 V or more?	Go to step 2.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness between main relay connector and camshaft position sensor connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and camshaft position sensor connector. Connector & terminal (B137) No. 24 — (E36) No. 2: (B137) No. 30 — (E36) No. 3:	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 connector and camshaft position sensor connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR. Measure the resistance between camshaft position sensor connector and engine ground. Connector & terminal (E36) No. 2 — Engine ground:	Is the resistance 1 M Ω or more?	Go to step 4.	Repair short circuit to ground in harness between ECM connector and camshaft position sensor connector.
4 CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR. Measure the voltage between camshaft position sensor connector and engine ground. Connector & terminal (E36) No. 2 (+) — Engine ground (-):	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and camshaft position sensor connector.	Go to step 5.
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. <Ref. to FU(STI)-37, Camshaft Position Sensor.> <Ref. to FU(w/o STI)-37, Camshaft Position Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK CAMSHAFT POSITION SENSOR. Check the waveform of the camshaft position sensor. <Ref. to EN(H4DOTC)(diag)-23, Engine Control Module (ECM) I/O Signal.>	Is there any abnormality in waveform?	Replace the camshaft position sensor. <Ref. to FU(STI)-37, Camshaft Position Sensor.> <Ref. to FU(w/o STI)-37, Camshaft Position Sensor.>	Repair the following item. • Poor contact of ECM connector • Poor contact of camshaft position sensor connector • Poor contact of coupling connector

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

NOTE:

For the diagnostic procedure, refer to DTC P0340. <Ref. to EN(H4DOTC)(diag)-211, DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 1 OR SINGLE SENSOR), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BP:DTC P0345 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 2)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-135, DTC P0345 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

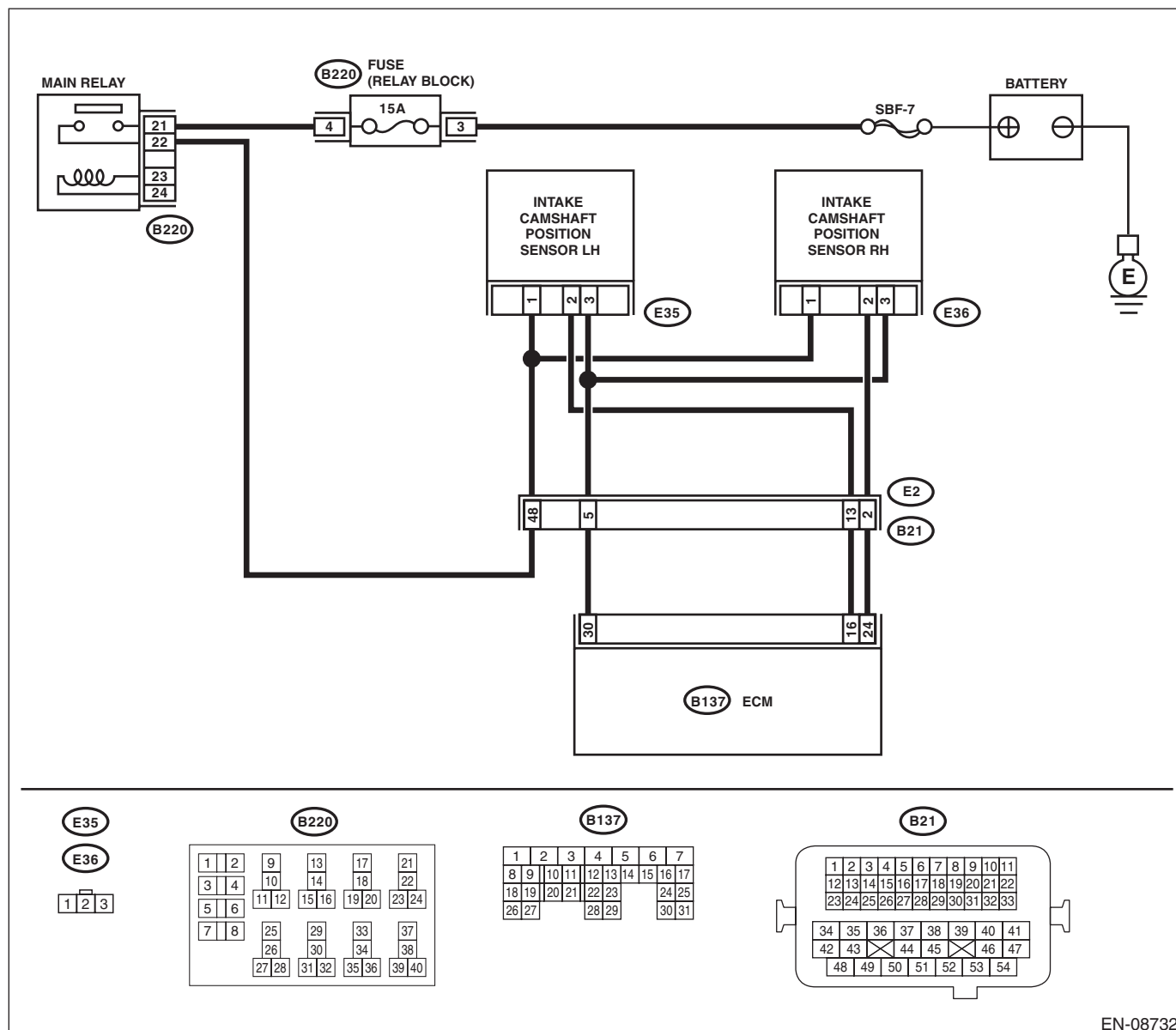
- Engine stalls.
- Failure of engine to start

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08732

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK POWER SUPPLY OF CAMSHAFT POSITION SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from camshaft position sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between camshaft position sensor connector and engine ground. Connector & terminal (E35) No. 1 (+) — Engine ground (-):	Is the voltage 10 V or more?	Go to step 2.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness between main relay connector and camshaft position sensor connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and camshaft position sensor connector. Connector & terminal (B137) No. 16 — (E35) No. 2: (B137) No. 22 — (E35) No. 3:	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 connector and camshaft position sensor connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR. Measure the resistance between camshaft position sensor connector and engine ground. Connector & terminal (E35) No. 2 — Engine ground:	Is the resistance 1 M Ω or more?	Go to step 4.	Repair short circuit to ground in harness between ECM connector and camshaft position sensor connector.
4 CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR. Measure the voltage between camshaft position sensor connector and engine ground. Connector & terminal (E35) No. 2 (+) — Engine ground (-):	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and camshaft position sensor connector.	Go to step 5.
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. <Ref. to FU(STI)-37, Camshaft Position Sensor.> <Ref. to FU(w/o STI)-37, Camshaft Position Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK CAMSHAFT POSITION SENSOR. Check the waveform of the camshaft position sensor. <Ref. to EN(H4DOTC)(diag)-23, Engine Control Module (ECM) I/O Signal.>	Is there any abnormality in waveform?	Replace the camshaft position sensor. <Ref. to FU(STI)-37, Camshaft Position Sensor.> <Ref. to FU(w/o STI)-37, Camshaft Position Sensor.>	Repair the following item. • Poor contact of ECM connector • Poor contact of camshaft position sensor connector • Poor contact of coupling connector

BQ:DTC P0346 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 2)

NOTE:

For the diagnostic procedure, refer to DTC P0345. <Ref. to EN(H4DOTC)(diag)-214, DTC P0345 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BR:DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-136, DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

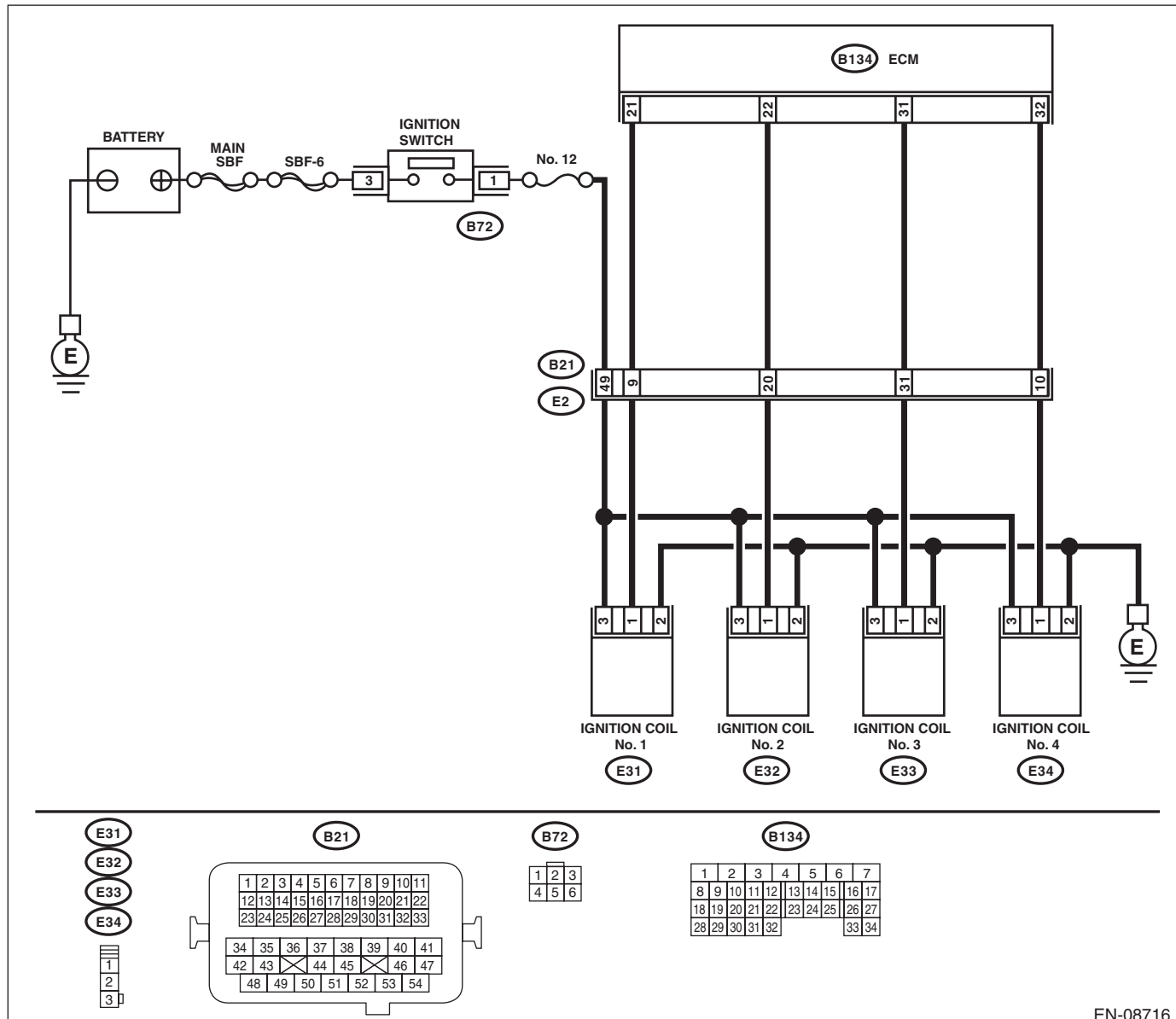
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08716

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK IGNITION COIL POWER SUPPLY CIRCUIT. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ignition coil. 3) Turn the ignition switch to ON. 4) Measure the voltage between ignition coil connector and engine ground. Connector & terminal DTC P0351; (E31) No. 3 (+) — Engine ground (-): DTC P0352; (E32) No. 3 (+) — Engine ground (-): DTC P0353; (E33) No. 3 (+) — Engine ground (-): DTC P0354; (E34) No. 3 (+) — Engine ground (-):	Is the voltage 10 V or more?	Go to step 2.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness of power supply circuit • Blown out of fuse • Poor contact of coupling connector
2 CHECK HARNESS OF IGNITION COIL GROUND CIRCUIT. 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between ignition coil connector and engine ground. Connector & terminal DTC P0351; (E31) No. 2 — Engine ground: DTC P0352; (E32) No. 2 — Engine ground: DTC P0353; (E33) No. 2 — Engine ground: DTC P0354; (E34) No. 2 — Engine ground:	Is the resistance less than 5 Ω ?	Go to step 3.	Repair the open circuit in harness between ignition coil connector and engine grounding terminal.
3 CHECK HARNESS BETWEEN ECM AND IGNITION COIL CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance between ignition coil connector and engine ground. Connector & terminal DTC P0351; (E31) No. 1 — Engine ground: DTC P0352; (E32) No. 1 — Engine ground: DTC P0353; (E33) No. 1 — Engine ground: DTC P0354; (E34) No. 1 — Engine ground:	Is the resistance 1 M Ω or more?	Go to step 4.	Repair the ground short circuit of harness between ECM connector and ignition coil connector.
4 CHECK HARNESS BETWEEN ECM AND IGNITION COIL CONNECTOR. Measure the resistance of harness between ECM connector and ignition coil connector. Connector & terminal DTC P0351; (B134) No. 21 — (E31) No. 1: DTC P0352; (B134) No. 22 — (E32) No. 1: DTC P0353; (B134) No. 31 — (E33) No. 1: DTC P0354; (B134) No. 32 — (E34) 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 connector and the ignition coil connector • Poor contact of coupling connector
5 CHECK FOR POOR CONTACT. Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Go to step 6.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK SPARK PLUG CONDITION. 1) Remove the spark plug of the corresponding cylinder. <Ref. to IG(STI)-4, REMOVAL, Spark Plug.> <Ref. to IG(w/o STI)-5, REMOVAL, Spark Plug.> 2) Check the spark plug condition. <Ref. to IG(STI)-5, INSPECTION, Spark Plug.> <Ref. to IG(w/o STI)-6, INSPECTION, Spark Plug.>	Is the spark plug condition normal?	Replace the ignition coil. <Ref. to IG(STI)-7, Ignition Coil.> <Ref. to IG(w/o STI)-8, Ignition Coil.>	Replace the spark plug. <Ref. to IG(STI)-4, Spark Plug.> <Ref. to IG(w/o STI)-5, Spark Plug.>

BS:DTC P0352 IGNITION COIL B PRIMARY/SECONDARY CIRCUIT

NOTE:

For the diagnostic procedure, refer to DTC P0351. <Ref. to EN(H4DOTC)(diag)-217, DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BT:DTC P0353 IGNITION COIL C PRIMARY/SECONDARY CIRCUIT

NOTE:

For the diagnostic procedure, refer to DTC P0351. <Ref. to EN(H4DOTC)(diag)-217, DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BU:DTC P0354 IGNITION COIL D PRIMARY/SECONDARY CIRCUIT

NOTE:

For the diagnostic procedure, refer to DTC P0351. <Ref. to EN(H4DOTC)(diag)-217, DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BV:DTC P0365 CAMSHAFT POSITION SENSOR “B” CIRCUIT (BANK 1)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-137, DTC P0365 CAMSHAFT POSITION SENSOR “B” CIRCUIT (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

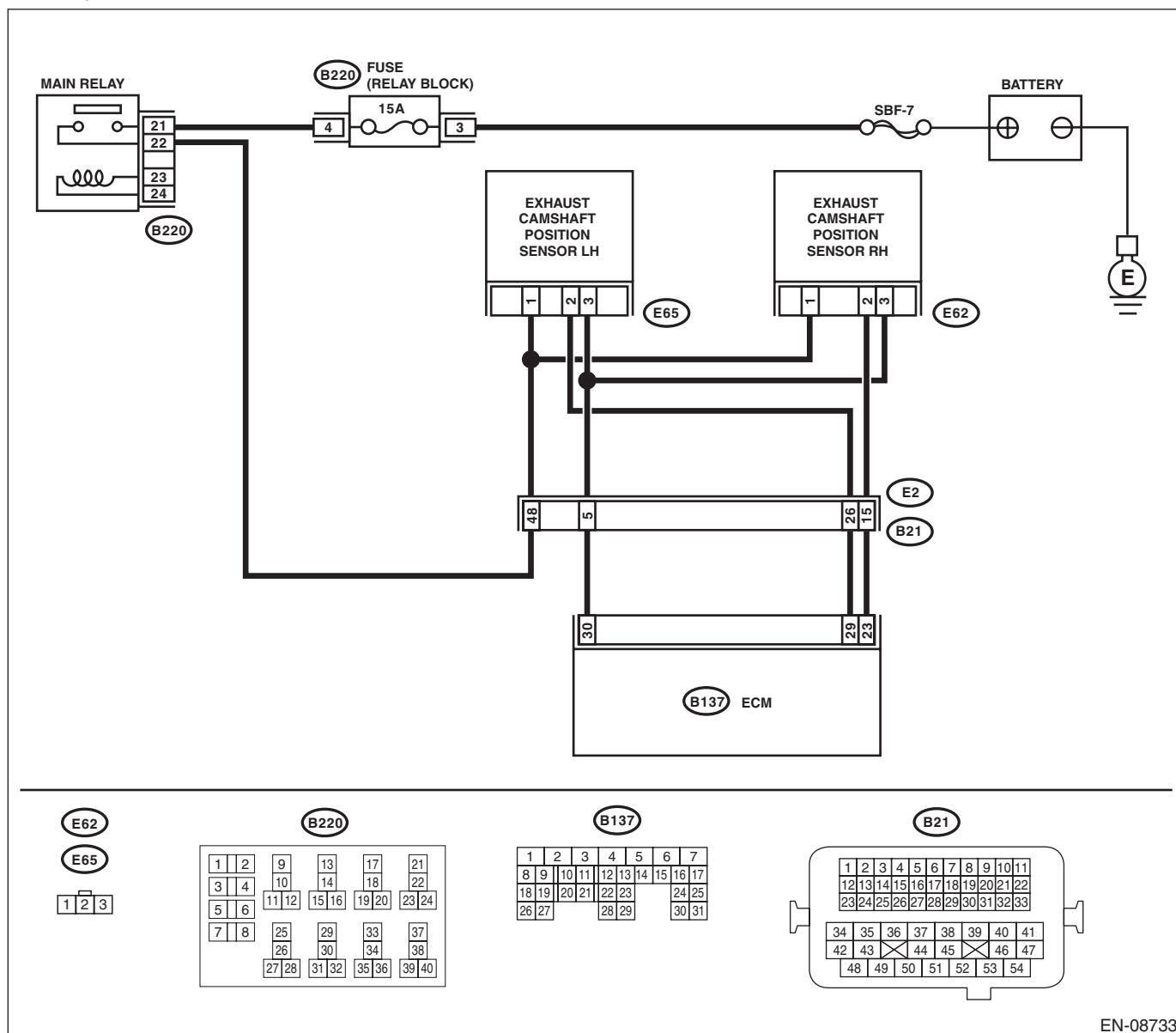
- Engine stalls.
- Failure of engine to start

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08733

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK POWER SUPPLY OF CAMSHAFT POSITION SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from camshaft position sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between camshaft position sensor connector and engine ground. Connector & terminal (E62) No. 1 (+) — Engine ground (-):	Is the voltage 10 V or more?	Go to step 2.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness between main relay connector and camshaft position sensor connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and camshaft position sensor connector. Connector & terminal (B137) No. 23 — (E62) No. 2: (B137) No. 30 — (E62) No. 3:	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 connector and camshaft position sensor connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR. Measure the resistance between camshaft position sensor connector and engine ground. Connector & terminal (E62) No. 2 — Engine ground:	Is the resistance 1 M Ω or more?	Go to step 4.	Repair short circuit to ground in harness between ECM connector and camshaft position sensor connector.
4 CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR. Measure the voltage between camshaft position sensor connector and engine ground. Connector & terminal (E62) No. 2 (+) — Engine ground (-):	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and camshaft position sensor connector.	Go to step 5.
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. <Ref. to FU(STI)-37, Camshaft Position Sensor.>
6 CHECK CAMSHAFT POSITION SENSOR. Check the waveform of the camshaft position sensor. <Ref. to EN(H4DOTC)(diag)-23, Engine Control Module (ECM) I/O Signal.>	Is there any abnormality in waveform?	Replace the camshaft position sensor. <Ref. to FU(STI)-37, Camshaft Position Sensor.>	Repair the following item. • Poor contact of ECM connector • Poor contact of camshaft position sensor connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BW:DTC P0366 CAMSHAFT POSITION SENSOR B CIRCUIT RANGE/PERFORMANCE (BANK 1)

NOTE:

For the diagnostic procedure, refer to DTC P0365. <Ref. to EN(H4DOTC)(diag)-220, DTC P0365 CAMSHAFT POSITION SENSOR “B” CIRCUIT (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BX:DTC P0390 CAMSHAFT POSITION SENSOR “B” CIRCUIT (BANK 2)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-138, DTC P0390 CAMSHAFT POSITION SENSOR “B” CIRCUIT (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

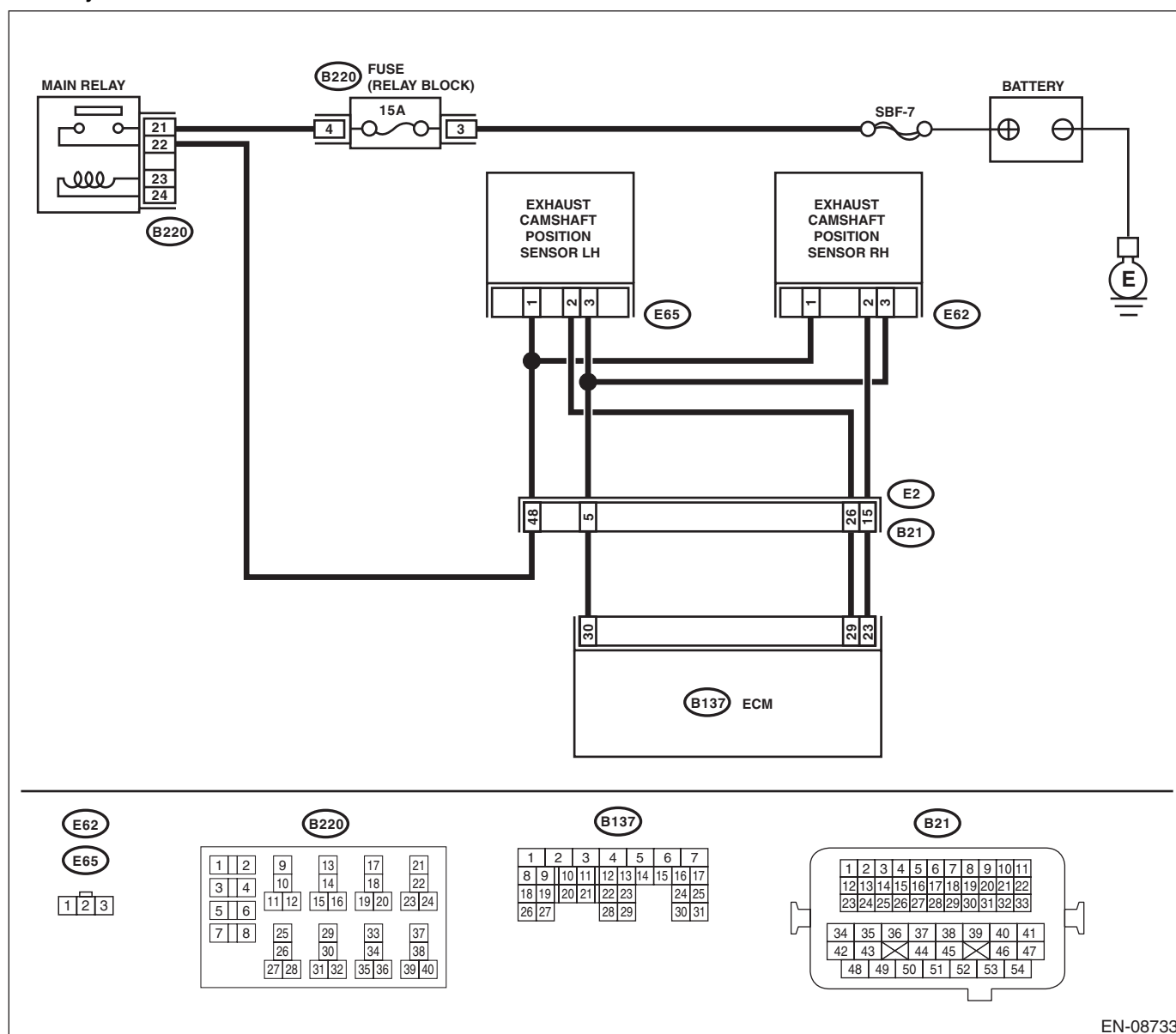
- Engine stalls.
- Failure of engine to start

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08733

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK POWER SUPPLY OF CAMSHAFT POSITION SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from camshaft position sensor. 3) Turn the ignition switch to ON. 4) Measure the voltage between camshaft position sensor connector and engine ground. Connector & terminal (E65) No. 1 (+) — Engine ground (-):	Is the voltage 10 V or more?	Go to step 2.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit or short circuit to ground in harness between main relay connector and camshaft position sensor connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and camshaft position sensor connector. Connector & terminal (B137) No. 29 — (E65) No. 2: (B137) No. 30 — (E65) No. 3:	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 connector and camshaft position sensor connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR. Measure the resistance between camshaft position sensor connector and engine ground. Connector & terminal (E65) No. 2 — Engine ground:	Is the resistance 1 M Ω or more?	Go to step 4.	Repair short circuit to ground in harness between ECM connector and camshaft position sensor connector.
4 CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR. Measure the voltage between camshaft position sensor connector and engine ground. Connector & terminal (E65) No. 2 (+) — Engine ground (-):	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM connector and camshaft position sensor connector.	Go to step 5.
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. <Ref. to FU(STI)-37, Camshaft Position Sensor.>
6 CHECK CAMSHAFT POSITION SENSOR. Check the waveform of the camshaft position sensor. <Ref. to EN(H4DOTC)(diag)-23, Engine Control Module (ECM) I/O Signal.>	Is there any abnormality in waveform?	Replace the camshaft position sensor. <Ref. to FU(STI)-37, Camshaft Position Sensor.>	Repair the following item. • Poor contact of ECM connector • Poor contact of camshaft position sensor connector • Poor contact of coupling connector

BY:DTC P0391 CAMSHAFT POSITION SENSOR B CIRCUIT RANGE/PERFORMANCE (BANK 2)

NOTE:

For the diagnostic procedure, refer to DTC P0390. <Ref. to EN(H4DOTC)(diag)-223, DTC P0390 CAMSHAFT POSITION SENSOR “B” CIRCUIT (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BZ:DTC P0410 SECONDARY AIR INJECTION SYSTEM

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-139, DTC P0410 SECONDARY AIR INJECTION SYSTEM, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

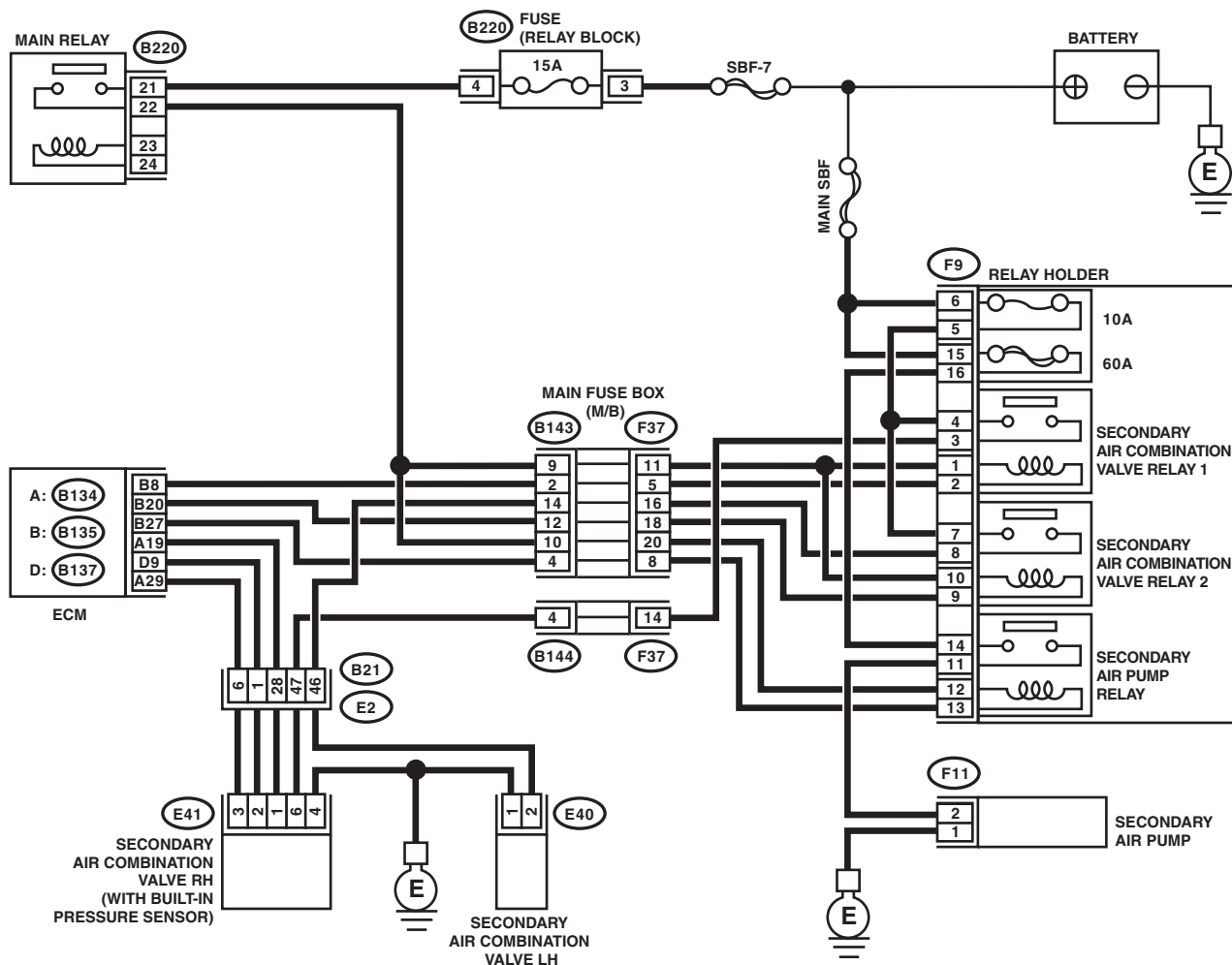
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

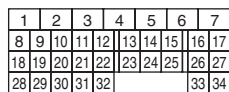
ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



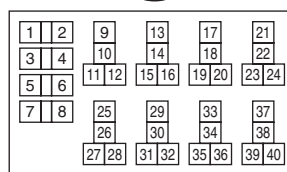
A: (B134)



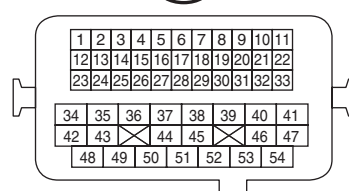
B: (B135)



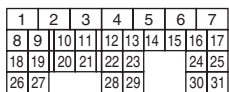
(B220)



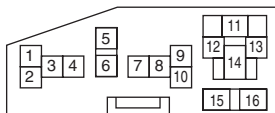
(B21)



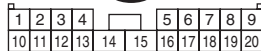
D: (B137)



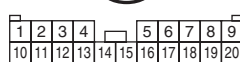
(F9)



(F37)



(B143)



(F11)



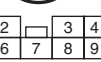
(E40)



(E41)



(B144)

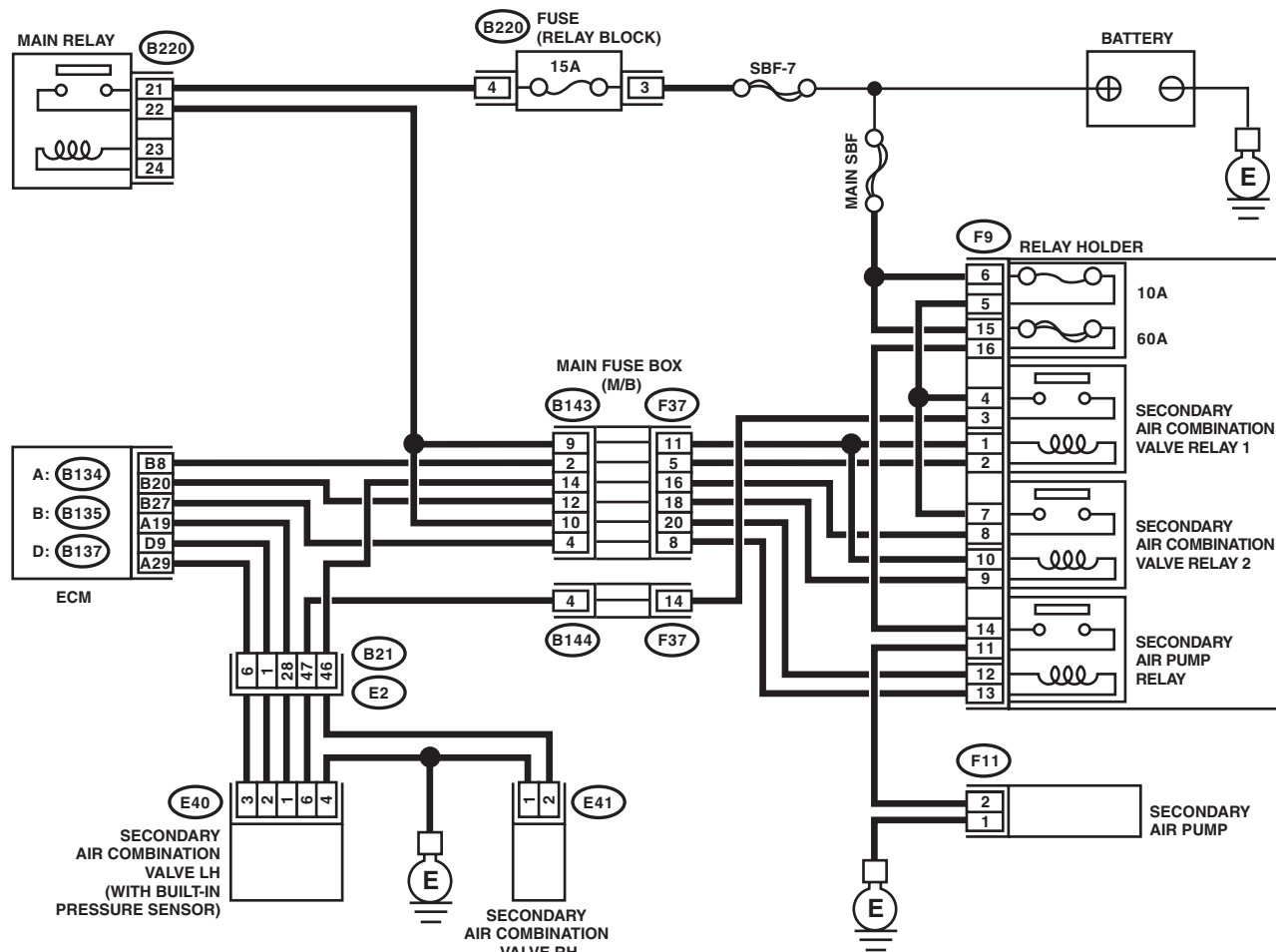


EN-08734

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

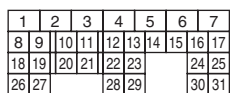
- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



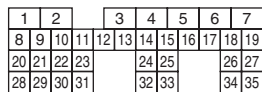
A: B134



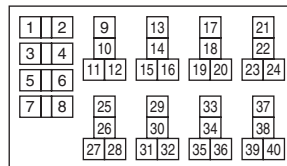
D: B137



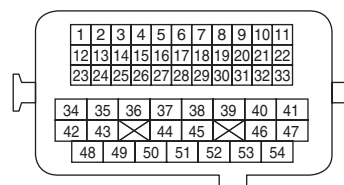
B: B135



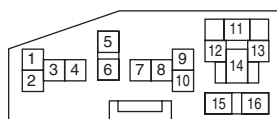
B220



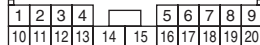
B21



F9



F37



B143



F11



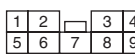
E41



E40



B144



EN-08735

Step	Check	Yes	No
1	CHECK SECONDARY AIR PUMP FUSE. Check if the secondary air pump fuse (60 A) is blown out.	Go to step 2.	Go to step 3.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK HARNESS BETWEEN FUSE BOX AND SECONDARY AIR PUMP CONNECTOR. 1) Remove the secondary air pump fuse from the fuse box. 2) Disconnect the secondary air pump connector. 3) Measure the resistance between the secondary air pump fuse and secondary air pump connector, and chassis ground. Connector & terminal (F9) No. 16 — Chassis ground: (F11) No. 2 — Chassis ground:	Is the resistance 1 MΩ or more?	Replace the fuse with a new part, and connect the secondary air pump connector. Go to step 3.	Repair ground short of the harness between the fuse box and the secondary air pump connector.
3 CHECK SECONDARY AIR PUMP OPERATION. CAUTION: Try your best to complete the confirmation process of this inspection in one try. This inspection will put a heavy workload on the secondary air pump, so the continuous operation may cause damage to the pump. Do not operate the pump continuously for more than three times. If you need to operate the pump further, turn the ignition switch to OFF and wait for at least two hours. 1) Connect the delivery (test) mode connector. 2) Turn the ignition switch to ON. 3) Perform operation check for the secondary air pump using the Subaru Select Monitor. NOTE: - The compulsory operation using the Subaru Select Monitor is performed only for 10 seconds in order to protect the secondary air pump. When you want to operate the pump again, disconnect the ground cable from battery, wait at least one minute, and perform the clear memory operation of ECM. Then, perform the forced operation using the Subaru Select Monitor. - Refer to "Compulsory Valve Operation Check Mode" for detailed procedures. <Ref. to EN(H4DOTC)(diag)-64, Compulsory Valve Operation Check Mode.>	Does the secondary air pump operate?	Go to step 4.	Go to step 5.
4 CHECK DUCT BETWEEN SECONDARY AIR PUMP AND COMBINATION VALVE. Check the duct between secondary air pump and combination valve.	Is there damage, clog or disconnection of the duct?	Replace, clean or connect the duct.	Replace the secondary air combination valve LH (models with SI-DRIVE) or RH (models without SI-DRIVE). <Ref. to EC(STI)-29, Secondary Air Combination Valve.> <Ref. to EC(w/o STI)-30, Secondary Air Combination Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK POWER SUPPLY TO SECONDARY AIR PUMP. 1) Turn the ignition switch to OFF. 2) Disconnect the battery negative terminal, wait for 1 minute, and connect it again. 3) Disconnect the secondary air pump connector. 4) Connect the delivery (test) mode connector. 5) Turn the ignition switch to ON. 6) Using the Subaru Select Monitor, measure the voltage between the secondary air pump connector and chassis ground while the secondary air pump is operating. NOTE: • The compulsory operation using the Subaru Select Monitor is performed only for 10 seconds in order to protect the secondary air pump. When you want to operate the pump again, disconnect the ground cable from battery, wait at least one minute, and perform the clear memory operation of ECM. Then, perform the forced operation using the Subaru Select Monitor. • Refer to "Compulsory Valve Operation Check Mode" for detailed procedures. <Ref. to EN(H4DOTC)(diag)-64, Compulsory Valve Operation Check Mode.> Connector & terminal (F11) No. 2 (+) — Chassis ground (–):	Is the voltage 10 V or more?	Replace the secondary air pump. <Ref. to EC(STI)-27, Secondary Air Pump.> <Ref. to EC(w/o STI)-29, Secondary Air Pump.>	Go to step 6.
6 CHECK HARNESS BETWEEN SECONDARY AIR PUMP RELAY AND SECONDARY AIR PUMP CONNECTOR. 1) Turn the ignition switch to OFF. 2) Remove the secondary air pump relay. 3) Measure the resistance of harness between secondary air pump relay connector and secondary air pump connector. Connector & terminal (F9) No. 11 — (F11) No. 2:	Is the resistance less than 1 Ω ?	Go to step 7.	Repair the open circuit in harness between secondary air pump relay connector and secondary air pump connector.
7 CHECK HARNESS BETWEEN SECONDARY AIR PUMP CONNECTOR AND CHASSIS GROUND. Measure the resistance of the harness between secondary air pump connector and chassis ground. Connector & terminal (F11) No. 1 — Chassis ground:	Is the resistance less than 5 Ω ?	Go to step 8.	Repair the open circuit of the harness between secondary air pump connector and chassis ground.
8 CHECK SECONDARY AIR PUMP RELAY. 1) Connect the battery to terminals No. 12 and No. 13 of the secondary air pump relay. 2) Measure the resistance between secondary air pump relay terminals. Terminals No. 14 — No. 11:	Is the resistance less than 1 Ω ?	Go to step 9.	Replace the secondary air pump relay. <Ref. to EN(H4DOTC)(diag)-9, Electrical Component Location.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
9 CHECK SECONDARY AIR PUMP RELAY POWER SUPPLY. 1) Turn the ignition switch to ON. 2) Measure the voltage between the secondary air pump relay connector and chassis ground. <i>Connector & terminal</i> <i>(F9) No. 14 (+) — Chassis ground (-):</i> <i>(F9) No. 12 (+) — Chassis ground (-):</i>	Is the voltage 10 V or more?	Go to step 10.	Repair the open or ground short circuit of power supply circuit.
10 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR PUMP RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector. 3) Measure the resistance of harness between ECM connector and secondary air pump relay connector. <i>Connector & terminal</i> <i>(B135) No. 27 — (F9) No. 13:</i>	Is the resistance less than 1 Ω ?	Repair the poor contact of ECM connector.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and secondary air pump relay connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CA:DTC P0411 SECONDARY AIR INJECTION SYSTEM INCORRECT FLOW DETECTED

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-147, DTC P0411 SECONDARY AIR INJECTION SYSTEM INCORRECT FLOW DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK SECONDARY AIR COMBINATION VALVE. Check the pipe between the secondary air combination valve and cylinder head.	Is there damage or disconnection of the pipe?	Replace the pipe between secondary air combination valve and cylinder head. <Ref. to EC(STI)-29, Secondary Air Combination Valve.> <Ref. to EC(w/o STI)-30, Secondary Air Combination Valve.>	Go to step 2.
2 CHECK SECONDARY AIR COMBINATION VALVE. Race the engine at 2,000 rpm to check whether or not the exhaust leak is heard.	Is there any exhaust leak?	Replace the pipe between secondary air combination valve and cylinder head. <Ref. to EC(STI)-29, Secondary Air Combination Valve.> <Ref. to EC(w/o STI)-30, Secondary Air Combination Valve.>	Repair the poor contact of ECM connector.

CB:DTC P0413 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE “A” CIRCUIT OPEN

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-148, DTC P0413 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE “A” CIRCUIT OPEN, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

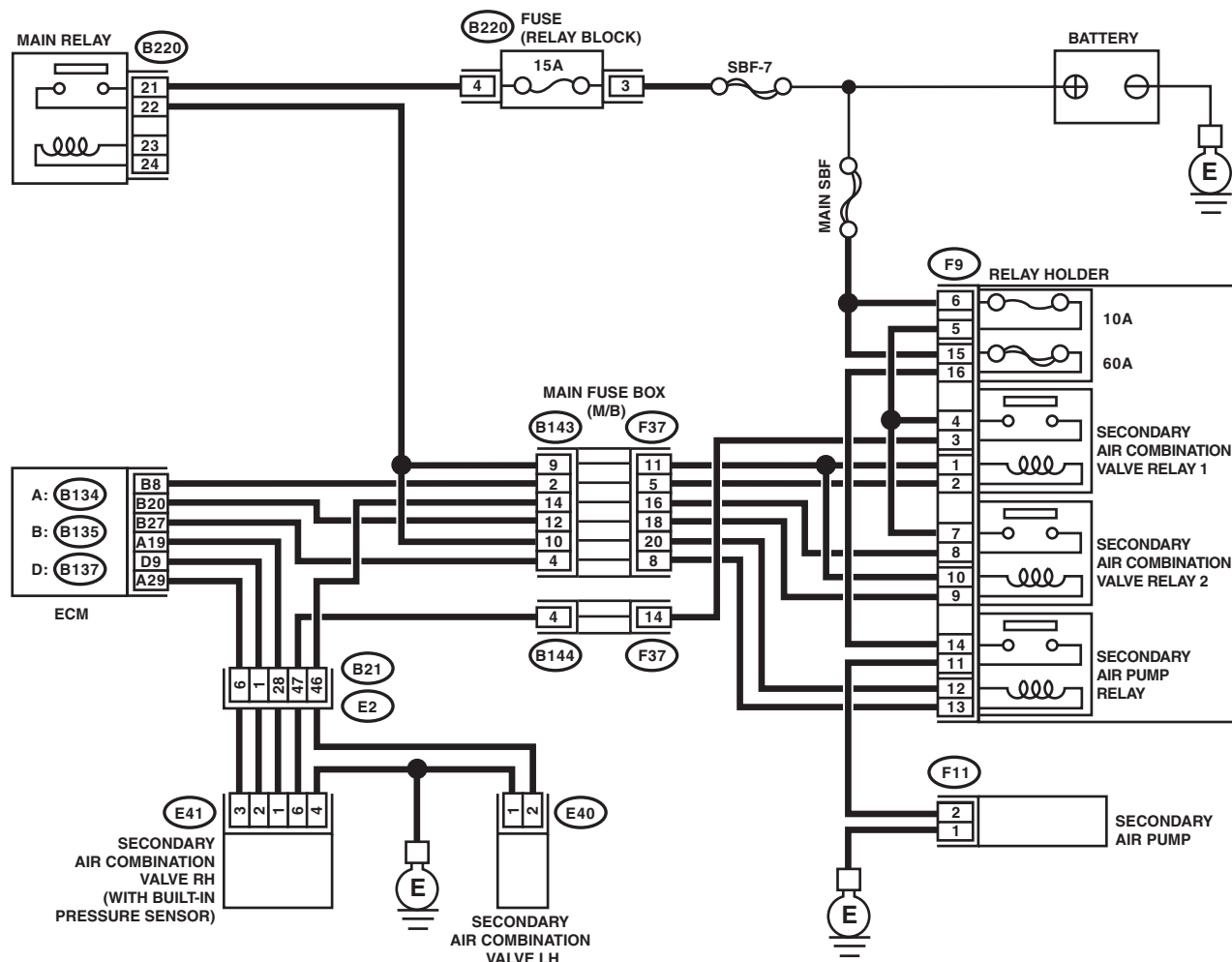
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



A: (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	

B: (B135)

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	35

(B220)

1	2	9	13	17	21
3	4	10	14	18	22
5	6	11	12	15	16
7	8	25	29	33	37
26	30	34	38	27	28
31	32	35	36	39	40

(B21)

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	35	36	37	38	39	40	41	42	43	44
45	46	47	48	49	50	51	52	53	54	

D: (B137)

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				

(F9)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

(F37)

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	35	36

(B143)

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	35	36

(F11)

1	2

(E40)

1	2

(E41)

1	2	3
4	5	6

(B144)

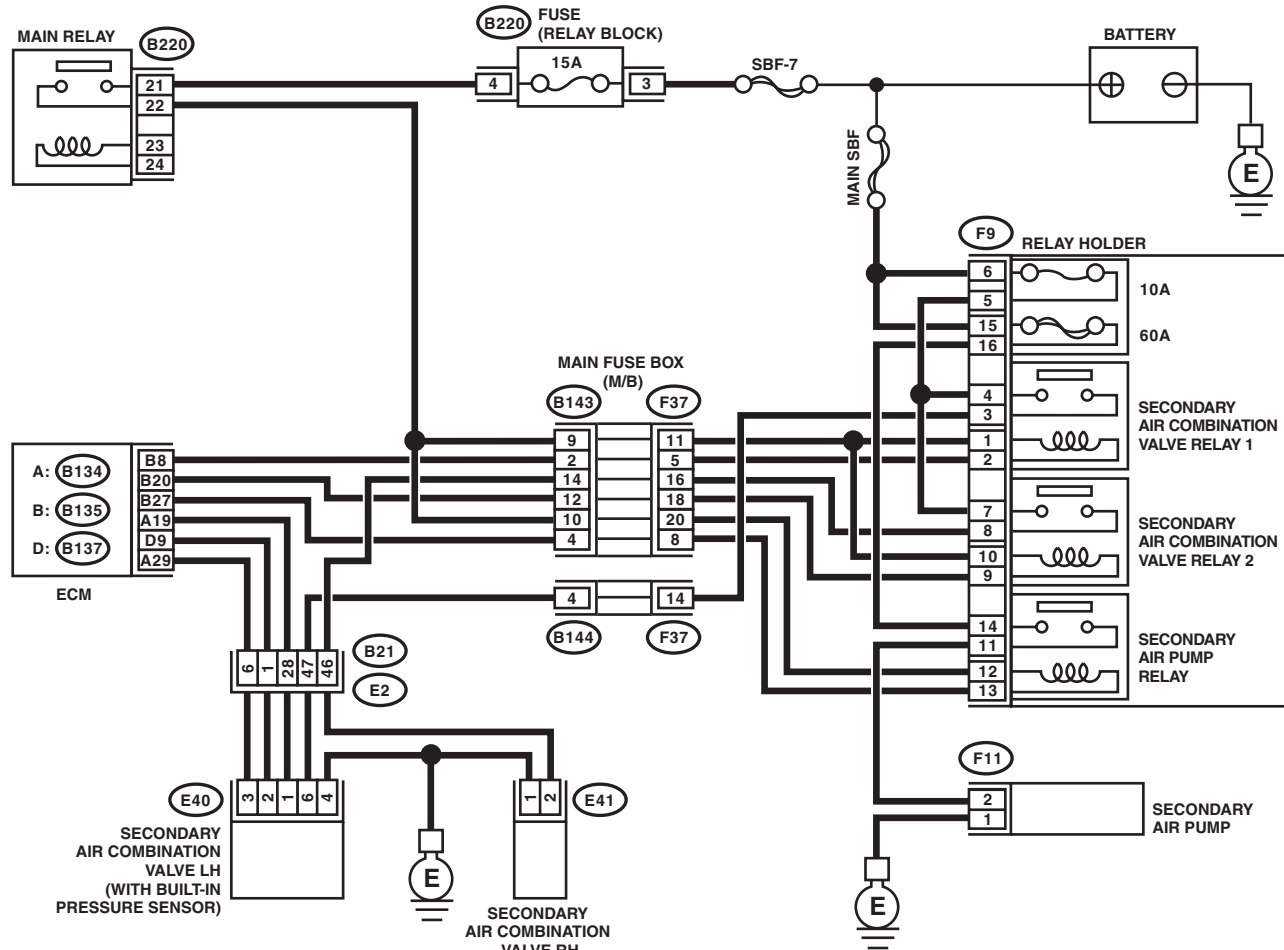
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

EN-08734

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



A: 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	

B: B135

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	35

B220

1	2			9		13		17		21																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															

B21

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	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54												

D: B137

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				

F9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

F37

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20							

B143

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20							

F11

1	2

E41

1	2

E40

1	2	3
4	5	6

B144

1	2	3	4
5	6	7	8
9			

EN-08735

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE RELAY 1 CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Remove the secondary air combination valve relay 1. 4) Measure the resistance of harness between ECM connector and secondary air combination valve relay 1 connector. Connector & terminal (B135) No. 8 — (F9) No. 2:	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 in harness between ECM connector and secondary air combination valve relay 1 connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE RELAY 1 CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B135) No. 8 — Chassis ground:	Is the resistance 1 MΩ or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Repair the short circuit to ground in harness between ECM connector and secondary air combination valve relay 1 connector.

CC:DTC P0414 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE “A” CIRCUIT SHORTED

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-149, DTC P0414 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE “A” CIRCUIT SHORTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

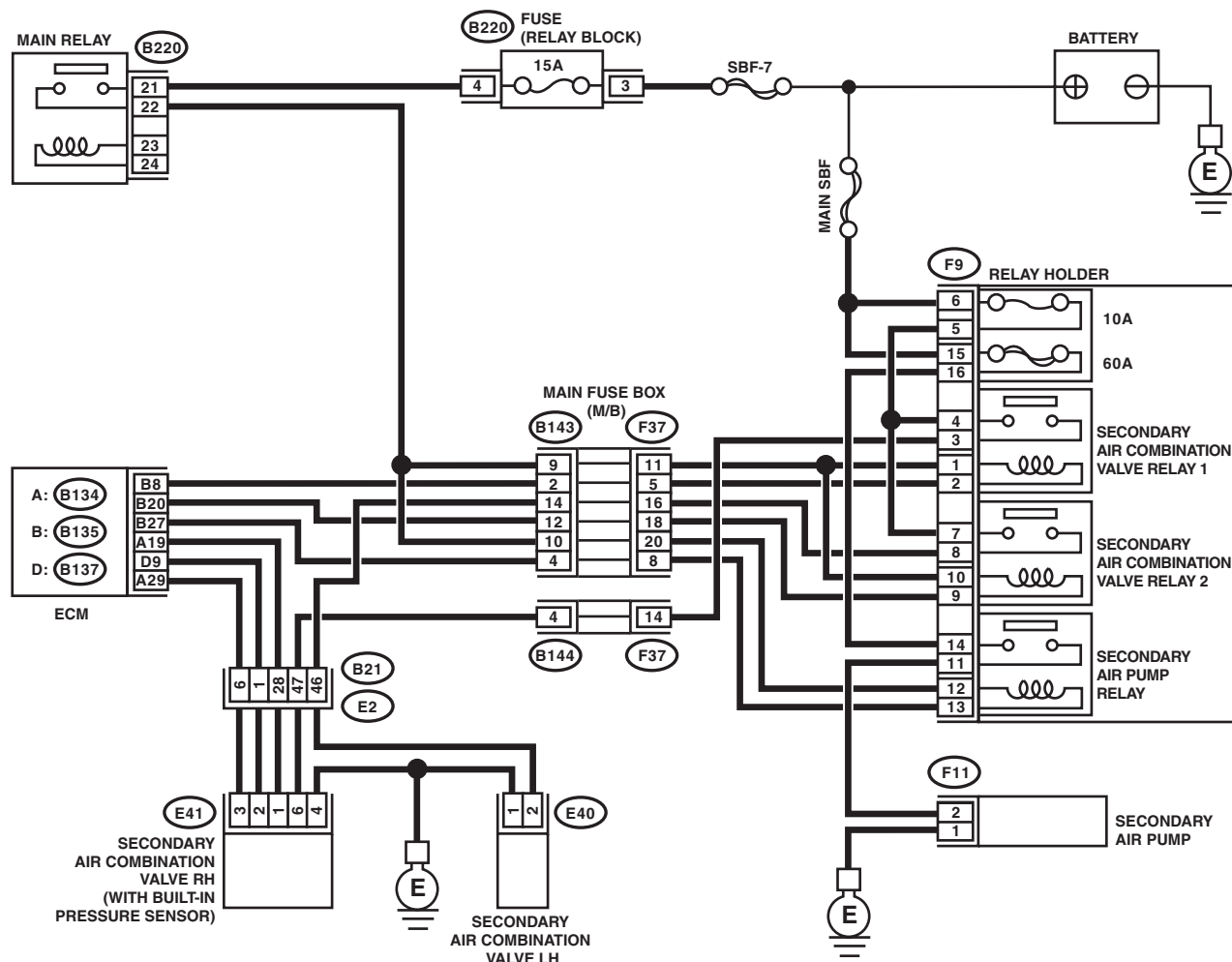
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



A: 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	

B: B135

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	35

B220

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	35	36	37	38	39	40

B21

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	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54

D: B137

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				

F9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

F37

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

B143

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

F11

1	2

E40

1	2

E41

1	2	3	4	5	6

B144

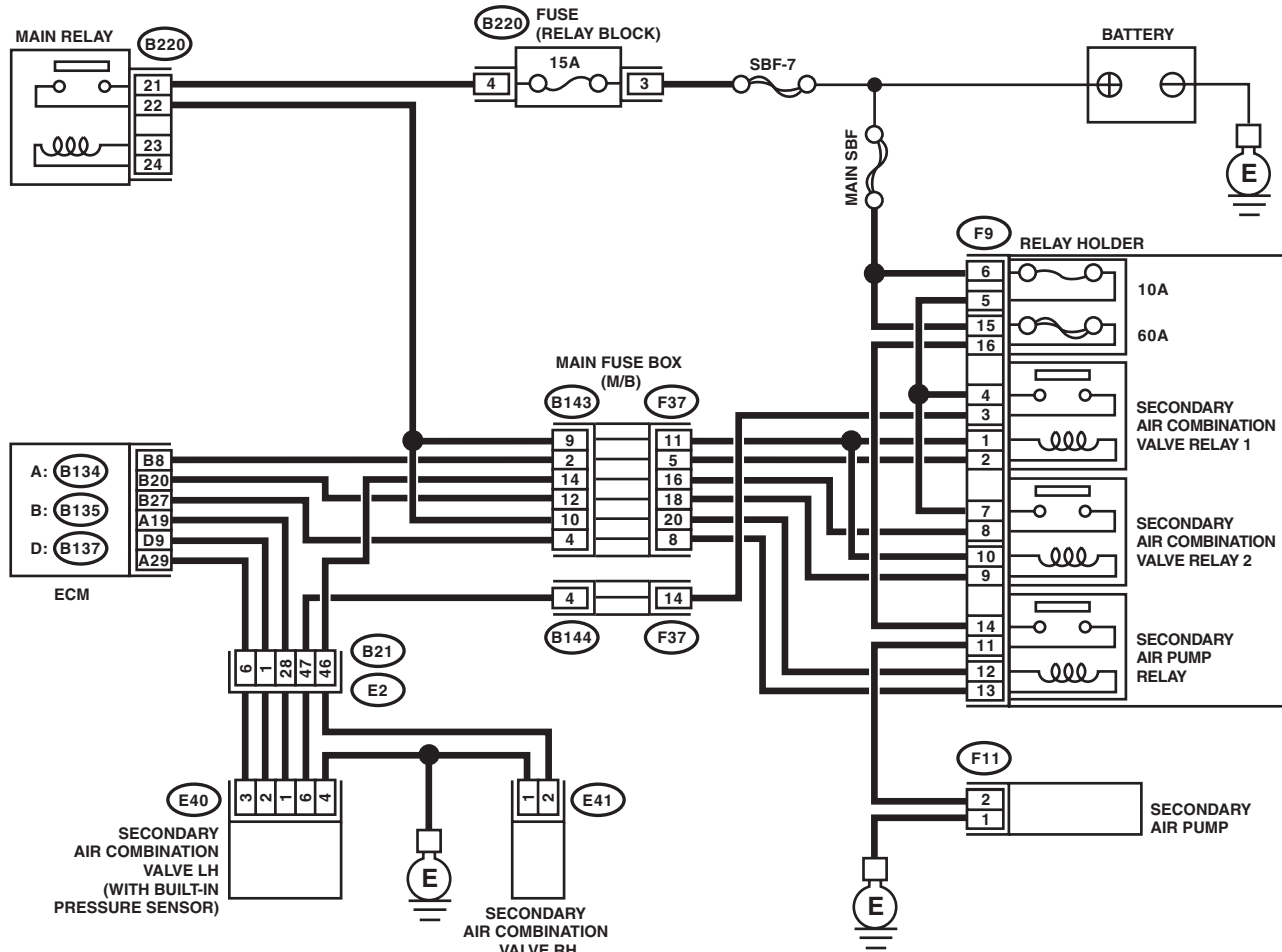
1	2	3	4	5	6	7	8	9

EN-08734

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



A: 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	

B: B135

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	35

B220

1	2	9	13	17	21				
3	4	10	14	18	22				
5	6	11	12	15	16	19	20	23	24
7	8	25	29	33	37				
		26	30	34	38				
		27	28	31	32	35	36	39	40

B21

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	35	36	37	38	39	40	41
42	43	X	44	45	X	46	47
48	49	50	51	52	53	54	

D: B137

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	

F9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

F37

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	35	36
37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54

B143

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	35	36
37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54

F11

1	2

E41

1	2

E40

1	2	3
4	5	6

B144

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	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56

EN-08735

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step		Check	Yes	No
1	CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE RELAY 1 CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Remove the secondary air combination valve relay 1. 4) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 8 (+) — Chassis ground (–):	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and secondary air combination valve relay 1 connector.	Repair the poor contact of ECM connector.

CD:DTC P0416 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE “B” CIRCUIT OPEN

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-149, DTC P0416 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE “B” CIRCUIT OPEN, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

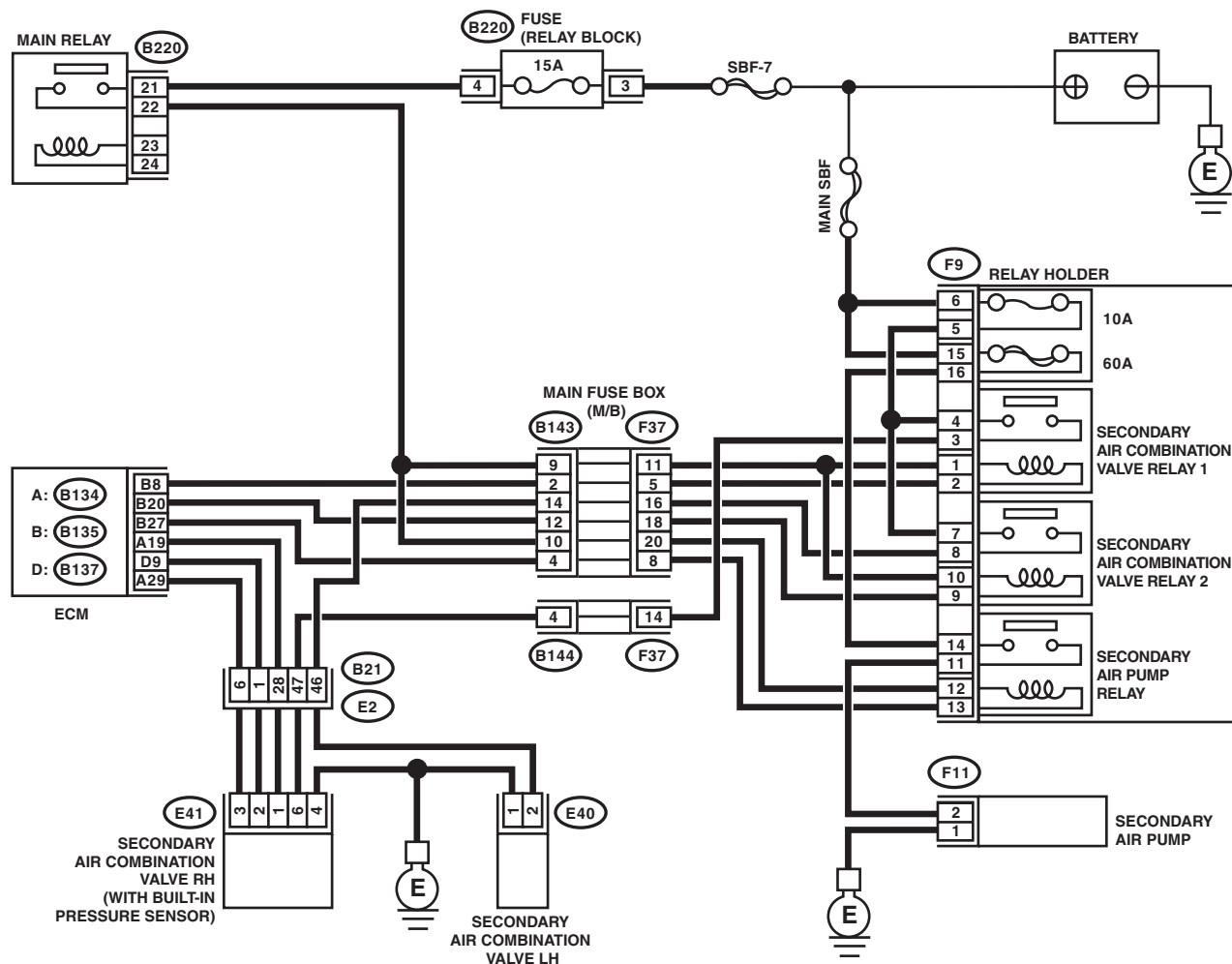
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



A: 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	

B: B135

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	35

B220

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	35	36	37	38	39	40

B21

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	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54

D: B137

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	

F9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

F37

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

B143

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

F11

1	2

E40

1	2

E41

1	2	3	4	5	6

B144

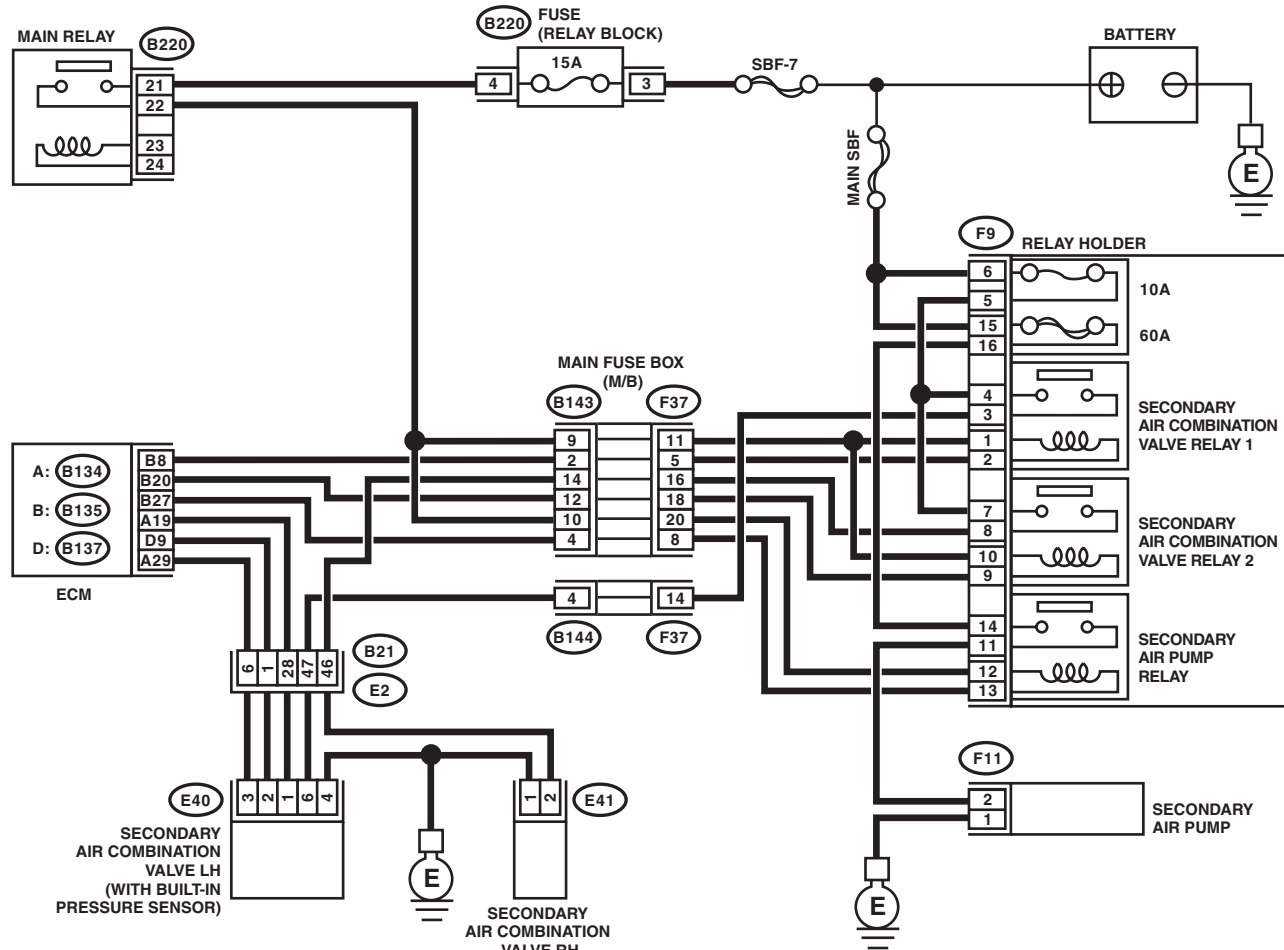
1	2	3	4	5	6	7	8	9

EN-08734

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



A: 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	

D: B137

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	

B: B135

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	35

B220

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	35	36	37	38	39	40

B21

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	35	36	37	38	39	40	41	42	43	44
45	46	47	48	49	50	51	52	53	54	55

F9

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	35	36	37	38	39	40

F37

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	35	36	37	38	39	40

B143

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	35	36	37	38	39	40

F11

1	2
3	4

E41

1	2
3	4

E40

1	2	3
4	5	6

B144

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

EN-08735

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE RELAY 2 CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Remove the secondary air combination valve relay 2. 4) Measure the resistance of harness between ECM connector and secondary air combination valve relay 2 connector. Connector & terminal (B135) No. 20 — (F9) No. 9:	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 in harness between ECM connector and secondary air combination valve relay 2 connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE RELAY 2 CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B135) No. 20 — Chassis ground:	Is the resistance 1 MΩ or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Repair the short circuit to ground in harness between ECM connector and secondary air combination valve relay 2 connector.

CE:DTC P0417 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE “B” CIRCUIT SHORTED

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-149, DTC P0417 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE “B” CIRCUIT SHORTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

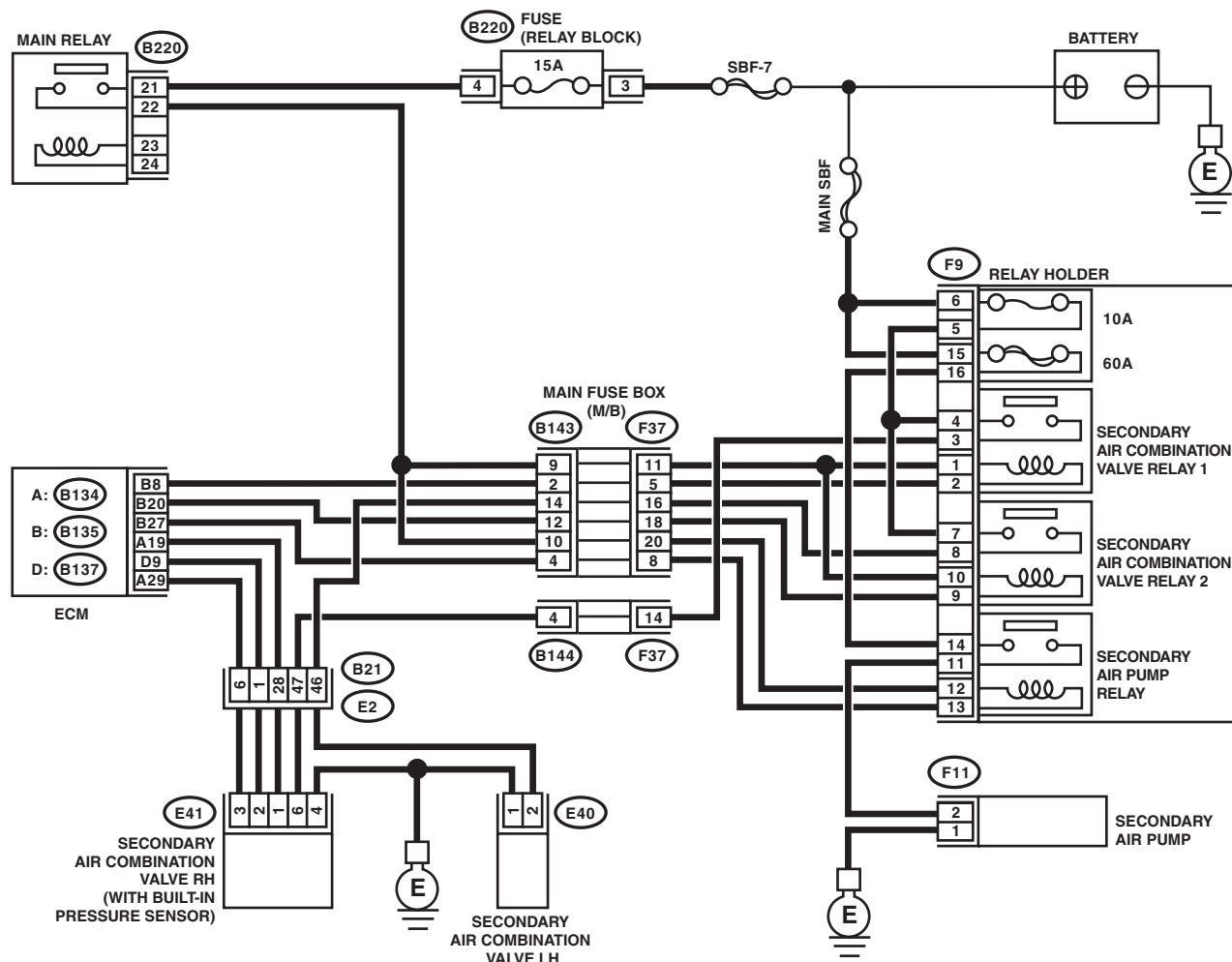
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

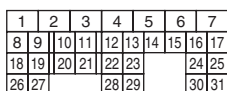
- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



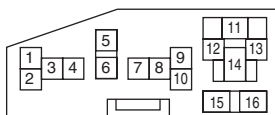
A: (B134)



D: (B137)



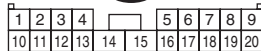
(F9)



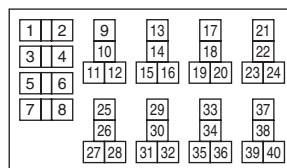
B: (B135)



(F37)



(B220)



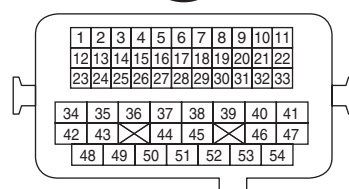
(B143)



(F11)



(B21)



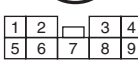
(E40)



(E41)



(B144)

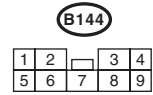
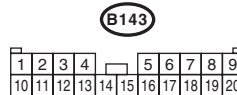
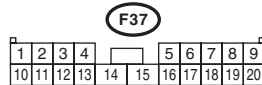
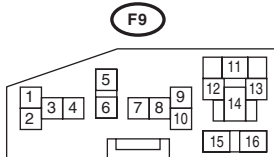
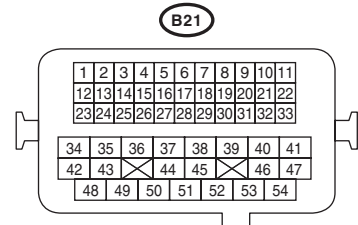
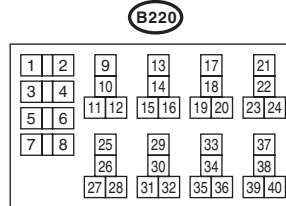
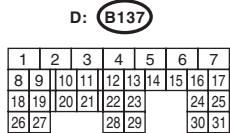
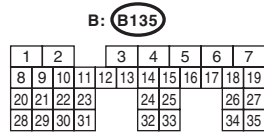
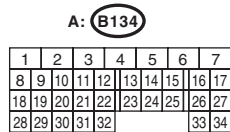
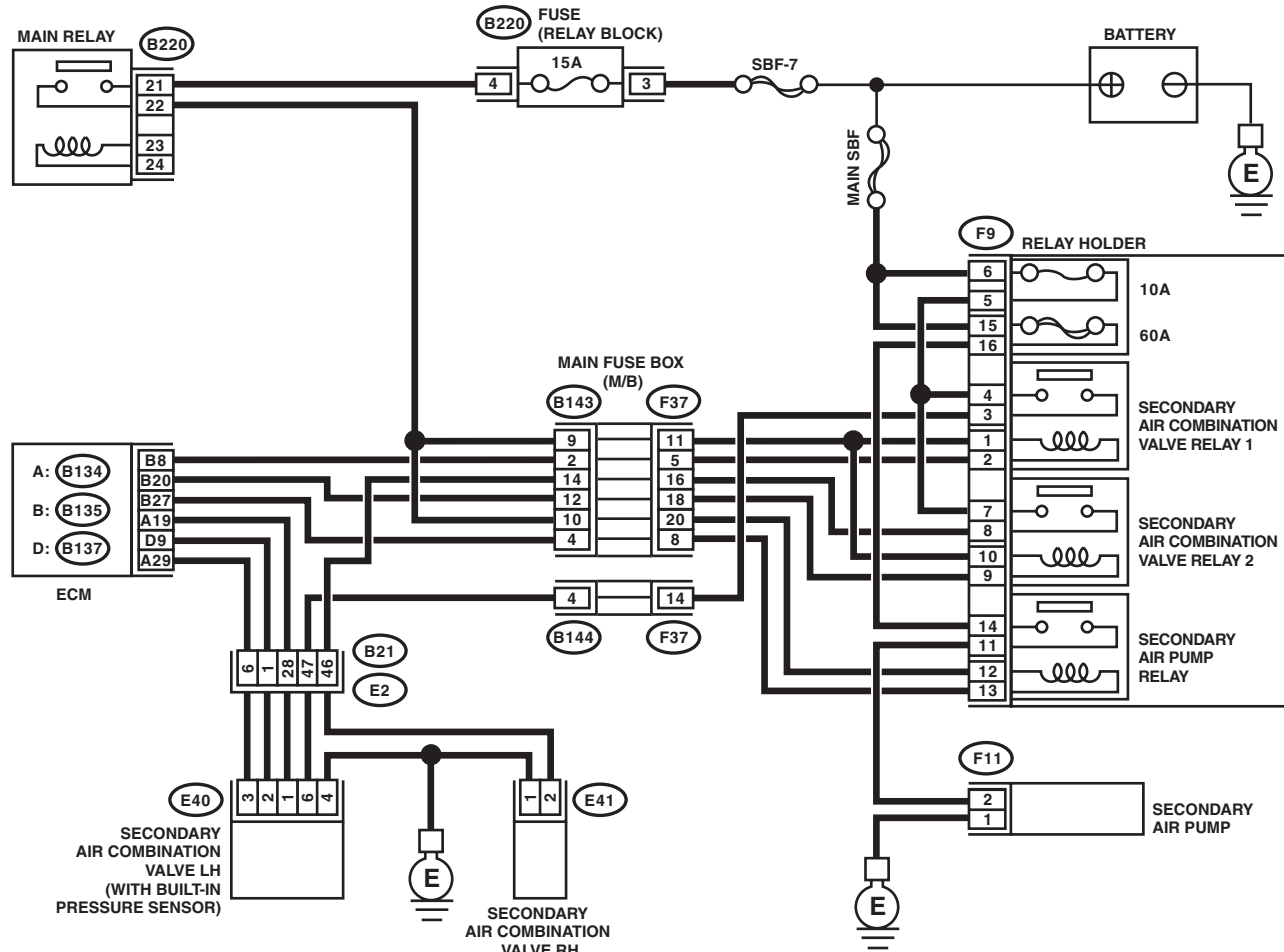


EN-08734

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08735

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step		Check	Yes	No
1	CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE RELAY 2 CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Remove the secondary air combination valve relay 2. 4) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 20 (+) — Chassis ground (–):	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and secondary air combination valve relay 2 connector.	Repair the poor contact of ECM connector.

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

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-150, DTC P0420 CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

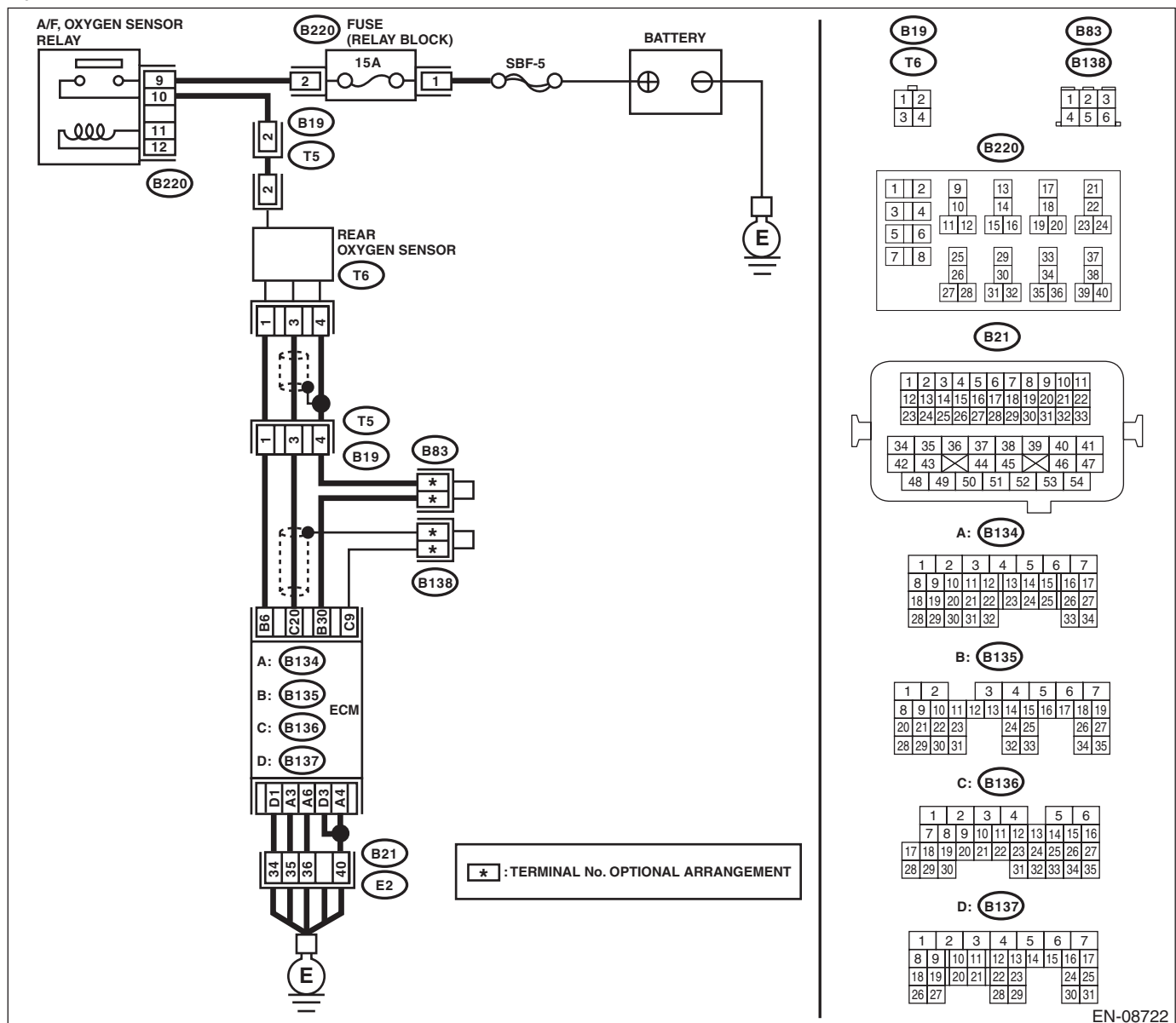
- Engine stalls.
- Idle mixture is out of specifications.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>

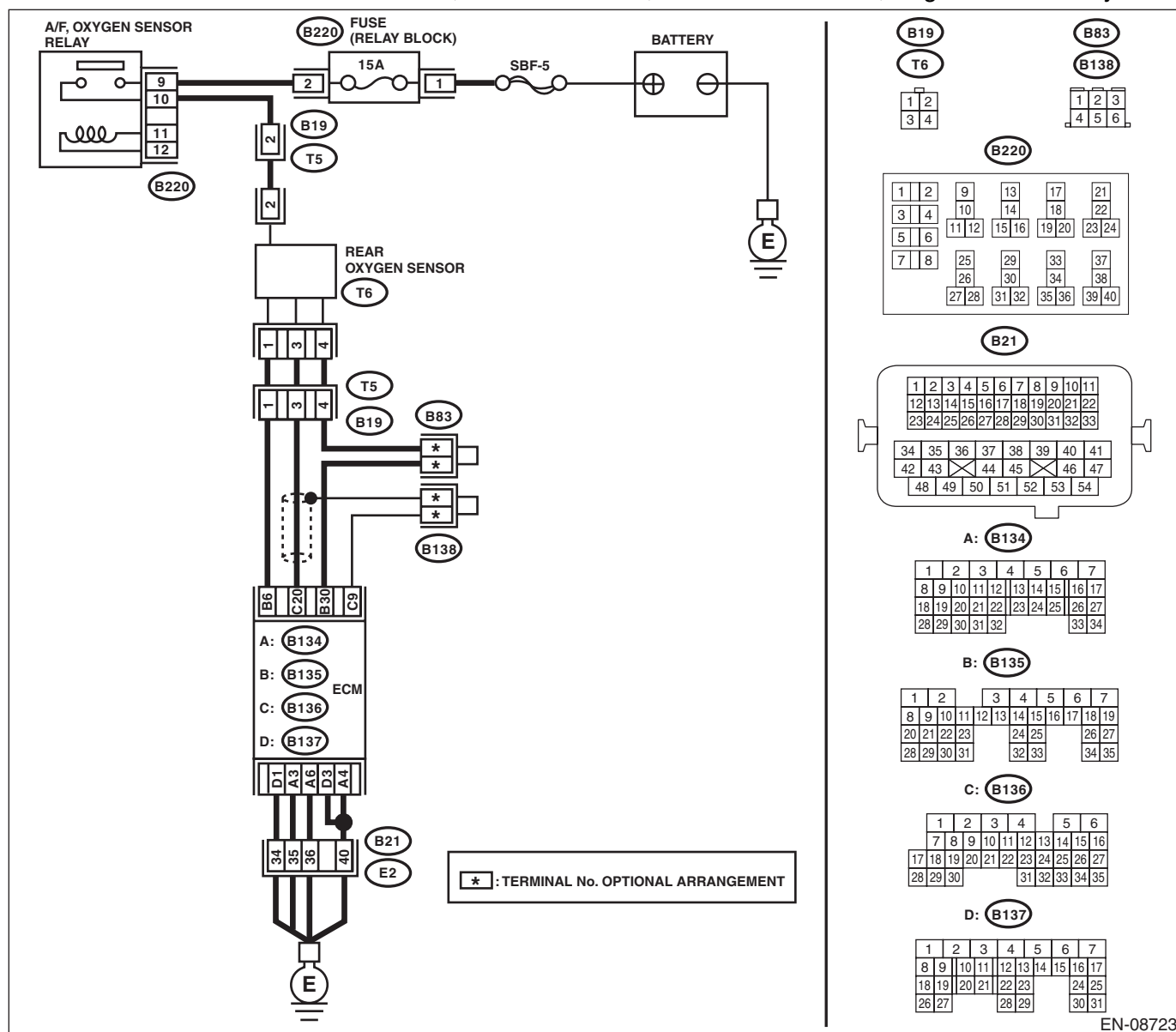


EN-08722

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>

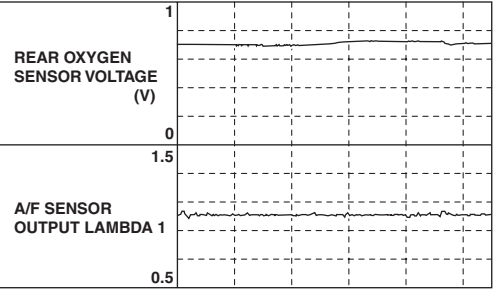
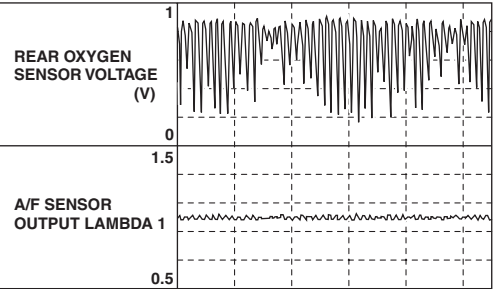


EN-08723

Step	Check	Yes	No
1 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 or improperly attached 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(STI)-2, General Description.>	Go to step 2.

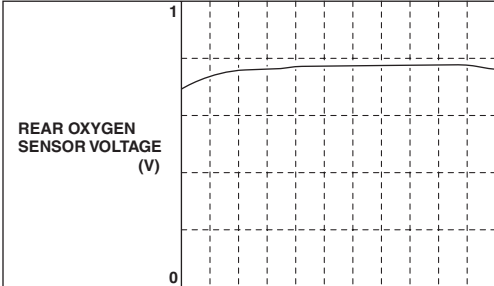
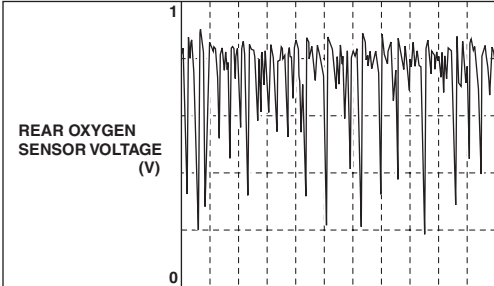
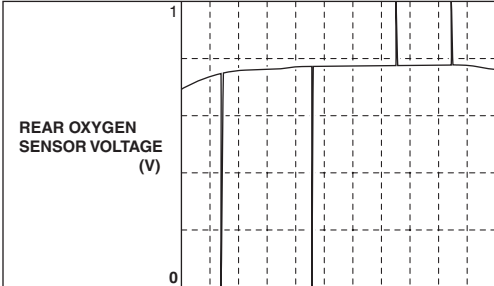
Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK WAVEFORM DATA ON THE SUBARU SELECT MONITOR (WHILE DRIVING). 1) Drive at a constant speed between 80 — 112 km/h (50 — 70 MPH). 2) After 5 minutes have elapsed in the condition of step 1), use the Subaru Select Monitor while still driving to read the waveform data. - At normal condition  10 sec/div EN-06666 - At abnormal condition (numerous inversion)  10 sec/div EN-06667	Is a normal waveform displayed?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Go to step 3.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
3 CHECK WAVEFORM DATA ON THE SUBARU SELECT MONITOR (WHILE IDLING). 1) Run the engine at idle. 2) In the condition of step 1), use the Subaru Select Monitor to read the waveform data. - At normal condition  10 sec/div EN-06668 - At abnormal condition 1 (numerous inversion)  10 sec/div EN-06669 - At abnormal condition 2 (noise input)  10 sec/div EN-06670	Is a normal waveform displayed?	Go to step 4.	- The waveform is displayed at abnormal condition 1: Go to step 4. - The waveform is displayed at abnormal condition 2: Go to step 5.
4 CHECK CATALYTIC CONVERTER.	Is the catalytic converter damaged?	Replace the catalytic converter. <Ref. to EC(STI)-5, Front Catalytic Converter.> <Ref. to EC(w/o STI)-5, Front Catalytic Converter.>	Go to step 5.
5 CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.	Has water entered the connector?	Completely remove any water inside.	Go to step 6.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 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 connector and rear oxygen sensor connector. Connector & terminal (B136) No. 20 — (T6) No. 3: (B135) No. 30 — (T6) No. 4:	Is the resistance less than 1 Ω ?	Go to step 7.	Repair the harness and connector. NOTE: Repair the following locations. • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
7 CHECK REAR OXYGEN SENSOR SHIELD. 1) Turn the ignition switch to OFF. 2) Expose the rear oxygen sensor connector body side harness sensor shield. 3) Measure the resistance between sensor shield and chassis ground.	Is the resistance less than 1 Ω ?	Go to step 8.	Repair the open circuit of rear oxygen sensor harness.
8 CHECK ENGINE OIL AMOUNT AND EXHAUST GAS. 1) Check the engine oil amount. <Ref. to LU(STI)-11, INSPECTION, Engine Oil.> 2) Check exhaust gas during idling.	Does the engine oil amount drop or white smoke emit from the muffler?	Check the engine, and repair the defective part. <Ref. to ME(STI)-107, INSPECTION, Engine Trouble in General.> <Ref. to ME(w/o STI)-103, INSPECTION, Engine Trouble in General.> After repairing the engine, replace the catalytic converter. <Ref. to EX(STI)-8, Center Exhaust Pipe.> After the catalytic converter is replaced, perform step 2 to check the normal waveform is displayed, and then exit the procedure.	Go to step 9.
9 CHECK IGNITION SYSTEM. 1) Check the spark plug. <Ref. to IG(STI)-5, INSPECTION, Spark Plug.> <Ref. to IG(w/o STI)-6, INSPECTION, Spark Plug.> 2) Check the status of the ignition coil connector and the spark plug terminal.	Is there any fault in the ignition system?	After repairing the ignition system, replace the catalytic converter. <Ref. to EX(STI)-8, Center Exhaust Pipe.> After the catalytic converter is replaced, perform step 2 to check the normal waveform is displayed, and then exit the procedure.	Go to step 10.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
10 CHECK FUEL SYSTEM. 1) Refer to and check the items in "Insufficient fuel supply to fuel injector (except for "a. Fuel pump does not operate.")" and "Leakage or blow out of fuel". <Ref. to FU(STI)-98, INSPECTION, Fuel System Trouble in General.> <Ref. to FU(w/o STI)-94, INSPECTION, Fuel System Trouble in General.> 2) Check throttle body. <Ref. to FU(STI)-15, INSPECTION, Throttle Body.> <Ref. to FU(w/o STI)-16, INSPECTION, Throttle Body.> 3) Check intake manifold. <Ref. to FU(STI)-33, INSPECTION, Intake Manifold.> <Ref. to FU(w/o STI)-33, INSPECTION, Intake Manifold.>	Is there any fault in the fuel system?	After repairing the fuel system, replace the catalytic converter. <Ref. to EX(STI)-8, Center Exhaust Pipe.> After the catalytic converter is replaced, perform step 2 to check the normal waveform is displayed, and then exit the procedure.	Go to step 11.
11 CHECK DTC.	Is any other DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).> After checking the DTC, replace the catalytic converter. <Ref. to EX(STI)-8, Center Exhaust Pipe.> After the catalytic converter is replaced, perform step 2 to check the normal waveform is displayed, and then exit the procedure.	Replace the rear oxygen sensor. <Ref. to FU(STI)-56, Rear Oxygen Sensor.> <Ref. to FU(w/o STI)-55, Rear Oxygen Sensor.>

CG:DTC P0441 EVAPORATIVE EMISSION CONT. SYS. INCORRECT PURGE FLOW**DTC DETECTING CONDITION:**

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-152, DTC P0441 EVAPORATIVE EMISSION CONT. SYS. INCORRECT PURGE FLOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK PURGE CONTROL SOLENOID VALVE. Operate the purge control solenoid valve using the Subaru Select Monitor. NOTE: Refer to "Compulsory Valve Operation Check Mode" for more operation procedures. <Ref. to EN(H4DOTC)(diag)-64, Compulsory Valve Operation Check Mode.>	Does the purge control solenoid valve operate?	Go to step 3.	Replace the purge control solenoid valve. <Ref. to EC(STI)-11, Purge Control Solenoid Valve.> <Ref. to EC(w/o STI)-11, Purge Control Solenoid Valve.>
3 CHECK EVAPORATIVE EMISSION CONTROL SYSTEM LINE. 1) Turn the ignition switch to OFF. 2) Check the delivery (test) mode connector is disconnected.	Are there holes, cracks, clogging, or disconnection, misconnection of hoses or pipes in evaporative emission control system?	Repair or replace the hoses or pipes.	Repair the poor contact of ECM connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CH:DTC P0451 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/ SWITCH RANGE/PERFORMANCE

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-155, DTC P0451 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/SWITCH RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK CURRENT DATA. 1) Turn the ignition switch to ON (engine OFF). 2) Using the Subaru Select Monitor or general scan tool, read the value in «Atmosphere Pressure» and «Mani. Absolute Pressure», and compare them with the actual atmospheric pressure. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual. • To read the actual atmospheric pressure, connect the Subaru Select Monitor or general scan tool to the other known good vehicle.	Is the difference with the actual atmospheric pressure 3.3 kPa (24.5 mmHg, 1 inHg) or more?	Replace the part that showed larger deviation from the actual atmospheric pressure than the other. • If deviations in value for «Atmosphere Pressure» is larger: Replace the leak check valve assembly. <Ref. to EC(STI)-19, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-20, Leak Check Valve Assembly.> • If deviations in value for «Mani. Absolute Pressure» is larger: Replace the manifold absolute pressure sensor. <Ref. to FU(STI)-43, Manifold Absolute Pressure Sensor.> <Ref. to FU(w/o STI)-43, Manifold Absolute Pressure Sensor.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

CI: DTC P0452 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/ SWITCH LOW

DTC DETECTING CONDITION:

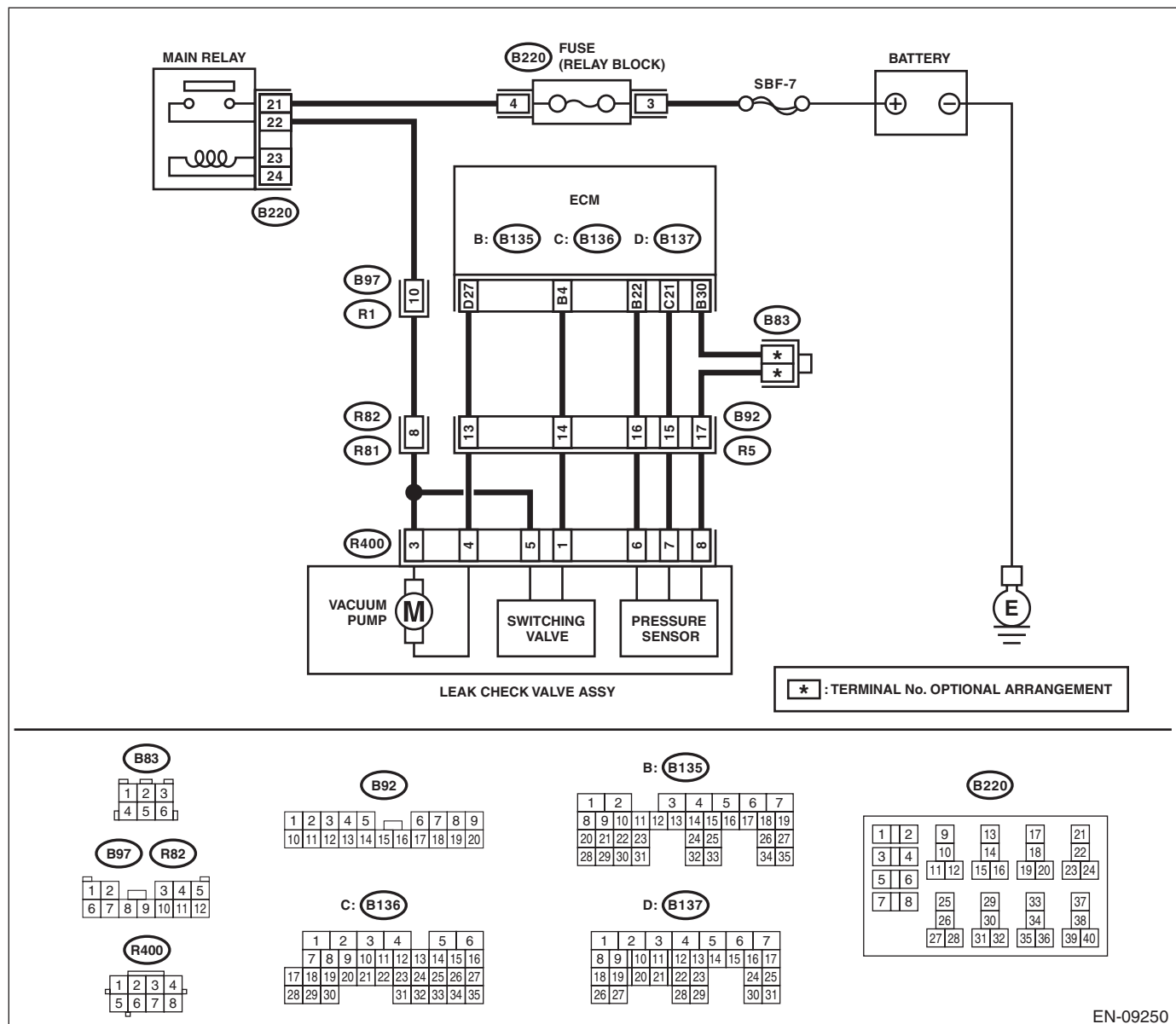
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-157, DTC P0452 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/SWITCH LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09250

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

	Step	Check	Yes	No
1	CHECK CURRENT DATA. 1) Turn the ignition switch to ON. 2) Read the value of «Atmosphere Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value in «Atmosphere Pressure» 34 kPa (255 mmHg, 10 inHg) or less?	Go to step 2.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	CHECK POWER SUPPLY OF LEAK CHECK VALVE ASSEMBLY. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the leak check valve assembly. 3) Turn the ignition switch to ON. 4) Measure the voltage between the leak check valve assembly connector and chassis ground. Connector & terminal (R400) No. 6 (+) — Chassis ground (-):	Is the voltage 4.5 V or more?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the leak check valve assembly connector • Poor contact of ECM connector • Poor contact of coupling connector
3	CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B136) No. 21 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 4.	Repair the short circuit to ground in harness between ECM connector and leak check valve assembly connector.
4	CHECK FOR POOR CONTACT. Check for poor contact of leak check valve assembly connector.	Is there poor contact in the leak check valve assembly connector?	Repair the poor contact in the leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(STI)-19, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-20, Leak Check Valve Assembly.>

**CJ:DTC P0453 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/
SWITCH HIGH****DTC DETECTING CONDITION:**

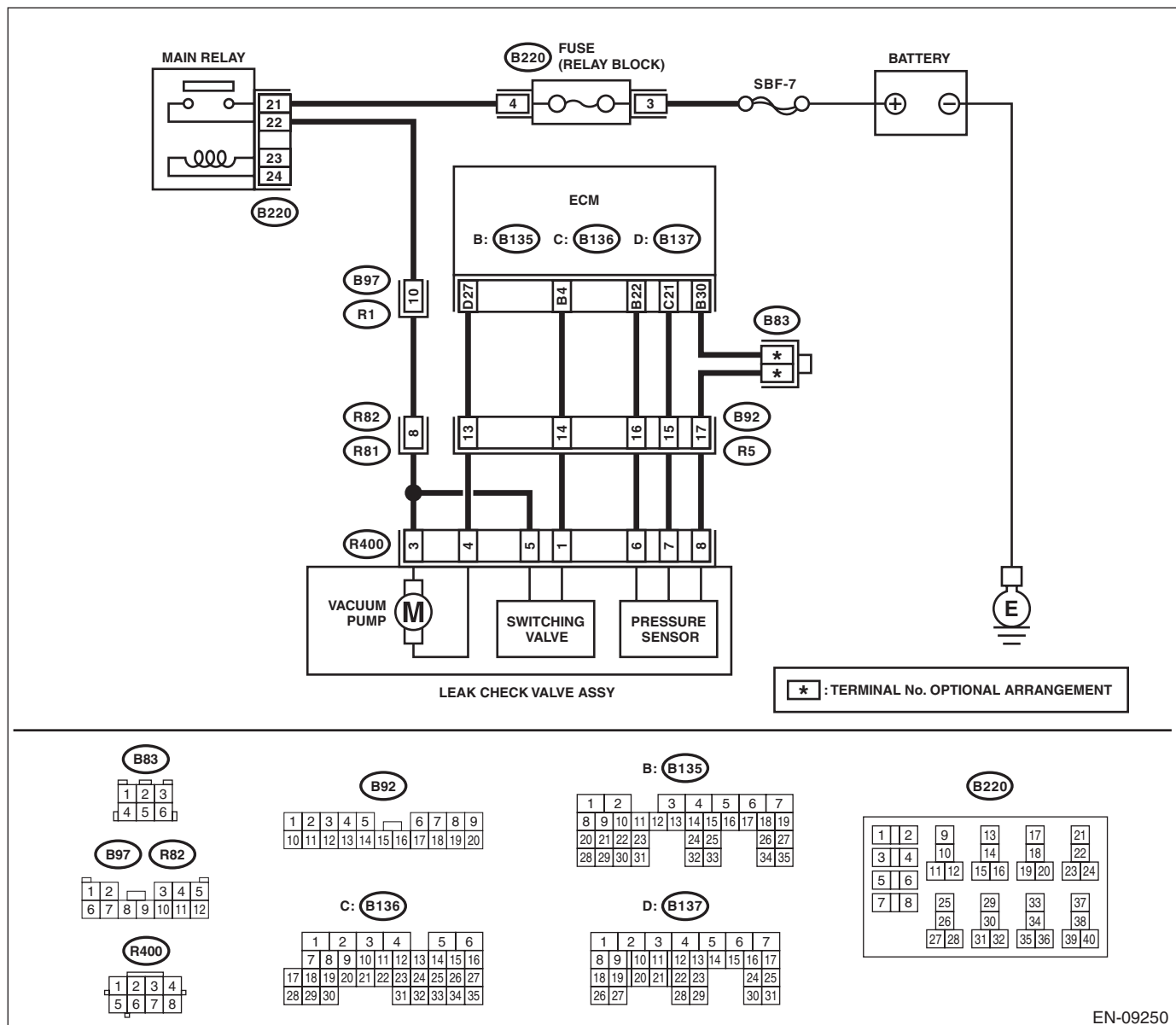
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-159, DTC P0453 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/SWITCH HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09250

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

	Step	Check	Yes	No
1	CHECK CURRENT DATA. 1) Turn the ignition switch to ON. 2) Read the value of «Atmosphere Pressure» using the Subaru Select Monitor or a general scan tool. NOTE: - Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value in «Atmosphere Pressure» 125 kPa (938 mmHg, 36.9 inHg) or more?	Go to step 2.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2	CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and the leak check valve assembly. 3) Measure the resistance of harness between ECM connector and the leak check valve assembly connector. Connector & terminal (B136) No. 21 — (R400) No. 7: (B135) No. 30 — (R400) No. 8:	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 connector and the leak check valve assembly connector - Poor contact of coupling connector - Poor contact of joint connector
3	CHECK FOR POOR CONTACT. Check for poor contact of ECM and the leak check valve assembly connector.	Is there poor contact in ECM and the leak check valve assembly connector?	Repair the poor contact of ECM and the leak check valve assembly connector.	Go to step 4.
4	CHECK LEAK CHECK VALVE ASSEMBLY. Check the pressure sensor of the leak check valve assembly. <Ref. to EC(STI)-21, CHECK PRESSURE SENSOR, INSPECTION, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-22, CHECK PRESSURE SENSOR, INSPECTION, Leak Check Valve Assembly.>	Is the pressure sensor of the leak check valve assembly OK?	Repair the short circuit to power in harness between ECM connector and leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(STI)-19, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-20, Leak Check Valve Assembly.>

CK:DTC P0455 EVAPORATIVE EMISSION SYSTEM LEAK DETECTED (LARGE LEAK)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-161, DTC P0455 EVAPORATIVE EMISSION SYSTEM LEAK DETECTED (LARGE 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.
- Fuel filler cap loose or lost

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 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 has caught while tightening.	Is the fuel filler cap tightened securely?	Go to step 2.	Tighten fuel filler cap securely.
2 CHECK FUEL FILLER CAP.	Is the fuel filler cap genuine?	Go to step 3.	Replace with a genuine fuel filler cap.
3 CHECK FUEL FILLER PIPE GASKET.	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(STI)-77, Fuel Filler Pipe.> <Ref. to FU(w/o STI)-75, Fuel Filler Pipe.>	Go to step 4.
4 CHECK PURGE CONTROL SOLENOID VALVE. Check air-tightness of the purge control solenoid valve. <Ref. to EC(STI)-12, INSPECTION, Purge Control Solenoid Valve.> <Ref. to EC(w/o STI)-13, INSPECTION, Purge Control Solenoid Valve.>	Is the purge control solenoid valve OK?	Go to step 5.	Replace the purge control solenoid valve. <Ref. to EC(STI)-11, Purge Control Solenoid Valve.> <Ref. to EC(w/o STI)-11, Purge Control Solenoid Valve.>
5 CHECK EVAPORATIVE EMISSION CONTROL SYSTEM LINE.	Are there holes on the evaporation line?	Repair or replace the evaporation line. <Ref. to FU(STI)-93, Fuel Delivery, Return and Evaporation Lines.> <Ref. to FU(w/o STI)-89, Fuel Delivery, Return and Evaporation Lines.>	Go to step 6.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

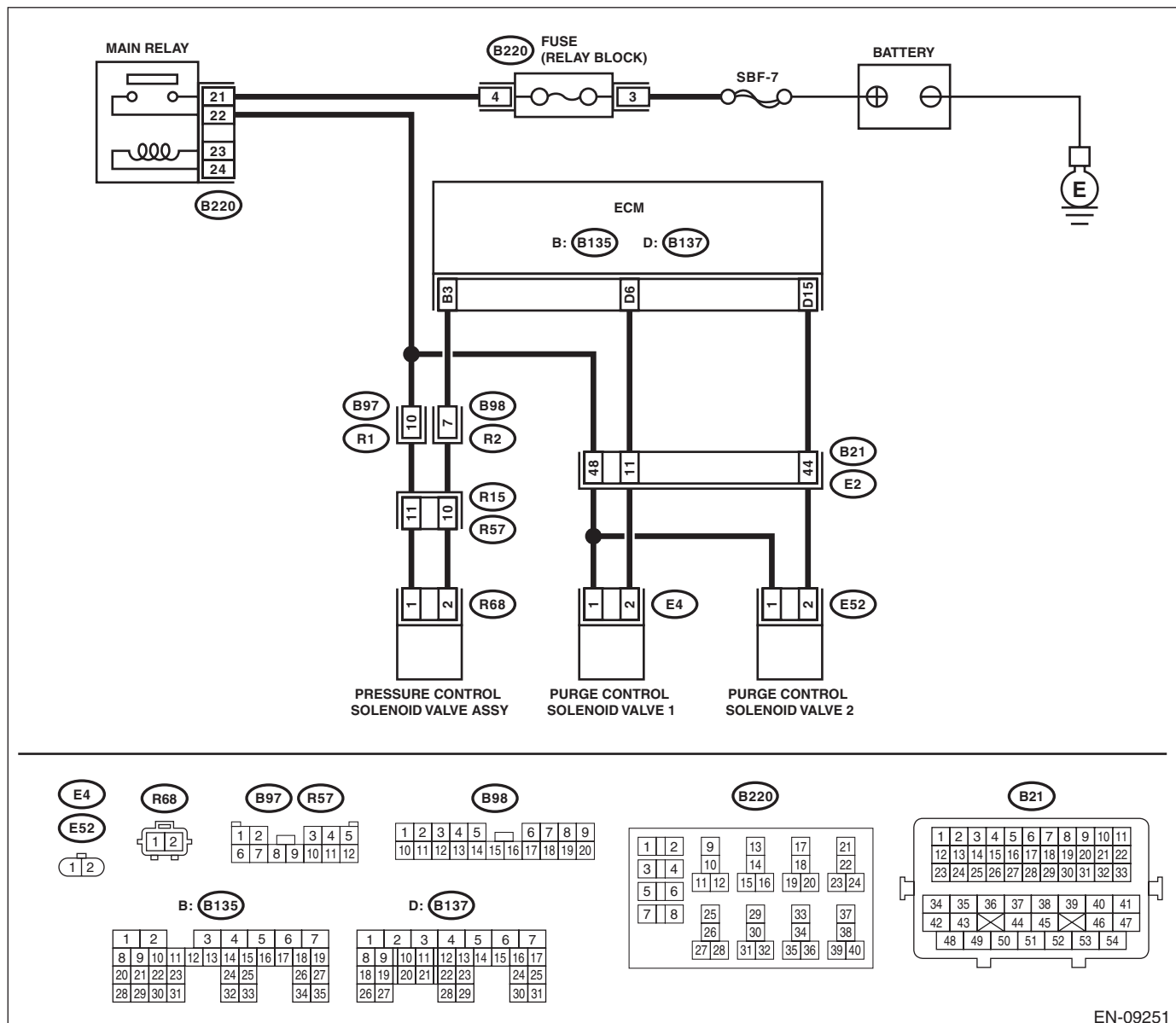
Step	Check	Yes	No
6 CHECK CANISTER.	Are there holes on the canister?	Replace the canister. <Ref. to EC(STI)-7, Canister.> <Ref. to EC(w/o STI)-7, Canister.>	Go to step 7.
7 CHECK LEAK CHECK VALVE ASSEMBLY.	Are there damage or holes on the leak check valve assembly?	Replace the leak check valve assembly. <Ref. to EC(STI)-19, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-20, Leak Check Valve Assembly.>	Go to step 8.
8 CHECK FUEL TANK. Remove the fuel tank. <Ref. to FU(STI)-70, Fuel Tank.> <Ref. to FU(w/o STI)-68, Fuel Tank.>	Are there damage or holes on the fuel tank?	Repair or replace the fuel tank. <Ref. to FU(STI)-70, Fuel Tank.> <Ref. to FU(w/o STI)-68, Fuel Tank.>	Go to step 9.
9 CHECK ANY OTHER MECHANICAL TROUBLE IN EVAPORATIVE EMISSION CONTROL SYSTEM.	Are there holes, cracks, clogging, or disconnection, misconnection of hoses or pipes in evaporative emission control system?	Repair or replace the hoses or pipes.	Repair the poor contact of ECM connector.

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

NOTE:

For the diagnostic procedure, refer to DTC P0455. <Ref. to EN(H4DOTC)(diag)-261, DTC P0455 EVAPORATIVE EMISSION SYSTEM LEAK DETECTED (LARGE LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



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 (B137) No. 6 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 2.	Go to step 3.
2	CHECK FOR POOR CONTACT. Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary open or short circuit of harness or temporary poor contact of connector may be the cause.
3	CHECK POWER SUPPLY TO PURGE CONTROL SOLENOID VALVE CONNECTOR. Measure the voltage between purge control solenoid valve connector and engine ground. Connector & terminal (E4) No. 1 (+) — Engine ground (-):	Is the voltage 10 V or more?	Go to step 4.	Repair the power supply circuit.
4	CHECK HARNESS BETWEEN ECM AND PURGE CONTROL SOLENOID VALVE CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and purge control solenoid valve. 3) Measure the resistance between the purge control solenoid valve connector and engine ground. Connector & terminal (E4) No. 2 — Engine ground:	Is the resistance 1 MΩ or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM connector and purge control solenoid valve connector.
5	CHECK HARNESS BETWEEN ECM AND PURGE CONTROL SOLENOID VALVE CONNECTOR. Measure the resistance of harness between ECM connector and purge control solenoid valve connector. Connector & terminal (B137) No. 6 — (E4) No. 2:	Is the resistance less than 1 Ω?	Go to step 6.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and purge control solenoid valve connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 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 10 — 100 Ω ?	Repair the poor contact of purge control solenoid valve connector.	Replace the purge control solenoid valve. <Ref. to EC(STI)-11, Purge Control Solenoid Valve.> <Ref. to EC(w/o STI)-11, Purge Control Solenoid Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CN:DTC P0459 EVAPORATIVE EMISSION SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-170, DTC P0459 EVAPORATIVE EMISSION SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

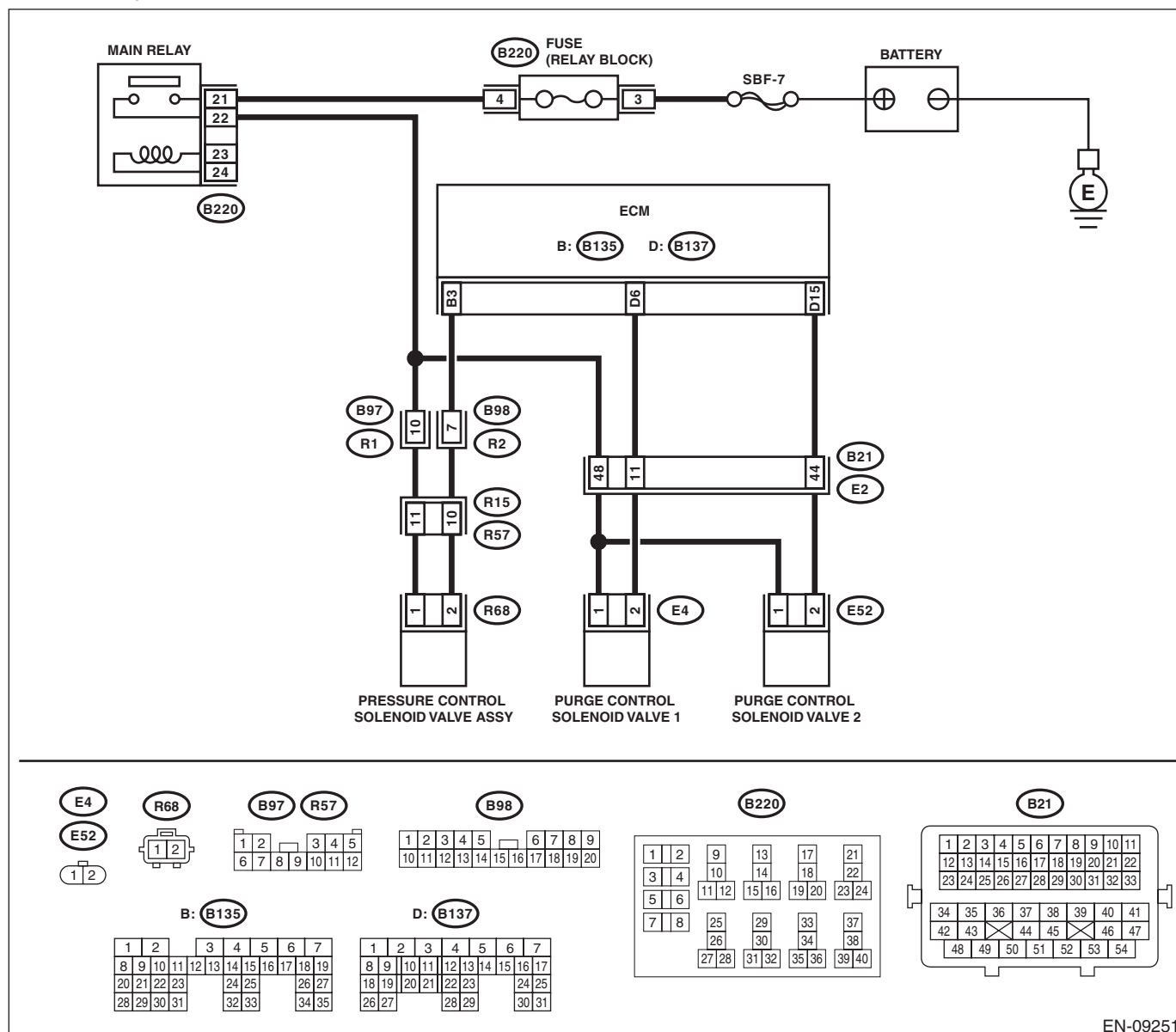
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09251

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND PURGE CONTROL SOLENOID VALVE CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and purge control solenoid valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B137) No. 6 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and purge control solenoid valve connector.	Go to step 2.
2 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(STI)-11, Purge Control Solenoid Valve.> <Ref. to EC(w/o STI)-11, Purge Control Solenoid Valve.>	Repair the poor contact of ECM connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CO: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(H4DOTC)-172, DTC P0461 FUEL LEVEL SENSOR “A” CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Replace the fuel level sensor and fuel sub level sensor. <Ref. to FU(STI)-82, Fuel Level Sensor.> <Ref. to FU(STI)-83, Fuel Sub Level Sensor.> <Ref. to FU(w/o STI)-80, Fuel Level Sensor.> <Ref. to FU(w/o STI)-81, Fuel Sub Level Sensor.>

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

NOTE:

For the diagnostic procedure, refer to DTC P0463. <Ref. to EN(H4DOTC)(diag)-269, DTC P0463 FUEL LEVEL SENSOR “A” CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CQ: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(H4DOTC)-176, DTC P0463 FUEL LEVEL SENSOR “A” CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR ANY OTHER DTC ON DISPLAY.	Is DTC P0462 or P0463 displayed on the Subaru Select Monitor?	Check the combination meter. <Ref. to IDI-8, CHECK FUEL LEVEL SENSOR, INSPECTION, Combination Meter System.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CR:DTC P04AC EVAP SYSTEM PURGE CONTROL VALVE "B" CIRCUIT LOW

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-178, DTC P04AC EVAP SYSTEM PURGE CONTROL VALVE "B" CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

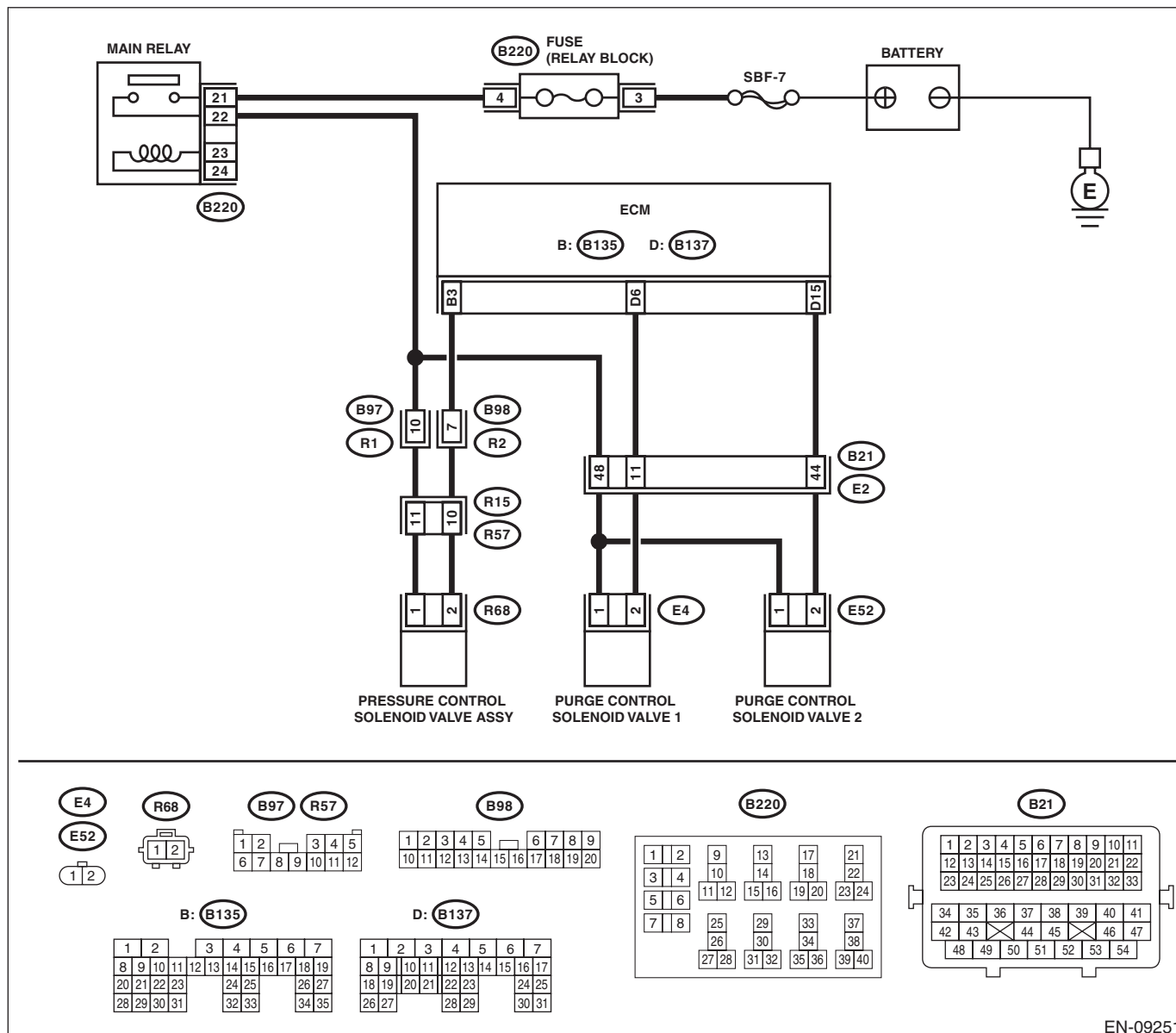
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09251

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 (B137) No. 15 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 2.	Go to step 3.
2 CHECK FOR POOR CONTACT. Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary open or short circuit of harness or temporary poor contact of connector may be the cause.
3 CHECK POWER SUPPLY TO PURGE CONTROL SOLENOID VALVE 2 CONNECTOR. Measure the voltage between purge control solenoid valve 2 connector and engine ground. Connector & terminal (E52) No. 1 (+) — Engine ground (-):	Is the voltage 10 V or more?	Go to step 4.	Repair the power supply circuit.
4 CHECK HARNESS BETWEEN ECM AND PURGE CONTROL SOLENOID VALVE 2 CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and purge control solenoid valve 2. 3) Measure the resistance between the purge control solenoid valve 2 connector and engine ground. Connector & terminal (E52) No. 2 — Engine ground:	Is the resistance 1 MΩ or more?	Go to step 5.	Repair the ground short circuit of harness between ECM connector and purge control solenoid valve 2 connector.
5 CHECK HARNESS BETWEEN ECM AND PURGE CONTROL SOLENOID VALVE 2 CONNECTOR. Measure the resistance of harness between ECM connector and purge control solenoid valve 2 connector. Connector & terminal (B137) No. 15 — (E52) No. 2:	Is the resistance less than 1 Ω?	Go to step 6.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and purge control solenoid valve 2 connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK PURGE CONTROL SOLENOID VALVE 2. 1) Remove the purge control solenoid valve 2. 2) Measure the resistance between purge control solenoid valve 2 terminals. Terminals No. 1 — No. 2:	Is the resistance 10 — 100 Ω ?	Repair the poor contact of the purge control solenoid valve 2 connector.	Replace the purge control solenoid valve 2. <Ref. to EC(STI)-11, Purge Control Solenoid Valve.> <Ref. to EC(w/o STI)-11, Purge Control Solenoid Valve.>

CS:DTC P04AD EVAP SYSTEM PURGE CONTROL VALVE "B" CIRCUIT HIGH**DTC DETECTING CONDITION:**

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-179, DTC P04AD EVAP SYSTEM PURGE CONTROL VALVE "B" CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

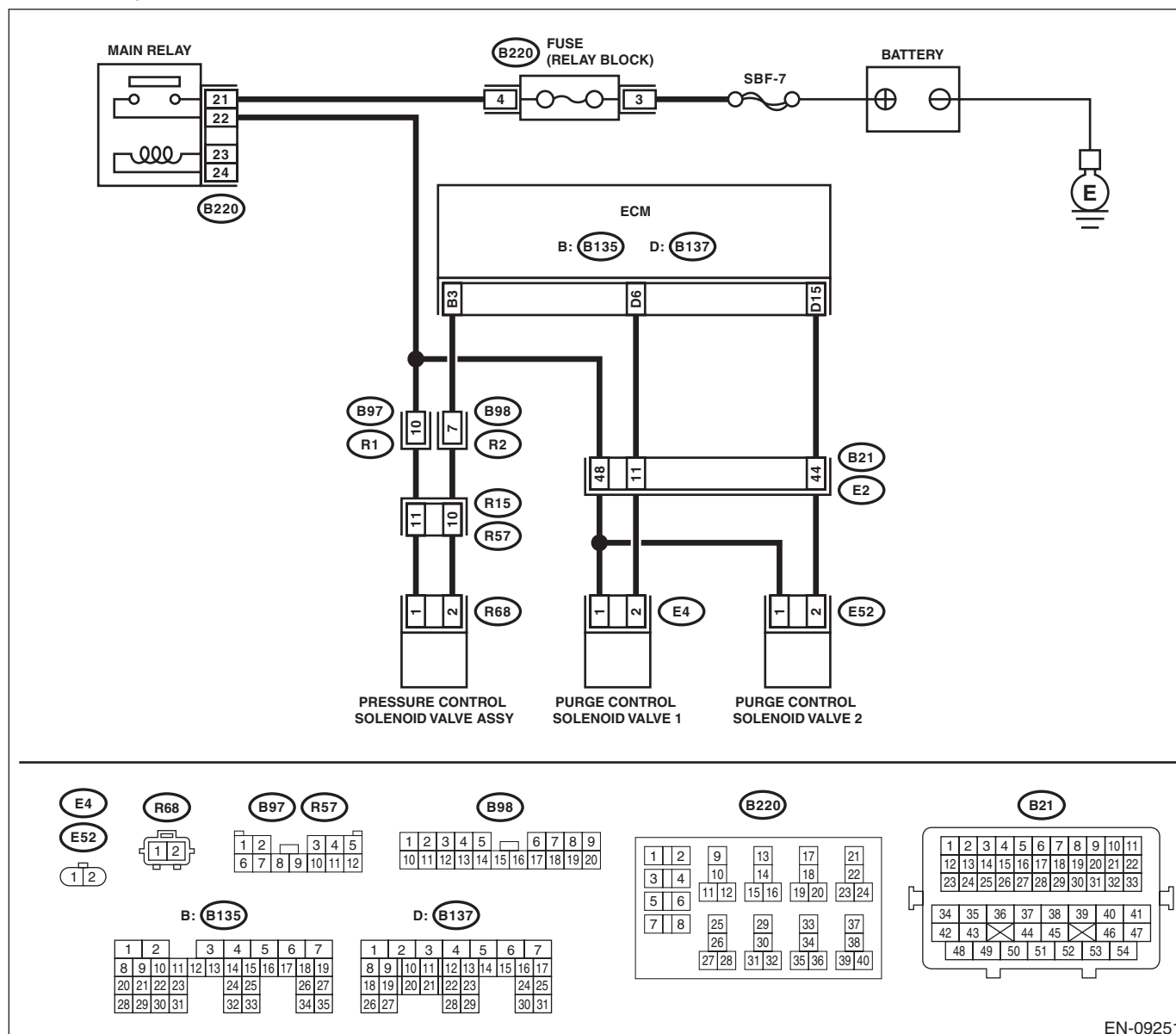
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09251

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND PURGE CONTROL SOLENOID VALVE 2 CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and purge control solenoid valve 2. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B137) No. 15 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and purge control solenoid valve 2 connector.	Go to step 2.
2 CHECK PURGE CONTROL SOLENOID VALVE 2. 1) Turn the ignition switch to OFF. 2) Measure the resistance between purge control solenoid valve 2 terminals. Terminals No. 1 — No. 2:	Is the resistance less than 1 Ω ?	Replace the purge control solenoid valve 2. <Ref. to EC(STI)-11, Purge Control Solenoid Valve.> <Ref. to EC(w/o STI)-11, Purge Control Solenoid Valve.>	Repair the poor contact of ECM connector.

CT:DTC P04DB CRANKCASE VENTILATION SYSTEM DISCONNECTED**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-180, DTC P04DB CRANKCASE VENTILATION SYSTEM DISCONNECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

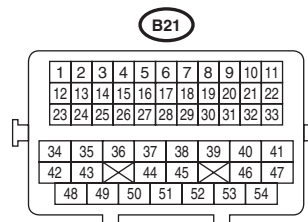
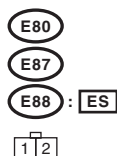
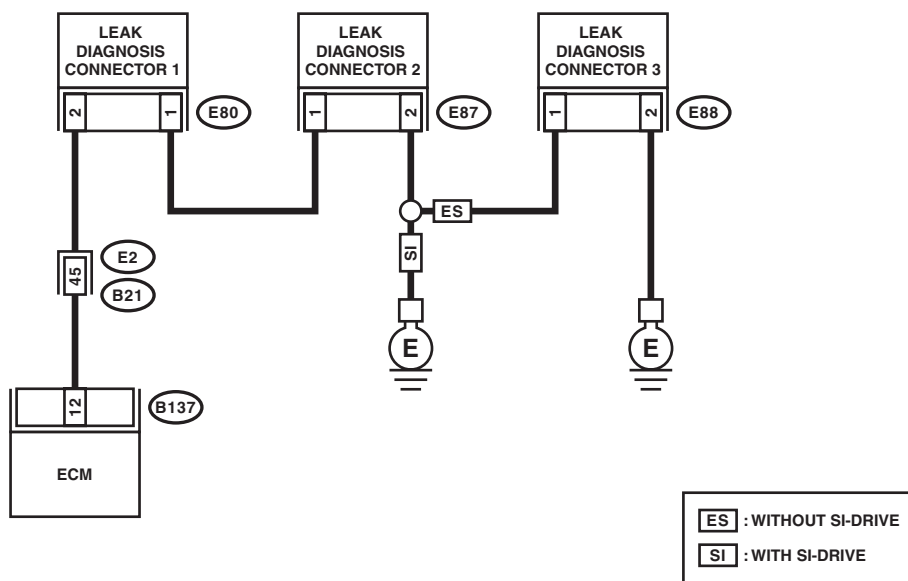
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

	Step	Check	Yes	No
1	CHECK BLOW-BY HOSE. Check the blow-by hose condition.	Is there any disconnection or crack in blow-by hose?	Install or replace the blow-by hose.	Go to step 2.
2	CHECK HARNESS BETWEEN ECM AND PCV HOSE ASSEMBLY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and PCV hose assembly. 3) Measure the resistance of harness between ECM connector and PCV hose assembly connector. Connector & terminal (B137) No. 12 — (E80) 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 in harness between ECM connector and PCV hose assembly connector • Poor contact of coupling connector
3	CHECK HARNESS BETWEEN ECM AND PCV HOSE ASSEMBLY CONNECTOR. Measure the resistance between PCV hose assembly connector and chassis ground. Connector & terminal (B137) No. 12 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 4.	Repair the short circuit to ground in harness between ECM connector and PCV hose assembly connector.
4	CHECK HARNESS BETWEEN LEAK DIAGNOSIS CONNECTORS. Measure the resistance of harness between leak diagnosis connectors. Connector & terminal Models without SI-DRIVE (B80) No. 1 — (B87) No. 1: (B87) No. 2 — (B88) No. 1: Models with SI-DRIVE (B80) No. 1 — (B87) No. 1:	Is the resistance less than 1 Ω ?	Go to step 5.	Repair the open circuit in the wiring harness between leak diagnosis connectors.
5	CHECK GROUND CIRCUIT OF PCV HOSE ASSEMBLY. Measure the resistance of harness between PCV hose assembly connector and engine ground. Connector & terminal Models without SI-DRIVE (B88) No. 2 — Engine ground: Models with SI-DRIVE (B87) No. 2 — Engine ground:	Is the resistance less than 5 Ω ?	Go to step 6.	Repair the open circuit in harness between PCV hose assembly connector and engine ground.
6	CHECK PCV HOSE ASSEMBLY. Measure the resistance between terminals of each leak diagnosis connector. Terminals No. 1 — No. 2:	Is the resistance less than 1 Ω at all measurement?	Repair the poor contact of ECM and PCV hose assembly connector.	Replace the PCV hose assembly. <Ref. to EC(STI)-24, PCV Hose Assembly.> <Ref. to EC(w/o STI)-25, PCV Hose Assembly.>

CU:DTC P0500 VEHICLE SPEED SENSOR “A”**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-182, DTC P0500 VEHICLE SPEED SENSOR “A”, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step		Check	Yes	No
1	CHECK DTC OF VDC. Check DTC of VDC.	Is DTC of VDC displayed?	Perform the diagnosis according to DTC. <Ref. to VDC(diag)-48, List of Diagnostic Trouble Code (DTC).>	Repair the poor contact of ECM connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CV: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(H4DOTC)-183, DTC P0506 IDLE AIR CONTROL SYSTEM RPM LOWER THAN EXPECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Hard to start the engine.
- Engine does not start.
- Improper idling
- Engine stalls.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK AIR CLEANER ELEMENT. 1) Turn the ignition switch to OFF. 2) Check the air cleaner element.	Is there excessive clogging on air cleaner element?	Replace the air cleaner element. <Ref. to IN(STI)-7, Air Cleaner Element.> <Ref. to IN(w/o STI)-7, Air Cleaner Element.>	Go to step 3.
3 CHECK ELECTRONIC THROTTLE CONTROL. 1) Remove the electronic throttle control. <Ref. to FU(STI)-15, REMOVAL, Throttle Body.> <Ref. to FU(w/o STI)-15, REMOVAL, Throttle Body.> 2) 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. <Ref. to EN(H4DOTC)(diag)-371, DTC P2101 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CW: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(H4DOTC)-184, 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 servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK AIR INTAKE SYSTEM. 1) Start and idle the engine. 2) 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. <Ref. to FU(STI)-15, REMOVAL, Throttle Body.> <Ref. to FU(w/o STI)-15, REMOVAL, Throttle Body.> 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. <Ref. to EN(H4DOTC)(diag)-371, 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)

CX:DTC P050A COLD START IDLE AIR CONTROL SYSTEM PERFORMANCE

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-185, DTC P050A COLD START IDLE AIR CONTROL SYSTEM PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

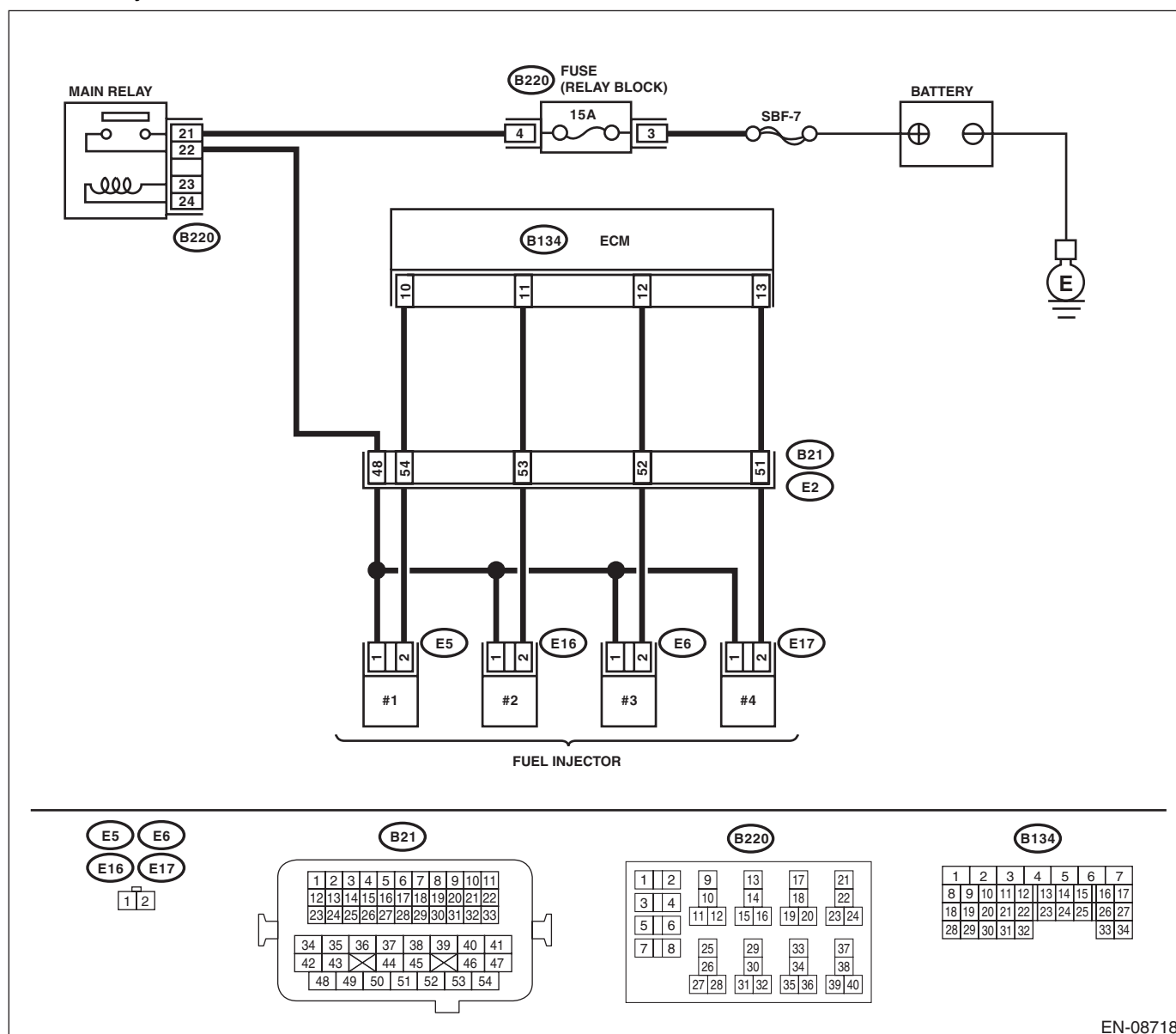
- Engine keeps running at higher speed than specified idle speed.
- Engine keeps running at a lower speed than the specified idle speed.
- Engine stalls.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

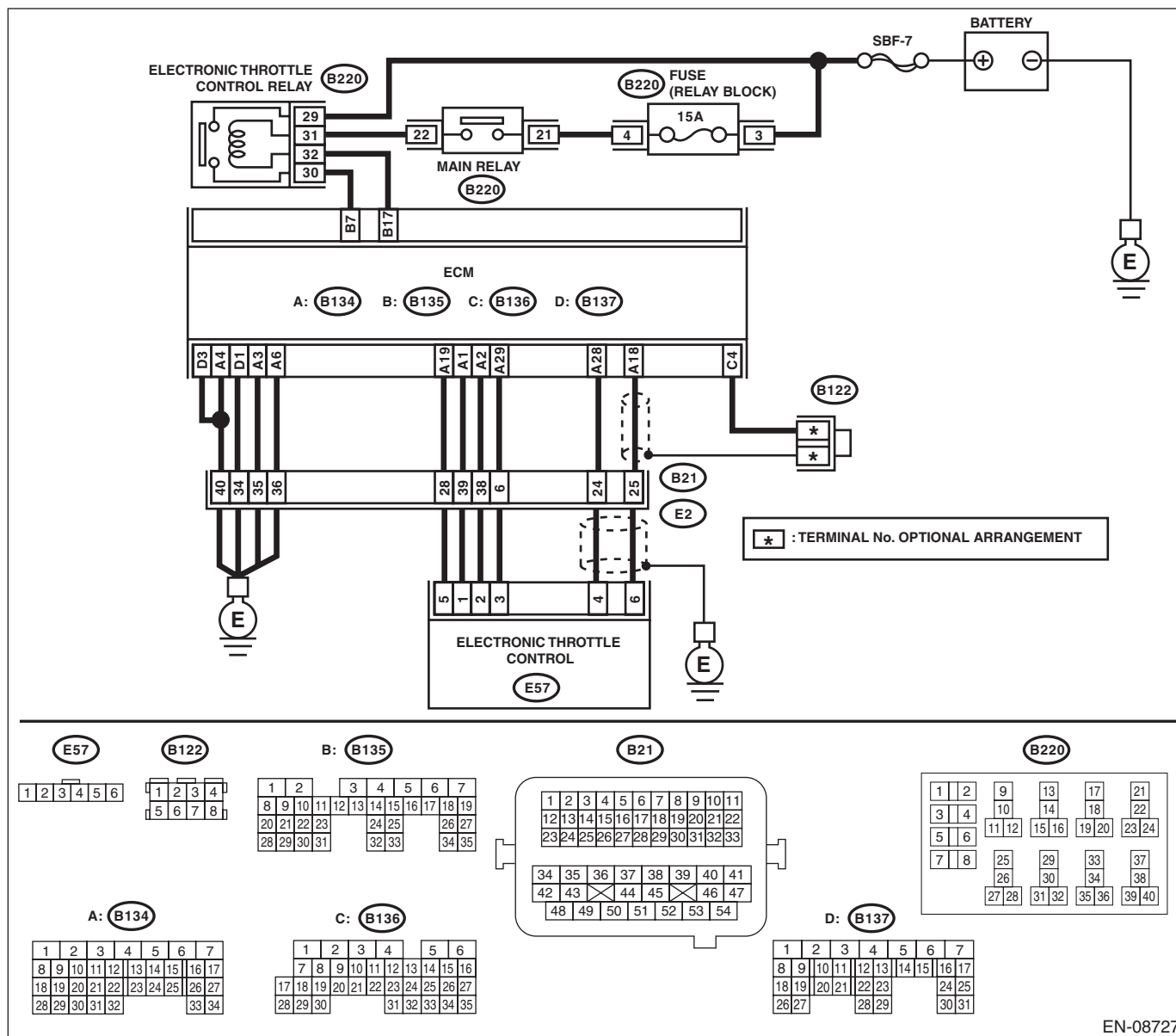
- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08718

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)



EN-08727

Step	Check	Yes	No
1	CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2	CHECK ENGINE OIL. Is there a proper amount of engine oil?	Go to step 3.	Replace engine oil. <Ref. to LU(STI)-11, REPLACE-MENT, Engine Oil.>
3	CHECK EXHAUST SYSTEM. Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step 4.

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 OPEN FLAMES" signs near the working area. CAUTION: Be careful not to spill fuel. Measure the fuel pressure while disconnecting pressure regulator vacuum hose from intake manifold. <Ref. to ME(STI)-25, INSPECTION, Fuel Pressure.> <Ref. to ME(w/o STI)-24, INSPECTION, Fuel Pressure.> CAUTION: Release fuel pressure before removing the fuel pressure gauge. NOTE: If fuel pressure does not increase, squeeze the fuel return hose 2 to 3 times, then measure fuel pressure again.	Is the measured value 284 — 314 kPa (2.9 — 3.2 kg/cm ² , 41 — 46 psi)?	Go to step 6.	Check the fuel pump and fuel delivery line. • Models without SI-DRIVE <Ref. to FU(w/o STI)-79, INSPECTION, Fuel Pump.> <Ref. to FU(w/o STI)-93, INSPECTION, Fuel Delivery, Return and Evaporation Lines.> • Models with SI-DRIVE <Ref. to FU(STI)-81, INSPECTION, Fuel Pump.> <Ref. to FU(STI)-97, INSPECTION, Fuel Delivery, Return and Evaporation Lines.>
6 CHECK FUEL PRESSURE. After connecting the pressure regulator vacuum hose, measure fuel pressure. <Ref. to ME(STI)-25, INSPECTION, Fuel Pressure.> <Ref. to ME(w/o STI)-24, INSPECTION, Fuel Pressure.> CAUTION: Release fuel pressure before removing the fuel pressure gauge. NOTE: • If fuel pressure does not increase, squeeze fuel return hose 2 to 3 times, then measure fuel pressure again. • If the measured value at this step is out of specification, check or replace pressure regulator and pressure regulator vacuum hose.	Is the measured value 230 — 260 kPa (2.4 — 2.7 kg/cm ² , 33 — 38 psi)?	Go to step 7.	Check the fuel pump and fuel delivery line. • Models without SI-DRIVE <Ref. to FU(w/o STI)-79, INSPECTION, Fuel Pump.> <Ref. to FU(w/o STI)-93, INSPECTION, Fuel Delivery, Return and Evaporation Lines.> • Models with SI-DRIVE <Ref. to FU(STI)-81, INSPECTION, Fuel Pump.> <Ref. to FU(STI)-97, INSPECTION, Fuel Delivery, Return and Evaporation Lines.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK ENGINE COOLANT TEMPERATURE SENSOR. 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Go to step 8.	Replace the engine coolant temperature sensor. <Ref. to FU(STI)-34, Engine Coolant Temperature Sensor.> <Ref. to FU(w/o STI)-34, Engine Coolant Temperature Sensor.>
8 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°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 value of «Mass Air Flow» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mass Air Flow» 2.0 — 5.0 g/s (0.26 — 0.66 lb/m)?	Go to step 9.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(STI)-42, Mass Air Flow and Intake Air Temperature Sensor.> <Ref. to FU(w/o STI)-42, Mass Air Flow and Intake Air Temperature Sensor.>
9 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°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 value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Subtract ambient temperature from «Intake Air Temp.». Is the obtained value -10 — 50°C (-18 — 90°F)?	Go to step 10.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(STI)-42, Mass Air Flow and Intake Air Temperature Sensor.> <Ref. to FU(w/o STI)-42, Mass Air Flow and Intake Air Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
10 CHECK OUTPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground on faulty cylinders. Connector & terminal #1 (B134) No. 10 (+) — Chassis ground (-): #2 (B134) No. 11 (+) — Chassis ground (-): #3 (B134) No. 12 (+) — Chassis ground (-): #4 (B134) No. 13 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 15.	Go to step 11.
11 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Measure the resistance between fuel injector connector 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 resistance 1 M Ω or more?	Go to step 12.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
12 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. Measure the resistance of harness between ECM and fuel injector connector on faulty cylinders. Connector & terminal #1 (B134) No. 10 — (E5) No. 2: #2 (B134) No. 11 — (E16) No. 2: #3 (B134) No. 12 — (E6) No. 2: #4 (B134) No. 13 — (E17) No. 2:	Is the resistance less than 1 Ω ?	Go to step 13.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and fuel injector connector • Poor contact of coupling connector
13 CHECK FUEL INJECTOR. Measure the resistance between fuel injector terminals on faulty cylinder. Terminals No. 1 — No. 2:	Is the resistance 5 — 20 Ω ?	Go to step 14.	Replace the faulty fuel injector. <Ref. to FU(STI)-45, Fuel Injector.> <Ref. to FU(w/o STI)-45, Fuel Injector.>
14 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. 1 (+) — Engine ground (-): #2 (E16) No. 1 (+) — Engine ground (-): #3 (E6) No. 1 (+) — Engine ground (-): #4 (E17) No. 1 (+) — Engine ground (-):	Is the voltage 10 V or more?	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 the main relay connector and fuel injector connector on faulty cylinders • Poor contact of coupling connector • Poor contact of main relay connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
15 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR 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 and chassis ground on faulty cylinders. Connector & terminal #1 (B134) No. 10 (+) — Chassis ground (-): #2 (B134) No. 11 (+) — Chassis ground (-): #3 (B134) No. 12 (+) — Chassis ground (-): #4 (B134) No. 13 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and fuel injector connectors.	Go to step 16.
16 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 5 — 20 Ω ?	Go to step 17.	Replace the faulty fuel injector. <Ref. to FU(STI)-45, Fuel Injector.> <Ref. to FU(w/o STI)-45, Fuel Injector.>
17 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. <Ref. to FU(STI)-37, Camshaft Position Sensor.> <Ref. to FU(STI)-35, Crankshaft Position Sensor.> <Ref. to FU(w/o STI)-37, Camshaft Position Sensor.> <Ref. to FU(w/o STI)-35, Crankshaft Position Sensor.>	Go to step 18.
18 CHECK CRANK SPROCKET. Remove the timing belt cover. <Ref. to ME(STI)-49, REMOVAL, Timing Belt Cover.> <Ref. to ME(w/o STI)-47, REMOVAL, Timing Belt Cover.>	Is the crank sprocket rusted or does it have broken teeth?	Replace the crank sprocket. <Ref. to ME(STI)-60, Crank Sprocket.> <Ref. to ME(w/o STI)-58, Crank Sprocket.>	Go to step 19.
19 CHECK INSTALLATION CONDITION OF TIMING BELT. Turn the crankshaft, and align alignment mark on crank sprocket with alignment mark on cylinder block. ST 499987500 CRANKSHAFT SOCKET	Is the timing belt dislocated from its proper position?	Repair the installation condition of timing belt. <Ref. to ME(STI)-50, Timing Belt.> <Ref. to ME(w/o STI)-48, Timing Belt.>	Go to step 20.
20 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. 31 and No. 32 of electronic throttle control relay. 4) Measure the resistance between electronic throttle control relay terminals. Terminals No. 29 — No. 30:	Is the resistance less than 1 Ω ?	Go to step 21.	Replace the electronic throttle control relay. <Ref. to FU(STI)-64, Electronic Throttle Control Relay.> <Ref. to FU(w/o STI)-62, Electronic Throttle Control Relay.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
21 CHECK POWER SUPPLY OF ELECTRONIC THROTTLE CONTROL RELAY. Measure the voltage between electronic throttle control relay connector and chassis ground. Connector & terminal (B220) No. 29 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 22.	Repair the open or ground short circuit of power supply circuit.
22 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR. 1) Disconnect the connector from ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control relay connector and chassis ground. Connector & terminal (B220) No. 32 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control relay connector.	Go to step 23.
23 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control relay connector and chassis ground. Connector & terminal (B220) No. 32 — Chassis ground: (B220) No. 30 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 24.	Repair the short circuit to ground in harness between ECM connector and electronic throttle control relay connector.
24 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR. Measure the resistance between ECM connector and electronic throttle control relay connector. Connector & terminal (B135) No. 17 — (B220) No. 32: (B135) No. 7 — (B220) No. 30:	Is the resistance less than 1 Ω ?	Go to step 25.	Repair the open circuit in harness between ECM connector and electronic throttle control relay connector.
25 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 19 — Chassis ground: (B134) No. 18 — Chassis ground: (B134) No. 18 — (B136) No. 4: (B134) No. 28 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 26.	Repair the ground 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
26 CHECK SHORT CIRCUIT INSIDE THE ECM. 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. Connector & terminal (B57) No. 6 — Engine ground: (B57) No. 4 — Engine ground:	Is the resistance 1 MΩ or more?	Go to step 27.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(STI)-59, Engine Control Module (ECM).> <Ref. to FU(w/o STI)-57, Engine Control Module (ECM).>
27 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 18 — (E57) No. 6: (B134) No. 28 — (E57) No. 4: (B134) No. 29 — (E57) No. 3:	Is the resistance less than 1 Ω?	Go to step 28.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
28 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Connect the connector to ECM. 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 29.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
29 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to ON. 2) 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 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step 30.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
30 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. Connector & terminal (B134) No. 19 — (B134) No. 18: (B134) No. 19 — (B134) No. 28:	Is the resistance 1 M Ω or more?	Go to step 31.	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.
31 CHECK SENSOR OUTPUT. 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Read the value of «Main-Throttle Sensor» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «Main-Throttle Sensor» 0.81 — 0.87 V?	Go to step 32.	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(STI)-15, Throttle Body.> <Ref. to FU(w/o STI)-15, Throttle Body.>
32 CHECK SENSOR OUTPUT. Read the value of «Sub-Throttle Sensor» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «Sub-Throttle Sensor» 1.64 — 1.70 V?	Go to step 33.	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(STI)-15, Throttle Body.> <Ref. to FU(w/o STI)-15, Throttle Body.>
33 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL MOTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 2 — (E57) No. 2: (B134) No. 1 — (E57) No. 1:	Is the resistance less than 1 Ω ?	Go to step 34.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
34 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 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step 35.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
35 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL MOTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector 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 1 M Ω or more?	Go to step 36.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.
36 CHECK ELECTRONIC THROTTLE CONTROL MOTOR HARNESS. Measure the resistance between electronic throttle control connectors. Connector & terminal (E57) No. 2 — (E57) No. 1:	Is the resistance 1 M Ω or more?	Go to step 37.	Repair the short circuit in harness between ECM connector and electronic throttle control connector.
37 CHECK ELECTRONIC THROTTLE CONTROL GROUND CIRCUIT. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 3 — Chassis ground: (B134) No. 4 — Chassis ground: (B134) No. 6 — Chassis ground: (B137) No. 1 — Chassis ground: (B137) No. 3 — Chassis ground:	Is the resistance less than 5 Ω ?	Go to step 38.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of coupling connector
38 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 39.	Replace the electronic throttle control. <Ref. to FU(STI)-15, Throttle Body.> <Ref. to FU(w/o STI)-15, Throttle Body.>
39 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 electronic throttle control. <Ref. to FU(STI)-15, Throttle Body.> <Ref. to FU(w/o STI)-15, Throttle Body.>

CY:DTC P050B COLD START IGNITION TIMING PERFORMANCE

NOTE:

For the diagnostic procedure, refer to DTC P050A. <Ref. to EN(H4DOTC)(diag)-280, DTC P050A COLD START IDLE AIR CONTROL SYSTEM PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CZ:DTC P0560 SYSTEM VOLTAGE

DTC DETECTING CONDITION:

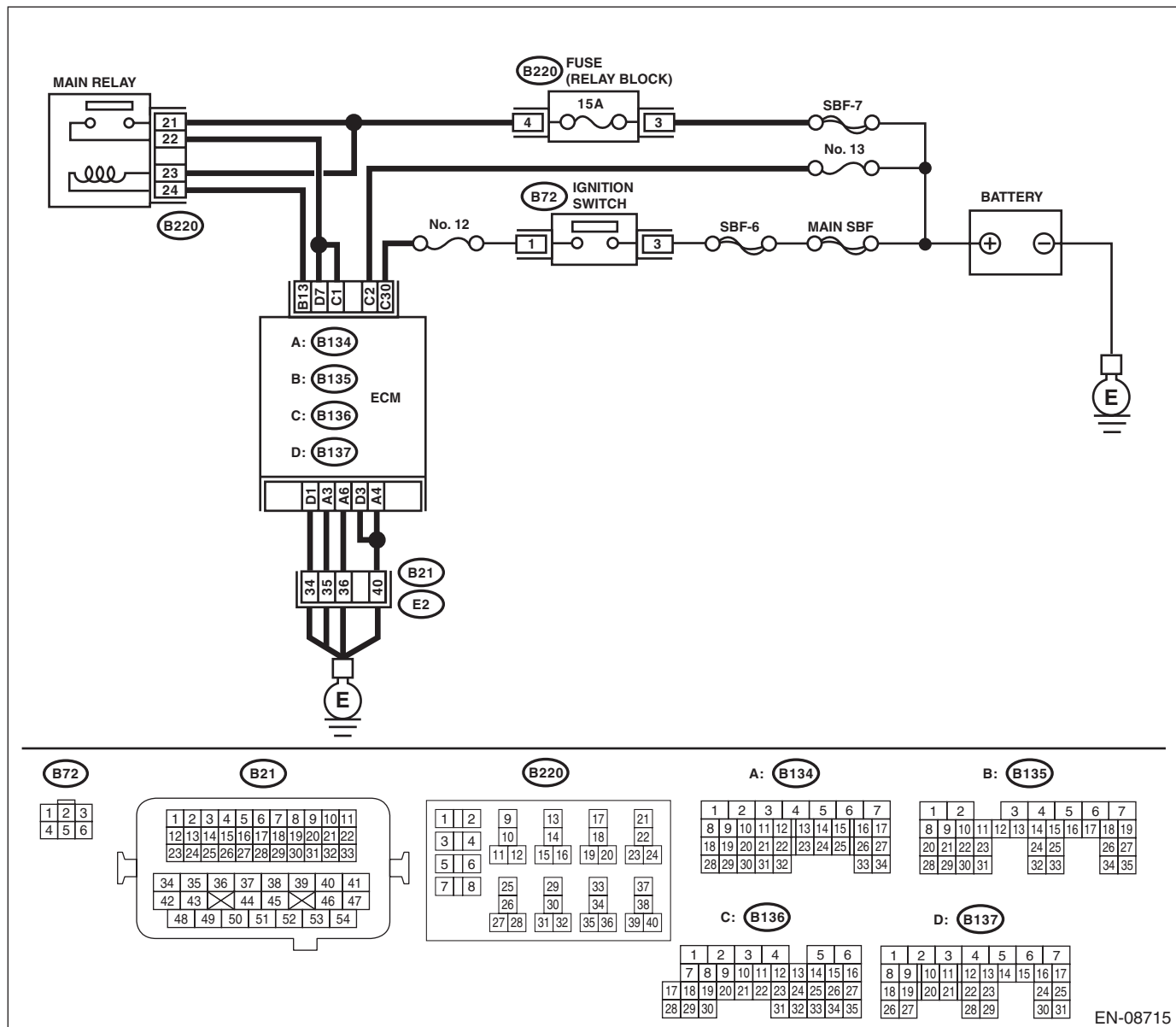
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-190, DTC P0560 SYSTEM VOLTAGE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



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 connector and chassis ground. Connector & terminal (B136) No. 2 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the poor contact of ECM connector.	Go to step 2.
2 CHECK HARNESS BETWEEN ECM AND MAIN FUSE BOX CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B136) No. 2 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the short circuit to ground in harness between ECM connector and battery terminal.
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 in harness between ECM connector and battery • Poor contact of ECM connector • Poor contact of battery terminal

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DA:DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-191, 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 servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

DB:DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR

NOTE:

For the diagnostic procedure, refer to DTC P0606. <Ref. to EN(H4DOTC)(diag)-293, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DC:DTC P0606 CONTROL MODULE PROCESSOR**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-193, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

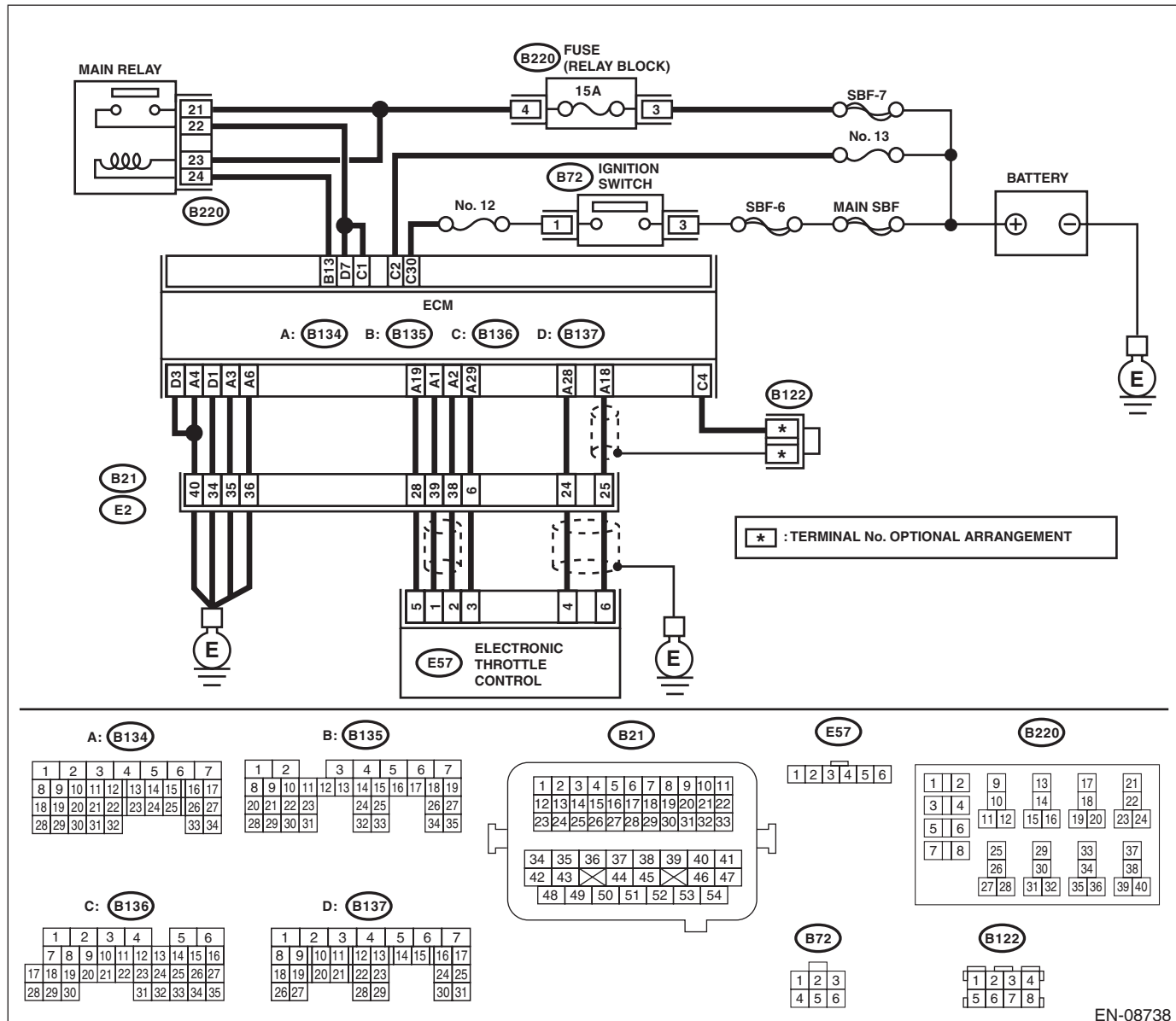
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08738

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 chassis ground. Connector & terminal (B136) No. 1 (+) — Chassis ground (-): (B137) 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 chassis ground. Connector & terminal (B136) No. 1 (+) — Chassis ground (-): (B137) 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 CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance of harness between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 19 — (E57) No. 5: (B134) No. 29 — (E57) No. 3:	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 connector and electronic throttle control connector • Poor contact of coupling connector
4 CHECK ECM GROUND HARNESS. 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B134) No. 3 — Chassis ground: (B134) No. 4 — Chassis ground: (B134) No. 6 — Chassis ground: (B137) No. 1 — Chassis ground: (B137) No. 3 — Chassis ground:	Is the voltage less than 1 V?	Repair the poor contact of ECM connector.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in ground circuit • Further tightening of the engine ground terminal • Poor contact of ECM connector • Poor contact of coupling connector

DD:DTC P060A INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE

NOTE:

For the diagnostic procedure, refer to DTC P0606. <Ref. to EN(H4DOTC)(diag)-293, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DE:DTC P060B INTERNAL CONTROL MODULE A/D PROCESSING PERFORMANCE

NOTE:

For the diagnostic procedure, refer to DTC P0606. <Ref. to EN(H4DOTC)(diag)-293, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DF:DTC P0616 STARTER RELAY CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-199, DTC P0616 STARTER RELAY CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

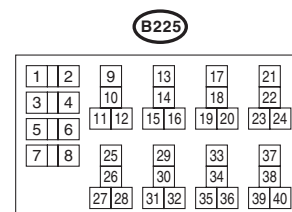
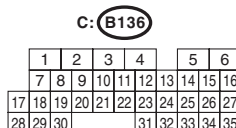
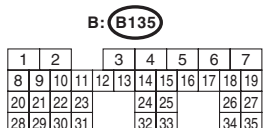
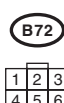
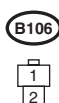
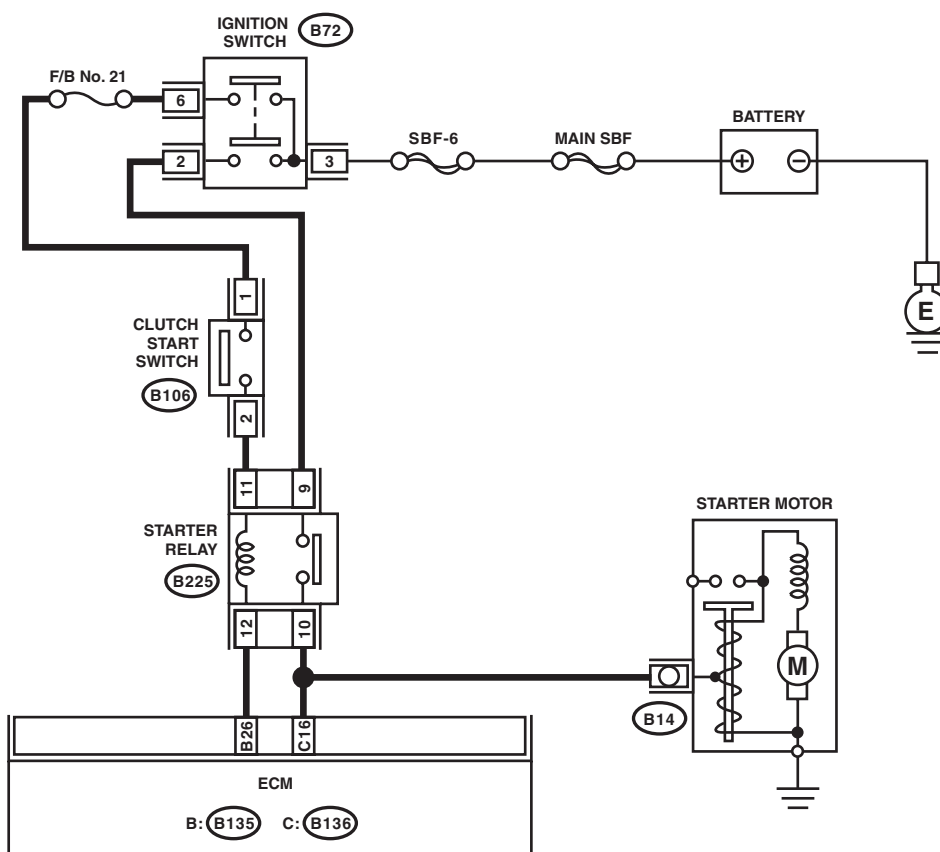
Failure of engine to start

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09249

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK HARNESS BETWEEN ECM AND STARTER RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and starter motor. 3) Remove the starter relay. 4) Measure the resistance of harness between ECM connector and starter relay connector. Connector & terminal (B136) No. 16 — (B225) No. 10:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit of harness between ECM connector and starter relay connector.
3 CHECK HARNESS BETWEEN ECM AND STARTER RELAY CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B136) No. 16 — Chassis ground:	Is the resistance 1 M Ω or more?	Repair the poor contact of ECM connector.	Repair the short circuit to ground in harness between ECM connector and starter relay connector.

DG:DTC P0617 STARTER RELAY CIRCUIT HIGH

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-200, DTC P0617 STARTER RELAY CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

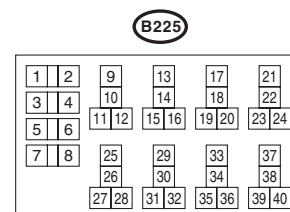
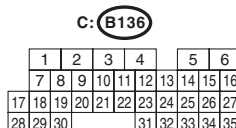
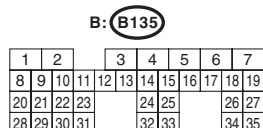
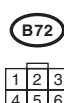
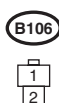
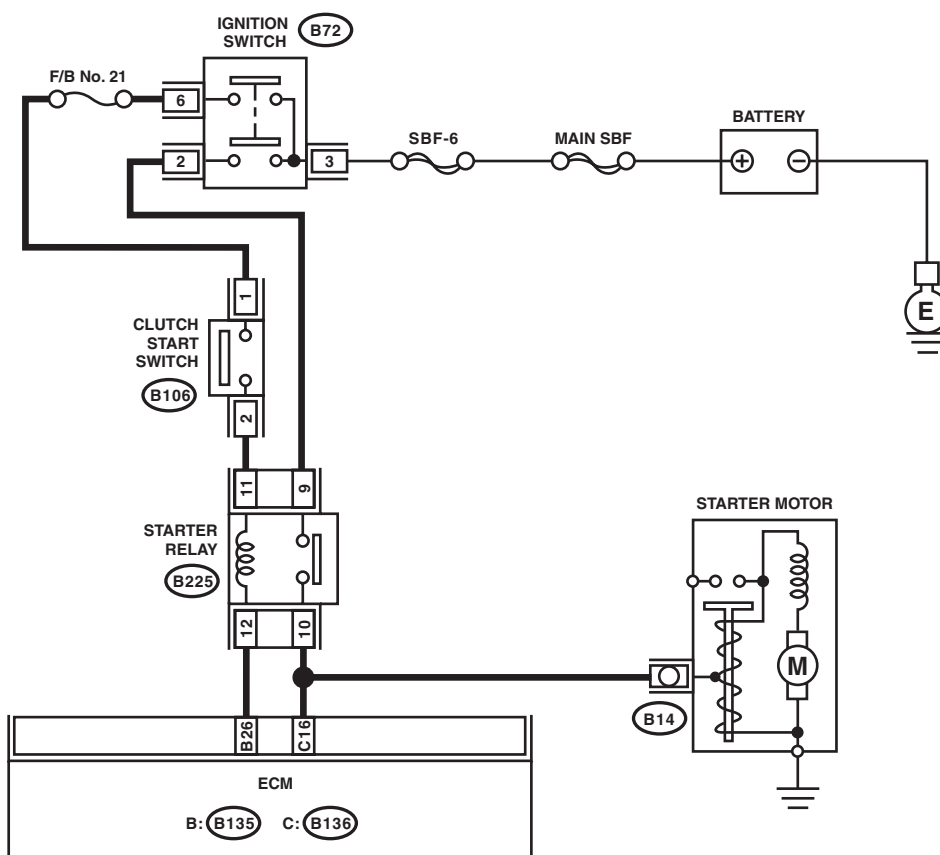
Failure of engine to start

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09249

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK HARNESS BETWEEN ECM AND IGNITION SWITCH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 16 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power supply in harness between ECM connector and ignition switch connector.	Repair the poor contact of ECM connector.

DH:DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR

NOTE:

For the diagnostic procedure, refer to DTC P0606. <Ref. to EN(H4DOTC)(diag)-293, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-203, DTC P0851 NEUTRAL SWITCH INPUT CIRCUIT LOW (MT MODEL), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

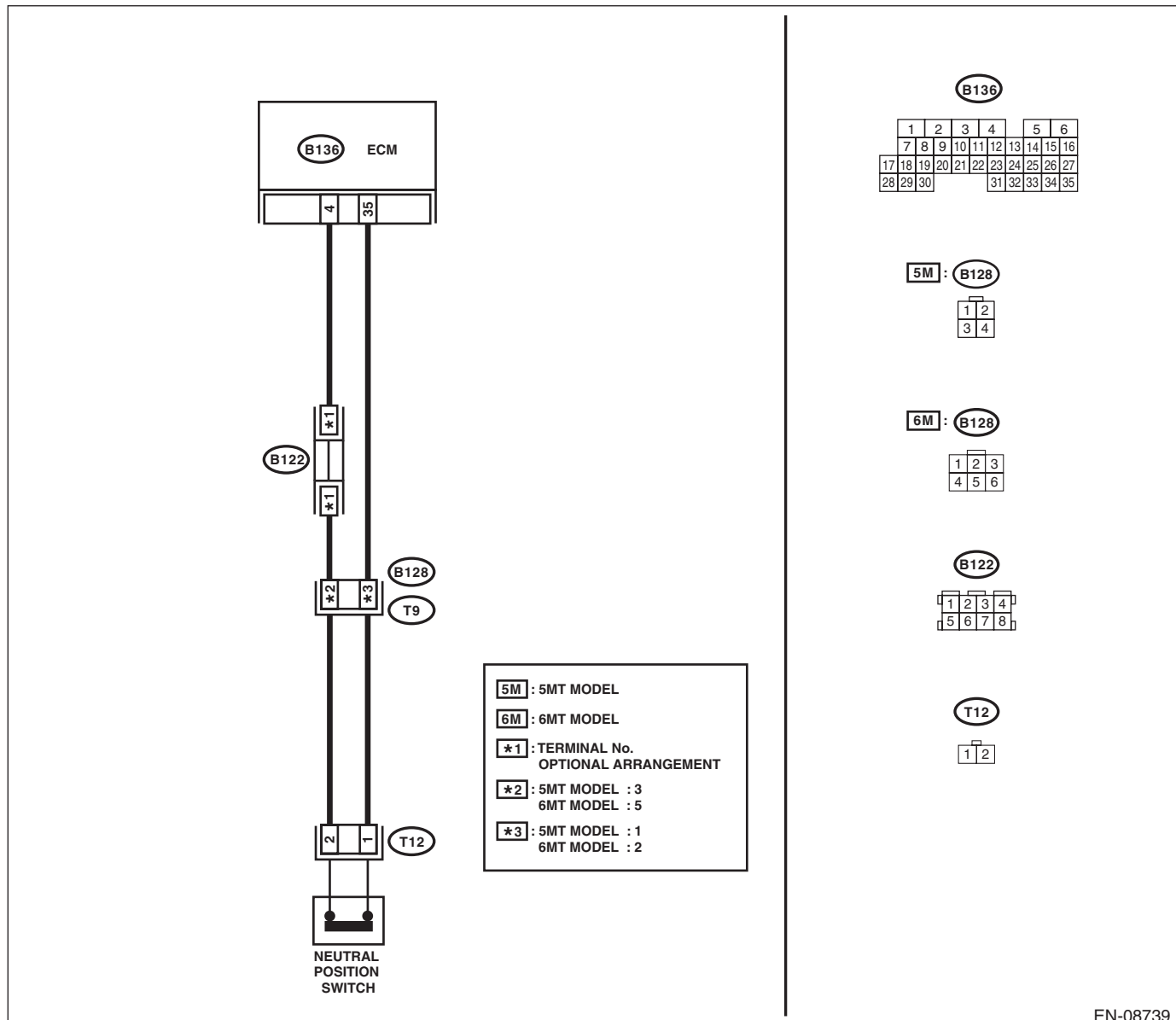
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08739

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 a position other than neutral. 3) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 35 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the poor contact of ECM connector.	Go to step 2.
	CHECK HARNESS BETWEEN ECM AND NEUTRAL POSITION SWITCH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and neutral position switch. 3) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B136) No. 35 — Chassis ground:			
2		Is the resistance 1 MΩ or more?	Replace the neutral position switch. <Ref. to 5MT-33, Switches and Harness.> <Ref. to 6MT-41, Neutral Position Switch.>	Repair the short circuit to ground harness between ECM connector and neutral position switch connector.

DJ:DTC P0852 NEUTRAL SWITCH INPUT CIRCUIT HIGH (MT MODEL)**DTC DETECTING CONDITION:**

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-204, DTC P0852 NEUTRAL SWITCH INPUT CIRCUIT HIGH (MT MODEL), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

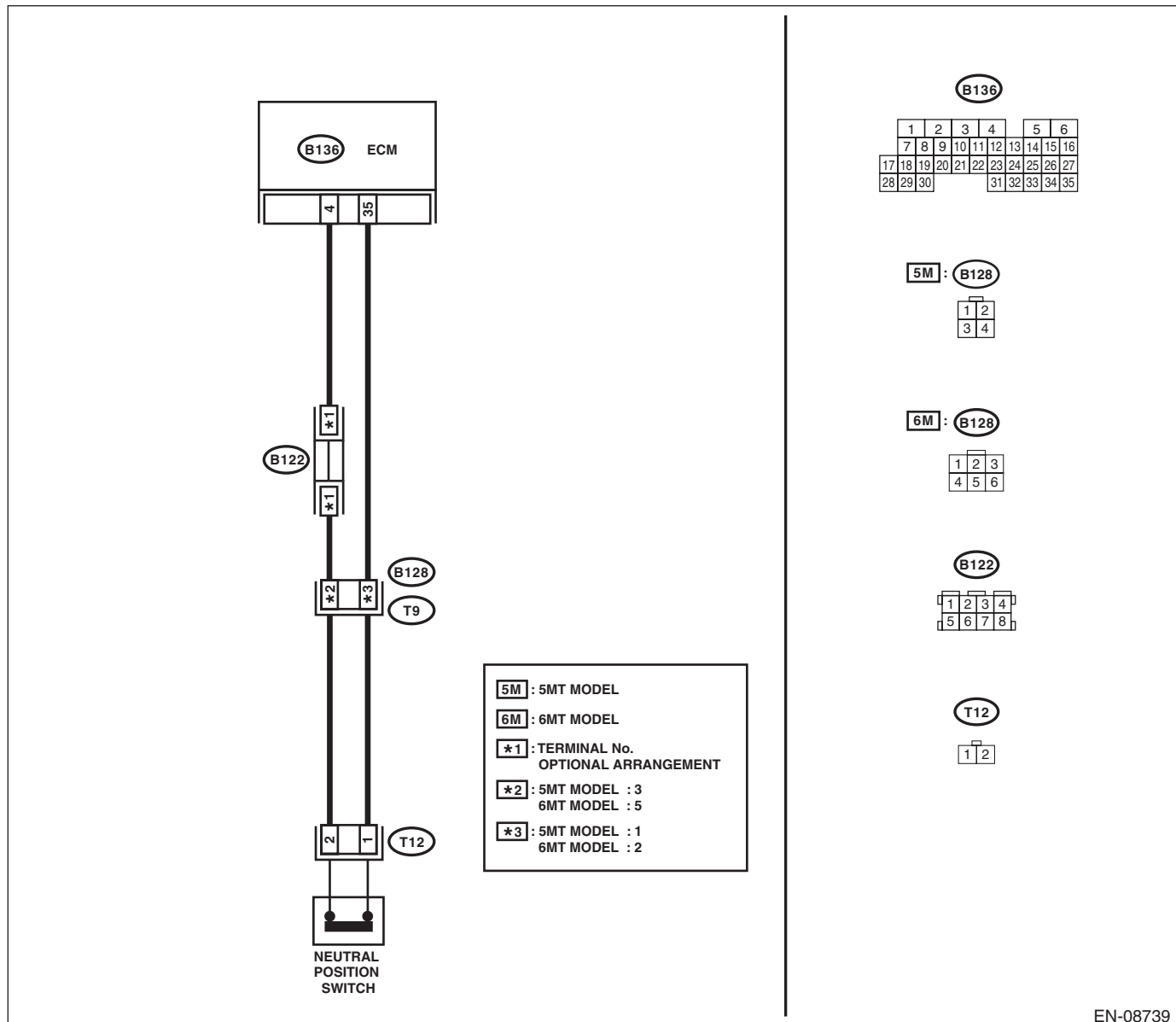
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08739

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 connector and chassis ground. Connector & terminal (B136) No. 35 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Repair the poor contact of ECM connector. Replace the ECM if defective. <Ref. to FU(STI)-59, Engine Control Module (ECM).> <Ref. to FU(w/o STI)-57, Engine Control Module (ECM).>	Go to step 2.
2 CHECK HARNESS BETWEEN ECM AND NEUTRAL POSITION SWITCH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and transmission harness connector (T9). 3) Measure the resistance of harness between ECM connector and transmission harness connector. Connector & terminal 5MT model (B136) No. 35 — (B128) No. 1: 6MT model (B136) No. 35 — (B128) No. 2:	Is the resistance less than 1 Ω?	Go to step 3.	Repair the open circuit in harness between ECM connector and transmission harness connector.
3 CHECK HARNESS BETWEEN ECM AND NEUTRAL POSITION SWITCH CONNECTOR. Measure the resistance of harness between ECM connector and transmission harness connector. Connector & terminal 5MT model (B128) No. 3 — (B136) No. 4: 6MT model (B128) No. 5 — (B136) No. 4:	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 ECM connector and transmission harness connector • Poor contact of coupling connector
4 CHECK NEUTRAL POSITION SWITCH. 1) Place the shift lever in neutral. 2) Measure the resistance between transmission harness connector terminals. Connector & terminal 5MT model (T9) No. 1 — No. 3: 6MT model (T9) No. 2 — No. 5:	Is the resistance less than 1 Ω?	Repair the poor contact of transmission harness connector.	Repair the open circuit of transmission harness, or replace the neutral position switch. <Ref. to 5MT-33, Switches and Harness.> <Ref. to 6MT-41, Neutral Position Switch.>

DK:DTC P1160 RETURN SPRING FAILURE

NOTE:

For the diagnostic procedure, refer to DTC P2101. <Ref. to EN(H4DOTC)(diag)-371, DTC P2101 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DL:DTC P1400 FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT LOW**DTC DETECTING CONDITION:**

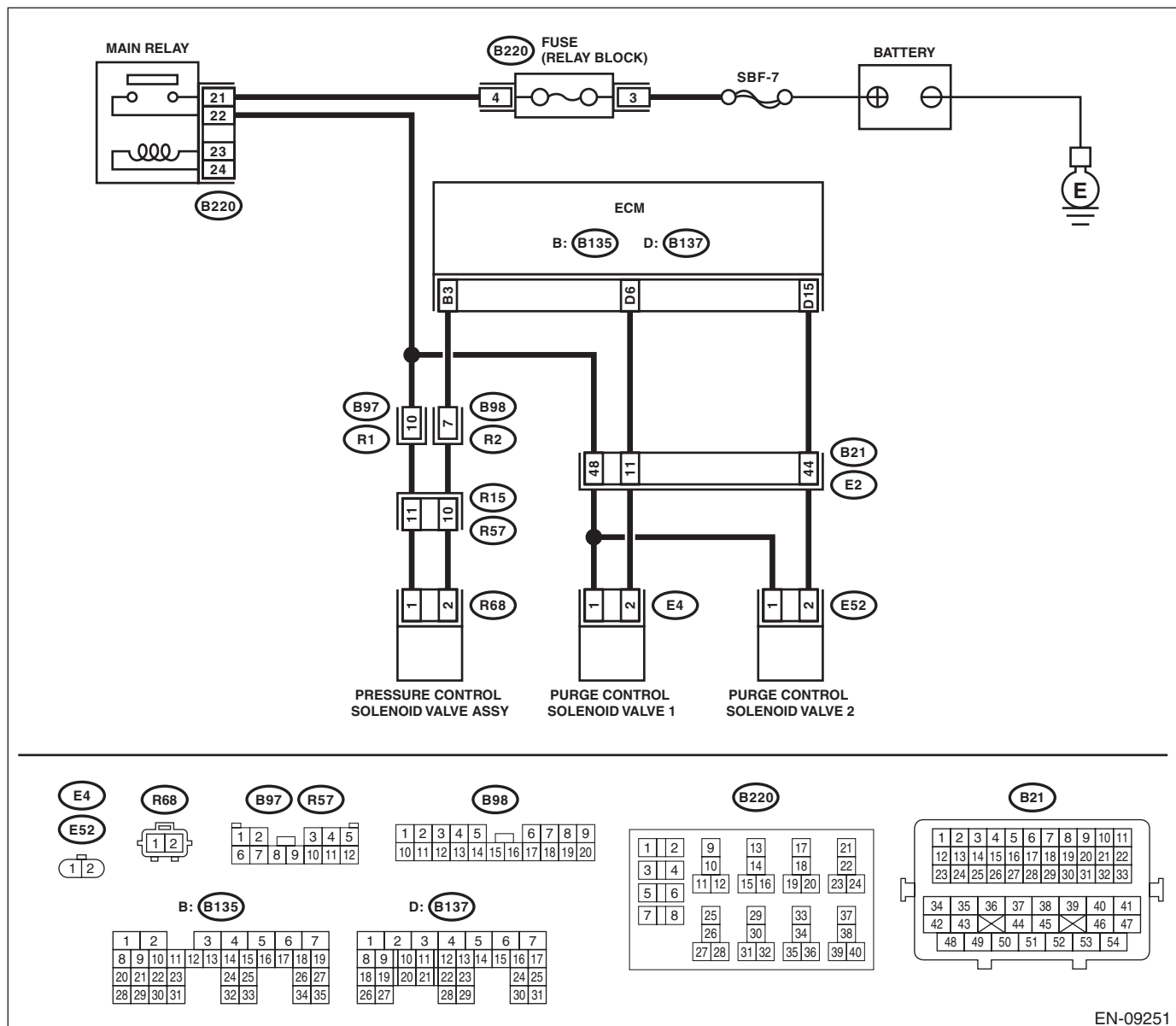
- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-207, DTC P1400 FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09251

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 (B135) No. 3 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 2.	Go to step 3.
2 CHECK FOR POOR CONTACT. Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary open or short circuit of harness or temporary poor contact of connector may be the cause.
3 CHECK POWER SUPPLY TO PRESSURE CONTROL SOLENOID VALVE ASSEMBLY. Measure the voltage between the pressure control solenoid valve assembly and chassis ground. Connector & terminal (R68) No. 1 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 4.	Repair the power supply circuit.
4 CHECK HARNESS BETWEEN ECM AND PRESSURE CONTROL SOLENOID VALVE ASSEMBLY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and pressure control solenoid valve assembly. 3) Measure the resistance between the pressure control solenoid valve assembly connector and chassis ground. Connector & terminal (R68) No. 2 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM connector and pressure control solenoid valve assembly connector.
5 CHECK HARNESS BETWEEN ECM AND PRESSURE CONTROL SOLENOID VALVE ASSEMBLY CONNECTOR. Measure the resistance of harness between ECM connector and pressure control solenoid valve assembly connector. Connector & terminal (B135) No. 3 — (R68) No. 2:	Is the resistance less than 1 Ω?	Go to step 6.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and pressure control solenoid valve assembly connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK PRESSURE CONTROL SOLENOID VALVE ASSEMBLY. Measure the resistance between terminals of pressure control solenoid valve assembly. Terminals No. 1 — No. 2:	Is the resistance 10 — 100 Ω ?	Repair the pressure control solenoid valve assembly connector for poor contact.	Replace the pressure control solenoid valve assembly. <Ref. to EC(STI)-16, Pressure Control Solenoid Valve Assembly.> <Ref. to EC(w/o STI)-17, Pressure Control Solenoid Valve Assembly.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DM:DTC P1410 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-209, DTC P1410 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK SECONDARY AIR COMBINATION VALVE. 1) Remove the secondary air combination valve. <Ref. to EC(STI)-29, Secondary Air Combination Valve.> <Ref. to EC(w/o STI)-30, Secondary Air Combination Valve.> 2) Blow in air from the secondary air combination valve air inlet, and check whether there are leaks at the pipe connections.	Are there air leaks from the pipe connections?	Replace the secondary air combination valve on the side with the air leak. <Ref. to EC(STI)-29, Secondary Air Combination Valve.> <Ref. to EC(w/o STI)-30, Secondary Air Combination Valve.>	Perform the diagnostic procedure of DTC P2440. <Ref. to EN(H4DOTC)(diag)-446, DTC P2440 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN (BANK1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DN:DTC P1420 FUEL TANK PRESSURE CONTROL SOL. VALVE CIRCUIT HIGH

DTC DETECTING CONDITION:

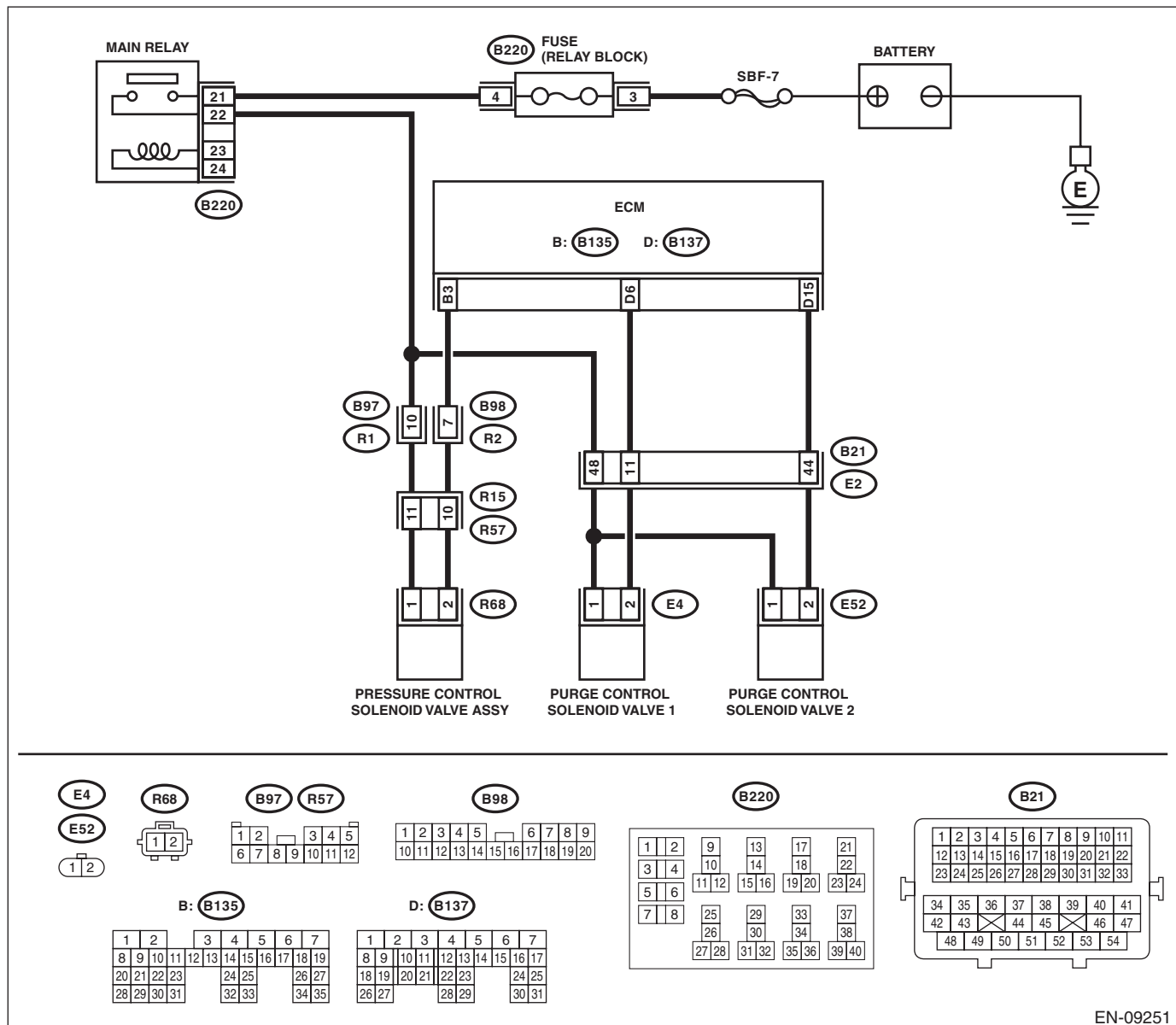
- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-211, DTC P1420 FUEL TANK PRESSURE CONTROL SOL. VALVE CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09251

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND PRESSURE CONTROL SOLENOID VALVE ASSEMBLY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and pressure control solenoid valve assembly. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 3 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and pressure control solenoid valve assembly connector.	Go to step 2.
2 CHECK PRESSURE CONTROL SOLENOID VALVE ASSEMBLY. 1) Turn the ignition switch to OFF. 2) Measure the resistance between terminals of pressure control solenoid valve assembly. Terminals No. 1 — No. 2:	Is the resistance less than 1 Ω ?	Replace the pressure control solenoid valve assembly. <Ref. to EC(STI)-16, Pressure Control Solenoid Valve Assembly.> <Ref. to EC(w/o STI)-17, Pressure Control Solenoid Valve Assembly.>	Repair the poor contact of ECM connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DO:DTC P1449 EVAPORATIVE EMISSION CONT. SYS. AIR FILTER CLOG

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-213, DTC P1449 EVAPORATIVE EMISSION CONT. SYS. AIR FILTER CLOG, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK DRAIN TUBE CONNECTED TO LEAK CHECK VALVE ASSEMBLY.	Is the drain tube A or the drain tube B connected to the leak check valve assembly clogged?	Replace the drain tube A or the drain tube B connected to the leak check valve assembly. <Ref. to EC(STI)-19, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-20, Leak Check Valve Assembly.>	Go to step 3.
3 CHECK DRAIN HOSE AND HOSE CONNECTOR BETWEEN LEAK CHECK VALVE ASSEMBLY AND DRAIN SEPARATOR.	Is the drain hose or the hose connector between leak check valve assembly and drain separator clogged?	Replace the drain hose or the hose connector between leak check valve assembly and drain separator. <Ref. to EC(STI)-7, Canister.> <Ref. to EC(w/o STI)-7, Canister.> <Ref. to EC(STI)-23, Drain Separator.> <Ref. to EC(w/o STI)-24, Drain Separator.>	Go to step 4.
4 CHECK DRAIN SEPARATOR.	Is the drain separator clogged?	Replace the drain separator. <Ref. to EC(STI)-23, Drain Separator.> <Ref. to EC(w/o STI)-24, Drain Separator.>	Replace the leak check valve assembly. <Ref. to EC(STI)-19, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-20, Leak Check Valve Assembly.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DP:DTC P1451 EVAPORATIVE EMISSION CONT. SYS.

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-215, DTC P1451 EVAPORATIVE EMISSION CONT. SYS., Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK DRAIN TUBE BETWEEN CANISTER AND LEAK CHECK VALVE ASSEMBLY.	Is the drain tube between canister and leak check valve assembly clogged?	Replace the drain tube between the canister and leak check valve assembly. <Ref. to EC(STI)-7, Canister.> <Ref. to EC(w/o STI)-7, Canister.>	Go to step 2.
2 CHECK HOSES BETWEEN CANISTER AND FUEL TANK.	Are the hoses between the canister and fuel tank clogged?	Replace the hoses between the canister and fuel tank. <Ref. to EC(STI)-7, Canister.> <Ref. to EC(w/o STI)-7, Canister.> <Ref. to FU(STI)-70, Fuel Tank.> <Ref. to FU(w/o STI)-68, Fuel Tank.>	Replace the canister. <Ref. to EC(STI)-7, Canister.> <Ref. to EC(w/o STI)-7, Canister.> After the operation is complete, go to the next step. Go to step 3.
3 CHECK EVAPORATIVE EMISSION CONTROL SYSTEM. Perform drive cycle I. <Ref. to EN(H4DOTC)(diag)-59, DRIVE CYCLE H, PROCEDURE, Drive Cycle.>	Is DTC P1451 displayed on the display?	Replace the leak check valve assembly. <Ref. to EC(STI)-19, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-20, Leak Check Valve Assembly.>	End.

**DQ:DTC P2004 INTAKE MANIFOLD RUNNER CONTROL STUCK OPEN
(BANK 1)****DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-216, DTC P2004 INTAKE MANIFOLD RUNNER CONTROL STUCK OPEN (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK TUMBLE GENERATOR VALVE RH. 1) Remove the tumble generator valve assembly RH. 2) Check the tumble generator valve body.	Is there any dirt or clogging with foreign objects in the tumble generator valve?	Clean the tumble generator valve.	Replace the tumble generator valve assembly RH. <Ref. to FU(STI)-48, Tumble Generator Valve Assembly.> <Ref. to FU(w/o STI)-48, Tumble Generator Valve Assembly.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DR:DTC P2005 INTAKE MANIFOLD RUNNER CONTROL STUCK OPEN (BANK 2)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-217, DTC P2005 INTAKE MANIFOLD RUNNER CONTROL STUCK OPEN (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK TUMBLE GENERATOR VALVE LH. 1) Remove the tumble generator valve assembly LH. 2) Check the tumble generator valve body.	Is there any dirt or clogging with foreign objects in the tumble generator valve?	Clean the tumble generator valve.	Replace the tumble generator valve assembly LH. <Ref. to FU(STI)-48, Tumble Generator Valve Assembly.> <Ref. to FU(w/o STI)-48, Tumble Generator Valve Assembly.>

**DS:DTC P2006 INTAKE MANIFOLD RUNNER CONTROL STUCK CLOSED
(BANK 1)****DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-218, DTC P2006 INTAKE MANIFOLD RUNNER CONTROL STUCK CLOSED (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK TUMBLE GENERATOR VALVE RH. 1) Remove the tumble generator valve assembly RH. 2) Check the tumble generator valve body.	Is there any dirt or clogging with foreign objects in the tumble generator valve?	Clean the tumble generator valve.	Replace the tumble generator valve assembly RH. <Ref. to FU(STI)-48, Tumble Generator Valve Assembly.> <Ref. to FU(w/o STI)-48, Tumble Generator Valve Assembly.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DT:DTC P2007 INTAKE MANIFOLD RUNNER CONTROL STUCK CLOSED (BANK 2)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-219, DTC P2007 INTAKE MANIFOLD RUNNER CONTROL STUCK CLOSED (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK TUMBLE GENERATOR VALVE LH. 1) Remove the tumble generator valve assembly LH. 2) Check the tumble generator valve body.	Is there any dirt or clogging with foreign objects in the tumble generator valve?	Clean the tumble generator valve.	Replace the tumble generator valve assembly LH. <Ref. to FU(STI)-48, Tumble Generator Valve Assembly.> <Ref. to FU(w/o STI)-48, Tumble Generator Valve Assembly.>

**DU:DTC P2008 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT / OPEN
(BANK 1)****DTC DETECTING CONDITION:**

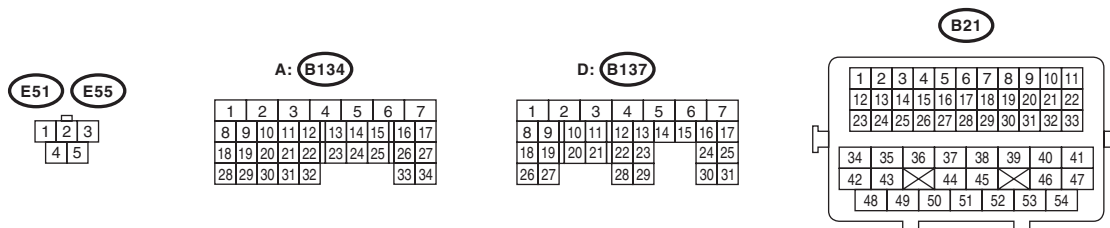
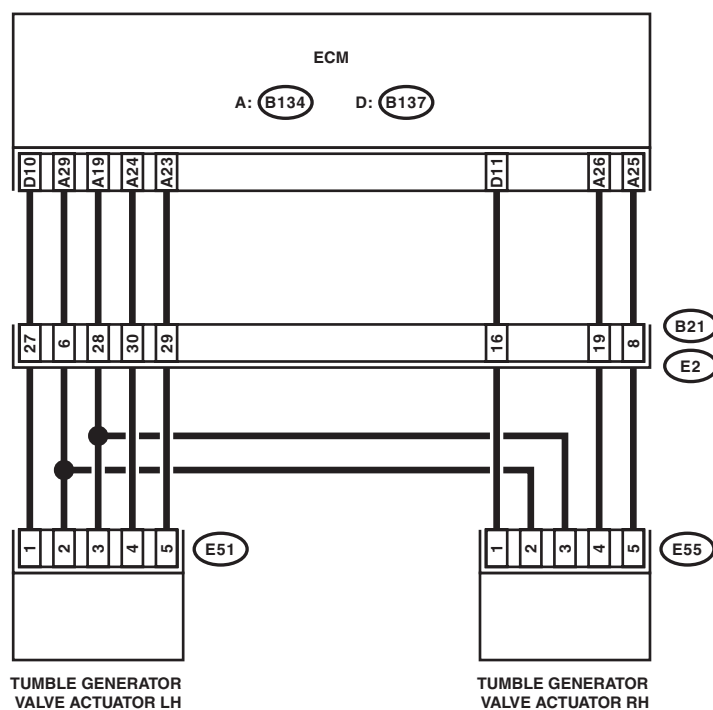
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-220, DTC P2008 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT / OPEN (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09253

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ASSEMBLY RH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and tumble generator valve assembly RH. 3) Measure the resistance of harness between ECM connector and tumble generator valve assembly RH connector. Connector & terminal (B134) No. 25 — (E55) No. 5: (B134) No. 26 — (E55) No. 4:	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 in harness between ECM connector and tumble generator valve assembly RH connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ASSEMBLY RH CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 25 — Chassis ground: (B134) No. 26 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 3.	Repair the short circuit to ground in harness between ECM connector and tumble generator valve assembly RH connector.
3 CHECK FOR POOR CONTACT. Check for poor contact of tumble generator valve assembly RH connector.	Is there poor contact of the tumble generator valve assembly RH connector?	Repair the poor contact of tumble generator valve assembly RH connector.	Replace the tumble generator valve assembly RH. <Ref. to FU(STI)-48, Tumble Generator Valve Assembly.> <Ref. to FU(w/o STI)-48, Tumble Generator Valve Assembly.>

**DV:DTC P2009 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT LOW
(BANK 1)****DTC DETECTING CONDITION:**

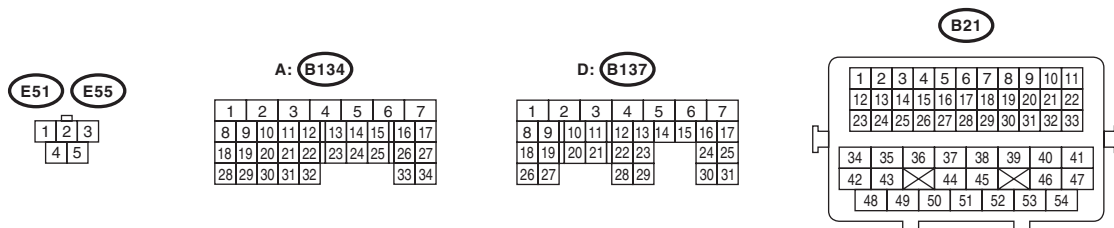
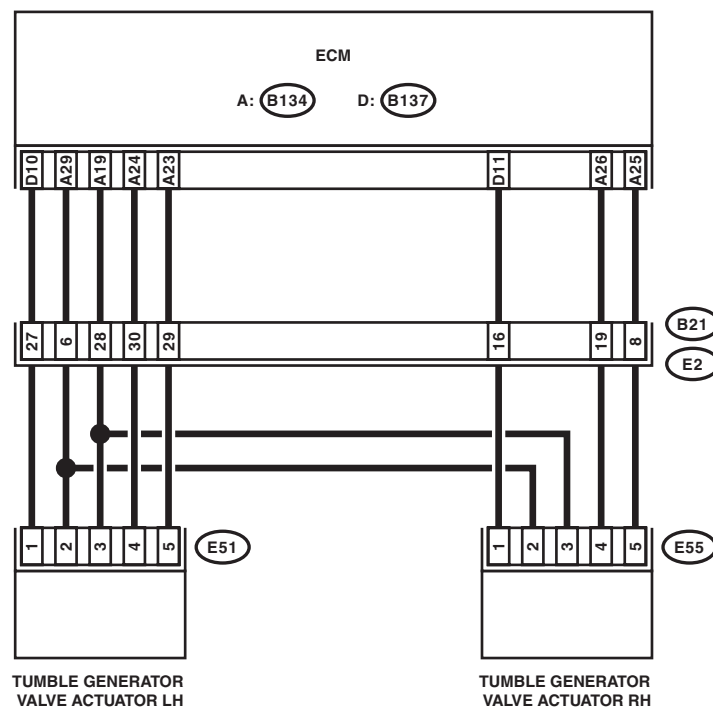
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-222, DTC P2009 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT LOW (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09253

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step		Check	Yes	No
1	CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ASSEMBLY RH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B134) No. 25 (+) — Chassis ground (-): (B134) No. 26 (+) — Chassis ground (-):	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM connector and tumble generator valve assembly RH connector.	Replace the tumble generator valve assembly RH. <Ref. to FU(STI)-48, Tumble Generator Valve Assembly.> <Ref. to FU(w/o STI)-48, Tumble Generator Valve Assembly.>

**DW:DTC P2011 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT / OPEN
(BANK 2)****DTC DETECTING CONDITION:**

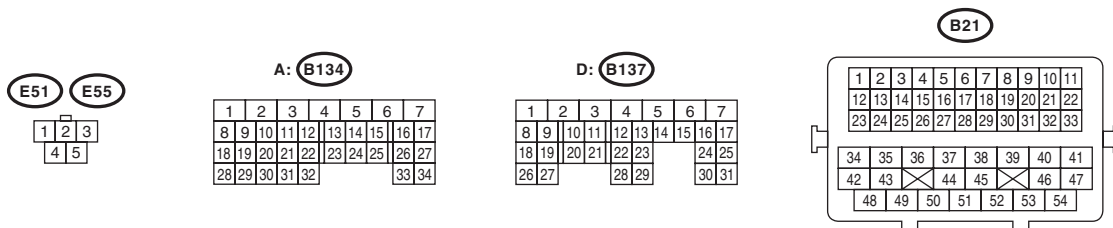
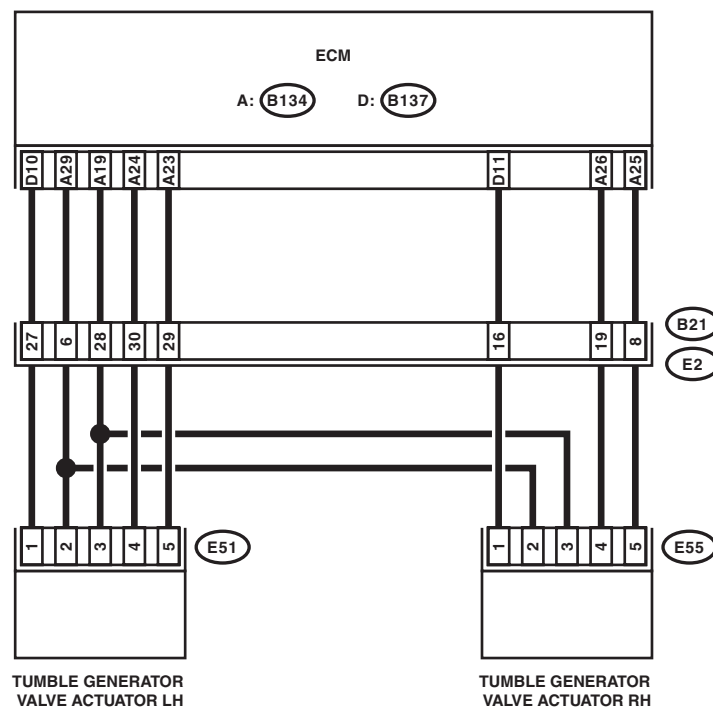
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-223, DTC P2011 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT / OPEN (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09253

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ASSEMBLY LH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and tumble generator valve assembly LH. 3) Measure the resistance of harness between ECM connector and tumble generator valve assembly LH connector. Connector & terminal (B134) No. 23 — (E51) No. 5: (B134) No. 24 — (E51) No. 4:	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 in harness between ECM connector and tumble generator valve assembly LH connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ASSEMBLY LH CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 23 — Chassis ground: (B134) No. 24 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the short circuit to ground in harness between ECM connector and tumble generator valve assembly LH connector.
3 CHECK FOR POOR CONTACT. Check for poor contact of tumble generator valve assembly LH connector.	Is there poor contact of the tumble generator valve assembly LH connector?	Repair the poor contact of tumble generator valve assembly LH connector.	Replace the tumble generator valve assembly LH. <Ref. to FU(STI)-48, Tumble Generator Valve Assembly.> <Ref. to FU(w/o STI)-48, Tumble Generator Valve Assembly.>

**DX:DTC P2012 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT LOW
(BANK 2)****DTC DETECTING CONDITION:**

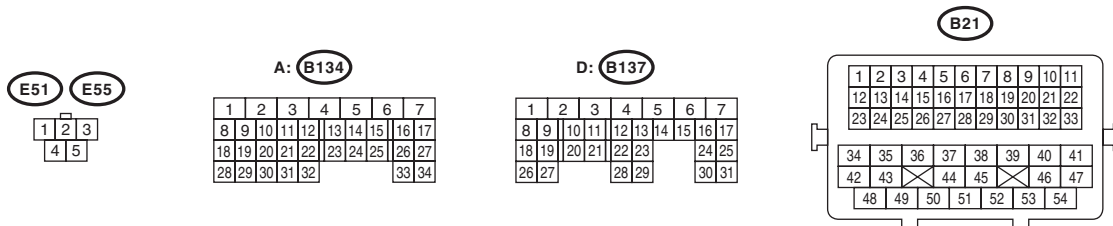
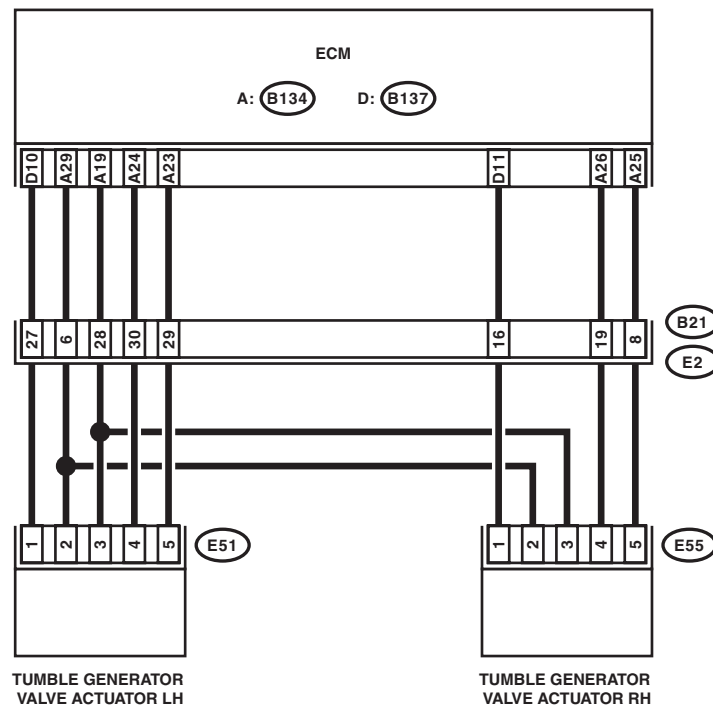
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-225, DTC P2012 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT LOW (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09253

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step		Check	Yes	No
1	CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ASSEMBLY LH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B134) No. 23 (+) — Chassis ground (-): (B134) No. 24 (+) — Chassis ground (-):	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM connector and tumble generator valve assembly LH connector.	Replace the tumble generator valve assembly LH. <Ref. to FU(STI)-48, Tumble Generator Valve Assembly.> <Ref. to FU(w/o STI)-48, Tumble Generator Valve Assembly.>

DY:DTC P2016 TUMBLE GENERATED VALVE POSITION SENSOR 1 CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-226, DTC P2016 TUMBLE GENERATED VALVE POSITION SENSOR 1 CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

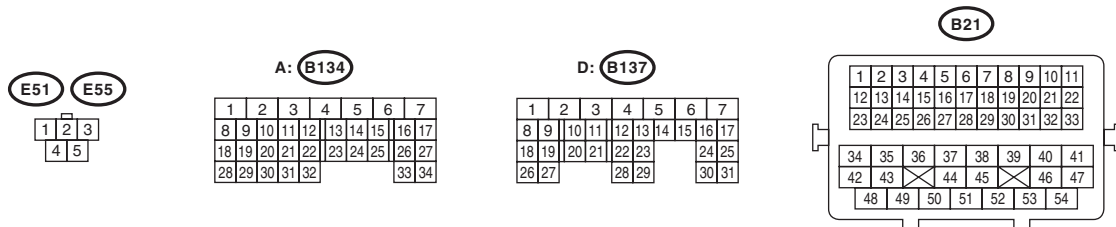
- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

ENGINE (DIAGNOSTICS)

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN(H4DOTC)(diag)-324

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the value of «TGV Position Sensor R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «TGV Position Sensor R» less than 0.2 V?	Go to step 2.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2 CHECK POWER SUPPLY OF TUMBLE GENERATOR VALVE ASSEMBLY RH. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from tumble generator valve assembly RH. 3) Turn the ignition switch to ON. 4) Measure the voltage between tumble generator valve assembly RH connector and engine ground. Connector & terminal (E55) No. 3 (+) — Engine ground (-):	Is the voltage 4.5 V or more?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and tumble generator valve assembly RH connector • Poor contact of ECM connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ASSEMBLY RH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and tumble generator valve assembly RH connector. Connector & terminal (B137) No. 11 — (E55) 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 connector and tumble generator valve assembly RH connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ASSEMBLY RH CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B137) No. 11 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM connector and tumble generator valve assembly RH connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK FOR POOR CONTACT. Check for poor contact of ECM and tumble generator valve assembly RH connector.	Is there poor contact of ECM or the tumble generator valve assembly RH connector?	Repair the poor contact of ECM or tumble generator valve assembly RH connector.	Replace the tumble generator valve assembly RH. <Ref. to FU(STI)-48, Tumble Generator Valve Assembly.> <Ref. to FU(w/o STI)-48, Tumble Generator Valve Assembly.>

DZ:DTC P2017 TUMBLE GENERATED VALVE POSITION SENSOR 1 CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-228, DTC P2017 TUMBLE GENERATED VALVE POSITION SENSOR 1 CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:

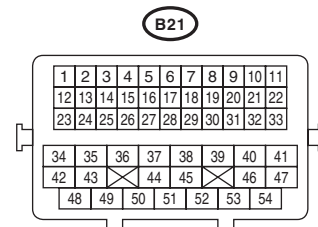
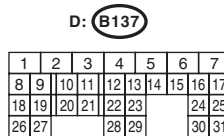
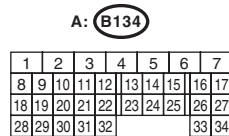
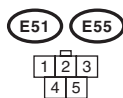
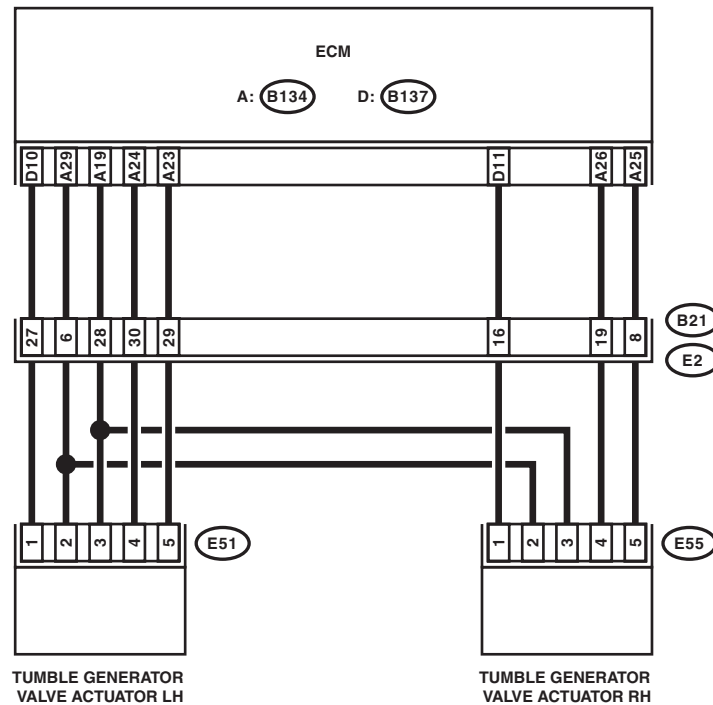
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09253

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the value of «TGV Position Sensor R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «TGV Position Sensor R» 5 V or more?	Go to step 2.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2 CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ASSEMBLY RH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from tumble generator valve assembly RH. 3) Start the engine. 4) Read the value of «TGV Position Sensor R» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «TGV Position Sensor R» 5 V or more?	Repair the short circuit to power in harness between ECM connector and tumble generator valve assembly RH connector.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ASSEMBLY RH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between tumble generator valve assembly RH connector and engine ground. Connector & terminal (E55) 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 ECM connector and tumble generator valve assembly RH connector • Poor contact of ECM connector • Poor contact of coupling connector
4 CHECK FOR POOR CONTACT. Check for poor contact of tumble generator valve assembly RH connector.	Is there poor contact of the tumble generator valve assembly RH connector?	Repair the poor contact of tumble generator valve assembly RH connector.	Replace the tumble generator valve assembly RH. <Ref. to FU(STI)-48, Tumble Generator Valve Assembly.> <Ref. to FU(w/o STI)-48, Tumble Generator Valve Assembly.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

EA:DTC P2021 TUMBLE GENERATED VALVE POSITION SENSOR 2 CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-230, DTC P2021 TUMBLE GENERATED VALVE POSITION SENSOR 2 CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:

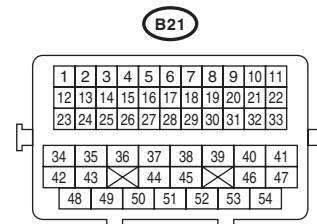
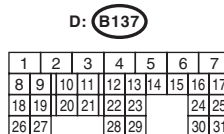
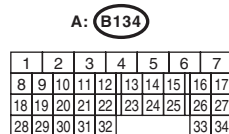
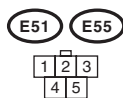
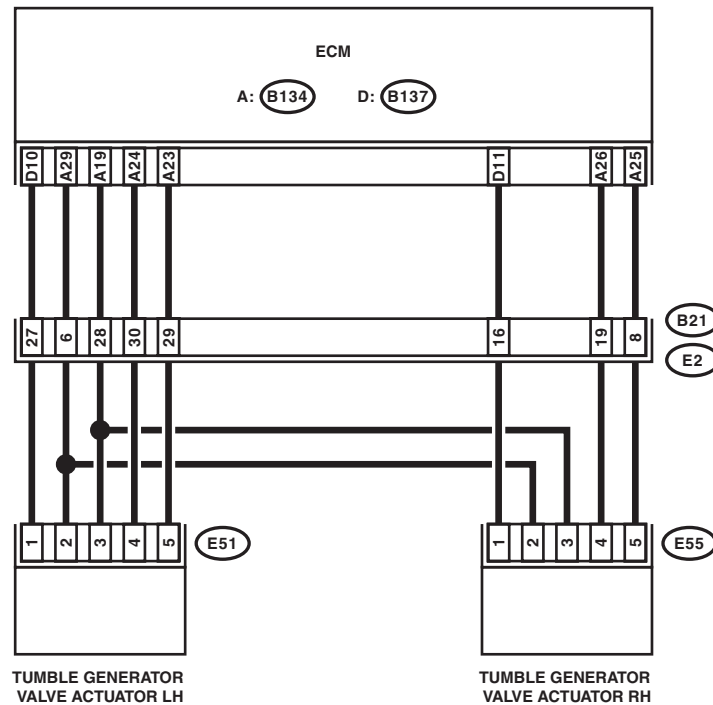
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09253

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the value of «TGV Position Sensor L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «TGV Position Sensor L» less than 0.2 V?	Go to step 2.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2 CHECK POWER SUPPLY OF TUMBLE GENERATOR VALVE ASSEMBLY LH. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from tumble generator valve assembly LH. 3) Turn the ignition switch to ON. 4) Measure the voltage between tumble generator valve assembly LH connector and engine ground. Connector & terminal (E51) No. 3 (+) — Engine ground (-):	Is the voltage 4.5 V or more?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and tumble generator valve assembly LH connector • Poor contact of ECM connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ASSEMBLY LH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and tumble generator valve assembly LH connector. Connector & terminal (B137) No. 10 — (E51) 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 connector and tumble generator valve assembly LH connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ASSEMBLY LH CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B137) No. 10 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM connector and tumble generator valve assembly LH connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK FOR POOR CONTACT. Check for poor contact of ECM and tumble generator valve assembly LH connector.	Is there poor contact of ECM or the tumble generator valve assembly LH connector?	Repair the poor contact of ECM or tumble generator valve assembly LH connector.	Replace the tumble generator valve assembly LH. <Ref. to FU(STI)-48, Tumble Generator Valve Assembly.> <Ref. to FU(w/o STI)-48, Tumble Generator Valve Assembly.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

EB:DTC P2022 TUMBLE GENERATED VALVE POSITION SENSOR 2 CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-232, DTC P2022 TUMBLE GENERATED VALVE POSITION SENSOR 2 CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:

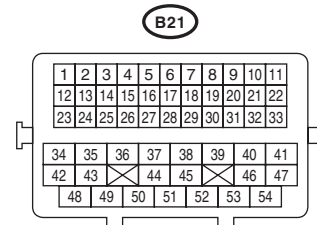
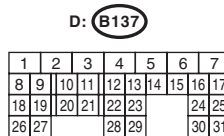
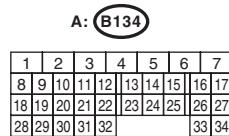
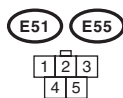
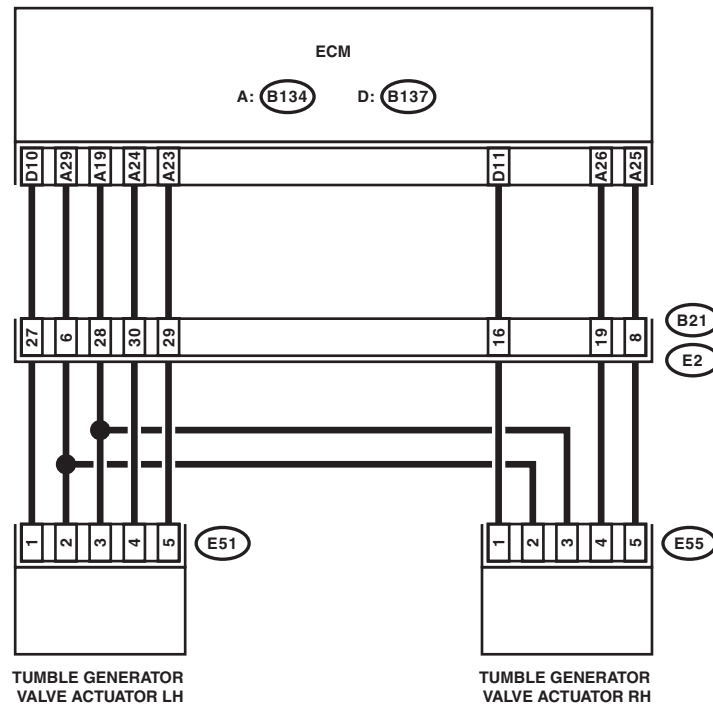
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09253

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Start the engine. 2) Read the value of «TGV Position Sensor L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «TGV Position Sensor L» 5 V or more?	Go to step 2.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2 CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ASSEMBLY LH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from tumble generator valve assembly LH. 3) Start the engine. 4) Read the value of «TGV Position Sensor L» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «TGV Position Sensor L» 5 V or more?	Repair the short circuit to power in harness between ECM connector and tumble generator valve assembly LH connector.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ASSEMBLY LH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between tumble generator valve assembly LH connector and engine ground. Connector & terminal (E51) 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 ECM connector and tumble generator valve assembly LH connector • Poor contact of ECM connector • Poor contact of coupling connector
4 CHECK FOR POOR CONTACT. Check for poor contact of tumble generator valve assembly LH connector.	Is there poor contact of the tumble generator valve assembly LH connector?	Repair the poor contact of tumble generator valve assembly LH connector.	Replace the tumble generator valve assembly LH. <Ref. to FU(STI)-48, Tumble Generator Valve Assembly.> <Ref. to FU(w/o STI)-48, Tumble Generator Valve Assembly.>

EC:DTC P2088 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 1)**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-234, DTC P2088 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

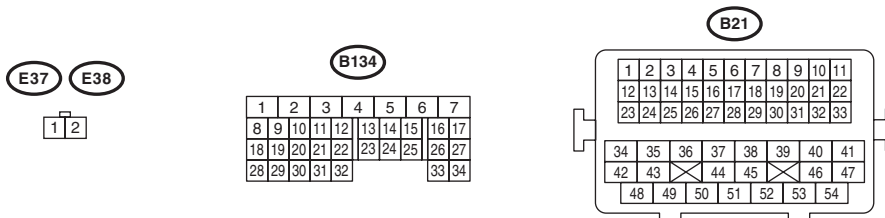
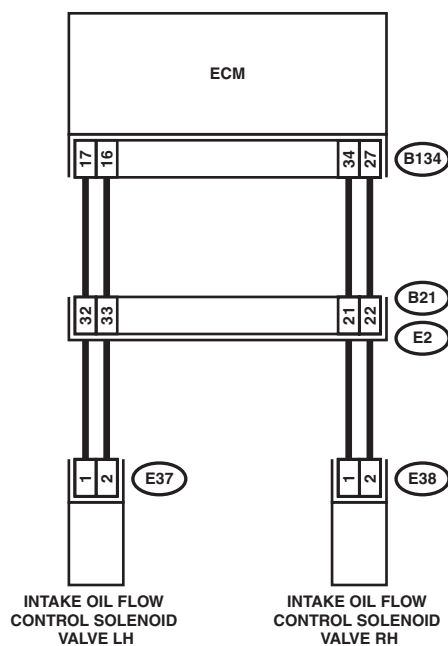
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND OIL FLOW CONTROL SOLENOID VALVE RH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and oil flow control solenoid valve RH. 3) Measure the resistance of harness between ECM connector and oil flow control solenoid valve RH connector. Connector & terminal (B134) No. 34 — (E38) No. 1: (B134) No. 27 — (E38) No. 2:	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 in harness between ECM connector and oil flow control solenoid valve RH connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND OIL FLOW CONTROL SOLENOID VALVE RH CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 34 — Chassis ground: (B134) No. 27 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 3.	Repair the short circuit to ground in harness between ECM connector and oil flow control solenoid valve RH connector.
3 CHECK OIL FLOW CONTROL SOLENOID VALVE. Measure the resistance between oil flow control solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance 6 — 12 Ω ?	Repair the poor contact of ECM and oil flow control solenoid valve RH connector.	Replace the oil flow control solenoid valve RH. <Ref. to ME(STI)-61, Camshaft.> <Ref. to ME(w/o STI)-59, Camshaft.>

ED:DTC P2089 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 1)**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-235, DTC P2089 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

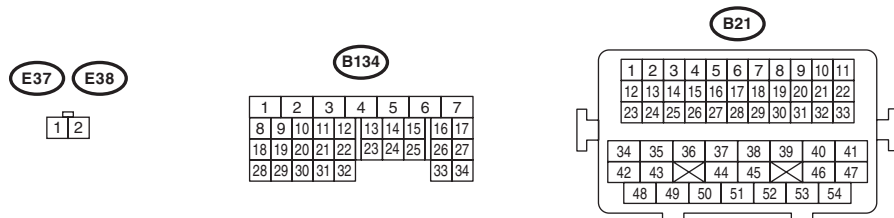
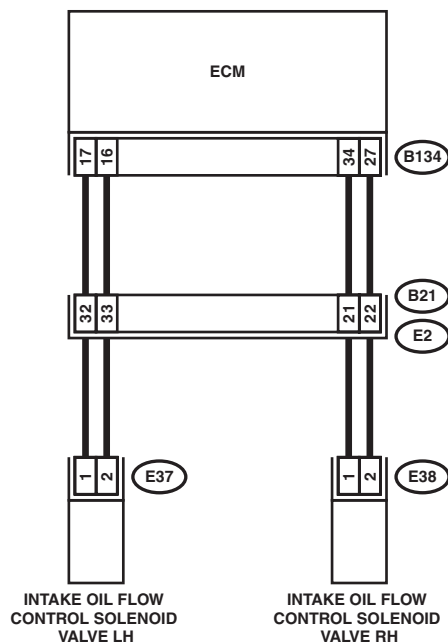
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09254

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND OIL FLOW CONTROL SOLENOID VALVE RH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and oil flow control solenoid valve RH. 3) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B134) No. 34 (+) — Chassis ground (-): (B134) No. 27 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 2.	Repair the short circuit to power in harness between ECM connector and oil flow control solenoid valve RH connector.
2 CHECK HARNESS BETWEEN ECM AND OIL FLOW CONTROL SOLENOID VALVE RH CONNECTOR. Measure the resistance of harness between ECM connector and oil flow control solenoid valve RH connector. Connector & terminal (B134) No. 34 — (E38) No. 1: (B134) No. 27 — (E38) 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 in harness between ECM connector and oil flow control solenoid valve RH connector • Poor contact of coupling connector
3 CHECK OIL FLOW CONTROL SOLENOID VALVE. Measure the resistance between oil flow control solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance 6 — 12 Ω ?	Repair the poor contact of ECM and oil flow control solenoid valve RH connector.	Replace the oil flow control solenoid valve RH. <Ref. to ME(STI)-61, Camshaft.> <Ref. to ME(w/o STI)-59, Camshaft.>

EE:DTC P2090 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 1)**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-236, DTC P2090 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

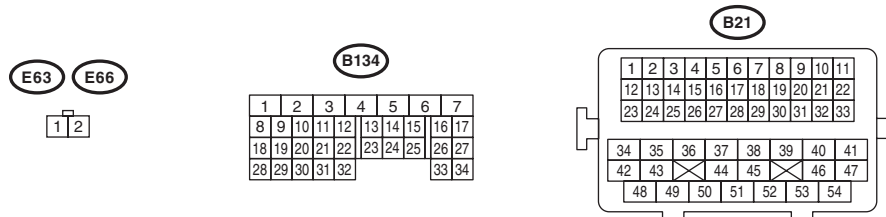
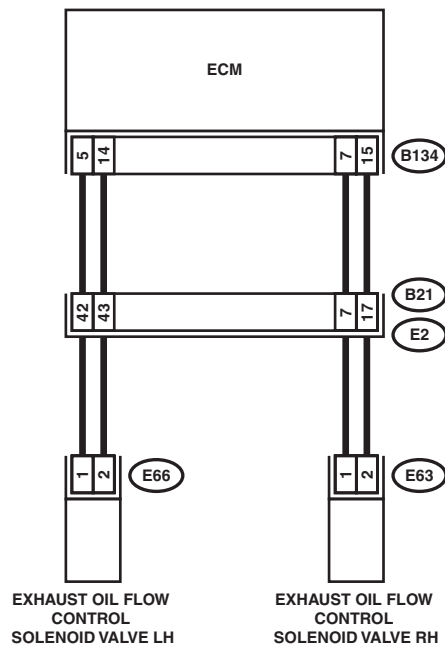
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09255

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND OIL FLOW CONTROL SOLENOID VALVE RH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and oil flow control solenoid valve RH. 3) Measure the resistance of harness between ECM connector and oil flow control solenoid valve RH connector. Connector & terminal (B134) No. 7 — (E63) No. 1: (B134) No. 15 — (E63) No. 2:	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 in harness between ECM connector and oil flow control solenoid valve RH connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND OIL FLOW CONTROL SOLENOID VALVE RH CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 7 — Chassis ground: (B134) No. 15 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the short circuit to ground in harness between ECM connector and oil flow control solenoid valve RH connector.
3 CHECK OIL FLOW CONTROL SOLENOID VALVE. Measure the resistance between oil flow control solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance 6 — 12 Ω?	Repair the poor contact of ECM and oil flow control solenoid valve RH connector.	Replace the oil flow control solenoid valve RH. <Ref. to FU(STI)-50, Oil Flow Control Solenoid Valve.>

EF:DTC P2091 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 1)**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-237, DTC P2091 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

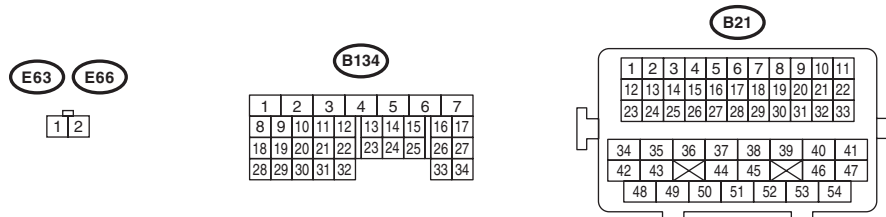
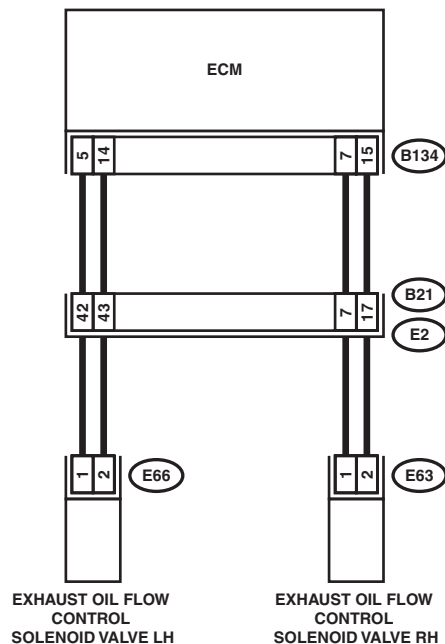
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09255

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND OIL FLOW CONTROL SOLENOID VALVE RH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and oil flow control solenoid valve RH. 3) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B134) No. 7 (+) — Chassis ground (-): (B134) No. 15 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 2.	Repair the short circuit to power in harness between ECM connector and oil flow control solenoid valve RH connector.
2 CHECK HARNESS BETWEEN ECM AND OIL FLOW CONTROL SOLENOID VALVE RH CONNECTOR. Measure the resistance of harness between ECM connector and oil flow control solenoid valve RH connector. Connector & terminal (B134) No. 7 — (E63) No. 1: (B134) No. 15 — (E63) 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 in harness between ECM connector and oil flow control solenoid valve RH connector • Poor contact of coupling connector
3 CHECK OIL FLOW CONTROL SOLENOID VALVE. Measure the resistance between oil flow control solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance 6 — 12 Ω ?	Repair the poor contact of ECM and oil flow control solenoid valve RH connector.	Replace the oil flow control solenoid valve RH. <Ref. to FU(STI)-50, Oil Flow Control Solenoid Valve.>

EG:DTC P2092 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 2)**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-238, DTC P2092 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

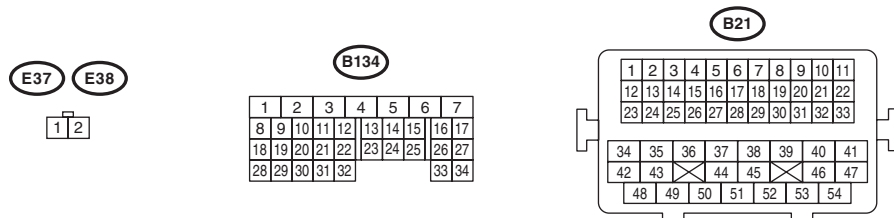
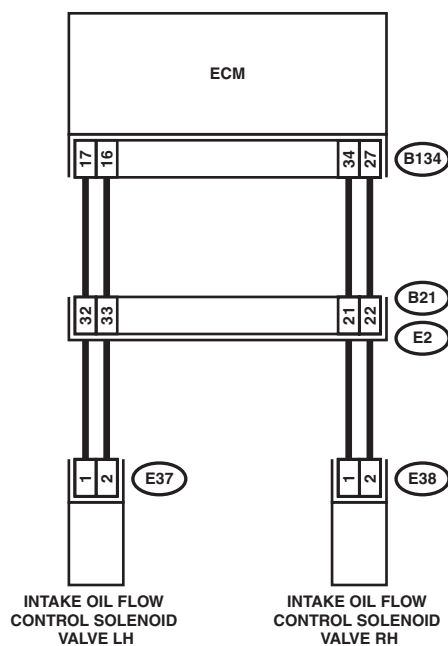
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09254

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND OIL FLOW CONTROL SOLENOID VALVE LH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and oil flow control solenoid valve LH. 3) Measure the resistance of harness between ECM connector and oil flow control solenoid valve LH connector. Connector & terminal (B134) No. 17 — (E37) No. 1: (B134) No. 16 — (E37) No. 2:	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 in harness between ECM connector and oil flow control solenoid valve LH connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND OIL FLOW CONTROL SOLENOID VALVE LH CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 17 — Chassis ground: (B134) No. 16 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the short circuit to ground in harness between ECM connector and oil flow control solenoid valve LH connector.
3 CHECK OIL FLOW CONTROL SOLENOID VALVE. Measure the resistance between oil flow control solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance 6 — 12 Ω?	Repair the poor contact of ECM and oil flow control solenoid valve LH connector.	Replace the oil flow control solenoid valve LH. <Ref. to ME(STI)-61, Camshaft.> <Ref. to ME(w/o STI)-59, Camshaft.>

EH:DTC P2093 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 2)**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-238, DTC P2093 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

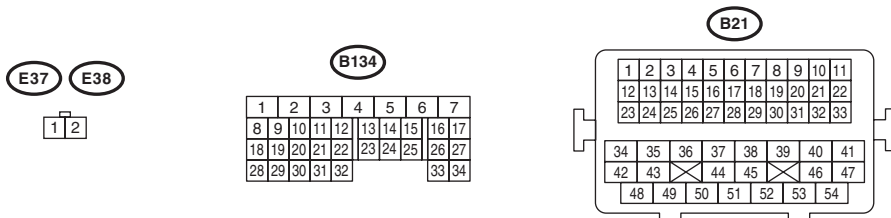
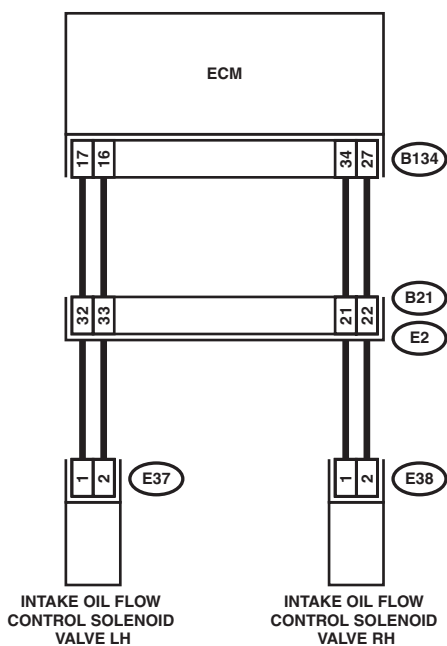
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND OIL FLOW CONTROL SOLENOID VALVE LH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and oil flow control solenoid valve LH. 3) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B134) No. 17 (+) — Chassis ground (-): (B134) No. 16 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 2.	Repair the short circuit to power in harness between ECM connector and oil flow control solenoid valve LH connector.
2 CHECK HARNESS BETWEEN ECM AND OIL FLOW CONTROL SOLENOID VALVE LH CONNECTOR. Measure the resistance of harness between ECM connector and oil flow control solenoid valve LH connector. Connector & terminal (B134) No. 17 — (E37) No. 1: (B134) No. 16 — (E37) 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 in harness between ECM connector and oil flow control solenoid valve LH connector • Poor contact of coupling connector
3 CHECK OIL FLOW CONTROL SOLENOID VALVE. Measure the resistance between oil flow control solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance 6 — 12 Ω ?	Repair the poor contact of ECM and oil flow control solenoid valve LH connector.	Replace the oil flow control solenoid valve LH. <Ref. to ME(STI)-61, Camshaft.> <Ref. to ME(w/o STI)-59, Camshaft.>

EI: DTC P2094 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 2)**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-238, DTC P2094 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

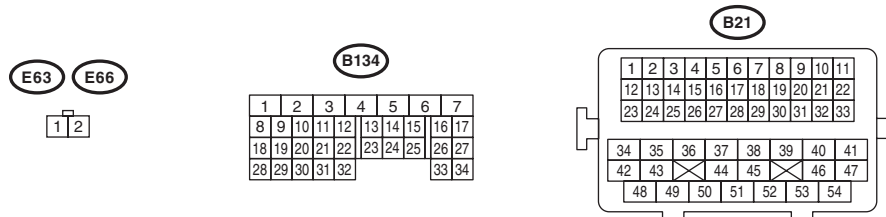
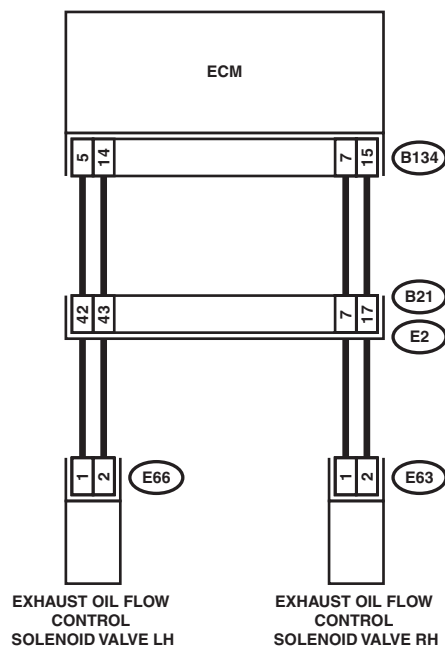
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09255

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND OIL FLOW CONTROL SOLENOID VALVE LH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and oil flow control solenoid valve LH. 3) Measure the resistance of harness between ECM connector and oil flow control solenoid valve LH connector. Connector & terminal (B134) No. 5 — (E66) No. 1: (B134) No. 14 — (E66) No. 2:	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 in harness between ECM connector and oil flow control solenoid valve LH connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND OIL FLOW CONTROL SOLENOID VALVE LH CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 5 — Chassis ground: (B134) No. 14 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the short circuit to ground in harness between ECM connector and oil flow control solenoid valve LH connector.
3 CHECK OIL FLOW CONTROL SOLENOID VALVE. Measure the resistance between oil flow control solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance 6 — 12 Ω?	Repair the poor contact of ECM and oil flow control solenoid valve LH connector.	Replace the oil flow control solenoid valve LH. <Ref. to FU(STI)-50, Oil Flow Control Solenoid Valve.>

EJ:DTC P2095 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 2)**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-238, DTC P2095 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

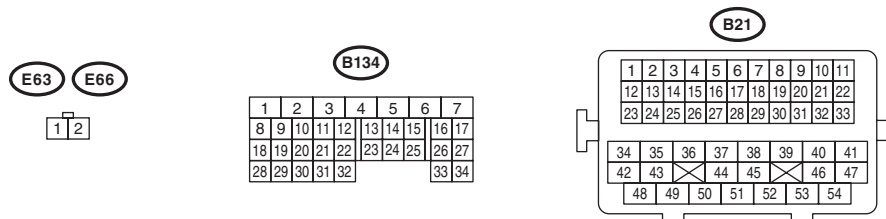
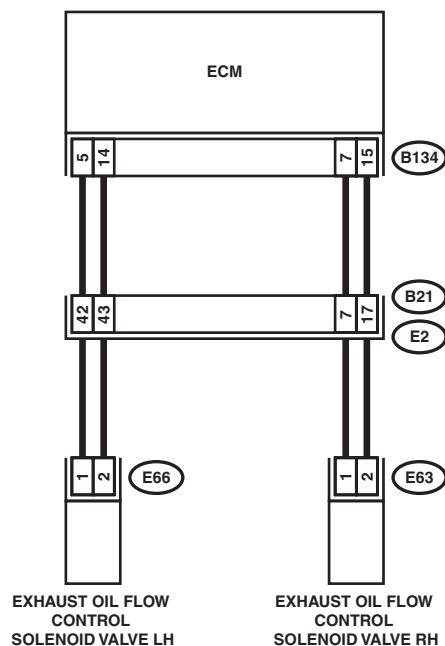
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09255

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

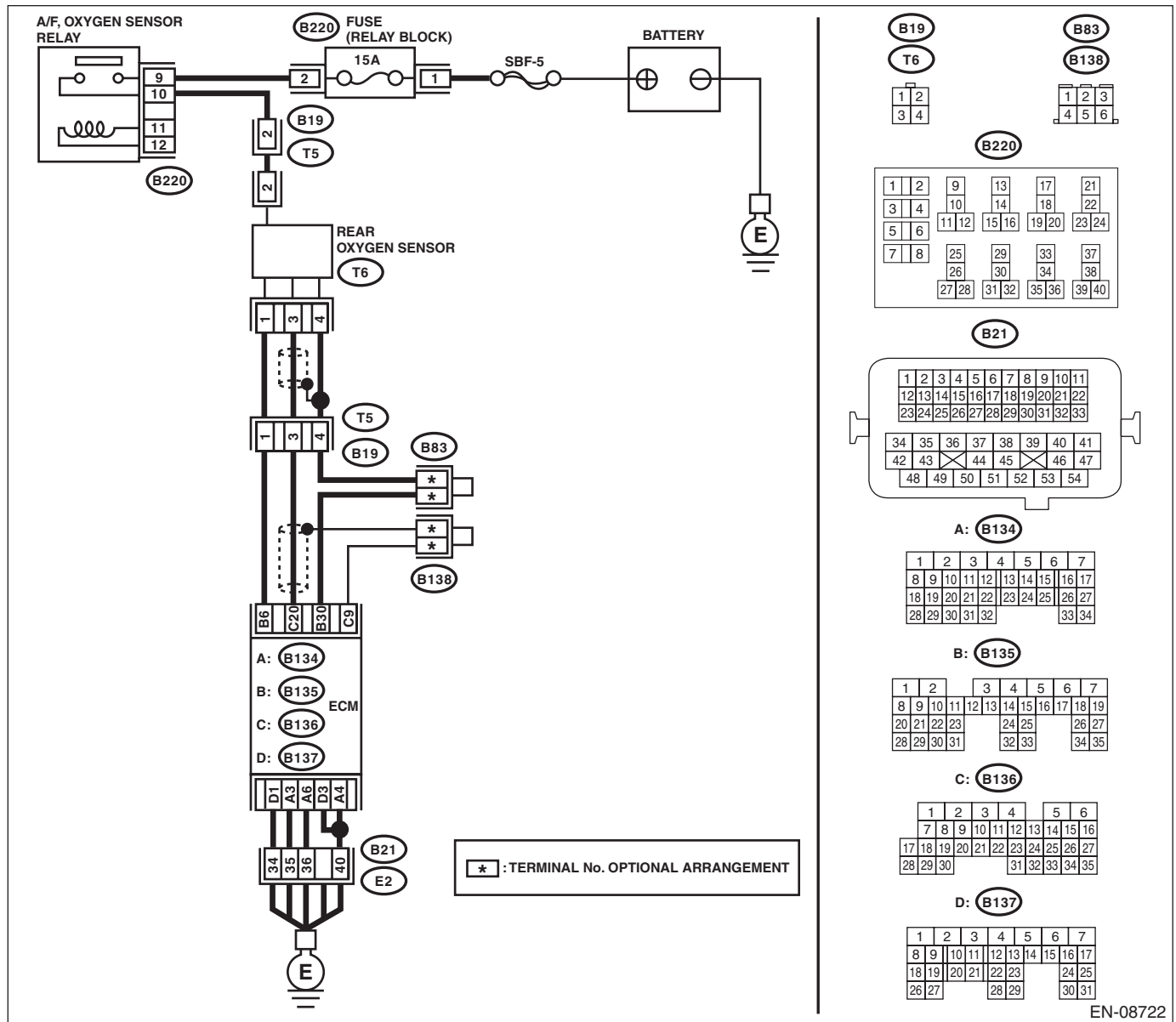
ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND OIL FLOW CONTROL SOLENOID VALVE LH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and oil flow control solenoid valve LH. 3) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B134) No. 5 (+) — Chassis ground (-): (B134) No. 14 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 2.	Repair the short circuit to power in harness between ECM connector and oil flow control solenoid valve LH connector.
2 CHECK HARNESS BETWEEN ECM AND OIL FLOW CONTROL SOLENOID VALVE LH CONNECTOR. Measure the resistance of harness between ECM connector and oil flow control solenoid valve LH connector. Connector & terminal (B134) No. 5 — (E66) No. 1: (B134) No. 14 — (E66) 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 in harness between ECM connector and oil flow control solenoid valve LH connector • Poor contact of coupling connector
3 CHECK OIL FLOW CONTROL SOLENOID VALVE. Measure the resistance between oil flow control solenoid valve terminals. Terminals No. 1 — No. 2:	Is the resistance 6 — 12 Ω ?	Repair the poor contact of ECM and oil flow control solenoid valve LH connector.	Replace the oil flow control solenoid valve LH. <Ref. to FU(STI)-50, Oil Flow Control Solenoid Valve.>

ENGINE (DIAGNOSTICS)

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

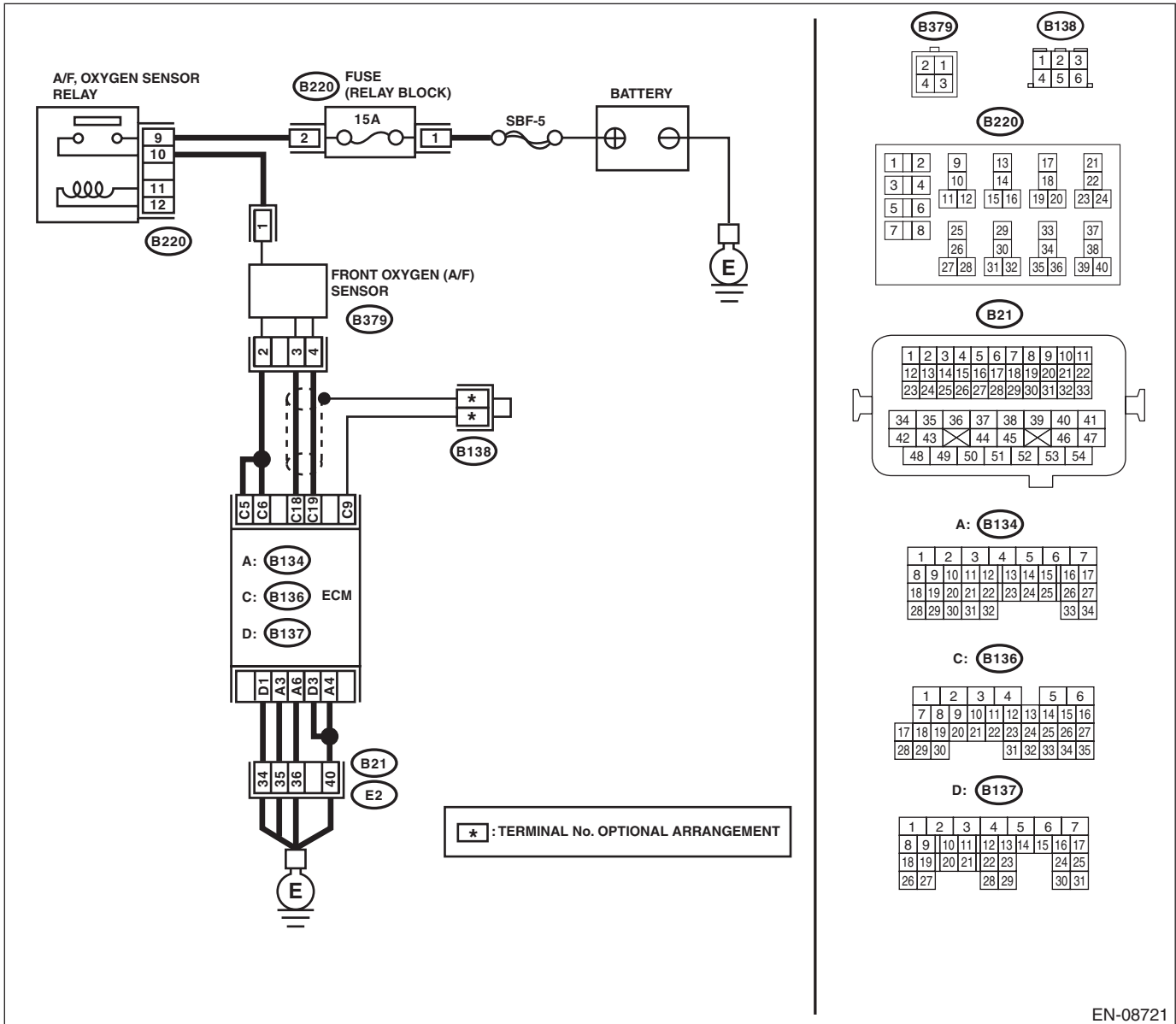


EN-08722

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

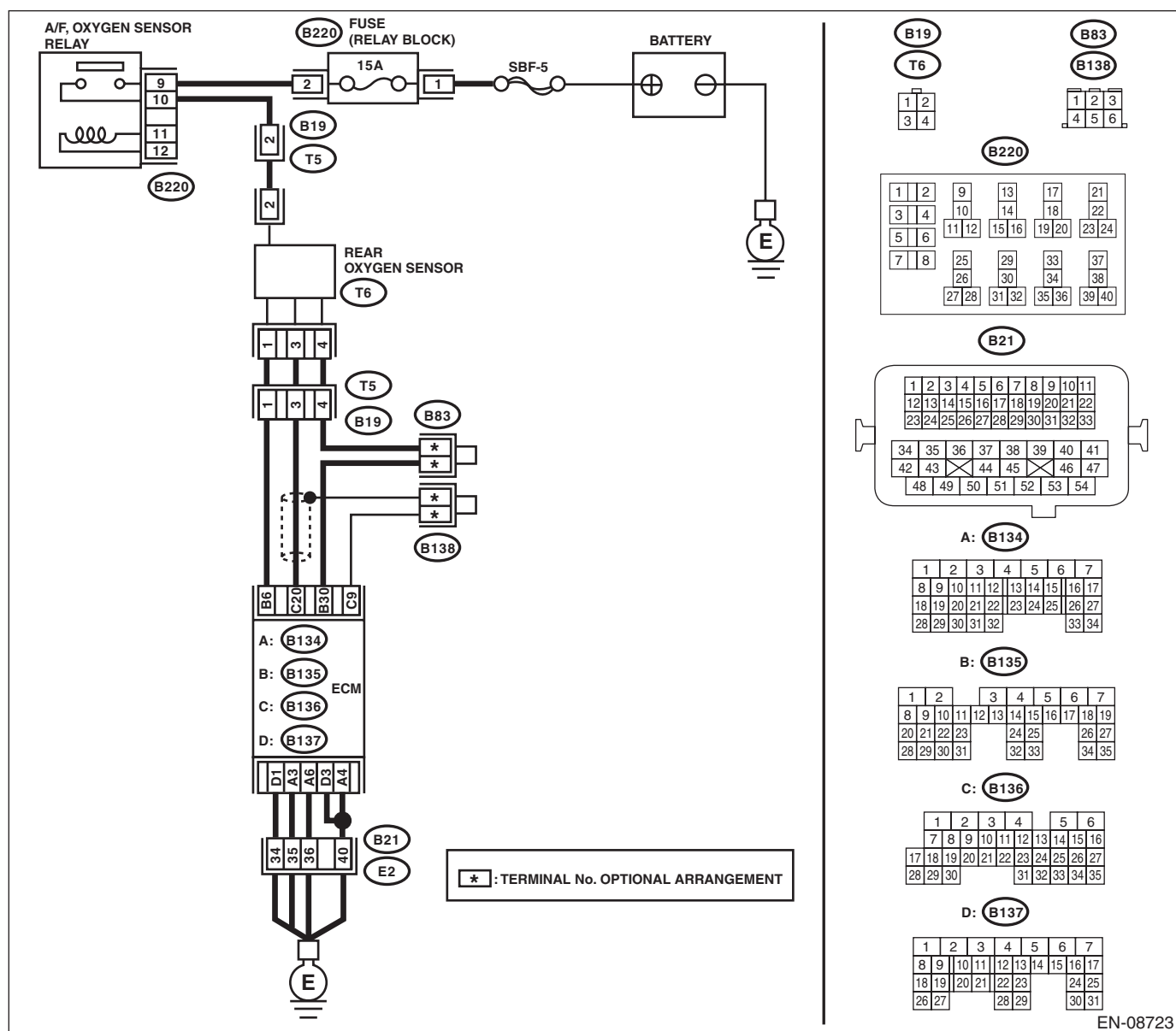
- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08721

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)



EN-08723

Step	Check	Yes	No
1	CHECK FOR ANY OTHER DTC ON DISPLAY. Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2	CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR. Has water entered the connector?	Completely remove any water inside.	Go to step 3.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
3 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 3) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. Connector & terminal Models without SI-DRIVE (B136) No. 19 — (E22) No. 1: (B136) No. 18 — (E22) No. 3: Models with SI-DRIVE (B136) No. 19 — (B379) No. 4: (B136) No. 18 — (B379) No. 3:	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 connector and front oxygen (A/F) sensor connector • Poor contact of front oxygen (A/F) sensor connector • Poor contact of ECM connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B136) No. 19 — Chassis ground: (B136) No. 18 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM connector 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 front oxygen (A/F) sensor connector and chassis ground. Connector & terminal Models without SI-DRIVE (E22) No. 1 (+) — Chassis ground (–): Models with SI-DRIVE (B379) No. 4 (+) — Chassis ground (–):	Is the voltage 4.5 V or more?	Go to step 7.	Go to step 6.
6 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. Connector & terminal Models without SI-DRIVE (E22) No. 3 (+) — Chassis ground (–): Models with SI-DRIVE (B379) No. 3 (+) — Chassis ground (–):	Is the voltage 4.95 V or more?	Go to step 7.	Go to step 8.
7 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. Connector & terminal Models without SI-DRIVE (E22) No. 3 (+) — Chassis ground (–): (E22) No. 1 (+) — Chassis ground (–): Models with SI-DRIVE (B379) No. 3 (+) — Chassis ground (–): (B379) No. 4 (+) — Chassis ground (–):	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(STI)-59, Engine Control Module (ECM).> <Ref. to FU(w/o STI)-57, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
8 CHECK EXHAUST SYSTEM.	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step 9.
9 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 10.
10 CHECK FUEL PRESSURE. WARNING: Place "NO OPEN FLAMES" signs near the working area. CAUTION: Be careful not to spill fuel. 1) Connect the front oxygen (A/F) sensor connector. 2) Measure the fuel pressure while disconnecting pressure regulator vacuum hose from intake manifold. <Ref. to ME(STI)-25, INSPECTION, Fuel Pressure.> <Ref. to ME(w/o STI)-24, INSPECTION, Fuel Pressure.> CAUTION: Release fuel pressure before removing the fuel pressure gauge. NOTE: If fuel pressure does not increase, squeeze the fuel return hose 2 to 3 times, then measure fuel pressure again.	Is the measured value 284 — 314 kPa (2.9 — 3.2 kgf/cm ² , 41 — 46 psi)?	Go to step 11.	Check the fuel pump and fuel delivery line. • Models without SI-DRIVE <Ref. to FU(w/o STI)-79, INSPECTION, Fuel Pump.> <Ref. to FU(w/o STI)-93, INSPECTION, Fuel Delivery, Return and Evaporation Lines.> • Models with SI-DRIVE <Ref. to FU(STI)-81, INSPECTION, Fuel Pump.> <Ref. to FU(STI)-97, INSPECTION, Fuel Delivery, Return and Evaporation Lines.>
11 CHECK FUEL PRESSURE. After connecting the pressure regulator vacuum hose, measure fuel pressure. <Ref. to ME(STI)-25, INSPECTION, Fuel Pressure.> <Ref. to ME(w/o STI)-24, INSPECTION, Fuel Pressure.> CAUTION: Release fuel pressure before removing the fuel pressure gauge. NOTE: • If fuel pressure does not increase, squeeze fuel return hose 2 to 3 times, then measure fuel pressure again. • If the measured value at this step is out of specification, check or replace pressure regulator and pressure regulator vacuum hose.	Is the measured value 230 — 260 kPa (2.4 — 2.7 kgf/cm ² , 33 — 38 psi)?	Go to step 12.	Check the fuel pump and fuel delivery line. • Models without SI-DRIVE <Ref. to FU(w/o STI)-79, INSPECTION, Fuel Pump.> <Ref. to FU(w/o STI)-93, INSPECTION, Fuel Delivery, Return and Evaporation Lines.> • Models with SI-DRIVE <Ref. to FU(STI)-81, INSPECTION, Fuel Pump.> <Ref. to FU(STI)-97, INSPECTION, Fuel Delivery, Return and Evaporation Lines.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
12 CHECK ENGINE COOLANT TEMPERATURE SENSOR. 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Go to step 13.	Replace the engine coolant temperature sensor. <Ref. to FU(STI)-34, Engine Coolant Temperature Sensor.> <Ref. to FU(w/o STI)-34, Engine Coolant Temperature Sensor.>
13 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°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 value of «Mass Air Flow» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mass Air Flow» 2.0 — 5.0 g/s (0.26 — 0.66 lb/m)?	Go to step 14.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(STI)-42, Mass Air Flow and Intake Air Temperature Sensor.> <Ref. to FU(w/o STI)-42, 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 higher than 75°C (167°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 value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Subtract ambient temperature from «Intake Air Temp.». 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(STI)-42, Mass Air Flow and Intake Air Temperature Sensor.> <Ref. to FU(w/o STI)-42, Mass Air Flow and Intake Air Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
15 CHECK REAR OXYGEN SENSOR DATA. 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and keep the engine speed at 3,000 rpm. (2 minutes maximum) 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: - Depress the clutch pedal. - Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.490 V or more?	Go to step 16.	Go to step 17.
16 CHECK REAR OXYGEN SENSOR DATA. 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: - Depress the clutch pedal. - Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.250 V or less?	Go to step 18.	Go to step 17.
17 CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.	Has water entered the connector?	Completely remove any water inside.	Go to step 19.
18 CHECK FRONT OXYGEN (A/F) SENSOR USING REAR OXYGEN SENSOR SIGNAL. 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), then keep the engine idling for 5 minutes or more. 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: - Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value in «Rear O2 Sensor» kept at 0.250 V or less for 5 minutes or more?	Replace the front oxygen (A/F) sensor. <Ref. to FU(STI)-54, Front Oxygen (A/F) Sensor.> <Ref. to FU(w/o STI)-53, Front Oxygen (A/F) Sensor.>	Go to step 19.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
19 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 connector and rear oxygen sensor connector. Connector & terminal (B136) No. 20 — (T6) No. 3: (B135) No. 30 — (T6) No. 4:	Is the resistance less than 1 Ω ?	Go to step 20.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
20 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and chassis ground. Connector & terminal (T6) No. 3 (+) — Chassis ground (-):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(STI)-56, Rear Oxygen Sensor.> <Ref. to FU(w/o STI)-55, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of ECM connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

EL:DTC P2097 POST CATALYST FUEL TRIM SYSTEM TOO RICH (BANK 1)

DTC DETECTING CONDITION:

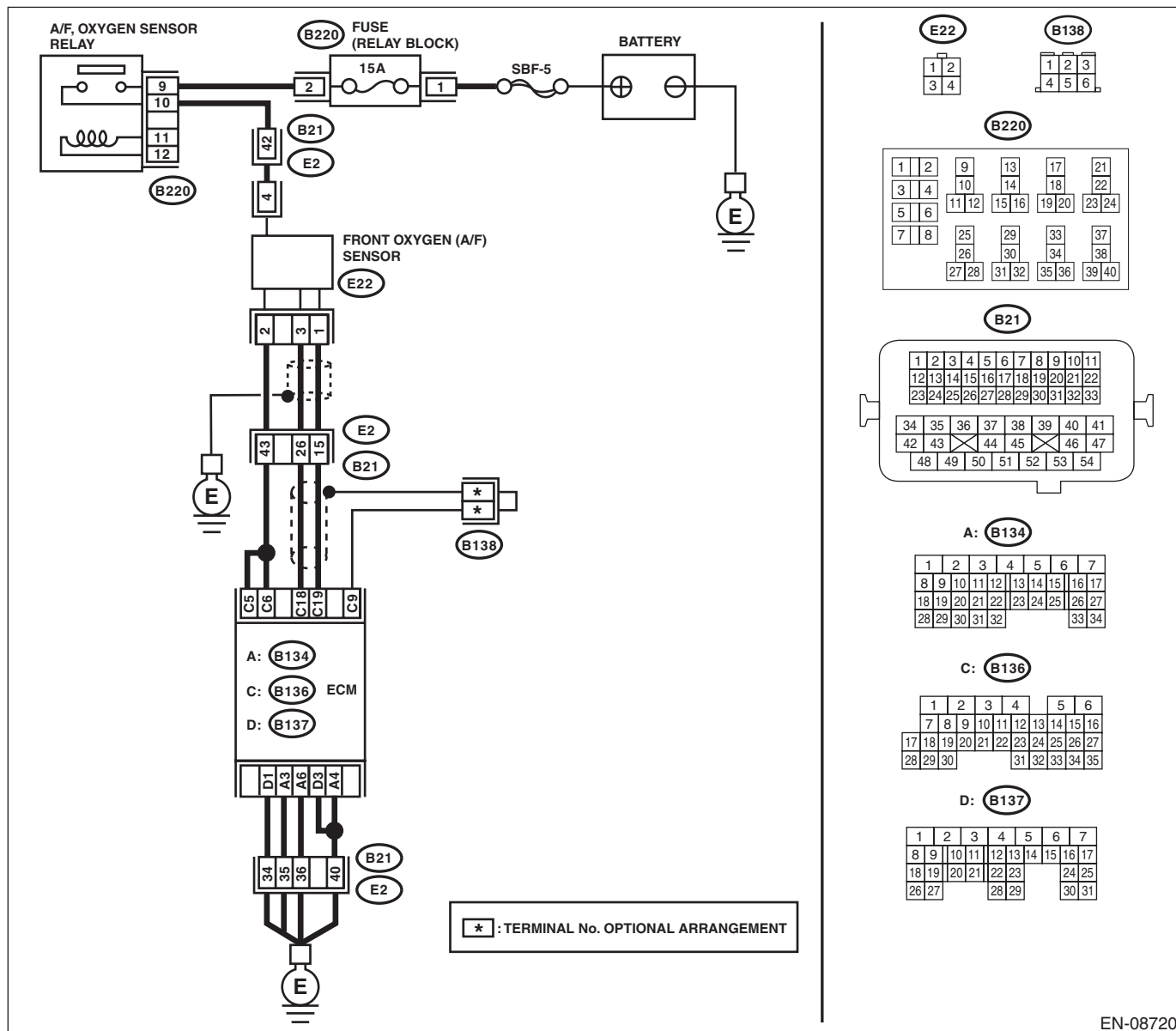
- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-241, DTC P2097 POST CATALYST FUEL TRIM SYSTEM TOO RICH (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

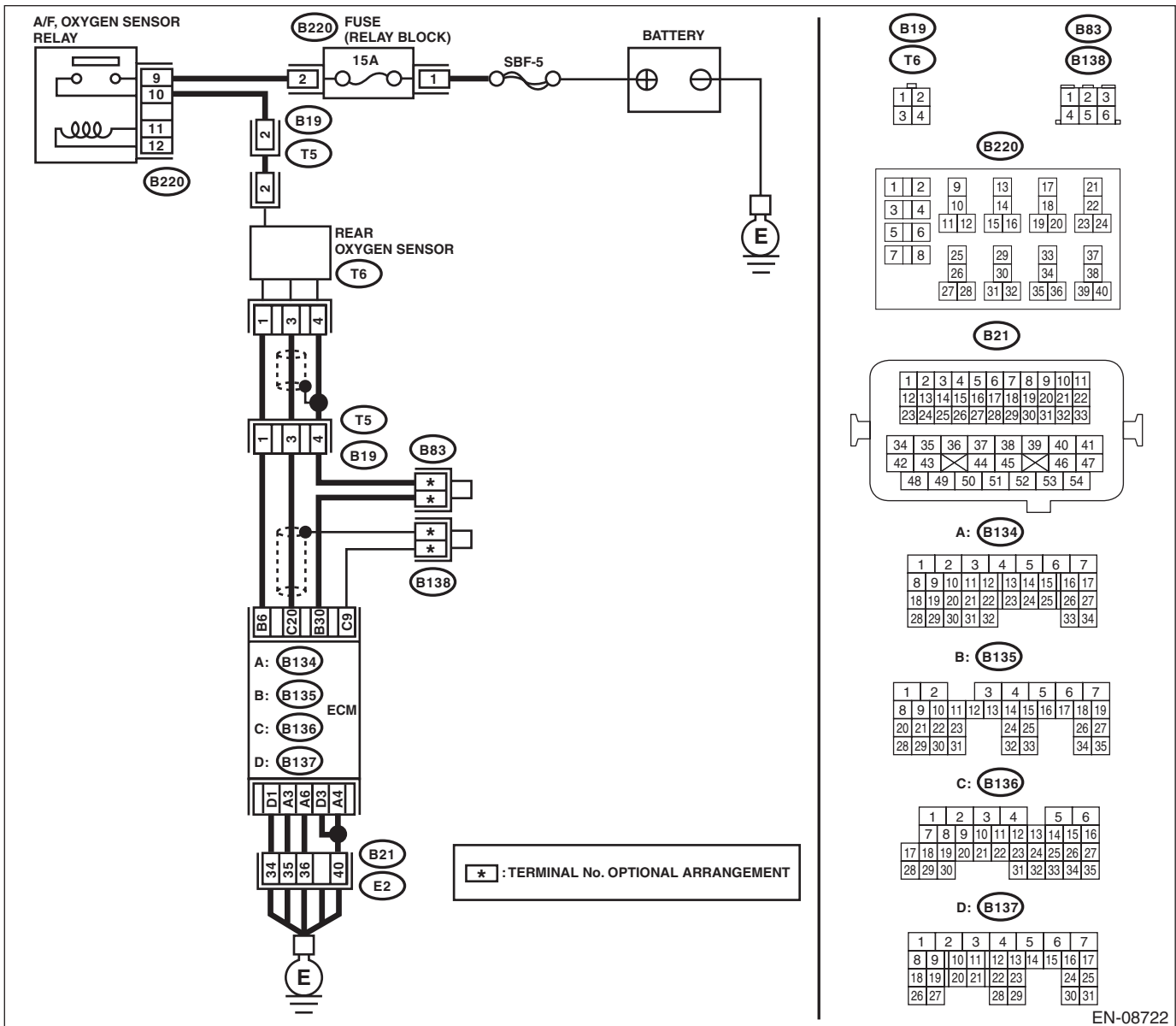
- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08720

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

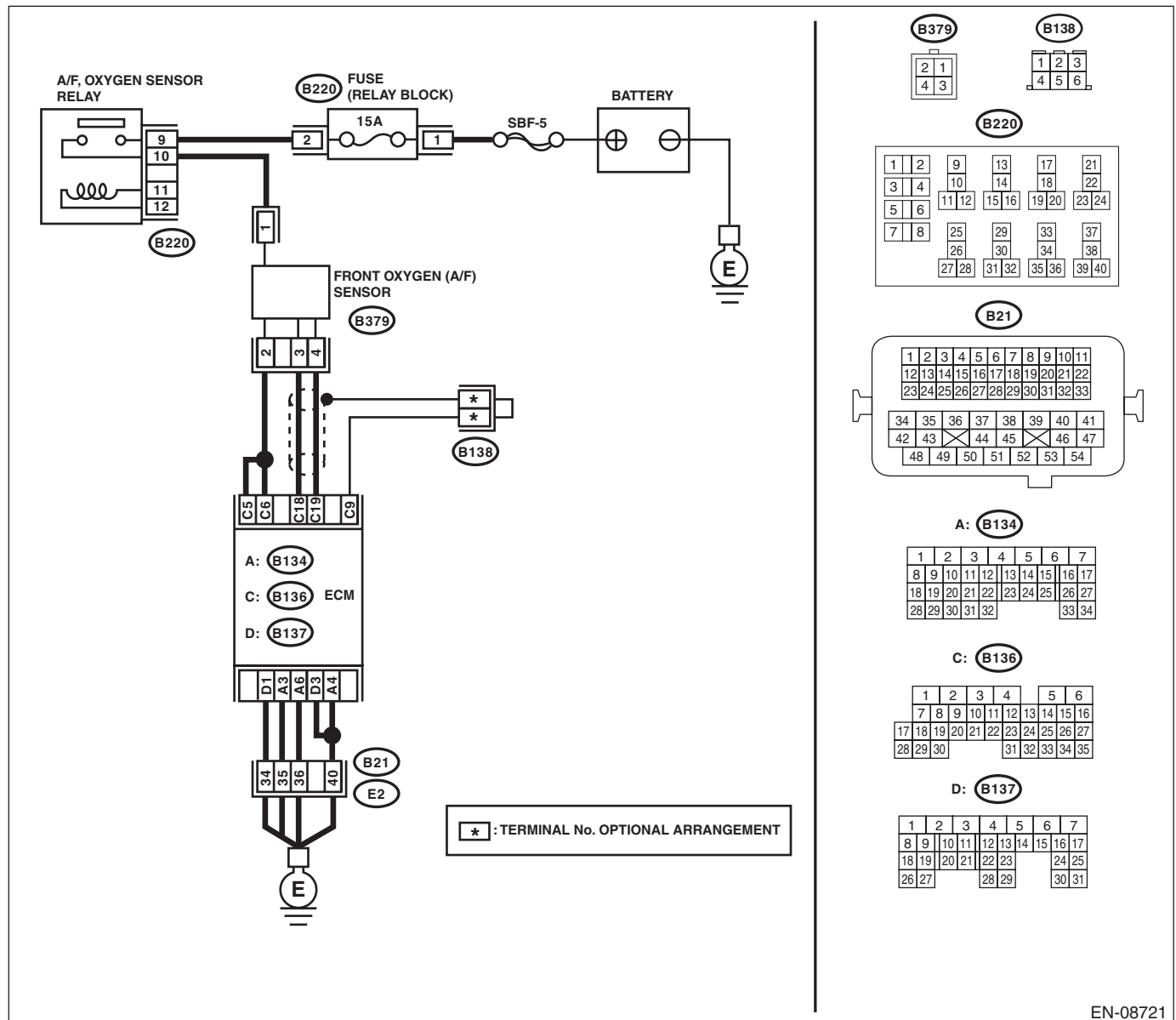


EN-08722

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

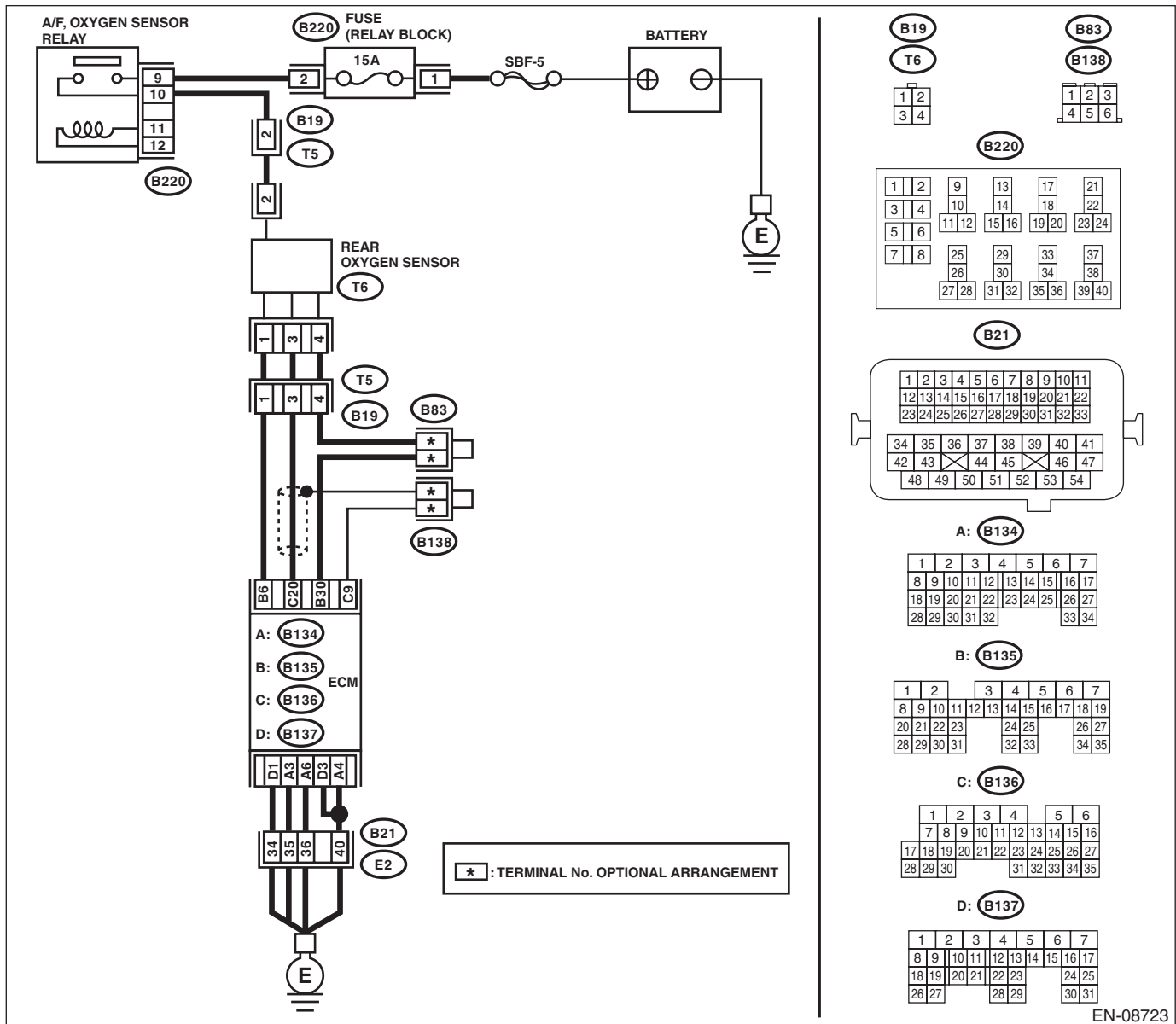
- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08721

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)



EN-08723

Step	Check	Yes	No
1	CHECK FOR ANY OTHER DTC ON DISPLAY. Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2	CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR. Has water entered the connector?	Completely remove any water inside.	Go to step 3.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
3 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 3) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. Connector & terminal Models without SI-DRIVE (B136) No. 19 — (E22) No. 1: (B136) No. 18 — (E22) No. 3: Models with SI-DRIVE (B136) No. 19 — (B379) No. 4: (B136) No. 18 — (B379) No. 3:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness between ECM connector and front oxygen (A/F) sensor connector.
4 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B136) No. 19 — Chassis ground: (B136) No. 18 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM connector 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 front oxygen (A/F) sensor connector and chassis ground. Connector & terminal Models without SI-DRIVE (E22) No. 1 (+) — Chassis ground (-): Models with SI-DRIVE (B379) No. 4 (+) — Chassis ground (-):	Is the voltage 4.5 V or more?	Go to step 7.	Go to step 6.
6 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. Connector & terminal Models without SI-DRIVE (E22) No. 3 (+) — Chassis ground (-): Models with SI-DRIVE (B379) No. 3 (+) — Chassis ground (-):	Is the voltage 4.95 V or more?	Go to step 7.	Go to step 8.
7 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. Connector & terminal Models without SI-DRIVE (E22) No. 3 (+) — Chassis ground (-): (E22) No. 1 (+) — Chassis ground (-): Models with SI-DRIVE (B379) No. 3 (+) — Chassis ground (-): (B379) No. 4 (+) — Chassis ground (-):	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(STI)-59, Engine Control Module (ECM).> <Ref. to FU(w/o STI)-57, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.
8 CHECK EXHAUST SYSTEM.	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step 9.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
9 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 10.
10 CHECK FUEL PRESSURE. WARNING: Place "NO OPEN FLAMES" signs near the working area. CAUTION: Be careful not to spill fuel. 1) Connect the front oxygen (A/F) sensor connector. 2) Measure the fuel pressure while disconnecting pressure regulator vacuum hose from intake manifold. <Ref. to ME(STI)-25, INSPECTION, Fuel Pressure.> <Ref. to ME(w/o STI)-24, INSPECTION, Fuel Pressure.> CAUTION: Release fuel pressure before removing the fuel pressure gauge. NOTE: If fuel pressure does not increase, squeeze the fuel return hose 2 to 3 times, then measure fuel pressure again.	Is the measured value 284 — 314 kPa (2.9 — 3.2 kgf/cm ² , 41 — 46 psi)?	Go to step 11.	Check the fuel pump and fuel delivery line. • Models without SI-DRIVE <Ref. to FU(w/o STI)-79, INSPECTION, Fuel Pump.> <Ref. to FU(w/o STI)-93, INSPECTION, Fuel Delivery, Return and Evaporation Lines.> • Models with SI-DRIVE <Ref. to FU(STI)-81, INSPECTION, Fuel Pump.> <Ref. to FU(STI)-97, INSPECTION, Fuel Delivery, Return and Evaporation Lines.>
11 CHECK FUEL PRESSURE. After connecting the pressure regulator vacuum hose, measure fuel pressure. <Ref. to ME(STI)-25, INSPECTION, Fuel Pressure.> <Ref. to ME(w/o STI)-24, INSPECTION, Fuel Pressure.> CAUTION: Release fuel pressure before removing the fuel pressure gauge. NOTE: • If fuel pressure does not increase, squeeze fuel return hose 2 to 3 times, then measure fuel pressure again. • If the measured value at this step is out of specification, check or replace pressure regulator and pressure regulator vacuum hose.	Is the measured value 230 — 260 kPa (2.4 — 2.7 kgf/cm ² , 33 — 38 psi)?	Go to step 12.	Check the fuel pump and fuel delivery line. • Models without SI-DRIVE <Ref. to FU(w/o STI)-79, INSPECTION, Fuel Pump.> <Ref. to FU(w/o STI)-93, INSPECTION, Fuel Delivery, Return and Evaporation Lines.> • Models with SI-DRIVE <Ref. to FU(STI)-81, INSPECTION, Fuel Pump.> <Ref. to FU(STI)-97, INSPECTION, Fuel Delivery, Return and Evaporation Lines.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
12 CHECK ENGINE COOLANT TEMPERATURE SENSOR. 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Go to step 13.	Replace the engine coolant temperature sensor. <Ref. to FU(STI)-34, Engine Coolant Temperature Sensor.> <Ref. to FU(w/o STI)-34, Engine Coolant Temperature Sensor.>
13 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°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 value of «Mass Air Flow» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mass Air Flow» 2.0 — 5.0 g/s (0.26 — 0.66 lb/m)?	Go to step 14.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(STI)-42, Mass Air Flow and Intake Air Temperature Sensor.> <Ref. to FU(w/o STI)-42, 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 higher than 75°C (167°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 value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Subtract ambient temperature from «Intake Air Temp.». 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(STI)-42, Mass Air Flow and Intake Air Temperature Sensor.> <Ref. to FU(w/o STI)-42, Mass Air Flow and Intake Air Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
15 CHECK REAR OXYGEN SENSOR DATA. 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and keep the engine speed at 3,000 rpm. (2 minutes maximum) 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: - Depress the clutch pedal. - Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.490 V or more?	Go to step 16.	Go to step 17.
16 CHECK REAR OXYGEN SENSOR DATA. 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: - Depress the clutch pedal. - Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.250 V or less?	Go to step 18.	Go to step 17.
17 CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.	Has water entered the connector?	Completely remove any water inside.	Go to step 19.
18 CHECK FRONT OXYGEN (A/F) SENSOR USING REAR OXYGEN SENSOR SIGNAL. 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), then keep the engine idling for 5 minutes or more. 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: - Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value in «Rear O2 Sensor» kept at 0.8 V or more for 5 minutes or more?	Replace the front oxygen (A/F) sensor. <Ref. to FU(STI)-54, Front Oxygen (A/F) Sensor.> <Ref. to FU(w/o STI)-53, Front Oxygen (A/F) Sensor.>	Go to step 19.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
19 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 connector and rear oxygen sensor connector. Connector & terminal (B136) No. 20 — (T6) No. 3: (B135) No. 30 — (T6) No. 4:	Is the resistance less than 1 Ω ?	Go to step 20.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
20 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and chassis ground. Connector & terminal (T6) No. 3 (+) — Chassis ground (-):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(STI)-56, Rear Oxygen Sensor.> <Ref. to FU(w/o STI)-55, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of ECM connector • Poor contact of coupling connector

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-243, DTC P2101 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Improper idling
- Poor driving performance
- Engine stalls.

CAUTION:

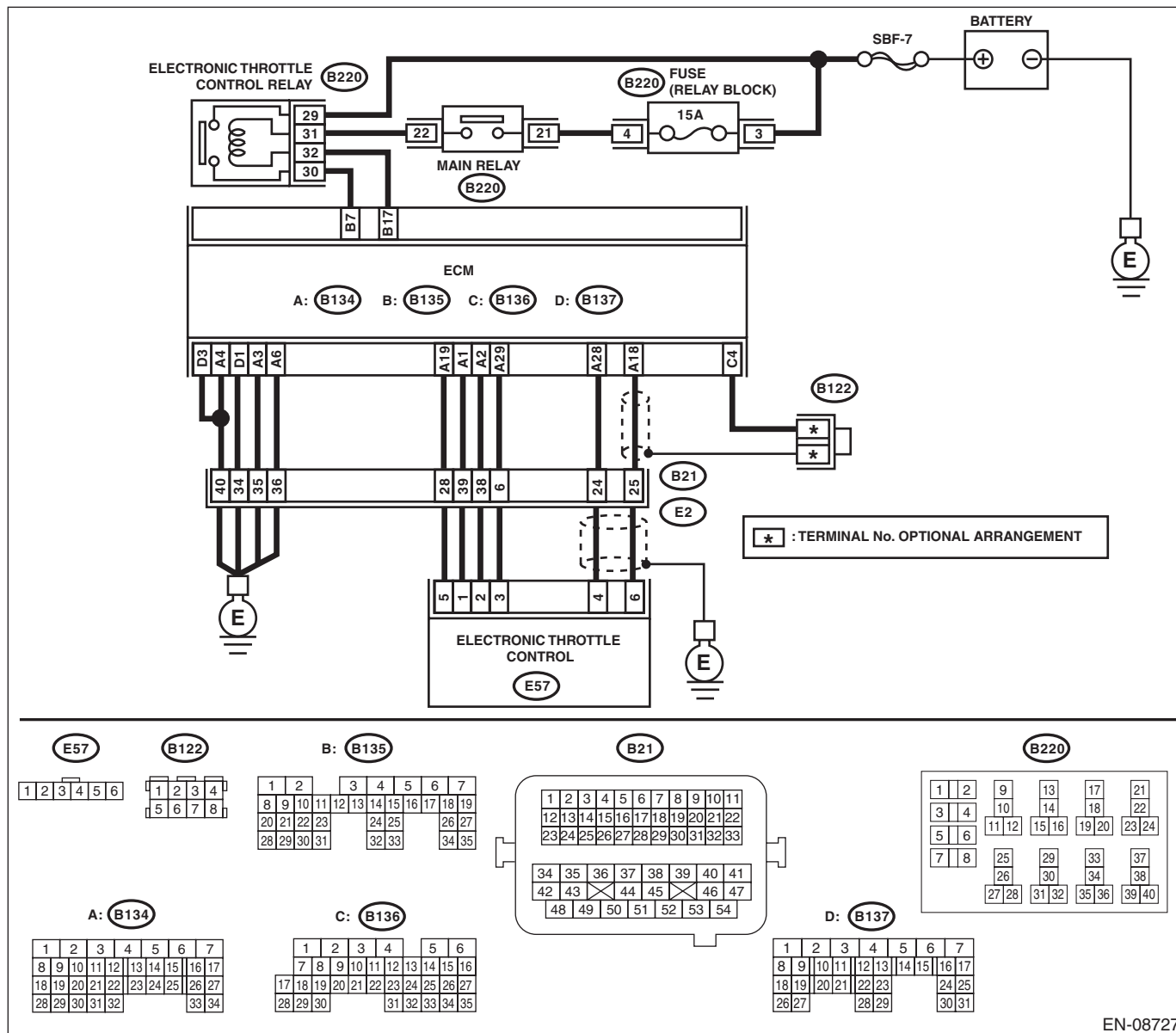
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08727

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. 31 and No. 32 of electronic throttle control relay. 4) Measure the resistance between electronic throttle control relay terminals. Terminals No. 29 — No. 30:	Is the resistance less than 1 Ω?	Go to step 2.	Replace the electronic throttle control relay. <Ref. to FU(STI)-64, Electronic Throttle Control Relay.> <Ref. to FU(w/o STI)-62, Electronic Throttle Control Relay.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK POWER SUPPLY OF ELECTRONIC THROTTLE CONTROL RELAY. Measure the voltage between electronic throttle control relay connector and chassis ground. Connector & terminal (B220) No. 29 (+) — Chassis ground (-):	Is the voltage 10 V or more?	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 CONNECTOR. 1) Disconnect the connector from ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control relay connector and chassis ground. Connector & terminal (B220) No. 32 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control relay connector.	Go to step 4.
4 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control relay connector and chassis ground. Connector & terminal (B220) No. 32 — Chassis ground: (B220) No. 30 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM connector and electronic throttle control relay connector.
5 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR. Measure the resistance between ECM connector and electronic throttle control relay connector. Connector & terminal (B135) No. 17 — (B220) No. 32: (B135) No. 7 — (B220) No. 30:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the open circuit in harness between ECM connector and electronic throttle control relay connector.
6 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from electronic throttle control. 3) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 19 — Chassis ground: (B134) No. 18 — Chassis ground: (B134) No. 18 — (B136) No. 4: (B134) No. 28 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 7.	Repair the ground 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
7 CHECK SHORT CIRCUIT INSIDE THE ECM. 1) Connect the connector to ECM. 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 1 MΩ or more?	Go to step 8.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(STI)-59, Engine Control Module (ECM).> <Ref. to FU(w/o STI)-57, Engine Control Module (ECM).>
8 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 18 — (E57) No. 6: (B134) No. 28 — (E57) No. 4: (B134) No. 29 — (E57) No. 3:	Is the resistance less than 1 Ω?	Go to step 9.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
9 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Connect the connector to ECM. 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 10.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
10 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to ON. 2) 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 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step 11.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
11 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. Connector & terminal (B134) No. 19 — (B134) No. 18: (B134) No. 19 — (B134) No. 28:	Is the resistance 1 M Ω or more?	Go to step 12.	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.
12 CHECK SENSOR OUTPUT. 1) Connect all connectors. 2) Start the engine and warm up completely. 3) Stop the engine, and then turn the ignition switch to ON (engine OFF). 4) Read the value of «Main-Throttle Sensor» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «Main-Throttle Sensor» 0.81 — 0.87 V?	Go to step 13.	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(STI)-15, Throttle Body.> <Ref. to FU(w/o STI)-15, Throttle Body.>
13 CHECK SENSOR OUTPUT. Read the value of «Sub-Throttle Sensor» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «Sub-Throttle Sensor» 1.64 — 1.70 V?	Go to step 14.	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(STI)-15, Throttle Body.> <Ref. to FU(w/o STI)-15, Throttle Body.>
14 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL MOTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 2 — (E57) No. 2: (B134) No. 1 — (E57) No. 1:	Is the resistance less than 1 Ω ?	Go to step 15.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and electronic throttle control connector • Poor contact of coupling connector
15 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 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step 16.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
16 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL MOTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector 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 1 M Ω or more?	Go to step 17.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.
17 CHECK ELECTRONIC THROTTLE CONTROL MOTOR HARNESS. Measure the resistance between electronic throttle control connectors. Connector & terminal (E57) No. 2 — (E57) No. 1:	Is the resistance 1 M Ω or more?	Go to step 18.	Repair the short circuit in harness between ECM connector and electronic throttle control connector.
18 CHECK ELECTRONIC THROTTLE CONTROL GROUND CIRCUIT. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 3 — Chassis ground: (B134) No. 4 — Chassis ground: (B134) No. 6 — Chassis ground: (B137) No. 1 — Chassis ground: (B137) No. 3 — Chassis ground:	Is the resistance less than 5 Ω ?	Go to step 19.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of coupling connector
19 CHECK ELECTRONIC THROTTLE CONTROL. Measure the resistance between electronic throttle control terminals. Terminals No. 2 — No. 1:	Is the resistance 50 Ω or less?	Go to step 20.	Replace the electronic throttle control. <Ref. to FU(STI)-15, Throttle Body.> <Ref. to FU(w/o STI)-15, Throttle Body.>
20 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 electronic throttle control. <Ref. to FU(STI)-15, Throttle Body.> <Ref. to FU(w/o STI)-15, Throttle Body.>

EN:DTC P2102 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT LOW**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-245, DTC P2102 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

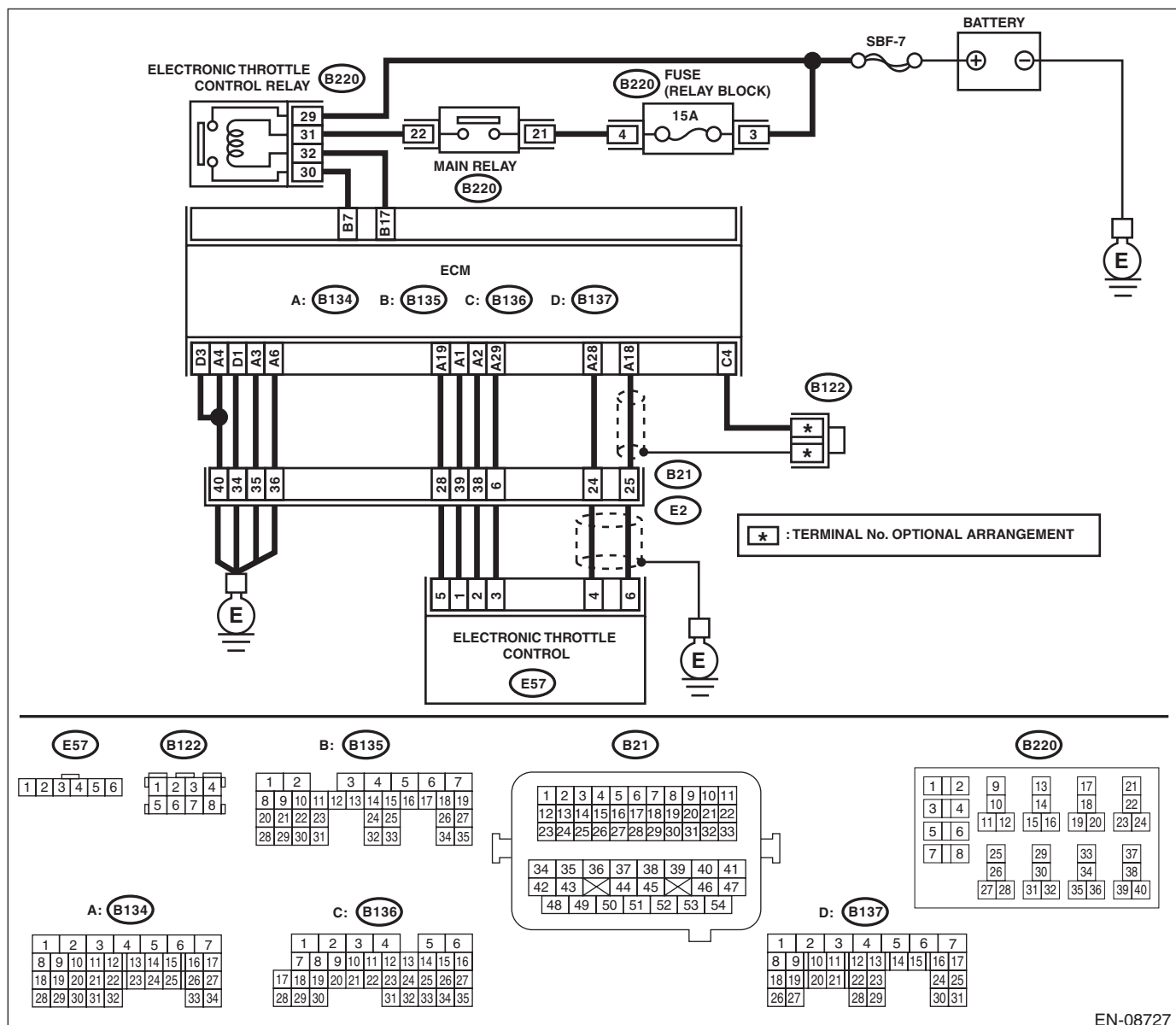
- Improper idling
- Poor driving performance
- Engine stalls.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08727

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. 31 and No. 32 of electronic throttle control relay. 4) Measure the resistance between electronic throttle control relay terminals. Terminals No. 29 — No. 30:	Is the resistance less than 1 Ω ?	Go to step 2.	Replace the electronic throttle control relay. <Ref. to FU(STI)-64, Electronic Throttle Control Relay.> <Ref. to FU(w/o STI)-62, Electronic Throttle Control Relay.>
2 CHECK POWER SUPPLY OF ELECTRONIC THROTTLE CONTROL RELAY. Measure the voltage between electronic throttle control relay connector and chassis ground. Connector & terminal (B220) No. 29 (+) — Chassis ground (-):	Is the voltage 10 V or more?	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 CONNECTOR. 1) Disconnect the connector from ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between electronic throttle control relay connector and chassis ground. Connector & terminal (B220) No. 32 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control relay connector.	Go to step 4.
4 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance between electronic throttle control relay connector and chassis ground. Connector & terminal (B220) No. 32 — Chassis ground: (B220) No. 30 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM connector and electronic throttle control relay connector.
5 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR. Measure the resistance between ECM connector and electronic throttle control relay connector. Connector & terminal (B135) No. 17 — (B220) No. 32: (B135) No. 7 — (B220) No. 30:	Is the resistance less than 1 Ω ?	Repair the poor contact of ECM connector.	Repair the open circuit in harness between ECM connector and electronic throttle control relay connector.

EO:DTC P2103 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT HIGH

DTC DETECTING CONDITION:

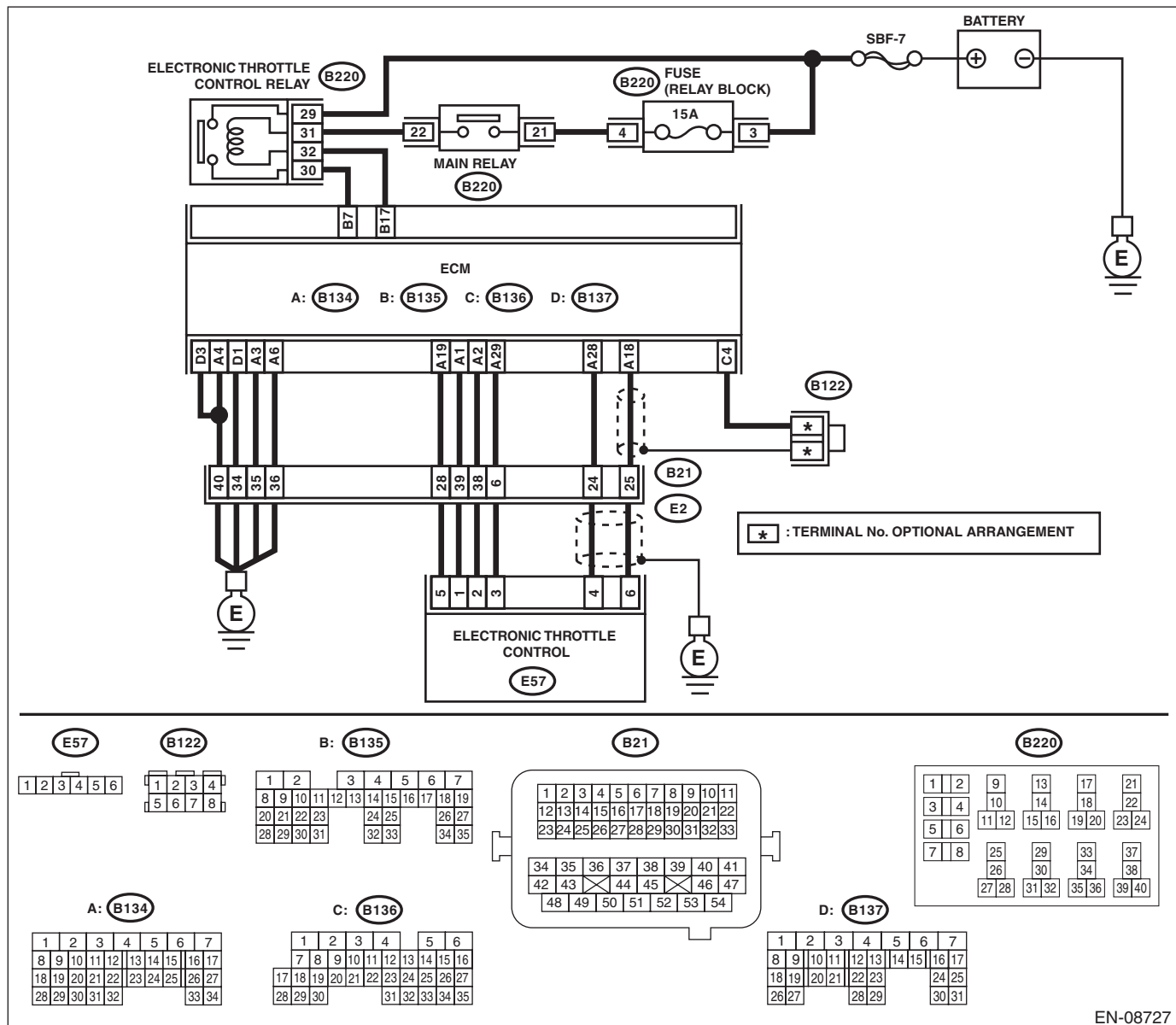
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-247, DTC P2103 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08727

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. 29 — No. 30:	Is the resistance 1 MΩ or more?	Go to step 2.	Replace the electronic throttle control relay. <Ref. to FU(STI)-64, Electronic Throttle Control Relay.> <Ref. to FU(w/o STI)-62, 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 (B220) No. 30 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control relay connector.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B135) No. 17 — Chassis ground:	Is the resistance 1 MΩ or more?	Repair the poor contact of ECM connector.	Repair the short circuit to ground in harness between ECM connector and electronic throttle control relay connector.

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

NOTE:

For the diagnostic procedure, refer to DTC P2101. <Ref. to EN(H4DOTC)(diag)-371, DTC P2101 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

EQ:DTC P2119 THROTTLE ACTUATOR CONTROL THROTTLE BODY RANGE/PERFORMANCE

NOTE:

For the diagnostic procedure, refer to DTC P2101. <Ref. to EN(H4DOTC)(diag)-371, DTC P2101 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

ER:DTC P2122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT LOW INPUT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-255, DTC P2122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

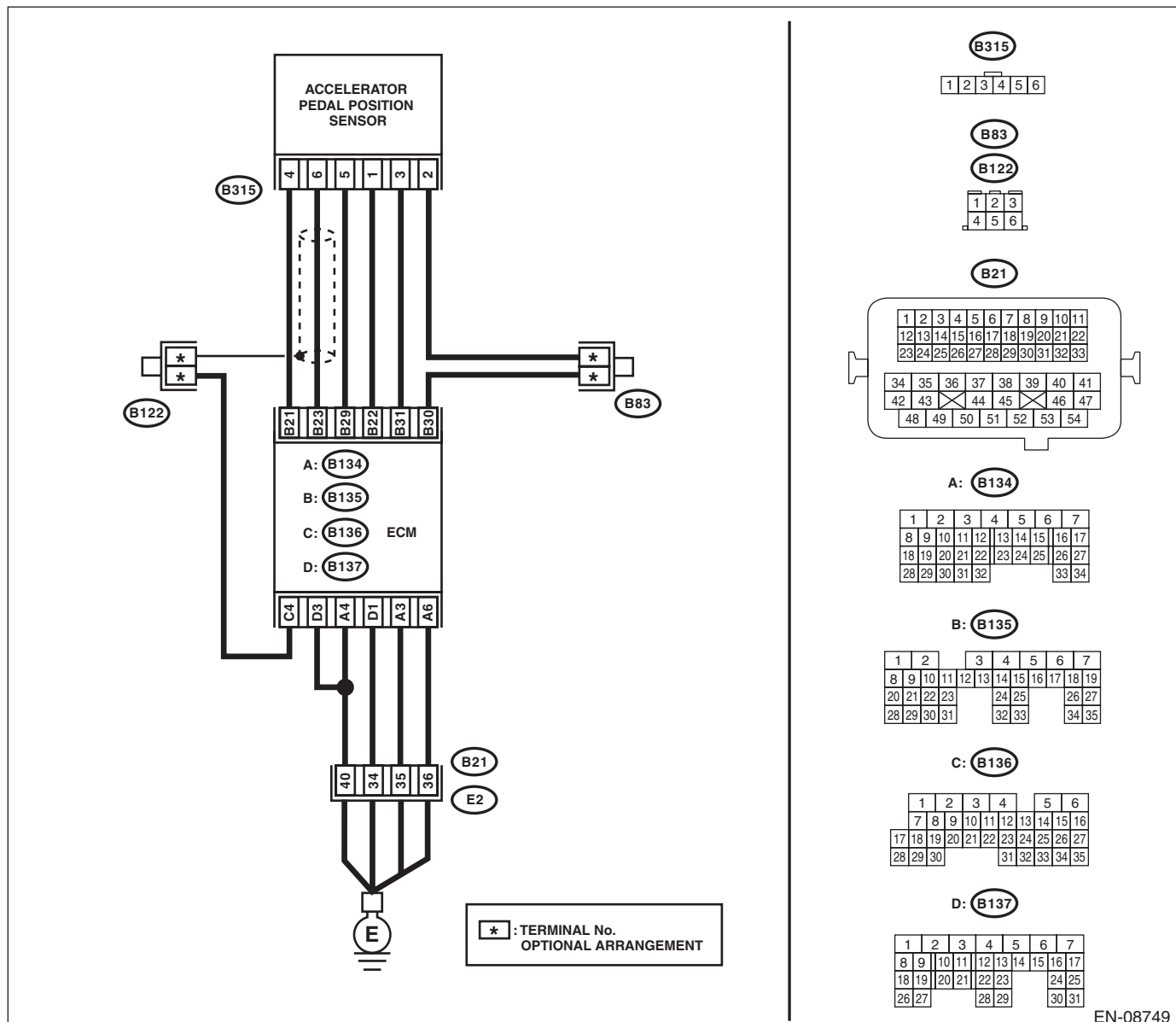
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08749

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and accelerator pedal position sensor. 3) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B135) No. 21 — Chassis ground: (B135) No. 23 — Chassis ground: (B135) No. 23 — (B136) No. 4:	Is the resistance 1 MΩ or more?	Go to step 2.	Repair the short circuit to ground in harness between ECM connector and accelerator pedal position sensor connector.
2 CHECK SHORT CIRCUIT INSIDE THE ECM. 1) Connect the connector to ECM. 2) Measure the resistance between accelerator pedal position sensor connector and chassis ground. Connector & terminal (B315) No. 6 — Chassis ground:	Is the resistance 1 MΩ or more?	Replace the accelerator pedal. <Ref. to SP(STI)-4, Accelerator Pedal.>	Repair the short circuit to ground in harness between ECM connector and accelerator pedal position sensor connector. Replace the ECM if defective. <Ref. to FU(STI)-59, Engine Control Module (ECM).> <Ref. to FU(w/o STI)-57, Engine Control Module (ECM).>

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-257, DTC P2123 THROTTLE/PEDAL POSITION SENSOR/SWITCH “D” CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

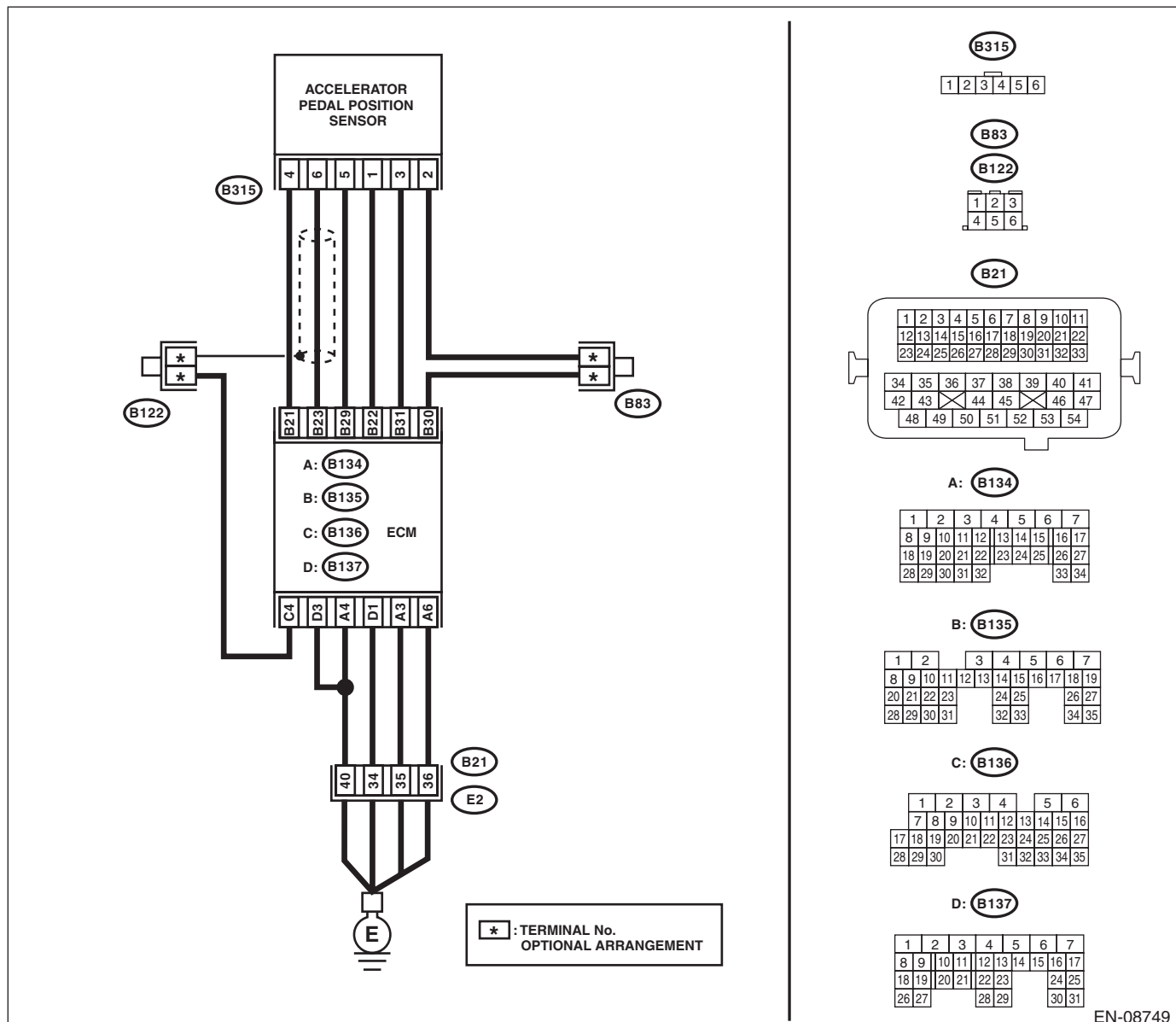
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08749

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and accelerator pedal position sensor. 3) Measure the resistance of harness between ECM connector and accelerator pedal position sensor connector. Connector & terminal (B135) No. 23 — (B315) No. 6: (B135) No. 29 — (B315) No. 5:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the open circuit of harness between ECM connector and accelerator pedal position sensor connector.
2 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR. 1) Connect the connector to ECM. 2) Measure the resistance between accelerator pedal position sensor connector and chassis ground. Connector & terminal (B315) No. 5 — 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 of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR. 1) Turn the ignition switch to ON. 2) Measure the voltage between accelerator pedal position sensor connector and chassis ground. Connector & terminal (B315) No. 6 (+) — Chassis ground (-):	Is the voltage 5 V or more?	Repair the short circuit to power supply in harness between ECM connector and accelerator pedal position sensor connector.	Go to step 4.
4 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. Connector & terminal (B135) No. 21 — (B135) No. 23:	Is the resistance 1 M Ω or more?	Repair the poor contact of accelerator pedal position sensor connector. Replace the accelerator pedal if defective. <Ref. to SP(STI)-4, Accelerator Pedal.>	Repair the short circuit to power supply in harness between ECM connector and accelerator pedal position sensor connector.

ET:DTC P2127 THROTTLE/PEDAL POSITION SENSOR/SWITCH “E” CIRCUIT LOW INPUT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-259, DTC P2127 THROTTLE/PEDAL POSITION SENSOR/SWITCH “E” CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

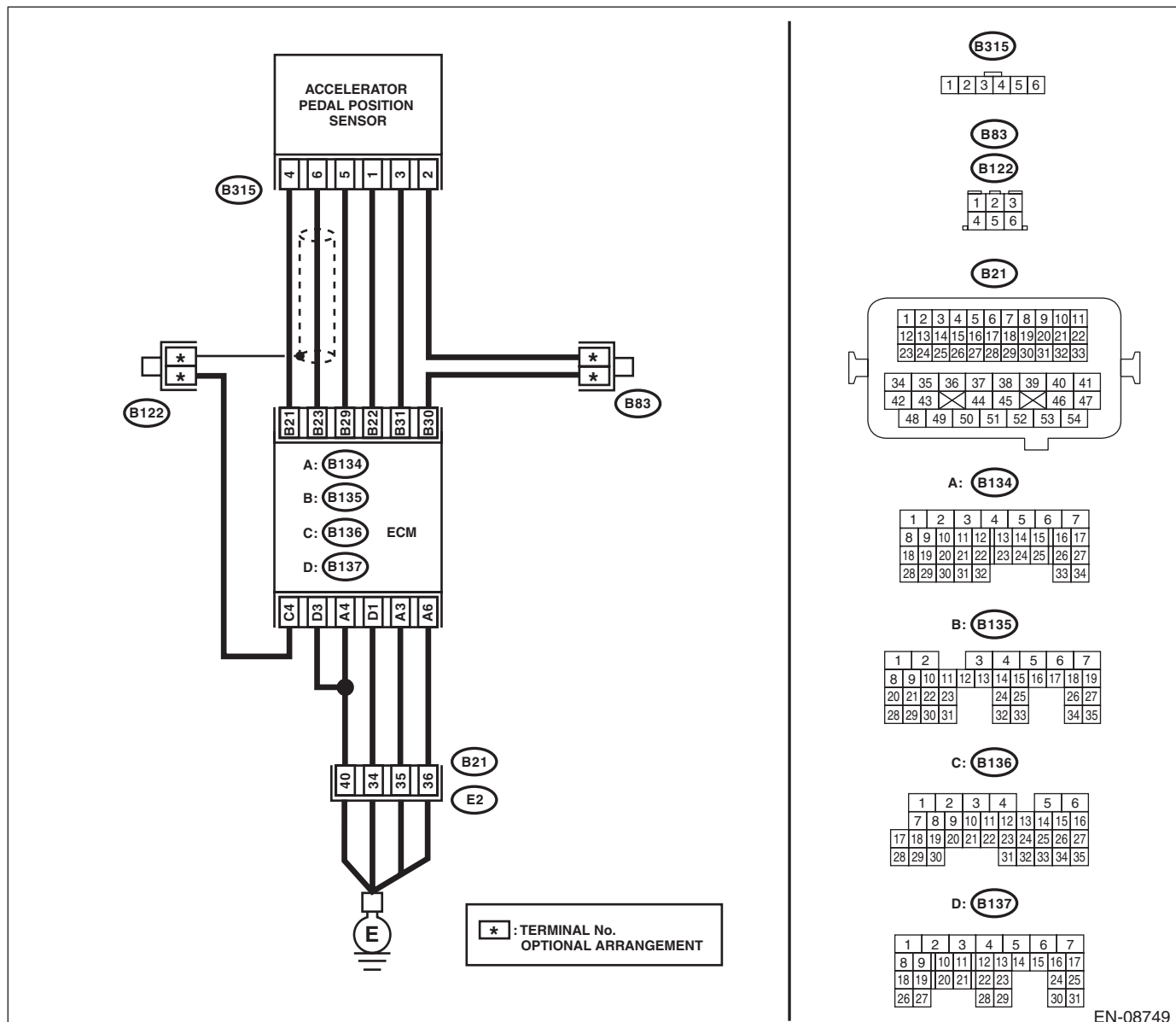
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08749

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and accelerator pedal position sensor. 3) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B135) No. 22 — Chassis ground: (B135) No. 31 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 2.	Repair the short circuit to ground in harness between ECM connector and accelerator pedal position sensor connector.
2 CHECK SHORT CIRCUIT INSIDE THE ECM. 1) Connect the connector to ECM. 2) Measure the resistance between accelerator pedal position sensor connector and chassis ground. Connector & terminal (B315) No. 3 — Chassis ground:	Is the resistance 1 MΩ or more?	Replace the accelerator pedal. <Ref. to SP(STI)-4, Accelerator Pedal.>	Repair the short circuit to ground in harness between ECM connector and accelerator pedal position sensor connector. Replace the ECM if defective. <Ref. to FU(STI)-59, Engine Control Module (ECM).> <Ref. to FU(w/o STI)-57, Engine Control Module (ECM).>

EU:DTC P2128 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT HIGH INPUT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-261, DTC P2128 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

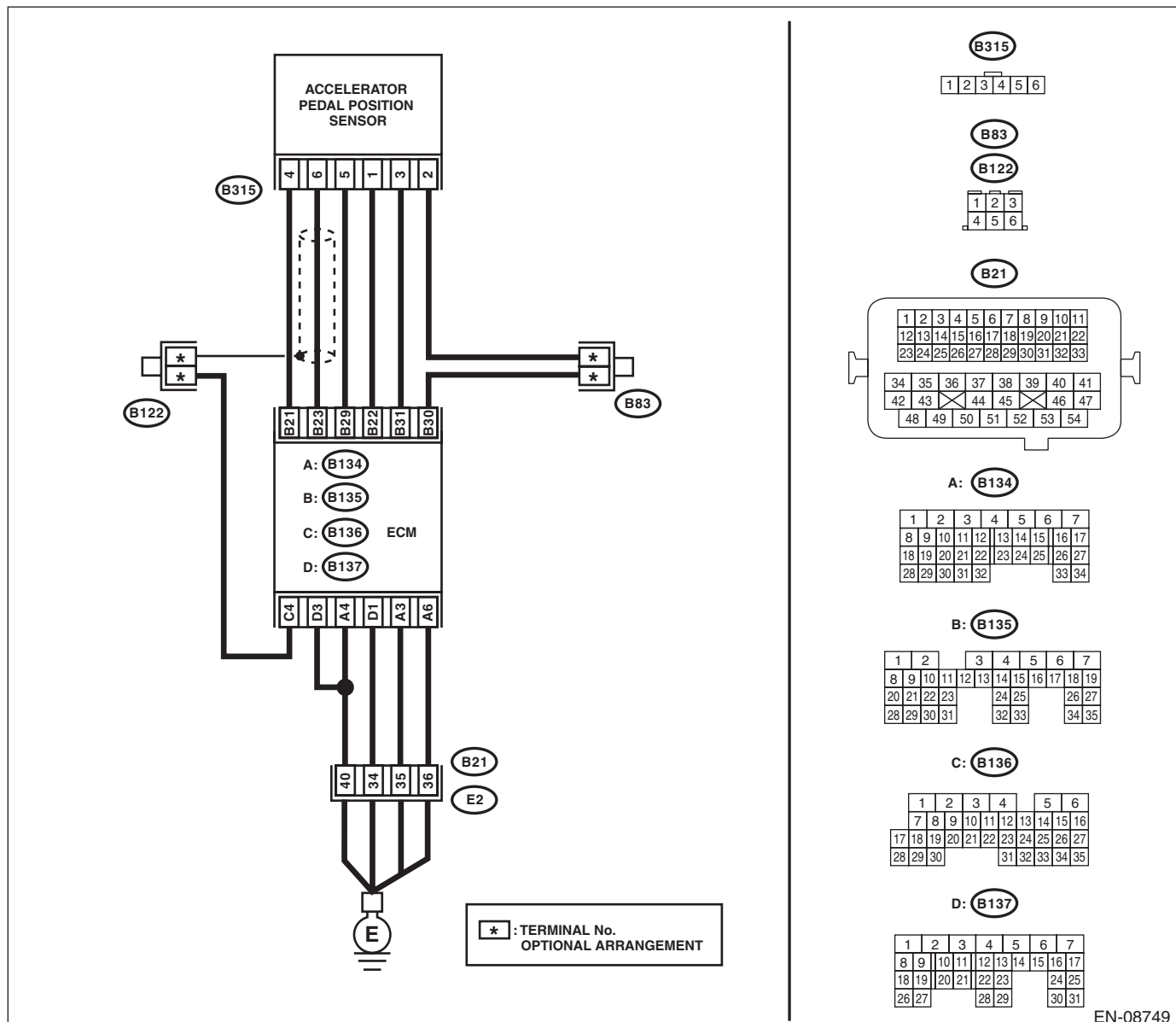
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08749

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and accelerator pedal position sensor. 3) Measure the resistance of harness between ECM connector and accelerator pedal position sensor connector. Connector & terminal (B135) No. 31 — (B315) No. 3: (B135) No. 30 — (B315) No. 2:	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 connector and accelerator pedal position sensor connector • Poor contact of joint connector
2 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR. 1) Connect the connector to ECM. 2) Measure the resistance between accelerator pedal position sensor connector and chassis ground. Connector & terminal (B315) No. 2 — Chassis ground:	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 ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR. 1) Turn the ignition switch to ON. 2) Measure the voltage between accelerator pedal position sensor connector and chassis ground. Connector & terminal (B315) No. 3 (+) — Chassis ground (-):	Is the voltage 5 V or more?	Repair the short circuit to power supply in harness between ECM connector and accelerator pedal position sensor connector.	Go to step 4.
4 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. Connector & terminal (B135) No. 22 — (B135) No. 31:	Is the resistance 1 M Ω or more?	Repair the poor contact of accelerator pedal position sensor connector. Replace the accelerator pedal if defective. <Ref. to SP(STI)-4, Accelerator Pedal.>	Repair the short circuit to power supply in harness between ECM connector and accelerator pedal position sensor connector.

EV:DTC P2135 THROTTLE/PEDAL POSITION SENSOR/SWITCH “A”/“B” VOLTAGE CORRELATION**DTC DETECTING CONDITION:**

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-263, DTC P2135 THROTTLE/PEDAL POSITION SENSOR/SWITCH “A”/“B” VOLTAGE CORRELATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

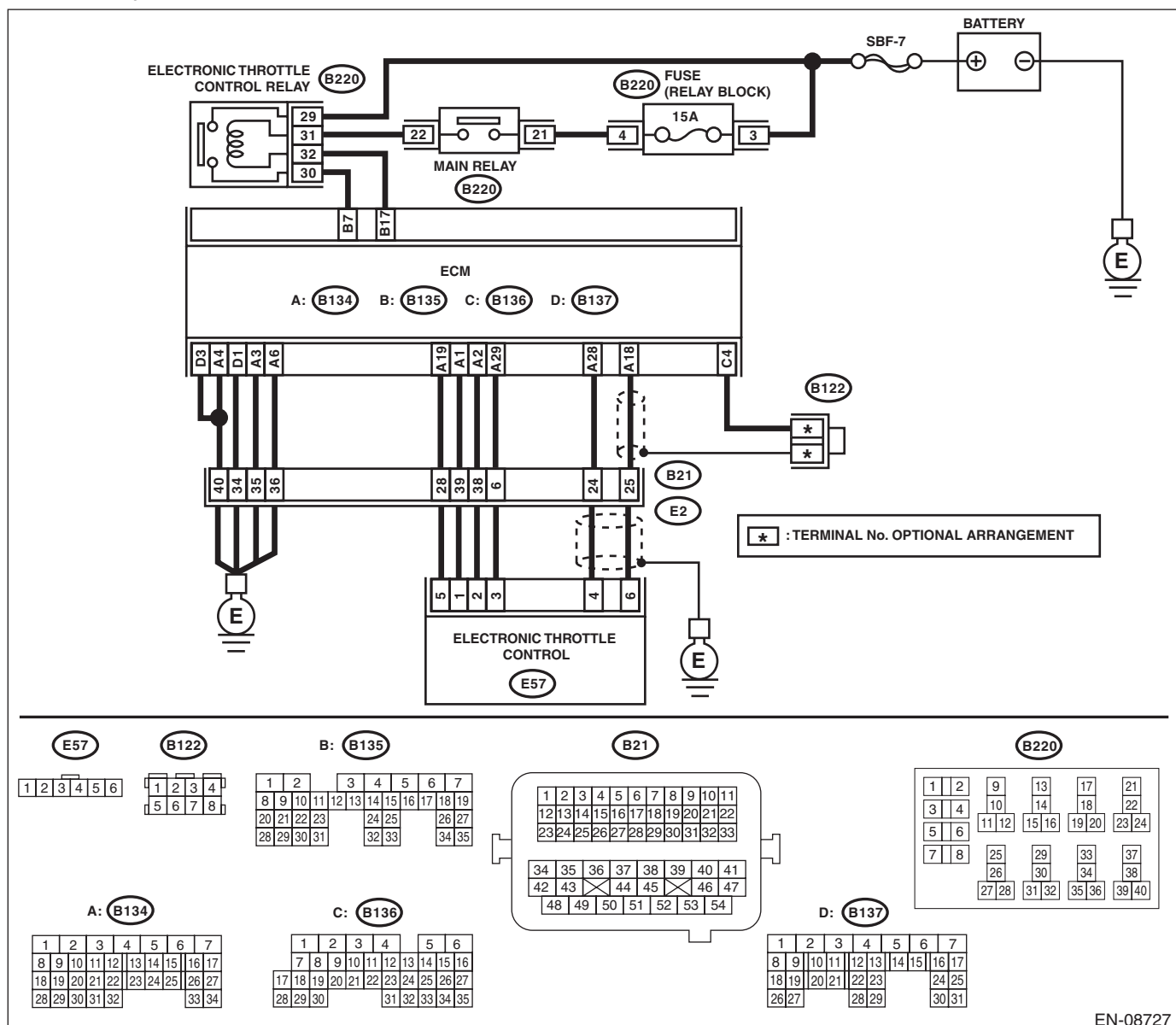
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and electronic throttle control. 3) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B134) No. 19 — Chassis ground: (B134) No. 18 — Chassis ground: (B134) No. 18 — (B136) No. 4: (B134) No. 28 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 2.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector.
2 CHECK SHORT CIRCUIT INSIDE THE ECM. 1) Connect the connector to ECM. 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 1 MΩ or more?	Go to step 3.	Repair the ground short circuit of harness between ECM connector and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(STI)-59, Engine Control Module (ECM).> <Ref. to FU(w/o STI)-57, Engine Control Module (ECM).>
3 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM connector and electronic throttle control connector. Connector & terminal (B134) No. 18 — (E57) No. 6: (B134) No. 28 — (E57) No. 4: (B134) No. 29 — (E57) No. 3:	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 connector and electronic throttle control connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Connect the connector to ECM. 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 harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to ON. 2) 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 5 V or more?	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.	Go to step 6.
6 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM connectors. Connector & terminal (B134) No. 19 — (B134) No. 18: (B134) No. 19 — (B134) No. 28:	Is the resistance 1 MΩ or more?	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(STI)-15, Throttle Body.> <Ref. to FU(w/o STI)-15, Throttle Body.>	Repair the short circuit to power in the harness between ECM connector and electronic throttle control connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-265, DTC P2138 THROTTLE/PEDAL POSITION SENSOR/SWITCH “D”/“E” VOLTAGE CORRELATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

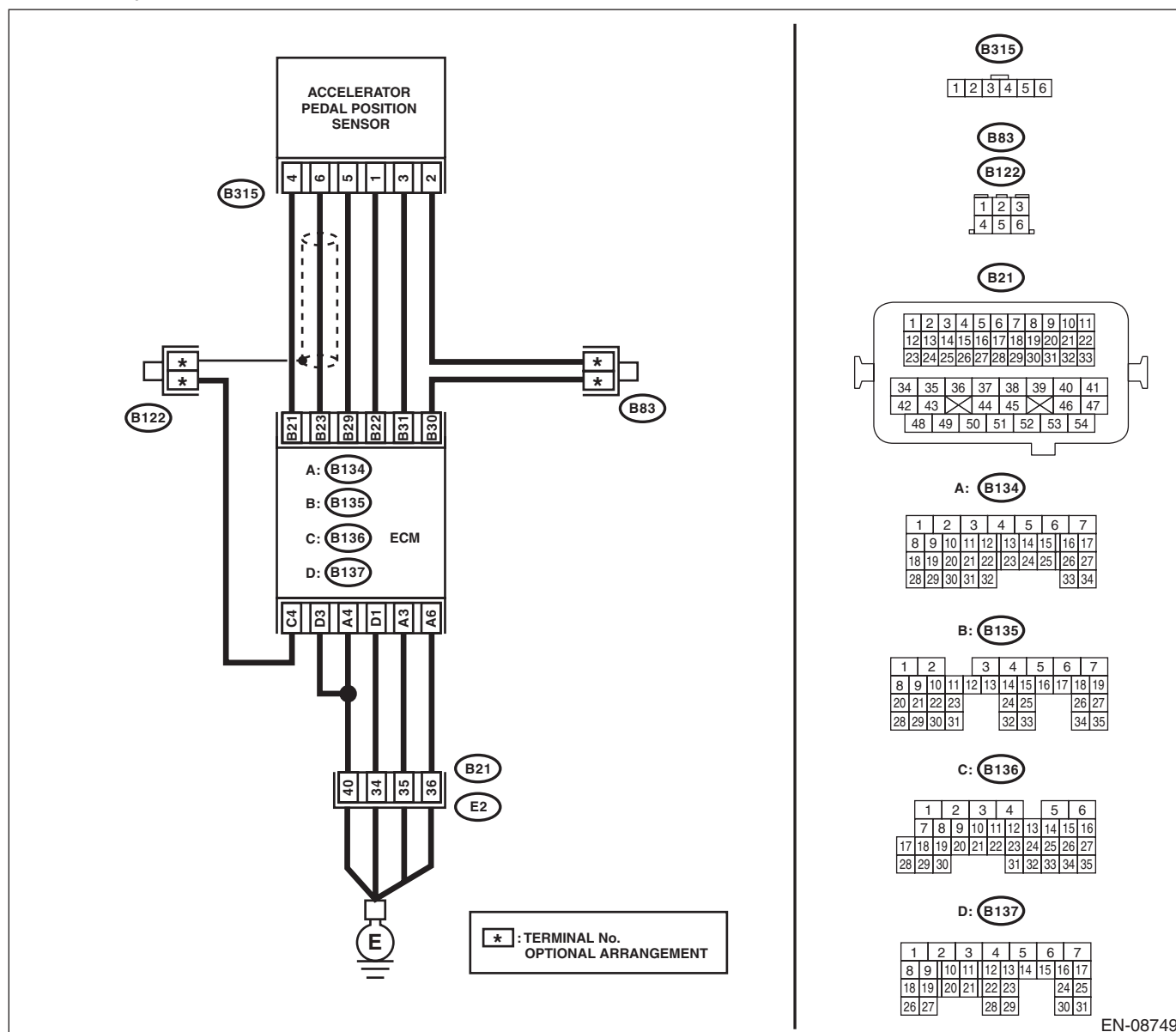
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08749

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) Measure the voltage between ECM connector and chassis ground. Connector & terminal Main accelerator pedal position sensor signal (B135) No. 23 (+) — Chassis ground (-): Sub accelerator pedal position sensor signal (B135) No. 31 (+) — Chassis ground (-):	Is the difference in measured values for the main accelerator pedal position sensor signal and the sub accelerator pedal position sensor signal 0 V?	Go to step 3.	Go to step 2.
2 CHECK ACCELERATOR PEDAL POSITION SENSOR OUTPUT. 1) Measure the voltage between accelerator pedal position sensor connector and chassis ground. Connector & terminal (B315) No. 6 (+) — Chassis ground (-): (B315) No. 3 (+) — Chassis ground (-):	Is the difference in measured values for the main accelerator pedal position sensor signal and the sub accelerator pedal position sensor signal 0 V?	Replace the accelerator pedal. <Ref. to SP(STI)-4, Accelerator Pedal.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and accelerator pedal position sensor connector • Short circuit to ground in harness between ECM connector and accelerator pedal position sensor connector
3 CHECK HARNESS BETWEEN ECM AND ACCELERATOR PEDAL POSITION SENSOR CONNECTOR. Measure the resistance of harness between accelerator pedal position sensor connector and chassis ground. Connector & terminal (B315) No. 5 — Chassis ground: (B315) No. 2 — Chassis ground:	Is the resistance less than 5 Ω ?	Repair the poor contact of ECM connector.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM connector and accelerator pedal position sensor connector • Open circuit of harness between ECM connector and engine ground • Poor contact of ECM connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

EX:DTC P2195 O2 SENSOR SIGNAL BIASED/STUCK LEAN (BANK 1 SENSOR 1)

DTC DETECTING CONDITION:

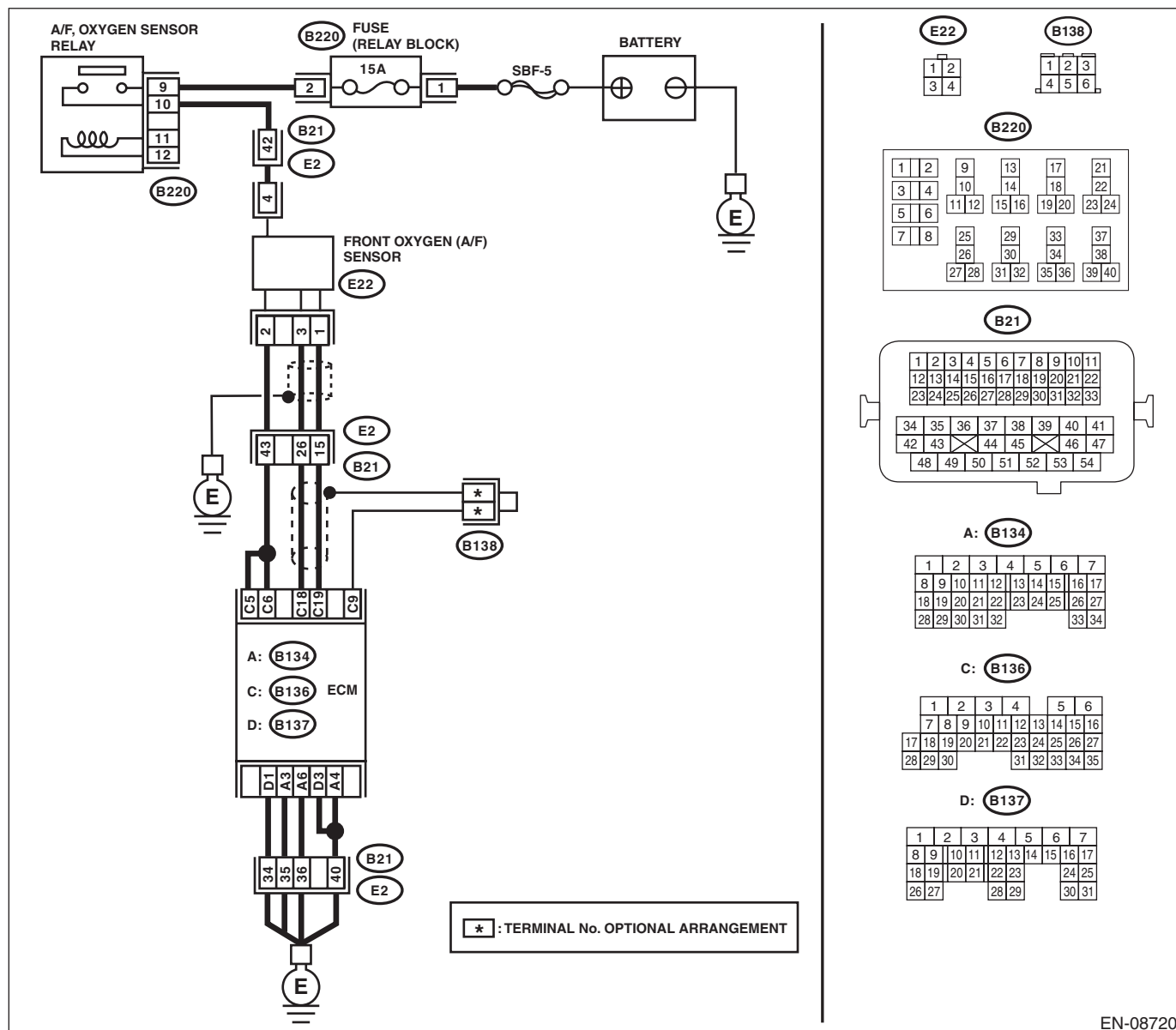
- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-267, DTC P2195 O2 SENSOR SIGNAL BIASED/STUCK LEAN (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>

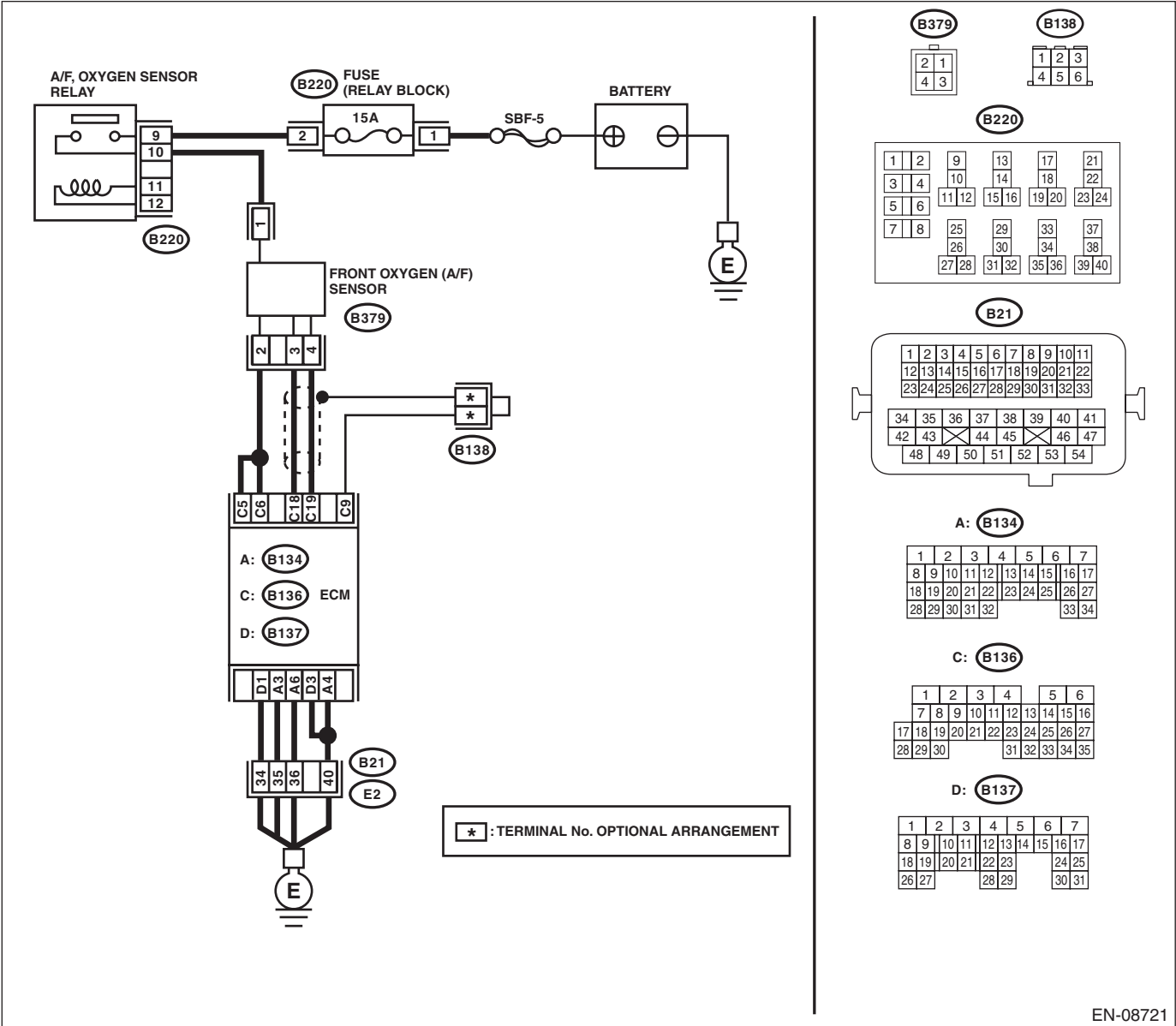


EN-08720

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08721

Step	Check	Yes	No
1	CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.	Has water entered the connector?	Completely remove any water inside.
			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 and front oxygen (A/F) sensor. 3) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. Connector & terminal Models without SI-DRIVE (B136) No. 19 — (E22) No. 1: (B136) No. 18 — (E22) No. 3: Models with SI-DRIVE (B136) No. 19 — (B379) No. 4: (B136) No. 18 — (B379) No. 3:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit of harness between ECM connector and front oxygen (A/F) sensor connector.
3 CHECK FOR POOR CONTACT. Check for poor contact of the front oxygen (A/F) sensor connector.	Is there poor contact of front oxygen (A/F) sensor connector?	Repair the poor contact of front oxygen (A/F) sensor connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(STI)-54, Front Oxygen (A/F) Sensor.> <Ref. to FU(w/o STI)-53, Front Oxygen (A/F) Sensor.>

EY:DTC P2196 O2 SENSOR SIGNAL BIASED/STUCK RICH (BANK 1 SENSOR 1)

DTC DETECTING CONDITION:

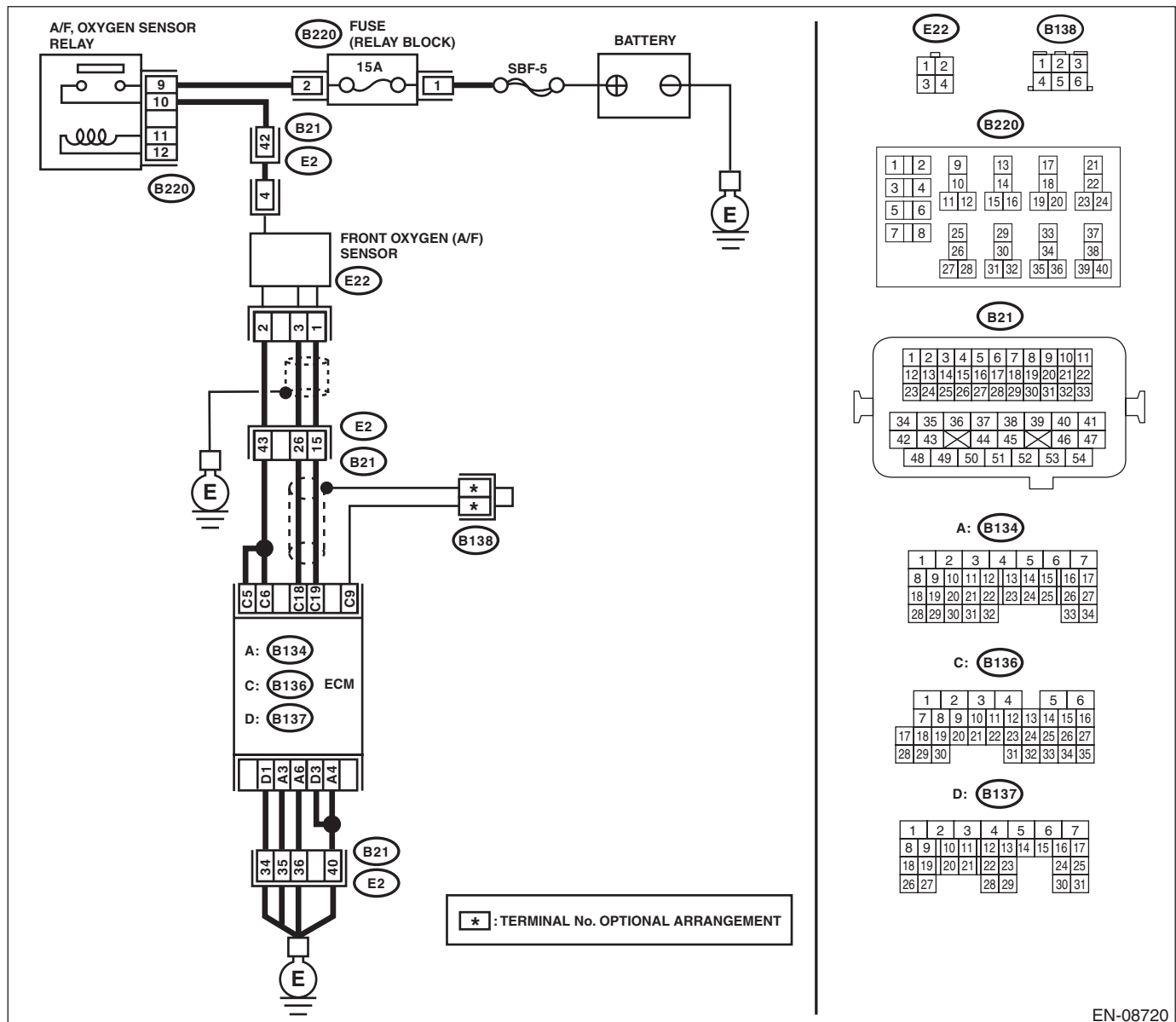
- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-269, DTC P2196 O2 SENSOR SIGNAL BIASED/STUCK RICH (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>

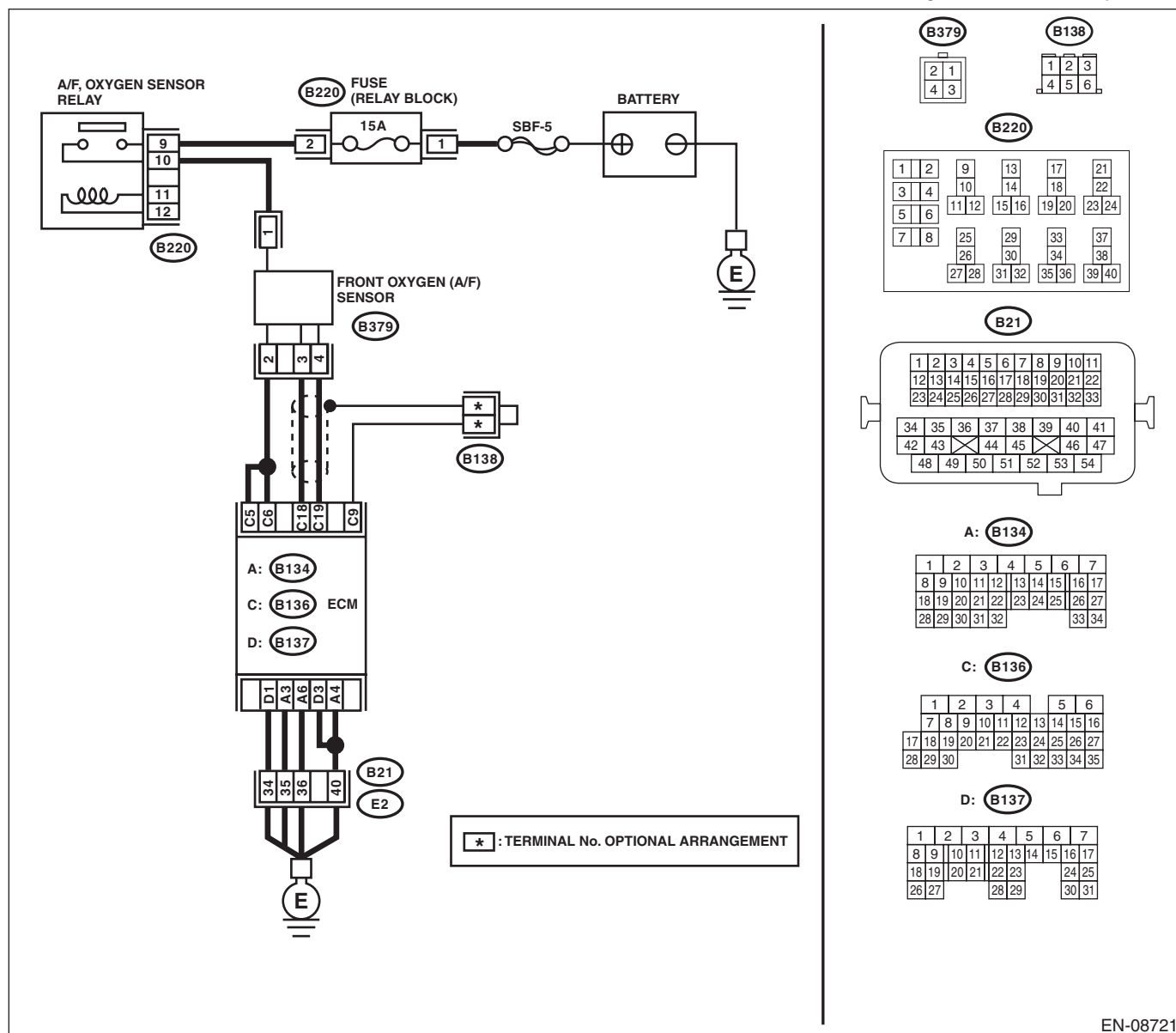


EN-08720

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08721

Step	Check	Yes	No
1	CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.	Has water entered the connector?	Completely remove any water inside.
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. 3) Measure the resistance between ECM connector and chassis ground. Connector & terminal (B136) No. 19 — Chassis ground: (B136) No. 18 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.
			Repair the short circuit to ground in harness between ECM connector and front oxygen (A/F) sensor connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
3 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 (B136) No. 19 (+) — Chassis ground (-):	Is the voltage 4.5 V or more?	Go to step 5.	Go to step 4.
4 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 18 (+) — Chassis ground (-):	Is the voltage 4.95 V or more?	Go to step 5.	Replace the front oxygen (A/F) sensor. <Ref. to FU(STI)-54, Front Oxygen (A/F) Sensor.> <Ref. to FU(w/o STI)-53, Front Oxygen (A/F) Sensor.>
5 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 19 (+) — Chassis ground (-): (B136) No. 18 (+) — Chassis ground (-):	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(STI)-59, Engine Control Module (ECM).> <Ref. to FU(w/o STI)-57, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

EZ:DTC P219A BANK 1 AIR-FUEL RATIO IMBALANCE

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-271, DTC P219A BANK 1 AIR-FUEL RATIO IMBALANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

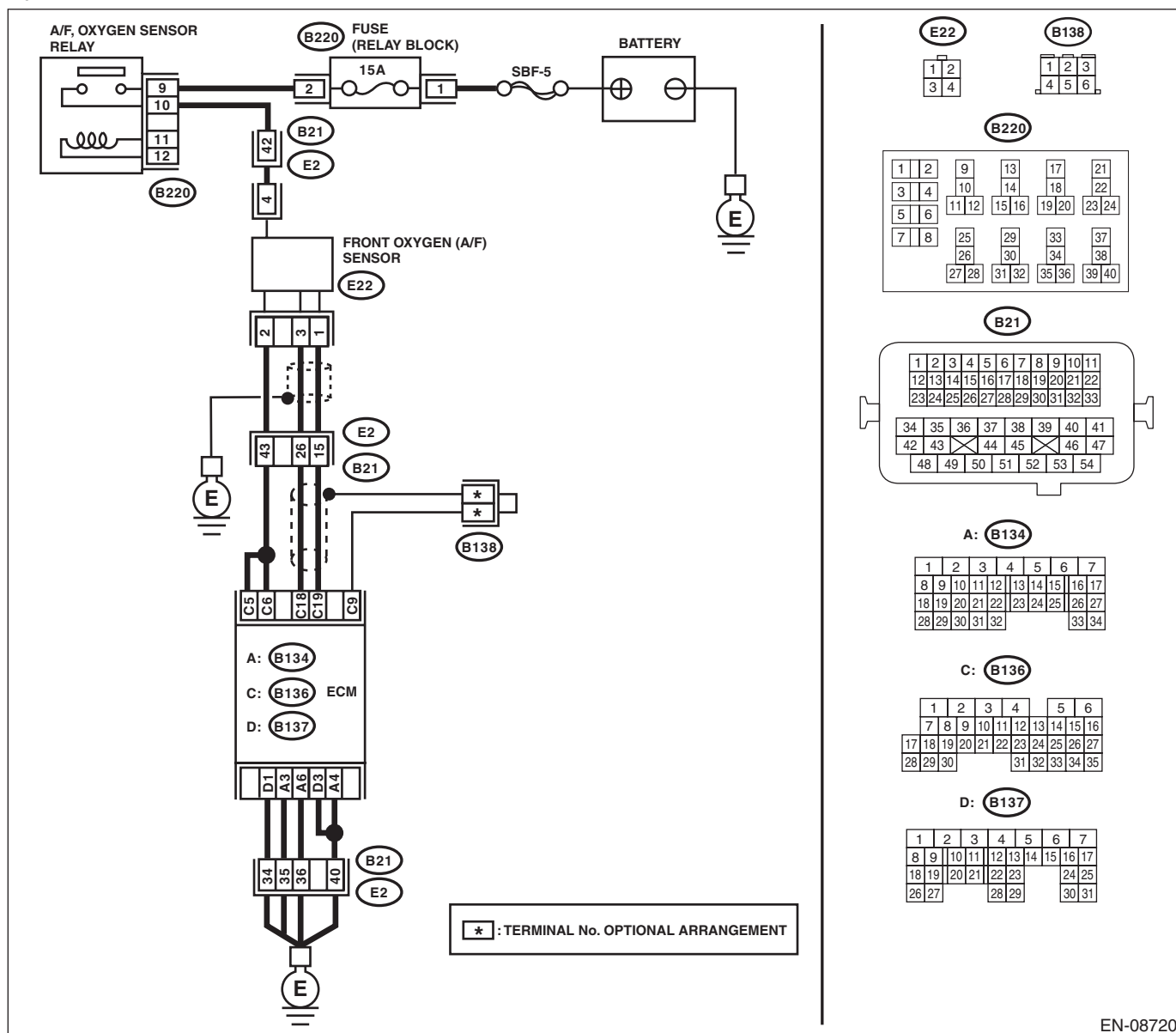
- Engine stalls.
- Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

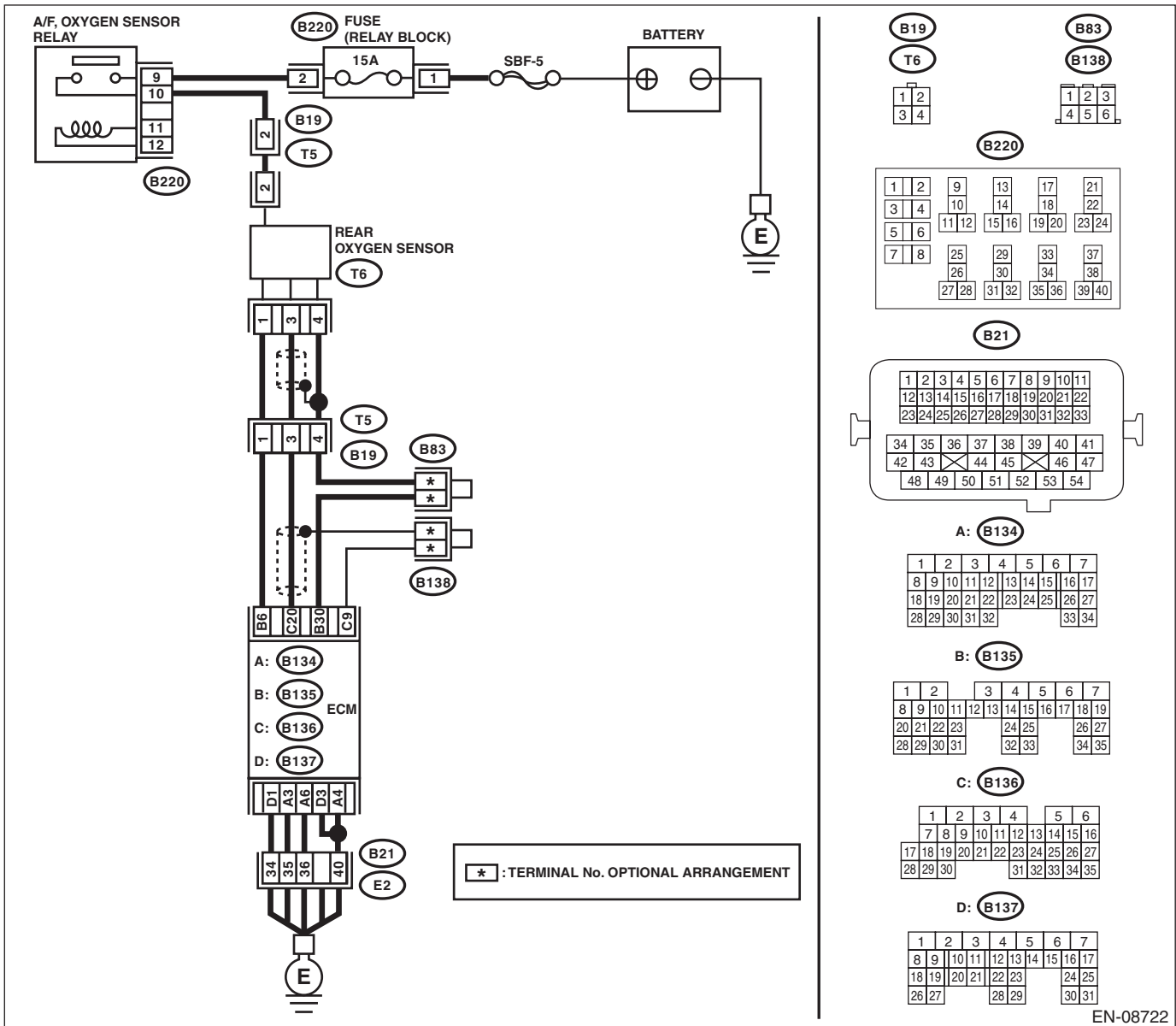
- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08720

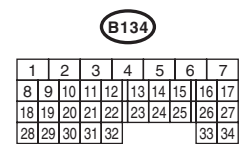
Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)



EN-08722

ENGINE (DIAGNOSTICS)

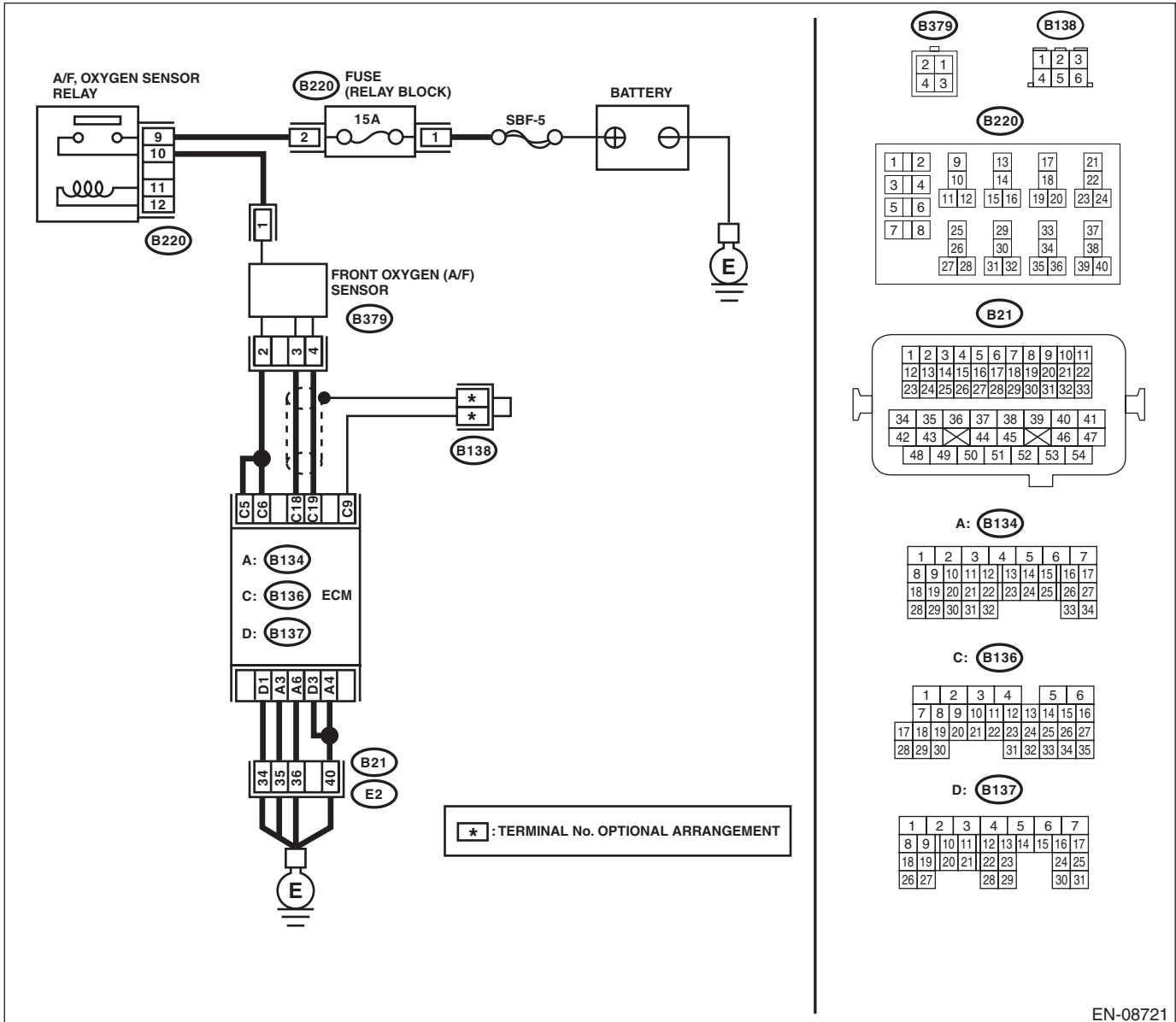


EN(H4DOTC)(diag)-402

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

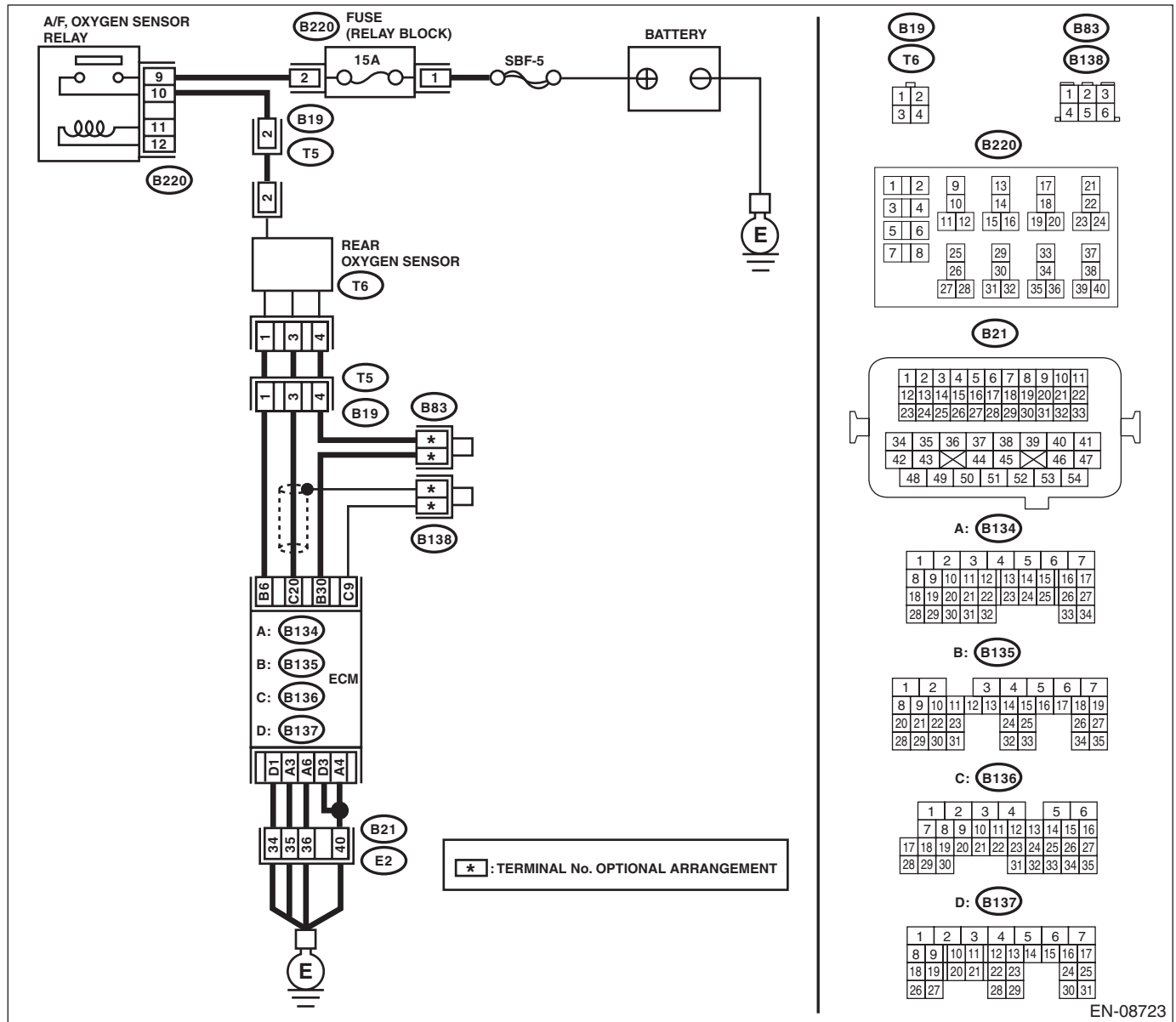
- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08721

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

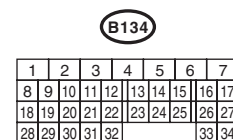
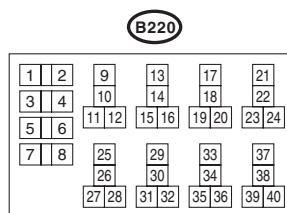
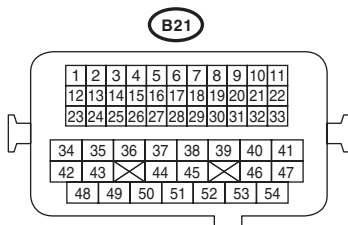
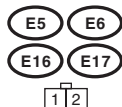
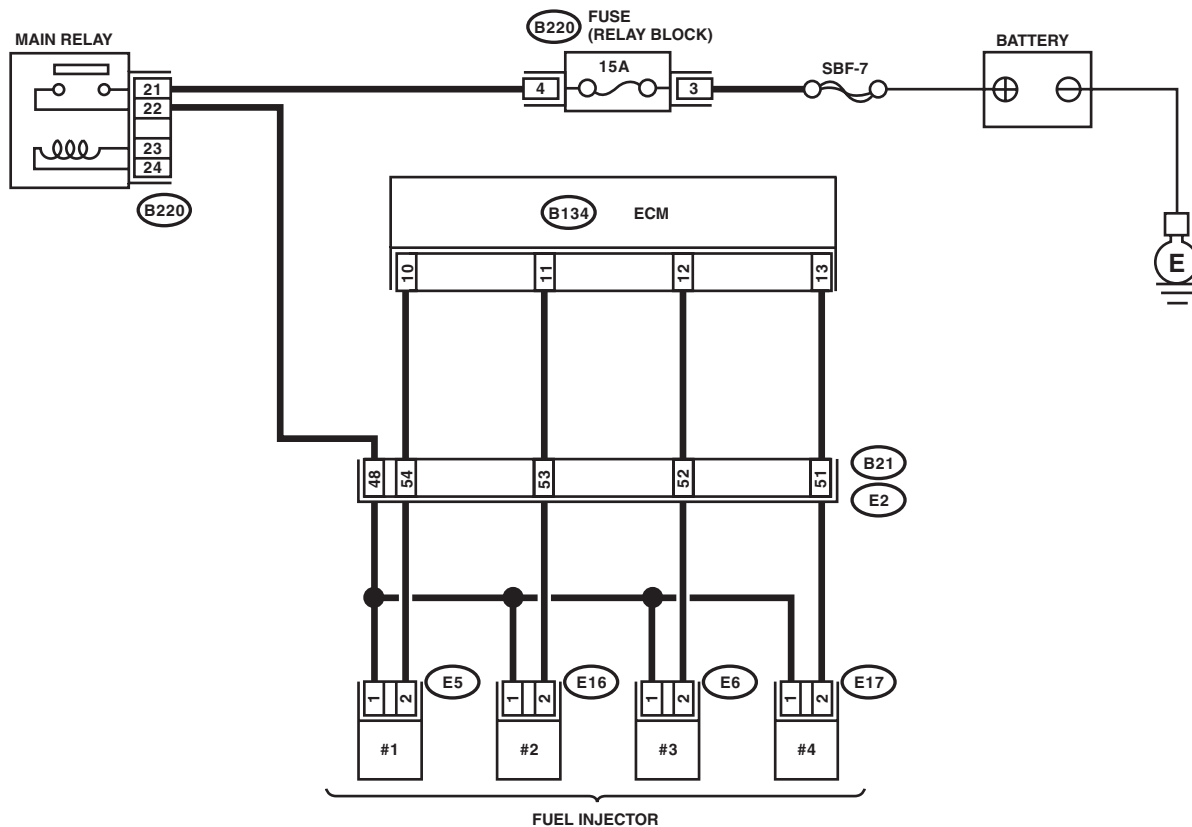
ENGINE (DIAGNOSTICS)



EN-08723

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)



EN-08718

Step	Check	Yes	No
1	CHECK FRONT OXYGEN (A/F) SENSOR CONNECTOR AND COUPLING CONNECTOR.	Has water entered the connector?	Completely remove any water inside.
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 and front oxygen (A/F) sensor. 3) Measure the resistance of harness between ECM connector and front oxygen (A/F) sensor connector. Connector & terminal Models without SI-DRIVE (B136) No. 19 — (E22) No. 1: (B136) No. 18 — (E22) No. 3: Models with SI-DRIVE (B136) No. 19 — (B379) No. 4: (B136) No. 18 — (B379) No. 3:	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 connector and front oxygen (A/F) sensor connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
3 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B136) No. 19 — Chassis ground: (B136) No. 18 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 4.	Repair the short circuit to ground in harness between ECM connector and front oxygen (A/F) sensor connector.
4 CHECK OUTPUT SIGNAL FOR ECM. 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. Connector & terminal Models without SI-DRIVE (E22) No. 1 (+) — Chassis ground (-): Models with SI-DRIVE (B379) No. 4 (+) — Chassis ground (-):	Is the voltage 4.5 V or more?	Go to step 6.	Go to step 5.
5 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. Connector & terminal Models without SI-DRIVE (E22) No. 3 (+) — Chassis ground (-): Models with SI-DRIVE (B379) No. 3 (+) — Chassis ground (-):	Is the voltage 4.95 V or more?	Go to step 6.	Go to step 7.
6 CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. Connector & terminal Models without SI-DRIVE (E22) No. 3 (+) — Chassis ground (-): (E22) No. 1 (+) — Chassis ground (-): Models with SI-DRIVE (B379) No. 3 (+) — Chassis ground (-): (B379) No. 4 (+) — Chassis ground (-):	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM connector and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(STI)-59, Engine Control Module (ECM).> <Ref. to FU(w/o STI)-57, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.
7 CHECK EXHAUST SYSTEM.	Are there holes or loose bolts on exhaust system?	Repair the exhaust system.	Go to step 8.
8 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 9.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
9 CHECK FUEL PRESSURE. WARNING: Place "NO OPEN FLAMES" signs near the working area. CAUTION: Be careful not to spill fuel. 1) Connect the front oxygen (A/F) sensor connector. 2) Measure the fuel pressure while disconnecting pressure regulator vacuum hose from intake manifold. <Ref. to ME(STI)-25, INSPECTION, Fuel Pressure.> <Ref. to ME(w/o STI)-24, INSPECTION, Fuel Pressure.> CAUTION: Release fuel pressure before removing the fuel pressure gauge. NOTE: If fuel pressure does not increase, squeeze the fuel return hose 2 to 3 times, then measure fuel pressure again.	Is the measured value 284 — 314 kPa (2.9 — 3.2 kg/cm ² , 41 — 46 psi)?	Go to step 10.	Check the fuel pump and fuel delivery line. • Models without SI-DRIVE <Ref. to FU(w/o STI)-79, INSPECTION, Fuel Pump.> <Ref. to FU(w/o STI)-93, INSPECTION, Fuel Delivery, Return and Evaporation Lines.> • Models with SI-DRIVE <Ref. to FU(STI)-81, INSPECTION, Fuel Pump.> <Ref. to FU(STI)-97, INSPECTION, Fuel Delivery, Return and Evaporation Lines.>
10 CHECK FUEL PRESSURE. After connecting the pressure regulator vacuum hose, measure fuel pressure. <Ref. to ME(STI)-25, INSPECTION, Fuel Pressure.> <Ref. to ME(w/o STI)-24, INSPECTION, Fuel Pressure.> CAUTION: Release fuel pressure before removing the fuel pressure gauge. NOTE: • If fuel pressure does not increase, squeeze fuel return hose 2 to 3 times, then measure fuel pressure again. • If the measured value at this step is out of specification, check or replace pressure regulator vacuum hose.	Is the measured value 230 — 260 kPa (2.4 — 2.7 kg/cm ² , 33 — 38 psi)?	Go to step 11.	Check the fuel pump and fuel delivery line. • Models without SI-DRIVE <Ref. to FU(w/o STI)-79, INSPECTION, Fuel Pump.> <Ref. to FU(w/o STI)-93, INSPECTION, Fuel Delivery, Return and Evaporation Lines.> • Models with SI-DRIVE <Ref. to FU(STI)-81, INSPECTION, Fuel Pump.> <Ref. to FU(STI)-97, INSPECTION, Fuel Delivery, Return and Evaporation Lines.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
11 CHECK ENGINE COOLANT TEMPERATURE SENSOR. 1) Start the engine and warm up completely. 2) Read the value of «Coolant Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» 75°C (167°F) or more?	Go to step 12.	Replace the engine coolant temperature sensor. <Ref. to FU(STI)-34, Engine Coolant Temperature Sensor.> <Ref. to FU(w/o STI)-34, Engine Coolant Temperature Sensor.>
12 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°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 value of «Mass Air Flow» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Mass Air Flow» 2.0 — 5.0 g/s (0.26 — 0.66 lb/m)?	Go to step 13.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(STI)-42, Mass Air Flow and Intake Air Temperature Sensor.> <Ref. to FU(w/o STI)-42, Mass Air Flow and Intake Air Temperature Sensor.>
13 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°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 value of «Intake Air Temp.» using the Subaru Select Monitor or a general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedures, refer to “READ CURRENT DATA FOR ENGINE”. <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Subtract ambient temperature from «Intake Air Temp.». Is the obtained value -10 — 50°C (-18 — 90°F)?	Go to step 14.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(STI)-42, Mass Air Flow and Intake Air Temperature Sensor.> <Ref. to FU(w/o STI)-42, Mass Air Flow and Intake Air Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
14 CHECK REAR OXYGEN SENSOR DATA. 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and keep the engine speed at 3,000 rpm. (2 minutes maximum) 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: - Depress the clutch pedal. - Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.490 V or more?	Go to step 15.	Go to step 16.
15 CHECK REAR OXYGEN SENSOR DATA. 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), and rapidly reduce the engine speed from 3,000 rpm. 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: - Depress the clutch pedal. - Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Rear O2 Sensor» 0.250 V or less?	Go to step 17.	Go to step 16.
16 CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.	Has water entered the connector?	Completely remove any water inside.	Go to step 18.
17 CHECK FRONT OXYGEN (A/F) SENSOR USING REAR OXYGEN SENSOR SIGNAL. 1) Warm up the engine until engine coolant temperature is higher than 75°C (167°F), then keep the engine idling for 5 minutes or more. 2) Read the value of «Rear O2 Sensor» using the Subaru Select Monitor or a general scan tool. NOTE: - Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.> - General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value in «Rear O2 Sensor» kept at 0.250 V or less for 5 minutes or more?	Replace the front oxygen (A/F) sensor. <Ref. to FU(STI)-54, Front Oxygen (A/F) Sensor.> <Ref. to FU(w/o STI)-53, Front Oxygen (A/F) Sensor.>	Go to step 18.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
18 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 connector and rear oxygen sensor connector. Connector & terminal (B136) No. 20 — (T6) No. 3: (B135) No. 30 — (T6) No. 4:	Is the resistance less than 1 Ω ?	Go to step 19.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and rear oxygen sensor connector • Poor contact of coupling connector
19 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between rear oxygen sensor connector and chassis ground. Connector & terminal (T6) No. 3 (+) — Chassis ground (–):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(STI)-56, Rear Oxygen Sensor.> <Ref. to FU(w/o STI)-55, Rear Oxygen Sensor.>	Go to step 20.
20 CHECK OUTPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground on faulty cylinders. Connector & terminal #1 (B134) No. 10 (+) — Chassis ground (–): #2 (B134) No. 11 (+) — Chassis ground (–): #3 (B134) No. 12 (+) — Chassis ground (–): #4 (B134) No. 13 (+) — Chassis ground (–):	Is the voltage 10 V or more?	Go to step 25.	Go to step 21.
21 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector on faulty cylinders. 3) Measure the resistance between fuel injector connector 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 resistance 1 M Ω or more?	Go to step 22.	Repair the short circuit to ground in harness between ECM connector and fuel injector connector.
22 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. Measure the resistance of harness between ECM and fuel injector connector on faulty cylinders. Connector & terminal #1 (B134) No. 10 — (E5) No. 2: #2 (B134) No. 11 — (E16) No. 2: #3 (B134) No. 12 — (E6) No. 2: #4 (B134) No. 13 — (E17) No. 2:	Is the resistance less than 1 Ω ?	Go to step 23.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and fuel injector connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
23 CHECK FUEL INJECTOR. Measure the resistance between fuel injector terminals on faulty cylinder. Terminals No. 1 — No. 2:	Is the resistance 5 — 20 Ω ?	Go to step 24.	Replace the faulty fuel injector. <Ref. to FU(STI)-45, Fuel Injector.> <Ref. to FU(w/o STI)-45, Fuel Injector.>
24 CHECK POWER SUPPLY LINE. 1) Turn the ignition switch to ON. 2) Measure the voltage between fuel injector connector of faulty cylinders and engine ground. 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 voltage 10 V or more?	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 the main relay and fuel injector connector on faulty cylinders • Poor contact of coupling connector • Poor contact of main relay connector
25 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR 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 and chassis ground on faulty cylinders. Connector & terminal #1 (B134) No. 10 (+) — Chassis ground (-): #2 (B134) No. 11 (+) — Chassis ground (-): #3 (B134) No. 12 (+) — Chassis ground (-): #4 (B134) No. 13 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and fuel injector connectors.	Go to step 26.
26 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 5 — 20 Ω ?	Go to step 27.	Replace the faulty fuel injector. <Ref. to FU(STI)-45, Fuel Injector.> <Ref. to FU(w/o STI)-45, Fuel Injector.>
27 CHECK INSTALLATION CONDITION 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. <Ref. to FU(STI)-37, Camshaft Position Sensor.> <Ref. to FU(STI)-35, Crankshaft Position Sensor.> <Ref. to FU(w/o STI)-37, Camshaft Position Sensor.> <Ref. to FU(w/o STI)-35, Crankshaft Position Sensor.>	Go to step 28.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
28 CHECK CRANK SPROCKET. Remove the timing belt cover. <Ref. to ME(STI)-49, REMOVAL, Timing Belt Cover.> <Ref. to ME(w/o STI)-47, REMOVAL, Timing Belt Cover.>	Is the crank sprocket rusted or does it have broken teeth?	Replace the crank sprocket. <Ref. to ME(STI)-60, Crank Sprocket.> <Ref. to ME(w/o STI)-58, Crank Sprocket.>	Go to step 29.
29 CHECK INSTALLATION CONDITION OF TIMING BELT. Turn the crankshaft using ST, and align the alignment mark on crank sprocket with alignment mark on cylinder block. ST 499987500 CRANKSHAFT SOCKET	Is the timing belt dislocated from its proper position?	Repair the installation condition of timing belt. <Ref. to ME(STI)-50, Timing Belt.> <Ref. to ME(w/o STI)-48, Timing Belt.>	Go to step 30.
30 CHECK FUEL LEVEL.	Is the fuel meter indication higher than the "Lower" level?	Go to step 31.	Refill the fuel so that the fuel meter indication is higher than the "Lower" level, and proceed to the next step. Go to step 31.
31 CHECK STATUS OF MALFUNCTION INDICATOR LIGHT. 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DOTC)(diag)-63, Clear Memory Mode.> 2) Start the engine, and drive the vehicle 10 minutes or more.	Does the malfunction indicator light illuminate or blink?	Go to step 33.	Go to step 32.
32 CHECK CAUSE OF MISFIRE.	Was the cause of misfire identified when the engine is running?	Finish diagnostics operation, if the engine has no abnormality.	Repair the poor contact of connector. NOTE: In this case, repair the following item: • Poor contact of ignition coil connector • Poor contact of fuel injector connector on faulty cylinders • Poor contact of ECM connector • Poor contact of coupling connector
33 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 34.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
34 CHECK MISFIRE SYMPTOM. 1) Turn the ignition switch to ON. 2) Check for DTC. <Ref. to EN(H4DOTC)(diag)-48, Read Diagnostic Trouble Code (DTC).>	Does the Subaru Select Monitor or general scan tool indicate only one DTC?	Go to step 37 .	Go to step 35 .
35 CHECK DTC.	Is DTC P0301 and P0303 displayed on the Subaru Select Monitor or general scan tool?	Go to step 38 .	Go to step 36 .
36 CHECK DTC.	Is DTC P0302 and P0304 displayed on the Subaru Select Monitor or general scan tool?	Go to step 39 .	Go to step 40 .
37 ONLY ONE CYLINDER.	Is there any fault in the cylinder?	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Ignition coil • Fuel injector • Compression ratio	Go to DTC P0171. <Ref. to EN(H4DOTC)(diag)-170, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
38 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 • Ignition coil • Fuel injector • Compression ratio • Skipping timing belt teeth	Go to DTC P0171. <Ref. to EN(H4DOTC)(diag)-170, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
39 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 • Ignition coil • Fuel injector • Compression ratio • Skipping timing belt teeth	Go to DTC P0171. <Ref. to EN(H4DOTC)(diag)-170, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
40 CYLINDER AT RANDOM.	Is the engine idle rough?	Go to DTC P0171. <Ref. to EN(H4DOTC)(diag)-170, 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 • Ignition coil • Fuel injector • Compression ratio

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

FA:DTC P2257 AIR SYSTEM CONTROL "A" CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-274, DTC P2257 AIR SYSTEM CONTROL "A" CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

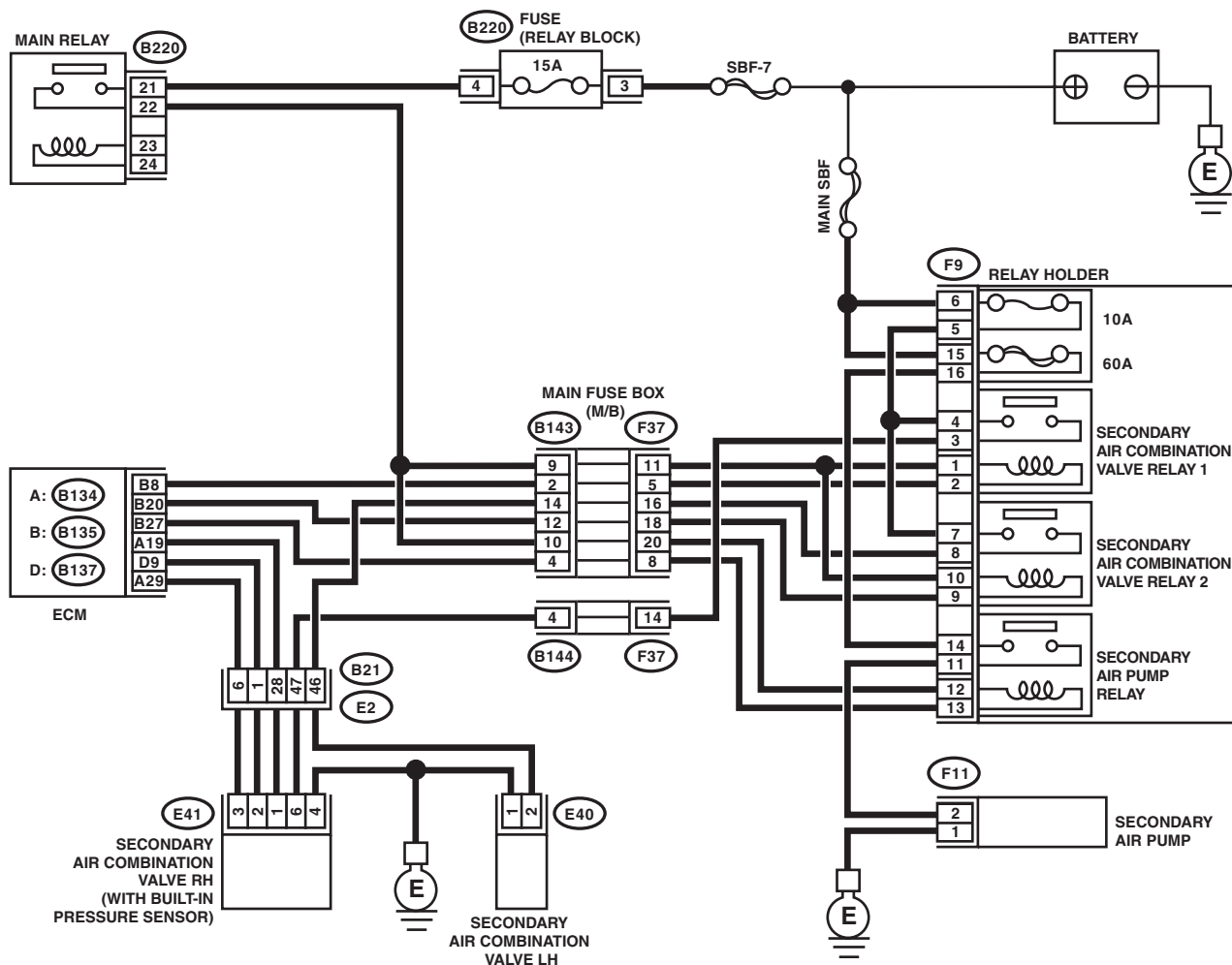
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

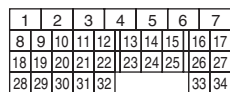
ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

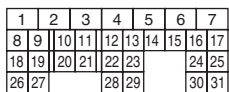
- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



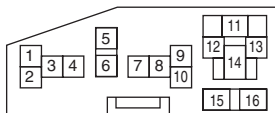
A: (B134)



D: (B137)



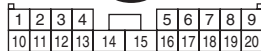
(F9)



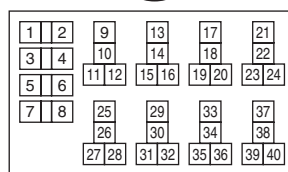
B: (B135)



(F37)



(B220)



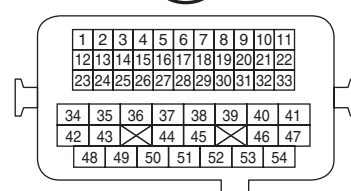
(B143)



(F11)



(B21)



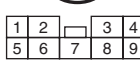
(E40)



(E41)



(B144)

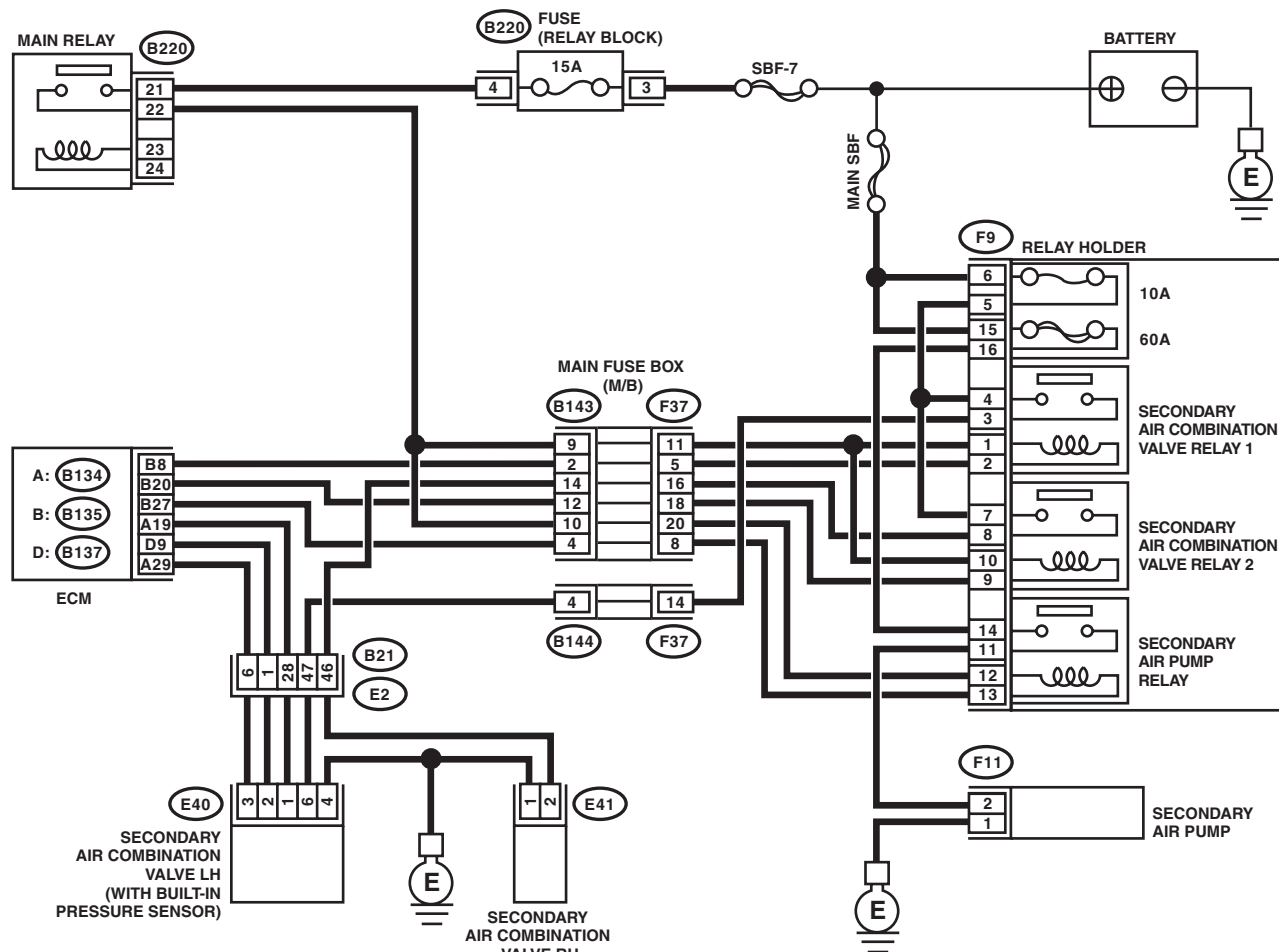


EN-08734

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



A: 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	

B: B135

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	35

B220

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	35	36	37	38	39	40

B21

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	35	36	37	38	39	40	41	42	43	44
45	46	47	48	49	50	51	52	53	54	

D: B137

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	

F9

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	35	36	37	38	39	40

F37

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	35	36

B143

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	35	36

F11

1	2

E41

1	2

E40

1	2	3
4	5	6

B144

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

EN-08735

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR PUMP RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Remove the secondary air pump relay. 4) Measure the resistance of harness between ECM connector and secondary air pump relay connector. Connector & terminal (B135) No. 27 — (F9) No. 13:	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 in harness between ECM connector and secondary air pump relay connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR PUMP RELAY CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B135) No. 27 — Chassis ground:	Is the resistance 1 MΩ or more?	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.	Repair the short circuit to ground in harness between ECM connector and secondary air pump relay connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

FB:DTC P2258 AIR SYSTEM CONTROL "A" CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-275, DTC P2258 AIR SYSTEM CONTROL "A" CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

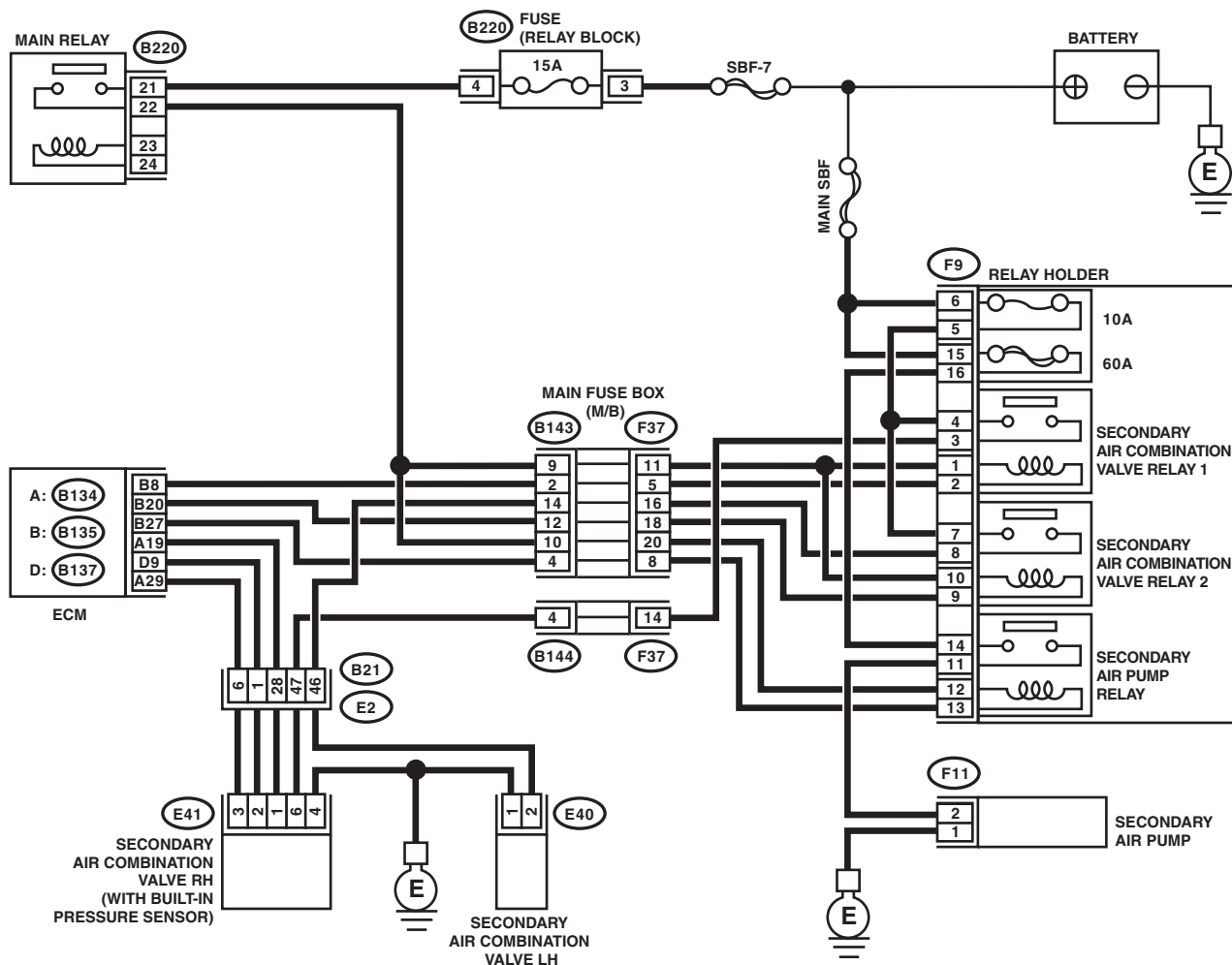
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



A: (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	

B: (B135)

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	35

(B220)

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	35	36	37	38	39	40	41	42	43	44
45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66

(B21)

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	35	36	37	38	39	40	41	42	43	44
45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66

D: (B137)

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	35

(F9)

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	35	36	37	38	39	40	41	42	43	44	45	46	47	48

(F37)

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	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60

(B143)

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	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60

(F11)

1	2
3	4

(E40)

1	2
3	4

(E41)

1	2	3
4	5	6

(B144)

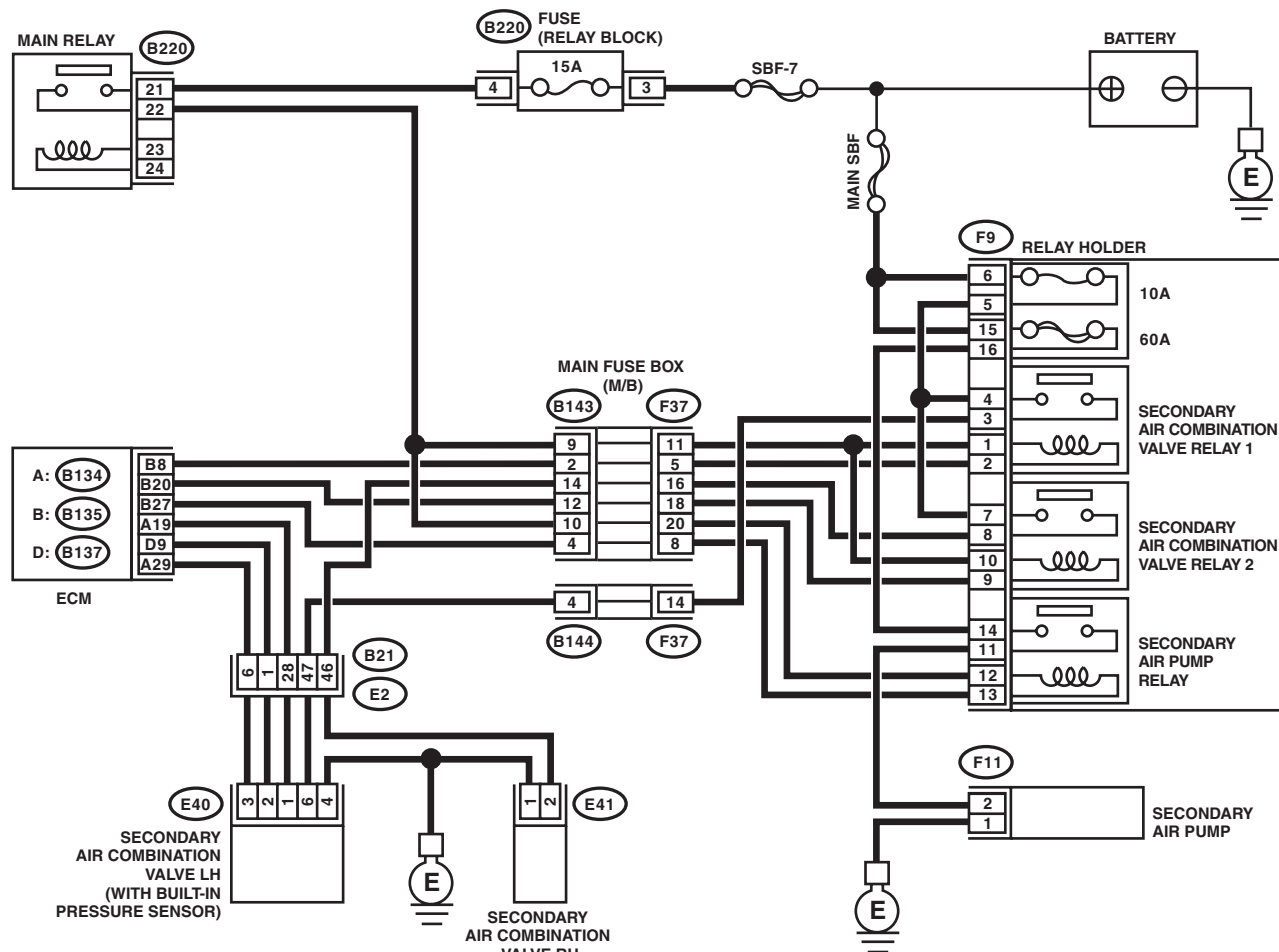
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5	6	7	8
9	10	11	12

EN-08734

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



A: 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	

B: B135

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	35

B220

1	2	9	13	17	21
3	4	10	14	18	22
5	6	11	12	15	16
7	8	19	20	23	24
		25	29	33	37
		26	30	34	38
		27	28	31	32
				35	36
				39	40

B21

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	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54												

D: B137

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	

F9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

F37

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	35	36

B143

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	35	36

F11

1	2

E41

1	2

E40

1	2	3
4	5	6

B144

1	2	3	4
5	6	7	8
9	10	11	12

EN-08735

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR PUMP RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Remove the secondary air pump relay. 4) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 27 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and secondary air pump relay connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

FC:DTC P2401 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:

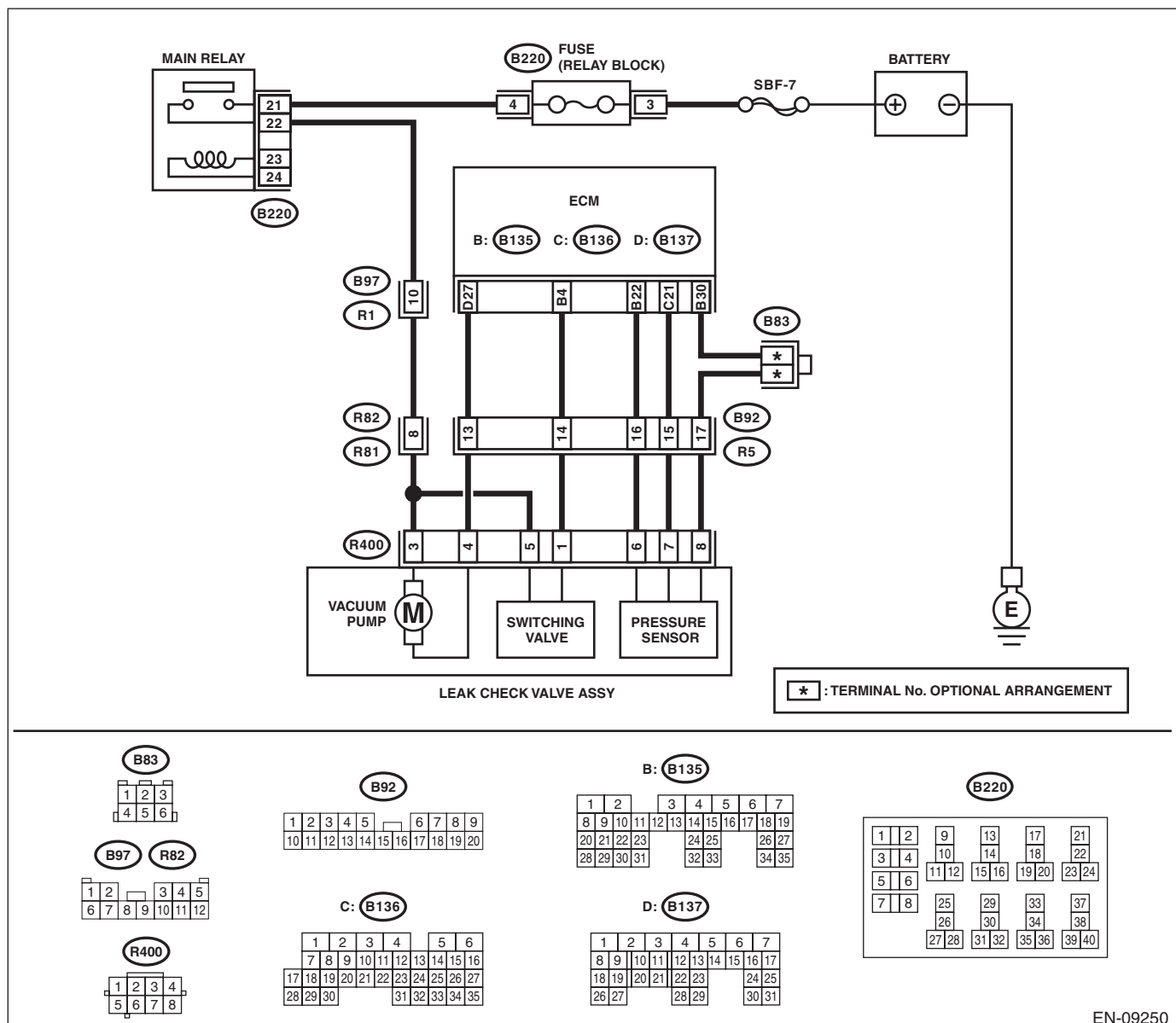
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-276, DTC P2401 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09250

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B137) No. 27 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 2.	Go to step 3.
2 CHECK FOR POOR CONTACT. Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary open or short circuit of harness or temporary poor contact of connector may be the cause.
3 CHECK POWER SUPPLY TO LEAK CHECK VALVE ASSEMBLY. Measure the voltage between the leak check valve assembly connector and engine ground. Connector & terminal (R400) No. 3 (+) — Engine ground (-):	Is the voltage 10 V or more?	Go to step 4.	Repair the power supply circuit.
4 CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and the leak check valve assembly. 3) Measure the resistance between leak check valve assembly and chassis ground. Connector & terminal (R400) No. 4 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM connector and leak check valve assembly connector.
5 CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR. Measure the resistance of harness between ECM connector and the leak check valve assembly connector. Connector & terminal (B137) No. 27 — (R400) No. 4:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the leak check valve assembly connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK LEAK CHECK VALVE ASSEMBLY. Check the vacuum pump of the leak check valve assembly. <Ref. to EC(STI)-21, CHECK VACUUM PUMP, INSPECTION, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-22, CHECK VACUUM PUMP, INSPECTION, Leak Check Valve Assembly.>	Is the vacuum pump of the leak check valve assembly OK?	Repair the poor contact in the leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(STI)-19, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-20, Leak Check Valve Assembly.>

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>

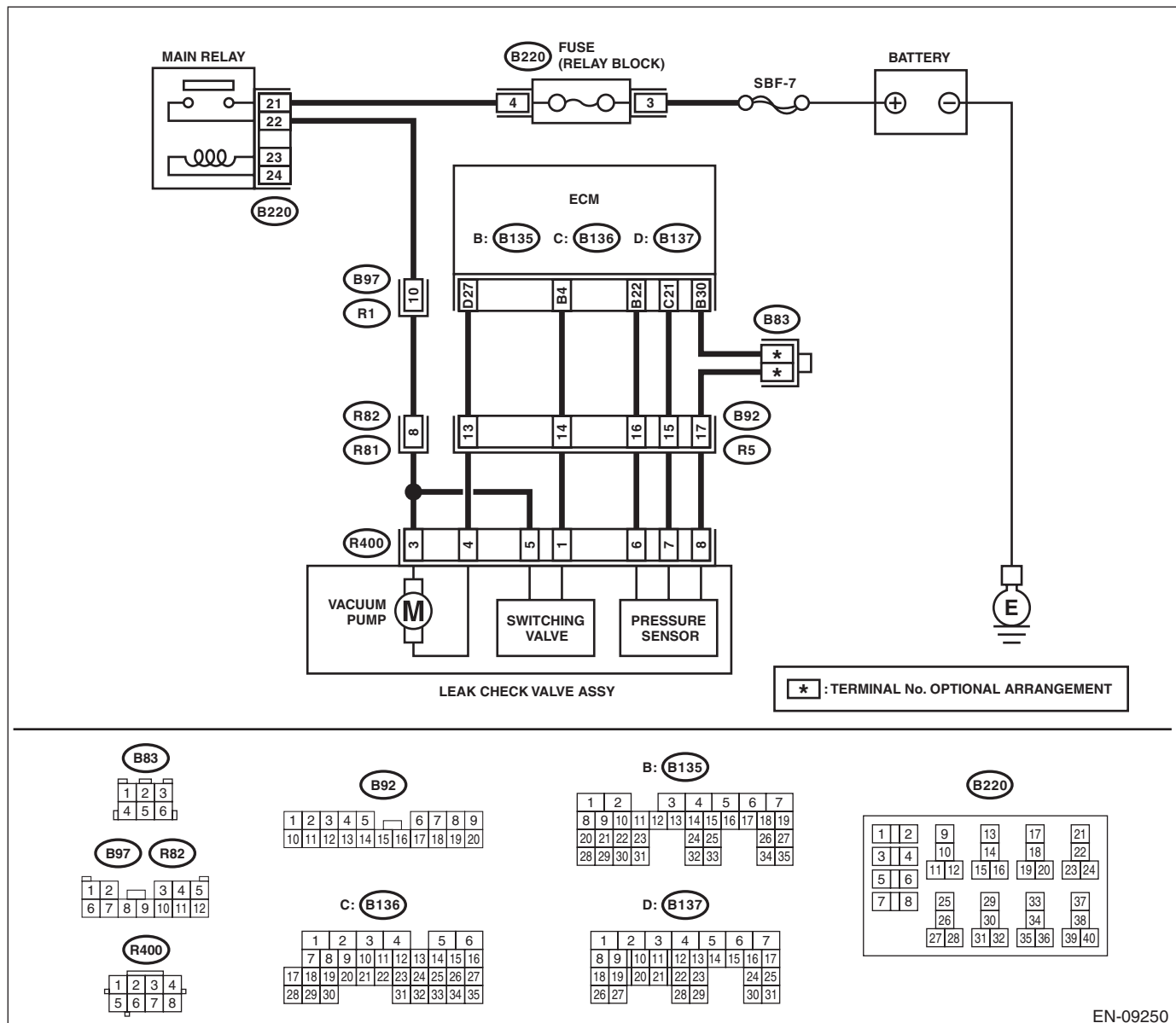


Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the leak check valve assembly. 3) Turn the ignition switch to ON. 4) Measure the voltage between leak check valve assembly and chassis ground. Connector & terminal (R400) No. 4 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and leak check valve assembly connector.	Go to step 2.
2 CHECK LEAK CHECK VALVE ASSEMBLY. 1) Turn the ignition switch to OFF. 2) Check the vacuum pump of the leak check valve assembly. <Ref. to EC(STI)-21, CHECK VACUUM PUMP, INSPECTION, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-22, CHECK VACUUM PUMP, INSPECTION, Leak Check Valve Assembly.>	Is the vacuum pump of the leak check valve assembly OK?	Repair the poor contact in the leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(STI)-19, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-20, Leak Check Valve Assembly.>

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK ELCM PUMP. Operate the ELCM pump using the Subaru Select Monitor. NOTE: Refer to "Compulsory Valve Operation Check Mode" for more operation procedures. <Ref. to EN(H4DOTC)(diag)-64, Compulsory Valve Operation Check Mode.>	Does the ELCM pump operate?	Go to step 6.	Go to step 3.
3 CHECK POWER SUPPLY OF LEAK CHECK VALVE ASSEMBLY. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the leak check valve assembly. 3) Turn the ignition switch to ON. 4) Measure the voltage between the leak check valve assembly connector and chassis ground. Connector & terminal (R400) No. 3 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 4.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between the main relay and the leak check valve assembly connector • Poor contact of main relay connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and the leak check valve assembly connector. Connector & terminal (B137) No. 27 — (R400) No. 4:	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 connector and the leak check valve assembly connector • Poor contact of coupling connector
5 CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR. 1) Measure the resistance of harness between ECM connector and chassis ground. Connector & terminal (B137) No. 27 — Chassis ground:	Is the resistance 1 M Ω or more?	Replace the leak check valve assembly. <Ref. to EC(STI)-19, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-20, Leak Check Valve Assembly.>	Repair the short circuit to ground in harness between ECM connector and leak check valve assembly connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK ELCM SWITCHING VALVE. Operate the ELCM switching valve using the Subaru Select Monitor. NOTE: Refer to "Compulsory Valve Operation Check Mode" for more operation procedures. <Ref. to EN(H4DOTC)(diag)-64, Compulsory Valve Operation Check Mode.>	Does the ELCM switching valve operate?	Go to step 10.	Go to step 7.
7 CHECK POWER SUPPLY OF LEAK CHECK VALVE ASSEMBLY. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the leak check valve assembly. 3) Turn the ignition switch to ON. 4) Measure the voltage between the leak check valve assembly connector and chassis ground. Connector & terminal (R400) No. 5 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 8.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between the main relay and the leak check valve assembly connector • Poor contact of main relay connector • Poor contact of coupling connector
8 CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and the leak check valve assembly connector. Connector & terminal (B135) No. 4 — (R400) No. 1:	Is the resistance less than 1 Ω ?	Go to step 9.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the leak check valve assembly connector • Poor contact of coupling connector
9 CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR. 1) Measure the resistance of harness between ECM connector and chassis ground. Connector & terminal (B135) No. 4 — Chassis ground:	Is the resistance 1 M Ω or more?	Replace the leak check valve assembly. <Ref. to EC(STI)-19, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-20, Leak Check Valve Assembly.>	Repair the short circuit to ground in harness between ECM connector and leak check valve assembly connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
10 CHECK EVAPORATIVE EMISSION CONTROL SYSTEM. Perform drive cycle I. <Ref. to EN(H4DOTC)(diag)-59, DRIVE CYCLE H, PROCEDURE, Drive Cycle.>	Is DTC P2404 displayed on the display?	Replace the leak check valve assembly. <Ref. to EC(STI)-19, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-20, Leak Check Valve Assembly.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

FF:DTC P2419 EVAPORATIVE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT LOW**DTC DETECTING CONDITION:**

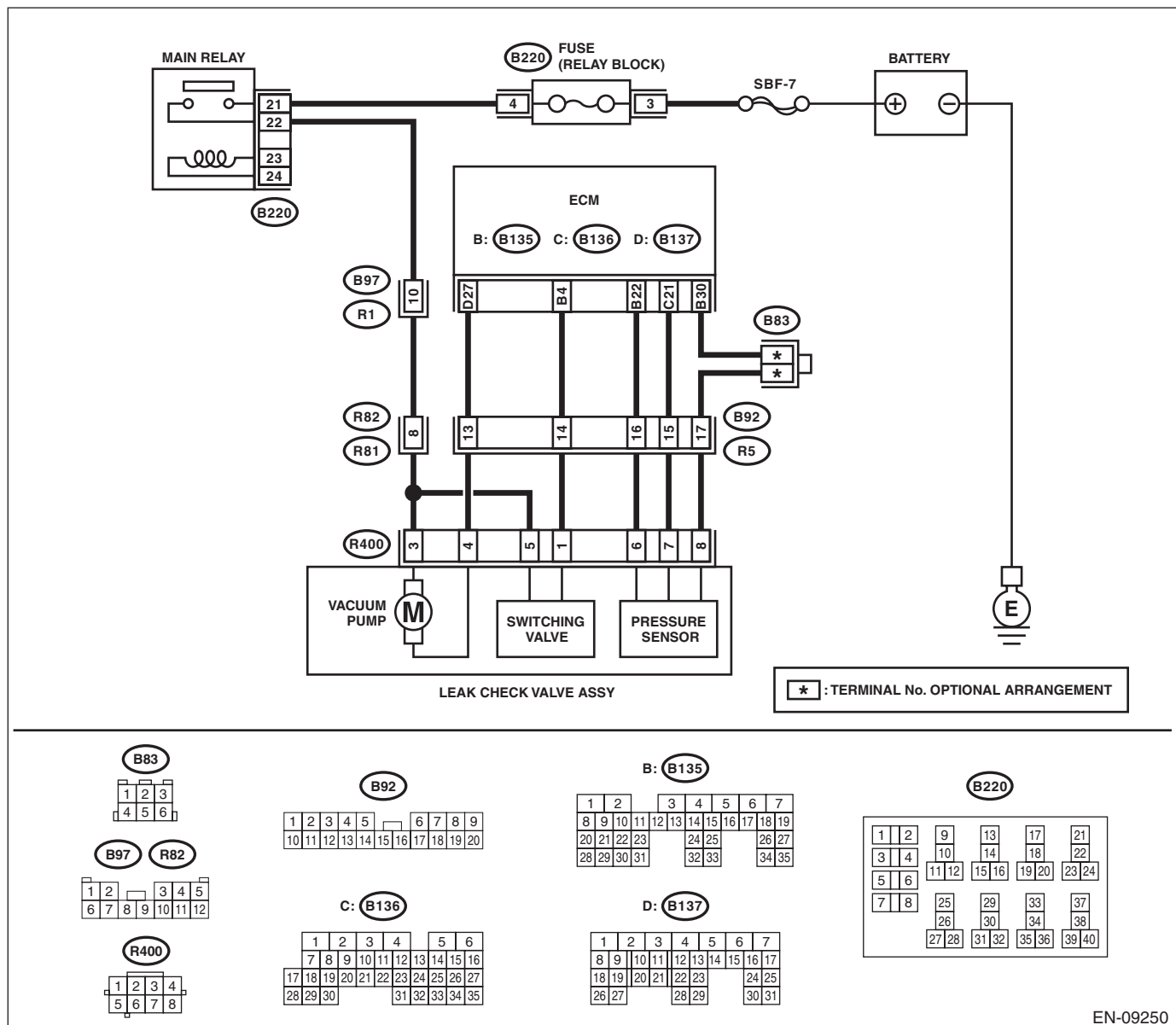
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-280, DTC P2419 EVAPORATIVE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-09250

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 4 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 2.	Go to step 3.
2 CHECK FOR POOR CONTACT. Check for poor contact of ECM connector.	Is there poor contact of ECM connector?	Repair the poor contact of ECM connector.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary open or short circuit of harness or temporary poor contact of connector may be the cause.
3 CHECK POWER SUPPLY TO LEAK CHECK VALVE ASSEMBLY. Measure the voltage between the leak check valve assembly connector and engine ground. Connector & terminal (R400) No. 5 (+) — Engine ground (-):	Is the voltage 10 V or more?	Go to step 4.	Repair the power supply circuit.
4 CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and the leak check valve assembly. 3) Measure the resistance between leak check valve assembly and chassis ground. Connector & terminal (R400) No. 1 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM connector and leak check valve assembly connector.
5 CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR. Measure the resistance of harness between ECM connector and the leak check valve assembly connector. Connector & terminal (B135) No. 4 — (R400) No. 1:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and the leak check valve assembly connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK LEAK CHECK VALVE ASSEMBLY. Check the switching valve of the leak check valve assembly. <Ref. to EC(STI)-20, CHECK SWITCHING VALVE, INSPECTION, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-21, CHECK SWITCHING VALVE, INSPECTION, Leak Check Valve Assembly.>	Is the switching valve of the leak check valve assembly OK?	Repair the poor contact in the leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(STI)-19, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-20, Leak Check Valve Assembly.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

FG:DTC P2420 EVAPORATIVE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:

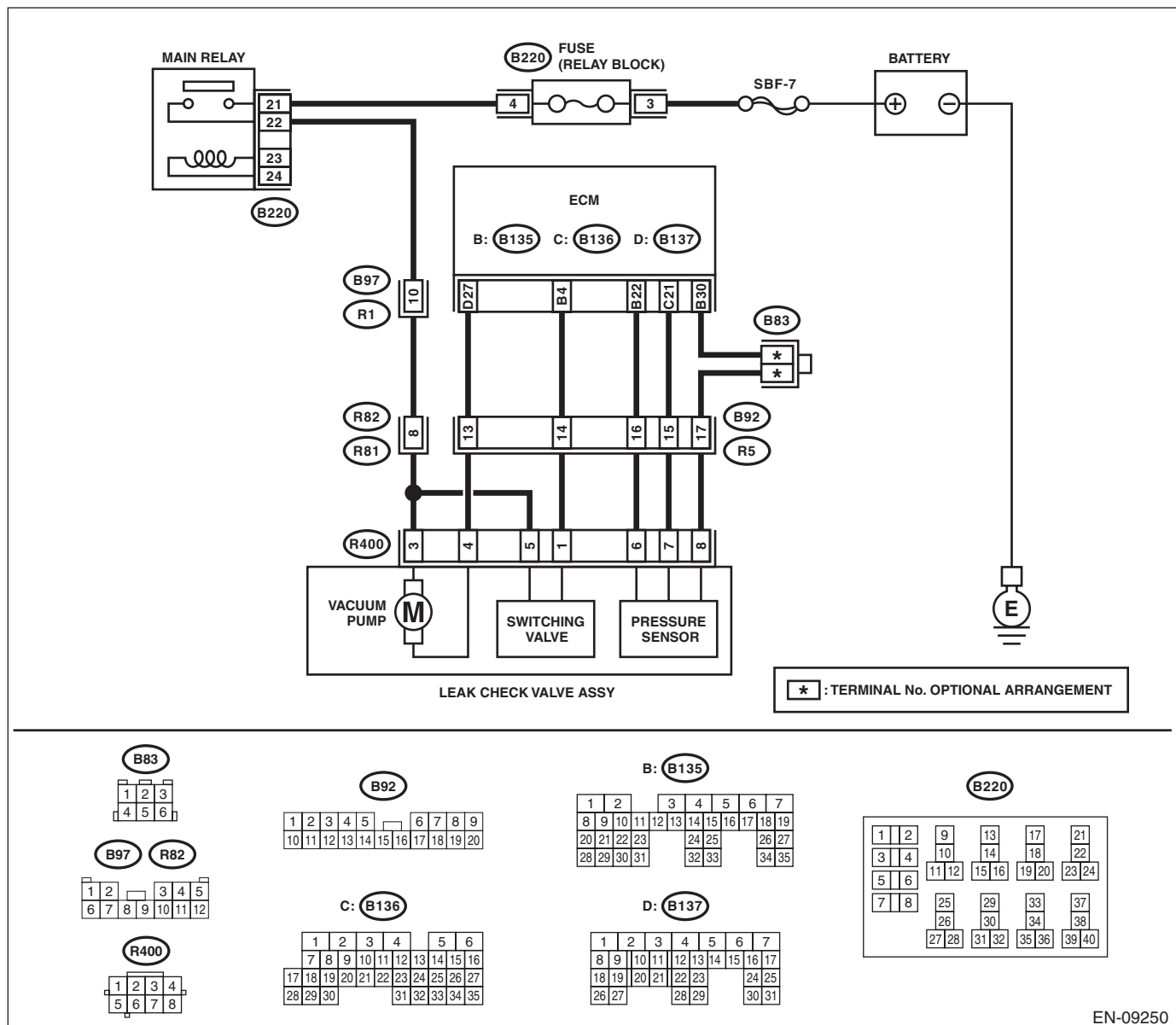
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-282, DTC P2420 EVAPORATIVE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the leak check valve assembly. 3) Turn the ignition switch to ON. 4) Measure the voltage between leak check valve assembly and chassis ground. Connector & terminal (R400) No. 1 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM connector and leak check valve assembly connector.	Go to step 2.
2 CHECK LEAK CHECK VALVE ASSEMBLY. 1) Turn the ignition switch to OFF. 2) Check the switching valve of the leak check valve assembly. <Ref. to EC(STI)-20, CHECK SWITCHING VALVE, INSPECTION, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-21, CHECK SWITCHING VALVE, INSPECTION, Leak Check Valve Assembly.>	Is the switching valve of the leak check valve assembly OK?	Repair the poor contact in the leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(STI)-19, Leak Check Valve Assembly.> <Ref. to EC(w/o STI)-20, Leak Check Valve Assembly.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

FH:DTC P2431 SECONDARY AIR INJECTION SYSTEM AIR FLOW /PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-284, DTC P2431 SECONDARY AIR INJECTION SYSTEM AIR FLOW /PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR 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(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK CURRENT DATA. 1) Turn the ignition switch to ON (engine OFF). 2) Using the Subaru Select Monitor, read the values in «Sec. Air Piping Pressure», «Mani. Absolute Pressure» and «Atmosphere Pressure», and compare them with actual atmospheric pressure. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Does the displayed value differ from the actual atmospheric pressure by 200 mmHg (27 kPa, 8 inHg, 3.9 psig) or more?	Replace the secondary air combination valve (with built-in pressure sensor). <Ref. to EC(STI)-29, Secondary Air Combination Valve.> <Ref. to EC(w/o STI)-30, Secondary Air Combination Valve.>	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

FI: DTC P2432 SECONDARY AIR INJECTION SYSTEM AIR FLOW /PRESSURE SENSOR CIRCUIT LOW

DTC DETECTING CONDITION:

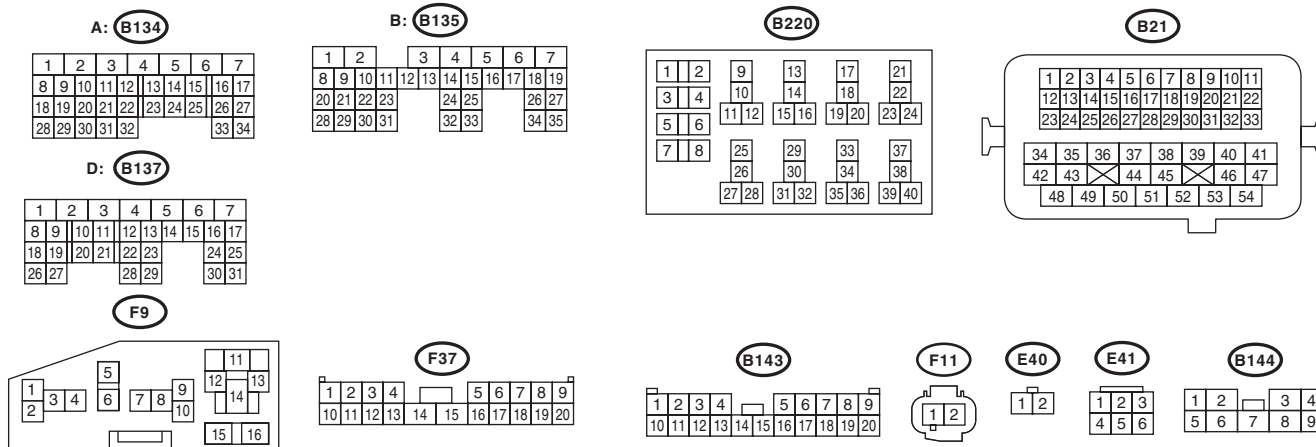
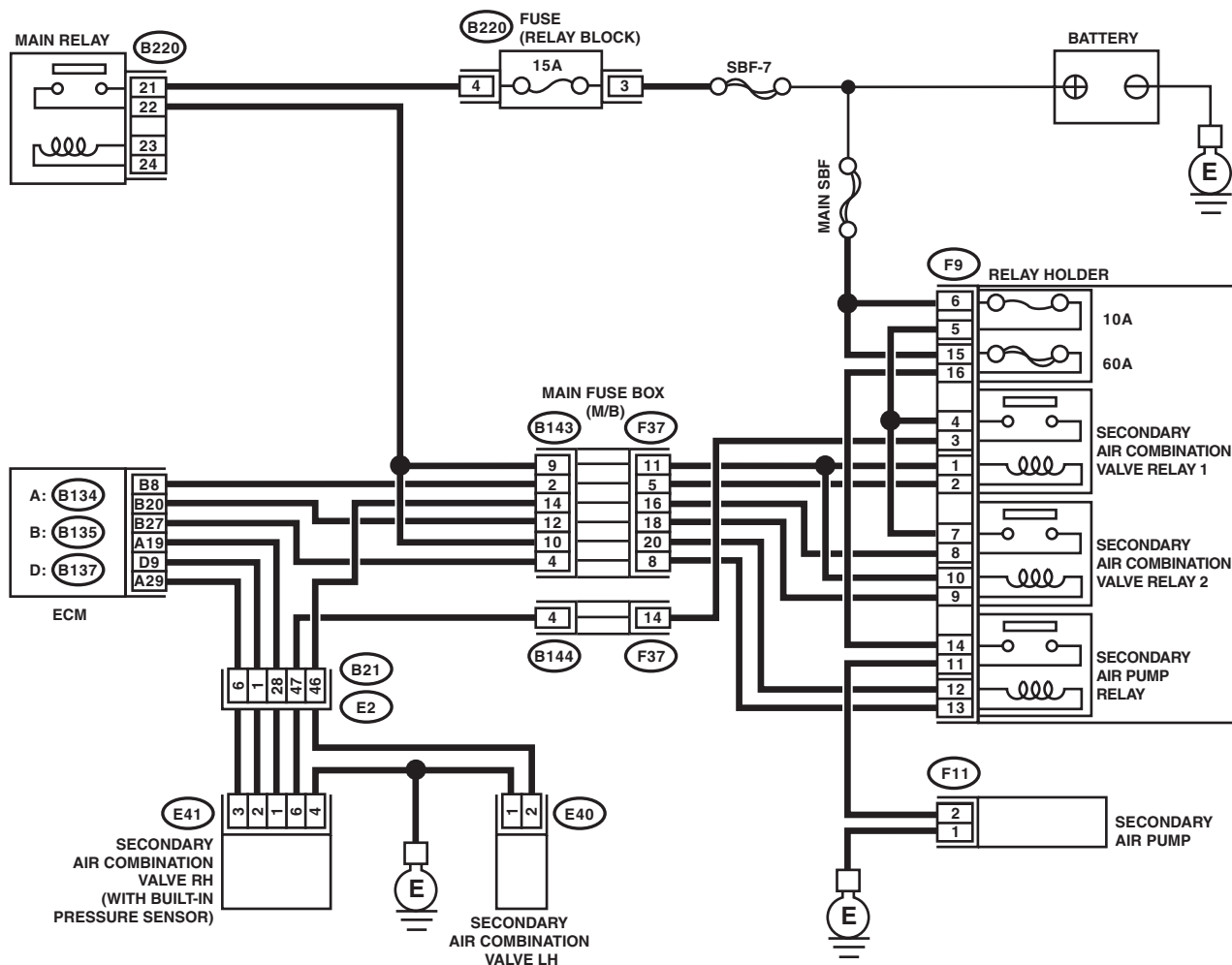
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-285, DTC P2432 SECONDARY AIR INJECTION SYSTEM AIR FLOW /PRESSURE SENSOR CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

ENGINE (DIAGNOSTICS)

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>

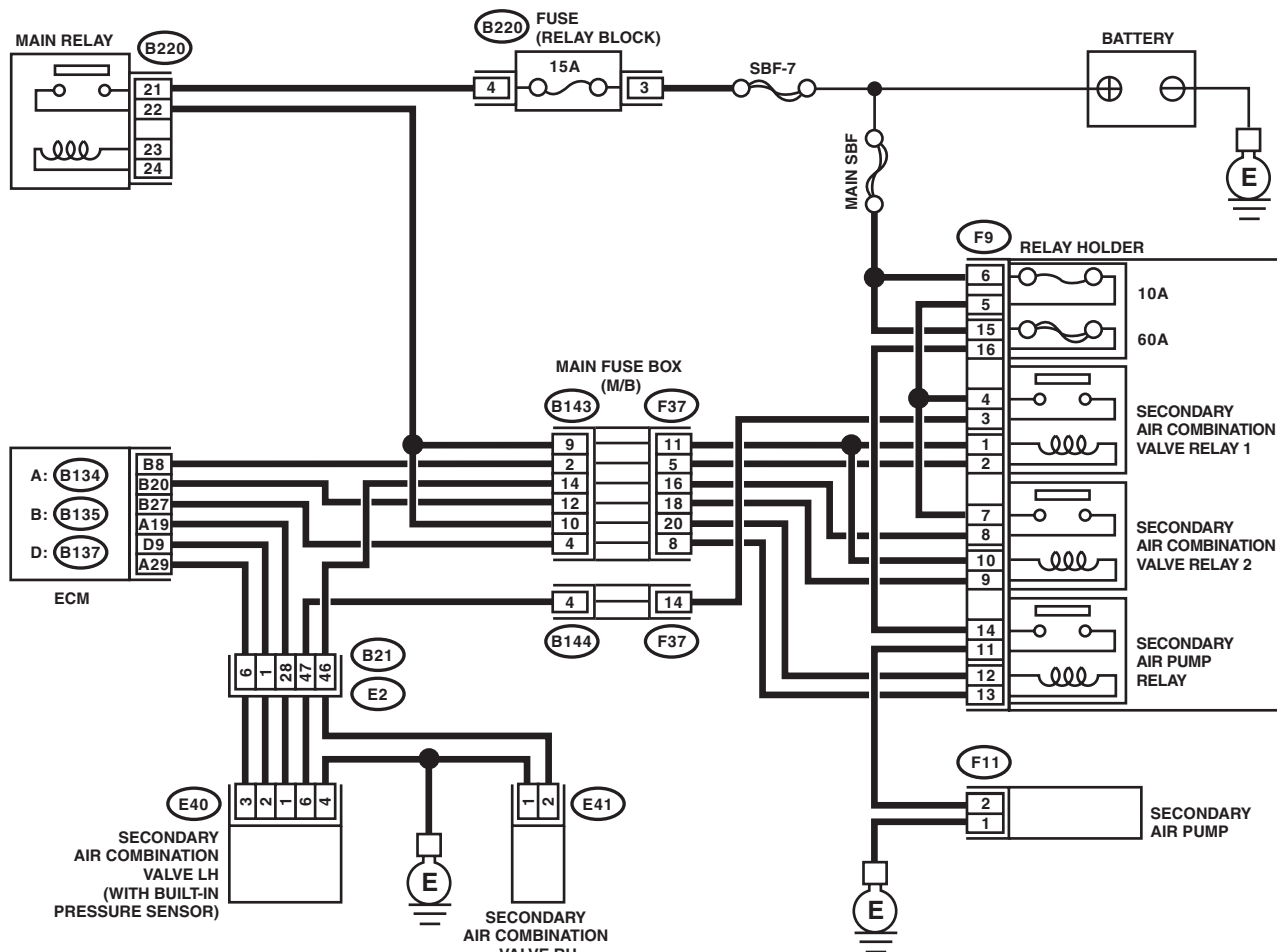


EN(H4DOTC)(diag)-438

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



A: B134

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B: B135

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29	30	31	32	33	34	35

B220

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B21

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D: B137

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F9

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31	32	33	34	35	36	37	38	39	40

F37

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	35	36

B143

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	35	36

F11

1	2

E41

1	2

E40

1	2	3
4	5	6

B144

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

EN-08735

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Turn the ignition switch to ON. 2) Read the value of «Sec. Air Piping Pressure» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «Sec. Air Piping Pressure» less than 53.3 kPa (400 mmHg, 15.8 inHg)?	Go to step 2.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2 CHECK POWER SUPPLY OF SECONDARY AIR COMBINATION VALVE. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from secondary air combination valve RH (models without SI-DRIVE) or LH (models with SI-DRIVE). 3) Turn the ignition switch to ON. 4) Measure the voltage between the secondary air combination valve RH or LH connector and chassis ground. Connector & terminal Models without SI-DRIVE (E41) No. 1 (+) — Chassis ground (-): Models with SI-DRIVE (E40) No. 1 (+) — Chassis ground (-):	Is the voltage 4.5 V or more?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and secondary air combination valve RH or LH connector • Poor contact of ECM connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and secondary air combination valve RH or LH connector. Connector & terminal Models without SI-DRIVE (B137) No. 9 — (E41) No. 2: Models with SI-DRIVE (B137) No. 9 — (E40) No. 2:	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 connector and secondary air combination valve RH or LH connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE CONNECTOR. Measure the resistance between ECM connector and chassis ground. Connector & terminal (B137) No. 9 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the ground short circuit in harness between ECM connector and secondary air combination valve RH or LH connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5	CHECK FOR POOR CONTACT. Check for poor contact of the ECM and secondary air combination valve RH or LH connector.	Is there poor contact of ECM or secondary air combination valve RH or LH connector?	Repair the poor contact of the ECM or secondary air combination valve RH or LH connector. Replace the secondary air combination valve RH or LH. <Ref. to EC(STI)-29, Secondary Air Combination Valve.> <Ref. to EC(w/o STI)-30, Secondary Air Combination Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

FJ: DTC P2433 SECONDARY AIR INJECTION SYSTEM AIR FLOW /PRESSURE SENSOR CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-286, DTC P2433 SECONDARY AIR INJECTION SYSTEM AIR FLOW /PRESSURE SENSOR CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

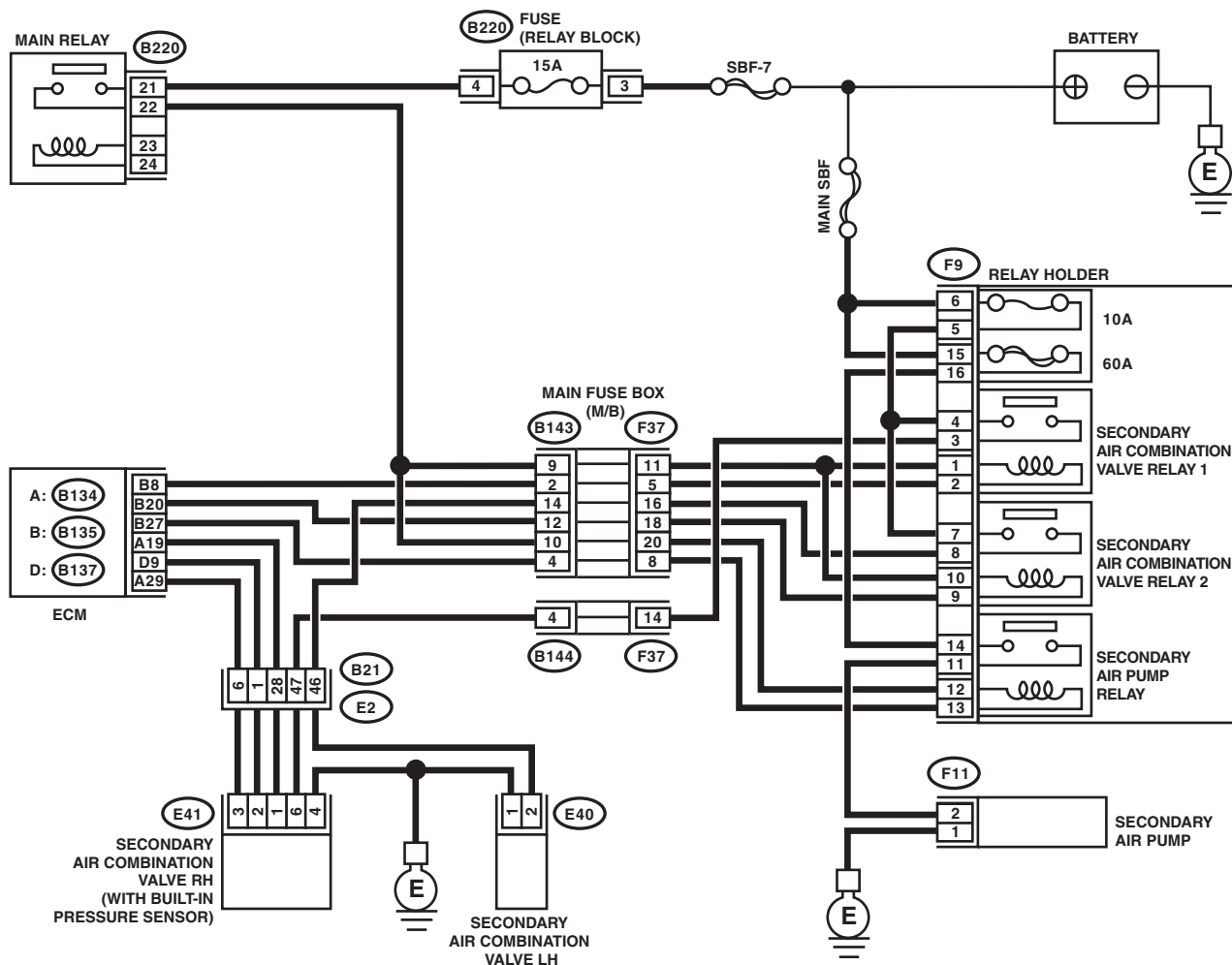
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



A: (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	

B: (B135)

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	35

(B220)

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	35	36	37	38	39	40	41	42	43	44
45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66

(B21)

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	35	36	37	38	39	40	41	42	43	44
45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66

D: (B137)

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	

(F9)

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

(F37)

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	35	36

(B143)

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	35	36

(F11)

1	2
3	4

(E40)

1	2
3	4

(E41)

1	2	3
4	5	6

(B144)

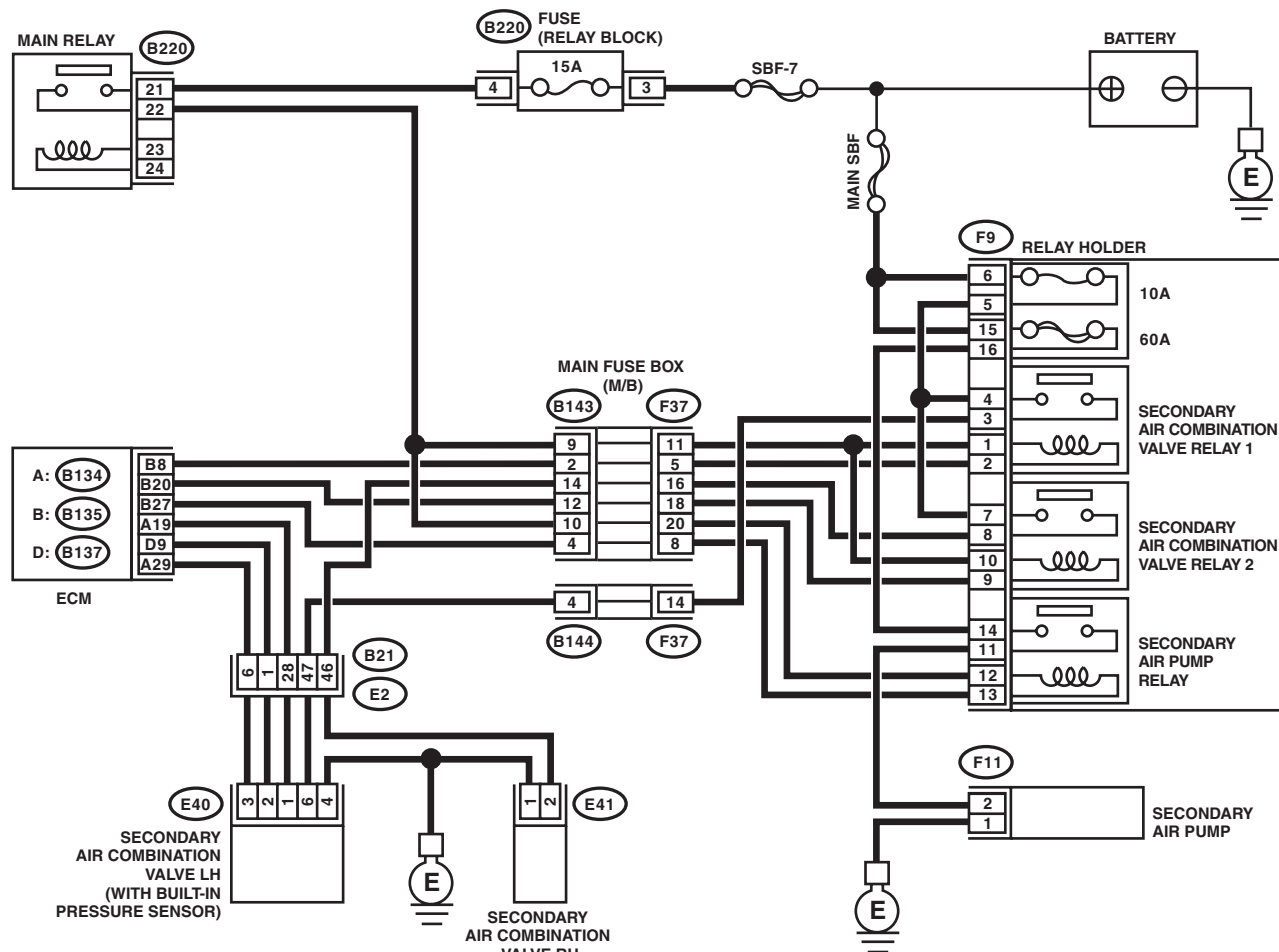
1	2	3	4
5	6	7	8
9	10	11	12

EN-08734

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



A: 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	

B: B135

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	35

B220

1	2			9				13				17				21								
3	4			10				14				18				22								
5	6			11	12			15	16			19	20			23	24							
7	8																							

B21

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	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54												

D: B137

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				

F9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

F37

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20							

B143

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20							

F11

1	2

E41

1	2

E40

1	2	3
4	5	6

B144

1	2	3	4
5	6	7	8
9			

EN-08735

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CURRENT DATA. 1) Turn the ignition switch to ON. 2) Read the value of «Sec. Air Piping Pressure» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «Sec. Air Piping Pressure» 133.3 kPa (1,000 mmHg, 39.4 inHg) or more?	Go to step 2.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.
2 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from secondary air combination valve RH (models without SI-DRIVE) or LH (models with SI-DRIVE). 3) Turn the ignition switch to ON. 4) Read the value of «Sec. Air Piping Pressure» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the value of «Sec. Air Piping Pressure» 133.3 kPa (1,000 mmHg, 39.4 inHg) or more?	Repair the short circuit to power supply in harness between ECM connector and secondary air combination valve RH or LH connector.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance of the harness between secondary air combination valve RH or LH connector and engine ground. Connector & terminal Models without SI-DRIVE (E41) No. 3 — Engine ground: Models with SI-DRIVE (E40) No. 3 — 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 ECM connector and secondary air combination valve RH or LH connector • Poor contact of ECM connector • Poor contact of coupling connector
4 CHECK FOR POOR CONTACT. Check for poor contact of the secondary air combination valve RH or LH connector.	Is there poor contact of the secondary air combination valve RH or LH connector?	Repair the poor contact of secondary air combination valve RH or LH connector.	Replace the secondary air combination valve RH or LH. <Ref. to EC(STI)-29, Secondary Air Combination Valve.> <Ref. to EC(w/o STI)-30, Secondary Air Combination Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

FK:DTC P2440 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN (BANK1)

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-287, DTC P2440 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN (BANK1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

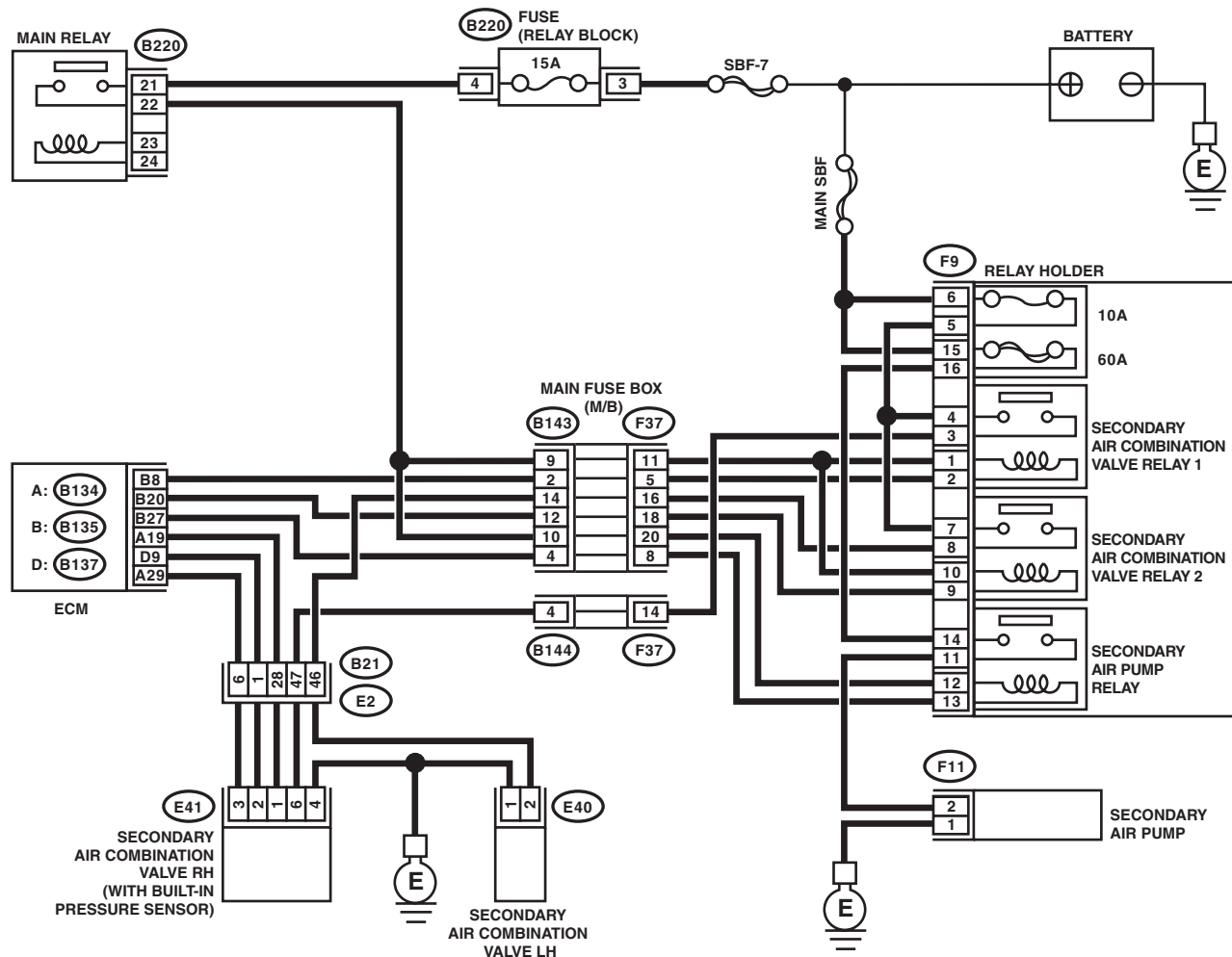
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

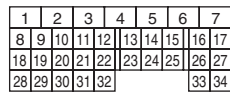
ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

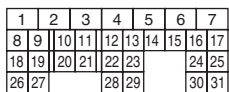
- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



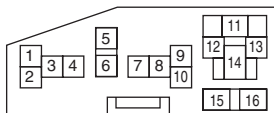
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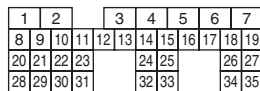
D: (B137)



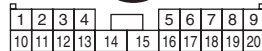
(F9)



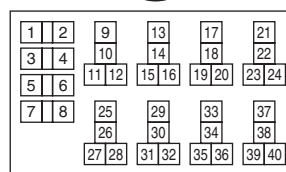
B: (B135)



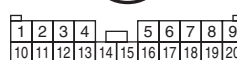
(F37)



(B220)



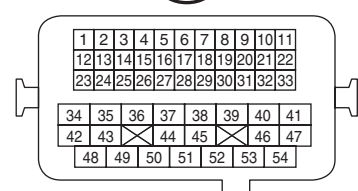
(B143)



(F11)



(B21)



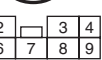
(E40)



(E41)



(B144)

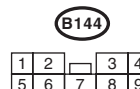
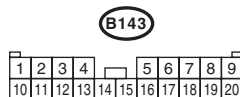
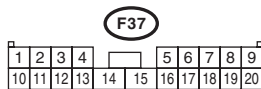
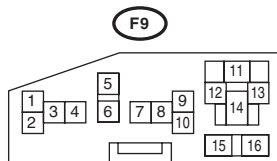
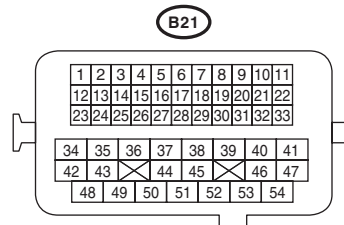
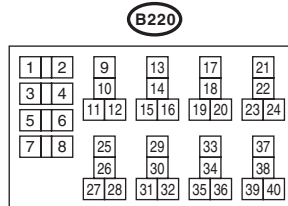
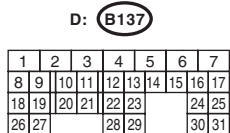
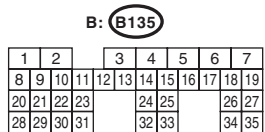
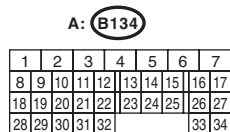
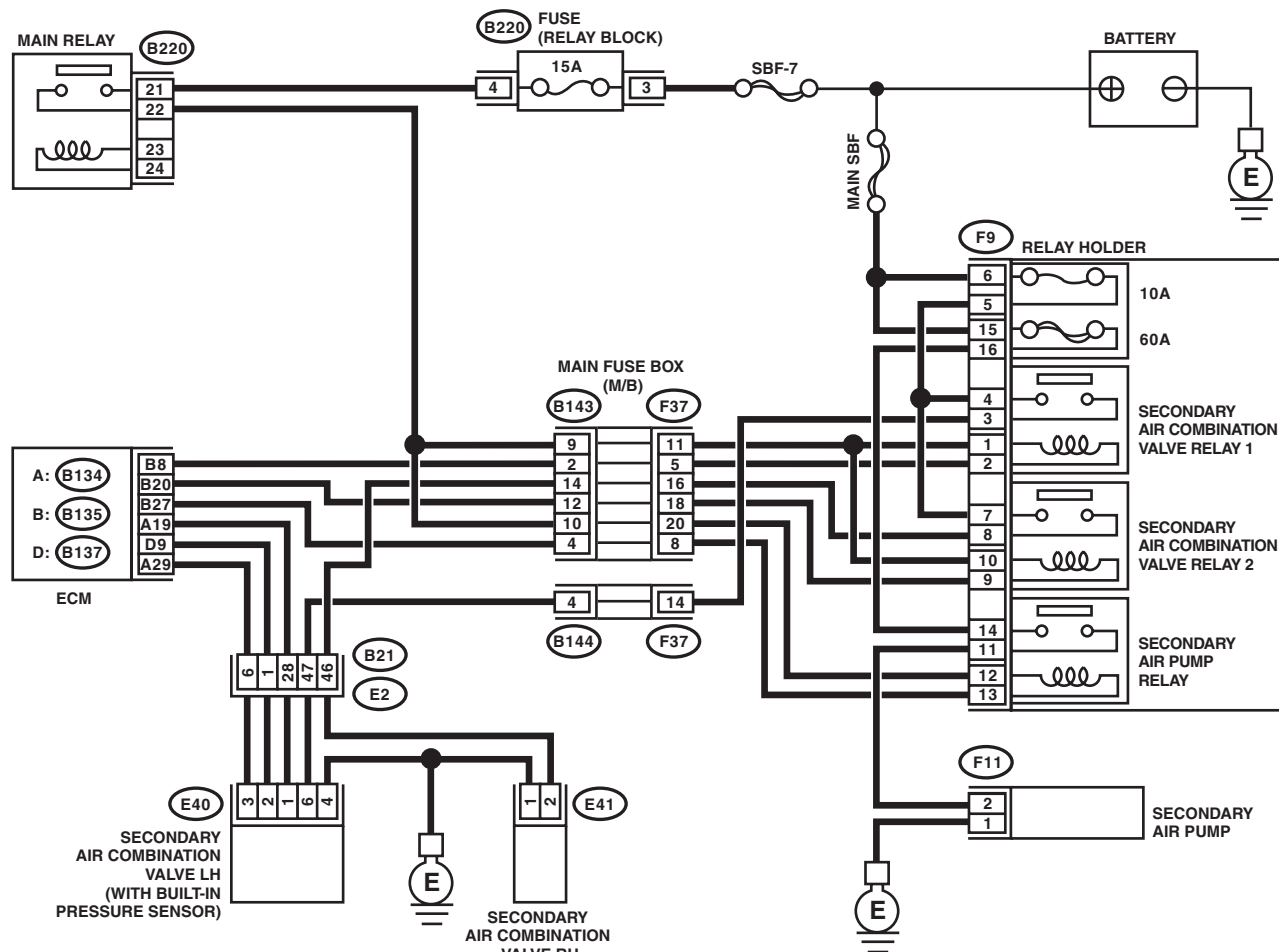


EN-08734

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08735

Step	Check	Yes	No
1	CHECK SECONDARY AIR COMBINATION VALVE FUSE. Check if the secondary air combination valve fuse (10 A) is blown out.	Go to step 2.	Go to step 3.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK HARNESS BETWEEN FUSE BOX AND SECONDARY AIR COMBINATION VALVE RH CONNECTOR. 1) Remove the secondary air combination valve fuse (10 A) from the fuse box. 2) Disconnect the connector from the secondary air combination valve RH. 3) Measure the resistance between the secondary air combination valve fuse and secondary air combination valve RH connector, and chassis ground. Connector & terminal Models without SI-DRIVE (F9) No. 5 — Chassis ground: (E41) No. 6 — Chassis ground: Models with SI-DRIVE (F9) No. 5 — Chassis ground: (E41) No. 2 — Chassis ground:	Is the resistance 1 MΩ or more?	Replace the fuse with a new part, and connect the secondary air combination valve RH connector. Go to step 3.	Repair the short circuit to ground in harness between the fuse box and the secondary air combination valve RH connector.
3 CHECK SECONDARY AIR COMBINATION VALVE RH OPERATION. 1) Connect the delivery (test) mode connector. 2) Turn the ignition switch to ON. 3) Perform operation check for the secondary air combination valve RH using the Subaru Select Monitor. NOTE: Refer to "Compulsory Valve Operation Check Mode" for more operation procedures. <Ref. to EN(H4DOTC)(diag)-64, Compulsory Valve Operation Check Mode.>	Does the secondary air combination valve RH repeatedly switch to ON and OFF?	Go to step 4.	Go to step 6.
4 CHECK DUCT BETWEEN SECONDARY AIR PUMP AND SECONDARY AIR COMBINATION VALVE RH. Check the duct between the secondary air pump and secondary air combination valve RH.	Is there damage, clog or disconnection of the duct?	Replace, clean or connect the duct.	Go to step 5.
5 CHECK PIPE BETWEEN SECONDARY AIR COMBINATION VALVE RH AND CYLINDER HEAD. Check the pipe between the secondary air combination valve RH and cylinder head.	Is there damage, clog or disconnection of the pipe?	Replace, clean or connect the pipe.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK POWER SUPPLY TO SECONDARY AIR COMBINATION VALVE RH. 1) Disconnect the connector from the secondary air combination valve RH. 2) In the condition of step 3, measure the voltage between secondary air combination valve RH connector and chassis ground. Connector & terminal Models without SI-DRIVE (E41) No. 6 (+) — Chassis ground (-): Models with SI-DRIVE (E41) No. 2 (+) — Chassis ground (-):	Does the voltage repeatedly change between 10 V and 0 V?	Replace the secondary air combination valve RH. <Ref. to EC(STI)-29, Secondary Air Combination Valve.> <Ref. to EC(w/o STI)-30, Secondary Air Combination Valve.>	Go to step 7.
7 CHECK HARNESS BETWEEN SECONDARY AIR COMBINATION VALVE RH AND CHASSIS GROUND. Measure the resistance between the secondary air combination valve RH connector and chassis ground. Connector & terminal Models without SI-DRIVE (E41) No. 4 — Chassis ground: Models with SI-DRIVE (E41) No. 1 — Chassis ground:	Is the resistance less than 5 Ω?	- Models without SI-DRIVE: Go to step 8. - Models with SI-DRIVE: Go to step 14.	Repair the open circuit in harness between secondary air combination valve RH connector and chassis ground.
8 CHECK HARNESS BETWEEN SECONDARY AIR COMBINATION VALVE RELAY 1 AND SECONDARY AIR COMBINATION VALVE RH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Remove the secondary air combination valve relay 1 from the relay box. 3) Measure the resistance of the harness between secondary air combination valve relay 1 connector and secondary air combination valve RH connector. Connector & terminal (F9) No. 3 — (E41) No. 6:	Is the resistance less than 1 Ω?	Go to step 9.	Repair the open circuit in harness between secondary air combination valve relay 1 and secondary air combination valve RH connector.
9 CHECK SECONDARY AIR COMBINATION VALVE RELAY 1. 1) Connect the battery to terminals No. 1 and No. 2 of the secondary air combination valve relay 1. 2) Measure the resistance between the secondary air combination valve relay 1 terminals. Terminals No. 3 — No. 4:	Is the resistance less than 1 Ω?	Go to step 10.	Replace the secondary air combination valve relay 1. <Ref. to EN(H4DOTC)(diag)-9, Electrical Component Location.>
10 CHECK SECONDARY AIR COMBINATION VALVE RELAY 1. Measure the resistance between the secondary air combination valve relay 1 terminals with the battery disconnected. Terminals No. 3 — No. 4:	Is the resistance 1 MΩ or more?	Go to step 11.	Replace the secondary air combination valve relay 1. <Ref. to EN(H4DOTC)(diag)-9, Electrical Component Location.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
11 CHECK SECONDARY AIR COMBINATION VALVE RELAY 1 POWER SUPPLY. 1) Turn the ignition switch to ON. 2) Measure the voltage between the secondary air combination valve relay 1 connector and chassis ground. Connector & terminal (F9) No. 4 (+) — Chassis ground (-): (F9) No. 1 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 12.	Repair the open or ground short circuit of power supply circuit.
12 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE RELAY 1 CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector. 3) Measure the resistance of harness between ECM connector and secondary air combination valve relay 1 connector. Connector & terminal (B135) No. 8 — (F9) No. 2:	Is the resistance less than 1 Ω ?	Go to step 13.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and secondary air combination valve relay 1 connector • Poor contact of coupling connector
13 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE RELAY 1 CONNECTOR. Measure the resistance between the secondary air combination valve relay 1 connector and chassis ground. Connector & terminal (F9) No. 2 — Chassis ground:	Is the resistance 1 M Ω or more?	Repair the poor contact of ECM connector.	Repair the short circuit to ground in harness between ECM connector and secondary air combination valve relay 1 connector.
14 CHECK HARNESS BETWEEN SECONDARY AIR COMBINATION VALVE RELAY 2 AND SECONDARY AIR COMBINATION VALVE RH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Remove the secondary air combination valve relay 2 from the relay box. 3) Measure the resistance of the harness between secondary air combination valve relay 2 connector and secondary air combination valve RH connector. Connector & terminal (F9) No. 8 — (E41) No. 2:	Is the resistance less than 1 Ω ?	Go to step 15.	Repair the open circuit in harness between secondary air combination valve relay 2 and secondary air combination valve RH connector.
15 CHECK SECONDARY AIR COMBINATION VALVE RELAY 2. 1) Connect the battery to terminals No. 9 and No. 10 of the secondary air combination valve relay 2. 2) Measure the resistance between the secondary air combination valve relay 2 terminals. Terminals No. 7 — No. 8:	Is the resistance less than 1 Ω ?	Go to step 16.	Replace the secondary air combination valve relay 2. <Ref. to EN(H4DOTC)(diag)-9, Electrical Component Location.>
16 CHECK SECONDARY AIR COMBINATION VALVE RELAY 2. Measure the resistance between the secondary air combination valve relay 2 terminals with the battery disconnected. Terminals No. 7 — No. 8:	Is the resistance 1 M Ω or more?	Go to step 17.	Replace the secondary air combination valve relay 2. <Ref. to EN(H4DOTC)(diag)-9, Electrical Component Location.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
17 CHECK SECONDARY AIR COMBINATION VALVE RELAY 2 POWER SUPPLY. 1) Turn the ignition switch to ON. 2) Measure the voltage between the secondary air combination valve relay 2 connector and chassis ground. Connector & terminal (F9) No. 7 (+) — Chassis ground (-): (F9) No. 10 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 18.	Repair the open or ground short circuit of power supply circuit.
18 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE RELAY 2 CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector. 3) Measure the resistance of harness between ECM connector and secondary air combination valve relay 2 connector. Connector & terminal (B135) No. 20 — (F9) No. 9:	Is the resistance less than 1 Ω?	Go to step 19.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and secondary air combination valve relay 2 connector • Poor contact of coupling connector
19 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE RELAY 2 CONNECTOR. Measure the resistance between the secondary air combination valve relay 2 connector and chassis ground. Connector & terminal (F9) No. 9 — Chassis ground:	Is the resistance 1 MΩ or more?	Repair the poor contact of ECM connector.	Repair the short circuit to ground in harness between ECM connector and secondary air combination valve relay 2 connector.

FL:DTC P2441 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK CLOSED (BANK1)

NOTE:

For the diagnostic procedure, refer to DTC P2440. <Ref. to EN(H4DOTC)(diag)-446, DTC P2440 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN (BANK1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

FM:DTC P2442 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN (BANK2)

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-287, DTC P2442 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN (BANK2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

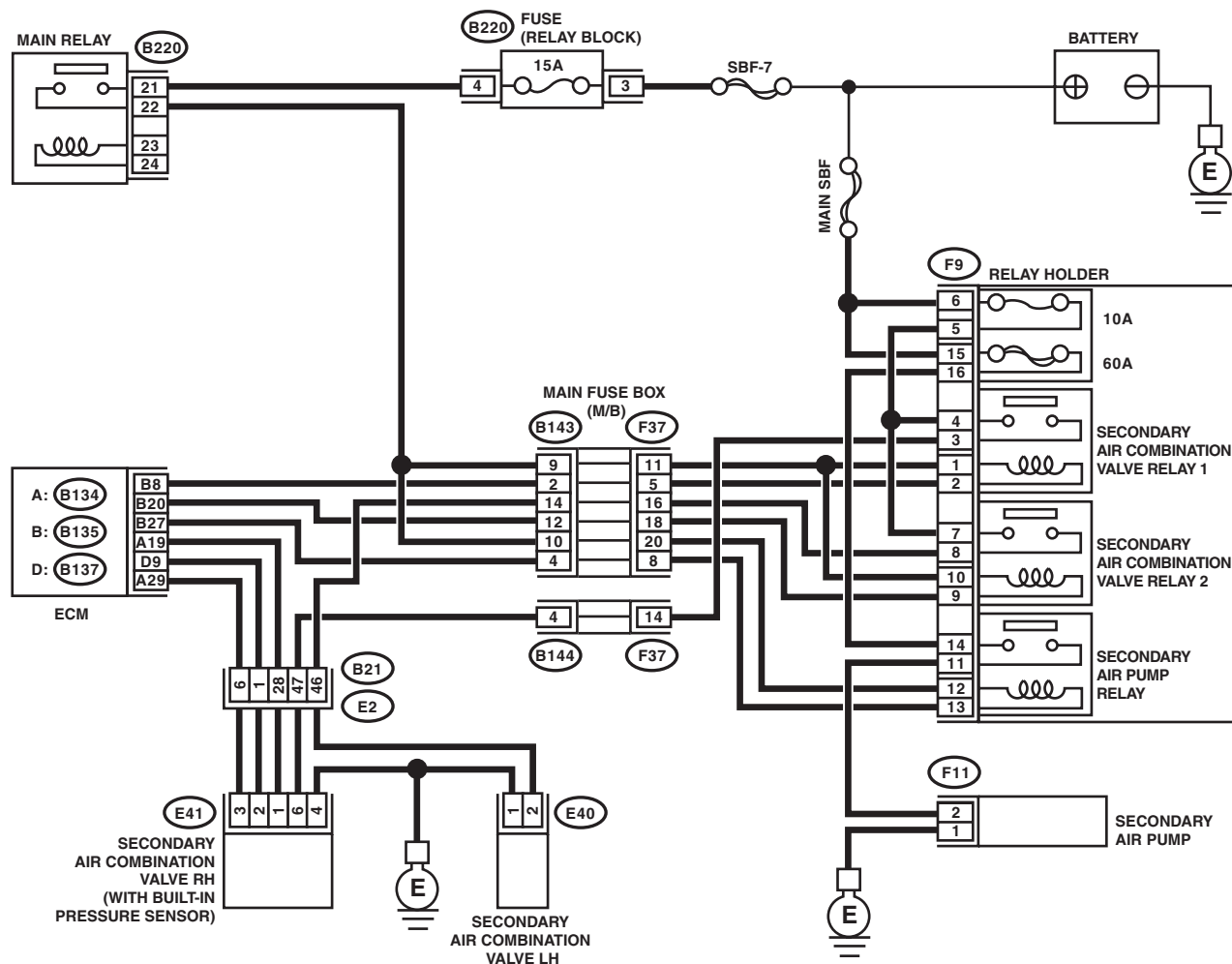
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



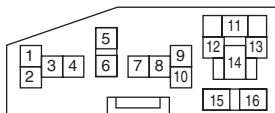
A: (B134)

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22	23	24	25	26	27	28
29	30	31	32	33	34	

D: (B137)

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	

(F9)



B: (B135)

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	35

(F37)

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	35	36

(B220)

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	35	36	37	38	39	40

(B143)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

(F11)

1	2

(B21)

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	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54

(E40)

1	2

(E41)

1	2	3	4	5	6

(B144)

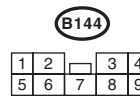
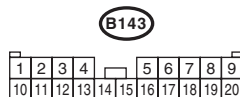
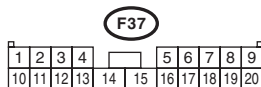
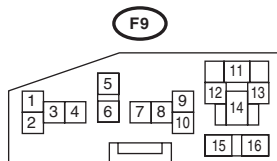
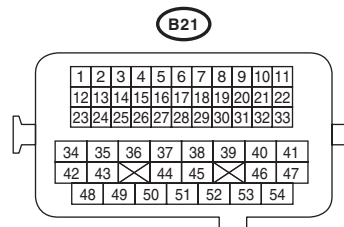
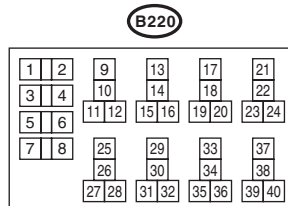
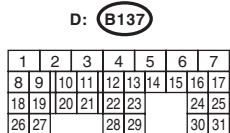
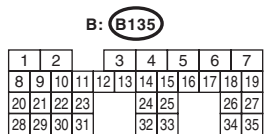
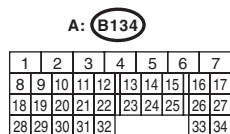
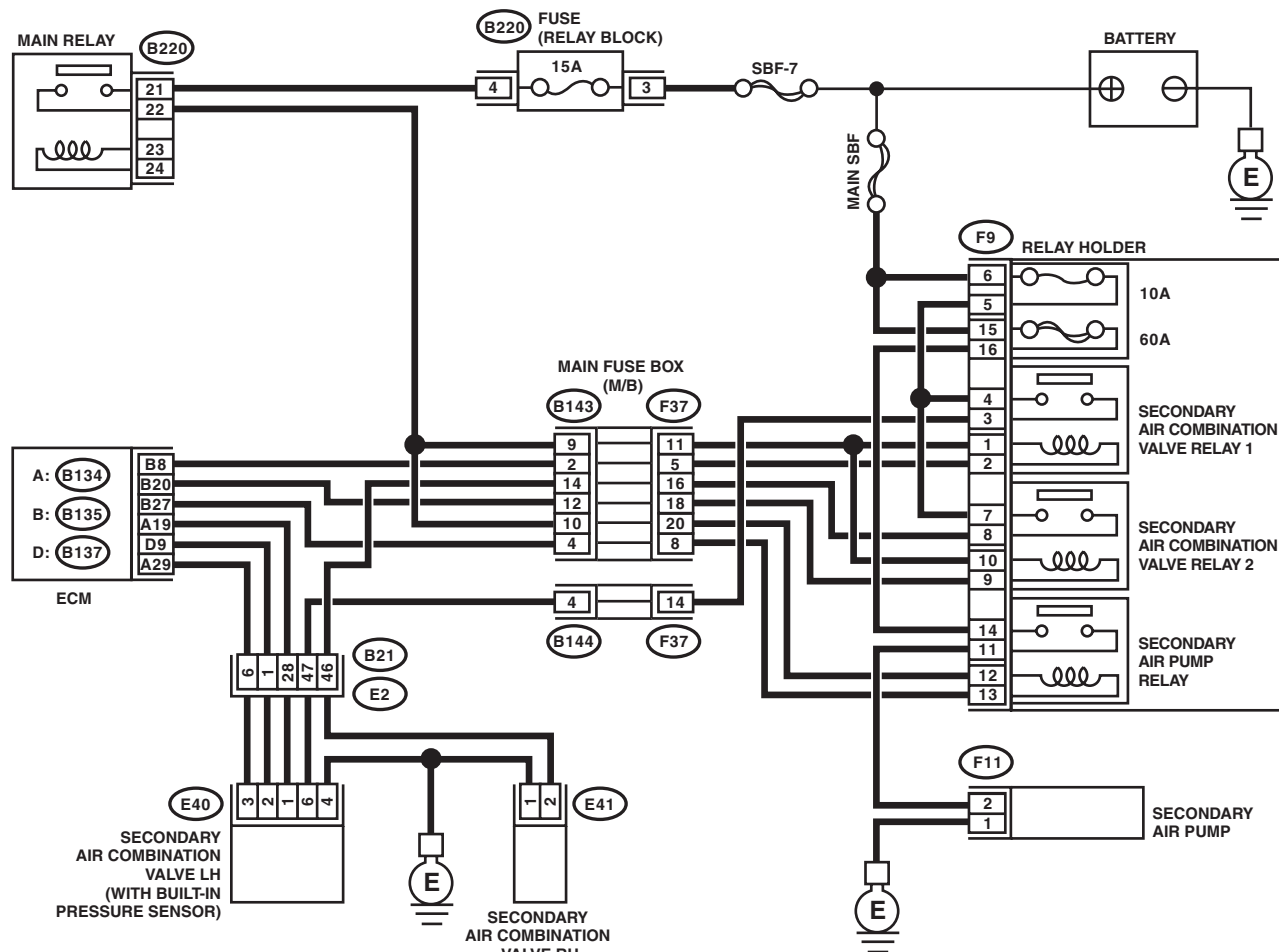
1	2	3	4	5	6	7	8	9

EN-08734

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-08735

Step	Check	Yes	No
1	CHECK SECONDARY AIR COMBINATION VALVE FUSE. Check if the secondary air combination valve fuse (10 A) is blown out.	Go to step 2.	Go to step 3.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK HARNESS BETWEEN FUSE BOX AND SECONDARY AIR COMBINATION VALVE LH CONNECTOR. 1) Remove the secondary air combination valve fuse (10 A) from the fuse box. 2) Disconnect the connector from the secondary air combination valve LH. 3) Measure the resistance between the secondary air combination valve fuse and secondary air combination valve LH connector, and chassis ground. Connector & terminal Models without SI-DRIVE (F9) No. 5 — Chassis ground: (E40) No. 2 — Chassis ground: Models with SI-DRIVE (F9) No. 5 — Chassis ground: (E40) No. 6 — Chassis ground:	Is the resistance 1 MΩ or more?	Replace the fuse with a new part, and connect the secondary air combination valve LH connector. Go to step 3.	Repair the ground short circuit of harness between the fuse box and the secondary air combination valve LH connector.
3 CHECK SECONDARY AIR COMBINATION VALVE LH OPERATION. 1) Connect the delivery (test) mode connector. 2) Turn the ignition switch to ON. 3) Perform operation check for the secondary air combination valve LH using the Subaru Select Monitor. NOTE: Refer to "Compulsory Valve Operation Check Mode" for more operation procedures. <Ref. to EN(H4DOTC)(diag)-64, Compulsory Valve Operation Check Mode.>	Does the secondary air combination valve LH repeatedly switch to ON and OFF?	Go to step 4.	Go to step 6.
4 CHECK DUCT BETWEEN SECONDARY AIR PUMP AND SECONDARY AIR COMBINATION VALVE LH. Check the duct between the secondary air pump and secondary air combination valve LH.	Is there damage, clog or disconnection of the duct?	Replace, clean or connect the duct.	Go to step 5.
5 CHECK PIPE BETWEEN SECONDARY AIR COMBINATION VALVE LH AND CYLINDER HEAD. Check the pipe between the secondary air combination valve LH and cylinder head.	Is there damage, clog or disconnection of the pipe?	Replace, clean or connect the pipe.	Even if DTC is detected, the circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK POWER SUPPLY TO SECONDARY AIR COMBINATION VALVE LH. 1) Disconnect the connector from the secondary air combination valve LH. 2) In the condition of step 3, measure the voltage between secondary air combination valve LH connector and chassis ground. Connector & terminal Models without SI-DRIVE (E40) No. 2 (+) — Chassis ground (-): Models with SI-DRIVE (E40) No. 6 (+) — Chassis ground (-):	Does the voltage repeatedly change between 10 V and 0 V?	Replace the secondary air combination valve LH. <Ref. to EC(STI)-29, Secondary Air Combination Valve.> <Ref. to EC(w/o STI)-30, Secondary Air Combination Valve.>	Go to step 7.
7 CHECK HARNESS BETWEEN SECONDARY AIR COMBINATION VALVE LH AND CHASSIS GROUND. Measure the resistance between the secondary air combination valve LH connector and chassis ground. Connector & terminal Models without SI-DRIVE (E40) No. 1 — Chassis ground: Models with SI-DRIVE (E40) No. 4 — Chassis ground:	Is the resistance less than 5 Ω ?	- Models without SI-DRIVE: Go to step 8. - Models with SI-DRIVE: Go to step 14.	Repair the open circuit in harness between secondary air combination valve LH connector and chassis ground.
8 CHECK HARNESS BETWEEN SECONDARY AIR COMBINATION VALVE RELAY 2 AND SECONDARY AIR COMBINATION VALVE LH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Remove the secondary air combination valve relay 2 from the relay box. 3) Measure the resistance of the harness between the secondary air combination valve relay 2 and secondary air combination valve LH connector. Connector & terminal (F9) No. 8 — (E40) No. 2:	Is the resistance less than 1 Ω ?	Go to step 9.	Repair the harness and connector. NOTE: In this case, repair the following item: - Open circuit in harness between secondary air combination valve relay 2 connector and secondary air combination valve LH connector - Poor contact of coupling connector
9 CHECK SECONDARY AIR COMBINATION VALVE RELAY 2. 1) Connect the battery to terminals No. 10 and No. 9 of the secondary air combination valve relay 2. 2) Measure the resistance between the secondary air combination valve relay 2 terminals. Terminals No. 7 — No. 8:	Is the resistance less than 1 Ω ?	Go to step 10.	Replace the secondary air combination valve relay 2. <Ref. to EN(H4DOTC)(diag)-9, Electrical Component Location.>
10 CHECK SECONDARY AIR COMBINATION VALVE RELAY 2. Measure the resistance between the secondary air combination valve relay 2 terminals with the battery disconnected. Terminals No. 7 — No. 8:	Is the resistance 1 M Ω or more?	Go to step 11.	Replace the secondary air combination valve relay 2. <Ref. to EN(H4DOTC)(diag)-9, Electrical Component Location.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
11 CHECK SECONDARY AIR COMBINATION VALVE RELAY 2 POWER SUPPLY. 1) Turn the ignition switch to ON. 2) Measure the voltage between the secondary air combination valve relay 2 connector and chassis ground. Connector & terminal (F9) No. 7 (+) — Chassis ground (-): (F9) No. 10 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 12.	Repair the open or ground short circuit of power supply circuit.
12 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE RELAY 2 CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector. 3) Measure the resistance of harness between ECM connector and secondary air combination valve relay 2 connector. Connector & terminal (B135) No. 20 — (F9) No. 9:	Is the resistance less than 1 Ω ?	Go to step 13.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and secondary air combination valve relay 2 connector • Poor contact of coupling connector
13 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE RELAY 2 CONNECTOR. Measure the resistance between the secondary air combination valve relay 2 connector and chassis ground. Connector & terminal (F9) No. 9 — Chassis ground:	Is the resistance 1 M Ω or more?	Repair the poor contact of ECM connector.	Repair the short circuit to ground in harness between ECM connector and secondary air combination valve relay 2 connector.
14 CHECK HARNESS BETWEEN SECONDARY AIR COMBINATION VALVE RELAY 1 AND SECONDARY AIR COMBINATION VALVE LH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Remove the secondary air combination valve relay 1 from the relay box. 3) Measure the resistance of the harness between the secondary air combination valve relay 1 and secondary air combination valve LH connector. Connector & terminal (F9) No. 3 — (E40) No. 6:	Is the resistance less than 1 Ω ?	Go to step 15.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between secondary air combination valve relay 1 connector and secondary air combination valve LH connector • Poor contact of coupling connector
15 CHECK SECONDARY AIR COMBINATION VALVE RELAY 1. 1) Connect the battery to terminals No. 1 and No. 2 of the secondary air combination valve relay 1. 2) Measure the resistance between the secondary air combination valve relay 1 terminals. Terminals No. 3 — No. 4:	Is the resistance less than 1 Ω ?	Go to step 16.	Replace the secondary air combination valve relay 1. <Ref. to EN(H4DOTC)(diag)-9, Electrical Component Location.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
16 CHECK SECONDARY AIR COMBINATION VALVE RELAY 1. Measure the resistance between the secondary air combination valve relay 1 terminals with the battery disconnected. Terminals No. 3 — No. 4:	Is the resistance 1 MΩ or more?	Go to step 17.	Replace the secondary air combination valve relay 1. <Ref. to EN(H4DOTC)(diag)-9, Electrical Component Location.>
17 CHECK SECONDARY AIR COMBINATION VALVE RELAY 1 POWER SUPPLY. 1) Turn the ignition switch to ON. 2) Measure the voltage between the secondary air combination valve relay 1 connector and chassis ground. Connector & terminal (F9) No. 4 (+) — Chassis ground (-): (F9) No. 1 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 18.	Repair the open or ground short circuit of power supply circuit.
18 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE RELAY 1 CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector. 3) Measure the resistance of harness between ECM connector and secondary air combination valve relay 1 connector. Connector & terminal (B135) No. 8 — (F9) No. 2:	Is the resistance less than 1 Ω?	Go to step 19.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM connector and secondary air combination valve relay 1 connector • Poor contact of coupling connector
19 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR COMBINATION VALVE RELAY 1 CONNECTOR. Measure the resistance between the secondary air combination valve relay 1 connector and chassis ground. Connector & terminal (F9) No. 2 — Chassis ground:	Is the resistance 1 MΩ or more?	Repair the poor contact of ECM connector.	Repair the short circuit to ground in harness between ECM connector and secondary air combination valve relay 1 connector.

FN:DTC P2443 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK CLOSED (BANK2)

NOTE:

For the diagnostic procedure, refer to DTC P2442. <Ref. to EN(H4DOTC)(diag)-453, DTC P2442 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN (BANK2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

FO:DTC P2444 SECONDARY AIR INJECTION SYSTEM PUMP STUCK ON

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-288, DTC P2444 SECONDARY AIR INJECTION SYSTEM PUMP STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

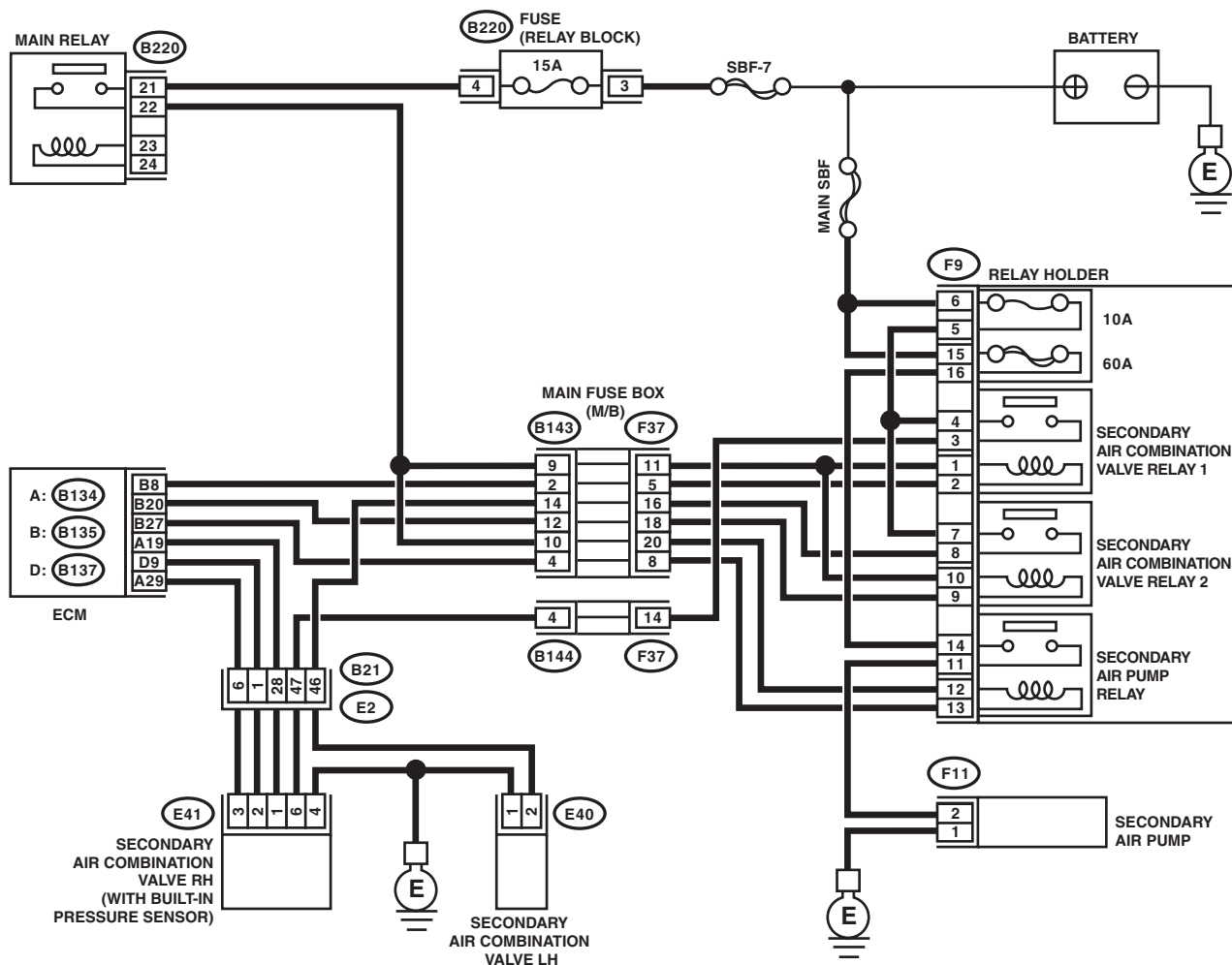
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

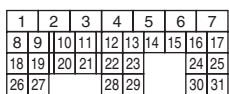
- Models without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



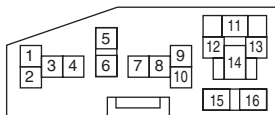
A: (B134)



D: (B137)



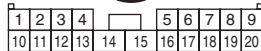
(F9)



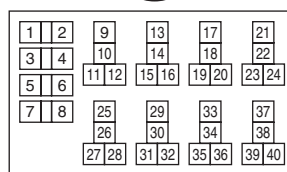
B: (B135)



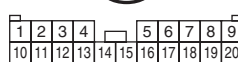
(F37)



(B220)



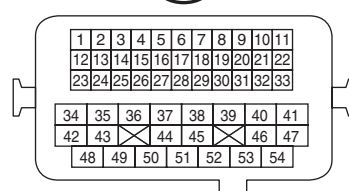
(B143)



(F11)



(B21)



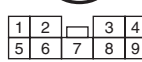
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(E41)



(B144)

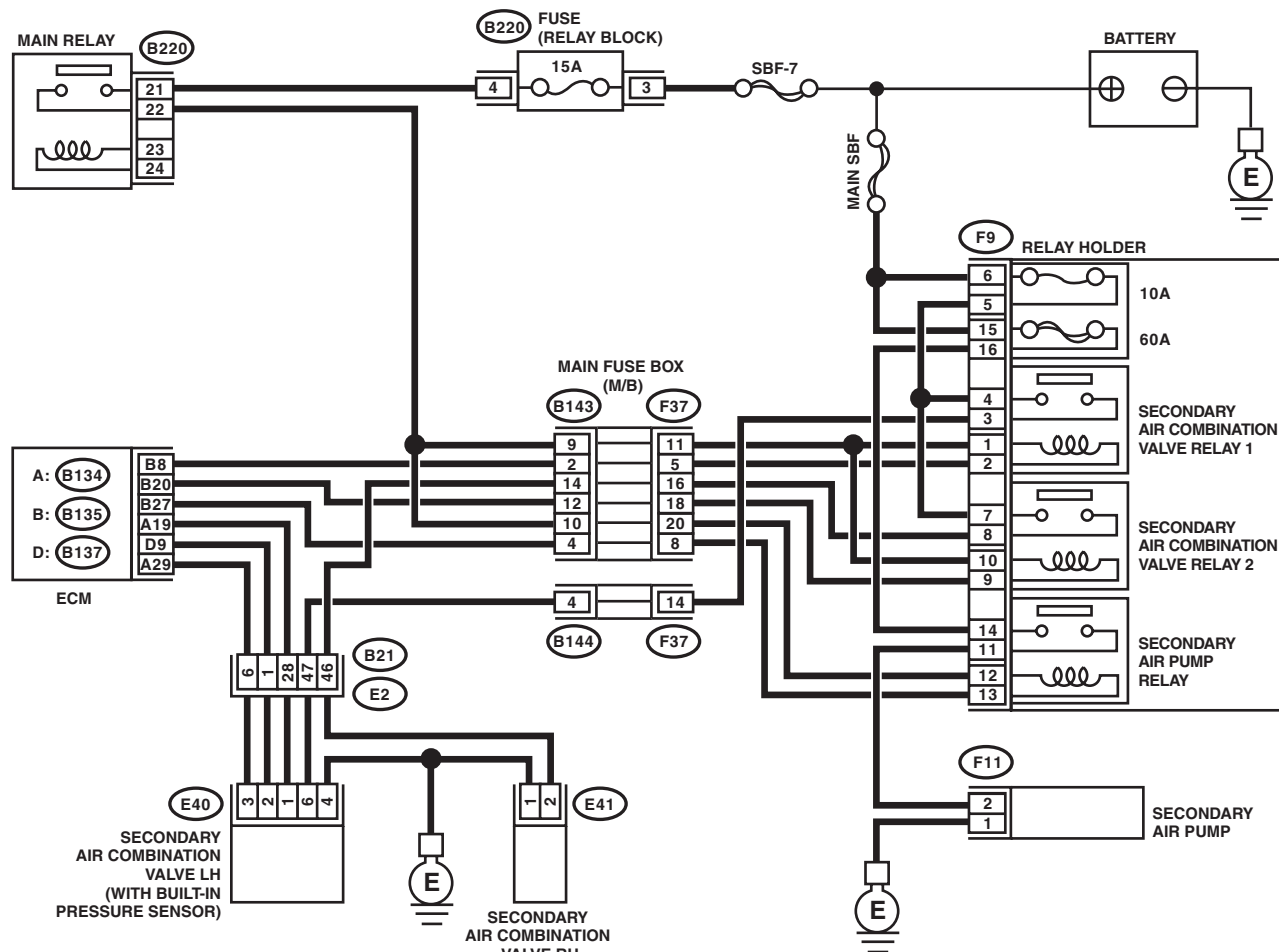


EN-08734

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

- Models with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



A: 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	

D: B137

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	

B: B135

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	35

B220

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	35	36	37	38	39	40

B21

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	35	36	37	38	39	40	41	42	43	44
45	46	47	48	49	50	51	52	53	54	55

F9

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	35	36	37	38	39	40

F37

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	35	36	37	38	39	40

B143

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	35	36	37	38	39	40

F11

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	35	36	37	38	39	40

E41

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	35	36	37	38	39	40

E40

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	35	36	37	38	39	40

B144

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	35	36	37	38	39	40

EN-08735

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK SECONDARY AIR PIPING PRESSURE. 1) Turn the ignition switch to ON. 2) Using the Subaru Select Monitor, read the value of «Sec. Air Piping Pressure», and compare with the actual atmospheric pressure. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DOTC)(diag)-40, Subaru Select Monitor.>	Is the difference between «Sec. Air Piping Pressure» and atmospheric pressure 50 mmHg (6.7 kPa, 2.0 inHg, 0.97 psig) or less?	Go to step 2.	Replace the secondary air combination valve RH (models without SI-DRIVE) or LH (models with SI-DRIVE). <Ref. to EC(STI)-29, Secondary Air Combination Valve.> <Ref. to EC(w/o STI)-30, Secondary Air Combination Valve.>
2 CHECK HARNESS BETWEEN ECM AND SECONDARY AIR PUMP RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Remove the secondary air pump relay from the relay holder. 3) Measure the resistance between the secondary air pump relay connector and engine ground terminals. Connector & terminal (F9) No. 13 — Engine ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the short circuit to ground in harness between ECM connector and secondary air pump relay connector, and go to the next step. Go to step 3.
3 CHECK SECONDARY AIR PUMP FUSE. 1) Disconnect the secondary air pump connector. 2) Install the secondary air pump relay to the relay holder. 3) Check the MAIN SBF and the secondary air pump fuse (60 A) for blown out.	Is the fuse blown out?	Replace the fuse with a new part, and go to the next step. Go to step 4.	Go to step 4.
4 CHECK SECONDARY AIR PUMP POWER SUPPLY. 1) Disconnect the positive (+) terminal after disconnecting the negative (–) terminal of battery. 2) Measure the resistance between secondary air pump connector and battery cable positive terminal. Connector & terminal (F11) No. 2 — battery cable positive terminal:	Is the resistance 1 MΩ or more?	Go to step 6.	Go to step 5.
5 CHECK SECONDARY AIR PUMP RELAY. 1) Remove the secondary air pump relay from the relay holder. 2) Measure the resistance between the secondary air pump relay terminals. Terminals No. 11 — No. 14:	Is the resistance 1 MΩ or more?	Repair the short circuit to power of the secondary air pump, and go to the next step. Go to step 6.	Replace the secondary air pump relay. <Ref. to EN(H4DOTC)(diag)-9, LOCATION, Electrical Component Location.> After replacement, go to the next step. Go to step 6.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK SECONDARY AIR PUMP. Check the appearance of secondary air pump and the condition of impeller.	Is the secondary air pump free from deformation, cracks and other damages? And does the impeller rotate smoothly?	End.	Replace the secondary air pump. <Ref. to EC(STI)-27, Secondary Air Pump.> <Ref. to EC(w/o STI)-29, Secondary Air Pump.>

FP:DTC P2610 ECM/PCM INTERNAL ENGINE OFF TIMER PERFORMANCE**DTC DETECTING CONDITION:**

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DOTC)-289, DTC P2610 ECM/PCM INTERNAL ENGINE OFF TIMER PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-63, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DOTC)(diag)-49, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR ANY OTHER DTC ON DISPLAY.	Is any other DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Replace the ECM. <Ref. to FU(STI)-59, Engine Control Module (ECM).> <Ref. to FU(w/o STI)-57, Engine Control Module (ECM).> NOTE: The soak timer IC is built into the ECM.

FQ:DTC U0073 CAN FAILURE, BUS 'OFF' DETECTION**NOTE:**

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

FR:DTC U0122 CAN (VDC) DATA NOT LOADED**NOTE:**

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

FS:DTC U0140 CAN (BCU) DATA NOT LOADED**NOTE:**

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

FT:DTC U0416 CAN (VDC) DATA ABNORMAL**NOTE:**

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

FU:DTC U0422 CAN (BCU) DATA ABNORMAL**NOTE:**

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

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

21.Diagnostic Procedure without Diagnostic Trouble Code (DTC)

A: CHECK SI-DRIVE (SUBARU INTELLIGENT DRIVE) SYSTEM

DIAGNOSIS:

SI-DRIVE mode does not switch.

CAUTION:

Note that SI-DRIVE system operates the following controls when it switches the modes.

1. Switches to S (SPORT) when turning the engine ON after turning the engine OFF in S# (SPORT sharp) mode.
2. Returns to the mode last selected when turning the engine ON after turning the engine OFF in S (SPORT) or I (Intelligent) mode.
3. Switches to S (SPORT) when the malfunction indicator light illuminates while the engine is running. In this case, Cannot switch to S# (SPORT sharp) or I (Intelligent) mode.
4. Cannot switch to S# (SPORT sharp), when engine coolant temperature tells that overheating may occur. Switches to S (SPORT) while driving in S# (SPORT sharp) mode.

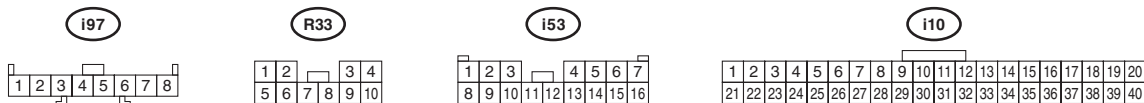
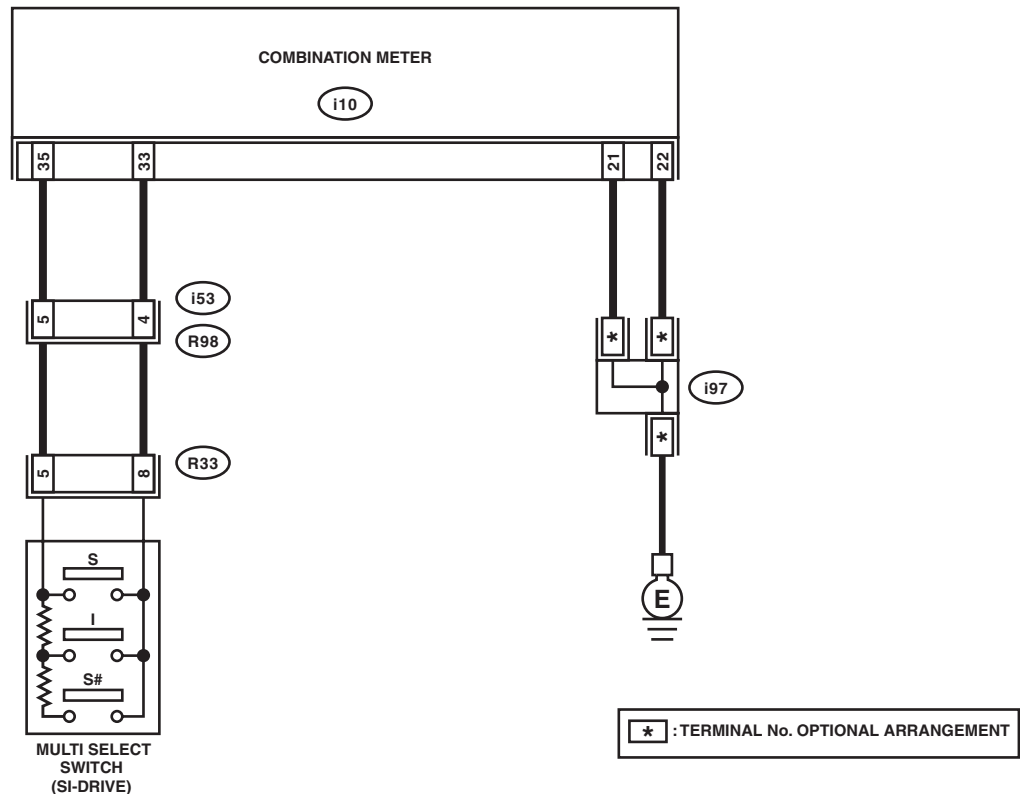
Diagnostic Procedure without Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

1. SI-DRIVE MODE INDICATION DOES NOT CHANGE AND MODES DO NOT SWITCH AFTER SWITCHING SI-DRIVE MODES

WIRING DIAGRAM:

- Engine electrical system, without SI-DRIVE <Ref. to WI-32, WITHOUT SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system, with SI-DRIVE <Ref. to WI-48, WITH SI-DRIVE, WIRING DIAGRAM, Engine Electrical System.>



EN-06527

Step	Check	Yes	No
1 CHECK SI-DRIVE SELECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the combination meter. 3) Measure the resistance between connectors when the SI-DRIVE selector is operated. Connector & terminal (i10) No. 33 — (i10) No. 35:	Does the resistance change as below? S#: 3.48 — 3.85 kΩ I: 0.95 — 1.05 kΩ S: less than 1 Ω	Go to step 4.	Go to step 2.

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK HARNESS BETWEEN COMBINATION METER AND MULTI-SELECT SWITCH CONNECTOR. 1) Disconnect the connector from multi-select switch. 2) Measure the resistance of harness between combination meter and multi-select switch connector. <i>Connector & terminal</i> <i>(i10) No. 33 — (R33) No. 8:</i> <i>(i10) No. 35 — (R33) No. 5:</i>	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 combination meter and multi-select switch connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN COMBINATION METER AND MULTI-SELECT SWITCH CONNECTOR. Measure the resistance between multi-select switch connector and chassis ground. <i>Connector & terminal</i> <i>(R33) No. 8 — Chassis ground:</i> <i>(R33) No. 5 — Chassis ground:</i>	Is the resistance 1 M Ω or more?	Repair the poor contact of multi-select switch connector. Replace the multi-select switch if defective. <Ref. to FU(STI)-58, SI-DRIVE (SUBARU Intelligent Drive) Selector.>	Repair the ground short circuit in harness between combination meter and multi-select switch connector.
4 CHECK HARNESS BETWEEN COMBINATION METER AND CHASSIS GROUND. Measure the resistance of harness between combination meter and chassis ground. <i>Connector & terminal</i> <i>(i10) No. 21 — Chassis ground:</i> <i>(i10) No. 22 — Chassis ground:</i>	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 combination meter and chassis ground • Poor contact of coupling connector
5 RECHECK FAULT. 1) Connect all connectors. 2) Switch SI-DRIVE modes.	Is there any fault?	Repair the poor contact of combination meter connector. Replace the combination meter if defective. <Ref. to IDI-16, Combination Meter.>	The circuit has returned to a normal condition at this time. Reproduce the failure, and then perform the diagnosis again. NOTE: In this case, temporary poor contact of connector, temporary open or short circuit of harness may be the cause.

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

2. "S" BLINKS ON SI-DRIVE MODE DISPLAY IN THE COMBINATION METER APPROX. 5 SECONDS AFTER SWITCHING SI-DRIVE MODES

Step	Check	Yes	No
1 CHECK DTC.	Is DTC displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)" concerning the respective units.	Go to step 2.
2 CHECK COMBINATION METER AND CLOCK DISPLAY. Check for abnormal indication other than "S" blinking. Examples: • Malfunction indicator light illuminates. • "Err" is displayed on fuel efficiency display part. • Engine coolant temperature gauge does not move.	Is there any abnormal indication other than "S" blinking?	For the diagnostic procedure, refer to LAN section. <Ref. to LAN(diag)-2, Basic Diagnostic Procedure.>	Go to step 3.
3 CHECK COMBINATION METER, ECM AND BODY INTEGRATED UNIT.	Are the part numbers of combination meter, ECM and body integrated unit correct?	Replace the combination meter. <Ref. to IDI-16, Combination Meter.>	Replace the combination meter, ECM or body integrated unit with parts of proper part number. <Ref. to IDI-16, Combination Meter.> <Ref. to FU(STI)-59, Engine Control Module (ECM).> or <Ref. to SL-48, Body Integrated Unit.>

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

3. “S#”, “I” OR “S” BLINKS ON SI-DRIVE MODE DISPLAY IN THE COMBINATION METER AFTER SWITCHING SI-DRIVE MODES

NOTE:

In this case, there is a fault other than in SI-DRIVE system.

Step	Check	Yes	No
1 CHECK MALFUNCTION INDICATOR LIGHT. 1) Start the engine. 2) Check if malfunction indicator light illuminates.	Does the malfunction indicator light illuminate?	Read the DTC using Subaru Select Monitor and check the indicated DTC. <Ref. to EN(H4DOTC)(diag)-87, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK ENGINE COOLANT TEMPERATURE GAUGE. 1) Turn the ignition switch to ON. 2) Check the engine coolant temperature gauge.	Does it indicate overheating?	Inspect for the cause of overheating and repair.	Go to step 3.
3 CHECK COMBINATION METER INDICATION. 1) Turn the ignition switch to ON. 2) Switch SI-DRIVE modes. 3) Check the SI-DRIVE mode display in the combination meter.	Does “S#”, “I” or “S” of the SI-DRIVE mode blink in combination meter?	Replace the combination meter. <Ref. to IDI-16, Combination Meter.>	Perform test driving to check the malfunction indicator light and engine coolant temperature gauge. Complete the diagnosis if they are normal.

22. General Diagnostic Table

A: INSPECTION

1. ENGINE

NOTE:

Malfunction of parts other than those listed is also possible. <Ref. to ME(STI)-107, Engine Trouble in General.> <Ref. to ME(w/o STI)-103, Engine Trouble in General.>

Symptoms	Faulty parts
1. Engine stalls during idling.	1) Electronic throttle control 2) Manifold absolute pressure sensor 3) Mass air flow and intake air temperature sensor 4) Ignition parts (*1) 5) Engine coolant temperature sensor (*2) 6) Crankshaft position sensor (*3) 7) Camshaft position sensor (*3) 8) Fuel injection parts (*4)
2. Rough idling	1) Electronic throttle control 2) Manifold absolute pressure sensor 3) Mass air flow and intake air temperature sensor 4) Engine coolant temperature sensor (*2) 5) Ignition parts (*1) 6) Air intake system (*5) 7) Fuel injection parts (*4) 8) Crankshaft position sensor (*3) 9) Camshaft position sensor (*3) 10) Oxygen sensor 11) Fuel pump and fuel pump relay
3. Engine does not return to idle.	1) Electronic throttle control 2) Engine coolant temperature sensor 3) Manifold absolute pressure sensor 4) Mass air flow and intake air temperature sensor 5) Accelerator pedal position sensor
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 relay 10) Engine torque control signal circuit 11) Ignition parts (*1) 12) Accelerator pedal position sensor
5. Engine stalls, hesitates, or sputters 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) Fuel pump and fuel pump relay 9) Electronic throttle control

General Diagnostic Table

ENGINE (DIAGNOSTICS)

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

*1: Check ignition coil and spark plug.

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

*3: Ensure secure installation.

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

*5: Inspect for air leak in air intake system.

GENERAL DESCRIPTION

GD(H4DOTC)

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2. Diagnostic Trouble Code (DTC) Detecting Criteria	11

List of Diagnostic Trouble Code (DTC)

GENERAL DESCRIPTION

1. List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Note
B1570	Antenna	<Ref. to GD(H4DOTC)-11, DTC B1570 ANTENNA, Diagnostic Trouble Code (DTC) Detecting Criteria.>
B1571	Reference Code Incompatibility	<Ref. to GD(H4DOTC)-11, DTC B1571 REFERENCE CODE INCOMPATIBILITY, Diagnostic Trouble Code (DTC) Detecting Criteria.>
B1572	IMM Circuit Failure (Except Antenna Circuit)	<Ref. to GD(H4DOTC)-11, DTC B1572 IMM CIRCUIT FAILURE (EXCEPT ANTENNA CIRCUIT), Diagnostic Trouble Code (DTC) Detecting Criteria.>
B1574	Key Communication Failure	<Ref. to GD(H4DOTC)-11, DTC B1574 KEY COMMUNICATION FAILURE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
B1575	Incorrect Immobilizer Key	<Ref. to GD(H4DOTC)-12, DTC B1575 INCORRECT IMMOBILIZER KEY, Diagnostic Trouble Code (DTC) Detecting Criteria.>
B1576	EGI Control Module EEPROM	<Ref. to GD(H4DOTC)-12, DTC B1576 EGI CONTROL MODULE EEPROM, Diagnostic Trouble Code (DTC) Detecting Criteria.>
B1577	IMM Control Module EEPROM	<Ref. to GD(H4DOTC)-12, DTC B1577 IMM CONTROL MODULE EEPROM, Diagnostic Trouble Code (DTC) Detecting Criteria.>
B1578	Meter Failure	<Ref. to GD(H4DOTC)-12, DTC B1578 METER FAILURE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0011	Intake Camshaft Position - Timing Over-Advanced or System Performance (Bank 1)	<Ref. to GD(H4DOTC)-13, DTC P0011 INTAKE CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0014	Exhaust AVCS System 1 (Range/Performance)	<Ref. to GD(H4DOTC)-15, DTC P0014 EXHAUST AVCS SYSTEM 1 (RANGE/PERFORMANCE), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0016	Crankshaft Position - Camshaft Position Correlation (Bank1)	<Ref. to GD(H4DOTC)-17, DTC P0016 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION (BANK1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0017	Crank and Cam Timing B System Failure (Bank 1)	<Ref. to GD(H4DOTC)-19, DTC P0017 CRANK AND CAM TIMING B SYSTEM FAILURE (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0018	Crankshaft Position - Camshaft Position Correlation (Bank2)	<Ref. to GD(H4DOTC)-21, DTC P0018 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION (BANK2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0019	Crank and Cam Timing B System Failure (Bank 2)	<Ref. to GD(H4DOTC)-21, DTC P0019 CRANK AND CAM TIMING B SYSTEM FAILURE (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0021	Intake Camshaft Position - Timing Over-Advanced or System Performance (Bank 2)	<Ref. to GD(H4DOTC)-21, DTC P0021 INTAKE CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0024	Exhaust AVCS System 2 (Range/Performance)	<Ref. to GD(H4DOTC)-21, DTC P0024 EXHAUST AVCS SYSTEM 2 (RANGE/PERFORMANCE), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0030	HO2S Heater Control Circuit (Bank 1 Sensor 1)	<Ref. to GD(H4DOTC)-22, 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(H4DOTC)-24, 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(H4DOTC)-26, 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(H4DOTC)-28, DTC P0037 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

List of Diagnostic Trouble Code (DTC)

GENERAL DESCRIPTION

DTC	Item	Note
P0038	HO2S Heater Control Circuit High (Bank 1 Sensor 2)	<Ref. to GD(H4DOTC)-30, 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(H4DOTC)-32, DTC P0068 MAP/MAF - THROTTLE POSITION CORRELATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0101	Mass or Volume Air Flow Circuit Range/Performance	<Ref. to GD(H4DOTC)-34, 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(H4DOTC)-36, 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(H4DOTC)-38, 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(H4DOTC)-40, 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(H4DOTC)-42, DTC P0108 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0111	Intake Air Temperature Sensor Range/Performance Problem	<Ref. to GD(H4DOTC)-44, DTC P0111 INTAKE AIR TEMPERATURE SENSOR RANGE/PERFORMANCE PROBLEM, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0112	Intake Air Temperature Sensor 1 Circuit Low	<Ref. to GD(H4DOTC)-47, DTC P0112 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0113	Intake Air Temperature Sensor 1 Circuit High	<Ref. to GD(H4DOTC)-49, DTC P0113 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0116	Engine Coolant Temp. Sensor Circuit Range/Performance	<Ref. to GD(H4DOTC)-51, DTC P0116 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0117	Engine Coolant Temperature Circuit Low	<Ref. to GD(H4DOTC)-53, DTC P0117 ENGINE COOLANT TEMPERATURE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0118	Engine Coolant Temperature Circuit High	<Ref. to GD(H4DOTC)-55, 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(H4DOTC)-57, 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(H4DOTC)-59, 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(H4DOTC)-61, DTC P0125 INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0128	Coolant Thermostat (Engine Coolant Temperature Below Thermostat Regulating Temperature)	<Ref. to GD(H4DOTC)-63, 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(H4DOTC)-67, 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(H4DOTC)-69, DTC P0132 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0134	O2 Sensor Circuit No Activity Detected (Bank 1 Sensor 1)	<Ref. to GD(H4DOTC)-71, 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(H4DOTC)-73, DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

List of Diagnostic Trouble Code (DTC)

GENERAL DESCRIPTION

DTC	Item	Note
P0138	O2 Sensor Circuit High Voltage (Bank 1 Sensor 2)	<Ref. to GD(H4DOTC)-75, DTC P0138 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P013A	O2 Sensor Slow Response - Rich to Lean (Bank 1 Sensor 2)	<Ref. to GD(H4DOTC)-76, DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P013B	O2 Sensor Slow Response - Lean to Rich (Bank 1 Sensor 2)	<Ref. to GD(H4DOTC)-78, DTC P013B O2 SENSOR SLOW RESPONSE - LEAN TO RICH (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P013E	O2 Sensor Delayed Response - Rich to Lean (Bank 1 Sensor 2)	<Ref. to GD(H4DOTC)-80, DTC P013E O2 SENSOR DELAYED RESPONSE - RICH TO LEAN (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P013F	O2 Sensor Delayed Response - Lean to Rich (Bank 1 Sensor 2)	<Ref. to GD(H4DOTC)-82, DTC P013F O2 SENSOR DELAYED RESPONSE - LEAN TO RICH (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0140	O2 Sensor Circuit No Activity Detected (Bank1 Sensor2)	<Ref. to GD(H4DOTC)-84, DTC P0140 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK1 SENSOR2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0141	O2 Sensor Heater Circuit (Bank1 Sensor2)	<Ref. to GD(H4DOTC)-86, DTC P0141 O2 SENSOR HEATER CIRCUIT (BANK1 SENSOR2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P014C	O2 Sensor Slow Response - Rich to Lean (Bank 1 Sensor 1)	<Ref. to GD(H4DOTC)-88, DTC P014C O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P014D	O2 Sensor Slow Response - Lean to Rich (Bank 1 Sensor 1)	<Ref. to GD(H4DOTC)-90, DTC P014D O2 SENSOR SLOW RESPONSE - LEAN TO RICH (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P015A	O2 Sensor Delayed Response - Rich to Lean (Bank 1 Sensor 1)	<Ref. to GD(H4DOTC)-91, DTC P015A O2 SENSOR DELAYED RESPONSE - RICH TO LEAN (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P015B	O2 Sensor Delayed Response - Lean to Rich (Bank 1 Sensor 1)	<Ref. to GD(H4DOTC)-97, DTC P015B O2 SENSOR DELAYED RESPONSE - LEAN TO RICH (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0171	System Too Lean (Bank 1)	<Ref. to GD(H4DOTC)-98, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0172	System Too Rich (Bank 1)	<Ref. to GD(H4DOTC)-99, DTC P0172 SYSTEM TOO RICH (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0201	Cylinder 1 - Injector Circuit	<Ref. to GD(H4DOTC)-100, DTC P0201 INJECTOR #1, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0202	Cylinder 2 - Injector Circuit	<Ref. to GD(H4DOTC)-101, DTC P0202 INJECTOR #2, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0203	Cylinder 3 - Injector Circuit	<Ref. to GD(H4DOTC)-101, DTC P0203 INJECTOR #3, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0204	Cylinder 4 - Injector Circuit	<Ref. to GD(H4DOTC)-101, DTC P0204 INJECTOR #4, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0222	Throttle/Pedal Position Sensor/ Switch "B" Circuit Low	<Ref. to GD(H4DOTC)-102, 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(H4DOTC)-104, DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0230	Fuel Pump Primary Circuit	<Ref. to GD(H4DOTC)-106, DTC P0230 FUEL PUMP PRIMARY CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0244	Turbo/Super Charger Wastegate Solenoid "A" Range/Performance	<Ref. to GD(H4DOTC)-108, DTC P0244 TURBO/SUPER CHARGER WASTEGATE SOLENOID "A" RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

List of Diagnostic Trouble Code (DTC)

GENERAL DESCRIPTION

DTC	Item	Note
P0245	Turbo/Super Charger Wastegate Solenoid "A" Low	<Ref. to GD(H4DOTC)-110, DTC P0245 TURBO/SUPER CHARGER WASTEGATE SOLENOID "A" LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0246	Turbo/Super Charger Wastegate Solenoid "A" High	<Ref. to GD(H4DOTC)-112, DTC P0246 TURBO/SUPER CHARGER WASTEGATE SOLENOID "A" HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0300	Random/Multiple Cylinder Misfire Detected	<Ref. to GD(H4DOTC)-113, DTC P0300 RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0301	Cylinder 1 Misfire Detected	<Ref. to GD(H4DOTC)-114, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0302	Cylinder 2 Misfire Detected	<Ref. to GD(H4DOTC)-123, DTC P0302 CYLINDER 2 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0303	Cylinder 3 Misfire Detected	<Ref. to GD(H4DOTC)-123, DTC P0303 CYLINDER 3 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0304	Cylinder 4 Misfire Detected	<Ref. to GD(H4DOTC)-123, 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(H4DOTC)-124, 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(H4DOTC)-126, 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(H4DOTC)-128, DTC P0335 CRANKSHAFT POSITION SENSOR "A" CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0336	Crankshaft Position Sensor "A" Circuit Range/Performance	<Ref. to GD(H4DOTC)-130, 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(H4DOTC)-132, 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(H4DOTC)-134, DTC P0341 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0345	Camshaft Position Sensor "A" Circuit (Bank 2)	<Ref. to GD(H4DOTC)-135, DTC P0345 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0346	Camshaft Position Sensor "A" Circuit Range/Performance (Bank 2)	<Ref. to GD(H4DOTC)-135, DTC P0346 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0351	Ignition Coil A Primary/Secondary Circuit	<Ref. to GD(H4DOTC)-136, DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0352	Ignition Coil B Primary/Secondary Circuit	<Ref. to GD(H4DOTC)-136, DTC P0352 IGNITION COIL B PRIMARY/SECONDARY CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0353	Ignition Coil C Primary/Secondary Circuit	<Ref. to GD(H4DOTC)-136, DTC P0353 IGNITION COIL C PRIMARY/SECONDARY CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0354	Ignition Coil D Primary/Secondary Circuit	<Ref. to GD(H4DOTC)-136, DTC P0354 IGNITION COIL D PRIMARY/SECONDARY CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0365	Camshaft Position Sensor "B" Circuit (Bank 1)	<Ref. to GD(H4DOTC)-137, DTC P0365 CAMSHAFT POSITION SENSOR "B" CIRCUIT (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0366	Camshaft Position Sensor B Circuit Range/Performance (Bank 1)	<Ref. to GD(H4DOTC)-138, DTC P0366 CAMSHAFT POSITION SENSOR B CIRCUIT RANGE/PERFORMANCE (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0390	Camshaft Position Sensor "B" Circuit (Bank 2)	<Ref. to GD(H4DOTC)-138, DTC P0390 CAMSHAFT POSITION SENSOR "B" CIRCUIT (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0391	Camshaft Position Sensor B Circuit Range/Performance (Bank 2)	<Ref. to GD(H4DOTC)-138, DTC P0391 CAMSHAFT POSITION SENSOR B CIRCUIT RANGE/PERFORMANCE (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

List of Diagnostic Trouble Code (DTC)

GENERAL DESCRIPTION

DTC	Item	Note
P0410	Secondary Air Injection System	<Ref. to GD(H4DOTC)-139, DTC P0410 SECONDARY AIR INJECTION SYSTEM, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0411	Secondary Air Injection System Incorrect Flow Detected	<Ref. to GD(H4DOTC)-147, DTC P0411 SECONDARY AIR INJECTION SYSTEM INCORRECT FLOW DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0413	Secondary Air Injection System Switching Valve "A" Circuit Open	<Ref. to GD(H4DOTC)-148, DTC P0413 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE "A" CIRCUIT OPEN, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0414	Secondary Air Injection System Switching Valve "A" Circuit Shorted	<Ref. to GD(H4DOTC)-149, DTC P0414 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE "A" CIRCUIT SHORTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0416	Secondary Air Injection System Switching Valve "B" Circuit Open	<Ref. to GD(H4DOTC)-149, DTC P0416 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE "B" CIRCUIT OPEN, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0417	Secondary Air Injection System Switching Valve "B" Circuit Shorted	<Ref. to GD(H4DOTC)-149, DTC P0417 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE "B" CIRCUIT SHORTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0420	Catalyst System Efficiency Below Threshold (Bank 1)	<Ref. to GD(H4DOTC)-150, DTC P0420 CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0441	Evaporative Emission Cont. Sys. Incorrect Purge Flow	<Ref. to GD(H4DOTC)-152, DTC P0441 EVAPORATIVE EMISSION CONT. SYS. INCORRECT PURGE FLOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0451	Evaporative Emission System Pressure Sensor/Switch Range/Performance	<Ref. to GD(H4DOTC)-155, DTC P0451 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/SWITCH RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0452	Evaporative Emission System Pressure Sensor/Switch Low	<Ref. to GD(H4DOTC)-157, DTC P0452 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/SWITCH LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0453	Evaporative Emission System Pressure Sensor/Switch High	<Ref. to GD(H4DOTC)-159, DTC P0453 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/SWITCH HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0455	Evaporative Emission System Leak Detected (Large Leak)	<Ref. to GD(H4DOTC)-161, DTC P0455 EVAPORATIVE EMISSION SYSTEM LEAK DETECTED (LARGE LEAK), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0456	Evaporative Emission Control System Leak Detected (Very Small Leak)	<Ref. to GD(H4DOTC)-167, DTC P0456 EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (VERY SMALL LEAK), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0458	Evaporative Emission System Purge Control Valve Circuit Low	<Ref. to GD(H4DOTC)-168, 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(H4DOTC)-170, 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(H4DOTC)-172, 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(H4DOTC)-174, DTC P0462 FUEL LEVEL SENSOR "A" CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0463	Fuel Level Sensor "A" Circuit High	<Ref. to GD(H4DOTC)-176, DTC P0463 FUEL LEVEL SENSOR "A" CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P04AC	Evap System Purge Control Valve "B" Circuit Low	<Ref. to GD(H4DOTC)-178, DTC P04AC EVAP SYSTEM PURGE CONTROL VALVE "B" CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P04AD	Evap System Purge Control Valve "B" Circuit High	<Ref. to GD(H4DOTC)-179, DTC P04AD EVAP SYSTEM PURGE CONTROL VALVE "B" CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

List of Diagnostic Trouble Code (DTC)

GENERAL DESCRIPTION

DTC	Item	Note
P04DB	Crankcase Ventilation System Disconnected	<Ref. to GD(H4DOTC)-180, DTC P04DB CRANKCASE VENTILATION SYSTEM DISCONNECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0500	Vehicle Speed Sensor "A"	<Ref. to GD(H4DOTC)-182, DTC P0500 VEHICLE SPEED SENSOR "A", Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0506	Idle Air Control System RPM Lower Than Expected	<Ref. to GD(H4DOTC)-183, 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(H4DOTC)-184, DTC P0507 IDLE AIR CONTROL SYSTEM RPM HIGHER THAN EXPECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P050A	Cold Start Idle Air Control System Performance	<Ref. to GD(H4DOTC)-185, DTC P050A COLD START IDLE AIR CONTROL SYSTEM PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P050B	Cold Start Ignition Timing Performance	<Ref. to GD(H4DOTC)-189, DTC P050B COLD START IGNITION TIMING PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0560	System Voltage	<Ref. to GD(H4DOTC)-190, DTC P0560 SYSTEM VOLTAGE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0604	Internal Control Module Random Access Memory (RAM) Error	<Ref. to GD(H4DOTC)-191, 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(H4DOTC)-192, DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0606	Control Module Processor	<Ref. to GD(H4DOTC)-193, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P060A	Internal Control Module Monitoring Processor Performance	<Ref. to GD(H4DOTC)-195, DTC P060A INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P060B	Internal Control Module A/D Processing Performance	<Ref. to GD(H4DOTC)-197, DTC P060B INTERNAL CONTROL MODULE A/D PROCESSING PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0616	Starter Relay Circuit Low	<Ref. to GD(H4DOTC)-199, DTC P0616 STARTER RELAY CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0617	Starter Relay Circuit High	<Ref. to GD(H4DOTC)-200, DTC P0617 STARTER RELAY CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P062F	Internal Control Module EEPROM Error	<Ref. to GD(H4DOTC)-201, DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0851	Neutral Switch Input Circuit Low (MT Model)	<Ref. to GD(H4DOTC)-203, DTC P0851 NEUTRAL SWITCH INPUT CIRCUIT LOW (MT MODEL), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P0852	Neutral Switch Input Circuit High (MT Model)	<Ref. to GD(H4DOTC)-204, DTC P0852 NEUTRAL SWITCH INPUT CIRCUIT HIGH (MT MODEL), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1160	Return Spring Failure	<Ref. to GD(H4DOTC)-205, DTC P1160 RETURN SPRING FAILURE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1400	Fuel Tank Pressure Control Solenoid Valve Circuit Low	<Ref. to GD(H4DOTC)-207, DTC P1400 FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1410	Secondary Air Injection System Switching Valve Stuck Open	<Ref. to GD(H4DOTC)-209, DTC P1410 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1420	Fuel Tank Pressure Control Sol. Valve Circuit High	<Ref. to GD(H4DOTC)-211, DTC P1420 FUEL TANK PRESSURE CONTROL SOL. VALVE CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

List of Diagnostic Trouble Code (DTC)

GENERAL DESCRIPTION

DTC	Item	Note
P1449	Evaporative Emission Cont. Sys. Air Filter Clog	<Ref. to GD(H4DOTC)-213, DTC P1449 EVAPORATIVE EMISSION CONT. SYS. AIR FILTER CLOG, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P1451	Evaporative Emission Cont. Sys.	<Ref. to GD(H4DOTC)-215, DTC P1451 EVAPORATIVE EMISSION CONT. SYS., Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2004	Intake Manifold Runner Control Stuck Open (Bank 1)	<Ref. to GD(H4DOTC)-216, DTC P2004 INTAKE MANIFOLD RUNNER CONTROL STUCK OPEN (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2005	Intake Manifold Runner Control Stuck Open (Bank 2)	<Ref. to GD(H4DOTC)-217, DTC P2005 INTAKE MANIFOLD RUNNER CONTROL STUCK OPEN (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2006	Intake Manifold Runner Control Stuck Closed (Bank 1)	<Ref. to GD(H4DOTC)-218, DTC P2006 INTAKE MANIFOLD RUNNER CONTROL STUCK CLOSED (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2007	Intake Manifold Runner Control Stuck Closed (Bank 2)	<Ref. to GD(H4DOTC)-219, DTC P2007 INTAKE MANIFOLD RUNNER CONTROL STUCK CLOSED (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2008	Intake Manifold Runner Control Circuit / Open (Bank 1)	<Ref. to GD(H4DOTC)-220, DTC P2008 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT / OPEN (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2009	Intake Manifold Runner Control Circuit Low (Bank 1)	<Ref. to GD(H4DOTC)-222, DTC P2009 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT LOW (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2011	Intake Manifold Runner Control Circuit / Open (Bank 2)	<Ref. to GD(H4DOTC)-223, DTC P2011 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT / OPEN (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2012	Intake Manifold Runner Control Circuit Low (Bank 2)	<Ref. to GD(H4DOTC)-225, DTC P2012 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT LOW (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2016	Tumble Generated Valve Position Sensor 1 Circuit Low	<Ref. to GD(H4DOTC)-226, DTC P2016 TUMBLE GENERATED VALVE POSITION SENSOR 1 CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2017	Intake Manifold Runner Position Sensor / Switch Circuit High (Bank 1)	<Ref. to GD(H4DOTC)-228, DTC P2017 TUMBLE GENERATED VALVE POSITION SENSOR 1 CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2021	Tumble Generated Valve Position Sensor 2 Circuit Low	<Ref. to GD(H4DOTC)-230, DTC P2021 TUMBLE GENERATED VALVE POSITION SENSOR 2 CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2022	Intake Manifold Runner Position Sensor / Switch Circuit High (Bank 2)	<Ref. to GD(H4DOTC)-232, DTC P2022 TUMBLE GENERATED VALVE POSITION SENSOR 2 CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2088	Intake Camshaft Position Actuator Control Circuit Low (Bank 1)	<Ref. to GD(H4DOTC)-234, DTC P2088 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2089	Intake Camshaft Position Actuator Control Circuit High (Bank 1)	<Ref. to GD(H4DOTC)-235, DTC P2089 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2090	Exhaust Camshaft Position Actuator Control Circuit Low (Bank 1)	<Ref. to GD(H4DOTC)-236, DTC P2090 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2091	Exhaust Camshaft Position Actuator Control Circuit High (Bank 1)	<Ref. to GD(H4DOTC)-237, DTC P2091 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2092	Intake Camshaft Position Actuator Control Circuit Low (Bank 2)	<Ref. to GD(H4DOTC)-238, DTC P2092 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

List of Diagnostic Trouble Code (DTC)

GENERAL DESCRIPTION

DTC	Item	Note
P2093	Intake Camshaft Position Actuator Control Circuit High (Bank 2)	<Ref. to GD(H4DOTC)-238, DTC P2093 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2094	Exhaust Camshaft Position Actuator Control Circuit Low (Bank 2)	<Ref. to GD(H4DOTC)-238, DTC P2094 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2095	Exhaust Camshaft Position Actuator Control Circuit High (Bank 2)	<Ref. to GD(H4DOTC)-238, DTC P2095 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2096	Post Catalyst Fuel Trim System Too Lean (Bank 1)	<Ref. to GD(H4DOTC)-239, 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(H4DOTC)-241, 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(H4DOTC)-243, 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(H4DOTC)-245, DTC P2102 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2103	Throttle Actuator Control Motor Circuit High	<Ref. to GD(H4DOTC)-247, 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(H4DOTC)-249, DTC P2109 THROTTLE/PEDAL POSITION SENSOR "A" MINIMUM STOP PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2119	Throttle Actuator Control Throttle Body Range/Performance	<Ref. to GD(H4DOTC)-251, DTC P2119 THROTTLE ACTUATOR CONTROL THROTTLE BODY RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2122	Throttle/Pedal Position Sensor/Switch "D" Circuit Low Input	<Ref. to GD(H4DOTC)-255, 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(H4DOTC)-257, 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(H4DOTC)-259, DTC P2127 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2128	Throttle/Pedal Position Sensor/Switch "E" Circuit High Input	<Ref. to GD(H4DOTC)-261, 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(H4DOTC)-263, 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(H4DOTC)-265, DTC P2138 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D"/"E" VOLTAGE CORRELATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2195	O2 Sensor Signal Biased/Stuck Lean (Bank 1 Sensor 1)	<Ref. to GD(H4DOTC)-267, DTC P2195 O2 SENSOR SIGNAL BIASED/STUCK LEAN (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2196	O2 Sensor Signal Biased/Stuck Rich (Bank 1 Sensor 1)	<Ref. to GD(H4DOTC)-269, DTC P2196 O2 SENSOR SIGNAL BIASED/STUCK RICH (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P219A	Bank 1 Air-Fuel Ratio Imbalance	<Ref. to GD(H4DOTC)-271, DTC P219A BANK 1 AIR-FUEL RATIO IMBALANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

List of Diagnostic Trouble Code (DTC)

GENERAL DESCRIPTION

DTC	Item	Note
P2257	Air System Control "A" Circuit Low	<Ref. to GD(H4DOTC)-274, DTC P2257 AIR SYSTEM CONTROL "A" CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2258	Air System Control "A" Circuit High	<Ref. to GD(H4DOTC)-275, DTC P2258 AIR SYSTEM CONTROL "A" CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2401	Evaporative Emission System Leak Detection Pump Control Circuit Low	<Ref. to GD(H4DOTC)-276, DTC P2401 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2402	Evaporative Emission System Leak Detection Pump Control Circuit High	<Ref. to GD(H4DOTC)-278, DTC P2402 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2404	Evaporative Emission System Leak Detection Pump Sense Circuit Range/Performance	<Ref. to GD(H4DOTC)-279, DTC P2404 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP SENSE CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2419	Evaporative Emission System Switching Valve Control Circuit Low	<Ref. to GD(H4DOTC)-280, DTC P2419 EVAPORATIVE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2420	Evaporative Emission System Switching Valve Control Circuit High	<Ref. to GD(H4DOTC)-282, DTC P2420 EVAPORATIVE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2431	Secondary Air Injection System Air Flow /Pressure Sensor Circuit Range/Performance	<Ref. to GD(H4DOTC)-284, DTC P2431 SECONDARY AIR INJECTION SYSTEM AIR FLOW /PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2432	Secondary Air Injection System Air Flow /Pressure Sensor Circuit Low	<Ref. to GD(H4DOTC)-285, DTC P2432 SECONDARY AIR INJECTION SYSTEM AIR FLOW /PRESSURE SENSOR CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2433	Secondary Air Injection System Air Flow /Pressure Sensor Circuit High	<Ref. to GD(H4DOTC)-286, DTC P2433 SECONDARY AIR INJECTION SYSTEM AIR FLOW /PRESSURE SENSOR CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2440	Secondary Air Injection System Switching Valve Stuck Open (Bank1)	<Ref. to GD(H4DOTC)-287, DTC P2440 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN (BANK1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2441	Secondary Air Injection System Switching Valve Stuck Closed (Bank1)	<Ref. to GD(H4DOTC)-287, DTC P2441 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK CLOSED (BANK1), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2442	Secondary Air Injection System Switching Valve Stuck Open (Bank2)	<Ref. to GD(H4DOTC)-287, DTC P2442 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN (BANK2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2443	Secondary Air Injection System Switching Valve Stuck Closed (Bank2)	<Ref. to GD(H4DOTC)-287, DTC P2443 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK CLOSED (BANK2), Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2444	Secondary Air Injection System Pump Stuck On	<Ref. to GD(H4DOTC)-288, DTC P2444 SECONDARY AIR INJECTION SYSTEM PUMP STUCK ON, Diagnostic Trouble Code (DTC) Detecting Criteria.>
P2610	ECM/PCM Internal Engine Off Timer Performance	<Ref. to GD(H4DOTC)-289, DTC P2610 ECM/PCM INTERNAL ENGINE OFF TIMER PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0073	CAN Failure, Bus 'Off' Detection	<Ref. to GD(H4DOTC)-297, DTC U0073 CAN FAILURE, BUS 'OFF' DETECTION, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0122	CAN (VDC) Data Not Loaded	<Ref. to GD(H4DOTC)-298, DTC U0122 CAN (VDC) DATA NOT LOADED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0140	CAN (BCU) Data Not Loaded	<Ref. to GD(H4DOTC)-298, DTC U0140 CAN (BCU) DATA NOT LOADED, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0416	CAN (VDC) Data Abnormal	<Ref. to GD(H4DOTC)-299, DTC U0416 CAN (VDC) DATA ABNORMAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>
U0422	CAN (BCU) Data Abnormal	<Ref. to GD(H4DOTC)-299, DTC U0422 CAN (BCU) DATA ABNORMAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>

2. Diagnostic Trouble Code (DTC) Detecting Criteria

A: DTC B1570 ANTENNA

1. OUTLINE OF DIAGNOSIS

DTC	Item	OUTLINE OF DIAGNOSIS
B1570	Antenna	Faulty antenna
B1571	Reference Code Incompatibility	Reference code incompatibility between body integrated unit and ECM
B1572	IMM Circuit Failure (Except Antenna Circuit)	Communication failure between body integrated unit and ECM
B1574	Key Communication Failure	The body integrated unit to confirm the key (transponder) ID code has malfunction, of the transponder is faulty.
B1575	Incorrect Immobilizer Key	Incorrect immobilizer key (Use of unregistered key in body integrated unit)
B1576	EGI Control Module EEPROM	ECM malfunctioning
B1577	IMM Control Module EEPROM	Body integrated unit malfunctioning
B1578	Meter Failure	Reference code incompatibility between combination meter and body integrated unit

2. ENABLE CONDITIONS

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.

B: DTC B1571 REFERENCE CODE INCOMPATIBILITY

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC B1570. <Ref. to GD(H4DOTC)-11, DTC B1570 ANTENNA, Diagnostic Trouble Code (DTC) Detecting Criteria.>

C: DTC B1572 IMM CIRCUIT FAILURE (EXCEPT ANTENNA CIRCUIT)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC B1570. <Ref. to GD(H4DOTC)-11, DTC B1570 ANTENNA, Diagnostic Trouble Code (DTC) Detecting Criteria.>

D: DTC B1574 KEY COMMUNICATION FAILURE

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC B1570. <Ref. to GD(H4DOTC)-11, DTC B1570 ANTENNA, Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

E: DTC B1575 INCORRECT IMMOBILIZER KEY

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC B1570. <Ref. to GD(H4DOTC)-11, DTC B1570 ANTENNA, Diagnostic Trouble Code (DTC) Detecting Criteria.>

F: DTC B1576 EGI CONTROL MODULE EEPROM

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC B1570. <Ref. to GD(H4DOTC)-11, DTC B1570 ANTENNA, Diagnostic Trouble Code (DTC) Detecting Criteria.>

G: DTC B1577 IMM CONTROL MODULE EEPROM

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC B1570. <Ref. to GD(H4DOTC)-11, DTC B1570 ANTENNA, Diagnostic Trouble Code (DTC) Detecting Criteria.>

H: DTC B1578 METER FAILURE

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC B1570. <Ref. to GD(H4DOTC)-11, DTC B1570 ANTENNA, Diagnostic Trouble Code (DTC) Detecting Criteria.>

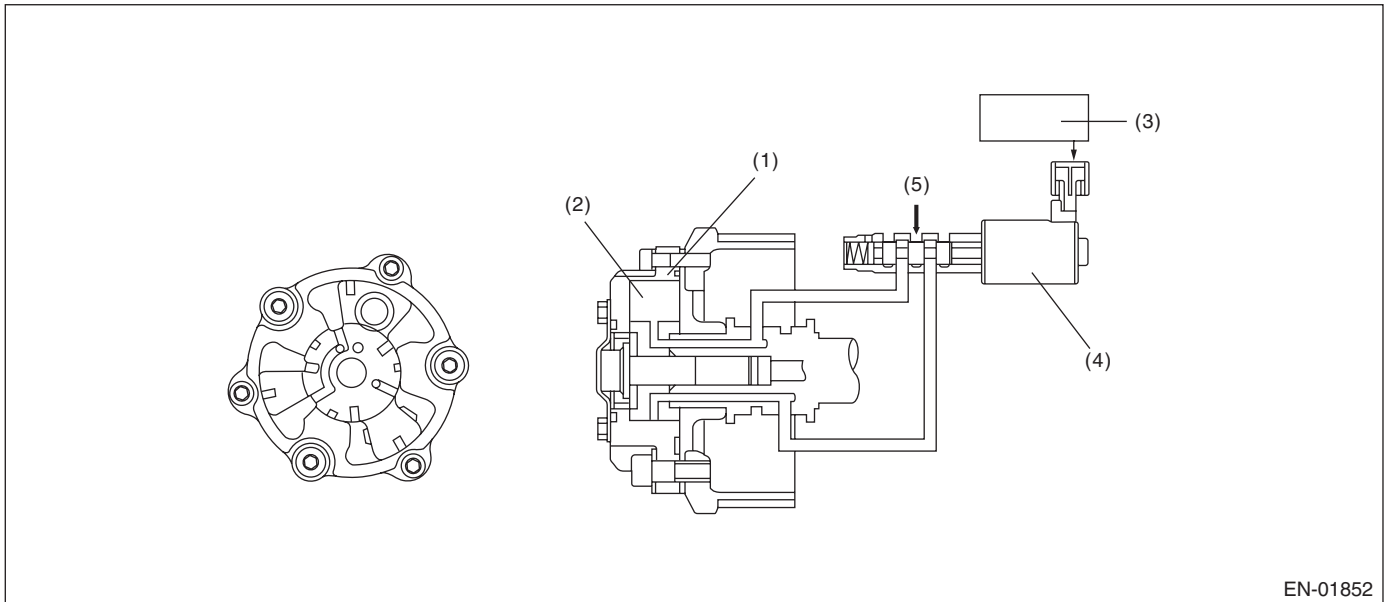
I: DTC P0011 INTAKE CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 1)

1. OUTLINE OF DIAGNOSIS

Detect the AVCS system malfunction.

Judge NG when the amount of AVCS actual timing advance does not approach to the amount of AVCS target timing advance.

2. COMPONENT DESCRIPTION



EN-01852

(1) AVCS timing controller	(3) Engine control module (ECM)	(5) Oil pressure
(2) Vane	(4) Oil flow control solenoid valve	

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Time of establishing all secondary parameter conditions	≥ 3000 ms
Battery voltage	≥ 10.9 V
Engine speed	≥ 1300 rpm (models without SI-DRIVE) ≥ 1500 rpm (models with SI-DRIVE)
Engine coolant temperature	≥ 60 °C (140 °F)
AVCS control	Operation
Target timing advance change amount (per 64 ms)	< 1.07 °CA

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after warming up when the engine speed increases and AVCS operates.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

- 1) When the conditions during which the differences of AVCS target timing advance amount and AVCS actual timing advance amount is large continues for certain amount of time.
- 2) When the differences of target timing advance amount and actual timing advance amount is calculated during AVCS control, and the difference per predetermined time is the specified value or larger.

• Abnormality Judgment

Judge as NG when the following conditions are established within the predetermined time.

Judgment Value

Models without SI-DRIVE

Malfunction Criteria	Threshold Value
$\Sigma(\text{Target position} - \text{Actual position})$	> 5300 °CA (Bank 1) > 5300 °CA (Bank 2)
or	
$\Sigma(\text{Target position} - \text{Actual position})$	< -5300 °CA (Bank 1) < -5300 °CA (Bank 2)

Time Needed for Diagnosis: 20000 ms

Models with SI-DRIVE

Malfunction Criteria	Threshold Value
$\Sigma(\text{Target position} - \text{Actual position})$	> 8000 °CA (Bank 1) > 8000 °CA (Bank 2)
or	
$\Sigma(\text{Target position} - \text{Actual position})$	< -8000 °CA (Bank 1) < -8000 °CA (Bank 2)

Time Needed for Diagnosis: 30000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established within the predetermined time.

Judgment Value

Models without SI-DRIVE

Malfunction Criteria	Threshold Value
$\Sigma(\text{Target position} - \text{Actual position})$	≤ 5300 °CA (Bank 1) ≤ 5300 °CA (Bank 2) and ≥ -5300 °CA (Bank 1) ≥ -5300 °CA (Bank 2)

Time Needed for Diagnosis: 20000 ms

Models with SI-DRIVE

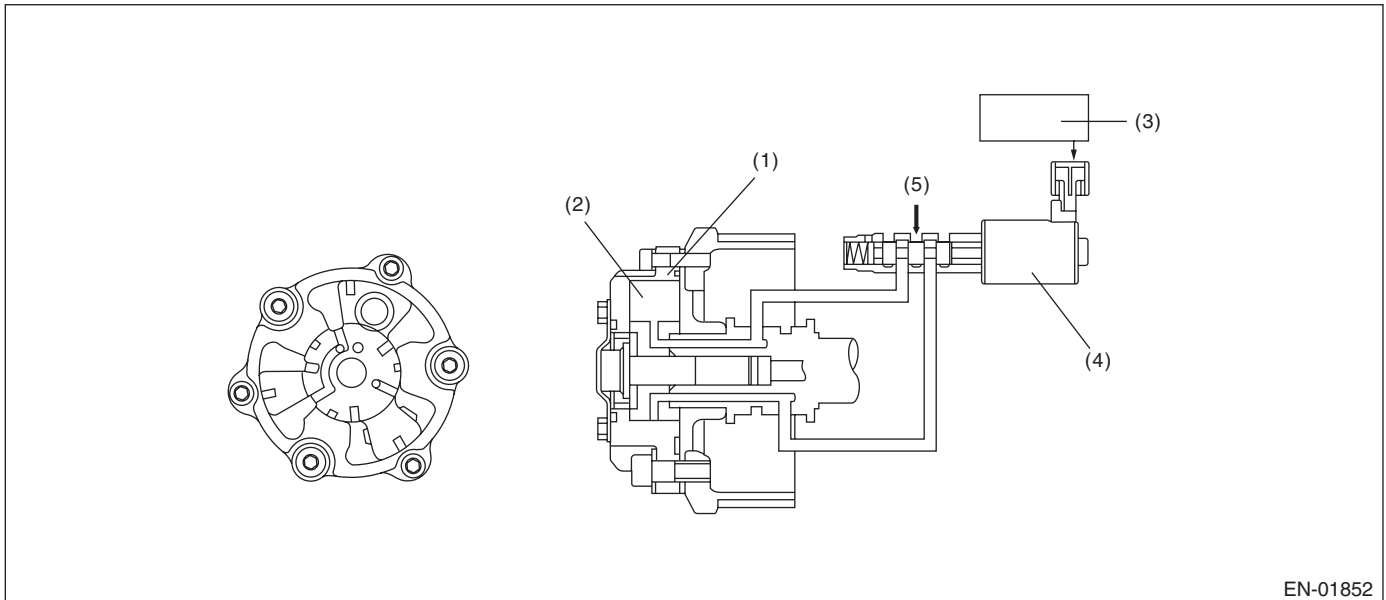
Malfunction Criteria	Threshold Value
$\Sigma(\text{Target position} - \text{Actual position})$	≤ 8000 °CA (Bank 1) ≤ 8000 °CA (Bank 2) and ≥ -8000 °CA (Bank 1) ≥ -8000 °CA (Bank 2)

Time Needed for Diagnosis: 30000 ms

J: DTC P0014 EXHAUST AVCS SYSTEM 1 (RANGE/PERFORMANCE)**1. OUTLINE OF DIAGNOSIS**

Detect the exhaust AVCS system malfunction.

Judge NG when the amount of exhaust AVCS actual timing advance does not approach the amount of exhaust AVCS target timing advance.

2. COMPONENT DESCRIPTION

(1) Exhaust AVCS timing controller

(3) Engine control module (ECM)

(5) Oil pressure

(2) Vane

(4) Oil flow control solenoid valve

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Time of establishing all secondary parameter conditions	≥ 3000 ms
Battery voltage	≥ 10.9 V
Engine speed	≥ 1500 rpm
Engine coolant temperature	≥ 60 °C (140 °F)
Exhaust AVCS control	Operation
Target timing advance change amount (per 64 ms)	< 1.07 °CA

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after warming up when the engine speed increases and exhaust AVCS operates.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

- 1) When the conditions during which the differences of exhaust AVCS target timing advance amount and exhaust AVCS actual timing advance amount is large continues for certain amount of time.
- 2) When the differences of target timing advance amount and actual timing advance amount is calculated during exhaust AVCS control, and the difference per predetermined time is the specified value or larger.

• Abnormality Judgment

Judge as NG when the following conditions are established within the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
$\Sigma(\text{Target position} - \text{Actual position})$	> 8000 °CA (Bank 1) > 8000 °CA (Bank 2)
or	
$\Sigma(\text{Target position} - \text{Actual position})$	< -8000 °CA (Bank 1) < -8000 °CA (Bank 2)

Time Needed for Diagnosis:

30000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established within the predetermined time.

Judgment Value

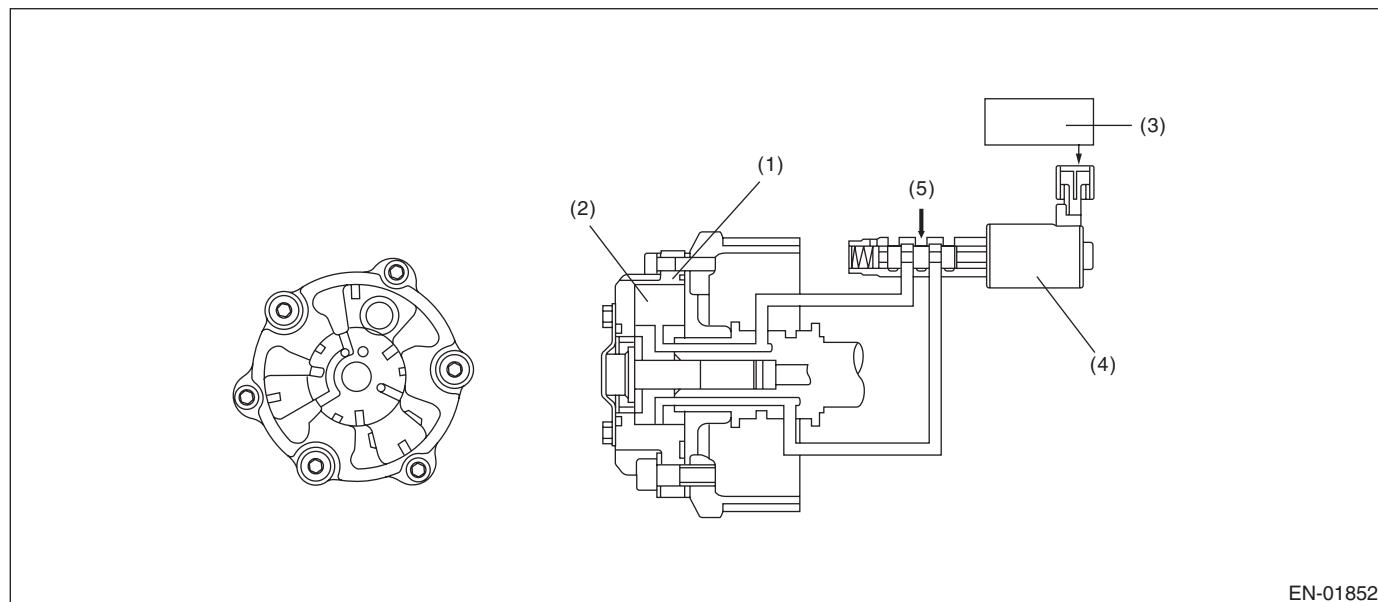
Malfunction Criteria	Threshold Value
$\Sigma(\text{Target position} - \text{Actual position})$	≤ 8000 °CA (Bank 1) ≤ 8000 °CA (Bank 2) and ≥ -8000 °CA (Bank 1) ≥ -8000 °CA (Bank 2)

Time Needed for Diagnosis: 30000 ms

K: DTC P0016 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION (BANK1)**1. OUTLINE OF DIAGNOSIS**

Detect the AVCS system malfunction.

Judge as NG when standard timing advance amount is far from learning angle.

2. COMPONENT DESCRIPTION

EN-01852

(1) AVCS timing controller

(3) Engine control module (ECM)

(5) Oil pressure

(2) Vane

(4) Oil flow control solenoid valve

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	≥ 10.9 V
Engine speed (models without SI-DRIVE)	≥ 600 rpm and < 1000 rpm
Engine speed (models with SI-DRIVE)	≥ 600 rpm and < 975 rpm
Engine coolant temperature	≥ 70 °C (158 °F)
AVCS control	Not in operation
Target timing advance	0°CA

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting engine and while AVCS is not operating.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Judge as NG when the absolute value of the difference between cam signal input position and learning value is out of specification.

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Crankshaft position when camshaft position sensor signal is input – Learning value	> 8.5 °CA

Time Needed for Diagnosis: 20000 ms

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

NOTE:

Initial standard learning value is the value of crank angle initially input at the production plant. And then it will be updated every time normal judgment has been completed. Learning value will not be updated if NG judgment occurs because timing belt or chain derails suddenly in process or because wrong assembly occurs during servicing.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

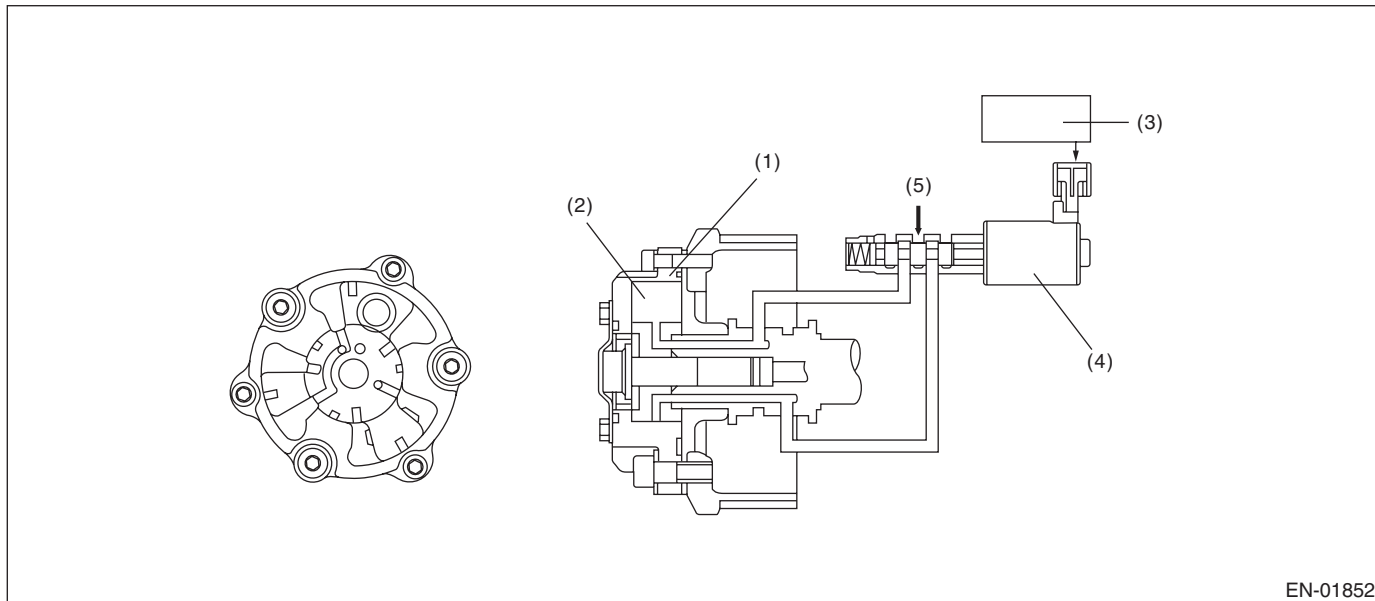
Malfunction Criteria	Threshold Value
Crankshaft position when camshaft position sensor signal is input – Learning value	≤ 8.5 °CA

Time Needed for Diagnosis: Less than 1 second

L: DTC P0017 CRANK AND CAM TIMING B SYSTEM FAILURE (BANK 1)**1. OUTLINE OF DIAGNOSIS**

Detect the exhaust AVCS system malfunction.

Judge as NG when standard timing advance amount is far from learning angle.

2. COMPONENT DESCRIPTION

EN-01852

(1) Exhaust AVCS timing controller

(3) Engine control module (ECM)

(5) Oil pressure

(2) Vane

(4) Oil flow control solenoid valve

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Engine speed	$\geq 600 \text{ rpm}$ and $< 975 \text{ rpm}$
Engine coolant temperature	$\geq 70 \text{ }^{\circ}\text{C}$ (158 $^{\circ}\text{F}$)
Exhaust AVCS control	Not in operation
Target timing advance	0 $^{\circ}\text{CA}$

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously while the exhaust AVCS is not operating after warming up.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Judge as NG when the absolute value of the difference between cam signal input position and learning value is out of specification.

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Crankshaft position when camshaft position sensor signal is input – Learning value	> 8.5 °CA

Time Needed for Diagnosis: 20000 ms

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

NOTE:

Initial standard learning value is the value of crank angle initially input at the production plant. And then it will be updated every time normal judgment has been completed. Learning value will not be updated if NG judgment occurs because timing belt or chain derails suddenly in process or because wrong assembly occurs during servicing.

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Crankshaft position when camshaft position sensor signal is input – Learning value	≤ 8.5 °CA

Time Needed for Diagnosis: Less than 1 second

M: DTC P0018 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION (BANK2)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0016. <Ref. to GD(H4DOTC)-17, DTC P0016 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION (BANK1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

N: DTC P0019 CRANK AND CAM TIMING B SYSTEM FAILURE (BANK 2)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0017. <Ref. to GD(H4DOTC)-19, DTC P0017 CRANK AND CAM TIMING B SYSTEM FAILURE (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

O: DTC P0021 INTAKE CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 2)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0011. <Ref. to GD(H4DOTC)-13, DTC P0011 INTAKE CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

P: DTC P0024 EXHAUST AVCS SYSTEM 2 (RANGE/PERFORMANCE)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0014. <Ref. to GD(H4DOTC)-15, DTC P0014 EXHAUST AVCS SYSTEM 1 (RANGE/PERFORMANCE), Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

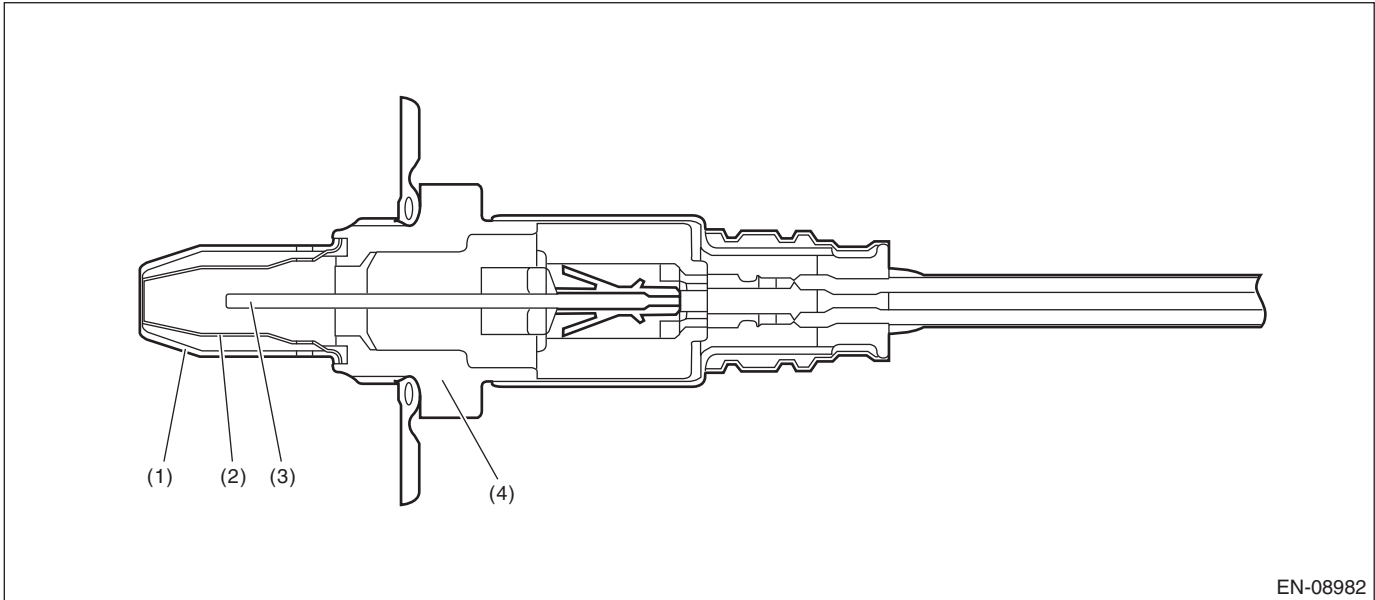
Q: DTC P0030 HO2S HEATER CONTROL CIRCUIT (BANK 1 SENSOR 1)

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 when looking at engine status such as deceleration fuel cut.

2. COMPONENT DESCRIPTION



(1) Element cover (outer)

(3) Sensor element

(4) Sensor housing

(2) Element cover (inner)

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Condition established time	≥ 42000 ms
Battery voltage	≥ 10.9 V
Heater current	Permitted
A/F sensor heater final control	Main energization status
Elapsed time after returning from the fuel cut	≥ 20000 ms

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after 42000 ms or more have passed since the engine started.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

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

Time Needed for Diagnosis: 10000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Front oxygen (A/F) sensor impedance	$\leq$ 50 Ω

Time Needed for Diagnosis: 10000 ms

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

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

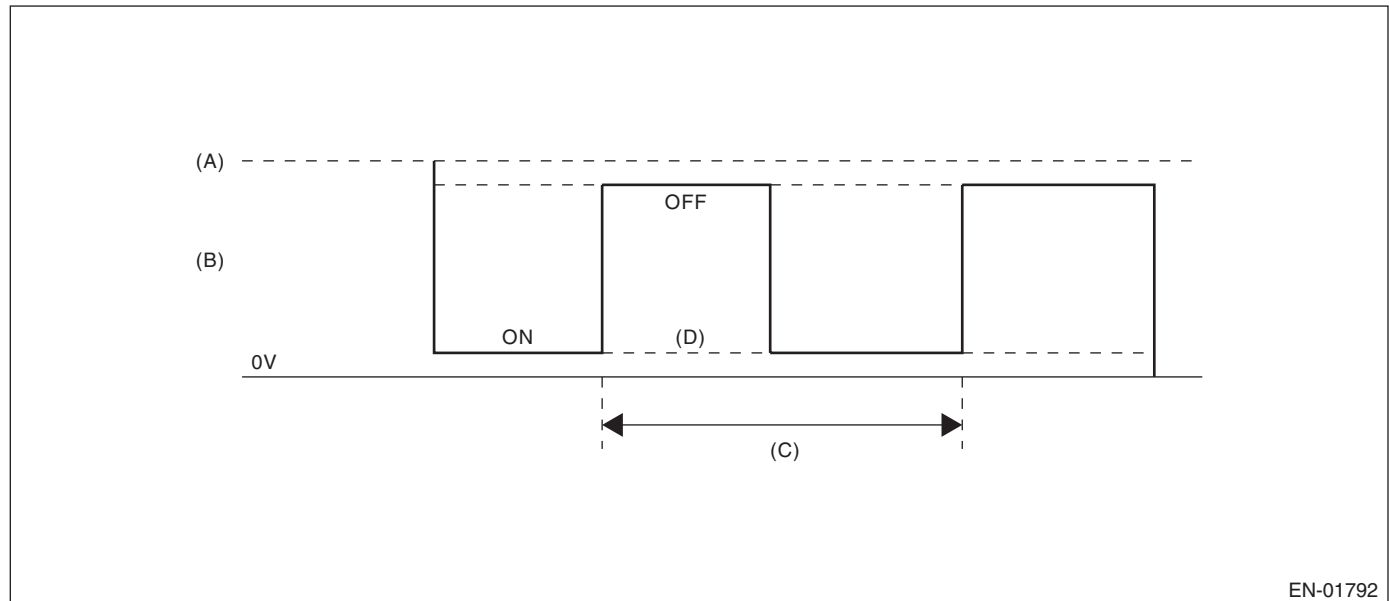
1. OUTLINE OF DIAGNOSIS

Detect front oxygen (A/F) sensor heater open or short circuit.

The front oxygen (A/F) 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



EN-01792

(A) Battery voltage

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

(C) 128 ms

(D) Low error

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

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

Time Needed for Diagnosis: 4 ms × 250 time(s)

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage level	High

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

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

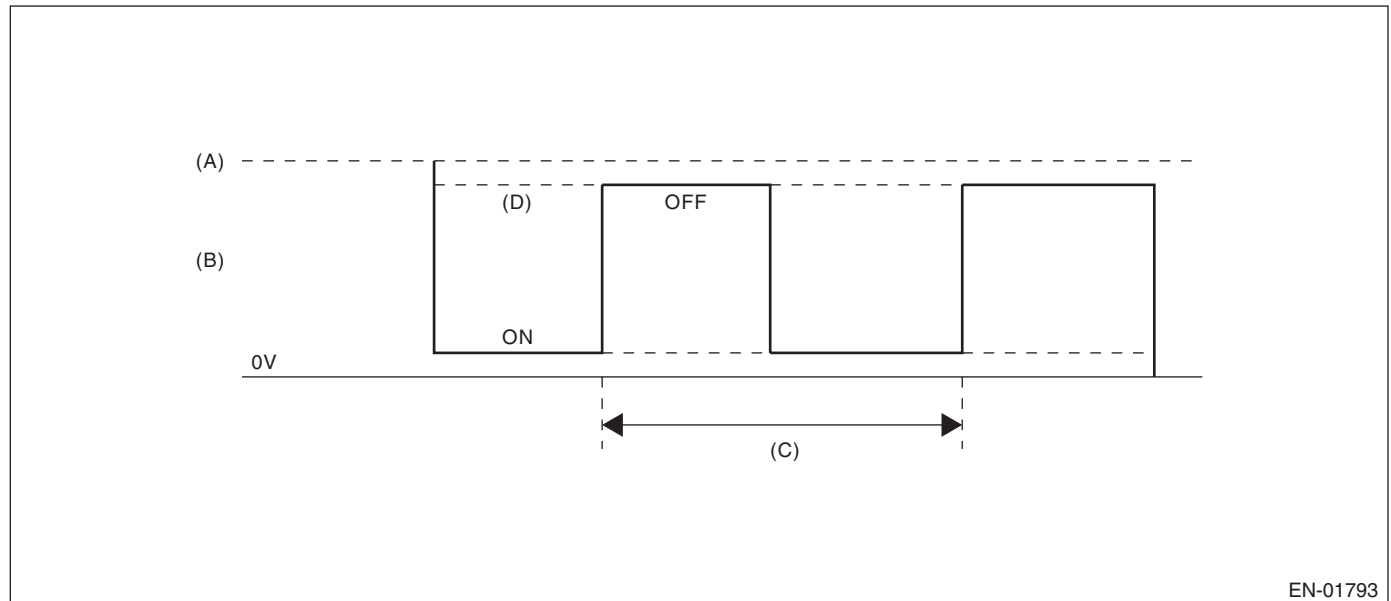
1. OUTLINE OF DIAGNOSIS

Detect front oxygen (A/F) sensor heater open or short circuit.

The front oxygen (A/F) 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

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

(C) 128 ms

(D) High error

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

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: 4 ms $\times$ 500 time(s)

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage level	Low

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

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

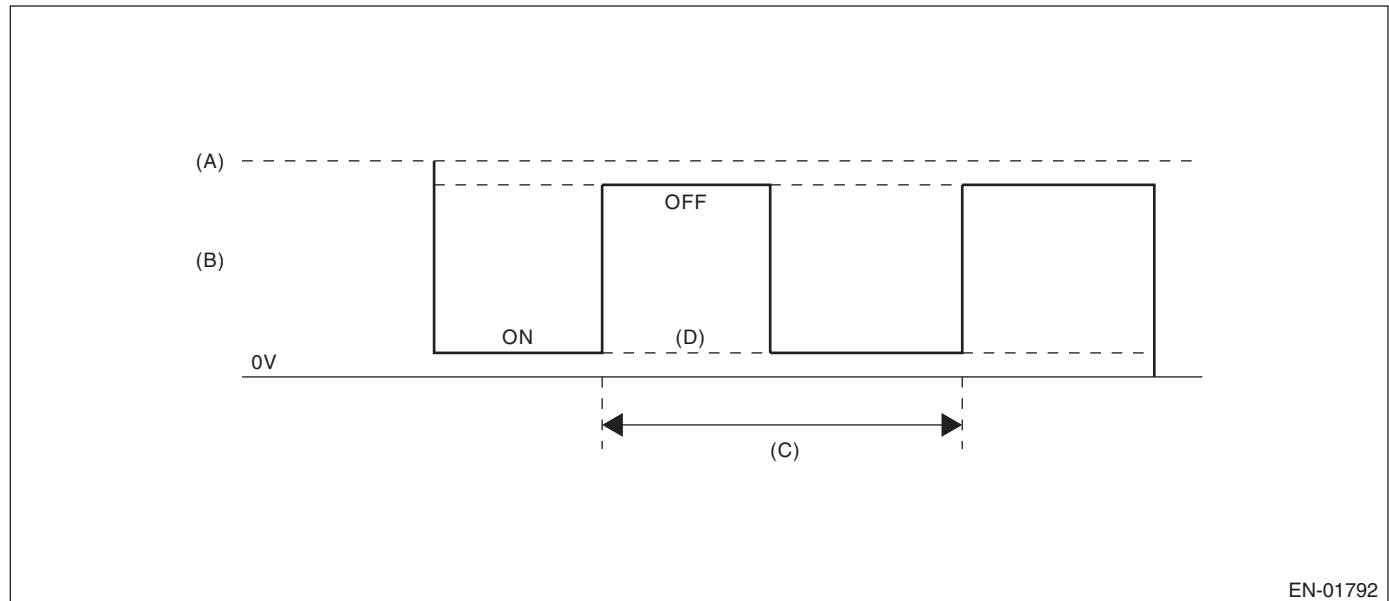
1. OUTLINE OF DIAGNOSIS

Detect the rear oxygen sensor heater open or short circuit.

The rear 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

(B) Output voltage of the rear oxygen sensor heater

(C) 256 ms (cycles)

(D) Low error

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Elapsed time after engine starting	$\geq 1 \text{ second}$
Engine speed	$< 8000 \text{ rpm}$

4. GENERAL DRIVING CYCLE

After starting the engine, perform the diagnosis continuously when engine is low speed.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

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

Time Needed for Diagnosis: 8 ms × 1250 time(s)

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage level	High

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

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

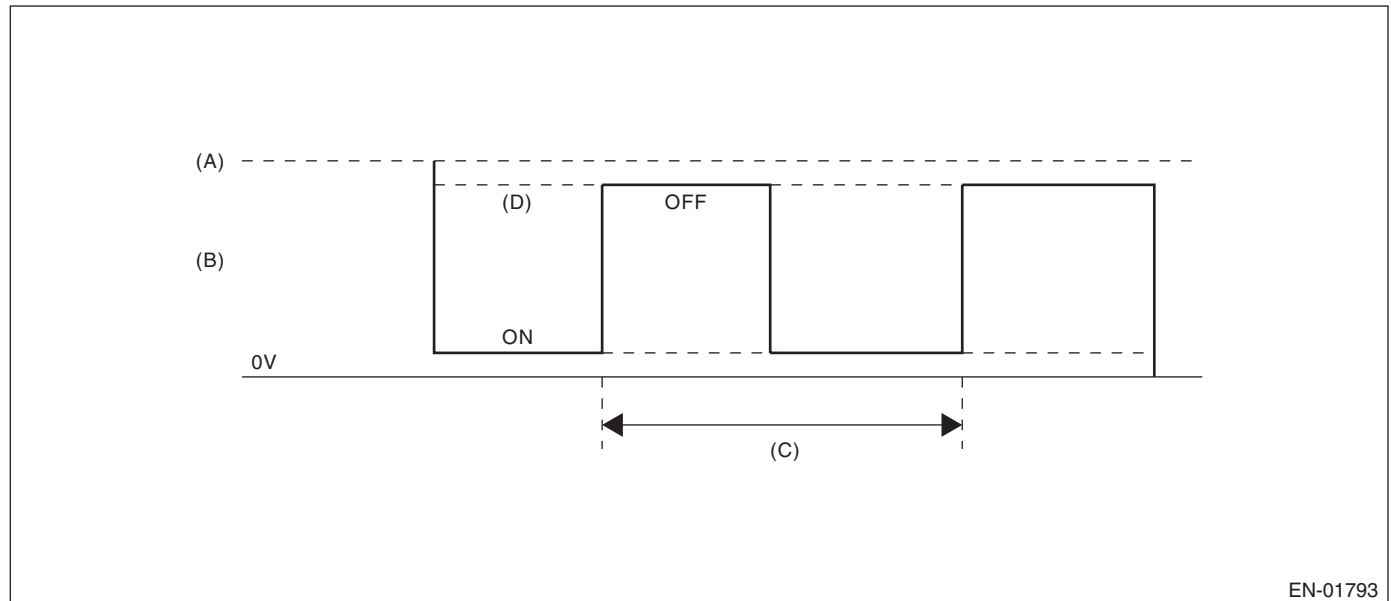
1. OUTLINE OF DIAGNOSIS

Detect the rear oxygen sensor heater open or short circuit.

The rear 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



(A) Battery voltage

(B) Output voltage of the rear oxygen sensor heater

(C) 256 ms (cycles)

(D) High error

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Elapsed time after engine starting	$\geq 1 \text{ second}$
Engine speed	$< 8000 \text{ rpm}$

4. GENERAL DRIVING CYCLE

After starting the engine, perform the diagnosis continuously when engine is low speed.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage level	High
Rear oxygen sensor heater control duty	$\geq 25 \%$

Time Needed for Diagnosis: 8 ms $\times$ 320 time(s)

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage level	Low

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

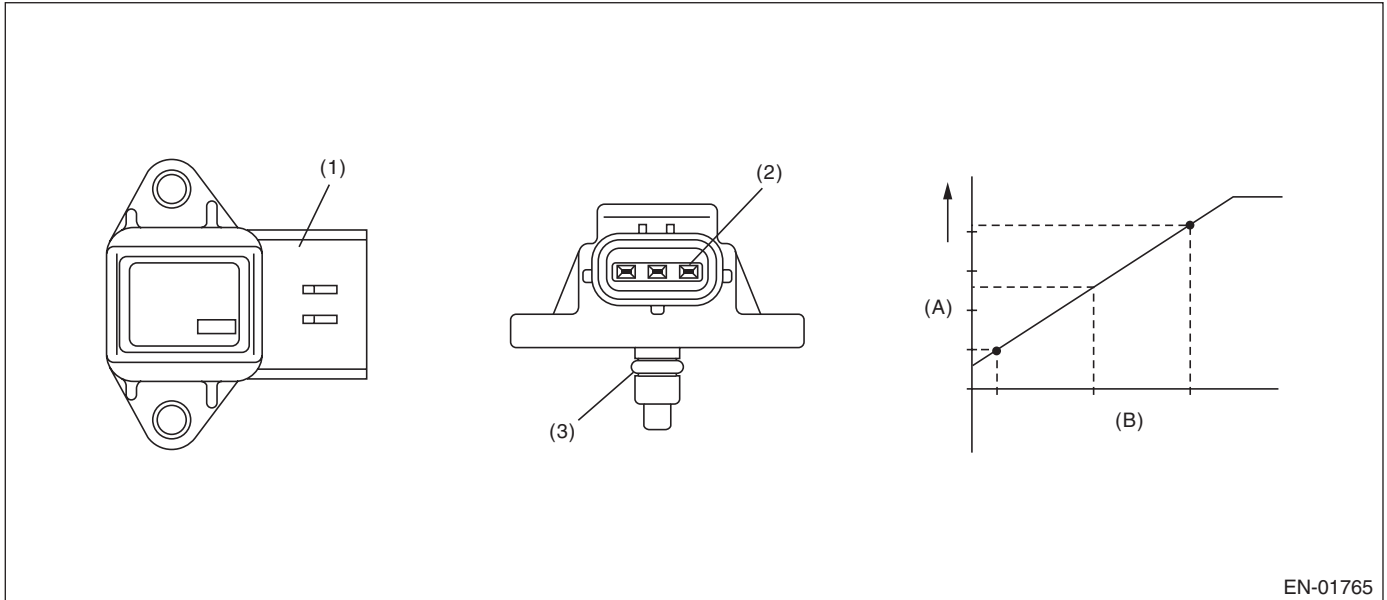
V: DTC P0068 MAP/MAF - THROTTLE POSITION CORRELATION

1. OUTLINE OF DIAGNOSIS

Detect problems in the intake manifold pressure sensor output properties.

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

(A) Output voltage

(B) Absolute pressure

(1) Connector

(2) Terminals

(3) O-ring

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Engine coolant temperature	$\geq 70^{\circ}\text{C}$ (158 $^{\circ}\text{F}$)

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 Low side or High side becomes NG.

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Low	
Engine speed	< 2500 rpm
Throttle position	$\geq 10^\circ$
Output voltage	< 1 V (Models without SI-DRIVE) < 0.764 V (Models with SI-DRIVE)
Engine load	> 1.356 g/rev (0.05 oz/rev)
High	
Engine speed	600 rpm — 900 rpm
Throttle position	< 2.75°
Output voltage	≥ 2.36 V (Models without SI-DRIVE) ≥ 2.126 V (Models with SI-DRIVE)
Engine load	< 0.4 g/rev (0.01 oz/rev)

Time Needed for Diagnosis:

Low side: 5000 ms

High side: 5000 ms

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.

If the duration of time while the following conditions are met is longer than the time indicated, judge as OK.

Judgment Value

Malfunction Criteria	Threshold Value
Low	
Engine speed	< 2500 rpm
Throttle position	$\geq 10^\circ$
Output voltage	≥ 1 V (Models without SI-DRIVE) ≥ 0.764 V (Models with SI-DRIVE)
Engine load	> 1.356 g/rev (0.05 oz/rev)
High	
Engine speed	600 rpm — 900 rpm
Throttle position	< 2.75°
Output voltage	< 2.36 V (Models without SI-DRIVE) < 2.126 V (Models with SI-DRIVE)
Engine load	< 0.4 g/rev (0.01 oz/rev)

Time Needed for Diagnosis:

Low side: Less than 1 second

High side: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

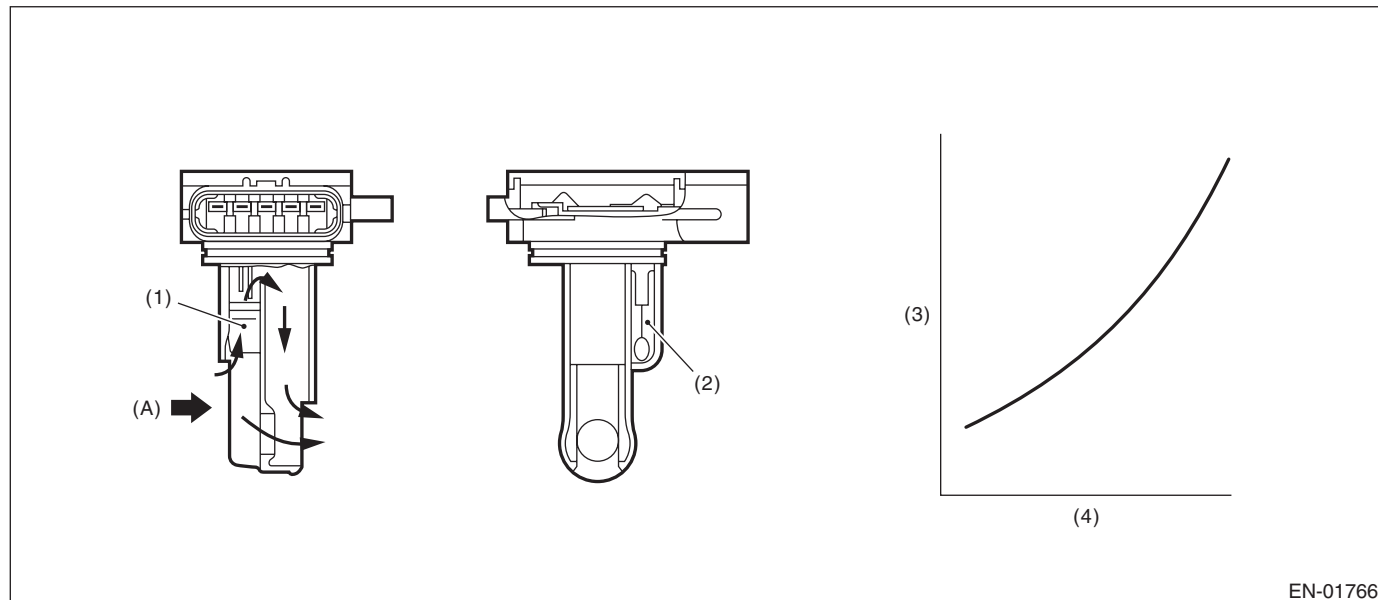
W: DTC P0101 MASS OR VOLUME AIR FLOW CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of air flow sensor output properties.

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



(A) Air

(1) Air flow sensor

(3) Voltage (V)

(4) Amount of intake air (kg (lb)/s)

(2) Intake air temperature sensor

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Engine coolant temperature	$\geq 70^{\circ}\text{C}$ (158 °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 Low side or High side becomes NG.

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Low	
Output voltage	< 1.5 V
Engine speed	≥ 2500 rpm
Throttle opening angle	≥ 15 °
Intake manifold pressure	≥ 53.3 kPa (400 mmHg, 15.7 inHg)
High (1)	
Output voltage	≥ 1.95 V
Engine speed	600 rpm — 900 rpm
Throttle opening angle	< 4.1 °
Intake manifold pressure	< 52.7 kPa (395 mmHg, 15.6 inHg)
High (2)	
Output voltage	≥ 1.70 V
Engine speed	600 rpm — 900 rpm
Throttle opening angle	< 4.1 °
Intake manifold pressure	< 52.7 kPa (395 mmHg, 15.6 inHg)
Fuel system diagnosis	Rich side malfunction

Time Needed for Diagnosis:

Low: 5000 ms

High: 5000 ms

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 and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Low	
Output voltage	≥ 1.5 V
Engine speed	≥ 2500 rpm
Throttle opening angle	≥ 15 °
Intake manifold pressure	≥ 53.3 kPa (400 mmHg, 15.7 inHg)
High	
Output voltage	< 1.95 V
Engine speed	600 rpm — 900 rpm
Throttle opening angle	< 4.1 °
Intake manifold pressure	< 52.7 kPa (395 mmHg, 15.6 inHg)
Fuel system diagnosis	Rich side normal

Time Needed for Diagnosis:

Low: Less than 1 second

High: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

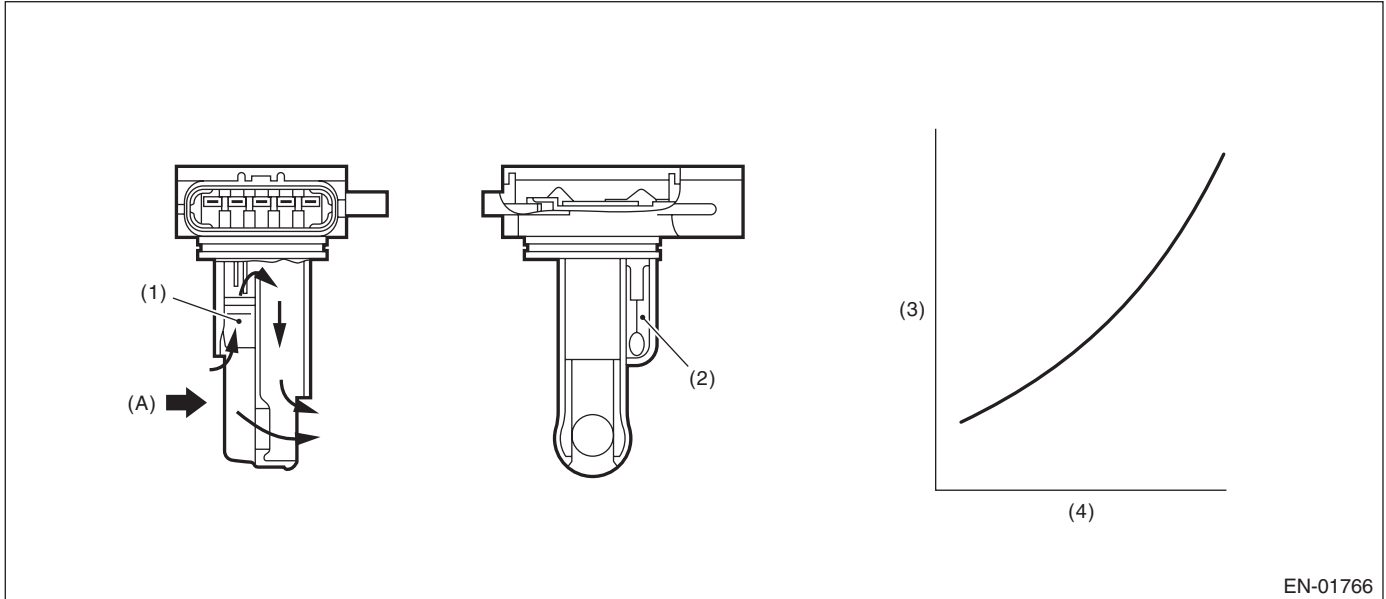
GENERAL DESCRIPTION

X: 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 out of specification.

2. COMPONENT DESCRIPTION



EN-01766

(A) Air

(1) Air flow sensor

(3) Voltage (V)

(4) Amount of intake air (kg (lb)/s)

(2) Intake air temperature sensor

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≤ 0.22 V

Time Needed for Diagnosis: 500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	> 0.22 V

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

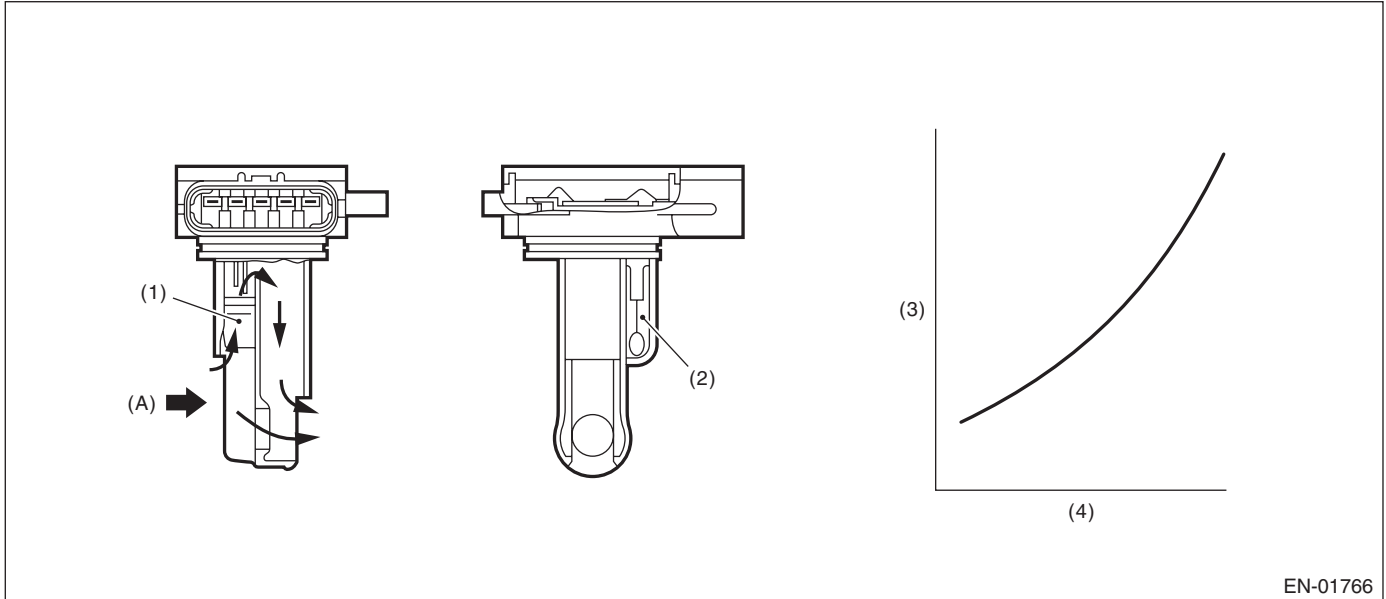
GENERAL DESCRIPTION

Y: 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 out of specification.

2. COMPONENT DESCRIPTION



EN-01766

(A) Air

(1) Air flow sensor

(3) Voltage (V)

(4) Amount of intake air (kg (lb)/s)

(2) Intake air temperature sensor

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.952 V

Time Needed for Diagnosis: 500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 4.952 V

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

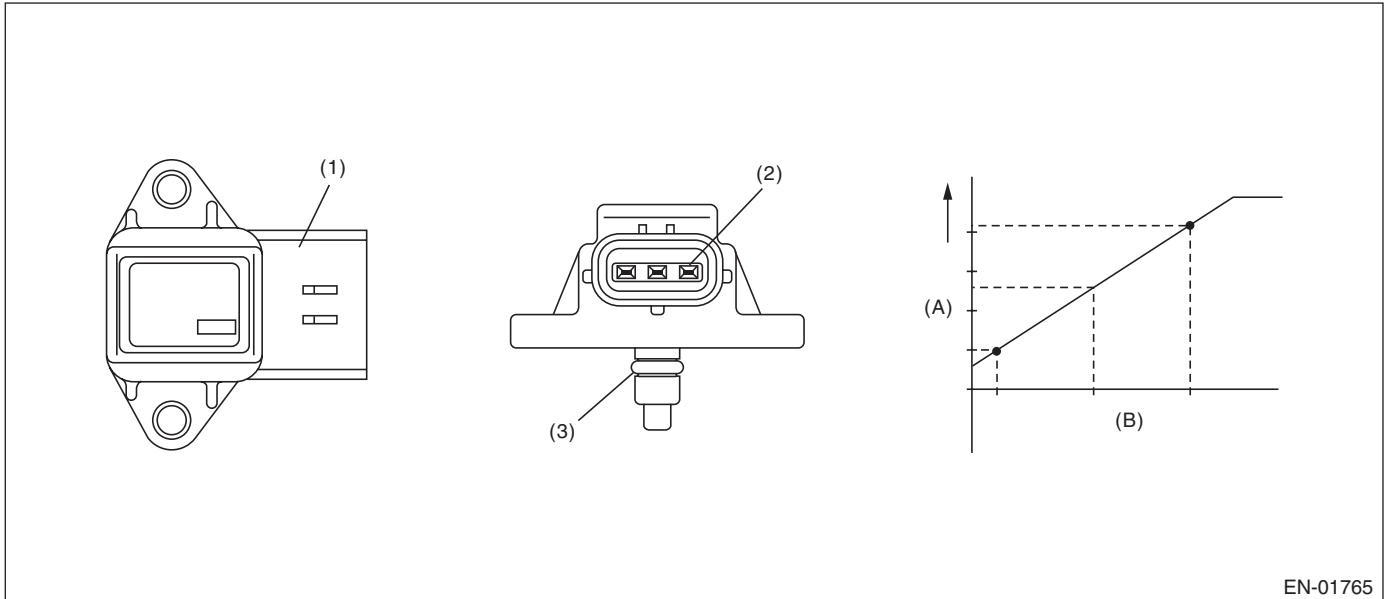
Z: DTC P0107 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT LOW INPUT

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of intake manifold pressure sensor.

Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Output voltage

(B) Absolute pressure

(1) Connector

(2) Terminals

(3) O-ring

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≤ 0.822 V (Models without SI-DRIVE) ≤ 0.581 V (Models with SI-DRIVE)

Time Needed for Diagnosis: 2000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	> 0.822 V (Models without SI-DRIVE) > 0.581 V (Models with SI-DRIVE)

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

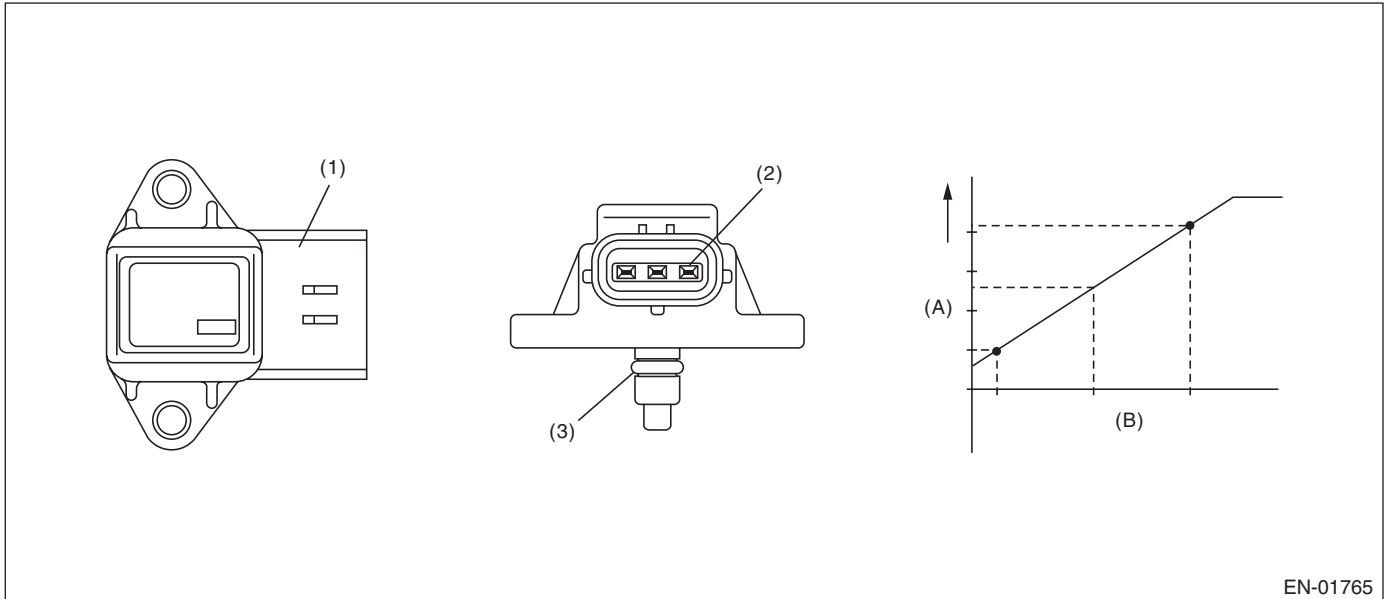
AA:DTC P0108 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT HIGH INPUT

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of intake manifold pressure sensor.

Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) Output voltage

(B) Absolute pressure

(1) Connector

(2) Terminals

(3) O-ring

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.474 V (models without SI-DRIVE) ≥ 4.681 V (models with SI-DRIVE)

Time Needed for Diagnosis: 2000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 4.474 V (models without SI-DRIVE) < 4.681 V (models with SI-DRIVE)

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

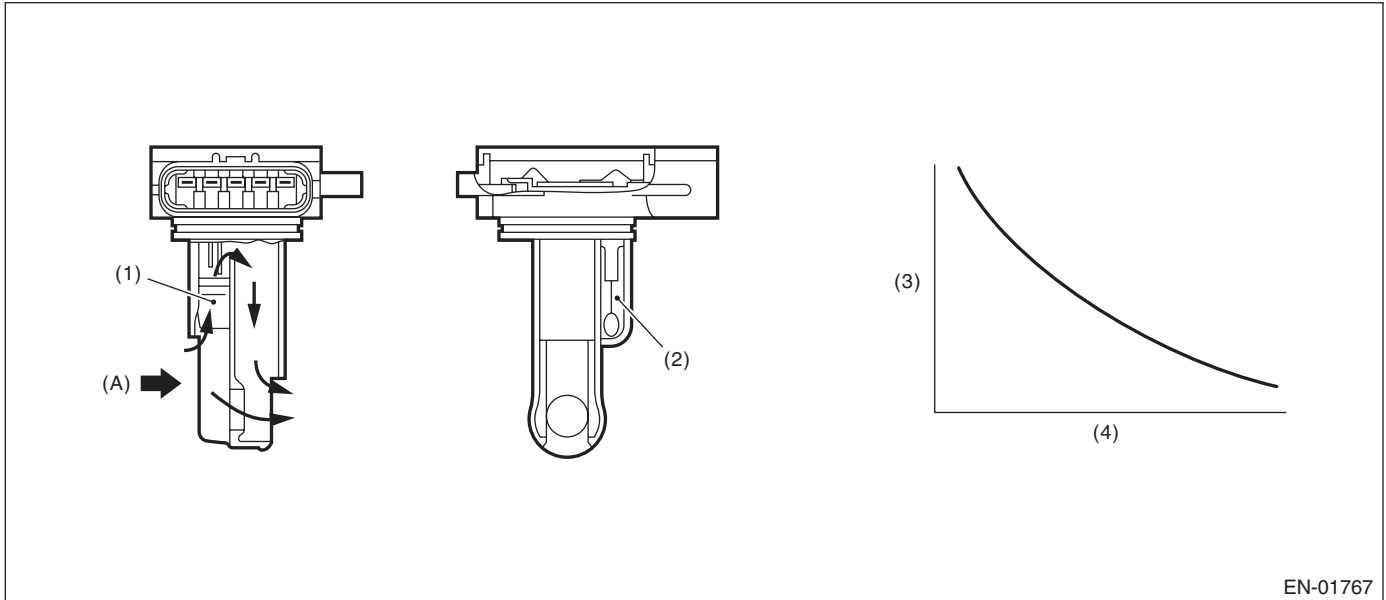
AB:DTC P0111 INTAKE AIR TEMPERATURE SENSOR RANGE/PERFORMANCE PROBLEM

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



EN-01767

(A) Air

(1) Air flow sensor

(2) Intake air temperature sensor

(3) Resistance value (Ω)

(4) Intake air temperature °C (°F)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Engine coolant temperature at engine starting	< 200 °C (392 °F)
Battery voltage	≥ 10.9 V
Continuous time when the vehicle speed is less than 200 km/h (124.3 MPH)	≥ 1 s
Engine coolant temperature	≥ 70 °C (158 °F)
Intake air amount sum value	≥ Value of Map 1
Number of experiences under conditions below	≥ 3 time(s)
• Continuous time when vehicle speed is less than 4 km/h (2.5 MPH)	≥ Value from Map 2
• Continuous time when vehicle speed is 40 km/h (24.9 MPH) or more	≥ 15 s
and	
Establishing time of 1, 2	≥ 15 s
1. Intake air amount	≥ 15 g/s (0.53 oz/s)
2. Vehicle speed	≥ 4 km/h (2.5 MPH)

Map 1 (Models without SI-DRIVE)

Engine coolant temperature °C (°F)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)
Intake air amount sum value (g (oz))	76000 (2680.52)	10192 (359.47)	9028 (318.42)	7864 (277.36)	5800 (204.57)

Map 1 (Models with SI-DRIVE)

Engine coolant temperature °C (°F)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)
Intake air amount sum value (g (oz))	76000 (2680.52)	10192 (359.47)	9028 (318.42)	7864 (277.36)	6320 (222.91)

Map 2

Engine coolant temperature °C (°F)	-20 (-4)	-10 (14)	5 (41)	20 (68)
Continuous time (s) when vehicle speed is less than 4 km/h (2.5 MPH)	250	40	32	24

4. GENERAL DRIVING CYCLE

Perform the diagnosis when the vehicle speed condition is met after warming up from a cold condition.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage difference between Max. and Min.	< 0.02 V(Equivalent to approximately 0.5°C (0.9°F) near 25°C)

Time Needed for Diagnosis: Less than 1 second

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

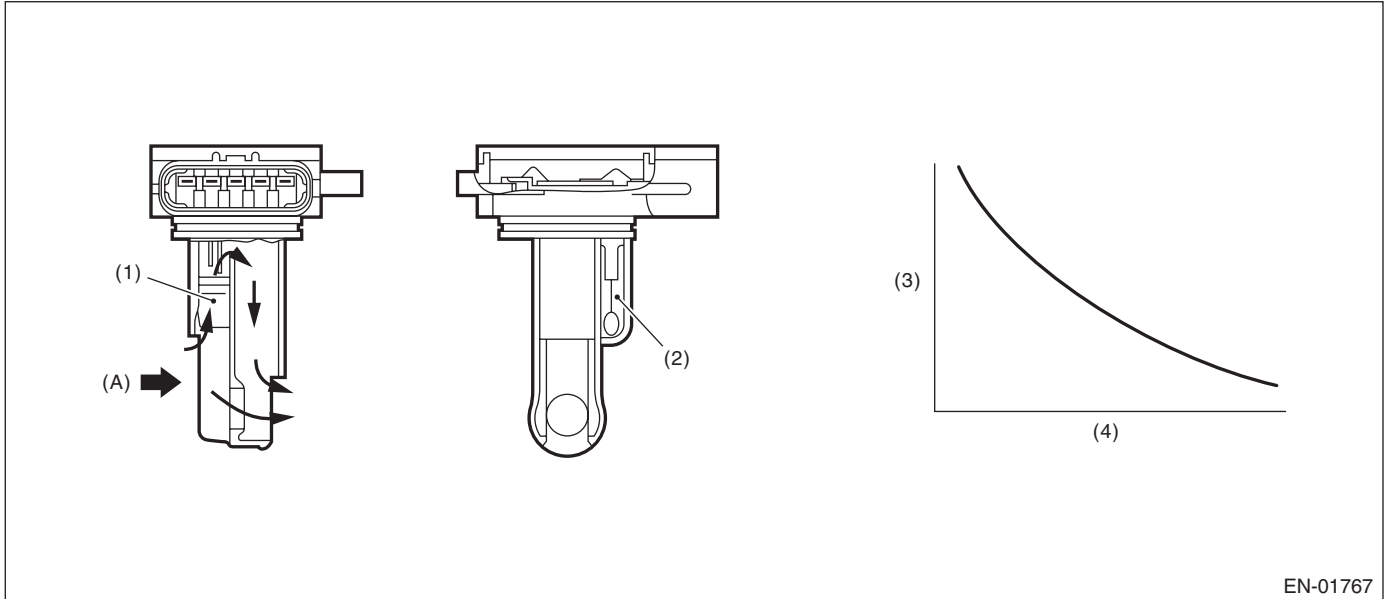
Judgment Value

Malfunction Criteria	Threshold Value
Output voltage difference between Max. and Min.	≥ 0.02 V

Time Needed for Diagnosis: Less than 1 second

AC: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 out of specification.

2. COMPONENT DESCRIPTION

EN-01767

(A) Air

(1) Air flow sensor

(3) Resistance value (Ω)

(4) Intake air temperature °C (°F)

(2) Intake air temperature sensor

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.395 V

Time Needed for Diagnosis: 500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 0.395 V

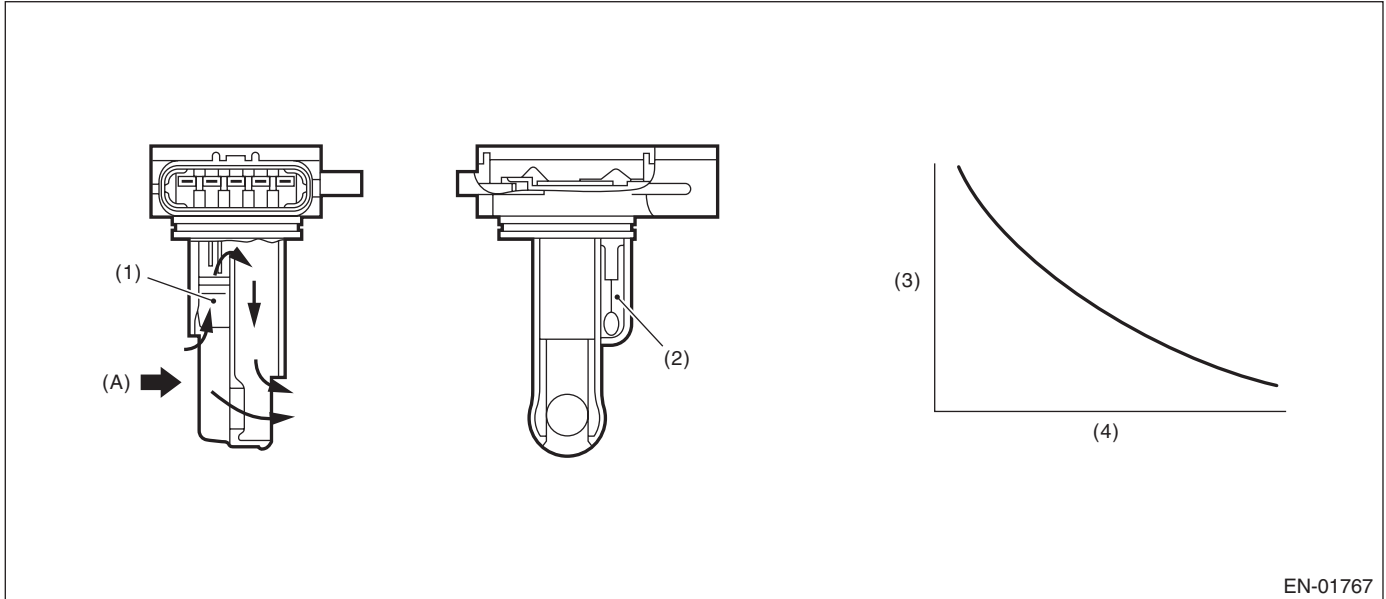
Time Needed for Diagnosis: Less than 1 second

AD: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 out of specification.

2. COMPONENT DESCRIPTION



EN-01767

(A) Air

(1) Air flow sensor

(2) Intake air temperature sensor

(3) Resistance value (Ω)

(4) Intake air temperature °C (°F)

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	$\geq 4.712 \text{ V}$

Time Needed for Diagnosis: 500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

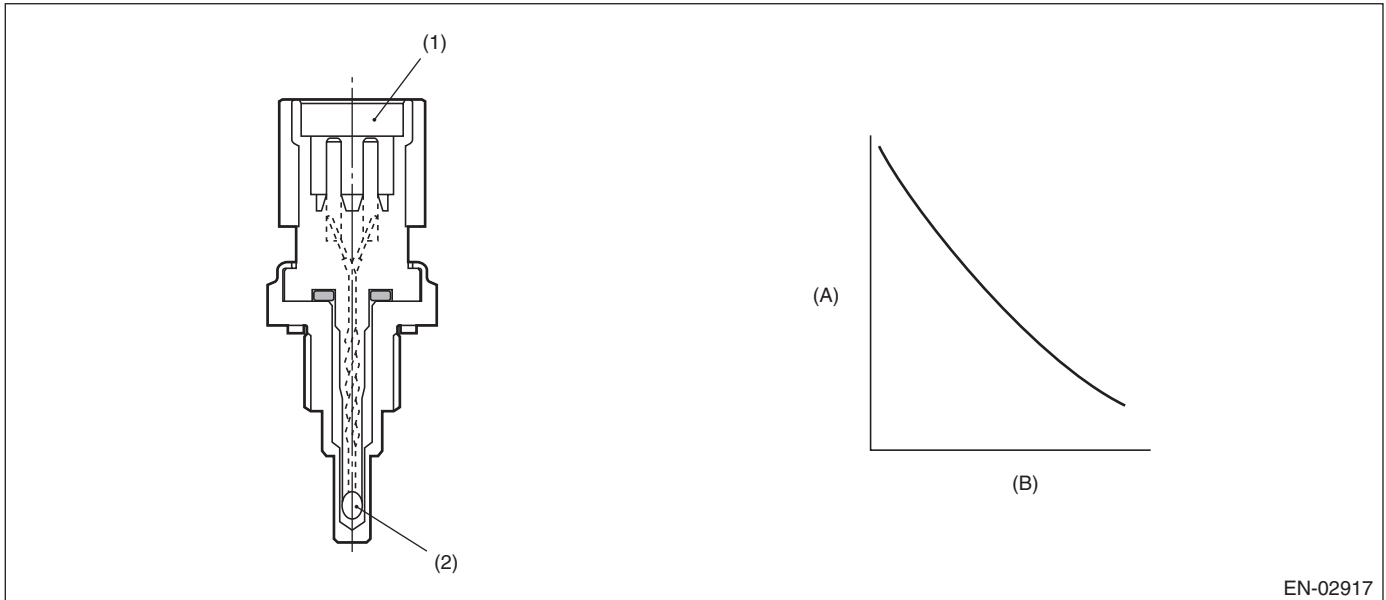
Malfunction Criteria	Threshold Value
Output voltage	$< 4.712 \text{ V}$

Time Needed for Diagnosis: Less than 1 second

AE:DTC P0116 ENGINE COOLANT TEMPERATURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE**1. OUTLINE OF DIAGNOSIS**

Detect the malfunction of the engine coolant temperature sensor characteristics.

When the ignition is ON after the specified period of soaking time has elapsed, compare the engine coolant temperature with intake air temperature. Judge as NG if the difference between two temperatures is larger than the predetermined value and the engine coolant temperature becomes the specified value or more.

2. COMPONENT DESCRIPTION

EN-02917

- (A) Resistance value (k Ω) (B) Temperature °C (°F)
- (1) Connector (2) Thermistor element

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	≥ 10.9 V
Soaking time	≥ 21600 s
Engine coolant temperature at the last engine stop	$\geq$ Value from Map

Map (Models without SI-DRIVE)

Estimate ambient temperature °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Engine coolant temperature at the last engine stop °C (°F)	57 (134.6)	57 (134.6)	57 (134.6)	57 (134.6)

Map (Models with SI-DRIVE)

Estimate ambient temperature °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Engine coolant temperature at the last engine stop °C (°F)	60 (140)	60 (140)	60 (140)	60 (140)

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
All of the following conditions are established.	
Engine coolant temperature – intake air temperature	> 15°C (27°F)
Engine coolant temperature	> 45 °C (113 °F)

Time Needed for Diagnosis: 512 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

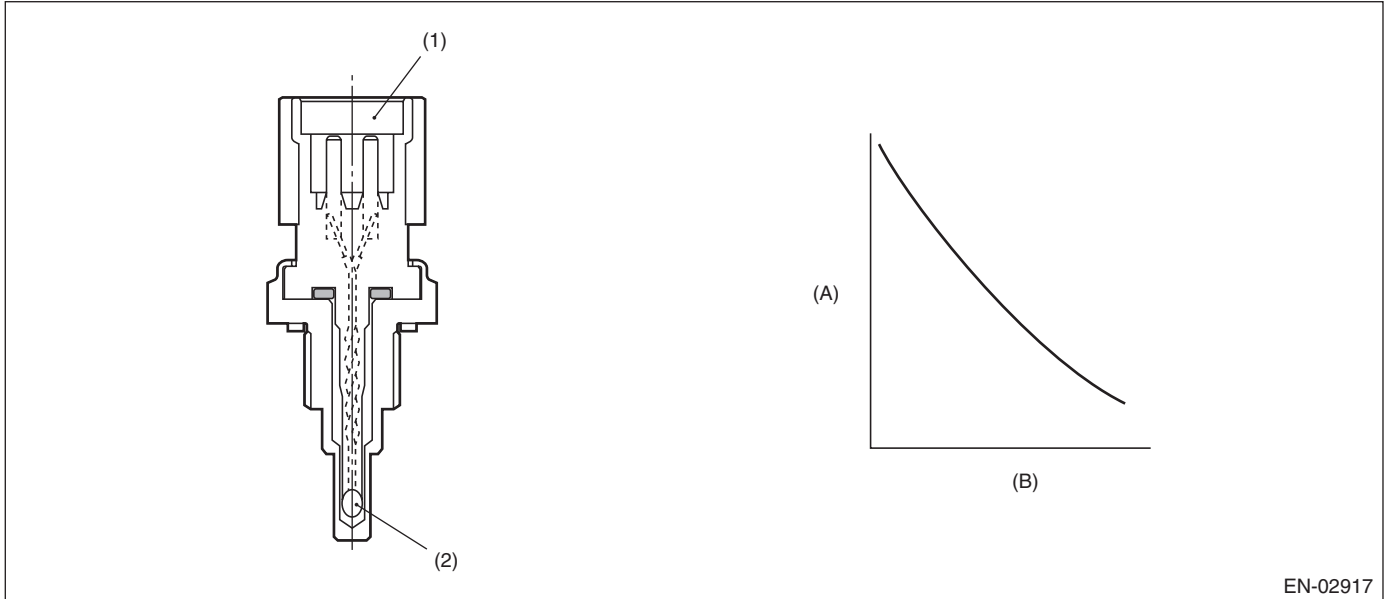
Judgment Value

Malfunction Criteria	Threshold Value
When any one of the followings is established.	
Engine coolant temperature – intake air temperature	≤ 15°C (27°F)
Engine coolant temperature	≤ 45 °C (113 °F)

Time Needed for Diagnosis: Less than 1 second

AF: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 out of specification.

2. COMPONENT DESCRIPTION

(A) Resistance value (k Ω)

(B) Temperature °C (°F)

(1) Connector

(2) Thermistor element

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.464 V

Time Needed for Diagnosis: 500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

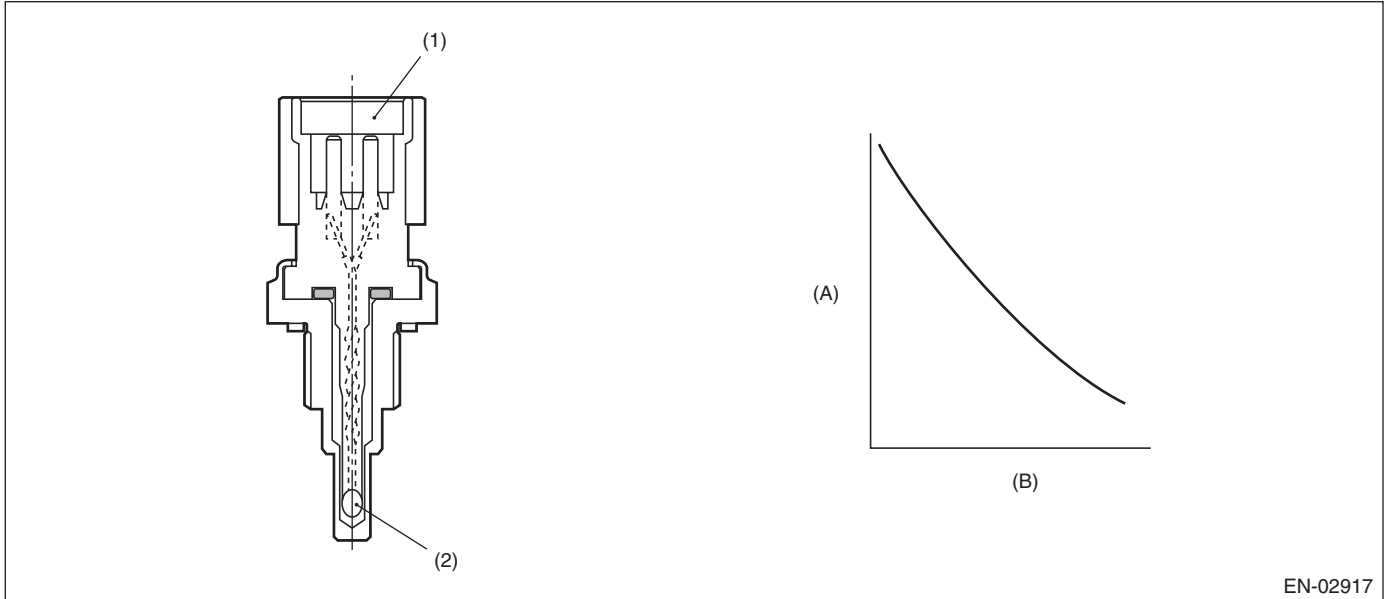
Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 0.464 V

Time Needed for Diagnosis: Less than 1 second

AG: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 out of specification.

2. COMPONENT DESCRIPTION

EN-02917

(A) Resistance value (k Ω)

(B) Temperature °C (°F)

(1) Connector

(2) Thermistor element

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.702 V

Time Needed for Diagnosis: 500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

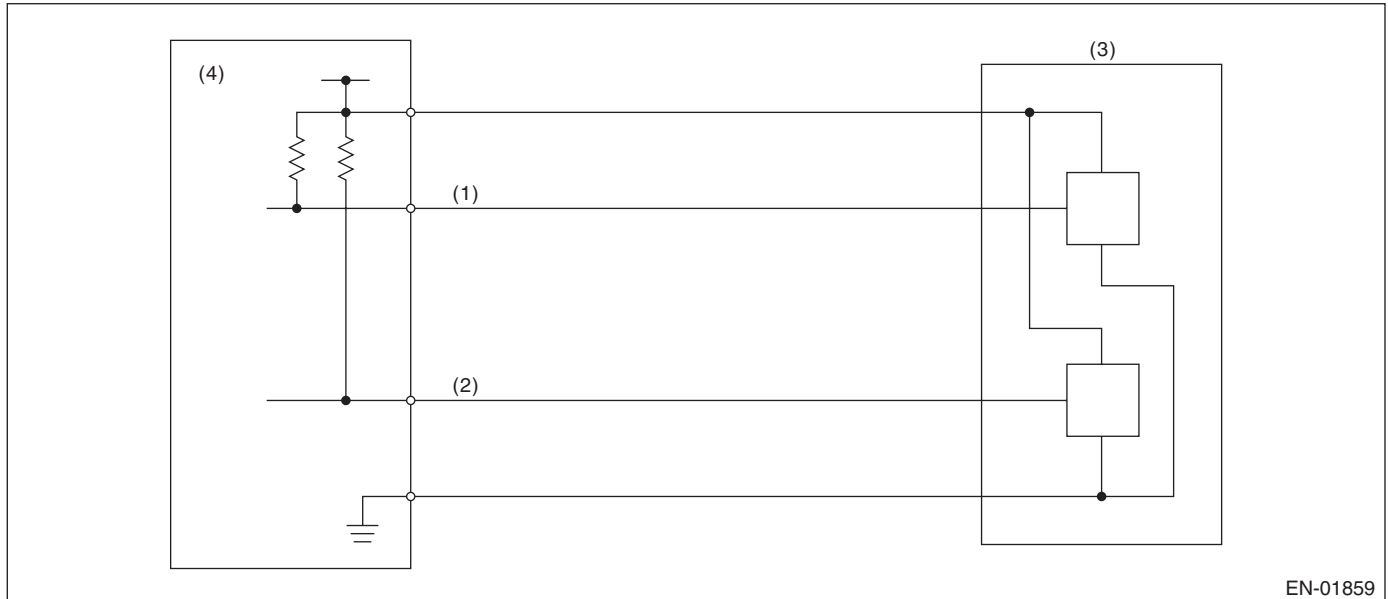
Malfunction Criteria	Threshold Value
Output voltage	< 4.702 V

Time Needed for Diagnosis: Less than 1 second

AH: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 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 CONDITIONS

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	$\geq 6\text{ V}$

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 1 input voltage	$\leq 0.27 \text{ V}$

Time Needed for Diagnosis: 24 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

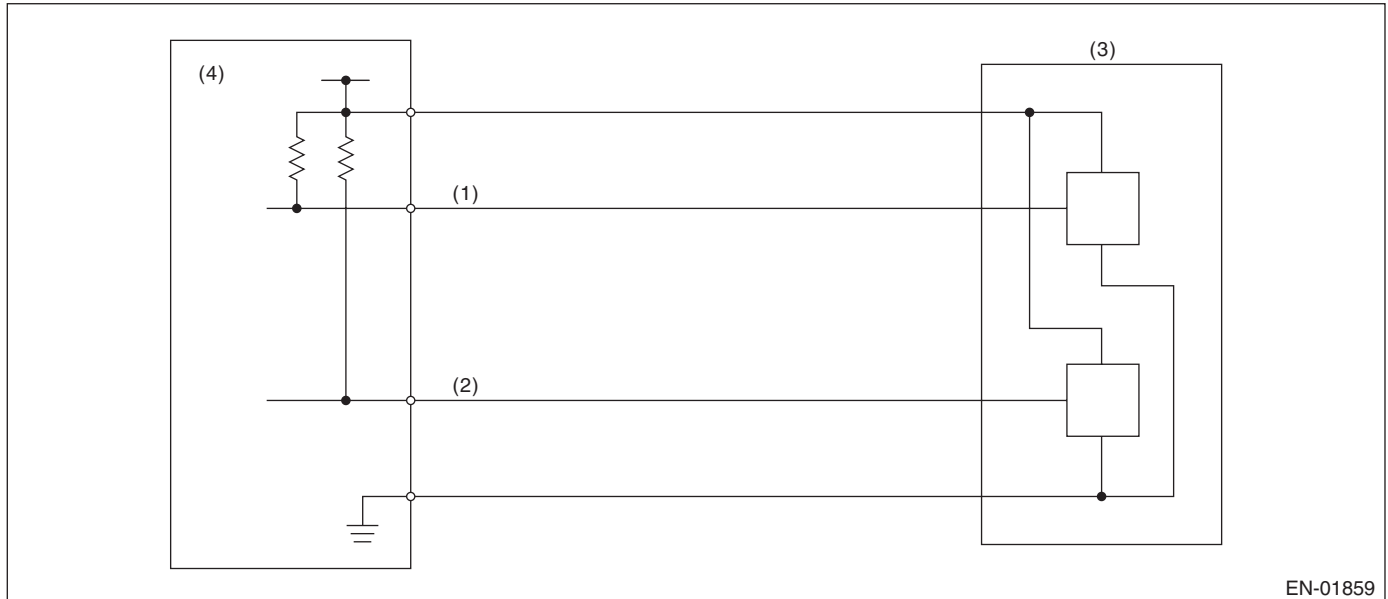
Malfunction Criteria	Threshold Value
Sensor 1 input voltage	$> 0.27 \text{ V}$

Time Needed for Diagnosis: 24 ms

AI: 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 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 CONDITIONS

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	$\geq 6\text{ V}$

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 1 input voltage	$\geq 4.858 \text{ V}$

Time Needed for Diagnosis: 24 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

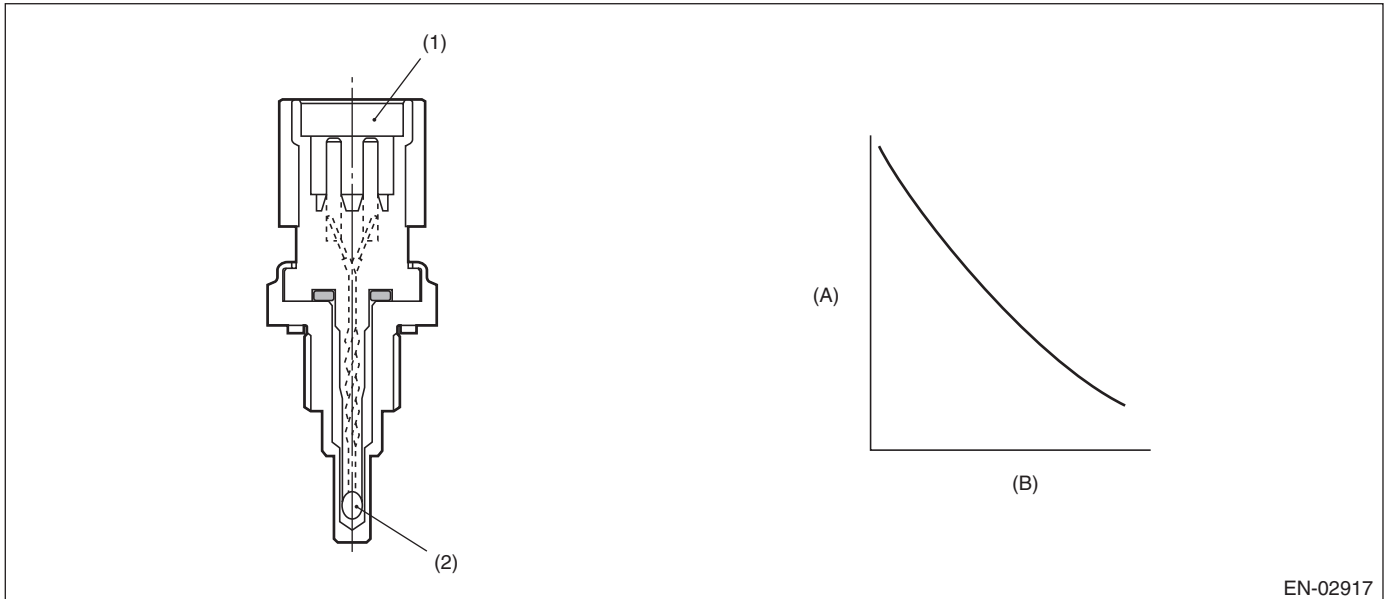
Malfunction Criteria	Threshold Value
Sensor 1 input voltage	$< 4.858 \text{ V}$

Time Needed for Diagnosis: 24 ms

AJ: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

(A) Resistance value (k Ω)

(B) Temperature °C (°F)

(1) Connector

(2) Thermistor element

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Engine speed	$\geq$ Value from Map
Battery voltage	≥ 10.9 V
Engine coolant temperature at engine starting	< -15 °C (5 °F)

Map

Engine coolant temperature °C (°F)	-40 (-40)	-30 (-22)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)
Engine speed rpm	500	500	500	500	500	500	500	500

Engine coolant temperature °C (°F)	40 (104)	50 (122)	60 (140)	70 (158)	80 (176)	90 (194)	100 (212)	110 (230)
Engine speed rpm	500	500	500	500	500	500	500	500

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once after engine start.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

Judge as NG if the criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
Engine coolant temperature	< -15 °C (5 °F)
Timer for diagnosis after engine start	≥ 299968 ms

Timer for diagnosis after engine start

64 ms + TWCNT ms (when at 64 ms)

TWCNT is shown in the following table.

		Vehicle speed km/h (MPH)							
		0 (0)	8 (5)	16 (9.9)	24 (14.9)	32 (19.9)	40 (24.9)	48 (29.8)	56 (34.8)
Lowest engine coolant temperature °C (°F)	-35 (-31)	0	0	0	0	0	0	0	0
	-23.5 (-10.3)	0	0	0	0	0	0	0	0
	-23.4 (-10.1)	96	96	96	96	96	96	96	96
	-15 (5)	96	96	96	96	96	96	96	96

Time Needed for Diagnosis: 120 or 300 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
Engine coolant temperature	≥ -15 °C (5 °F)

Time Needed for Diagnosis: Less than 1 second

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

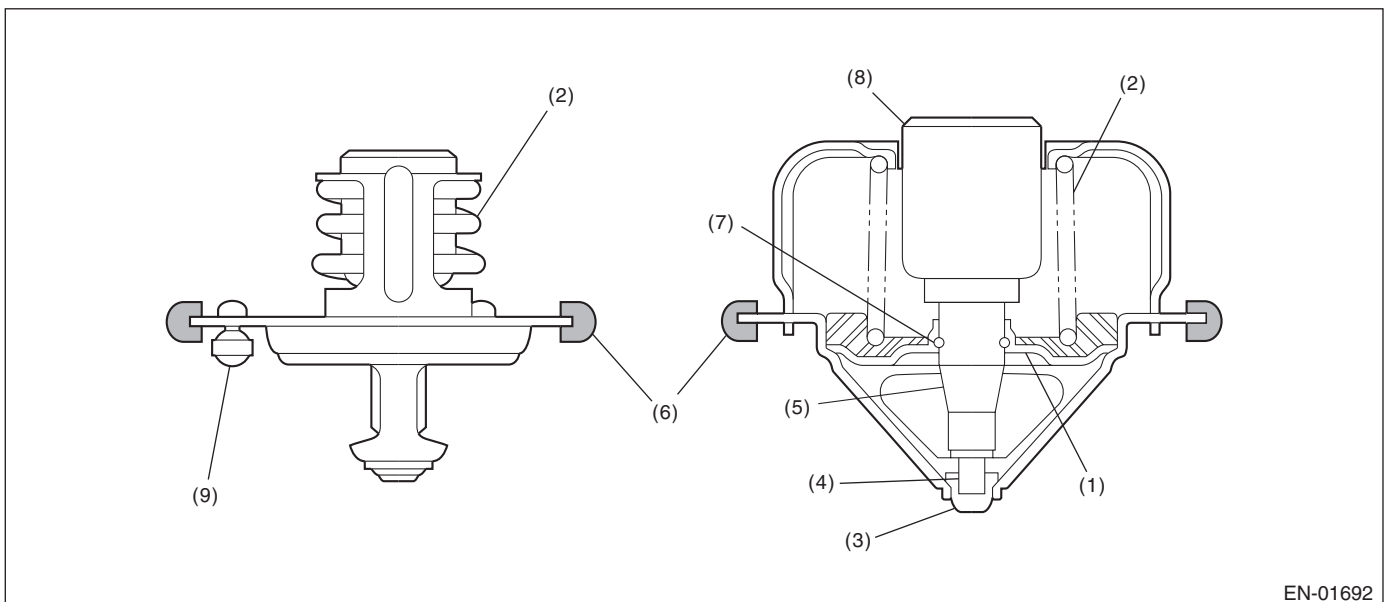
1. OUTLINE OF DIAGNOSIS

Detect malfunctions of the thermostat function.

Judge as NG when any one of the following conditions is established.

- When the actual engine coolant temperature does not reach the maximum temperature necessary to perform other OBDII diagnosis and Σ (Estimated engine coolant temperature – actual engine coolant temperature) exceeded the predetermined value. (Judgment 1)
- When the actual engine coolant temperature does not reach the range within -11°C (-19.8°F) from the regulated temperature and Σ (Estimated engine coolant temperature – actual engine coolant temperature) exceeded the predetermined value. (Judgment 2)
- When the difference between the estimated coolant temperature and the actual engine coolant temperature exceeds the predetermined value, and Σ (Estimated engine coolant temperature – actual engine coolant temperature) exceeded the predetermined value. (Judgment 3)

2. COMPONENT DESCRIPTION



EN-01692

- (1) Valve
- (2) Spring
- (3) Stopper

- (4) Piston
- (5) Guide
- (6) Rubber seal

- (7) Stop ring
- (8) Wax element
- (9) Jiggle valve

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
<Judgment 1>	
Battery voltage	≥ 10.9 V
Estimate ambient temperature	≥ -7 °C (19.4 °F)
Vehicle speed	≥ 30 km/h (18.6 MPH)
Estimated coolant temperature	≥ Value of Map 1
<Judgment 2>	
Battery voltage	≥ 10.9 V
Estimate ambient temperature	≥ -7 °C (19.4 °F)
Vehicle speed	≥ 30 km/h (18.6 MPH)
Estimated coolant temperature	≥ Value from Map 2
<Judgment 3>	
Battery voltage	≥ 10.9 V
Estimate ambient temperature	≥ -7 °C (19.4 °F)
Vehicle speed	≥ 30 km/h (18.6 MPH)
Estimated coolant temperature	≥ Value from Map 3

Map 1

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Estimated coolant temperature °C (°F)	70 (158)	70 (158)	70 (158)	70 (158)

Map 2 (Models without SI-DRIVE)

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Estimated coolant temperature °C (°F)	75 (167)	75 (167)	75 (167)	75 (167)

Map 2 (Models with SI-DRIVE)

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Estimated coolant temperature °C (°F)	77.5 (171.5)	77.5 (171.5)	77.5 (171.5)	77.5 (171.5)

Map 3 (Models without SI-DRIVE)

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	10 (50)	25 (77)	27 (80.6)
Estimated coolant temperature °C (°F)	58.1 (136.6)	66.6 (151.9)	74.2 (165.6)	75 (167)

Map 3 (Models with SI-DRIVE)

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	10 (50)	25 (77)	46 (114.8)
Estimated coolant temperature °C (°F)	59.8 (139.6)	65.5 (149.9)	70.5 (158.9)	77.5 (171.5)

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
When any one of the followings is established.	
<Judgment 1>	
Actual engine coolant temperature and Σ (Estimated engine coolant temperature – actual engine coolant temperature)	< Value of Map 4 > Value of Map 5
<Judgment 2>	
Actual engine coolant temperature and Σ (Estimated engine coolant temperature – actual engine coolant temperature)	< Regulated temperature – Value of Map 6 > Value of Map 7
<Judgment 3>	
Estimated engine coolant temperature – actual engine coolant temperature and Σ (Estimated engine coolant temperature – actual engine coolant temperature)	> Value of Map 8 > Value of Map 9

Map 4

Estimate ambient temperature °C (°F)	–7 (19.4)	8 (46.4)	10 (50)	25 (77)
Threshold Value °C (°F)	70 (158)	70 (158)	70 (158)	70 (158)

Map 5

Engine coolant temperature at engine starting °C (°F)	–7 (19.4)	0 (32)	8 (46.4)	10 (50)	25 (77)	35 (95)
Threshold Value °C (°F)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1000 (1800)

Map 6

Estimate ambient temperature °C (°F)	–7 (19.4)	8 (46.4)	10 (50)	25 (77)
Threshold Value °C (°F)	11.1 (20)	11.1 (20)	11.1 (20)	11.1 (20)

Map 7

Engine coolant temperature at engine starting °C (°F)	–7 (19.4)	0 (32)	8 (46.4)	10 (50)	25 (77)	30 (86)	35 (95)
Threshold Value °C (°F)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1200 (2160)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Map 8

Estimate ambient temperature °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Threshold Value °C (°F)	11.1 (20)	11.1 (20)	11.1 (20)	11.1 (20)

Map 9

Engine coolant temperature at engine starting °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Threshold Value °C (°F)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)	1731.6 (3116.9)

Time Needed for Diagnosis: 300 — 700 seconds

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
All of the following conditions are established.	
<Judgment 1>	
Actual engine coolant temperature and Σ (Estimated engine coolant temperature – actual engine coolant temperature)	$\geq$ Value of Map 4 $\leq$ Value of Map 5
<Judgment 2>	
Actual engine coolant temperature and Σ (Estimated engine coolant temperature – actual engine coolant temperature)	$\geq$ Regulated temperature – Value of Map 6 $\leq$ Value of Map 7
<Judgment 3>	
Estimated engine coolant temperature – actual engine coolant temperature and Σ (Estimated engine coolant temperature – actual engine coolant temperature) and Actual engine coolant temperature	$\leq$ Value of Map 8 $\leq$ Value of Map 9 $\geq$ Regulated temperature – Value of Map 10

Map 10

Estimate ambient temperature °C (°F)	-7 (19.4)	8 (46.4)	10 (50)	25 (77)
Threshold Value °C (°F)	11.1 (20)	11.1 (20)	11.1 (20)	11.1 (20)

Time Needed for Diagnosis: 300 — 700 seconds

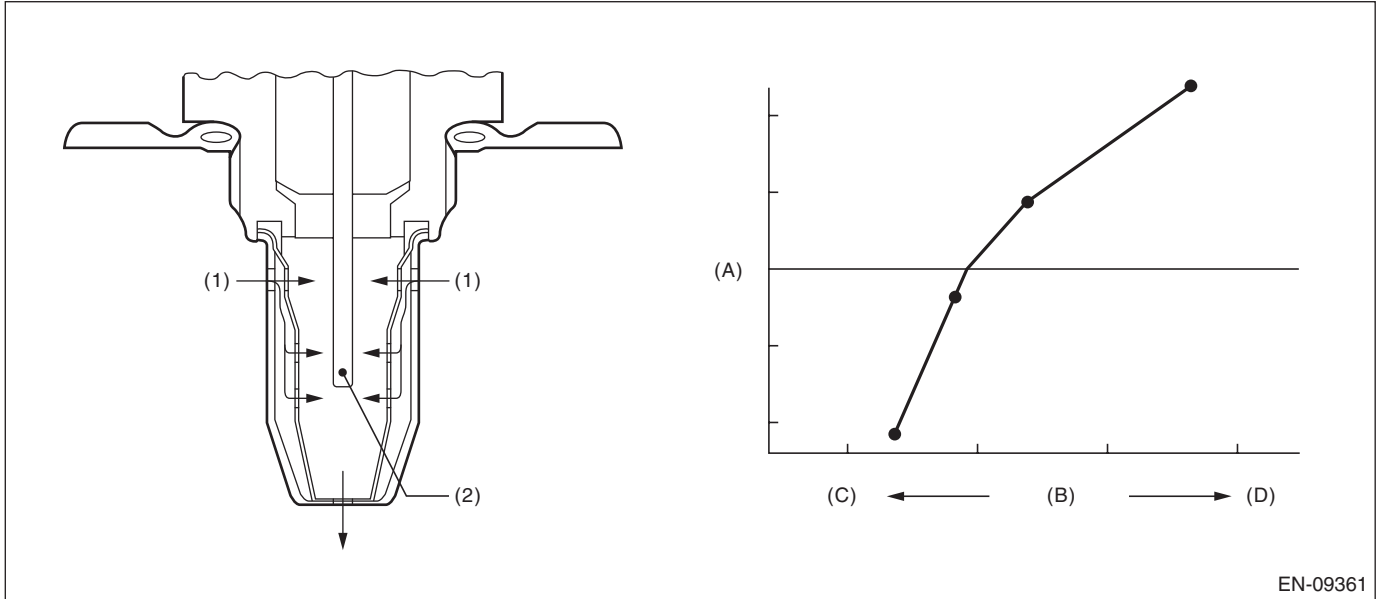
AL:DTC P0131 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 1)

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of sensor.

Judge as NG, when the element voltage is out of the specified range.

2. COMPONENT DESCRIPTION



EN-09361

(A) Electromotive force

(B) Air fuel ratio

(C) Rich

(D) Lean

(1) Exhaust gas

(2) ZrO₂

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Input voltage (+) or Input voltage (-) or Input voltage (+) – Input voltage (-)	< 1.128 V < 0.23 V < 0.644 V

Time Needed for Diagnosis:

Input voltage (+): 1000 ms

Input voltage (-): 1000 ms

|Input voltage (+) – Input voltage (-)|: 1000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Input voltage (+) Input voltage (-) Input voltage (+) – Input voltage (-)	≥ 1.128 V ≥ 0.23 V ≥ 0.644 V

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

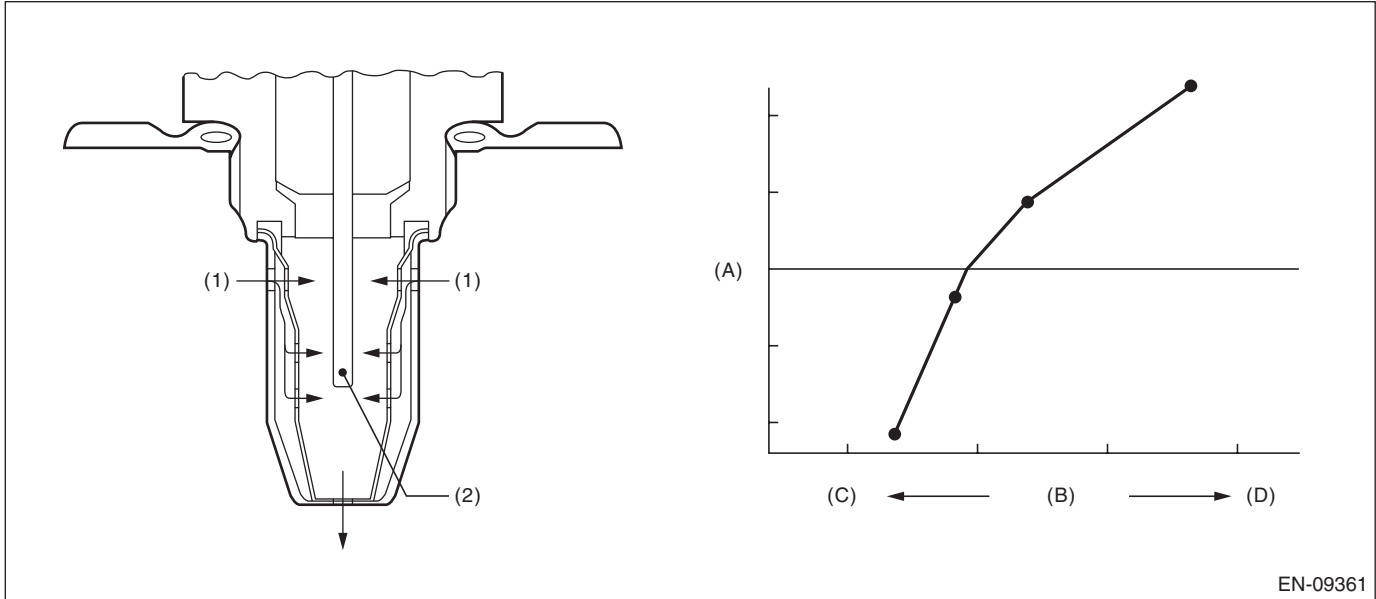
AM:DTC P0132 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 1)

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of sensor.

Judge as NG, when the element voltage is out of the specified range.

2. COMPONENT DESCRIPTION



(A) Electromotive force

(B) Air fuel ratio

(C) Rich

(D) Lean

(1) Exhaust gas

(2) ZrO₂

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	≥ 10.9 V

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Input voltage (+) or Input voltage (–)	> 3.589 V > 3.541 V

Time Needed for Diagnosis:

Input voltage (+): 1000 ms

Input voltage (–): 1000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Input voltage (+) Input voltage (–)	≤ 3.589 V ≤ 3.541 V

Time Needed for Diagnosis: Less than 1 second

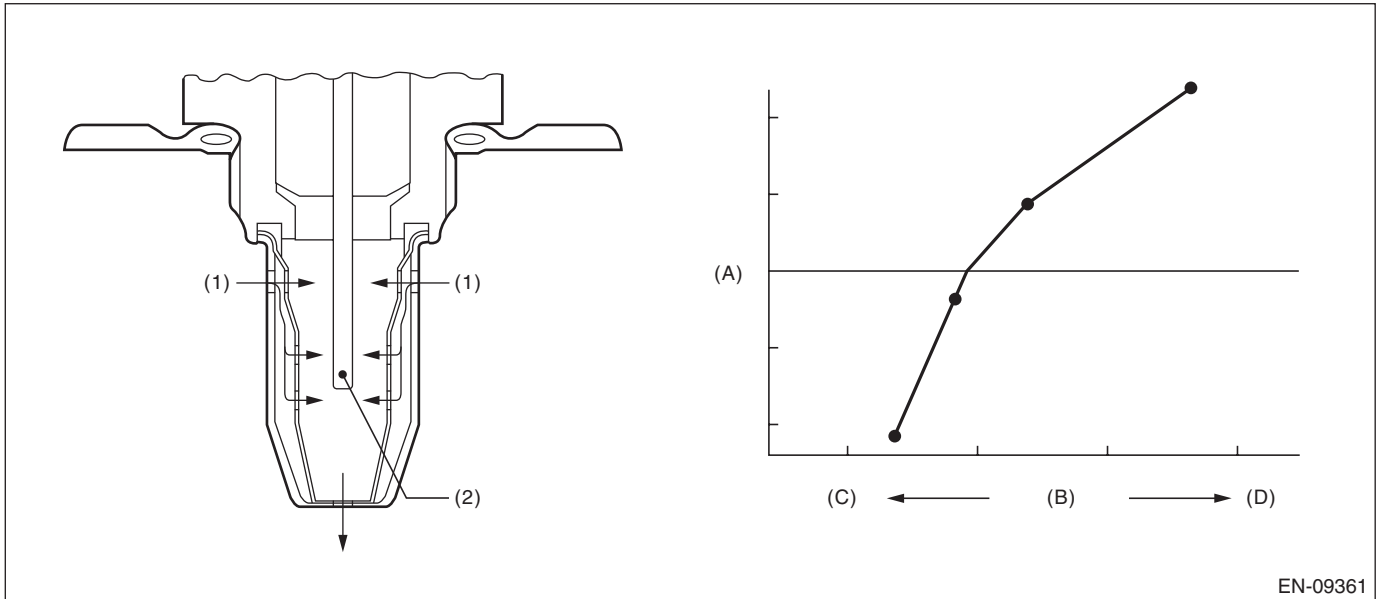
AN:DTC P0134 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK 1 SENSOR 1)

1. OUTLINE OF DIAGNOSIS

Detect open circuits of the sensor.

Judge as NG when the impedance of the element is large.

2. COMPONENT DESCRIPTION



(A) Electromotive force

(B) Air fuel ratio

(C) Rich

(D) Lean

(1) Exhaust gas

(2) ZrO₂

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 10.9 \text{ V}$
Time of heater control duty at 70 % or more	$\geq 36000 \text{ ms}$
Front oxygen (A/F) sensor impedance.	$> 500 \Omega$

Time Needed for Diagnosis: 5000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 10.9 \text{ V}$
Front oxygen (A/F) sensor impedance.	$\leq 500 \Omega$

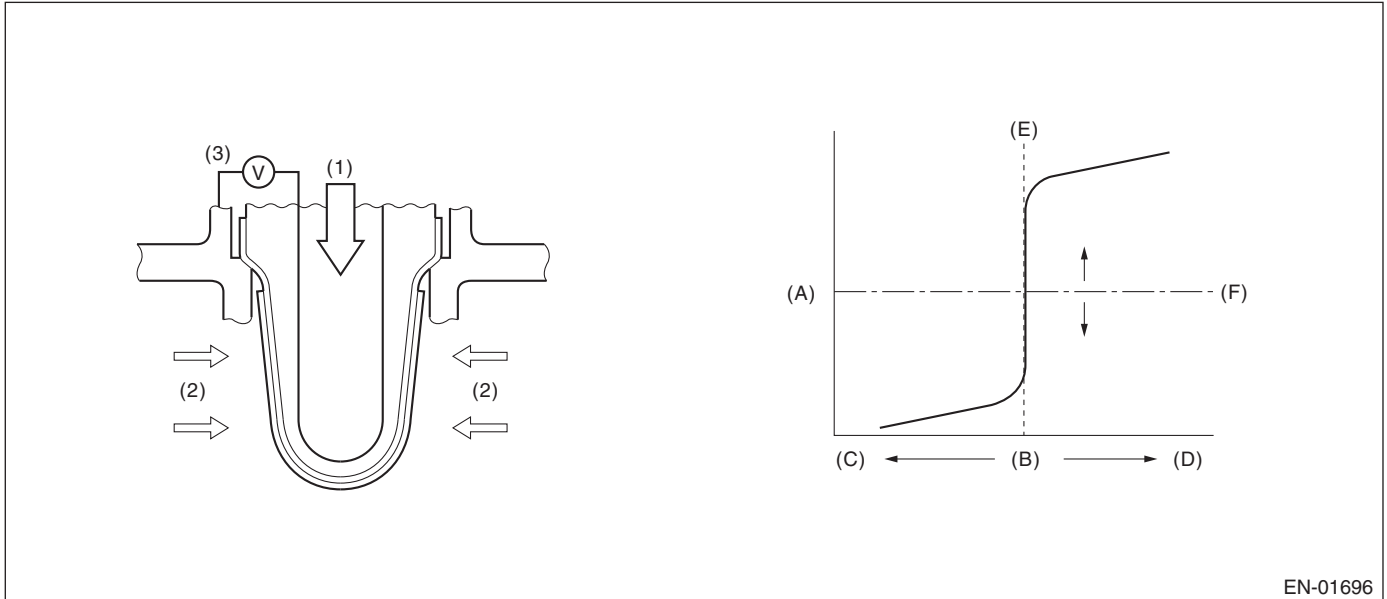
Time Needed for Diagnosis: Less than 1 second

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

1. OUTLINE OF DIAGNOSIS

Detect continuity NG of the 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

(D) Rich

(1) Atmosphere

(B) Air fuel ratio

(E) Theoretical air fuel ratio

(2) Exhaust gas

(C) Lean

(F) Comparative voltage

(3) Electromotive force

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

3. ENABLE CONDITIONS

Used for abnormality judgment

Secondary Parameters	Enable Conditions
High Secondary air system Closed loop control at the oxygen sensor Misfire detection every 200 rotations Front oxygen (A/F) sensor compensation coefficient Battery voltage Engine coolant temperature	Not in operation In operation < 65535 time(s) Not in limit value ≥ 10.9 V ≥ 70 °C (158 °F)
Low (1) Secondary air system Closed loop control at the oxygen sensor Misfire detection every 200 rotations Front oxygen (A/F) sensor compensation coefficient Battery voltage Engine coolant temperature Amount of intake air	Not in operation In operation < 65535 time(s) Not in limit value ≥ 10.9 V ≥ 70 °C (158 °F) ≥ 10 g/s (0.35 oz/s)
Low (2) Secondary air system Closed loop control at the oxygen sensor Misfire detection every 200 rotations Front oxygen (A/F) sensor compensation coefficient Battery voltage Engine coolant temperature Amount of intake air Current continuation time of the rear oxygen sensor heater	Not in operation In operation < 65535 time(s) Not in limit value ≥ 10.9 V ≥ 70 °C (158 °F) < 10 g/s (0.35 oz/s) ≥ 25000 ms
Low (3) Secondary air system Closed loop control at the oxygen sensor Misfire detection every 200 rotations Front oxygen (A/F) sensor compensation coefficient Battery voltage Engine coolant temperature Amount of intake air Current continuation time of the rear oxygen sensor heater Fuel cut	Not in operation In operation < 65535 time(s) Not in limit value ≥ 10.9 V ≥ 70 °C (158 °F) < 10 g/s (0.35 oz/s) ≥ 25000 ms Experienced

Used for normality judgment

Secondary Parameters	Enable Conditions
Secondary air system Closed loop control at the oxygen sensor Misfire detection every 200 rotations Front oxygen (A/F) sensor compensation coefficient Battery voltage Engine coolant temperature	Not in operation In operation < 65535 time(s) Not in limit value ≥ 10.9 V ≥ 70 °C (158 °F)

4. GENERAL DRIVING CYCLE

After starting the engine, continuously perform the diagnosis with the same engine condition.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
High Sensor output voltage	> 1.2 V	P0138
Low Sensor output voltage	< 0.03 V	P0137

Time Needed for Diagnosis:

High: 2500 ms
Low (1): 20000 ms
Low (2): 150000 ms
Low (3): Value from Map

Map

Fuel cut time (s)	0	2000	10000
Time Needed for Diagnosis (s)	150000	150000	150000

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
High Sensor output voltage	≤ 1.2 V	P0138
Low Sensor output voltage	≥ 0.03 V	P0137

Time Needed for Diagnosis:

High: Less than 1 second
Low (1): Less than 1 second
Low (2): Less than 1 second
Low (3): Less than 1 second

AP:DTC P0138 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 2)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0137. <Ref. to GD(H4DOTC)-73, DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

AQ:DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 2)

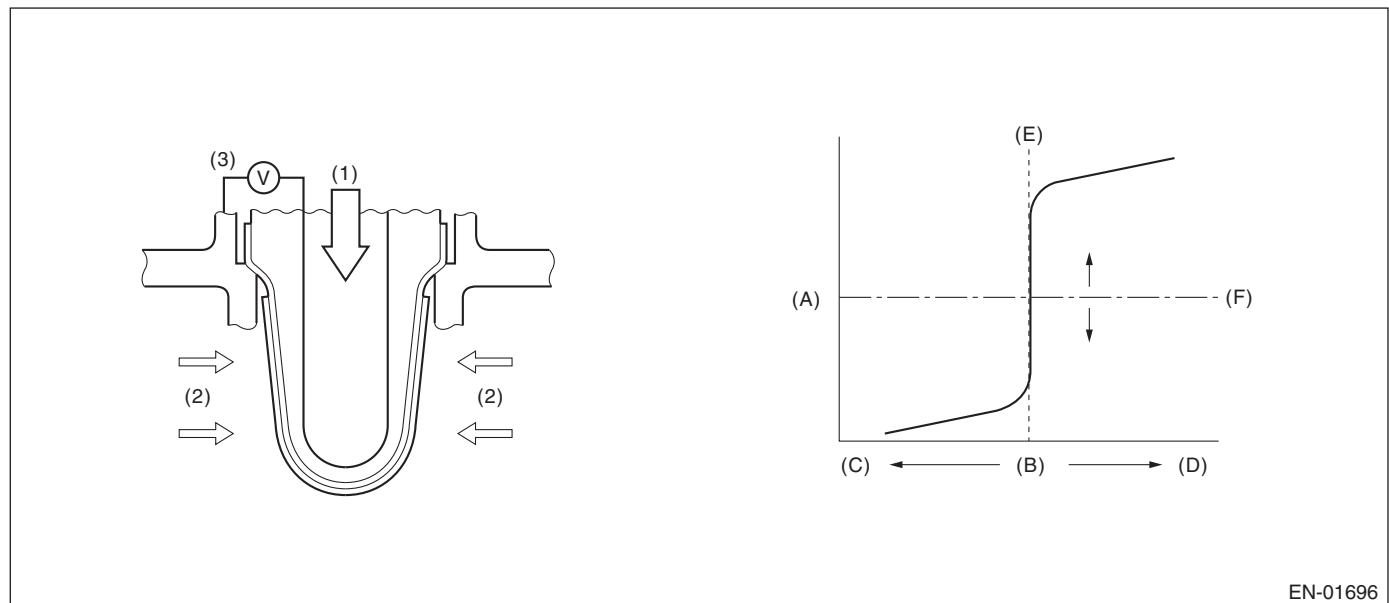
1. OUTLINE OF DIAGNOSIS

Detect the slow response of rich → lean for rear oxygen sensor output.

When the deceleration fuel cut has occurred, detect the trouble by calculating the time when the rear oxygen sensor output passes through the predetermined range of voltages.

Judge as NG when the response time is larger than the threshold value.

2. COMPONENT DESCRIPTION



EN-01696

(A) Electromotive force

(B) Air fuel ratio

(C) Lean

(D) Rich

(E) Theoretical air fuel ratio

(F) Comparative voltage

(1) Atmosphere

(2) Exhaust gas

(3) Electromotive force

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	> 10.9 V
Rear oxygen sensor closed loop control	Operation
Current calculation time of the rear oxygen sensor heater after starting	≥ 180000 ms
Engine speed when fuel cut starts	≥ 1000 rpm
Rear oxygen sensor voltage when fuel cut starts	≥ 0.55 V
Fuel cut time	≥ 5000 ms
Engine coolant temperature when fuel cut starts	≥ -40 °C (-40 °F)
Estimated temperature of rear oxygen sensor element when fuel cut starts	≥ 450 °C (842 °F)

4. GENERAL DRIVING CYCLE

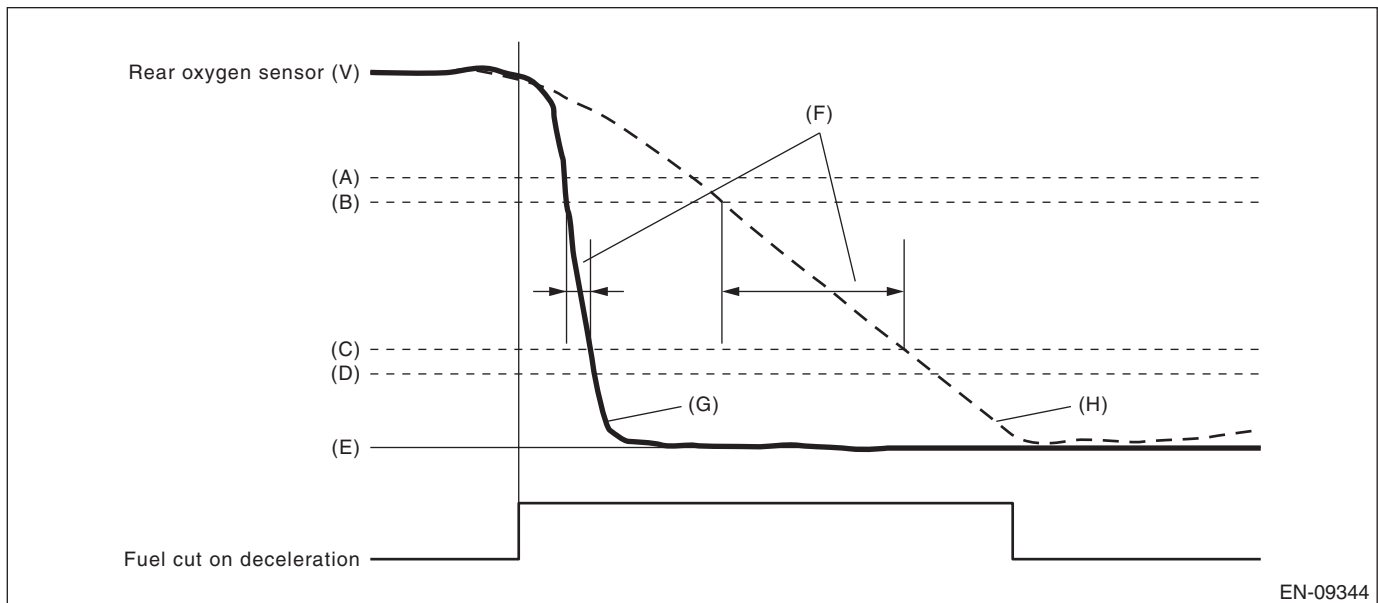
Perform diagnosis once during deceleration fuel cut from a constant and high speed driving, when rear oxygen sensor is warmed up sufficiently.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Detect the trouble by calculating the response time of the rear oxygen sensor during fuel cut.



(A) 0.55 V

(B) 0.50 V

(C) 0.20 V

(D) 0.15 V

(E) 0 V

(F) Diagnostic parameter

(G) Normal

(H) Malfunction

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Time when rear oxygen sensor voltage changed from 0.5 V to 0.2 V.	> 837 ms

Time Needed for Diagnosis: 10 seconds

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Time when rear oxygen sensor voltage changed from 0.5 V to 0.2 V.	≤ 837 ms

Time Needed for Diagnosis: 10 seconds

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

AR:DTC P013B O2 SENSOR SLOW RESPONSE - LEAN TO RICH (BANK 1 SENSOR 2)

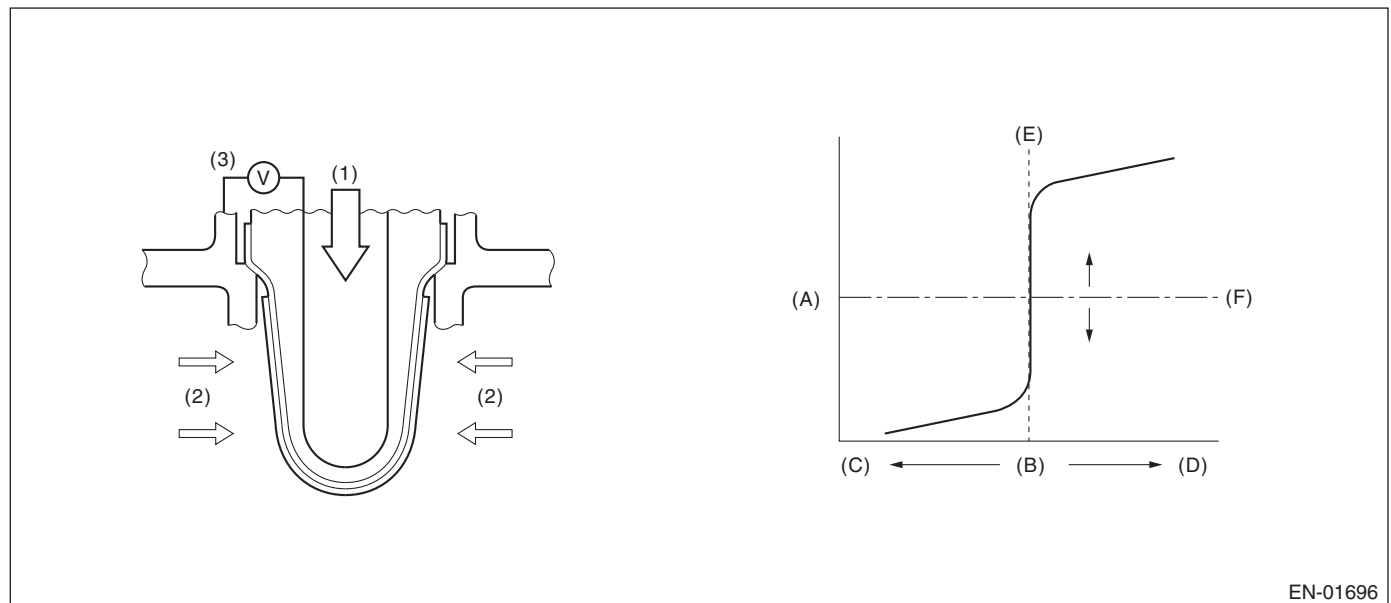
1. OUTLINE OF DIAGNOSIS

Detect the slow response of lean → rich for rear oxygen sensor output.

After the deceleration fuel cut has occurred, detect the trouble by calculating the time when the rear oxygen sensor output passes through the predetermined range of voltages.

Judge as NG when the response time is larger than the threshold value.

2. COMPONENT DESCRIPTION



EN-01696

(A) Electromotive force

(B) Air fuel ratio

(C) Lean

(D) Rich

(E) Theoretical air fuel ratio

(F) Comparative voltage

(1) Atmosphere

(2) Exhaust gas

(3) Electromotive force

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	> 10.9 V
Front oxygen (A/F) sensor closed loop control	Operation
Fuel cut time	≥ 5000 ms

4. GENERAL DRIVING CYCLE

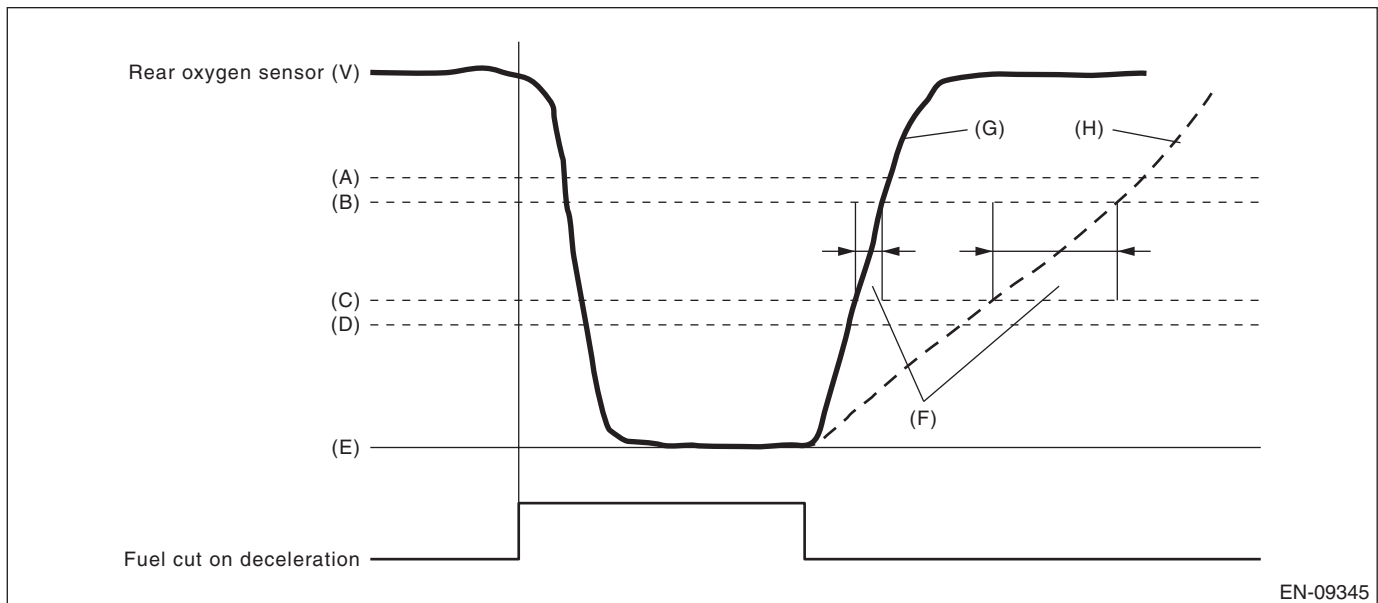
Perform diagnosis only once after recovering from a deceleration fuel cut continued for more than predetermined time.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Detect the trouble by calculating the response time of the rear oxygen sensor after fuel cut.



(A) 0.55 V	(B) 0.50 V	(C) 0.30 V
(D) 0.25 V	(E) 0 V	(F) Diagnostic parameter
(G) Normal	(H) Malfunction	

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Time when rear oxygen sensor voltage changed from 0.3 V to 0.5 V.	> 4000 ms

Time Needed for Diagnosis: 10 seconds

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Time when rear oxygen sensor voltage changed from 0.3 V to 0.5 V.	≤ 4000 ms

Time Needed for Diagnosis: 10 seconds

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

AS:DTC P013E O2 SENSOR DELAYED RESPONSE - RICH TO LEAN (BANK 1 SENSOR 2)

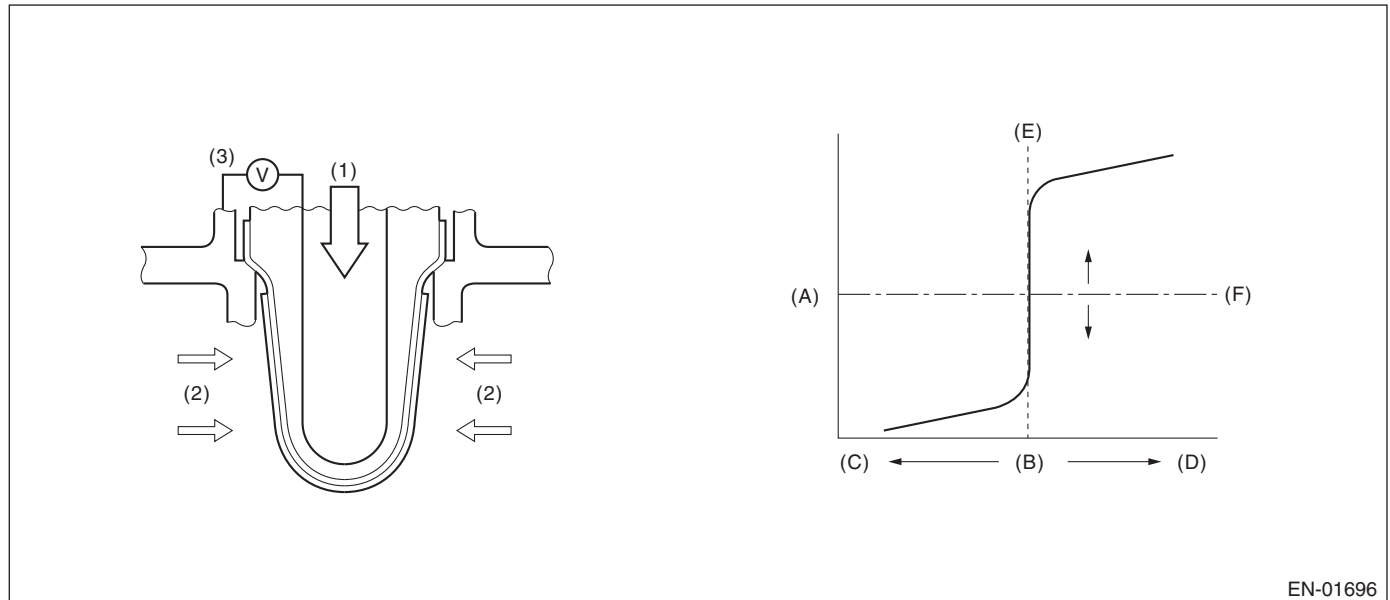
1. OUTLINE OF DIAGNOSIS

Detect the delayed response of rear oxygen sensor output for rich → lean.

After the deceleration fuel cut has started, detect the trouble by calculating the time when the rear oxygen sensor output decreases to the predetermined voltages.

Judge as NG when the response time is larger than the threshold value.

2. COMPONENT DESCRIPTION



EN-01696

(A) Electromotive force	(B) Air fuel ratio	(C) Lean
(D) Rich	(E) Theoretical air fuel ratio	(F) Comparative voltage
(1) Atmosphere	(2) Exhaust gas	(3) Electromotive force

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	> 10.9 V
Rear oxygen sensor closed loop control	Operation
Engine speed when fuel cut starts	≥ 1000 rpm
Rear oxygen sensor voltage when fuel cut starts	≥ 0.55 V
Fuel cut time	≥ 5000 ms
Engine coolant temperature when fuel cut starts	≥ -40 °C (-40 °F)
Estimated temperature of rear oxygen sensor element when fuel cut starts	≥ 450 °C (842 °F)

4. GENERAL DRIVING CYCLE

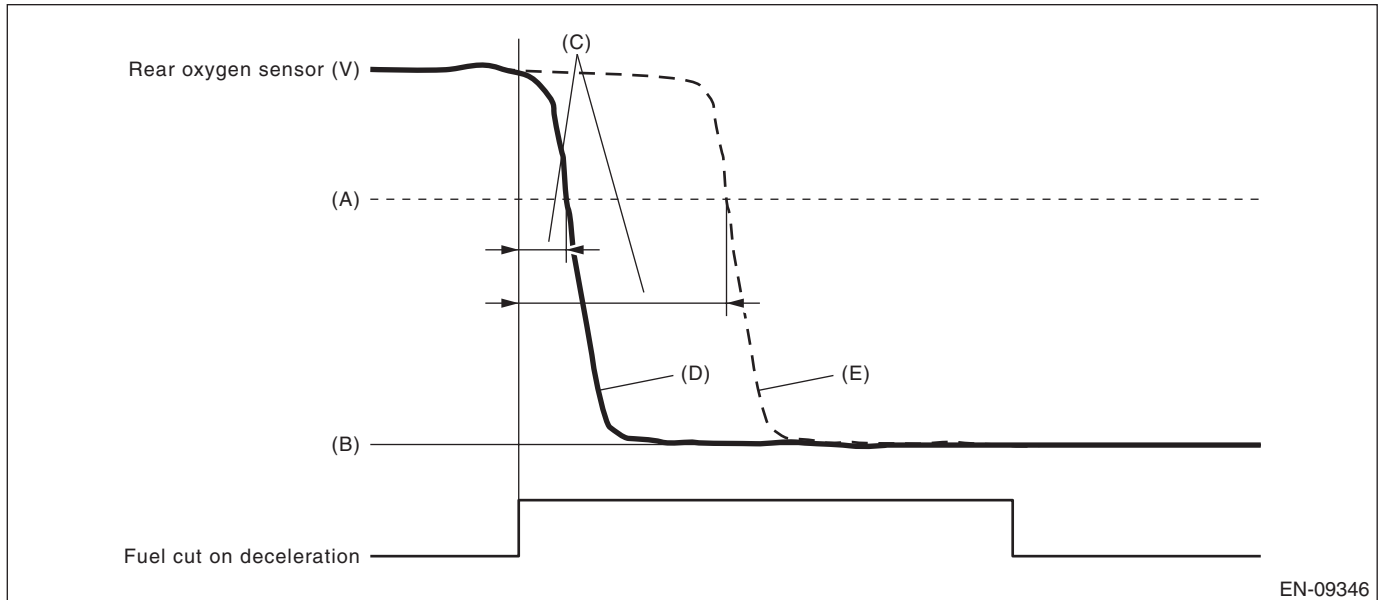
Perform diagnosis once during deceleration fuel cut from a constant and high speed driving, when rear oxygen sensor is warmed up sufficiently.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Detect the trouble by calculating the time from the beginning of the fuel cut to the beginning of the rear oxygen sensor voltage starting to drop.



EN-09346

(A) 0.5 V

(B) 0 V

(C) Diagnostic parameter

(D) Normal

(E) Malfunction

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Time when rear oxygen sensor voltage changed to 0.5 V after the fuel cut started.	> 4000 ms

Time Needed for Diagnosis: 10 seconds

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Time when rear oxygen sensor voltage changed to 0.5 V after the fuel cut started.	≤ 4000 ms

Time Needed for Diagnosis: 10 seconds

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

AT:DTC P013F O2 SENSOR DELAYED RESPONSE - LEAN TO RICH (BANK 1 SENSOR 2)

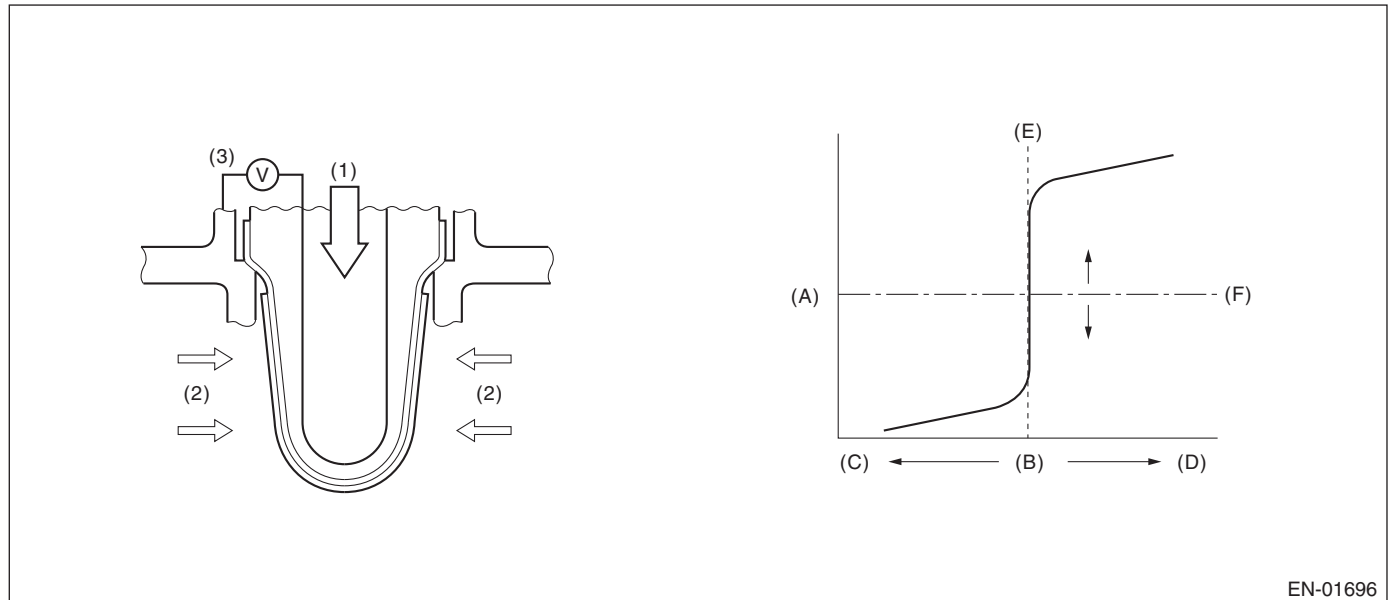
1. OUTLINE OF DIAGNOSIS

Detect the delayed response of rear oxygen sensor output for lean → rich.

After the deceleration fuel cut has completed, detect the trouble by calculating the time when the rear oxygen sensor output increases to the predetermined voltages.

Judge as NG when the response time is larger than the threshold value.

2. COMPONENT DESCRIPTION



EN-01696

(A) Electromotive force	(B) Air fuel ratio	(C) Lean
(D) Rich	(E) Theoretical air fuel ratio	(F) Comparative voltage
(1) Atmosphere	(2) Exhaust gas	(3) Electromotive force

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	> 10.9 V
Front oxygen (A/F) sensor closed loop control	Operation
Engine speed	≥ 550 rpm
Rear oxygen sensor voltage when fuel cut has completed	< 0.15 V
Fuel cut time	≥ 5000 ms
Engine coolant temperature when fuel cut has completed	≥ -40 °C (-40 °F)
Estimated element temperature of rear oxygen sensor when fuel cut has completed	≥ 450 °C (842 °F)

4. GENERAL DRIVING CYCLE

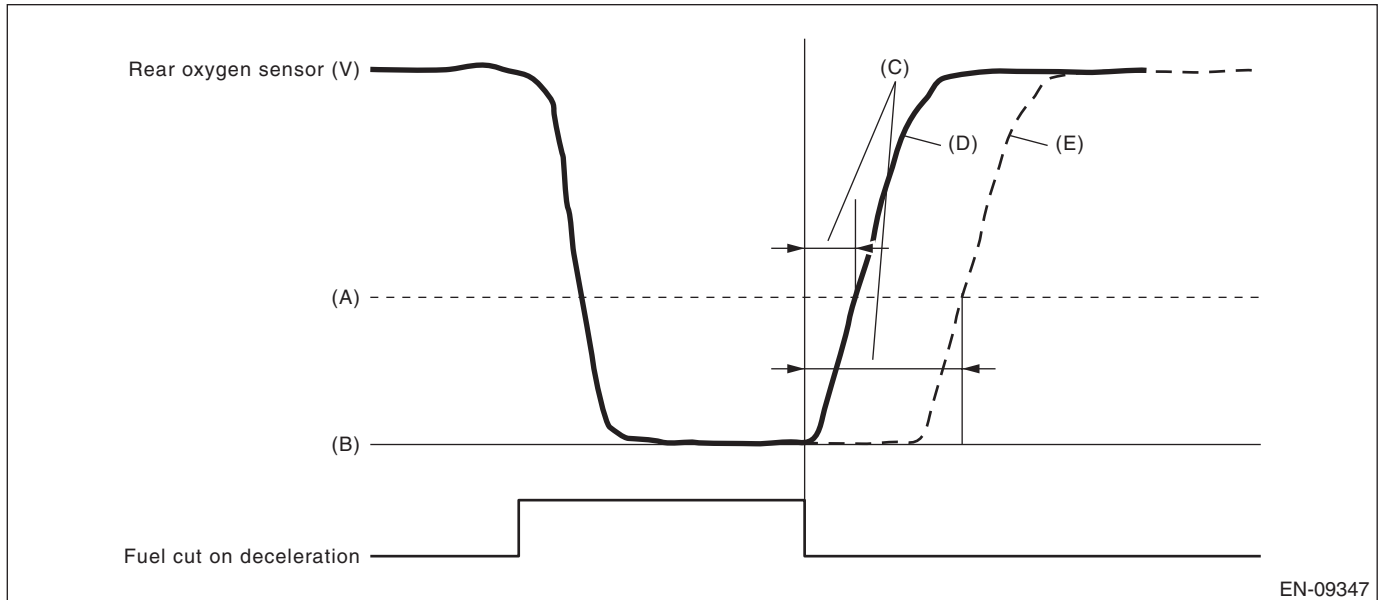
Perform diagnosis only once when recovering from the deceleration fuel cut continued for more than predetermined time with the rear oxygen sensor warmed up sufficiently.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

Detect the trouble by calculating the time from the completion of the fuel cut to the beginning of the rear oxygen sensor voltage starting to rise.



EN-09347

(A) 0.3 V

(B) 0 V

(C) Diagnostic parameter

(D) Normal

(E) Malfunction

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
The number of times that the rear oxygen sensor voltage changed to 0.3 V after the fuel cut has completed (time counter)	> 3750 time(s)

Time Needed for Diagnosis: 10 seconds

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
The number of times that the rear oxygen sensor voltage changed to 0.3 V after the fuel cut has completed (time counter)	≤ 3750 time(s)

Time Needed for Diagnosis: 10 seconds

Diagnostic Trouble Code (DTC) Detecting Criteria

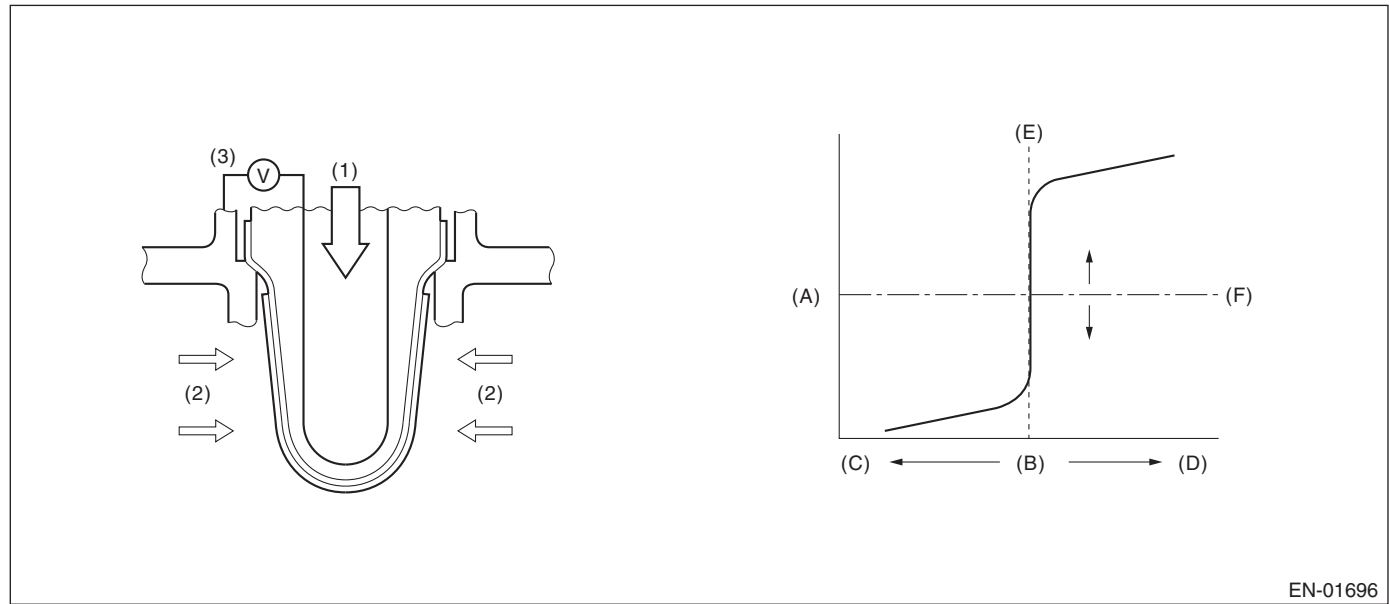
GENERAL DESCRIPTION

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

1. OUTLINE OF DIAGNOSIS

Detect the rear oxygen sensor open or short circuit. Judge as NG when the rear oxygen sensor voltage can be determined to be abnormal considering conditions such as intake air amount, engine coolant temperature, main feedback control and deceleration fuel cut.

2. COMPONENT DESCRIPTION



EN-01696

(A) Electromotive force	(B) Air fuel ratio	(C) Lean
(D) Rich	(E) Theoretical air fuel ratio	(F) Comparative voltage
(1) Atmosphere	(2) Exhaust gas	(3) Electromotive force

3. ENABLE CONDITION (USED ONLY FOR MALFUNCTION JUDGMENT)

Secondary Parameters	Enable Conditions
Closed loop control at the rear oxygen sensor	In operation
Target output voltage of rear oxygen sensor	$\geq 0.55 \text{ V} + 0.05 \text{ V}$
Amount of intake air	$\geq 10 \text{ g/s (0.35 oz/s)}$
Engine coolant temperature	$\geq -40 \text{ }^{\circ}\text{C (-40 }^{\circ}\text{F)}$
Misfire detection every 200 rotations	$< 65535 \text{ time(s)}$
Front oxygen (A/F) sensor compensation coefficient	Not in limit value
Battery voltage	$\geq 10.9 \text{ V}$
Deceleration fuel cut of 5000 ms or more.	Experienced

4. GENERAL DRIVING CYCLE

Perform the diagnosis once after starting the engine.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Minimum output voltage or Maximum output voltage	> 0.15 V < 0.55 V

Time Needed for Diagnosis: 90000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Diagnosis of the rear oxygen sensor voltage low side Minimum output voltage Maximum output voltage	Incomplete $\leq 0.15 \text{ V}$ $\geq 0.55 \text{ V}$

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

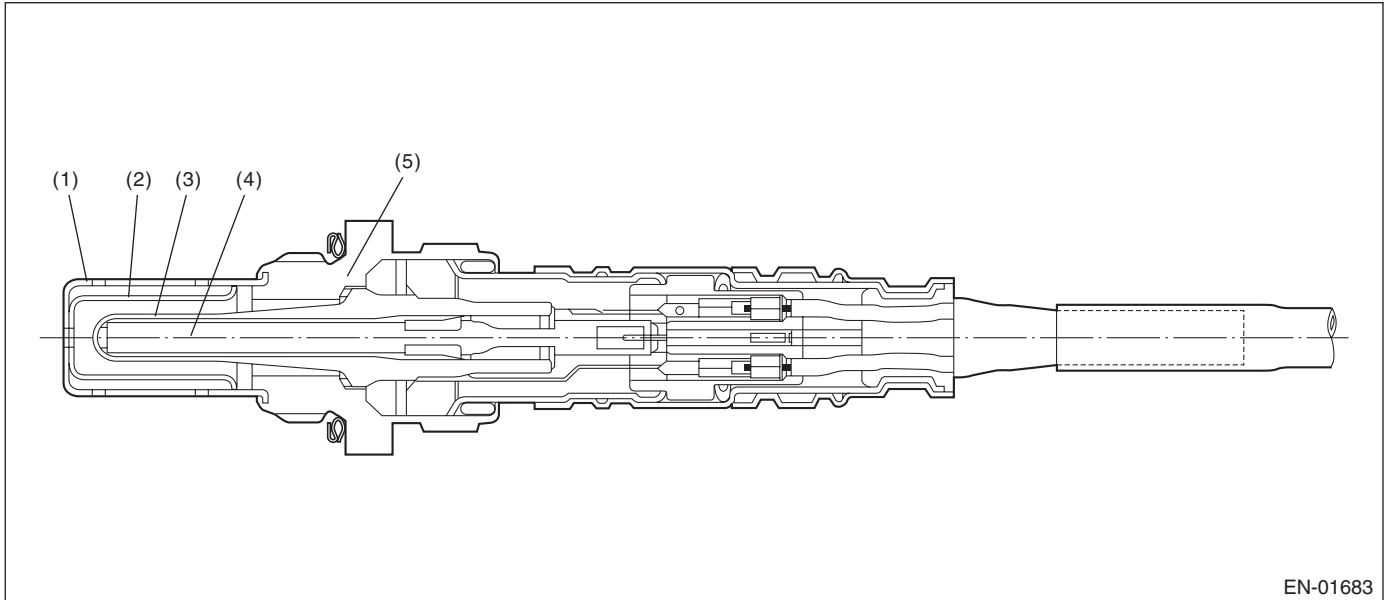
AV:DTC P0141 O2 SENSOR HEATER CIRCUIT (BANK1 SENSOR2)

1. OUTLINE OF DIAGNOSIS

Detect malfunction of the rear oxygen sensor heater.

Judge as NG if it is determined that the rear oxygen sensor impedance is large by observing the engine conditions.

2. COMPONENT DESCRIPTION



(1) Element cover (outer)

(2) Element cover (inner)

(3) Sensor element

(4) Ceramic heater

(5) Sensor housing

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Elapsed time after starting the engine	$\geq 1000 \text{ ms}$
Engine coolant temperature	$\geq 70 \text{ }^{\circ}\text{C}$ (158 $^{\circ}\text{F}$)
A/F sensor element impedance	$\leq 50 \text{ } \Omega$
A/F sensor heater control duty	$\leq 75 \text{ } \%$
Rear oxygen sensor heater control duty	$< 30 \text{ } \%$

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after 1000 ms seconds or more have passed since the engine started.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output terminal for heater characteristics failure detection	Low

Time Needed for Diagnosis: 4 ms × 2500 time(s)

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output terminal for heater characteristics failure detection	High

Time Needed for Diagnosis: 4 ms × 2500 time(s)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

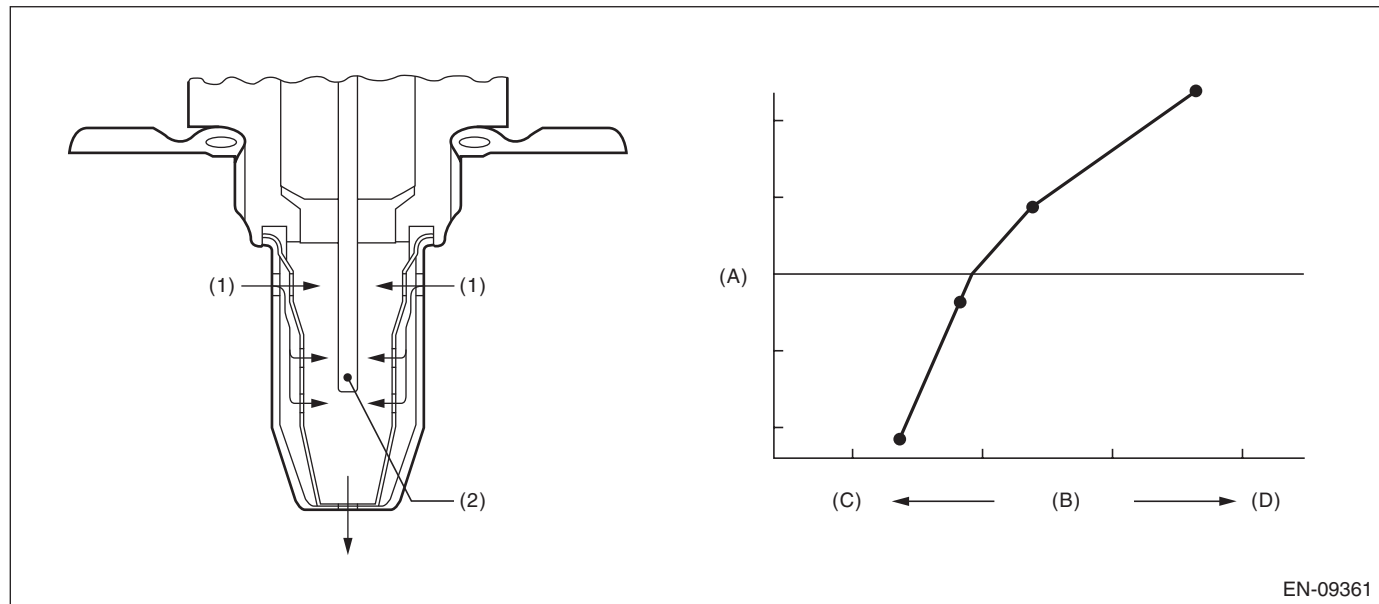
AW:DTC P014C O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 1)

1. OUTLINE OF DIAGNOSIS

Detect the slow response of front oxygen (A/F) sensor.

For diagnosis, detect the trouble by processing the λ waveform in normal driving without forcibly changing the target air fuel ratio.

2. COMPONENT DESCRIPTION



(A) Electromotive force

(B) Air fuel ratio

(C) Rich

(D) Lean

(1) Exhaust gas

(2) ZrO₂

3. ENABLE CONDITIONS

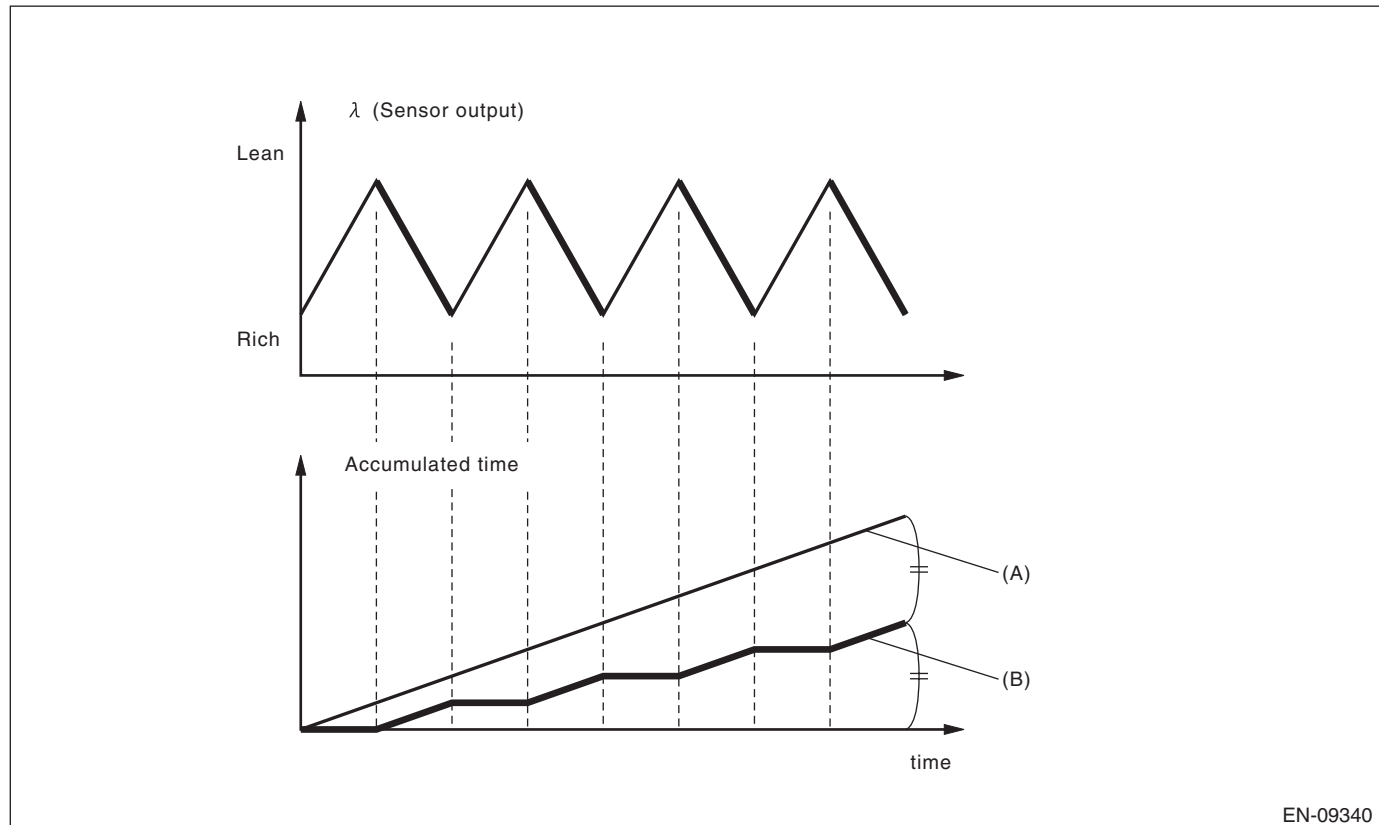
Secondary Parameters	Enable Conditions
Battery voltage	> 10.9 V
Closed loop control with main feedback	Operation
Front oxygen (A/F) sensor impedance	$\geq 0 \Omega$ and < 50 Ω
Elapsed time after starting the engine	≥ 0 ms
Engine coolant temperature	$\geq -40^\circ\text{C}$ (-40°F)
Engine speed	≥ 1000 rpm
Amount of intake air	≥ 10 g/s (0.35 oz/s)
Elapsed time after returning from the fuel cut	≥ 3000 ms
Accelerator pedal position	$\neq 0\%$

4. GENERAL DRIVING CYCLE

Perform diagnosis only once in a city driving including normal acceleration and deceleration.

5. DIAGNOSTIC METHOD 1

Detect the malfunction by checking “Cumulative value of time when λ changes from lean $\rightarrow$ rich” in comparison to “Time during which diagnosis is in progress”.



EN-09340

(A) Time during which diagnosis is in progress

(B) Cumulative value of time when λ changes from lean $\rightarrow$ rich

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
(Cumulative value of time when λ changes from lean $\rightarrow$ rich) / (Time during which diagnosis is in progress)	< 0.39 (Models without SI-DRIVE)	P014C
	< 0.42 (Models with SI-DRIVE)	
	> 0.63 (Models without SI-DRIVE)	P014D
	> 0.56 (Models with SI-DRIVE)	

Time Needed for Diagnosis: 90 seconds

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
(Cumulative value of time when λ changes from lean $\rightarrow$ rich) / (Time during which diagnosis is in progress)	≥ 0.39 (Models without SI-DRIVE)	P014C
	≥ 0.42 (Models with SI-DRIVE)	
	≤ 0.63 (Models without SI-DRIVE)	P014D
	≤ 0.56 (Models with SI-DRIVE)	

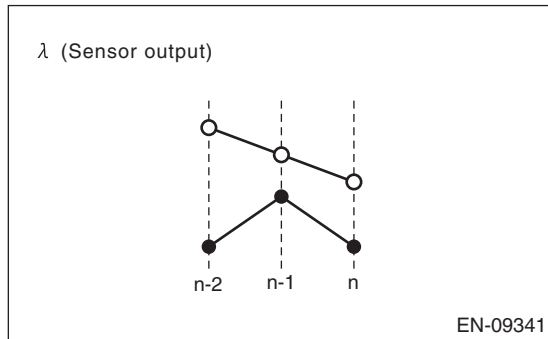
Time Needed for Diagnosis: 90 seconds

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. DIAGNOSTIC METHOD 2

Detect the malfunction by the cumulative value obtained from the amount of variation in λ change.



• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Cumulative value obtained from the amount of variation in λ change $\Sigma (\lambda(n) - \lambda(n-1)) - (\lambda(n-1) - \lambda(n-2)) $	< Value from Map	P014C and P014D

Map (Models without SI-DRIVE)

Cumulative value obtained from the amount of variation in λ $\Sigma \lambda(n) - \lambda(n-1) $	0.00	4.00
Cumulative value obtained from the amount of variation in λ change	0.00	4.00

Map (Models with SI-DRIVE)

Cumulative value obtained from the amount of variation in λ $\Sigma \lambda(n) - \lambda(n-1) $	0.00	6.00
Cumulative value obtained from the amount of variation in λ change	0.00	6.50

Time Needed for Diagnosis: 90 seconds

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Cumulative value obtained from the amount of variation in λ change $\Sigma (\lambda(n) - \lambda(n-1)) - (\lambda(n-1) - \lambda(n-2)) $	$\geq$ Value from Map	P014C and P014D

Time Needed for Diagnosis: 90 seconds

AX:DTC P014D O2 SENSOR SLOW RESPONSE - LEAN TO RICH (BANK 1 SENSOR 1)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P014C. <Ref. to GD(H4DOTC)-88, DTC P014C O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

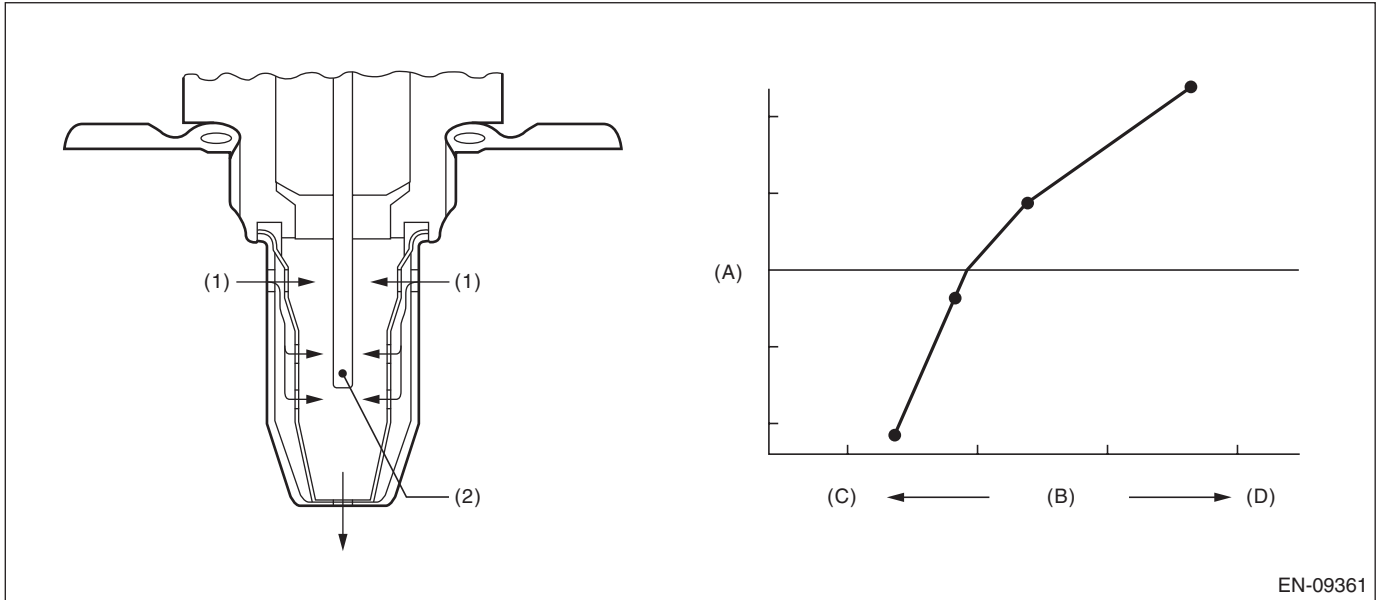
AY:DTC P015A O2 SENSOR DELAYED RESPONSE - RICH TO LEAN (BANK 1 SENSOR 1)

1. OUTLINE OF DIAGNOSIS

Detect the slow response of front oxygen (A/F) sensor.

For diagnosis, detect the trouble by processing the λ waveform in normal driving without forcibly changing the target air fuel ratio.

2. COMPONENT DESCRIPTION



EN-09361

(A) Electromotive force

(B) Air fuel ratio

(C) Rich

(D) Lean

(1) Exhaust gas

(2) ZrO₂

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

3. ENABLE CONDITIONS

Diagnostic method 1

Secondary Parameters	Enable Conditions
Battery voltage	> 10.9 V
Closed loop control with main feedback	Operation
Front oxygen (A/F) sensor impedance	$\geq 0 \Omega$ and $< 50 \Omega$
Elapsed time after starting the engine	≥ 0 ms
Engine coolant temperature	$\geq -40^{\circ}\text{C}$ (-40°F)
Engine speed	≥ 1000 rpm
Amount of intake air	≥ 10 g/s (0.35 oz/s)
Elapsed time after returning from the fuel cut	≥ 3000 ms
Accelerator pedal position	$\neq 0\%$

Diagnostic method 2

Secondary Parameters	Enable Conditions
Battery voltage	> 10.9 V
Closed loop control with main feedback	Operation
Front oxygen (A/F) sensor impedance	$\geq 0 \Omega$ and $< 50 \Omega$
Elapsed time after starting the engine	≥ 0 ms
Engine coolant temperature	$\geq -40^{\circ}\text{C}$ (-40°F)
Engine speed	≥ 1000 rpm
Amount of intake air	≥ 10 g/s (0.35 oz/s)
Elapsed time after returning from the fuel cut	≥ 3000 ms
Learning value of EVAP conc. during purge	< 1
Total time of operating canister purge	≥ 0 s
Engine load change	< 255 g/rev (8.99 oz/rev)
Accelerator pedal position	$\neq 0\%$

Diagnostic method 3

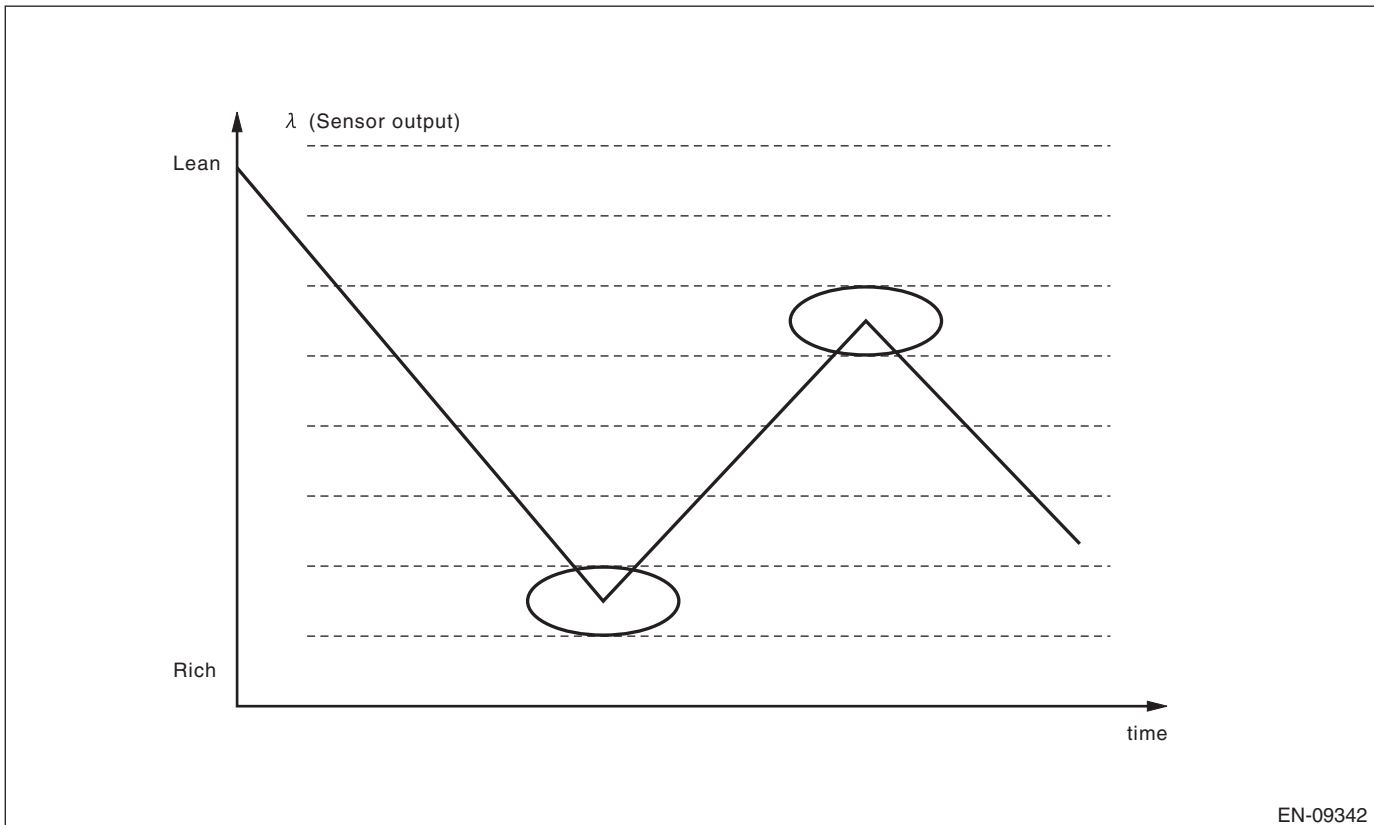
Secondary Parameters	Enable Conditions
Battery voltage	> 10.9 V
Closed loop control with main feedback	Operation
Front oxygen (A/F) sensor impedance	$\geq 0 \Omega$ and $< 50 \Omega$
Elapsed time after starting the engine	≥ 0 ms
Engine coolant temperature	$\geq -40^{\circ}\text{C}$ (-40°F)
Vehicle speed	≥ 40 km/h (24.9 MPH)
Engine speed	≥ 1000 rpm and < 4000 rpm
Amount of intake air	≥ 10 g/s (0.35 oz/s) and < 40 g/s (1.41 oz/s)
Learning value of EVAP conc. during purge	< 1
Catalyst depletion diagnosis	Not under diagnosis

4. GENERAL DRIVING CYCLE

Perform diagnosis only once in a city driving including normal acceleration and deceleration.

5. DIAGNOSTIC METHOD 1

Detect the malfunction depending on the average value of time necessary for λ to inverse the air fuel ratio from "Lean $\rightarrow$ Rich $\rightarrow$ Lean" to "Rich $\rightarrow$ Lean $\rightarrow$ Rich".



EN-09342

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Average value of time necessary for λ to inverse the air fuel ratio to Lean $\rightarrow$ Rich $\rightarrow$ Lean.	> 200 ms (Models without SI-DRIVE) > 100 ms (Models with SI-DRIVE)	P015A
Average value of time necessary for λ to inverse the air fuel ratio to Rich $\rightarrow$ Lean $\rightarrow$ Rich.	> 150 ms (Models without SI-DRIVE) > 200 ms (Models with SI-DRIVE)	P015B

Time Needed for Diagnosis: 50 times of inversion

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Average value of time necessary for λ to inverse the air fuel ratio to Lean $\rightarrow$ Rich $\rightarrow$ Lean.	$\leq$ 200 ms (Models without SI-DRIVE) $\leq$ 100 ms (Models with SI-DRIVE)	P015A
Average value of time necessary for λ to inverse the air fuel ratio to Rich $\rightarrow$ Lean $\rightarrow$ Rich.	$\leq$ 150 ms (Models without SI-DRIVE) $\leq$ 200 ms (Models with SI-DRIVE)	P015B

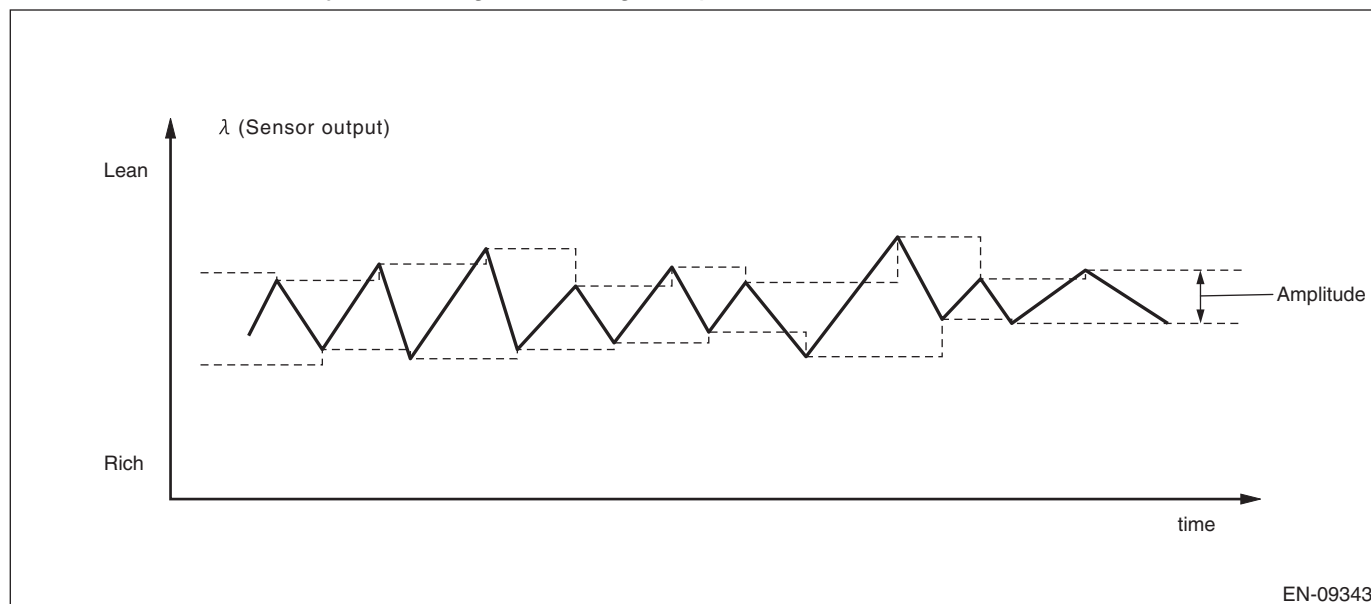
Time Needed for Diagnosis: 50 times of inversion

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

6. DIAGNOSTIC METHOD 2

Detect the malfunction by calculating the average amplitude of λ .



• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Average value for λ amplitude	> 0.1	P015A and P015B

Time Needed for Diagnosis: 11250 time(s) $\times$ 8 ms

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

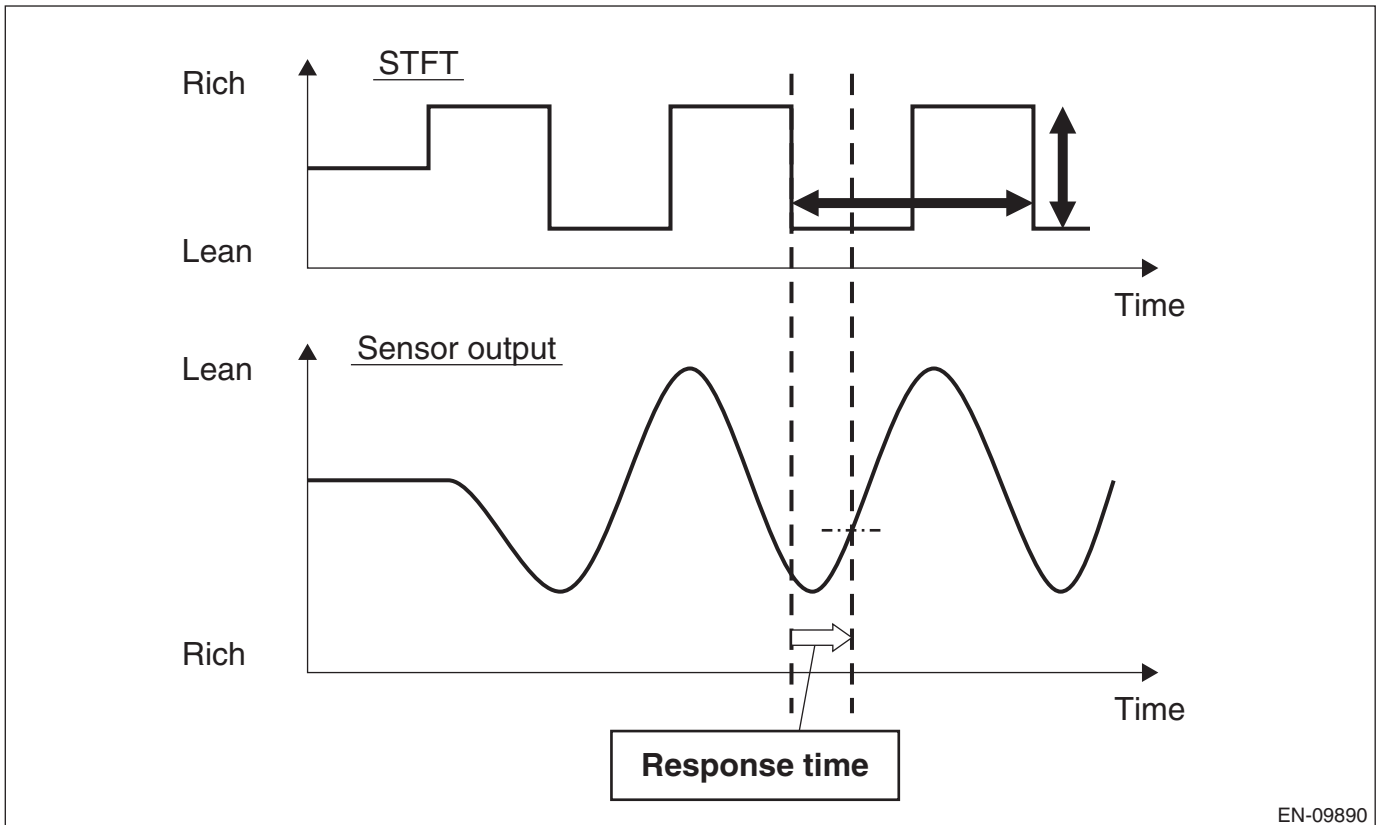
Judgment Value

Malfunction Criteria	Threshold Value	DTC
Average value for λ amplitude	≤ 0.1	P015A and P015B

Time Needed for Diagnosis: 11250 time(s) $\times$ 8 ms

7. DIAGNOSTIC METHOD 3

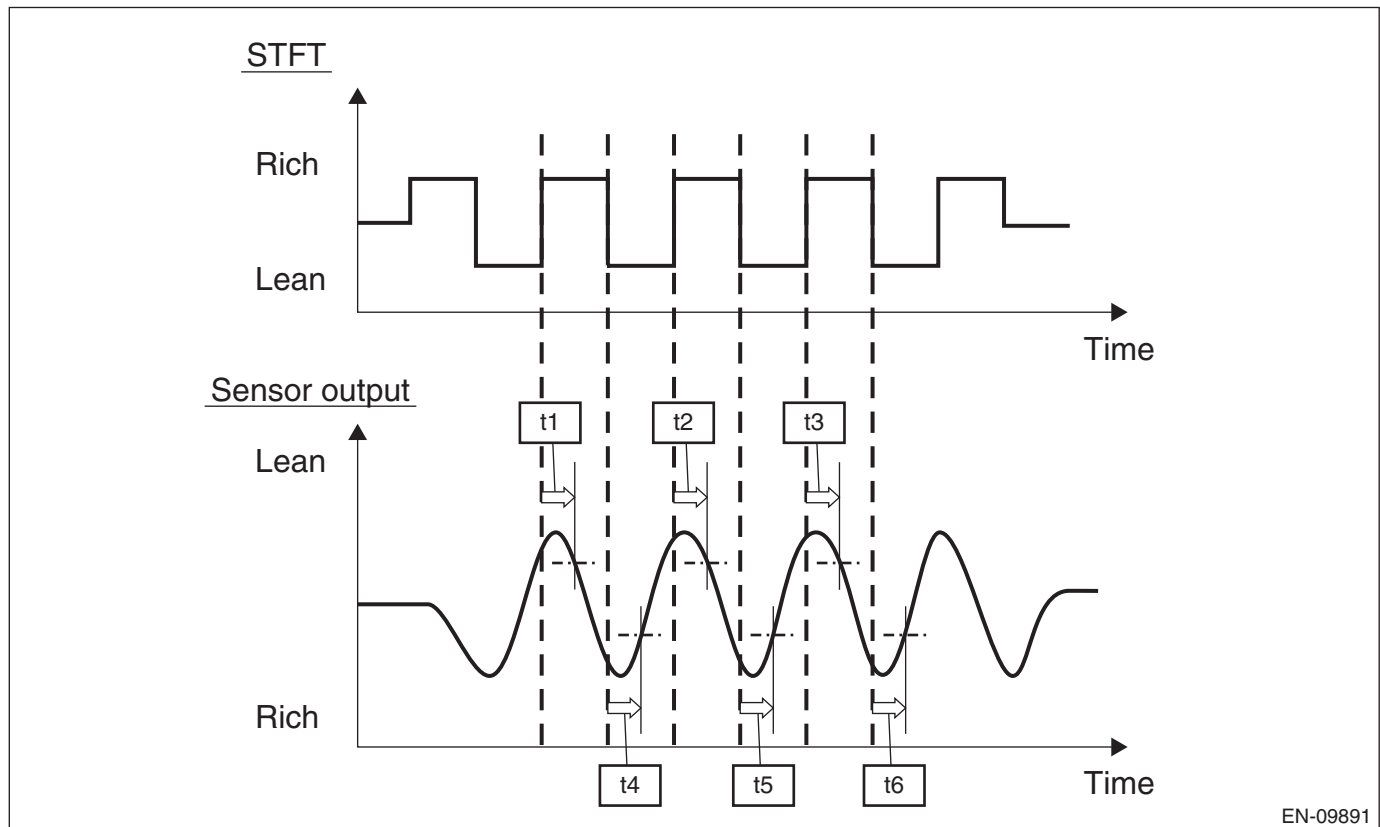
Change STFT (A/F compensation value) by interruption, and measure the reaction time of λ value. When A/F sensor malfunctions, the reaction time takes longer than at normal condition. In this case, judge as abnormal.



Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Measure reaction time (t1, t2, t3) and reaction time (t4, t5, t6). Use the average value of the reaction time to obtain the diagnostic value.



EN-09891

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
(t1 + t2 + t3)/3	> 420 ms (Models without SI-DRIVE) > 380 ms (Models with SI-DRIVE)	P015A and P015B
and (t4 + t5 + t6)/3	> 420 ms (Models without SI-DRIVE) > 380 ms (Models with SI-DRIVE)	

Time Needed for Diagnosis: 1000 ms × [1 time(s)/2] + 1000 ms × 3 time(s) + 500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
(t1 + t2 + t3)/3	≤ 420 ms (Models without SI-DRIVE) ≤ 380 ms (Models with SI-DRIVE)	P015A and P015B
or (t4 + t5 + t6)/3	≤ 420 ms (Models without SI-DRIVE) ≤ 380 ms (Models with SI-DRIVE)	

Time Needed for Diagnosis: 1000 ms × [1 time(s)/2] + 1000 ms × 3 time(s) + 500 ms

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

AZ:DTC P015B O2 SENSOR DELAYED RESPONSE - LEAN TO RICH (BANK 1 SENSOR 1)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P015A. <Ref. to GD(H4DOTC)-91, DTC P015A O2 SENSOR DELAYED RESPONSE - RICH TO LEAN (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

BA: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 CONDITIONS

Secondary Parameters	Enable Conditions
A/F main learning system	In operation
Engine load change	< 0.02 g/rev (0 oz/rev)
Engine load	≥ Value of Map 1

Map 1

Engine speed (rpm)	Idling	650	1000	1500	2000	2500	3000	3500	4000	4500
Measured value (g (oz)/rev)	na	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

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 diagnostic value (fsobd) with the threshold value, and if a condition meeting the malfunction criteria below continues for 10 s × 3 time(s) or more, judge that there is a fault in the fuel system.

Judgment Value

Malfunction Criteria	Threshold Value
$fsobd = (sglmd - tglmda) + faf + flaf$ In this case: sglmd = measured lambda tglmda = target lambda faf = main feedback compensation coefficient (every 64 milliseconds) flaf = main feedback learning compensation coefficient	≥ Value from Map 2

Map 2

Amount of air (g (oz)/s)	0 (0)	3.2 (0.11)	6.4 (0.23)	9.6 (0.34)	12.8 (0.45)	16 (0.56)	19.2 (0.68)
fsobdL1 (%)	1.35	1.35	1.35	1.35	1.35	1.35	1.35

Time Needed for Diagnosis: 10 s × 3 time(s)

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
$fsobd = (sglmd - tglmda) + faf + flaf$	< 1.15

Time Needed for Diagnosis: 10 s

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

BB: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 CONDITIONS

Secondary Parameters	Enable Conditions
A/F main learning system	In operation
Engine load change	≤ 0.02 g/rev (0 oz/rev)
Learning value of EVAP conc.	< 1
Cumulative time of canister purge after engine start	≥ 0 s
Continuous period after canister purge starting	≥ 0 ms
Engine load	$\geq$ Value of Map 1

Map 1

Engine speed (rpm)	Idling	650	1000	1500	2000	2500	3000	3500	4000	4500
Measured value (g (oz)/rev)	na	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

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 diagnostic value (fsobd) with the threshold value, and if a condition meeting the malfunction criteria below continues for $10 \text{ s} \times 3 \text{ time(s)}$ or more, judge that there is a fault in the fuel system.

Judgment Value

Malfunction Criteria	Threshold Value
$\text{fsobd} = (\text{sglmd} - \text{tglmda}) + \text{faf} + \text{flaf}$ In this case: sglmd = measured lambda tglmda = target lambda faf = main feedback compensation coefficient (every 64 milliseconds) flaf = main feedback learning compensation coefficient	$< \text{Value of Map 2}$

Map 2

Amount of air (g (oz)/s)	0 (0)	3.2 (0.11)	6.4 (0.23)	9.6 (0.34)	12.8 (0.45)	16 (0.56)	19.2 (0.68)
fsobdL1 (%)	0.65	0.65	0.65	0.65	0.65	0.65	0.65

Time Needed for Diagnosis: $10 \text{ s} \times 3 \text{ time(s)}$

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

• Normality Judgment

Judge as OK if the status that the criteria below are met continues for 10 seconds.

Judgment Value

Malfunction Criteria	Threshold Value
$\text{fsobd} = (\text{sglmd} - \text{tglmda}) + \text{faf} + \text{flaf}$	≥ 0.85

Time Needed for Diagnosis: 10 s

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

BC:DTC P0201 INJECTOR #1

1. OUTLINE OF DIAGNOSIS

Based on the self-diagnostic result of the injector driving IC, judge the injector driving circuit as normal or abnormal.

Injector driving IC detects the status of “fuel remains injected” or “fuel is not injected” as a malfunction.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Elapsed time after starting the engine	$> 1 \text{ s}$
Engine speed	$> 500 \text{ rpm}$
Injection time	$\geq 1000 \mu\text{s}$ and $< 120000000/\text{engine speed} - 1000 \mu\text{s}$
Injection status	Not during fuel cut and Not during asynchronous injection controlled by crankshaft position sensor

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Injector driving IC information	Malfunction

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Injector driving IC information	Normal

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

BD:DTC P0202 INJECTOR #2

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0201. <Ref. to GD(H4DOTC)-100, DTC P0201 INJECTOR #1, Diagnostic Trouble Code (DTC) Detecting Criteria.>

BE:DTC P0203 INJECTOR #3

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0201. <Ref. to GD(H4DOTC)-100, DTC P0201 INJECTOR #1, Diagnostic Trouble Code (DTC) Detecting Criteria.>

BF:DTC P0204 INJECTOR #4

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0201. <Ref. to GD(H4DOTC)-100, DTC P0201 INJECTOR #1, Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

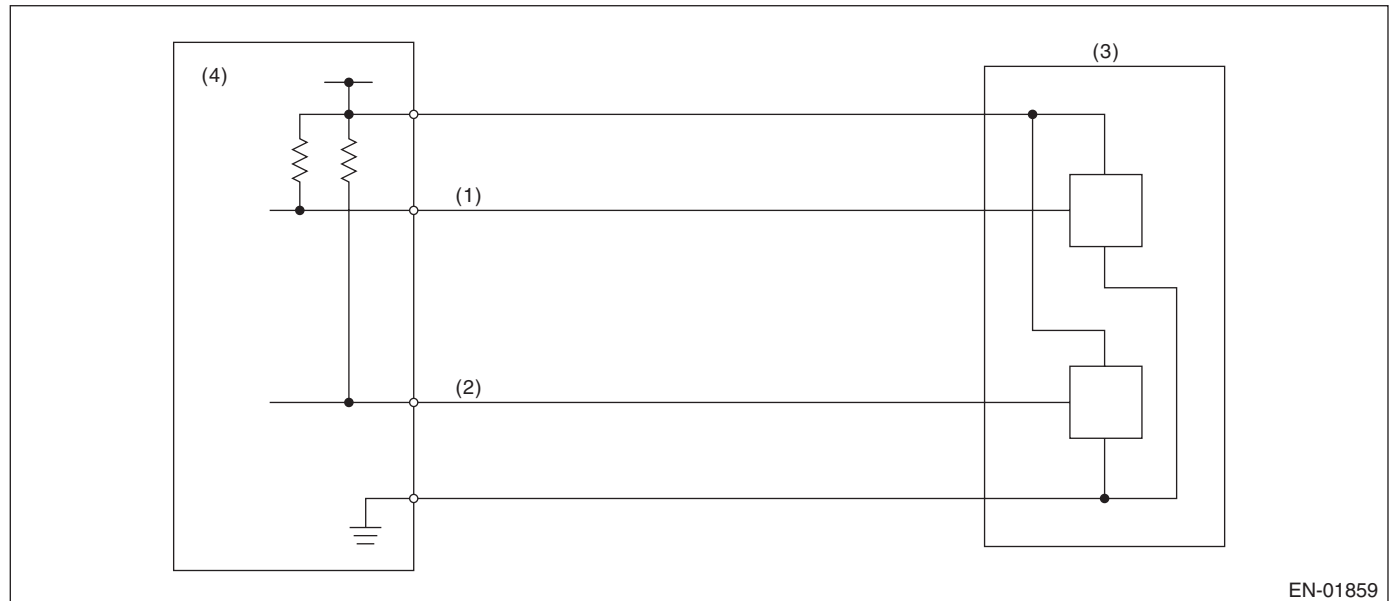
BG:DTC P0222 THROTTLE/PEDAL POSITION SENSOR/SWITCH “B” CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of throttle position sensor 2.

Judge as NG if 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 CONDITIONS

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	$\geq 6\text{ V}$

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 2 input voltage	$\leq 1.15 \text{ V}$

Time Needed for Diagnosis: 24 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 2 input voltage	$> 1.15 \text{ V}$

Time Needed for Diagnosis: 24 ms

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

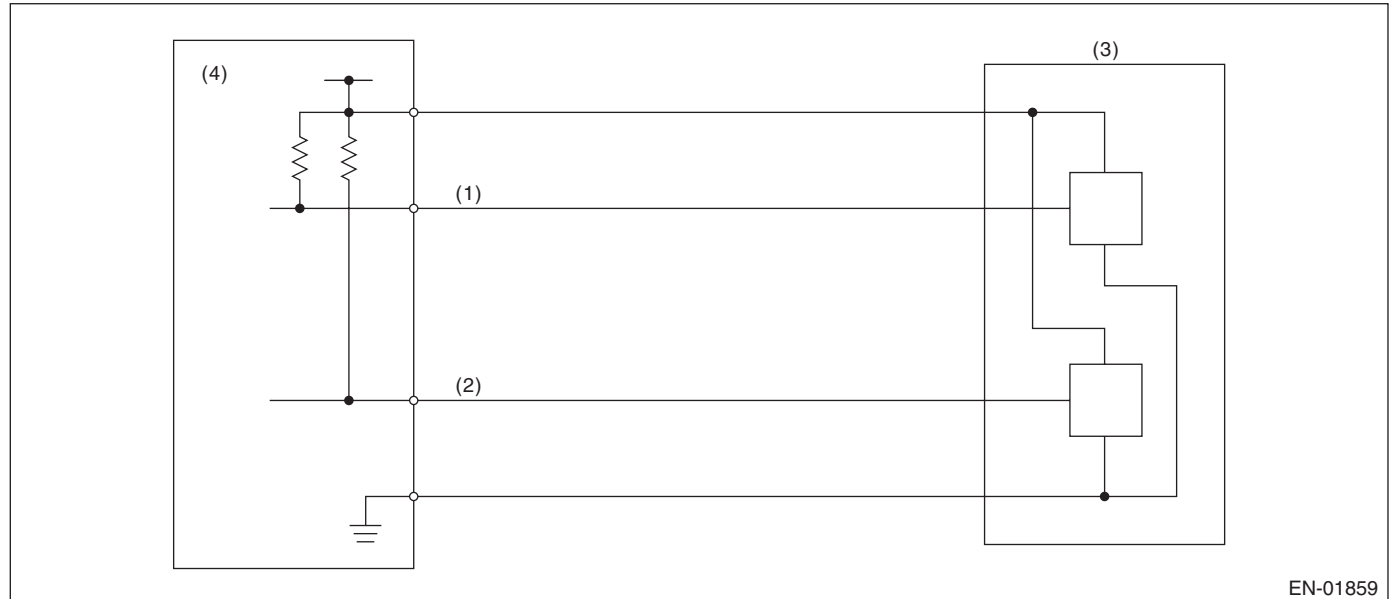
BH:DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH “B” CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of throttle position sensor 2.

Judge as NG if 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 CONDITIONS

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	$\geq 6\text{ V}$

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 2 input voltage	≥ 4.858 V

Time Needed for Diagnosis: 24 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 2 input voltage	< 4.858 V

Time Needed for Diagnosis: 24 ms

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

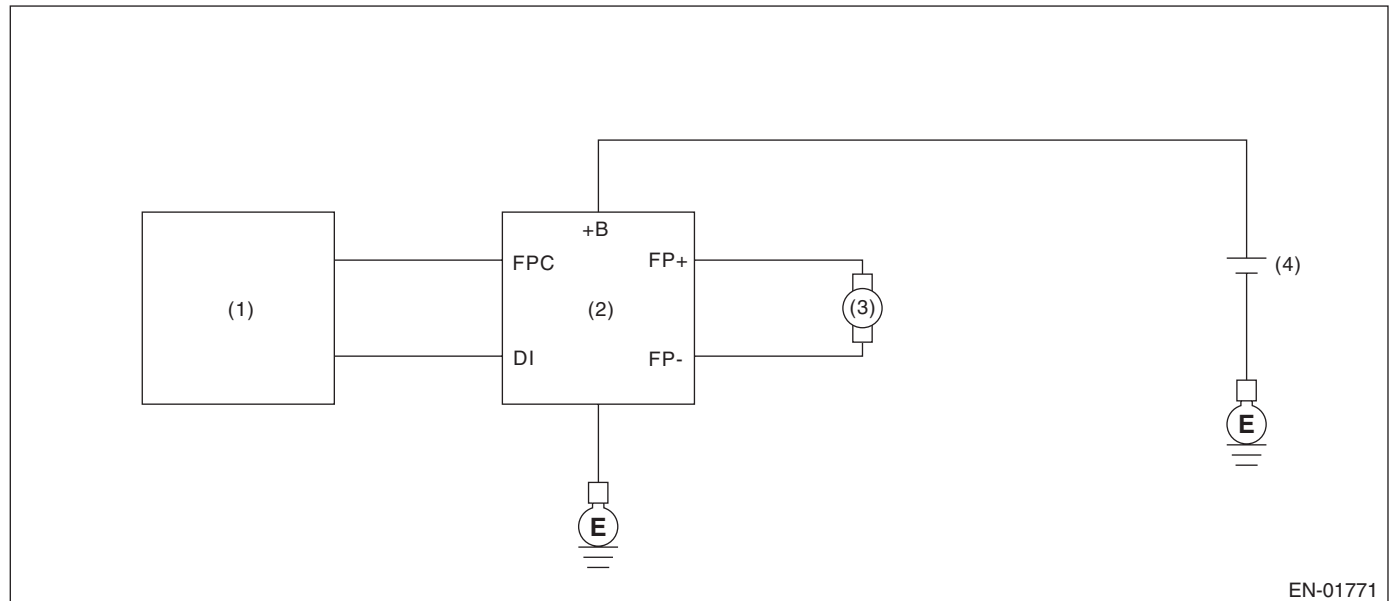
BI: DTC P0230 FUEL PUMP PRIMARY CIRCUIT

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of fuel pump control unit.

Judge as NG when the NG signal is sent through a diagnostic line coming from the fuel pump control unit. Fuel pump control unit detects the open or short circuit malfunction for each line, and then sends NG signals if one of them is found NG.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)

(3) Fuel pump

(4) Battery

(2) Fuel pump control unit

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 8 V
Elapsed time after starting the engine	≥ 180000 ms
Fuel pump control	ON
Fuel pump control unit output diagnosis signal	Low
Fuel level	≥ 10 ℓ (2.64 US gal, 2.2 Imp gal)

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 8 V
Elapsed time after starting the engine	≥ 180000 ms
Fuel pump control	ON
Fuel pump control unit output diagnosis signal	High
Fuel level	≥ 10 ℓ (2.64 US gal, 2.2 Imp gal)

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

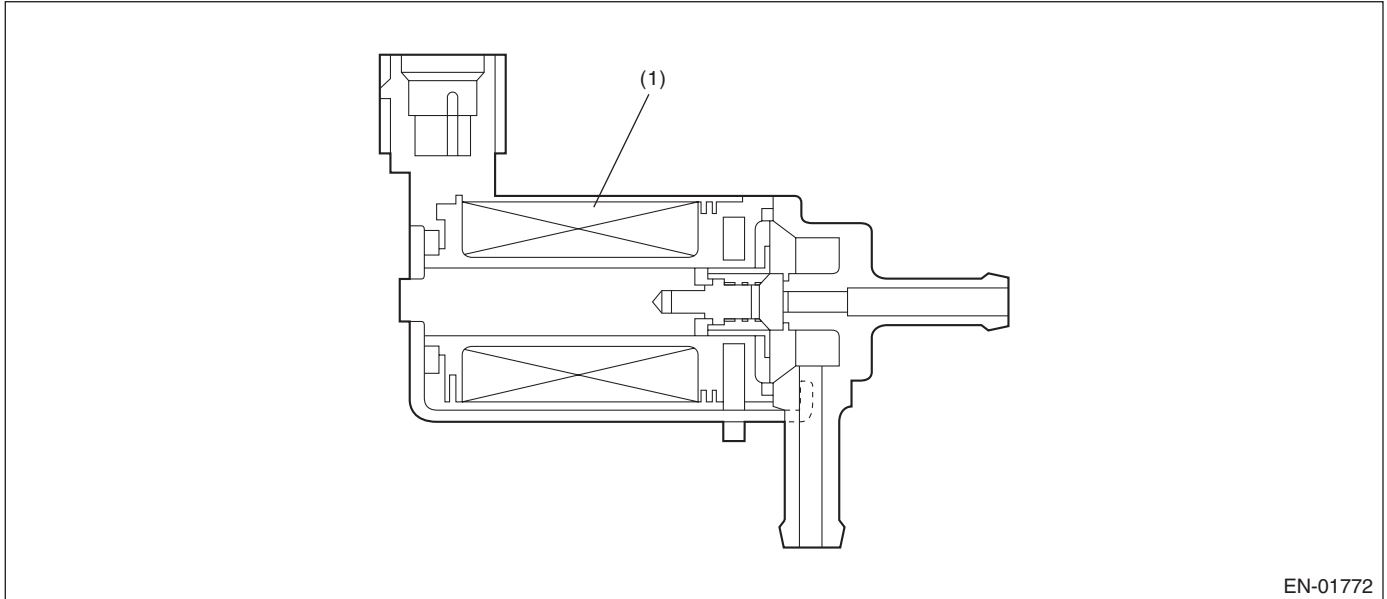
GENERAL DESCRIPTION

BJ:DTC P0244 TURBO/SUPER CHARGER WASTEGATE SOLENOID “A” RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of wastegate control solenoid valve function.
Judge as NG when becoming high wastegate pressure.

2. COMPONENT DESCRIPTION



(1) Coil

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Intake manifold pressure	≥ Value from Map

Map (models without SI-DRIVE)

		Barometric pressure (kPa (mmHg, inHg))					
		58.7 (440, 17.3)	77.3 (580, 22.8)	89.3 (670, 26.4)	96 (720, 28.3)	98.6 (740, 29.1)	101.3 (760, 29.9)
Engine speed (rpm)	1000	109.5 (822, 32.3)	127.4 (956, 37.6)	138.6 (1040, 40.9)	138.6 (1040, 40.9)	138.6 (1040, 40.9)	138.6 (1040, 40.9)
	2000	139.1 (1044, 41.1)	163.4 (1226, 48.3)	178.6 (1340, 52.8)	178.6 (1340, 52.8)	178.6 (1340, 52.8)	178.6 (1340, 52.8)
	2400	169.7 (1273, 50.1)	200.6 (1505, 59.3)	219.9 (1650, 65)	219.9 (1650, 65)	219.9 (1650, 65)	219.9 (1650, 65)
	4000	169.7 (1273, 50.1)	200.6 (1505, 59.3)	219.9 (1650, 65)	219.9 (1650, 65)	219.9 (1650, 65)	219.9 (1650, 65)
	5000	144.1 (1081, 42.6)	173 (1298, 51.1)	193.9 (1454, 57.3)	200.7 (1506, 59.3)	217.9 (1635, 64.4)	217.9 (1635, 64.4)
	6000	138.6 (1040, 40.9)	166.6 (1250, 49.2)	187.2 (1404, 55.3)	194.6 (1460, 57.5)	213.3 (1600, 63)	213.3 (1600, 63)
kPa (mmHg, inHg)							

Map (models with SI-DRIVE)

		Barometric pressure (kPa (mmHg, inHg))					
		59.3 (445, 17.5)	68.6 (515, 20.3)	78 (585, 23)	92 (690, 27.2)	96 (720, 28.3)	98.6 (740, 29.1)
Engine speed (rpm)	1000	124.4 (934, 36.8)	135.3 (1015, 40)	135.3 (1015, 40)	135.3 (1015, 40)	135.3 (1015, 40)	135.3 (1015, 40)
	2000	169.4 (1271, 50)	185.3 (1390, 54.7)	185.3 (1390, 54.7)	185.3 (1390, 54.7)	185.3 (1390, 54.7)	185.3 (1390, 54.7)
	3000	158.2 (1187, 46.7)	214.6 (1610, 63.4)	214.6 (1610, 63.4)	214.6 (1610, 63.4)	214.6 (1610, 63.4)	214.6 (1610, 63.4)
	4000	155.8 (1169, 46)	195.5 (1467, 57.7)	205.4 (1541, 60.7)	225.3 (1690, 66.5)	225.3 (1690, 66.5)	225.3 (1690, 66.5)
	5000	145.8 (1094, 43.1)	169.7 (1273, 50.1)	185.6 (1392, 54.8)	215.3 (1616, 63.6)	225.3 (1690, 66.5)	225.3 (1690, 66.5)
	6000	117.8 (884, 34.8)	156.3 (1173, 46.2)	168.5 (1264, 49.8)	205 (1538, 60.5)	215.1 (1614, 63.5)	229.3 (1720, 67.7)
kPa (mmHg, inHg)							

Time Needed for Diagnosis: 2000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Intake manifold pressure	<Map Value of Map – 22.4 kPa (168 mmHg, 6.6 inHg) (models without SI-DRIVE) <Map Value of Map – 20 kPa (150 mmHg, 5.9 inHg) (models with SI-DRIVE)

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

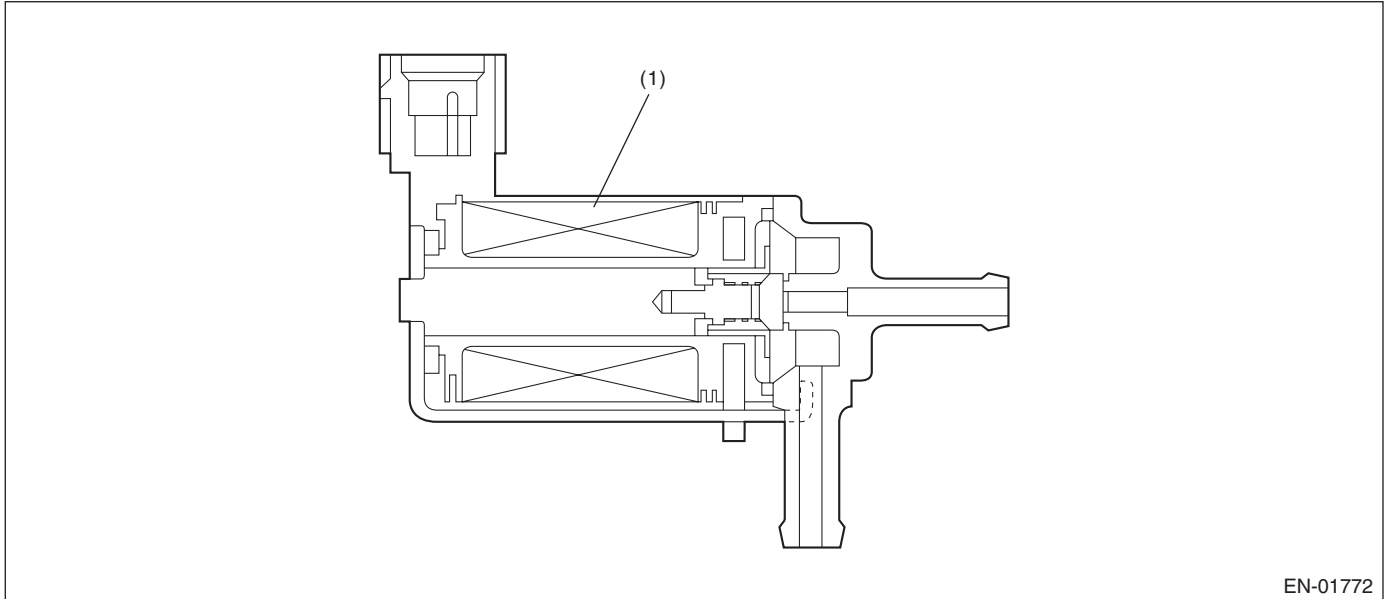
BK:DTC P0245 TURBO/SUPER CHARGER WASTEGATE SOLENOID “A” LOW

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the wastegate control solenoid valve.

Judge as NG when the terminal output voltage remains Low during outputting the duty signal.

2. COMPONENT DESCRIPTION



EN-01772

(1) Coil

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Elapsed time after starting the engine	$\geq 1 \text{ second}$

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal output voltage	Low
Duty ratio of wastegate control	< 75%

Time Needed for Diagnosis: 640 ms

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

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal output voltage	High

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

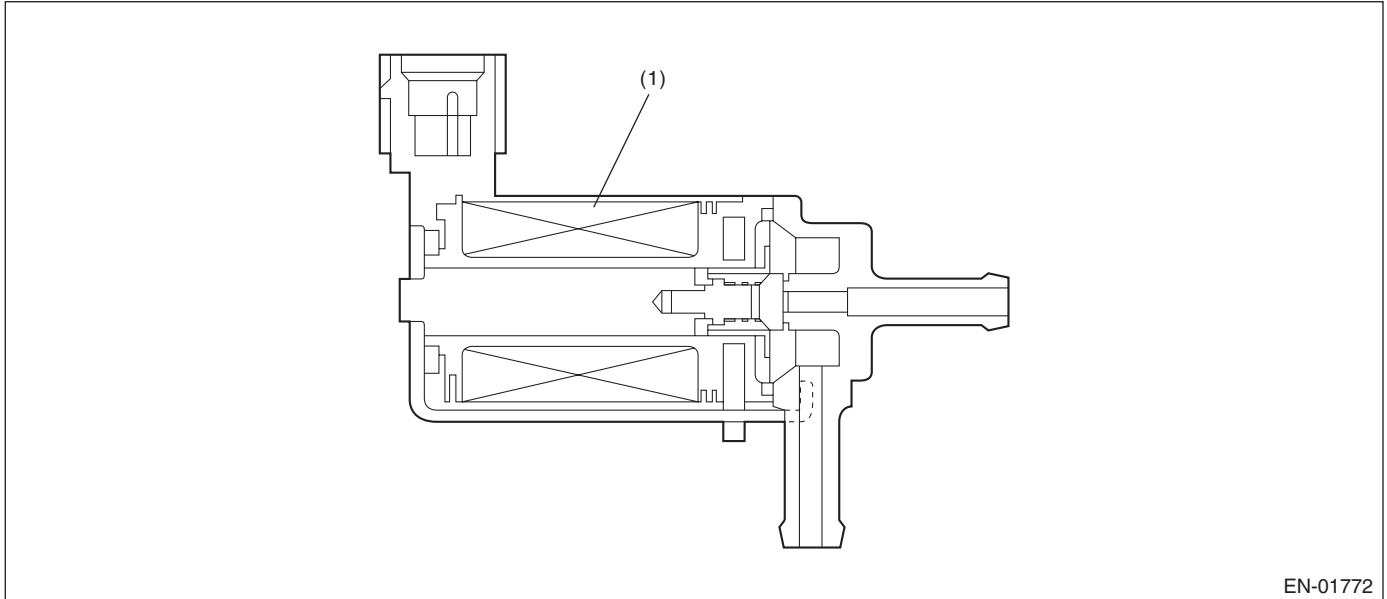
BL:DTC P0246 TURBO/SUPER CHARGER WASTEGATE SOLENOID “A” HIGH

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the wastegate control solenoid valve.

Judge as NG when the terminal output voltage remains Low or High during outputting the duty signal.

2. COMPONENT DESCRIPTION



EN-01772

(1) Coil

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Elapsed time after starting the engine	$\geq 1 \text{ second}$

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal output voltage	High
Duty ratio of wastegate control	≥ 25%

Time Needed for Diagnosis: 640 ms

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

Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal output voltage	Low

Time Needed for Diagnosis: Less than 1 second

BM:DTC P0300 RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0301. <Ref. to GD(H4DOTC)-114, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

BN: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 two 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
- 360° Interval Difference Method (whole range)
- 720° Interval Difference Method (3,000 rpm or more)

2) Misfire every time: FTP 1.5 times misfire, Catalyst damage misfire

- 360° Interval Difference Method

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
All secondary parameters enable conditions	≥ 1024 ms
Intake manifold pressure change at 180°CA	< Value of Map 1
Throttle position change during 16 milliseconds	< 14 °
Fuel shut-off function	Not in operation
Fuel level	≥ 9.6 ℓ (2.54 US gal, 2.11 Imp gal)
Vehicle dynamic control or AT torque control	Not in operation
Evaporative system leak check	Not in operation
Engine speed	550 rpm — 6700 rpm
Intake manifold pressure	≥ Value from Map 2
Battery voltage	≥ 8 V
Fuel parameter determination	Not extremely low volatility
Elapsed time after starting the engine	≥ 0 ms
Engine speed change during 32 milliseconds	< 1000 rpm

Map 1 (Models without SI-DRIVE)

rpm	750	1000	1500	2000	2500	3000	3500	4000
kPa (mmHg, inHg)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)

rpm	4500	5000	5500	6000	6500	6700
kPa (mmHg, inHg)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)

Map 1 (Models with SI-DRIVE)

rpm	700	1000	1500	2000	2500	3000	3500	4000
kPa (mmHg, inHg)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)

rpm	4500	5000	5500	6000	6500	6700
kPa (mmHg, inHg)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Map 2 (Models without SI-DRIVE)

- Normal ignition

		Barometric pressure (kPa (mmHg, inHg))						
		66.7 (500.0 , 19.7)	76.6 (575.0 , 22.6)	80 (600.0 , 23.6)	84 (630.0 , 24.8)	86.6 (650.0 , 25.6)	92 (690.0 , 27.2)	100.2 (752.0 , 29.6)
Engine speed (rpm)	700	23 (172.4 , 6.8)	23 (172.4 , 6.8)	23.7 (177.5 , 7)	25.4 (190.2 , 7.5)	26.7 (200.2 , 7.9)	26.5 (198.6 , 7.8)	27.9 (208.9 , 8.2)
	1000	20.4 (152.8 , 6)	20.4 (152.8 , 6)	20.8 (156.0 , 6.1)	22.7 (170.1 , 6.7)	23.2 (174.4 , 6.9)	23.9 (179.4 , 7.1)	25.1 (188.4 , 7.4)
	1500	20.7 (155.4 , 6.1)	20.7 (155.4 , 6.1)	21.5 (161.1 , 6.3)	22.6 (169.4 , 6.7)	23.3 (175.0 , 6.9)	24.4 (183.2 , 7.2)	25.8 (193.7 , 7.6)
	2000	20.1 (150.9 , 5.9)	20.1 (150.9 , 5.9)	20.9 (156.7 , 6.2)	22 (165.3 , 6.5)	22.8 (170.8 , 6.7)	23.6 (177.2 , 7)	24.8 (186.1 , 7.3)
	2500	20.2 (151.3 , 6)	20.2 (151.3 , 6)	20.9 (156.5 , 6.2)	21.9 (164.4 , 6.5)	22.5 (168.8 , 6.6)	23.2 (174.3 , 6.9)	24.4 (183.1 , 7.2)
	3000	21.4 (160.9 , 6.3)	21.4 (160.9 , 6.3)	20.7 (155.6 , 6.1)	21.9 (164.1 , 6.5)	22.6 (169.2 , 6.7)	23.6 (177.3 , 7)	24.3 (182.2 , 7.2)
	3500	25.1 (188.3 , 7.4)	25.1 (188.3 , 7.4)	25.8 (193.4 , 7.6)	27.1 (203.5 , 8)	27.8 (208.4 , 8.2)	29.2 (218.8 , 8.6)	29.3 (220.2 , 8.7)
	4000	25.7 (192.8 , 7.6)	25.7 (192.8 , 7.6)	26.5 (199.0 , 7.8)	28 (210.2 , 8.3)	28.9 (216.7 , 8.5)	29.4 (220.6 , 8.7)	29.5 (221.2 , 8.7)
	4500	25.8 (193.3 , 7.6)	25.8 (193.3 , 7.6)	26.3 (197.1 , 7.8)	27.5 (206.2 , 8.1)	28.7 (215.3 , 8.5)	29.1 (218.3 , 8.6)	29.2 (219.3 , 8.6)
	5000	30 (225.3 , 8.9)	30 (225.3 , 8.9)	30.6 (229.6 , 9)	31.3 (234.5 , 9.2)	32.1 (240.7 , 9.5)	33 (247.4 , 9.7)	33.2 (248.8 , 9.8)
	5500	33.8 (253.2 , 10)	33.8 (253.2 , 10)	34.2 (256.8 , 10.1)	35.5 (266.4 , 10.5)	36.2 (271.9 , 10.7)	37.2 (279.1 , 11)	37.2 (278.9 , 11)
	6000	37.9 (284.4 , 11.2)	37.9 (284.4 , 11.2)	38.2 (286.8 , 11.3)	39.3 (294.5 , 11.6)	40.2 (301.3 , 11.9)	40.8 (306.3 , 12.1)	41.6 (312.0 , 12.3)
	6500	42.6 (319.8 , 12.6)	42.6 (319.8 , 12.6)	43.4 (325.4 , 12.8)	44.5 (333.6 , 13.1)	45.5 (341.2 , 13.4)	47 (352.8 , 13.9)	47.2 (354.0 , 13.9)
	6700	43.4 (325.2 , 12.8)	43.4 (325.2 , 12.8)	44.1 (330.8 , 13)	45.2 (339.0 , 13.3)	46.2 (346.6 , 13.6)	47.7 (358.2 , 14.1)	47.9 (359.4 , 14.1)
kPa (mmHg, inHg)								

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

- Idling ignition

		Barometric pressure (kPa (mmHg, inHg))						
		66.7 (500.0 , 19.7)	76.6 (575.0 , 22.6)	80 (600.0 , 23.6)	84 (630.0 , 24.8)	86.6 (650.0 , 25.6)	92 (690.0 , 27.2)	100.2 (752.0 , 29.6)
Engine speed (rpm)	700	23 (172.4 , 6.8)	23 (172.4 , 6.8)	23.7 (177.5 , 7)	25.4 (190.2 , 7.5)	26.7 (200.2 , 7.9)	26.5 (198.6 , 7.8)	27.9 (208.9 , 8.2)
	1000	22.3 (167.3 , 6.6)	22.3 (167.3 , 6.6)	23 (172.6 , 6.8)	24.5 (184.2 , 7.3)	25.7 (192.8 , 7.6)	26.8 (201.0 , 7.9)	27 (202.3 , 8)
	1500	22.3 (167.6 , 6.6)	22.3 (167.6 , 6.6)	24.2 (181.9 , 7.2)	24.8 (185.7 , 7.3)	26.2 (196.7 , 7.7)	26.7 (200.0 , 7.9)	28.2 (211.8 , 8.3)
	2000	22 (164.8 , 6.5)	22 (164.8 , 6.5)	22.8 (170.9 , 6.7)	23.7 (177.8 , 7)	24.6 (184.7 , 7.3)	25.5 (191.6 , 7.5)	26.5 (198.4 , 7.8)
	2500	21.2 (158.9 , 6.3)	21.2 (158.9 , 6.3)	21.9 (164.3 , 6.5)	22.9 (171.7 , 6.8)	23.6 (177.2 , 7)	25.5 (191.6 , 7.5)	25.4 (190.3 , 7.5)
	3000	20.9 (156.4 , 6.2)	20.9 (156.4 , 6.2)	26.3 (197.6 , 7.8)	22.6 (169.7 , 6.7)	27.5 (206.2 , 8.1)	24.4 (183.1 , 7.2)	25.3 (189.5 , 7.5)
	3500	30 (225.3 , 8.9)	30 (225.3 , 8.9)	30.9 (231.8 , 9.1)	32 (240.4 , 9.5)	32.8 (246.0 , 9.7)	33.7 (252.5 , 9.9)	33.8 (253.7 , 10)
	4000	30.7 (230.0 , 9.1)	30.7 (230.0 , 9.1)	31.1 (233.6 , 9.2)	32.3 (242.7 , 9.6)	33.9 (254.5 , 10)	34.7 (260.6 , 10.3)	33.9 (254.4 , 10)
	4500	28.4 (213.4 , 8.4)	28.4 (213.4 , 8.4)	29 (217.2 , 8.6)	29.7 (222.9 , 8.8)	31.7 (237.5 , 9.3)	32.2 (241.8 , 9.5)	31.2 (234.1 , 9.2)
	5000	34.4 (257.9 , 10.2)	34.4 (257.9 , 10.2)	34.4 (257.7 , 10.1)	34.9 (261.8 , 10.3)	35.7 (268.1 , 10.6)	36.4 (272.8 , 10.7)	37 (277.6 , 10.9)
	5500	38.2 (286.5 , 11.3)	38.2 (286.5 , 11.3)	38.6 (289.8 , 11.4)	39.8 (298.3 , 11.7)	40.7 (305.1 , 12)	41.4 (310.8 , 12.2)	41.1 (308.3 , 12.1)
	6000	40.7 (305.0 , 12)	40.7 (305.0 , 12)	41.1 (308.6 , 12.2)	42.2 (316.8 , 12.5)	44.2 (331.3 , 13)	44.3 (332.3 , 13.1)	44.2 (331.3 , 13)
	6500	46.3 (347.3 , 13.7)	46.3 (347.3 , 13.7)	46.6 (349.9 , 13.8)	47.8 (358.4 , 14.1)	48.9 (366.5 , 14.4)	49.7 (372.9 , 14.7)	50.4 (377.9 , 14.9)
	6700	47 (352.7 , 13.9)	47 (352.7 , 13.9)	47.4 (355.3 , 14)	48.5 (363.8 , 14.3)	49.6 (371.9 , 14.6)	50.4 (378.3 , 14.9)	51.1 (383.3 , 15.1)
kPa (mmHg, inHg)								

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Map 2 (Models with SI-DRIVE)

- Normal ignition

		Barometric pressure (kPa (mmHg, inHg))						
		66.7 (500, 19.7)	76.6 (575, 22.6)	80 (600, 23.6)	84 (630, 24.8)	86.6 (650, 25.6)	92 (690, 27.2)	100.2 (752, 29.6)
Engine speed (rpm)	700	26.7 (200.0 , 7.9)	26.7 (200.0 , 7.9)	27.3 (205.0 , 8.1)	28.4 (213.0 , 8.4)	29.3 (220.0 , 8.7)	29.9 (224.0 , 8.8)	28.8 (216.0 , 8.5)
	1000	23.9 (179.0 , 7)	23.9 (179.0 , 7)	24.9 (187.0 , 7.4)	25.5 (191.0 , 7.5)	25.9 (194.0 , 7.6)	27.5 (206.0 , 8.1)	28.6 (214.7 , 8.5)
	1500	22.4 (168.0 , 6.6)	22.4 (168.0 , 6.6)	23.3 (175.0 , 6.9)	24.1 (181.0 , 7.1)	24.7 (185.0 , 7.3)	24.8 (186.0 , 7.3)	24.9 (186.9 , 7.4)
	2000	23.2 (174.0 , 6.9)	23.2 (174.0 , 6.9)	24 (180.0 , 7.1)	25.5 (191.0 , 7.5)	26.1 (196.0 , 7.7)	25.6 (192.0 , 7.6)	25.3 (189.5 , 7.5)
	2500	23.9 (179.0 , 7)	23.9 (179.0 , 7)	24.5 (184.0 , 7.2)	25.5 (191.0 , 7.5)	26 (195.0 , 7.7)	25.5 (191.0 , 7.5)	25.1 (188.6 , 7.4)
	3000	24.7 (185.0 , 7.3)	24.7 (185.0 , 7.3)	25.3 (190.0 , 7.5)	25.6 (192.0 , 7.6)	26.1 (196.0 , 7.7)	25.9 (194.0 , 7.6)	25.8 (193.3 , 7.6)
	3500	29.1 (218.5 , 8.6)	29.1 (218.5 , 8.6)	29.8 (223.5 , 8.8)	29.9 (224.5 , 8.8)	31.3 (234.5 , 9.2)	31.5 (236.0 , 9.3)	29.5 (221.5 , 8.7)
	4000	29.2 (219.0 , 8.6)	29.2 (219.0 , 8.6)	29.9 (224.0 , 8.8)	30.5 (229.0 , 9)	30.8 (231.0 , 9.1)	31.7 (238.0 , 9.4)	32.3 (242.2 , 9.5)
	4500	29.3 (219.5 , 8.6)	29.3 (219.5 , 8.6)	30.3 (227.5 , 9)	30.9 (231.5 , 9.1)	31.4 (235.5 , 9.3)	32.1 (241.0 , 9.5)	32.6 (244.2 , 9.6)
	5000	30.4 (228.1 , 9)	30.4 (228.1 , 9)	30.7 (230.1 , 9.1)	31.7 (238.1 , 9.4)	32.1 (241.1 , 9.5)	32.7 (245.0 , 9.6)	33.1 (248.0 , 9.8)
	5500	33.4 (250.6 , 9.9)	33.4 (250.6 , 9.9)	34.2 (256.6 , 10.1)	34.9 (261.6 , 10.3)	35.1 (263.6 , 10.4)	35.7 (268.0 , 10.6)	36.1 (271.0 , 10.7)
	6000	37.5 (281.1 , 11.1)	37.5 (281.1 , 11.1)	38 (285.1 , 11.2)	38.8 (291.1 , 11.5)	39.1 (293.1 , 11.5)	40.3 (302.0 , 11.9)	40.9 (306.9 , 12.1)
	6500	42.6 (319.6 , 12.6)	42.6 (319.6 , 12.6)	43.3 (324.6 , 12.8)	43.9 (329.6 , 13)	43.8 (328.6 , 12.9)	44.9 (337.0 , 13.3)	45.6 (341.7 , 13.5)
	6700	43.3 (325, 12.8)	43.3 (325, 12.8)	44 (330, 13)	44.7 (335, 13.2)	44.5 (334, 13.1)	45.6 (342, 13.5)	46.3 (347.1442749, 13.7)
kPa (mmHg, inHg)								

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

- Idling ignition

		Barometric pressure (kPa (mmHg, inHg))						
		66.7 (500, 19.7)	76.6 (575, 22.6)	80 (600, 23.6)	84 (630, 24.8)	86.6 (650, 25.6)	92 (690, 27.2)	100.2 (752, 29.6)
Engine speed (rpm)	700	26.7 (200.0, 7.9)	26.7 (200.0, 7.9)	27.3 (205.0, 8.1)	28.4 (213.0, 8.4)	29.3 (220.0, 8.7)	29.9 (224.0, 8.8)	28.8 (216.0, 8.5)
	1000	25.1 (188.0, 7.4)	25.1 (188.0, 7.4)	26 (195.0, 7.7)	26.9 (202.0, 8)	28 (210.0, 8.3)	28.7 (215.0, 8.5)	30.4 (228.1, 9)
	1500	22.9 (172.0, 6.8)	22.9 (172.0, 6.8)	23.3 (175.0, 6.9)	23.9 (179.0, 7)	24.7 (185.0, 7.3)	24.9 (187.0, 7.4)	26.7 (200.6, 7.9)
	2000	23.2 (174.0, 6.9)	23.2 (174.0, 6.9)	23.7 (178.0, 7)	24.4 (183.0, 7.2)	25.1 (188.0, 7.4)	25.3 (190.0, 7.5)	27.8 (208.5, 8.2)
	2500	23.2 (174.0, 6.9)	23.2 (174.0, 6.9)	23.7 (178.0, 7)	24.5 (184.0, 7.2)	24.8 (186.0, 7.3)	25.3 (190.0, 7.5)	26.6 (199.7, 7.9)
	3000	24.3 (182.0, 7.2)	24.3 (182.0, 7.2)	24.9 (187.0, 7.4)	25.9 (194.0, 7.6)	25.9 (194.0, 7.6)	26.1 (196.0, 7.7)	26.6 (199.7, 7.9)
	3500	31.7 (237.5, 9.4)	31.7 (237.5, 9.4)	31.4 (235.5, 9.3)	32.6 (244.5, 9.6)	33.1 (248.5, 9.8)	34.6 (259.5, 10.2)	35.2 (264.0, 10.4)
	4000	32.1 (241.0, 9.5)	32.1 (241.0, 9.5)	32.3 (242.0, 9.5)	33.2 (249.0, 9.8)	33.7 (253.0, 10)	34.9 (262.0, 10.3)	36 (270.0, 10.6)
	4500	32.1 (240.5, 9.5)	32.1 (240.5, 9.5)	32.1 (240.5, 9.5)	33 (247.5, 9.7)	33.9 (254.5, 10)	35.5 (266.5, 10.5)	35.3 (265.1, 10.4)
	5000	35.5 (266.1, 10.5)	35.5 (266.1, 10.5)	34.4 (258.1, 10.2)	35.3 (265.1, 10.4)	35.7 (268.1, 10.6)	37.3 (280.1, 11)	37.2 (279.2, 11)
	5500	38.1 (285.6, 11.2)	38.1 (285.6, 11.2)	37.5 (281.6, 11.1)	38.5 (288.6, 11.4)	39.5 (296.6, 11.7)	40.3 (302.6, 11.9)	40.7 (305.2, 12)
	6000	41.6 (312.1, 12.3)	41.6 (312.1, 12.3)	41.5 (311.1, 12.2)	42.8 (321.1, 12.6)	43.5 (326.1, 12.8)	45.6 (342.1, 13.5)	45.4 (340.3, 13.4)
	6500	48.6 (364.6, 14.4)	48.6 (364.6, 14.4)	49.3 (369.6, 14.6)	48.6 (364.6, 14.4)	49.4 (370.6, 14.6)	49.4 (370.6, 14.6)	53.4 (400.7, 15.8)
	6700	49.3 (370, 14.6)	49.3 (370, 14.6)	50 (375, 14.8)	49.3 (370, 14.6)	50.1 (376, 14.8)	50.1 (376, 14.8)	54.1 (406.1514536, 16)
kPa (mmHg, inHg)								

3. GENERAL DRIVING CYCLE

- If conditions are met, it is possible to detect the misfires from idling to high engine speed. However, in case any engine load or breakage occurs, perform with the engine at idle.
- Perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

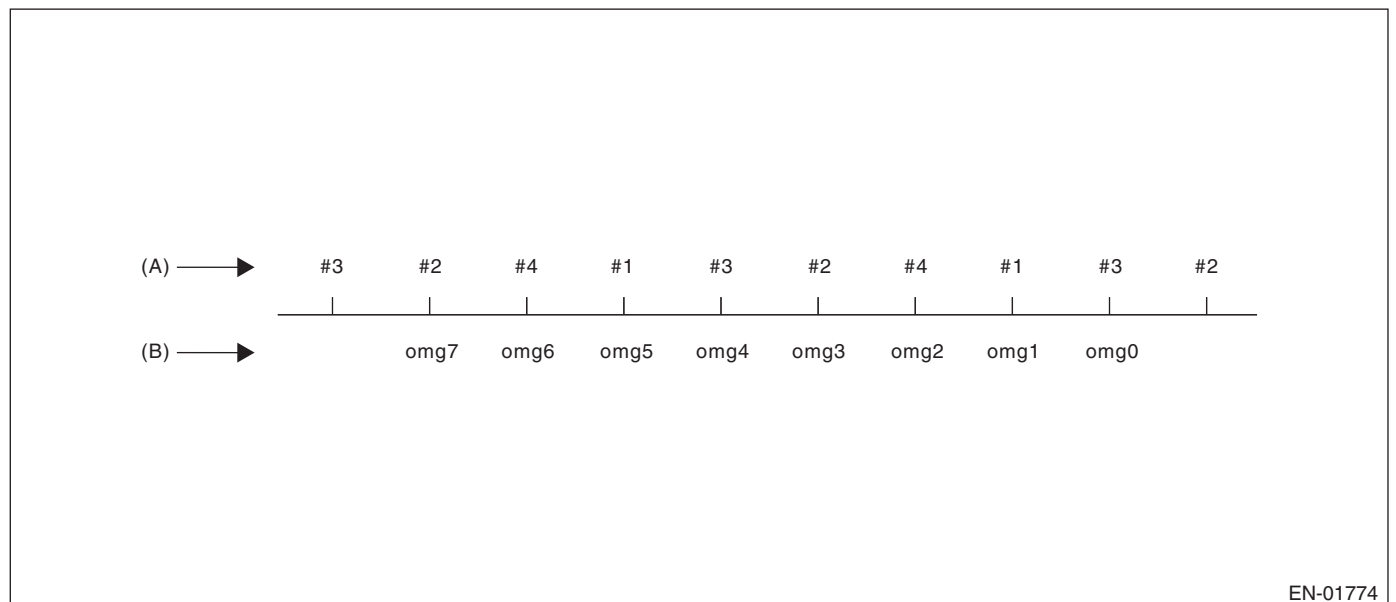
GENERAL DESCRIPTION

4. DIAGNOSTIC METHOD

When a misfire occurs, the engine speed will decrease 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. Count the number of misfires, if the misfire ratio is higher during 1000 revs. or 200 revs., 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 value)
	• 180° Interval Difference Method • 360° Interval Difference Method • 720° Interval Difference Method	• FTP 1.5 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

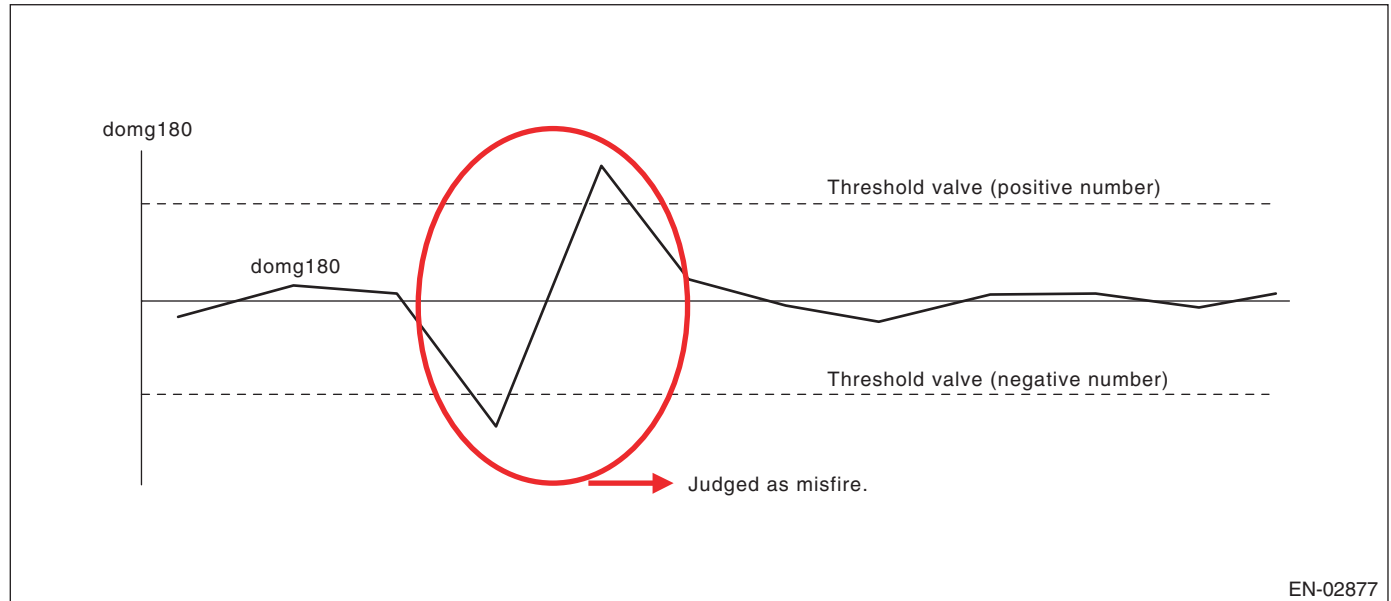
(B) Crankshaft position speed

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

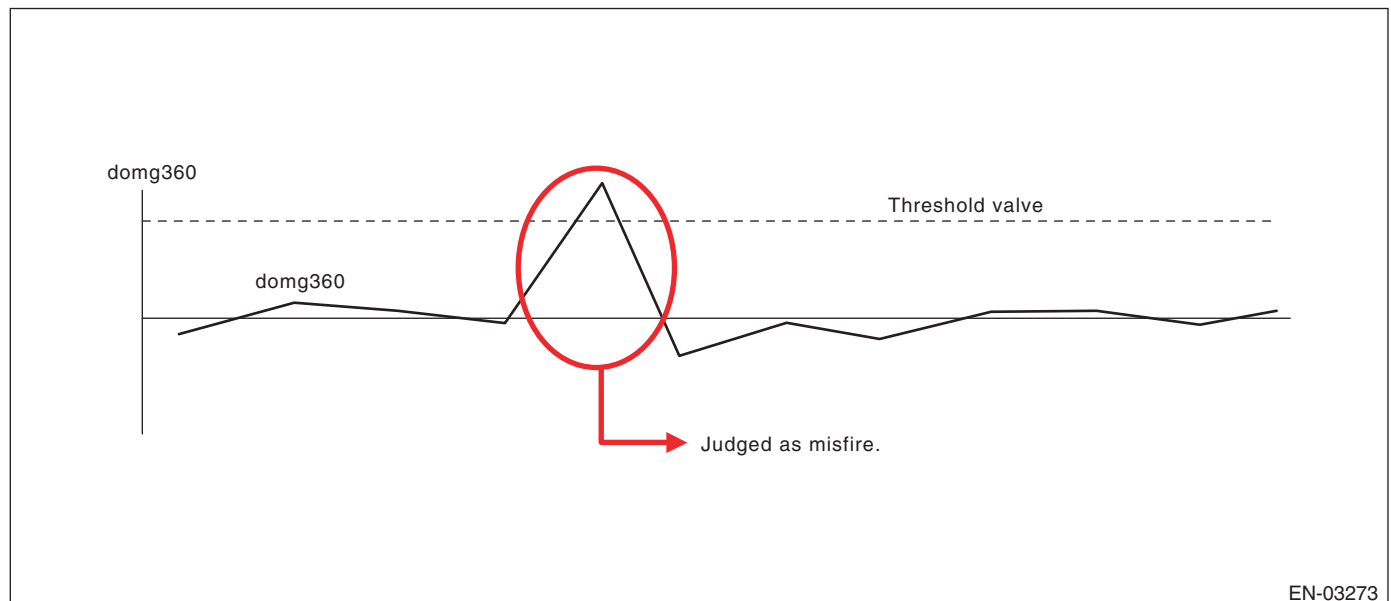
180° Interval Difference Method

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.	
• $\text{domg } 180 > \text{judgment value of positive side}$ • $\text{domg } 180 \leq \text{judgment value of negative side}$ (Diagnostic 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	$\text{domg } 360 > \text{Judgment value} \rightarrow \text{Judge as misfire}$

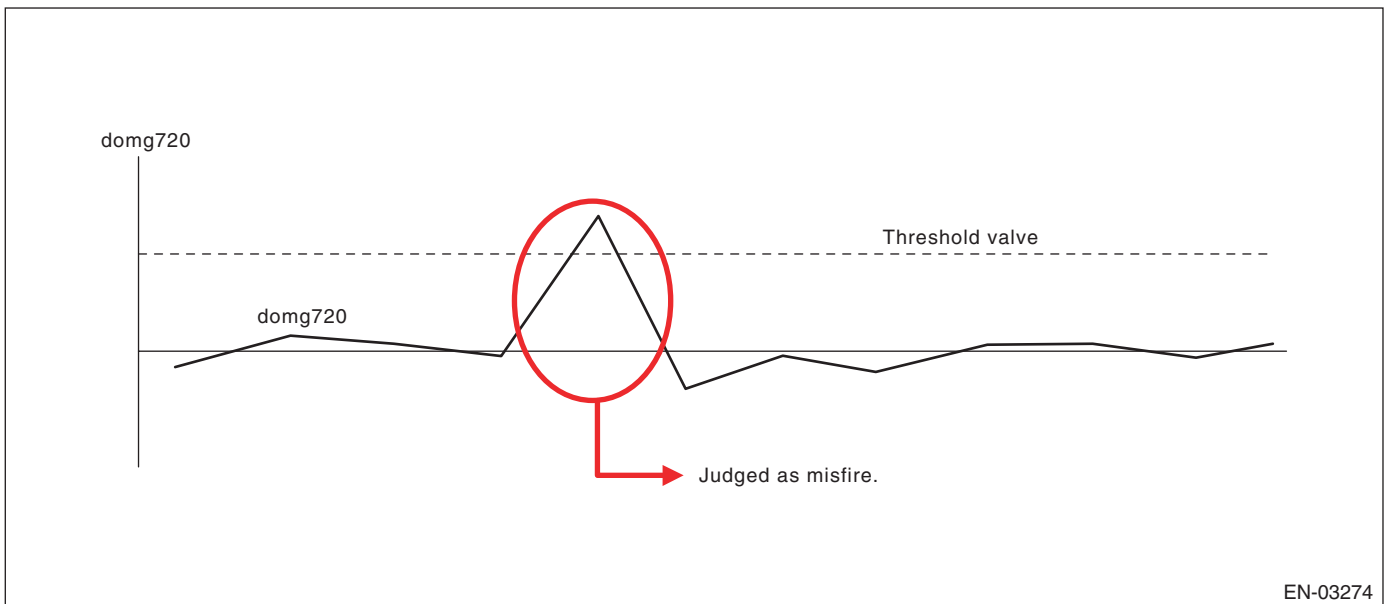


Diagnostic Trouble Code (DTC) Detecting Criteria

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)

- Abnormality Judgment

Judgment Value (Judge that malfunction occurs when the misfire ratio is high in 1000 engine revs.)

Malfunction Criteria	Threshold Value
FTP emission diagnostic value	$\geq 17 \times 100/2000\%$ in 1000 revs.

Time Needed for Diagnosis: 1000 engine revs.

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

- Normality Judgment

Judgment Value

Malfunction Criteria	Threshold Value
FTP emission diagnostic value	$< 17 \times 100/2000\%$ in 1000 revs.

Time Needed for Diagnosis: 1000 engine revs.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

- Catalyst damage misfire (Misfire occurrence level damaging catalyst)
- Abnormality Judgment

Judgment Value

Malfunction Criteria	Threshold Value
Catalyst damage misfire diagnostic value	≥ Value from Map 3

Map 3 (Models without SI-DRIVE)

		Intake air (g(oz)/rev)									
		0.2 (0.01)	0.4 (0.01)	0.6 (0.02)	0.8 (0.03)	1 (0.04)	1.2 (0.04)	1.4 (0.05)	1.6 (0.06)	1.8 (0.06)	2 (0.07)
Engine speed (rpm)	700	100	100	100	100	100	90	90	90	90	90
	1000	100	100	100	100	92	85	85	85	85	85
	1500	100	100	100	90	85	85	85	72	72	72
	2000	100	90	90	73	58	43	40	36	32	20
	2500	100	87	57	45	39	36	34	32	30	20
	3000	100	87	58	39	36	36	32	30	28	20
	3500	98	74	43	27	23	22	20	20	20	20
	4000	69	61	40	27	22	20	20	20	20	20
	4500	60	55	34	25	20	20	20	20	20	20
	5000	55	55	34	23	20	20	20	20	20	20
	5500	54	54	33	22	20	20	20	20	20	20
	6000	52	52	32	21	20	20	20	20	20	20
	6500	50	50	30	20	20	20	20	20	20	20
	6700	50	50	30	20	20	20	20	20	20	20

Map 3 (Models with SI-DRIVE)

		Intake air (g(oz)/rev)									
		0.2 (0.01)	0.4 (0.01)	0.6 (0.02)	0.8 (0.03)	1 (0.04)	1.2 (0.04)	1.4 (0.05)	1.6 (0.06)	1.8 (0.06)	2 (0.07)
Engine speed (rpm)	700	148	128	116	106	100	90	90	90	90	90
	1000	148	128	114	104	92	85	85	85	85	85
	1500	140	118	102	90	85	85	85	72	72	72
	2000	128	90	90	73	58	43	40	36	32	20
	2500	116	87	57	45	39	36	34	32	30	20
	3000	108	87	58	39	36	36	32	30	28	20
	3500	74	74	43	27	23	22	20	20	20	20
	4000	61	61	40	27	22	20	20	20	20	20
	4500	55	55	34	25	20	20	20	20	20	20
	5000	55	55	34	23	20	20	20	20	20	20
	5500	54	54	33	22	20	20	20	20	20	20
	6000	52	52	32	21	20	20	20	20	20	20
	6500	50	50	30	20	20	20	20	20	20	20
	6700	50	50	30	20	20	20	20	20	20	20

Time Needed for Diagnosis: 200 engine revs.

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

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

- **Normality Judgment**

Judgment Value

Malfunction Criteria	Threshold Value
Catalyst damage misfire diagnostic value	< Value of Map 3

Time Needed for Diagnosis: 200 engine revs.

BO:DTC P0302 CYLINDER 2 MISFIRE DETECTED

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0301. <Ref. to GD(H4DOTC)-114, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

BP:DTC P0303 CYLINDER 3 MISFIRE DETECTED

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0301. <Ref. to GD(H4DOTC)-114, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

BQ:DTC P0304 CYLINDER 4 MISFIRE DETECTED

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0301. <Ref. to GD(H4DOTC)-114, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

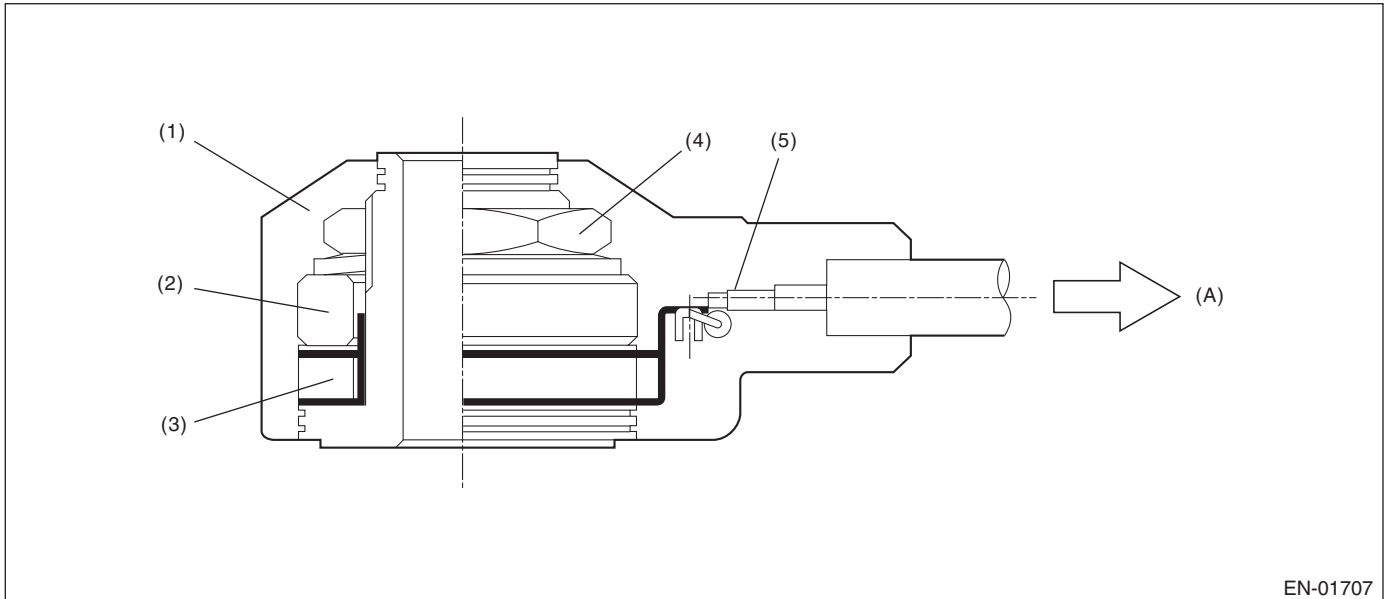
BR:DTC P0327 KNOCK SENSOR 1 CIRCUIT LOW (BANK 1 OR SINGLE SENSOR)

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of knock sensor.

Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) To knock sensor harness

(1) Case

(2) Weight

(3) Piezoelectric element

(4) Nut

(5) Resistance

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.243 V

Time Needed for Diagnosis: 1000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 0.243 V

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

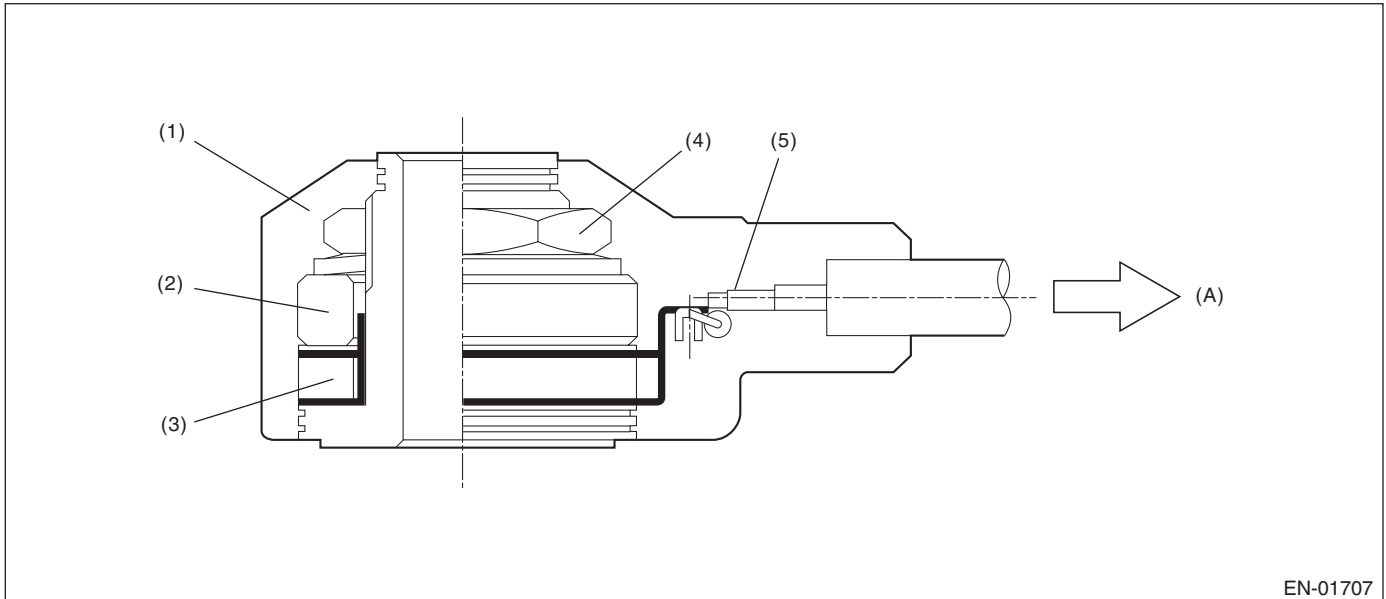
BS:DTC P0328 KNOCK SENSOR 1 CIRCUIT HIGH (BANK 1 OR SINGLE SENSOR)

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of knock sensor.

Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(A) To knock sensor harness

(1) Case

(2) Weight

(3) Piezoelectric element

(4) Nut

(5) Resistance

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.709 V

Time Needed for Diagnosis: 1000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 4.709 V

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

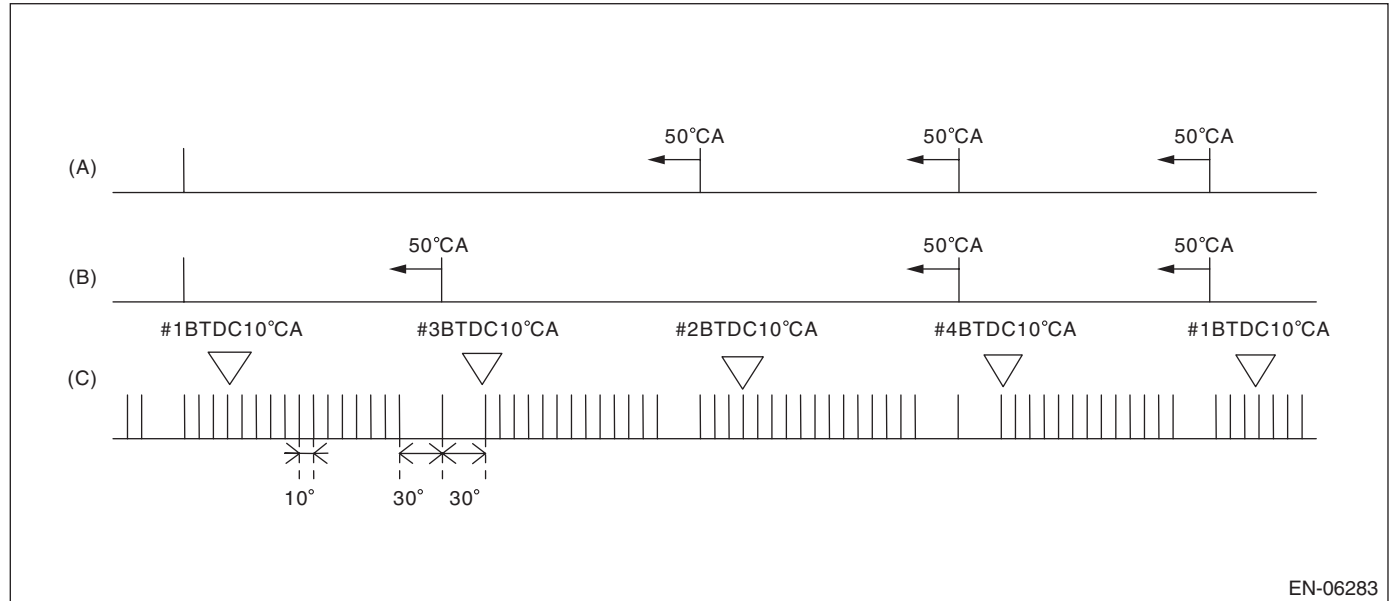
BT:DTC P0335 CRANKSHAFT POSITION SENSOR “A” CIRCUIT

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.

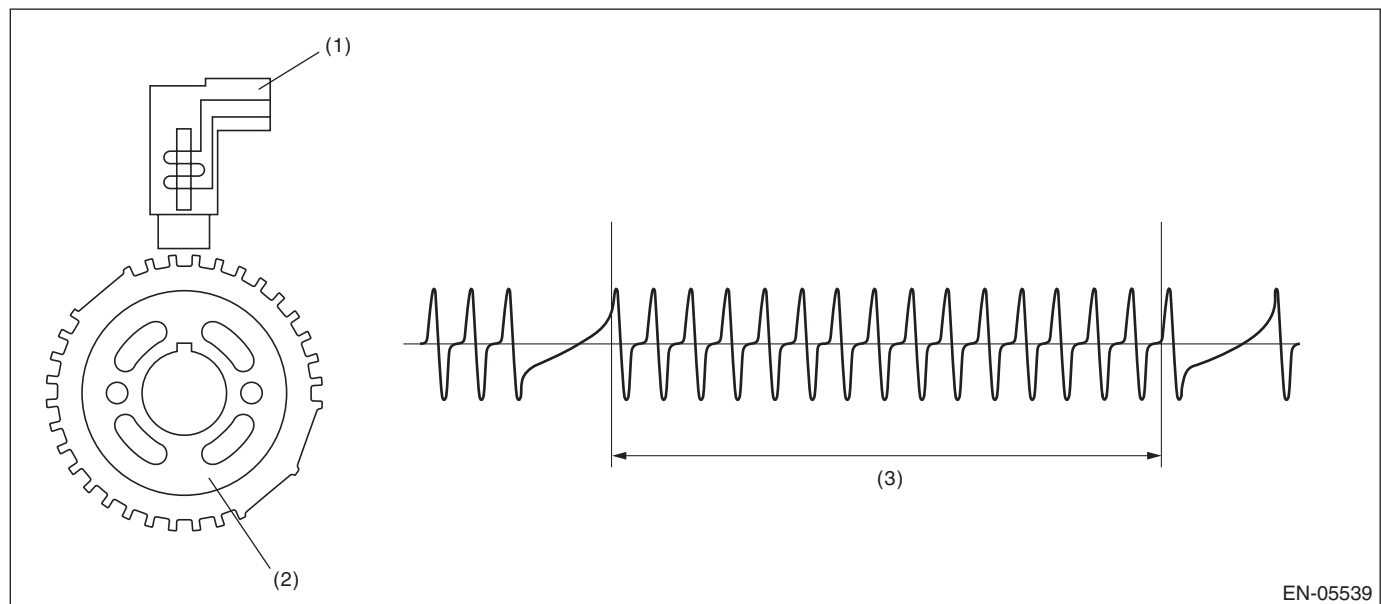
2. COMPONENT DESCRIPTION



(A) Camshaft signal (RH)

(B) Camshaft signal (LH)

(C) Crankshaft signal



(1) Crankshaft position sensor

(2) Crank sprocket

(3) Crankshaft half-turn

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

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: 3000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Crankshaft position sensor signal	Input exists
Battery voltage	$\geq 8 \text{ V}$

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

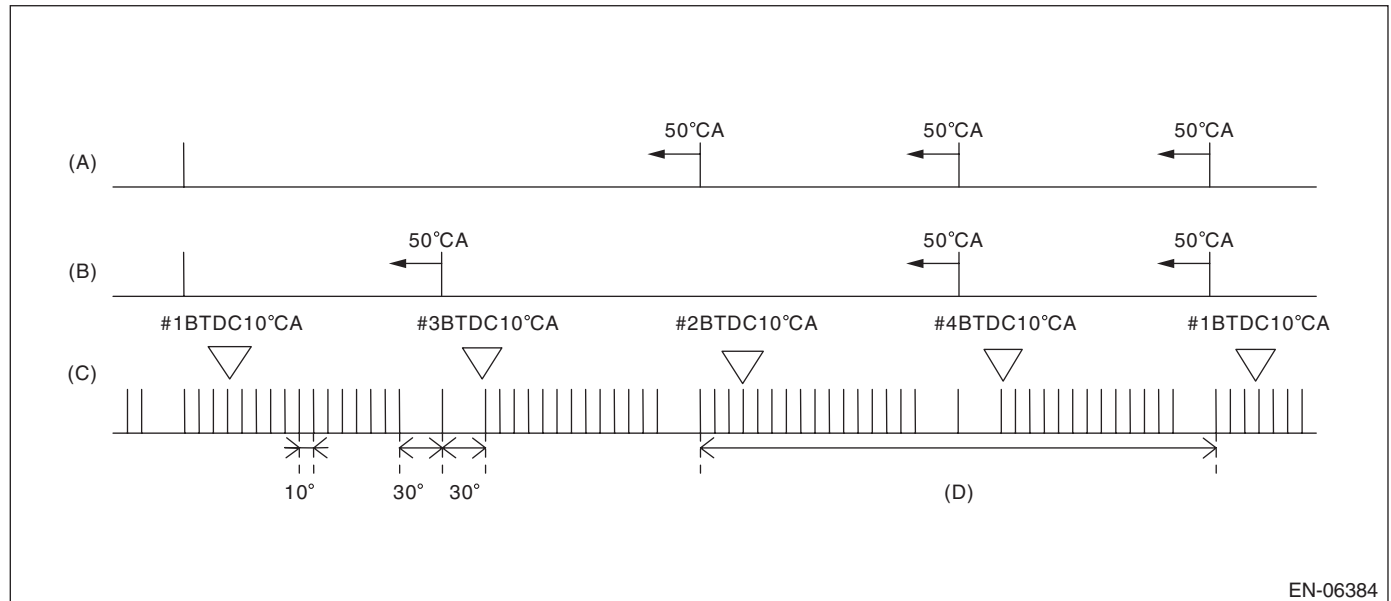
BU:DTC P0336 CRANKSHAFT POSITION SENSOR “A” CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

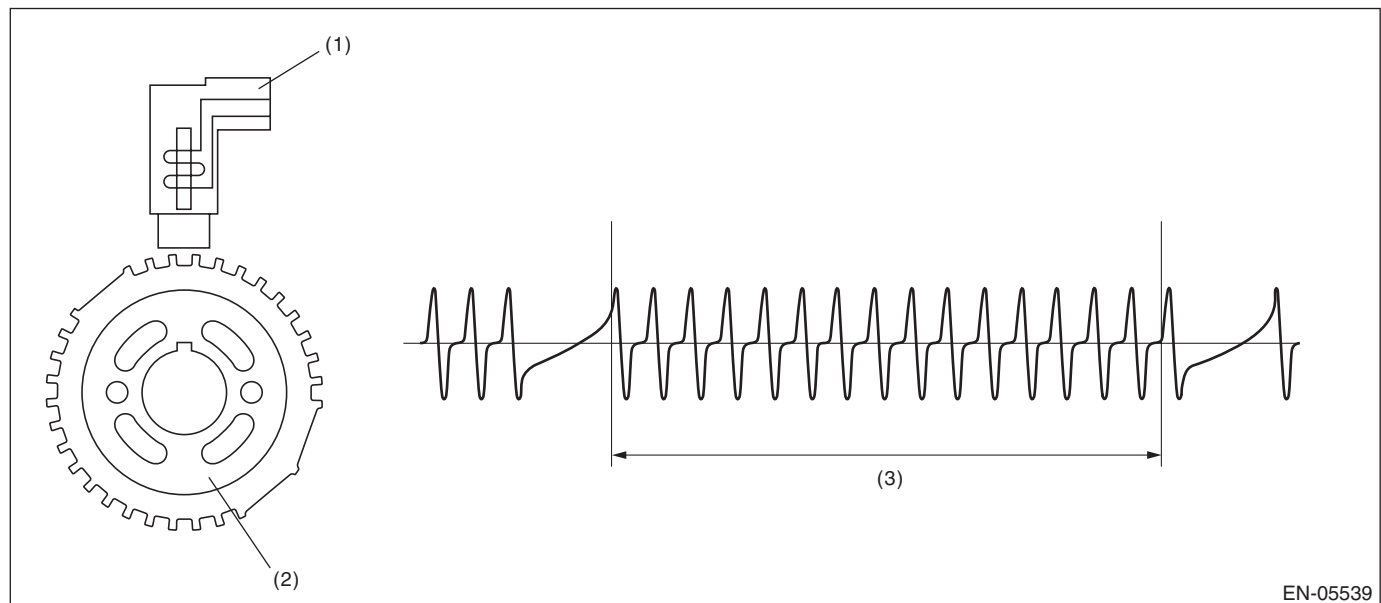
Detect for faults in crankshaft position sensor output properties.

Judge as NG when there is a problem in the number of crankshaft signals for every revolution.

2. COMPONENT DESCRIPTION



- (A) Camshaft signal (RH) (B) Camshaft signal (LH) (C) Crankshaft signal
(D) Number of crankshaft signals = 30 is normal



- (1) Crankshaft position sensor (2) Crank sprocket (3) Crankshaft half-turn

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 8 \text{ V}$

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 following conditions are established.

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 revs.

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Cylinder number identification	Completed
Amount of crank sensor signal during 1 rev.	= 30

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

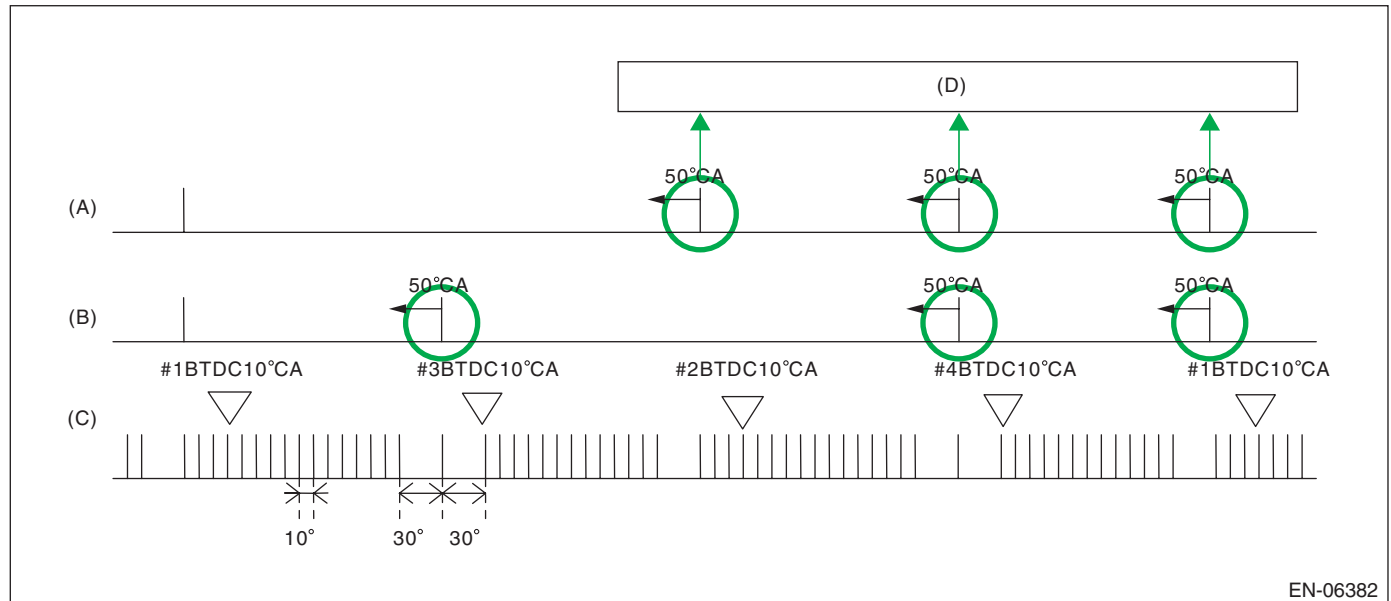
BV:DTC P0340 CAMSHAFT POSITION SENSOR “A” CIRCUIT (BANK 1 OR SINGLE SENSOR)

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the camshaft position sensor.

When there is no camshaft position signal input continuously, judge as NG.

2. COMPONENT DESCRIPTION



(A) Camshaft signal (RH)

(B) Camshaft signal (LH)

(C) Crankshaft signal

(D) Camshaft position signal: When normal, there will be 3 camshaft position signals for every 2 crankshaft revolutions.

3. ENABLE CONDITIONS

Diagnosis 1

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 8\text{ V}$
Elapsed time after starting the engine	$\geq 200\text{ ms}$

Diagnosis 2

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 8\text{ V}$
Starter	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

Diagnosis 1

Judge as NG when no input of camshaft position sensor signal in TDC remains for 10 time(s).

Judgment Value

Malfunction Criteria	Threshold Value
No camshaft position sensor signal input in TDC	≥ 10 time(s)

Time Needed for Diagnosis: TDC $\times$ 10 time(s)

Diagnosis 2

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Camshaft position sensor signal	No input

Time Needed for Diagnosis: 3000 ms

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

• Normality Judgment

Diagnosis 1

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

Judgment Value

Malfunction Criteria	Threshold Value
No camshaft position sensor signal input in TDC	$= 0$ time(s)

Time Needed for Diagnosis: TDC $\times$ 10 time(s)

Diagnosis 2

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Camshaft position sensor signal	Input exists

Time Needed for Diagnosis: 32 ms

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

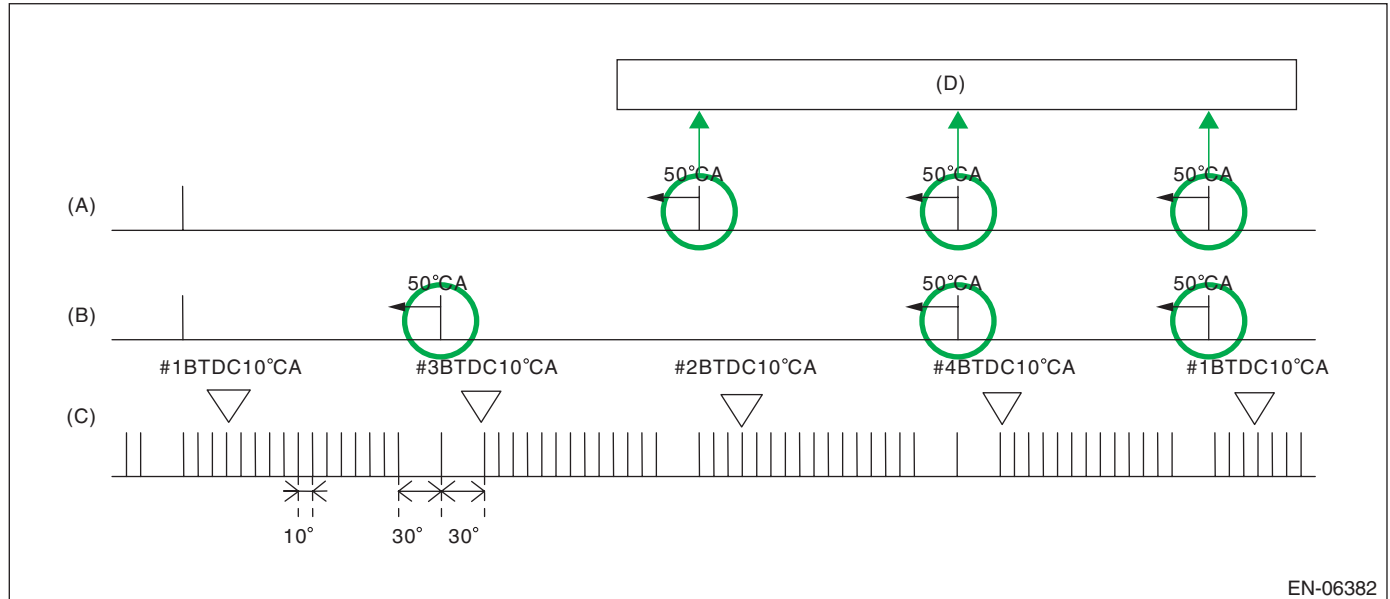
BW:DTC P0341 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 1 OR SINGLE SENSOR)

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of camshaft position sensor property.

Judge as NG when the number of camshaft signals remains abnormal.

2. COMPONENT DESCRIPTION



(A) Camshaft signal (RH)

(B) Camshaft signal (LH)

(C) Crankshaft signal

(D) Camshaft position signal: When normal, there will be 3 camshaft position signals for every 2 crankshaft revolutions.

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 8 \text{ V}$
Elapsed time after starting the engine	$\geq 200 \text{ ms}$

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 status where the number of camshaft position sensor signal in two crankshaft revolutions is other than 3 time(s).

Judgment Value

Malfunction Criteria	Threshold Value
Amount of camshaft sensor signal during 2 revs of crankshaft.	$\neq$ 3 time(s)

Time Needed for Diagnosis: Two engine revs. $\times$ 4 time(s)

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
Camshaft position sensor signal	$=$ 3 time(s)

Time Needed for Diagnosis: Two engine revs.

BX:DTC P0345 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 2)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0340. <Ref. to GD(H4DOTC)-132, DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>

BY:DTC P0346 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 2)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0341. <Ref. to GD(H4DOTC)-134, DTC P0341 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

BZ:DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT

1. OUTLINE OF DIAGNOSIS

Based on the self-diagnostic result of the ignition coil driving IC, judge the ignition coil driving circuit as normal or abnormal.

The ignition coil driving IC detects “no ignition” status as a malfunction.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Elapsed time after starting the engine	$> 1 \text{ s}$
Engine speed	$> 500 \text{ rpm}$
Ignition energization time	$> 2000 \mu\text{s}$
Ignition status	Not during ignition cut

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition driving IC information	Malfunction

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition driving IC information	Normal

Time Needed for Diagnosis: Less than 1 second

CA:DTC P0352 IGNITION COIL B PRIMARY/SECONDARY CIRCUIT

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0351. <Ref. to GD(H4DOTC)-136, DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CB:DTC P0353 IGNITION COIL C PRIMARY/SECONDARY CIRCUIT

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0351. <Ref. to GD(H4DOTC)-136, DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CC:DTC P0354 IGNITION COIL D PRIMARY/SECONDARY CIRCUIT

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0351. <Ref. to GD(H4DOTC)-136, DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CD:DTC P0365 CAMSHAFT POSITION SENSOR “B” CIRCUIT (BANK 1)**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of the camshaft position sensor.

When there is no camshaft position signal input continuously, judge as NG.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 8 \text{ V}$
Elapsed time after starting the engine	$\geq 200 \text{ ms}$

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD**• Abnormality Judgment**

Judge as NG when no input of camshaft position sensor signal in TDC remains for 10 time(s).

Judgment Value

Malfunction Criteria	Threshold Value
No camshaft position sensor signal input in TDC	$\geq 10 \text{ time(s)}$

Time Needed for Diagnosis: TDC $\times$ 10 time(s)

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
No camshaft position sensor signal input in TDC	$= 0 \text{ time(s)}$

Time Needed for Diagnosis: Two engine revs.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

CE:DTC P0366 CAMSHAFT POSITION SENSOR B CIRCUIT RANGE/PERFORMANCE (BANK 1)

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of camshaft position sensor property.

Judge as NG when the number of camshaft signals remains abnormal.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 8 \text{ V}$
Elapsed time after starting the engine	$\geq 200 \text{ ms}$

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

Judge as NG when the status where the number of camshaft position sensor signal in two crankshaft revolutions is other than 2 time(s).

Judgment Value

Malfunction Criteria	Threshold Value
Amount of camshaft sensor signal during 2 revs of crankshaft.	$\neq 2 \text{ time(s)}$

Time Needed for Diagnosis: Two engine revs. $\times 4 \text{ time(s)}$

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
Camshaft position sensor signal	$= 2 \text{ time(s)}$

Time Needed for Diagnosis: Two engine revs.

CF:DTC P0390 CAMSHAFT POSITION SENSOR “B” CIRCUIT (BANK 2)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0365. <Ref. to GD(H4DOTC)-137, DTC P0365 CAMSHAFT POSITION SENSOR “B” CIRCUIT (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CG:DTC P0391 CAMSHAFT POSITION SENSOR B CIRCUIT RANGE/PERFORMANCE (BANK 2)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0366. <Ref. to GD(H4DOTC)-138, DTC P0366 CAMSHAFT POSITION SENSOR B CIRCUIT RANGE/PERFORMANCE (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CH:DTC P0410 SECONDARY AIR INJECTION SYSTEM**1. OUTLINE OF DIAGNOSIS**

Detect NG judging from secondary air delivery pipe pressure, pulse of secondary air delivery pipe pressure and secondary air pipe airflow amount.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Pump supply pressure check Estimate ambient temperature Battery voltage Atmospheric pressure Engine Amount of intake air Secondary air pump Combination valve	 ≥ 4.4 °C ≥ 10.9 V ≥ 75 kPa (563 mmHg, 22.2 inHg) In operation ≥ 2 g/s (0.07 oz/s) Operating Bank open (Except with both banks closed)
Combination valve both closed pulse diagnosis Estimate ambient temperature Battery voltage Atmospheric pressure Engine Engine load After fuel cut	 ≥ 4.4 °C ≥ 10.9 V ≥ 75 kPa (563 mmHg, 22.2 inHg) In operation ≥ 0.2 g/rev (0.01 oz/rev) ≥ 1000 ms
Combination valve changeover pressure diagnosis Estimate ambient temperature Battery voltage Atmospheric pressure Engine Amount of intake air Engine speed After fuel cut	 ≥ 4.4 °C ≥ 10.9 V ≥ 75 kPa (563 mmHg, 22.2 inHg) In operation > 2 g/s (0.07 oz/s) and < 25 g/s (0.88 oz/s) < 4000 rpm ≥ 1000 ms
Overflow diagnosis Estimate ambient temperature Battery voltage Atmospheric pressure Engine	 ≥ 4.4 °C ≥ 10.9 V ≥ 75 kPa (563 mmHg, 22.2 inHg) In operation

3. GENERAL DRIVING CYCLE

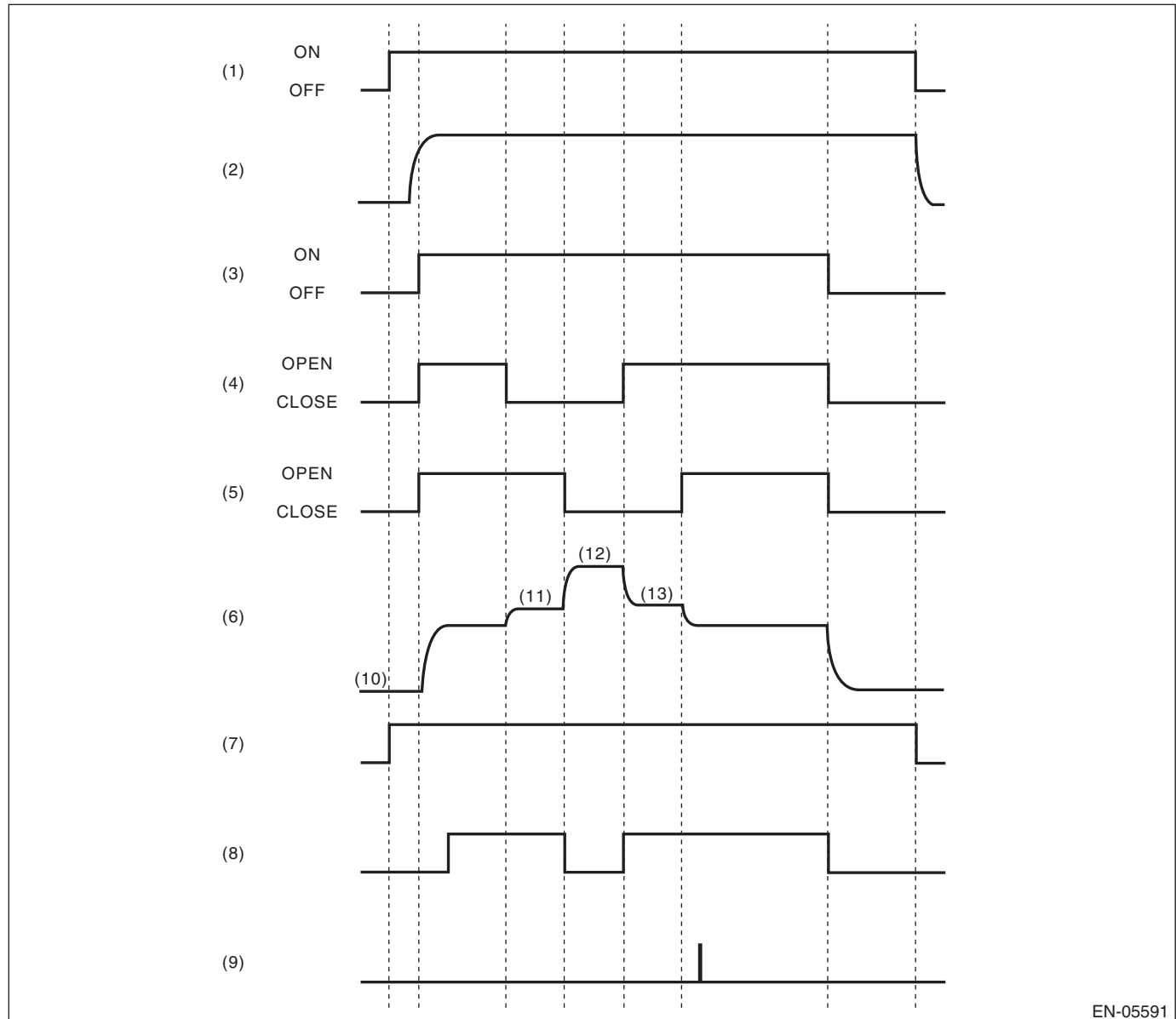
Perform diagnosis during secondary air pump operation

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

4. DIAGNOSTIC METHOD

Measure secondary air delivery pipe pressure, pulse of secondary air delivery pipe pressure and secondary air pipe airflow amount.



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(1) IG	(6) Secondary air delivery pipe pressure (psi)	(10) Barometric pressure (Pas) measurement before secondary air control
(2) Ne	(7) Diagnosis enable condition	(11) Right bank all closed pressure (P0R) measurement
(3) Secondary air pump operating status	(8) Pump supply pressure check (judgment)	(12) Both banks all closed pressure (P0RL) measurement
(4) E-COMB valve (right hand) status	(9) Flow amount check (judgment)	(13) Left bank all closed pressure (P0L) measurement
(5) E-COMB valve (left hand) status		

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Pump supply pressure check

Perform the system function diagnosis with how much the pressure rises when the secondary air pump is turned from OFF to ON.

Judge as NG if delivery pipe pressure does not rise though it should when the secondary air pump turns OFF → ON.

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Secondary air supply pipe pressure (after barometric pressure compensation)	< 0.9 kPa (7 mmHg, 0.3 inHg)	P0410

Time Needed for Diagnosis: 2000 ms + 2800 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Secondary air supply pipe pressure (after barometric pressure compensation)	≥ 0.9 kPa (7 mmHg, 0.3 inHg)	P0410

Time Needed for Diagnosis: 2000 ms + 2800 ms

Combination valve both closed pulse diagnosis

Perform open stuck diagnosis of both combination valves using delivery pipe pressure pulse when both combination valves are closed. Determine which side of valves is stuck open by comparing secondary air flow amount when RH combination valve is closed with that when LH combination valve is closed.

Calculate voltage pulse of the pump delivery pipe pressure when both combination valves are closed. The calculation should be small because there is no pulse from supply pipe pressure with both combination valves closed. When the calculation is large, determine that either of the combination valves is stuck open. Determine which side of valves is stuck open by comparing secondary air flow amount when the RH combination valve is closed with that when the LH combination valve is closed. Air flow amount is larger on the open stuck valve.

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Pulse calculation value when both combination valves are closed	> Value of Map 3	P2440
Air flow amount when the right bank is closed (value from Map 4)	≥ Air flow amount when the left bank is closed (value from Map 5)	
Pulse calculation value when both combination valves are closed	> Value of Map 3	P2442
Air flow amount when the left bank is closed (value from Map 5)	> Air flow amount when the right bank is closed (value from Map 4)	

Time Needed for Diagnosis: 4000 ms + 992 ms + 992 ms + 992 ms

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

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Pulse calculation value when both combination valves are closed	≤ Value of Map 3	P2440, P2442

Time Needed for Diagnosis: 4000 ms + 992 ms + 992 ms + 992 ms

Combination valve changeover pressure diagnosis

Perform the RH combination valve stuck closed diagnosis with the variation of delivery pipe pressure when the RH combination valve turns closed → open.

Delivery pipe pressure should vary when the RH combination valve turns closed → open. When the variation is small, determine that the RH combination valve is stuck closed.

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Pressure variation value when the RH combination valve is switched	< Value of Map 6	P2441

Time Needed for Diagnosis: 4000 ms + 992 ms + 992 ms + 992 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Pressure variation value when the RH combination valve is switched	≥ Value of Map 6	P2441

Time Needed for Diagnosis: 4000 ms + 992 ms + 992 ms + 992 ms

Perform the LH combination valve stuck closed diagnosis with the variation of delivery pipe pressure when the LH combination valve turns open → closed.

Delivery pipe pressure should vary when the LH combination valve turns open → closed. When the variation is small, determine that the LH combination valve is stuck closed.

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Pressure variation value when the LH combination valve is switched	< Value of Map 7	P2443

Time Needed for Diagnosis: 4000 ms + 992 ms + 992 ms + 992 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Pressure variation value when the LH combination valve is switched	≥ Value of Map 7	P2443

Time Needed for Diagnosis: 4000 ms + 992 ms + 992 ms + 992 ms

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Overflow diagnosis

Perform secondary air system flow abnormality diagnosis using both sides of combination valves secondary air amount when both are closed.

Judge as secondary air system flow abnormality either if there is excessive secondary air flow amount with the RH combination valve closed, or if there is excessive secondary air flow amount with the LH combination valve closed.

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Air flow amount when the right bank is closed (value from Map 4) or Air flow amount when the left bank is closed (value from Map 5)	> Value of Map 8 > Value of Map 9	P0411
Voltage at P0RL measurement – Voltage at P0R measurement	≤ 4 V	
Voltage at P0RL measurement – Voltage at P0L measurement	≤ 4 V	

P0RL: Both banks all closed pressure

P0R: Right bank all closed pressure

P0L: Left bank all closed pressure

Time Needed for Diagnosis: 4000 ms + 992 ms + 992 ms + 992 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Air flow amount when the right bank is closed (value from Map 4) or Air flow amount when the left bank is closed (value from Map 5)	≤ Value of Map 8 ≤ Value of Map 9	P0411
Voltage at P0RL measurement – Voltage at P0R measurement	≤ 4 V	
Voltage at P0RL measurement – Voltage at P0L measurement	≤ 4 V	

P0RL: Both banks all closed pressure

P0R: Right bank all closed pressure

P0L: Left bank all closed pressure

Time Needed for Diagnosis: 4000 ms + 992 ms + 992 ms + 992 ms

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Map 3 (Models without SI-DRIVE)

Intake air (g (oz)/rev)	0.1 (0)	0.25 (0.01)	0.3 (0.01)	1 (0.04)
Threshold value (V)	13	13	3.25	3.25

Map 3 (Models with SI-DRIVE)

Intake air (g (oz)/rev)	0.1 (0)	0.25 (0.01)	0.3 (0.01)	1 (0.04)
Threshold value (V)	100	100	4.5	4.5

Map 4

Secondary air pressure in the pipe when both comb. valve is closing kPa (mmHg, inHg)	69.3 (520, 20.5)	74.6 (560, 22)	80 (600, 23.6)	85.3 (640, 25.2)	90.6 (680, 26.8)	96 (720, 28.3)	101.3 (760, 29.9)	106.6 (800, 31.5)	112 (840, 33.1)	117.3 (880, 34.6)	122.6 (920, 36.2)	128 (960, 37.8)	133.3 (1000, 39.4)	138.6 (1040, 40.9)	144 (1080, 42.5)	149.3 (1120, 44.1)
69.3 (520, 20.5)	0	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2400	2400	2400
74.6 (560, 22)	-200	0	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2400	2400
80 (600, 23.6)	-400	-200	0	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2400
85.3 (640, 25.2)	-600	-400	-200	0	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400
90.6 (680, 26.8)	-800	-600	-400	-200	0	200	400	600	800	1000	1200	1400	1600	1800	2000	2200
96 (720, 28.3)	-1000	-800	-600	-400	-200	0	200	400	600	800	1000	1200	1400	1600	1800	2000
101.3 (760, 29.9)	-1200	-1000	-800	-600	-400	-200	0	200	400	600	800	1000	1200	1400	1600	1800
106.6 (800, 31.5)	-1400	-1200	-1000	-800	-600	-400	-200	0	200	400	600	800	1000	1200	1400	1600
112 (840, 33.1)	-1600	-1400	-1200	-1000	-800	-600	-400	-200	0	200	400	600	800	1000	1200	1400
117.3 (880, 34.6)	-1800	-1600	-1400	-1200	-1000	-800	-600	-400	-200	0	200	400	600	800	1000	1200
122.6 (920, 36.2)	-2000	-1800	-1600	-1400	-1200	-1000	-800	-600	-400	-200	0	200	400	600	800	1000
128 (960, 37.8)	-2200	-2000	-1800	-1600	-1400	-1200	-1000	-800	-600	-400	-200	0	200	400	600	800
133.3 (1000, 39.4)	-2400	-2200	-2000	-1800	-1600	-1400	-1200	-1000	-800	-600	-400	-200	0	200	400	600
138.6 (1040, 40.9)	-2400	-2400	-2200	-2000	-1800	-1600	-1400	-1200	-1000	-800	-600	-400	-200	0	200	400

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Map 4

Secondary air pressure in the pipe when both comb. valve is closing kPa (mmHg, inHg) Secondary air pressure in the pipe when LH comb. valve is closing kPa (mmHg, inHg)	69.3 (520, 20.5)	74.6 (560, 22)	80 (600, 23.6)	85.3 (640, 25.2)	90.6 (680, 26.8)	96 (720, 28.3)	101.3 (760, 29.9)	106.6 (800, 31.5)	112 (840, 33.1)	117.3 (880, 34.6)	122.6 (920, 36.2)	128 (960, 37.8)	133.3 (1000, 39.4)	138.6 (1040, 40.9)	144 (1080, 42.5)	149.3 (1120, 44.1)
144 (1080, 42.5)	-2400	-2400	-2400	-2200	-2000	-1800	-1600	-1400	-1200	-1000	-800	-600	-400	-200	0	200
149.3 (1120, 44.1)	-2400	-2400	-2400	-2400	-2200	-2000	-1800	-1600	-1400	-1200	-1000	-800	-600	-400	-200	0
(L/min)																

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Map 5

Secondary air pressure in the pipe when both comb. valve is closing kPa (mmHg, inHg) Secondary air pressure in the pipe when RH comb. valve is closing kPa (mmHg, inHg)	69.3 (520, 20.5)	74.6 (560, 22)	80 (600, 23.6)	85.3 (640, 25.2)	90.6 (680, 26.8)	96 (720, 28.3)	101.3 (760, 29.9)	106.6 (800, 31.5)	112 (840, 33.1)	117.3 (880, 34.6)	122.6 (920, 36.2)	128 (960, 37.8)	133.3 (1000, 39.4)	138.6 (1040, 40.9)	144 (1080, 42.5)	149.3 (1120, 44.1)
69.3 (520, 20.5)	0	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2400	2400	2400
74.6 (560, 22)	-200	0	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2400	2400
80 (600, 23.6)	-400	-200	0	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2400
85.3 (640, 25.2)	-600	-400	-200	0	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400
90.6 (680, 26.8)	-800	-600	-400	-200	0	200	400	600	800	1000	1200	1400	1600	1800	2000	2200
96 (720, 28.3)	-1000	-800	-600	-400	-200	0	200	400	600	800	1000	1200	1400	1600	1800	2000
101.3 (760, 29.9)	-1200	-1000	-800	-600	-400	-200	0	200	400	600	800	1000	1200	1400	1600	1800
106.6 (800, 31.5)	-1400	-1200	-1000	-800	-600	-400	-200	0	200	400	600	800	1000	1200	1400	1600
112 (840, 33.1)	-1600	-1400	-1200	-1000	-800	-600	-400	-200	0	200	400	600	800	1000	1200	1400
117.3 (880, 34.6)	-1800	-1600	-1400	-1200	-1000	-800	-600	-400	-200	0	200	400	600	800	1000	1200
122.6 (920, 36.2)	-2000	-1800	-1600	-1400	-1200	-1000	-800	-600	-400	-200	0	200	400	600	800	1000
128 (960, 37.8)	-2200	-2000	-1800	-1600	-1400	-1200	-1000	-800	-600	-400	-200	0	200	400	600	800
133.3 (1000, 39.4)	-2400	-2200	-2000	-1800	-1600	-1400	-1200	-1000	-800	-600	-400	-200	0	200	400	600
138.6 (1040, 40.9)	-2400	-2400	-2200	-2000	-1800	-1600	-1400	-1200	-1000	-800	-600	-400	-200	0	200	400
144 (1080, 42.5)	-2400	-2400	-2400	-2200	-2000	-1800	-1600	-1400	-1200	-1000	-800	-600	-400	-200	0	200
149.3 (1120, 44.1)	-2400	-2400	-2400	-2400	-2200	-2000	-1800	-1600	-1400	-1200	-1000	-800	-600	-400	-200	0
(L/min)																

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Map 6

Amount of intake air when RH comb. valve switches (g (oz)/s)	10	15	20	25	26
Battery voltage when RH comb. valve switches (V)	(0.35)	(0.53)	(0.71)	(0.88)	(0.92)
11	0.025	0.025	0.025	0.005	0
12	0.035	0.035	0.035	0.015	0
13	0.05	0.05	0.05	0.025	0
14	0.05	0.05	0.05	0.025	0
(V)					

Map 7

Amount of intake air when LH comb. valve switches (g (oz)/s)	10	15	20	25	26
Battery voltage when LH comb. valve switches (V)	(0.35)	(0.53)	(0.71)	(0.88)	(0.92)
11	0.025	0.025	0.025	0.005	0
12	0.035	0.035	0.035	0.015	0
13	0.05	0.05	0.05	0.025	0
14	0.05	0.05	0.05	0.025	0
(V)					

Map 8

Amount of intake air when P0R is measuring (g (oz)/s)	2	25
Battery voltage when P0R measuring (V)	(0.07)	(0.88)
11.5	345	345
12.5	345	345
13.5	345	345
14.5	390	390
15.5	420	420
(L/min)		

Map 9

Amount of intake air when P0L is measuring (g (oz)/s)	2	25
Battery voltage when P0L measuring (V)	(0.07)	(0.88)
11.5	345	345
12.5	345	345
13.5	345	345
14.5	390	390
15.5	420	420
(L/min)		

CI: DTC P0411 SECONDARY AIR INJECTION SYSTEM INCORRECT FLOW DETECTED

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0410. <Ref. to GD(H4DOTC)-139, DTC P0410 SECONDARY AIR INJECTION SYSTEM, Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

CJ:DTC P0413 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE “A” CIRCUIT OPEN

1. OUTLINE OF DIAGNOSIS

Judge as NG when the ECM output level differs from the actual terminal level.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Ignition	ON
Terminal output voltage when ECM outputs OFF signal	LOW

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Ignition	ON
Terminal output voltage when ECM outputs OFF signal	HIGH

Time Needed for Diagnosis: Less than 1 second

**CK:DTC P0414 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE “A”
CIRCUIT SHORTED****1. OUTLINE OF DIAGNOSIS**

Judge as NG when the ECM output level differs from the actual terminal level.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD**• Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Ignition	ON
Terminal output voltage when ECM outputs ON signal	HIGH

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Ignition	ON
Terminal output voltage when ECM outputs ON signal	LOW

Time Needed for Diagnosis: Less than 1 second

**CL:DTC P0416 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE “B”
CIRCUIT OPEN****1. OUTLINE OF DIAGNOSIS**

NOTE:

For the detection standard, refer to DTC P0413. <Ref. to GD(H4DOTC)-148, DTC P0413 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE “A” CIRCUIT OPEN, Diagnostic Trouble Code (DTC) Detecting Criteria.>

**CM:DTC P0417 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE “B”
CIRCUIT SHORTED****1. OUTLINE OF DIAGNOSIS**

NOTE:

For the detection standard, refer to DTC P0414. <Ref. to GD(H4DOTC)-149, DTC P0414 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE “A” CIRCUIT SHORTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

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

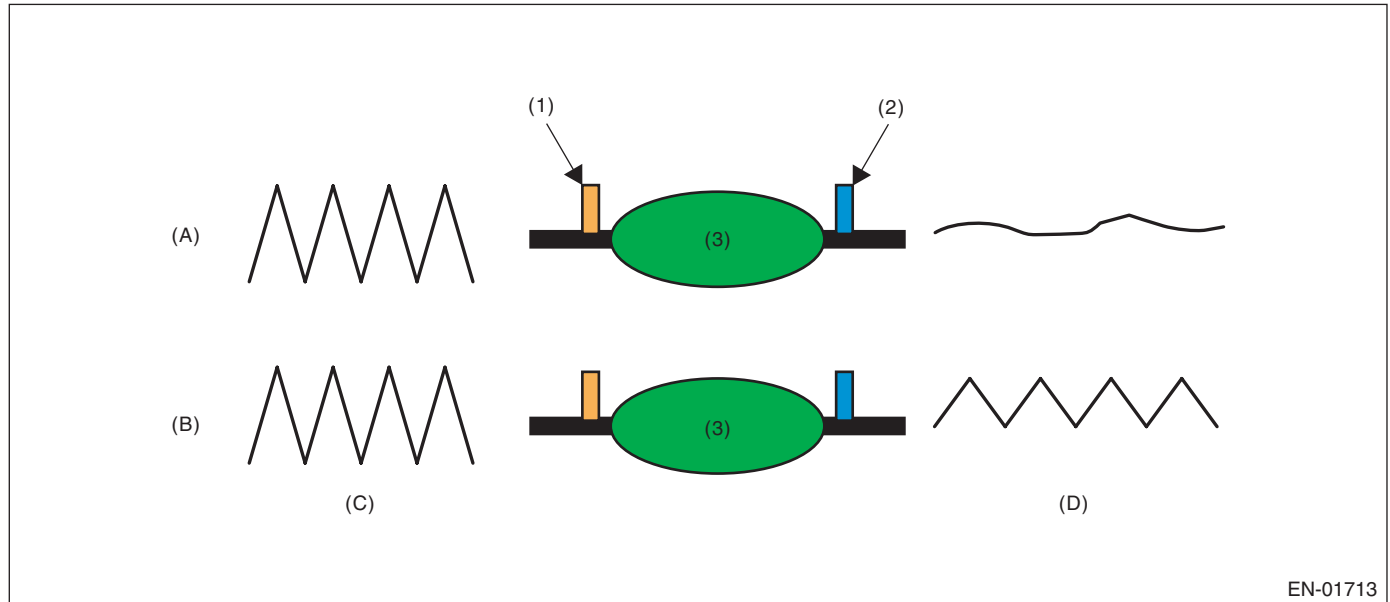
1. OUTLINE OF DIAGNOSIS

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

(A) Normal

(B) Deterioration

(C) Output waveform from the front oxygen (A/F) sensor

(D) Output waveform from the front oxygen sensor

(1) Front oxygen (A/F) sensor

(2) Front oxygen sensor

(3) Catalytic converter

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	≥ 10.9 V
Atmospheric pressure	≥ 75 kPa (563 mmHg, 22.2 inHg)
Engine coolant temperature	≥ -50 °C (-58 °F)
Estimated catalyst temperature	≥ 490 °C (914 °F)
Misfire detection every 200 rotations	< 65535 time(s)
Learning value of evaporation gas density	< 1
Sub feedback	In operation
Evaporative system diagnosis	Not in operation
Time of difference (< 0.10) between actual lambda and target lambda	≥ 0 ms
Vehicle speed	> 40 km/h (24.9 MPH)
Amount of intake air	≥ 10 g/s (0.35 oz/s) and < 50 g/s (1.76 oz/s)
Engine load change every 0.5 engine revs.	< 255 g/rev (8.99 oz/rev)
Rear oxygen output change from 660 mV or less to 660 mV or more	Experienced after fuel cut
Purge execution calculated time	≥ 0 s

4. GENERAL DRIVING CYCLE

Perform the diagnosis only once at a constant speed of 40 km/h (24.9 MPH) or higher.

5. DIAGNOSTIC METHOD

After the enable conditions have been established, calculate the front oxygen (A/F) sensor lambda value deviation sum value ($\sum |(sglmd_n - sglmd_{n-1})|$), and rear oxygen sensor output voltage deviation sum value ($\sum |(ro2sad_n - ro2sad_{n-1})|$) in every 32 ms $\times$ 4 times. If the front oxygen (A/F) sensor lambda value deviation sum value ($\sum |(sglmd_n - sglmd_{n-1})|$) is the predetermined value or more, calculate the diagnostic value.

• Abnormality Judgment

If the duration of time while the following conditions are met is within the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
$\sum (ro2sad_n - ro2sad_{n-1}) / \sum (sglmd_n - sglmd_{n-1}) $	> 7.94 (Models without SI-DRIVE) > 8 (Models with SI-DRIVE)

Time Needed for Diagnosis: 30 — 55 seconds

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is within the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
$\sum (ro2sad_n - ro2sad_{n-1}) / \sum (sglmd_n - sglmd_{n-1}) $	≤ 7.94 (Models without SI-DRIVE) ≤ 8 (Models with SI-DRIVE)

Time Needed for Diagnosis: 30 — 55 seconds

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

CO:DTC P0441 EVAPORATIVE EMISSION CONT. SYS. INCORRECT PURGE FLOW

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of purge flow by the change of ELCM pressure sensor output value before/after purge introduction.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
<Common conditions>	
Battery voltage	≥ 10.9 V
Atmospheric pressure	> 75 kPa (563 mmHg, 22.2 inHg)
<First diagnosis>	
Learning value of EVAP conc. during purge	< 1
Total time of canister purge operation	≥ 120 s
<Second diagnosis>	
Time after cancel of second diagnosis	≥ 60000 ms
Total time of canister purge operation	≥ 120 s
Intake manifold pressure (absolute pressure)	> 13.3 kPa (100 mmHg, 3.9 inHg)
Engine speed	≥ 0 rpm
Intake manifold pressure (relative pressure)	< 13.3 kPa (100 mmHg, 3.9 inHg)
Vehicle speed	≥ 30 km/h (18.6 MPH)
Closed air/fuel ratio control	In operation
Air fuel ratio	> 0 and < 2
Main feedback compensation coefficient	> 0
Learning value of EVAP conc. during purge	< 1

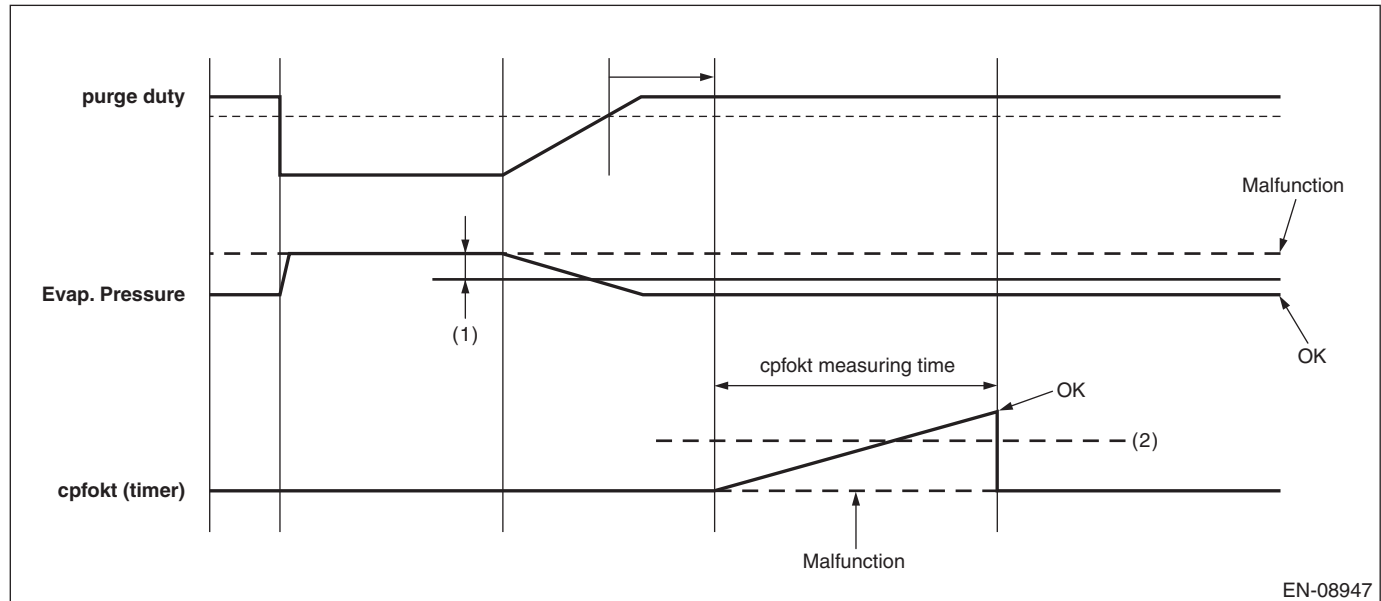
3. GENERAL DRIVING CYCLE

Perform the diagnosis only once after engine start.

4. DIAGNOSTIC METHOD

First diagnosis

Pressure decreases when the purge is introduced compared with when the purge is not performed. By using this, judge if the purge is correctly performed. If there is no pressure decrease, go to the second diagnosis.



EN-08947

(1) 0.0045 V

(2) 2000 ms

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
ELCM pressure sensor output voltage when purge is not performed – ELCM pressure sensor output voltage when purge is performed	> 0.0045 V
The accumulated time while the above conditions are met: cpfokt	< 2000 ms

Time Needed for Diagnosis: 26 seconds

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
ELCM pressure sensor output voltage when purge is not performed – ELCM pressure sensor output voltage when purge is performed	> 0.0045 V
The accumulated time while the above conditions are met: cpfokt	≥ 2000 ms

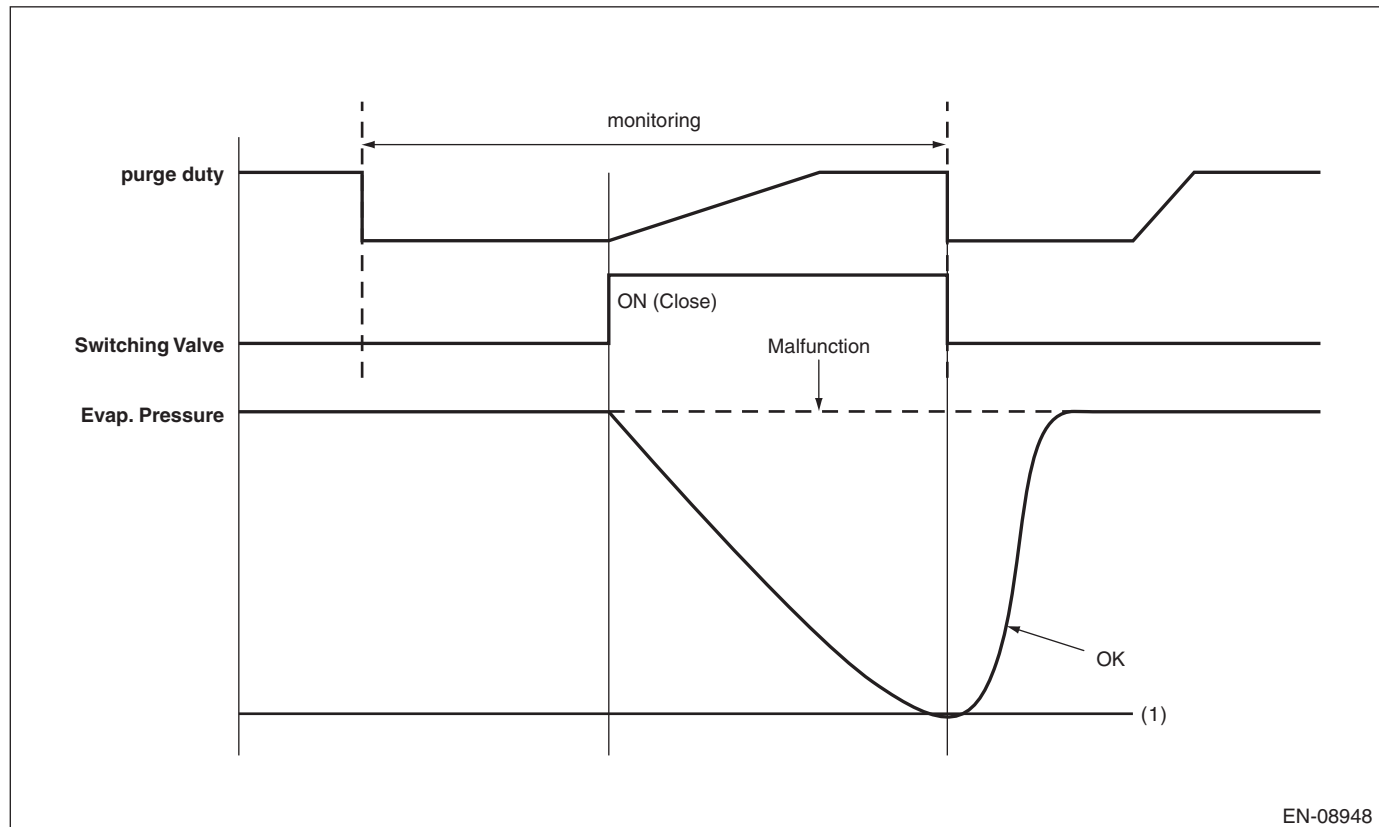
Time Needed for Diagnosis: 26 seconds

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Second diagnosis

Close the ELCM switching valve, and close the fuel tank completely, and perform the forced purging. If pressure change amount is 0.7 kPa (5 mmHg, 0.2 inHg) or less, judge as malfunction of purge flow.



EN-08948

(1) 0.7 kPa (5 mmHg, 0.2 inHg)

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
ELCM pressure sensor output voltage when purge is not performed – ELCM pressure sensor output voltage when purge is performed	< 0.7 kPa (5 mmHg, 0.2 inHg)
Time of negative pressure introduction	≥ 30000 ms

Time Needed for Diagnosis: 21 seconds

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
ELCM pressure sensor output voltage when purge is not performed – ELCM pressure sensor output voltage when purge is performed	≥ 0.7 kPa (5 mmHg, 0.2 inHg)

Time Needed for Diagnosis: Less than 21 second

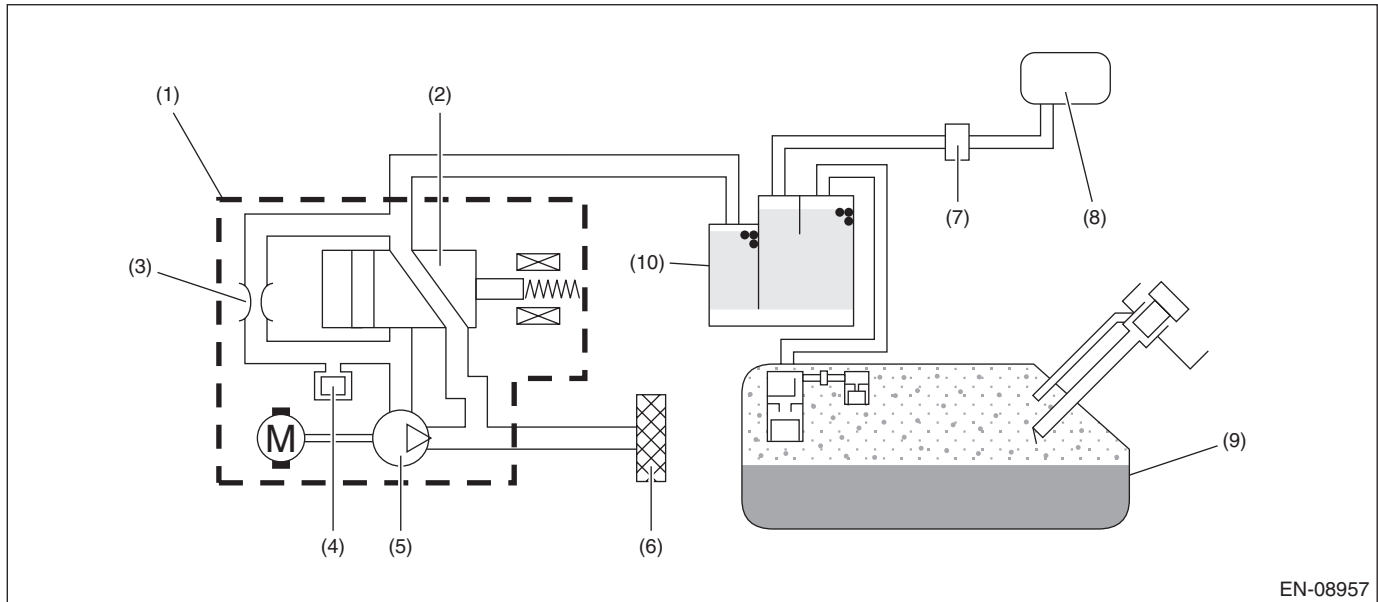
CP:DTC P0451 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/ SWITCH RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of ELCM pressure sensor output properties.

Judge as NG when the ELCM pressure sensor output value is largely different from the intake manifold pressure when the ignition switch is ON.

2. COMPONENT DESCRIPTION



(1) ELCM	(5) Vacuum pump	(9) Fuel tank
(2) Switching valve	(6) Drain filter	(10) Canister
(3) Reference orifice (0.02 inch orifice)	(7) Purge control solenoid valve	
(4) Pressure sensor	(8) Intake manifold	

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition switch	ON
Engine speed	< 300 rpm
Vehicle speed	< 1 km/h (0.621 MPH)
Soaking time	≥ 60 s
Variation value of intake manifold pressure (absolute pressure) since ignition switch is turned to ON	< 1.332 kPa (9.99 mmHg, 0.39 inHg)
ELCM vacuum pump	Not in operation
ELCM switching valve	Open
Purge control	Not in operation

4. GENERAL DRIVING CYCLE

Perform the diagnosis once at ignition ON.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
ELCM pressure sensor output value – intake manifold pressure (absolute pressure) when ignition switch is ON	> 6531.7 Pa (49 mmHg, 1.9 inHg)

Time Needed for Diagnosis: 328 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
ELCM pressure sensor output value – intake manifold pressure (absolute pressure) when ignition switch is ON	$\leq$ 6531.7 Pa (49 mmHg, 1.9 inHg)

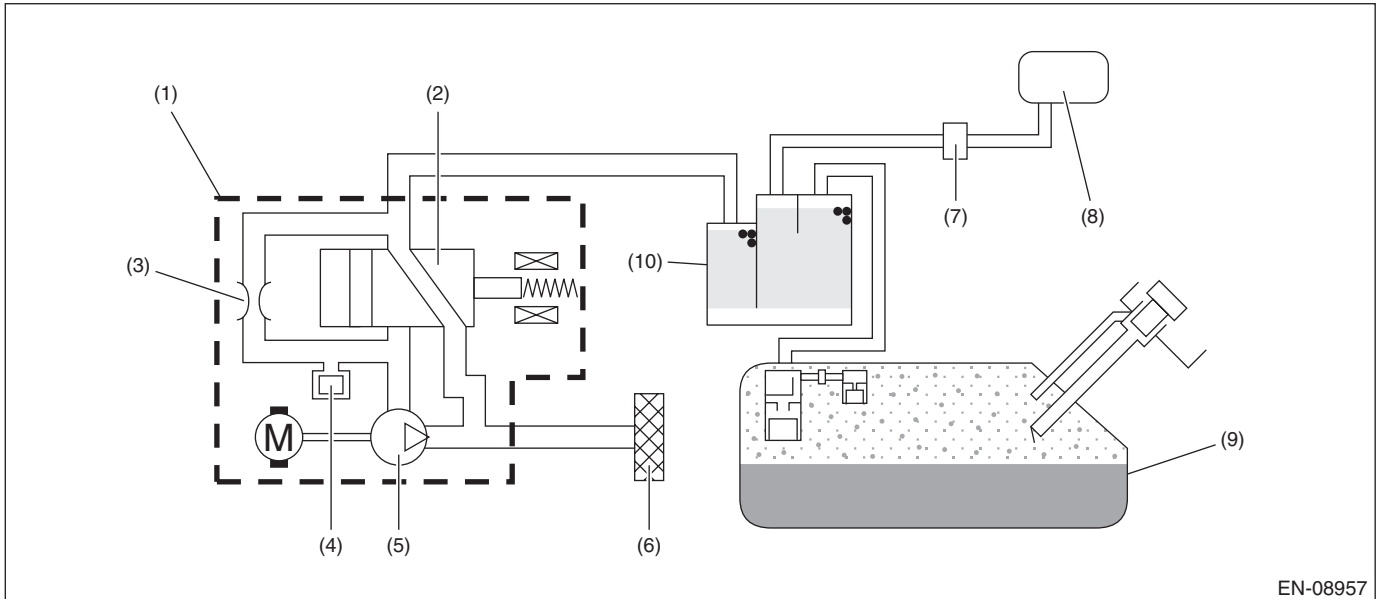
Time Needed for Diagnosis: 262 ms

CQ:DTC P0452 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/ SWITCH LOW

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM pressure sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM	(5) Vacuum pump	(9) Fuel tank
(2) Switching valve	(6) Drain filter	(10) Canister
(3) Reference orifice (0.02 inch orifice)	(7) Purge control solenoid valve	
(4) Pressure sensor	(8) Intake manifold	

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.973 V

Time Needed for Diagnosis: 1000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 0.973 V

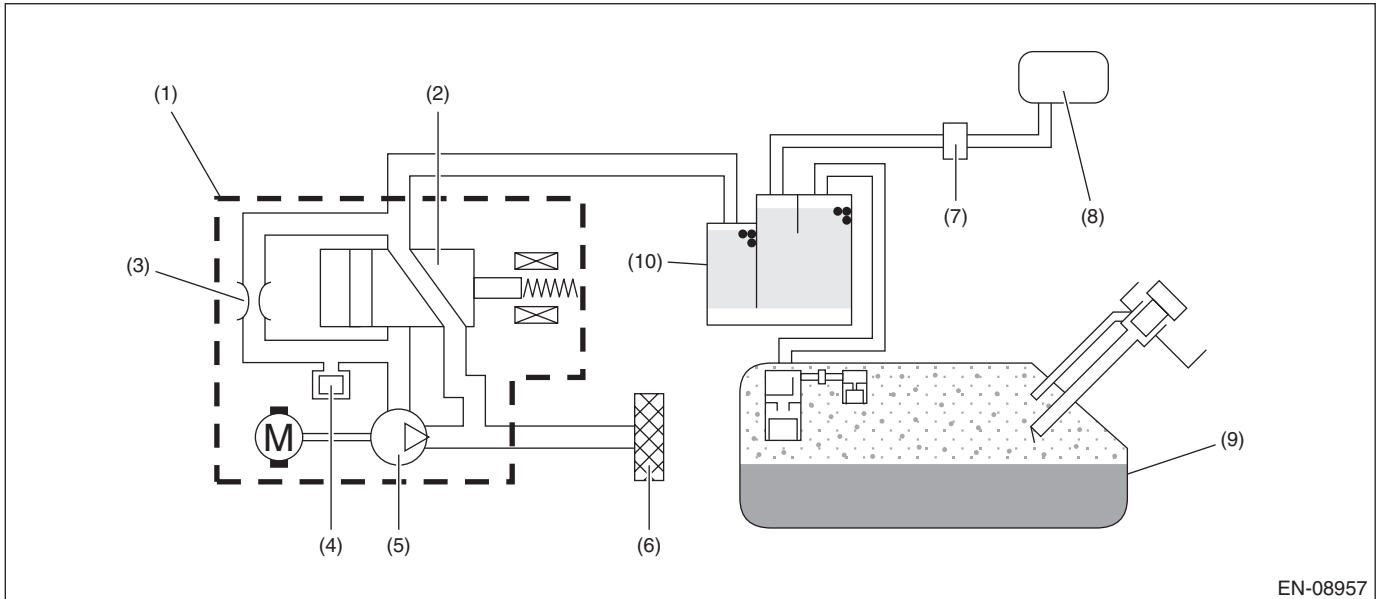
Time Needed for Diagnosis: Less than 1 second

CR:DTC P0453 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/ SWITCH HIGH

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM pressure sensor.
Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM	(5) Vacuum pump	(9) Fuel tank
(2) Switching valve	(6) Drain filter	(10) Canister
(3) Reference orifice (0.02 inch orifice)	(7) Purge control solenoid valve	
(4) Pressure sensor	(8) Intake manifold	

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.095 V

Time Needed for Diagnosis: 1000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 4.095 V

Time Needed for Diagnosis: Less than 1 second

CS:DTC P0455 EVAPORATIVE EMISSION SYSTEM LEAK DETECTED (LARGE LEAK)**1. OUTLINE OF DIAGNOSIS**

This diagnosis judges whether the ELCM operation is normal or not, and whether the evaporative emission system has leak and clogging or not.

To purge the canister, after driving, perform the five hours soaking after ignition switch OFF in order to stabilize the evaporative gas status. * After 5, 7 or 9.5 hours passed, ECM is activated by soaking timer, and the leak check is started.

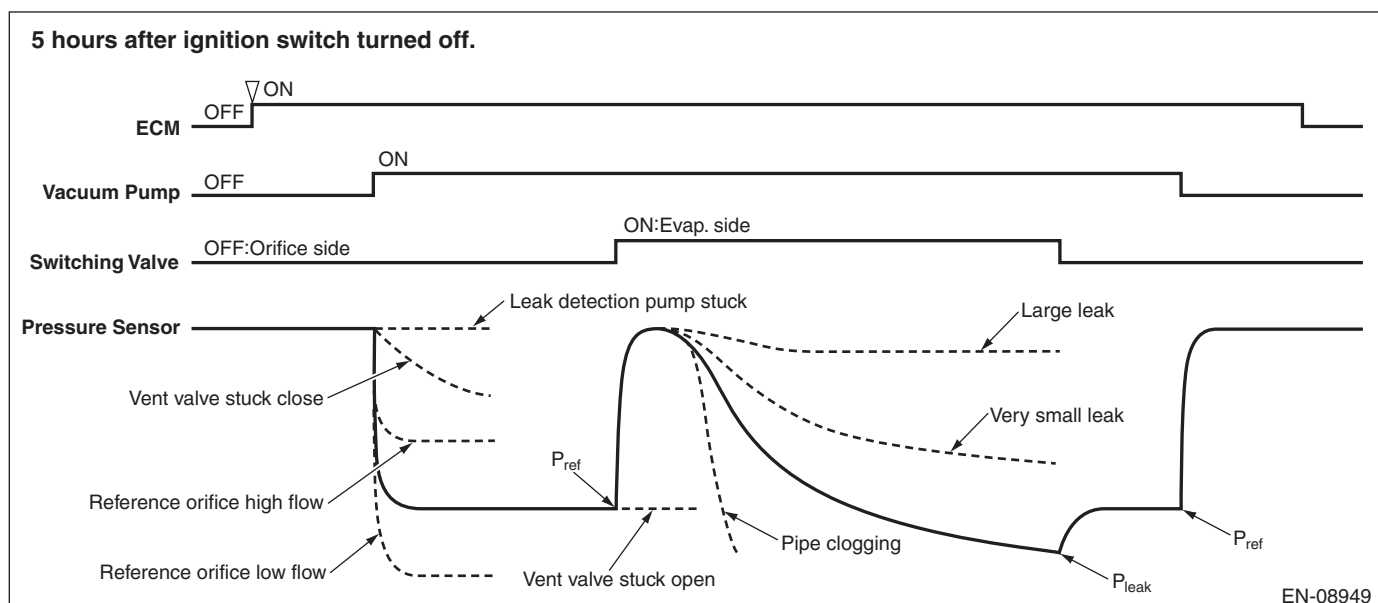
Judges whether the ELCM operation is normal or not, by measuring the reference pressure status via reference orifice (0.02 inch orifice). Judge as malfunction if the reference pressure is out of specified range. Then, judge whether there is a leak or not, by comparing the pressure (leak pressure) when the reference pressure and the evaporative emission system are in negative pressure condition. Judge as system leak in the evaporative emission system if the leak pressure is higher than reference pressure. Judge as clogging of pipe if the leak pressure becomes lower than the reference pressure within the specified amount of time.

0.02 inch leak and 0.04 inch leak can be distinguished by measuring the leak pressure.

The diagnosis results are stored inside ECM until the engine is started again.

*: When the test conditions are not met in 5 hours, perform diagnosis at elapsed time of 7 hours. When the test conditions are not met in 7 hours, perform diagnosis at elapsed time of 9.5 hours.

Diagnostic item	
ELCM system (ELCM body)	Vacuum pump stuck Switching valve stuck to open Switching valve stuck to close Reference orifice flow large Reference orifice flow small
Leak check	Large leak • 0.04 inch leak • Fuel cap loose • Fuel cap off • System malfunction
	Very small leak • 0.02 inch leak
Clogging of pipe	—

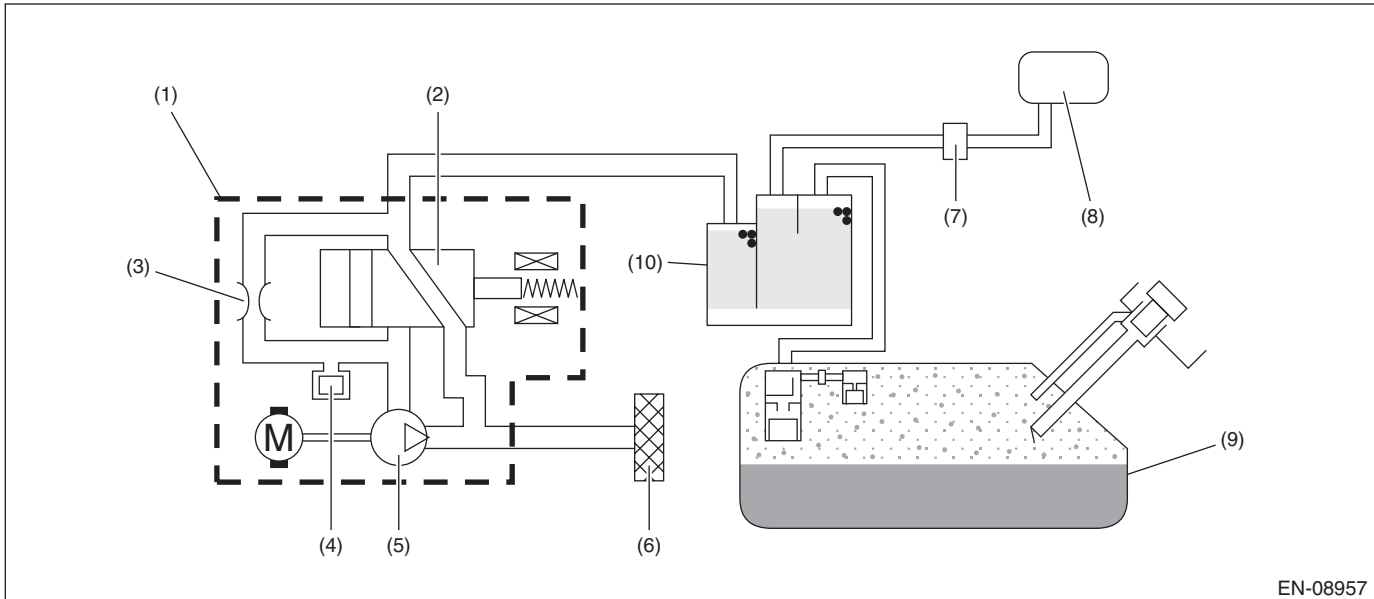
OUTLINE OF DIAGNOSIS

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

2. COMPONENT DESCRIPTION

ELCM consists of the pressure sensor, the reference orifice (diameter of 0.02 inch), the vacuum pump which introduces the negative pressure into evaporative emission system, and the switching valve which switches the passage to introduce the negative pressure.



EN-08957

(1) ELCM	(5) Vacuum pump	(9) Fuel tank
(2) Switching valve	(6) Drain filter	(10) Canister
(3) Reference orifice (0.02 inch orifice)	(7) Purge control solenoid valve	
(4) Pressure sensor	(8) Intake manifold	

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Activation of soaking timer	Completed
Battery voltage	$\geq 10.9 \text{ V}$
Ignition switch	OFF
Engine coolant temperature	$\geq 4.4 \text{ }^{\circ}\text{C}$ (39.9 $^{\circ}\text{F}$) and $< 45 \text{ }^{\circ}\text{C}$ (113 $^{\circ}\text{F}$)
Atmospheric pressure	$\geq 75 \text{ kPa}$ (563 mmHg, 22.2 inHg) and $< 110 \text{ kPa}$ (825 mmHg, 32.5 inHg)
EVAP conc. learning during previous driving cycle	Done
Learning value of EVAP conc. during previous driving cycle	≤ 1
Accumulated purge amount during previous driving cycle	$\geq \text{Value of Map 1}$

Map 1

Engine coolant temperature $^{\circ}\text{C}$ ($^{\circ}\text{F}$)	0 (32)	30 (86)	35 (95)	40 (104)	45 (113)
Accumulated purge amount during previous driving cycle g (oz)	3000 (105.81)	3000 (105.81)	5000 (176.35)	7500 (264.53)	10000 (352.7)

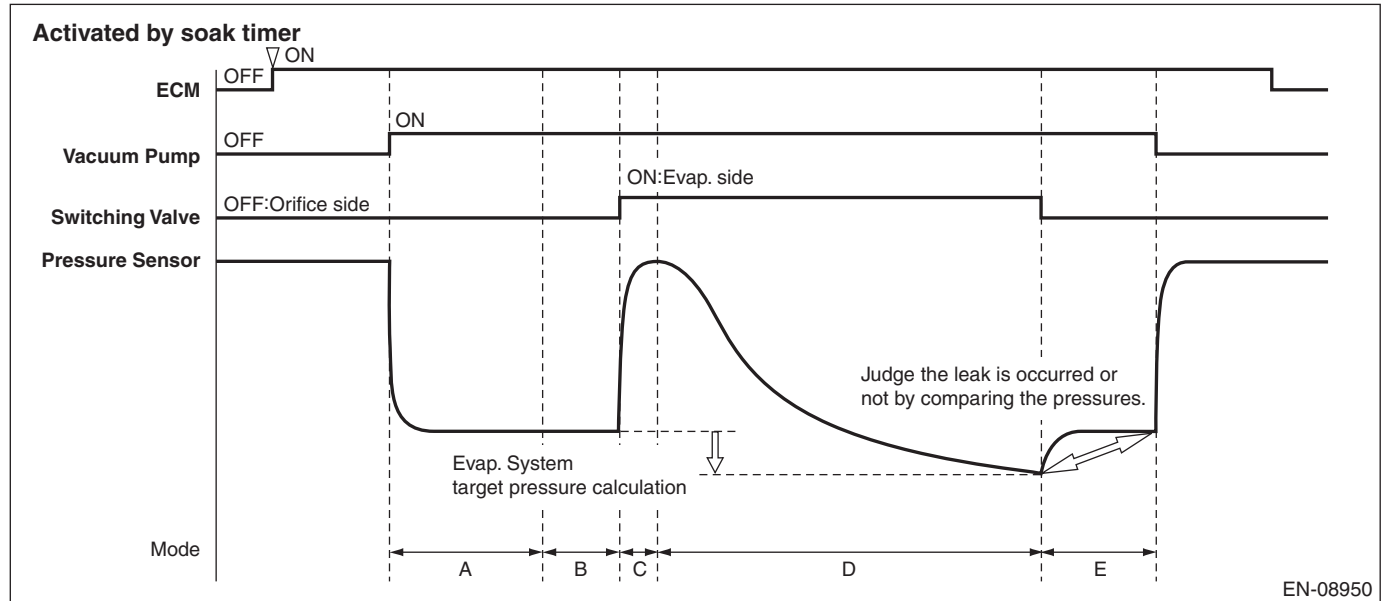
Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

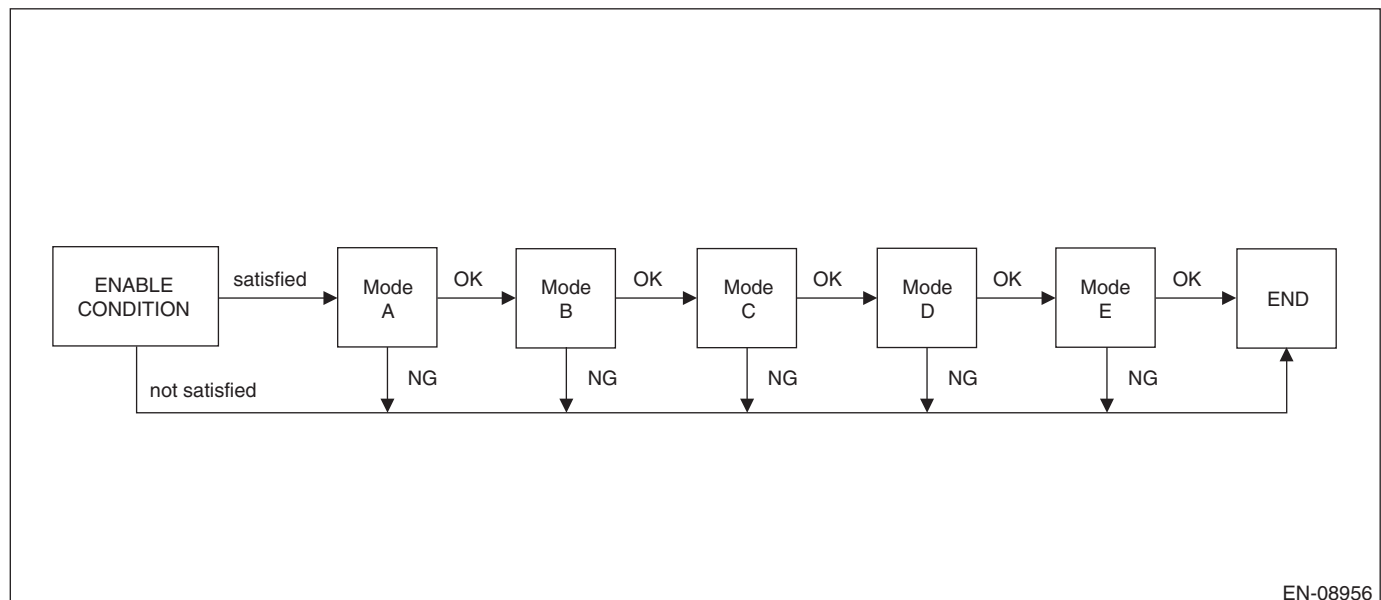
4. GENERAL DRIVING CYCLE

Perform the diagnosis only once when 5, 7 or 9.5 hours has passed after ignition switch is OFF. For more detail, refer to "OUTLINE OF DIAGNOSIS". <Ref. to GD(H4DOTC)-161, OUTLINE OF DIAGNOSIS, DTC P0455 EVAPORATIVE EMISSION SYSTEM LEAK DETECTED (LARGE LEAK), Diagnostic Trouble Code (DTC) Detecting Criteria.>

5. DIAGNOSTIC METHOD



Mode	Explanation of Mode	Diagnosis Period
A	Vacuum pump operation confirmation and characteristics stability	7 s or less & 300 s
B	Measurement of reference pressure for setting the target negative pressure	40 s or less
C	Switching valve operation confirmation	12 s or less
D	Clogging of pipe diagnosis and leak pressure measurement	900 s or less
E	Reference pressure measurement for judgment	40 s or less



Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Mode A (Vacuum pump operation confirmation and characteristics stability)

Purpose: Detect the vacuum pump operation trouble.

Judge as NG when the following conditions are established.

Judge as OK if the following conditions are not established, and warm up for five minutes to stabilize the vacuum pump characteristics.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Pressure sensor output value	> -0.2 kPa (-1.68 mmHg, -0.1 inHg)	P2404

Mode B (Measurement of reference pressure for setting the target negative pressure)

1. Purpose: Judge the reference pressure stability.

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Pressure sensor maximum output value – Pressure sensor minimum output value	> 0.3 kPa (2.355 mmHg, 0.1 inHg)	P2404

2. Purpose: Judge whether the reference pressure is within the normal range, and detect the vacuum pump and orifice malfunctions.

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Reference pressure for setting the target negative pressure	< Value of Map 2 or > Value of Map 3	P2404

Map 2

Atmospheric pressure kPa (mmHg, inHg)	70 (525, 20.7)	80 (600, 23.6)	90 (675, 26.6)	100 (750, 29.5)
Reference pressure for setting the target negative pressure kPa (mmHg, inHg)	-4 (-29.79, -1.2)	-4.1 (-30.593, -1.2)	-4.2 (-31.395, -1.2)	-4.3 (-32.19, -1.3)

Map 3

Atmospheric pressure kPa (mmHg, inHg)	70 (525, 20.7)	80 (600, 23.6)	90 (675, 26.6)	100 (750, 29.5)
Reference pressure for setting the target negative pressure kPa (mmHg, inHg)	-0.9 (-7.065, -0.3)	-1 (-7.86, -0.3)	-1.2 (-8.663, -0.3)	-1.3 (-9.465, -0.4)

Mode C (Switching valve operation confirmation)

Purpose: Measure the pressure increase when switching valve is changed from open to close, and detect the stuck to open/close malfunctions of the switching valve.

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Pressure sensor output value – Reference pressure for setting the target negative pressure	< 0.2 kPa (1.68 mmHg, 0.1 inHg)	P2404

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Mode D (Clogging of pipe diagnosis and leak pressure measurement)

1. Clogging of pipe

Purpose: Measure the time required for the evaporative emission system to reach the target negative pressure by the vacuum pump, and detect the clogging of pipe trouble.

Judge as clogging of pipe malfunction if the evaporative emission system reaches to the target negative pressure within the specified time.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Time required to reach to the target negative pressure For target vacuum, use one of the followings. • Reference pressure for target vacuum setting – value of Map 4 • –5 kPa (–37.298 mmHg, –1.5 inHg)	≤ 30000 ms	P1451

Map 4

Time of negative pressure introduction ms	0	100000	200000	300000	400000	500000	600000	700000	800000	900000	1000000	1100000	1200000
Reference pressure for setting the target negative pressure – Pressure sensor output value kPa (mmHg, inHg)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)	0.9 (7.058, 0.3)

2. Leak pressure measurement

Purpose: Measure the pressure (leak pressure) when the evaporative emission system becomes the negative pressure by the vacuum pump.

Store the pressure as a leak pressure while the following conditions are met.

Judgment Value

Conditions for storing the leak pressure	Threshold Value
When any one of the followings is established: • Reference pressure for setting the target negative pressure – Pressure sensor output value • Pressure sensor output value • Time of negative pressure introduction	≥ Value of Map 4 < –5 kPa (–37.298 mmHg, –1.5 inHg) ≥ 900000 ms

Mode E (Measurement of reference pressure for judgment)

1. Purpose: Judge the reference pressure stability.

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Pressure sensor maximum output value – Pressure sensor minimum output value	> 0.3 kPa (2.355 mmHg, 0.1 inHg)	P2404

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

2. Purpose: Judge whether the reference pressure is within the normal range, and detect the vacuum pump and orifice malfunctions. Judge the vacuum pump performance stability.

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
Reference pressure for judgment	< Value of Map 5 or > Value of Map 6	P2404

Map 5

Atmospheric pressure kPa (mmHg, inHg)	70 (525, 20.7)	80 (600, 23.6)	90 (675, 26.6)	100 (750, 29.5)
Reference pressure for judgment kPa (mmHg, inHg)	-4.5 (-34.02, -1.3)	-4.6 (-34.815, -1.4)	-4.7 (-35.618, -1.4)	-4.9 (-36.42, -1.4)

Map 6

Atmospheric pressure kPa (mmHg, inHg)	70 (525, 20.7)	80 (600, 23.6)	90 (675, 26.6)	100 (750, 29.5)
Reference pressure for judgment kPa (mmHg, inHg)	-0.8 (-6.18, -0.2)	-0.9 (-6.983, -0.3)	-1 (-7.785, -0.3)	-1.1 (-8.58, -0.3)

3. Purpose: Judge the presence of evaporative emission system leak.

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
<Large leak (0.04 inch)> Leak pressure lLeakjdg = (Reference pressure for judgment) × 0.377 - (-45.5 Pa)	≥ lLeakjdg (Pa)	P0455
<Very small leak (0.02 inch)> Leak pressure	< lLeakjdg (Pa)	P0456

Time Needed for Diagnosis: Approx. 23 min

• Abnormality Judgment

At next engine start, confirm whether the enable conditions are satisfied even though refueling has been done during soaking, and determine the malfunction.

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

• Normality Judgment

At next engine start, confirm whether the enable conditions are satisfied even though refueling has been done during soaking, then, if the following conditions are established, judge as OK and clear the NG.

Judgment Value

Malfunction Criteria	Threshold Value	DTC
NG flag	Not set	P0455 P0456 P1451 P2404

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

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

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0455. <Ref. to GD(H4DOTC)-161, DTC P0455 EVAPORATIVE EMISSION SYSTEM LEAK DETECTED (LARGE LEAK), Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

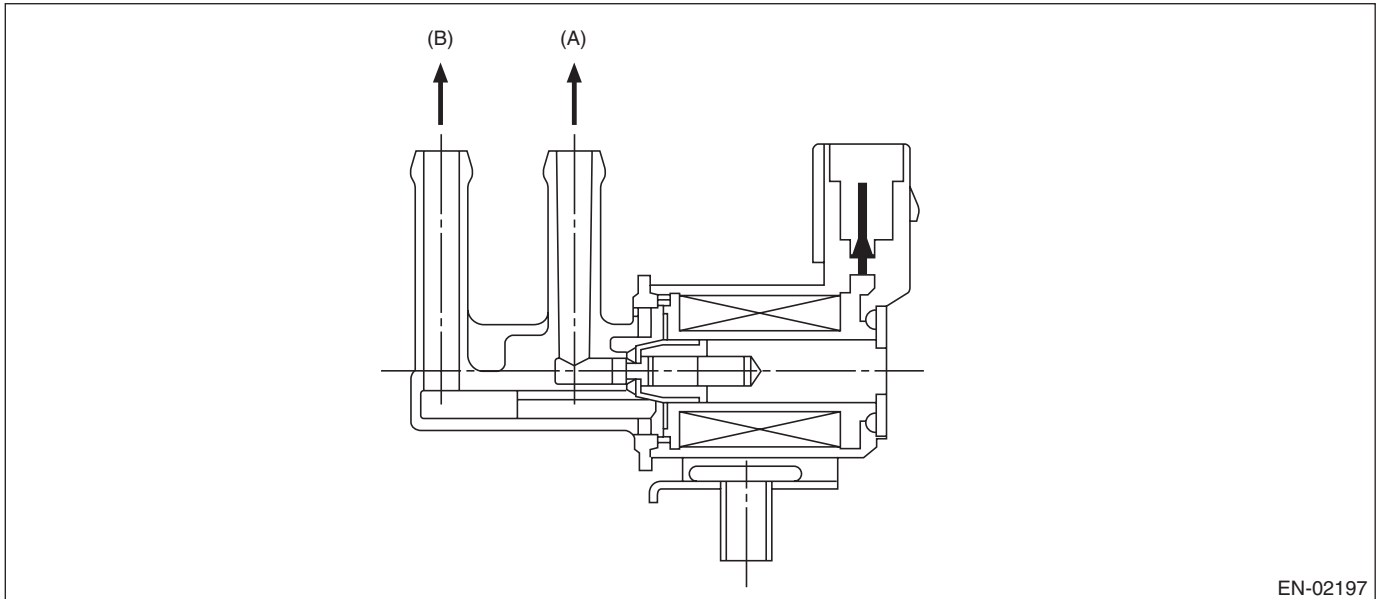
CU:DTC P0458 EVAPORATIVE EMISSION SYSTEM PURGE CONTROL VALVE CIRCUIT LOW

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



(A) To canister

(B) To intake manifold

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Elapsed time after starting the engine	$\geq 1 \text{ second}$

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Duty ratio of "ON"	< 0.75
Terminal output voltage	Low

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal output voltage	High

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

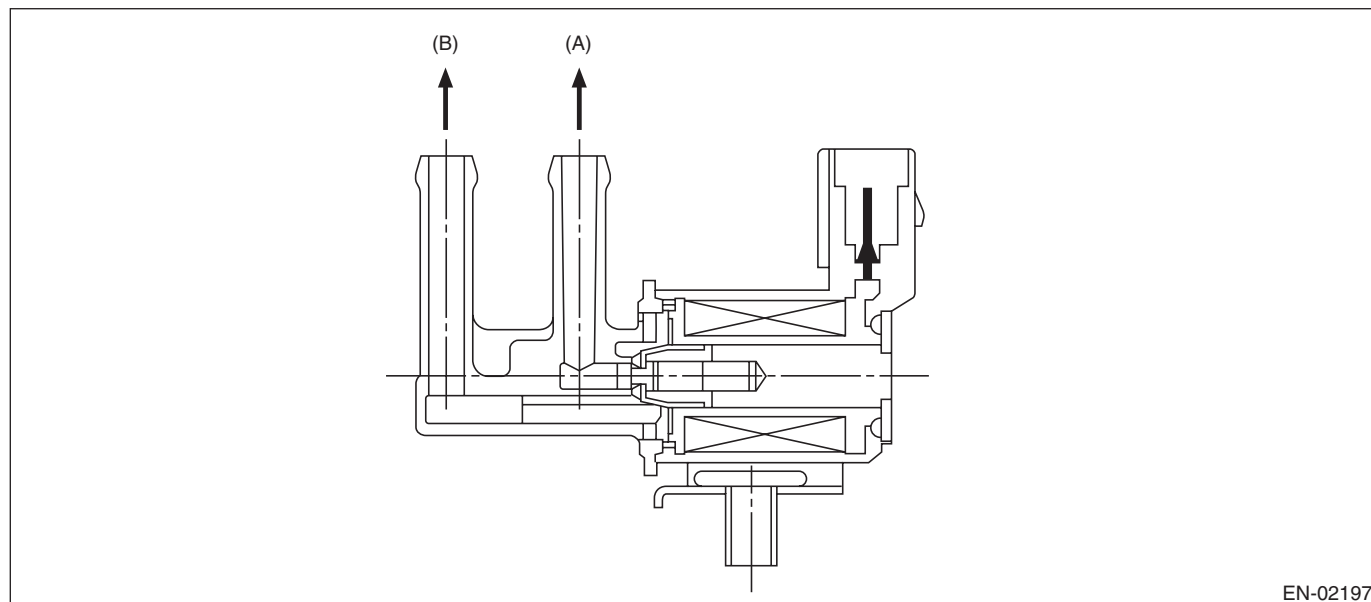
CV:DTC P0459 EVAPORATIVE EMISSION SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH

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



(A) To canister

(B) To intake manifold

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Elapsed time after starting the engine	$\geq 1 \text{ second}$

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Duty ratio of "ON"	≥ 0.25
Terminal output voltage	High

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Terminal output voltage	Low

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

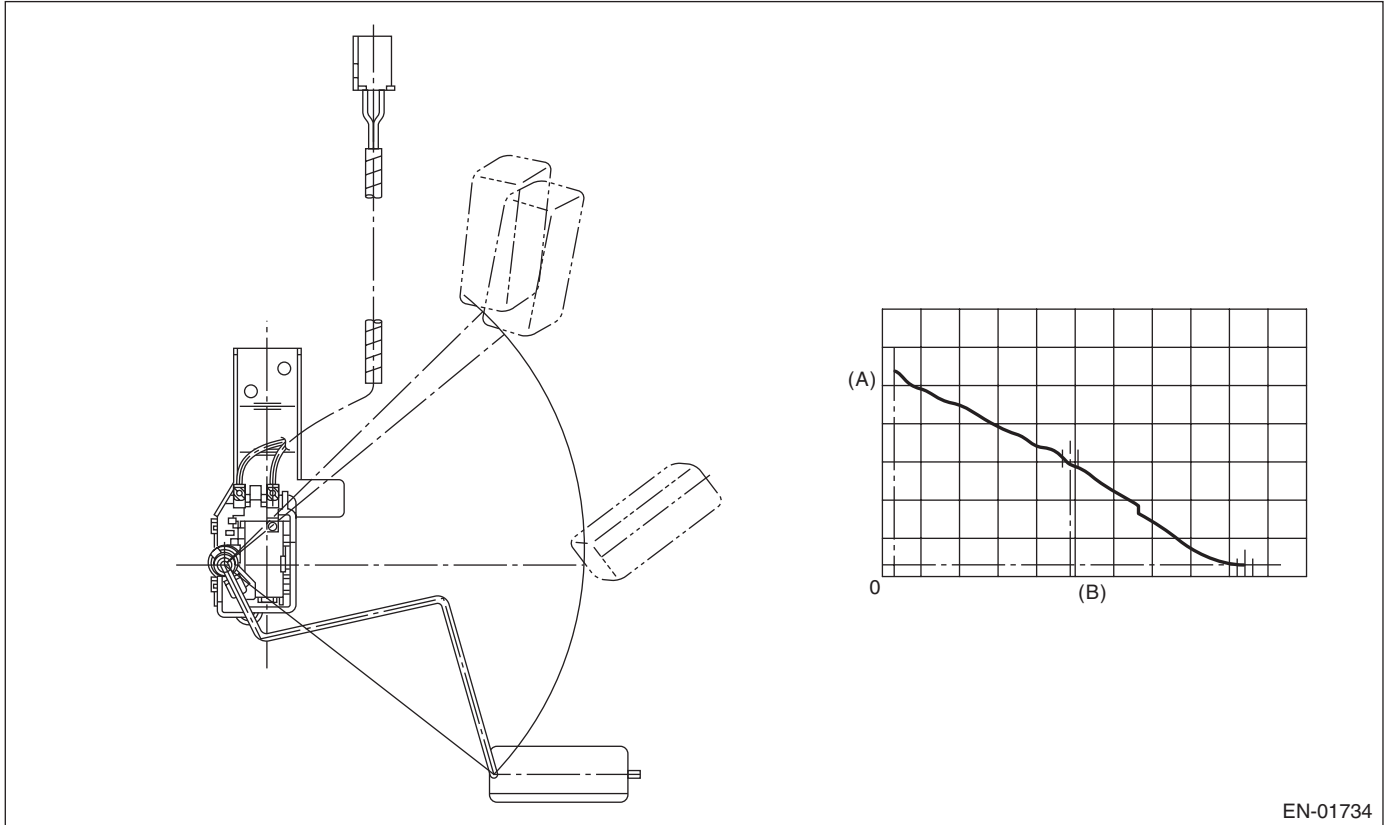
CW:DTC P0461 FUEL LEVEL SENSOR “A” CIRCUIT RANGE/PERFORMANCE

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



(A) Fuel level

(B) Resistance

3. ENABLE CONDITIONS

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 conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Accumulated amount of intake air	≥ 165375 g (5832.78 oz)
Max. – min. values of fuel level output	< 2.6 ℓ (0.69 US gal, 0.57 Imp gal)
Battery voltage	≥ 10.9 V
Engine speed	< 10000 rpm
Elapsed time after starting the engine	≥ 5000 ms

Time Needed for Diagnosis: Less than 1 second

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Accumulated amount of intake air	≥ 165375 g (5832.78 oz)
Max. – min. values of fuel level output	≥ 2.6 ℓ (0.69 US gal, 0.57 Imp gal)
Battery voltage	≥ 10.9 V
Engine speed	< 10000 rpm
Elapsed time after starting the engine	≥ 5000 ms

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

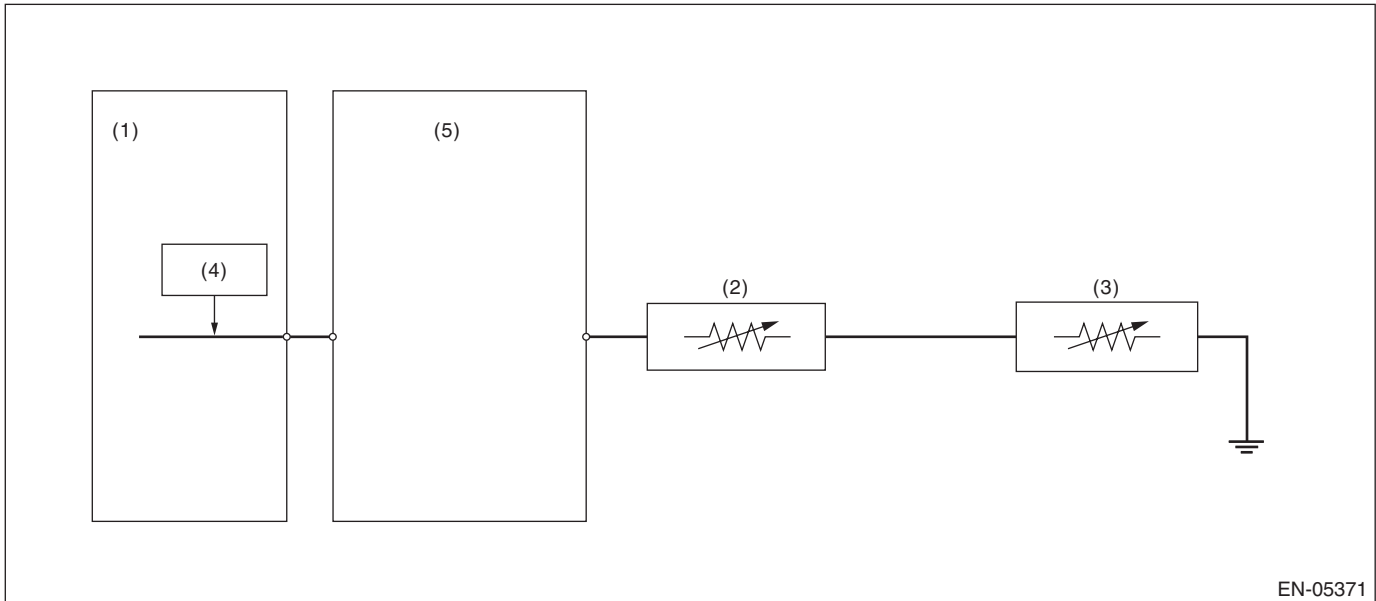
GENERAL DESCRIPTION

CX: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 out of specification.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)	(3) Fuel sub level sensor	(5) Body integrated unit
(2) Fuel level sensor	(4) Detecting circuit	

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 10.9 \text{ V}$
Elapsed time after starting the engine	$\geq 3000 \text{ ms}$
Output voltage	$< 0.173 \text{ V}$

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 10.9 \text{ V}$
Elapsed time after starting the engine	$\geq 3000 \text{ ms}$
Output voltage	$\geq 0.173 \text{ V}$

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

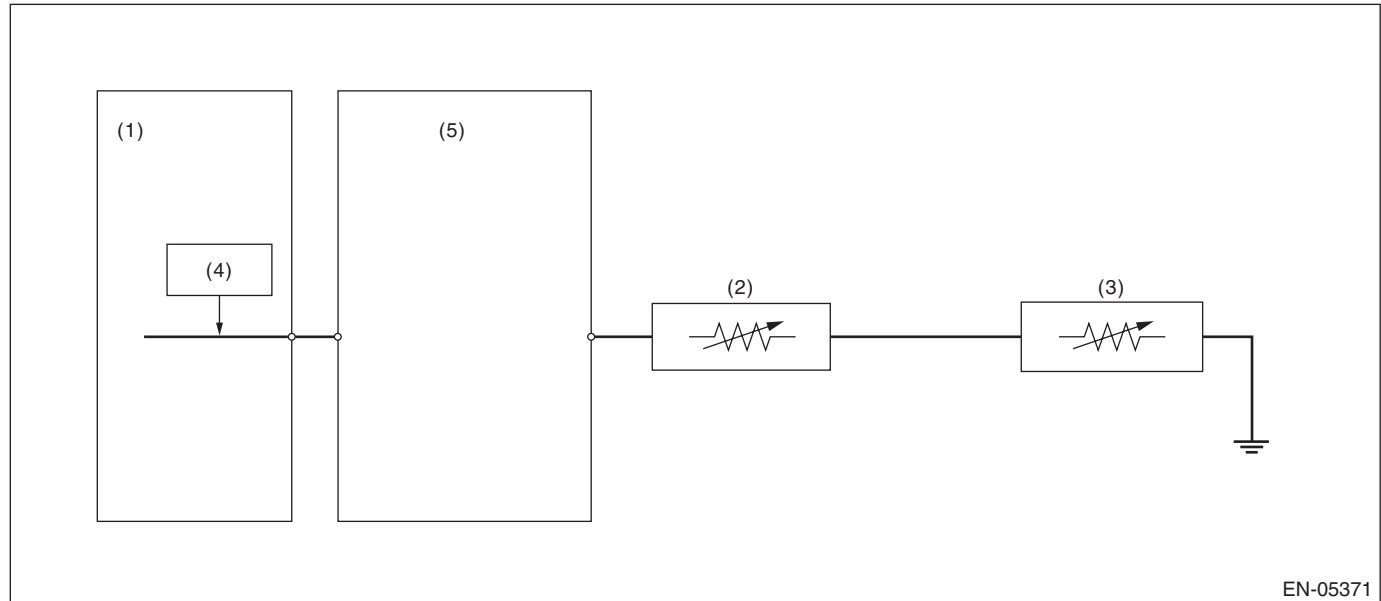
GENERAL DESCRIPTION

CY: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 out of specification.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)	(3) Fuel sub level sensor	(5) Body integrated unit
(2) Fuel level sensor	(4) Detecting circuit	

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 10.9 \text{ V}$
Elapsed time after starting the engine	$\geq 3000 \text{ ms}$
Output voltage	$\geq 7.212 \text{ V}$

Time Needed for Diagnosis: 1000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 10.9 \text{ V}$
Elapsed time after starting the engine	$\geq 3000 \text{ ms}$
Output voltage	$< 7.212 \text{ V}$

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

CZ:DTC P04AC EVAP SYSTEM PURGE CONTROL VALVE "B" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the purge control solenoid valve 2.

Judge as NG when the ECM output level differs from the actual terminal level.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	≥ 1 s
Terminal output voltage when ECM outputs OFF signal	Low

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	≥ 1 s
Terminal output voltage when ECM outputs OFF signal	High

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

DA:DTC P04AD EVAP SYSTEM PURGE CONTROL VALVE "B" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the purge control solenoid valve 2.

Judge as NG when the ECM output level differs from the actual terminal level.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	≥ 1 s
Terminal output voltage when ECM outputs ON signal	High

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	≥ 1 s
Terminal output voltage when ECM outputs ON signal	Low

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

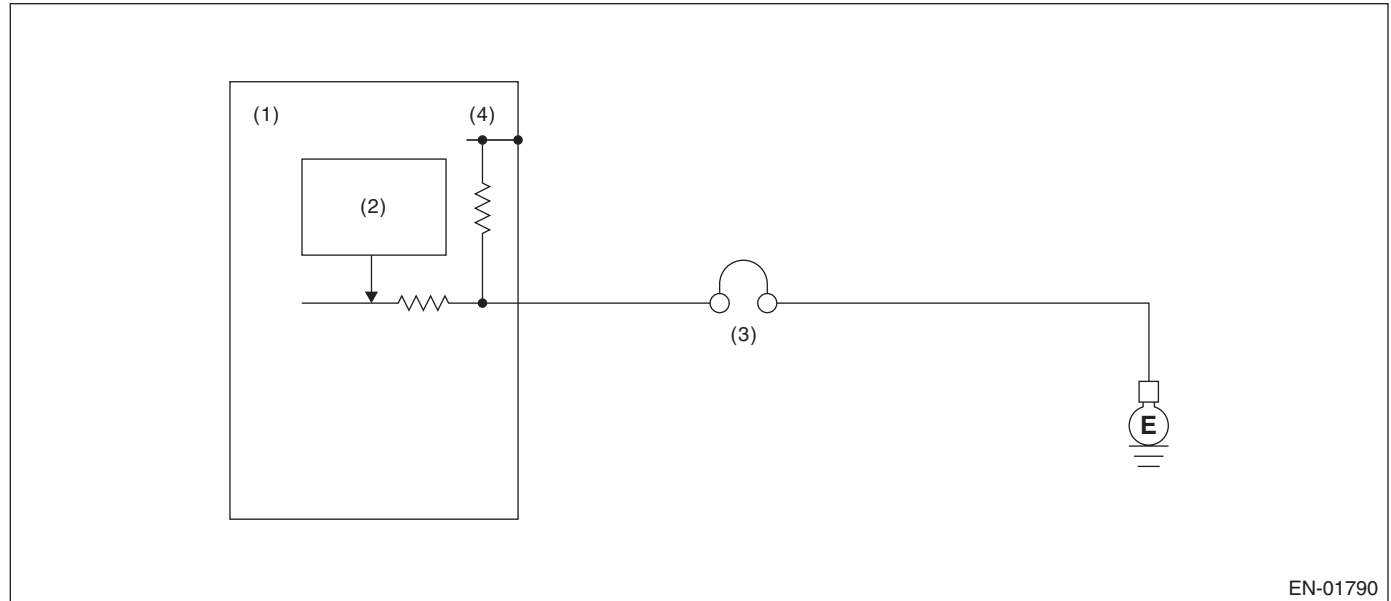
GENERAL DESCRIPTION

DB:DTC P04DB CRANKCASE VENTILATION SYSTEM DISCONNECTED

1. OUTLINE OF DIAGNOSIS

Detect the blow-by hose disconnection abnormality.
Judge as NG when the diagnosis terminal voltage is high.

2. COMPONENT DESCRIPTION



- (1) Engine control module (ECM) (3) PCV diagnosis connector (4) 5 V
(2) Detecting circuit

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Engine condition	After engine starting
Positive crankcase ventilation diagnosis voltage	High

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Engine condition	After engine starting
Positive crankcase ventilation diagnosis voltage	Low

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

DC:DTC P0500 VEHICLE SPEED SENSOR “A”

1. OUTLINE OF DIAGNOSIS

Judge as NG when outside of the judgment value.

Judge NG when the received data from ABSCM&H/U is abnormal vehicle speed, and the vehicle speed data is impossible.

2. COMPONENT DESCRIPTION

Vehicle speed signals are taken in to the ABS control module and hydraulic control unit, and normal/erroneous data of the ABS wheel speed sensor is received by CAN communication from the ABS control module and hydraulic control unit.

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	≥ 10.9 V
Elapsed time after engine starting	≥ 2000 ms

4. GENERAL DRIVING CYCLE

Always perform diagnosis more than 2000 ms after starting the engine.

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Front ABS wheel speed sensor status	Malfunction
Either of the following is established	
Front left wheel speed	≥ 300 km/h (186.4 MPH)
Front right wheel speed	≥ 300 km/h (186.4 MPH)

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Front left wheel speed	> 0 km/h (0 MPH) and < 300 km/h (186.4 MPH)
Front right wheel speed	> 0 km/h (0 MPH) and < 300 km/h (186.4 MPH)

Time Needed for Diagnosis: 2500 ms

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

DD: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 CONDITIONS

Secondary Parameters	Enable Conditions
Engine coolant temperature	$\geq 70^{\circ}\text{C}$ (158 °F)
Battery voltage	$\geq 10.9\text{ V}$
Atmospheric pressure	$\geq 75\text{ kPa}$ (563 mmHg, 22.2 inHg)
Fuel level	$\geq 9.6\text{ ℓ}$ (2.54 US gal, 2.11 Imp gal)
Elapsed time after starting the engine	$\geq 10.49\text{ s}$
Accelerator pedal position	$= 0\%$
Lambda value (left and right)	≥ 0.9 and < 1.1
After switching air conditioner to ON/OFF	$\geq 5.1\text{ s}$
After intake manifold pressure changes by 4 kPa (30 mmHg, 1.2 inHg) or more.	$> 5.1\text{ s}$
Elapsed time after switching neutral position switch to ON/OFF	$> 5.1\text{ s}$
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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual engine speed – Targeted engine speed	$< -100\text{ rpm}$
Feedback compensation for ISC	Max.

Time Needed for Diagnosis: 15 s × 1 time(s)

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Actual engine speed – Targeted engine speed	$\geq -100\text{ rpm}$

Time Needed for Diagnosis: 15 s

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

DE: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 CONDITIONS

Secondary Parameters	Enable Conditions
Engine coolant temperature	$\geq 70^{\circ}\text{C}$ (158°F)
Battery voltage	$\geq 10.9\text{ V}$
Atmospheric pressure	$\geq 75\text{ kPa}$ (563 mmHg, 22.2 inHg)
Fuel level	$\geq 9.6\text{ }\ell$ (2.54 US gal, 2.11 Imp gal)
Elapsed time after starting the engine	$\geq 10.49\text{ s}$
Accelerator pedal position	$= 0\%$
Lambda value (left and right)	≥ 0.9 and < 1.1
After switching air conditioner to ON/OFF	$\geq 5.1\text{ s}$
After intake manifold pressure changes by 4 kPa (30 mmHg, 1.2 inHg) or more.	$> 5.1\text{ s}$
Elapsed time after switching neutral position switch to ON/OFF	$> 5.1\text{ s}$
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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Actual engine speed – Targeted engine speed	$\geq 200\text{ rpm}$
Feedback compensation for ISC	Min.

Time Needed for Diagnosis: 15 s $\times$ 1 time(s)

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Actual engine speed – Targeted engine speed	$< 200\text{ rpm}$

Time Needed for Diagnosis: 15 s

DF:DTC P050A COLD START IDLE AIR CONTROL SYSTEM PERFORMANCE

1. OUTLINE OF DIAGNOSIS

- **When cold, the abnormality in the control of target engine speed increase is detected. (P050A)**

Judge as NG if the exhaust gas temperature diagnosis or idle speed diagnosis is NG.

- Exhaust gas temperature diagnosis

Judge as NG when the estimated exhausted gas temperature in 14 seconds after the cold start is below the specified value.

- Idle speed diagnosis

Judge as NG when actual engine speed is not close to target engine speed at cold start.

- **Detect malfunctions of the catalyst advanced idling retard angle control. (P050B)**

Judge as NG when ECM is not controlling the angle properly during catalyst advanced idling retard angle control.

- Final ignition timing diagnosis

Judge as NG when actual retard amount is under the specified value at cold start.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
<Exhaust gas temperature diagnosis>	
Atmospheric pressure	≥ 75 kPa (563 mmHg, 22.2 inHg)
Battery voltage	> 10.9 V
Engine condition	In operation
Vehicle speed	≤ 2 km/h (1.2 MPH)
Elapsed time after gear position change (P ↔ D or N ↔ D)	≥ 3000 ms
ISC feedback	In operation
Throttle opening angle	< 0.37 °
Fuel property	Not extremely low volatility
Target retard amount	≥ 0 °CA
<Idle speed diagnosis>	
Atmospheric pressure	≥ 75 kPa (563 mmHg, 22.2 inHg)
Battery voltage	> 10.9 V
Engine condition	In operation
Vehicle speed	≤ 2 km/h (1.2 MPH)
Engine coolant temperature	≤ 60 °C (140 °F)
Intake air amount sum value	≤ Value of Map 1
Elapsed time after gear position change (P ↔ D or N ↔ D)	≥ 3000 ms
Throttle opening angle	< 0.37 °
Fuel property	Not extremely low volatility
Elapsed time after starting the engine	≥ 2000 ms
<Final ignition timing diagnosis>	
Atmospheric pressure	≥ 75 kPa (563 mmHg, 22.2 inHg)
Battery voltage	> 10.9 V
Engine condition	In operation
Vehicle speed	≤ 2 km/h (1.2 MPH)
Engine coolant temperature	≤ 60 °C (140 °F)
Intake air amount sum value	≤ Value of Map 2
Elapsed time after gear position change (P ↔ D or N ↔ D)	≥ 3000 ms
Throttle opening angle	< 0.37 °
Fuel property	Not extremely low volatility
Target retard amount	≥ Value from Map 3

Map 1 (Models without SI-DRIVE)

Engine coolant temperature at engine starting °C (°F)	-40 (-40)	-30 (-22)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)
Intake air amount sum value g (oz)	1240 (43.73)	1170 (41.27)	1100 (38.8)	1040 (36.68)	980 (34.56)	570 (20.1)	280 (9.88)	265 (9.35)

Engine coolant temperature at engine starting °C (°F)	40 (104)	50 (122)	60 (140)	70 (158)	80 (176)	90 (194)	100 (212)	110 (230)
Intake air amount sum value g (oz)	250 (8.82)	210 (7.41)	210 (7.41)	210 (7.41)	210 (7.41)	210 (7.41)	210 (7.41)	210 (7.41)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Map 1 (Models with SI-DRIVE)

Engine coolant temperature at engine starting °C (°F)	-40 (-40)	-30 (-22)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)
Intake air amount sum value g (oz)	950 (33.51)	925 (32.62)	900 (31.74)	870 (30.68)	840 (29.63)	620 (21.87)	420 (14.81)	310 (10.93)

Engine coolant temperature at engine starting °C (°F)	40 (104)	50 (122)	60 (140)	70 (158)	80 (176)	90 (194)	100 (212)	110 (230)
Intake air amount sum value g (oz)	260 (9.17)	210 (7.41)	170 (6)	170 (6)	170 (6)	170 (6)	170 (6)	170 (6)

Map 2 (Models without SI-DRIVE)

Engine coolant temperature at engine starting °C (°F)	-40 (-40)	-30 (-22)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)
Intake air amount sum value g (oz)	1240 (43.73)	1170 (41.27)	1100 (38.8)	1040 (36.68)	980 (34.56)	570 (20.1)	280 (9.88)	265 (9.35)

Engine coolant temperature at engine starting °C (°F)	40 (104)	50 (122)	60 (140)	70 (158)	80 (176)	90 (194)	100 (212)	110 (230)
Intake air amount sum value g (oz)	250 (8.82)	210 (7.41)	210 (7.41)	210 (7.41)	210 (7.41)	210 (7.41)	210 (7.41)	210 (7.41)

Map 2 (Models with SI-DRIVE)

Engine coolant temperature at engine starting °C (°F)	-40 (-40)	-30 (-22)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)
Intake air amount sum value g (oz)	950 (33.51)	925 (32.62)	900 (31.74)	870 (30.68)	840 (29.63)	620 (21.87)	420 (14.81)	310 (10.93)

Engine coolant temperature at engine starting °C (°F)	40 (104)	50 (122)	60 (140)	70 (158)	80 (176)	90 (194)	100 (212)	110 (230)
Intake air amount sum value g (oz)	260 (9.17)	210 (7.41)	170 (6)	170 (6)	170 (6)	170 (6)	170 (6)	170 (6)

Map 3

Engine coolant temperature	-40 °C (-40 °F)	-30 °C (-22 °F)	-20 °C (-4 °F)	-10 °C (14 °F)	0 °C (32 °F)	10 °C (50 °F)	20 °C (68 °F)	30 °C (86 °F)	40 °C (104 °F)	50 °C (122 °F)	60 °C (140 °F)
Target retard amount	6 °CA	6 °CA	6 °CA	6 °CA	6 °CA	6 °CA	6 °CA	6 °CA	6 °CA	6 °CA	6 °CA

3. GENERAL DRIVING CYCLE

Perform the diagnosis at cold start.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

4. DIAGNOSTIC METHOD

• Exhaust gas temperature diagnosis

Abnormality Judgment

Calculate the estimated exhaust gas temperature when the diagnostic enable condition is established. Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Estimated exhaust gas temperature	< Value of Map 4

Map 4 (Models without SI-DRIVE)

Engine coolant temperature at engine starting	-40 °C (-40 °F)	-30 °C (-22 °F)	-20 °C (-4 °F)	-10 °C (14 °F)	0 °C (32 °F)	10 °C (50 °F)	20 °C (68 °F)	30 °C (86 °F)	40 °C (104 °F)	45 °C (113 °F)
Threshold Value	0 °C (32 °F)	0 °C (32 °F)	0 °C (32 °F)	0 °C (32 °F)	0 °C (32 °F)	0 °C (32 °F)	0 °C (32 °F)	0 °C (32 °F)	0 °C (32 °F)	0 °C (32 °F)

Map 4 (Models with SI-DRIVE)

Engine coolant temperature at engine starting	-40 °C (-40 °F)	-30 °C (-22 °F)	-20 °C (-4 °F)	-10 °C (14 °F)	0 °C (32 °F)	10 °C (50 °F)	20 °C (68 °F)	30 °C (86 °F)	40 °C (104 °F)	45 °C (113 °F)
Threshold Value	0 °C (32 °F)	0 °C (32 °F)	0 °C (32 °F)	0 °C (32 °F)	0 °C (32 °F)	0 °C (32 °F)	0 °C (32 °F)	0 °C (32 °F)	0 °C (32 °F)	0 °C (32 °F)

Time Needed for Diagnosis: 14 seconds

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

Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Estimated exhaust gas temperature	≥ Value of Map 4

Time Needed for Diagnosis: Less than 1 second

• Idle speed diagnosis

Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Actual engine speed – Target engine speed	< – 125 rpm

Time Needed for Diagnosis: 7000 ms

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

Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Actual engine speed – Target engine speed	≥ – 125 rpm

Time Needed for Diagnosis: 7000 ms

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

• Final ignition timing diagnosis

Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Final ignition timing – ignition timing during CSERS* *: Ignition timing during CSERS (Cold Start Emission Reduction Strategy) = Base ignition timing – retard amount	> Value of Map 5

Map 5

Engine coolant temperature	–40 °C (–40 °F)	–30 °C (–22 °F)	–20 °C (–4 °F)	–10 °C (14 °F)	0 °C (32 °F)	10 °C (50 °F)	20 °C (68 °F)	30 °C (86 °F)	40 °C (104 °F)	50 °C (122 °F)	60 °C (140 °F)
Threshold Value	6 °CA	6 °CA	6 °CA	6 °CA	6 °CA	6 °CA	6 °CA	6 °CA	6 °CA	6 °CA	6 °CA

Time Needed for Diagnosis: 7000 ms

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

Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Final ignition timing – ignition timing during CSERS* *: Ignition timing during CSERS (Cold Start Emission Reduction Strategy) = Base ignition timing – retard amount	≤ Value of Map 5

Time Needed for Diagnosis: 7000 ms

DG:DTC P050B COLD START IGNITION TIMING PERFORMANCE

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P050A. <Ref. to GD(H4DOTC)-185, DTC P050A COLD START IDLE AIR CONTROL SYSTEM PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

DH:DTC P0560 SYSTEM VOLTAGE

1. OUTLINE OF DIAGNOSIS

Detect the open/short circuit of back-up power supply circuit.
Judge as NG when the backup power voltage is low.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Voltage of back-up power supply	Low
Battery voltage	≥ 10.9 V
Engine condition	After engine starting

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Voltage of back-up power supply	High
Battery voltage	≥ 10.9 V
Engine condition	After engine starting

Time Needed for Diagnosis: Less than 1 second

DI: 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 CONDITIONS

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 following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Write the specified value into the RAM.	The written value cannot be read.

Time Needed for Diagnosis: Less than 1 second

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

- Normality Judgment**

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Write the specified value into the RAM.	The written value can be read.

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

DJ: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 CONDITIONS

Secondary Parameters	Enable Conditions
Ignition switch	ON

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

Abnormality Judgment

Judge as NG if the criteria below are met.

Judgment Value

Malfunction Criteria	Threshold Value
SUM value of ROM	Standard

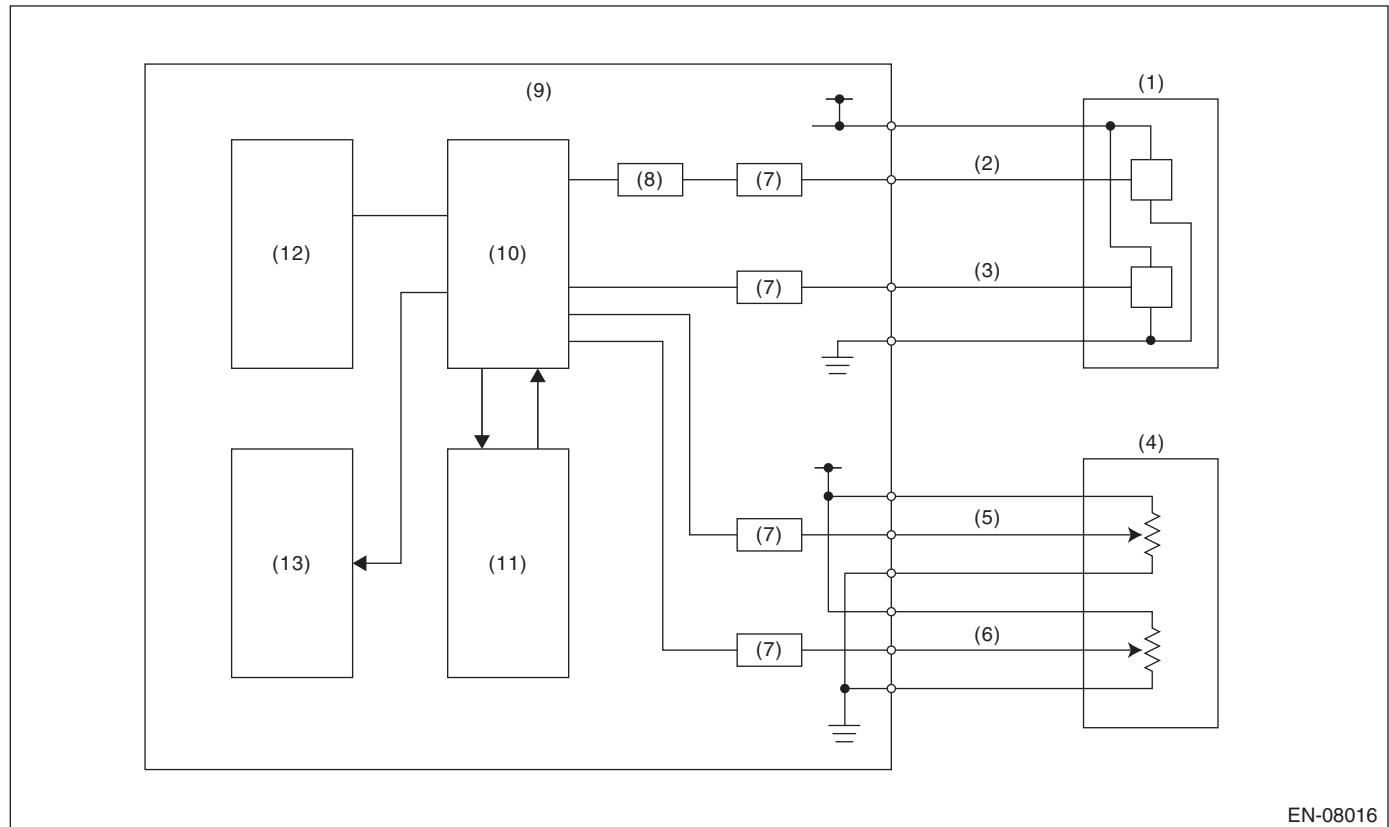
Time Needed for Diagnosis: Undetermined

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

DK:DTC P0606 CONTROL MODULE PROCESSOR**1. OUTLINE OF DIAGNOSIS**

Judge as NG when any one of the followings is established.

- (1) If the CPU operation is abnormal (instruction/flow check).
- (2) If the output IC operation is abnormal (output driver malfunction).

2. COMPONENT DESCRIPTION

EN-08016

(1) Throttle position sensor	(6) Accelerator pedal position sensor 2	(10) CPU
(2) Throttle position sensor 1	(7) I/F circuit	(11) Monitoring IC
(3) Throttle position sensor 2	(8) Amplifier circuit	(12) EEPROM
(4) Accelerator pedal position sensor	(9) Engine control module (ECM)	(13) Output IC
(5) Accelerator pedal position sensor 1		

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
(1) Ignition switch	ON
(1) ETC control	Permission
(2) Ignition switch	ON
(2) Battery voltage	≥ 10.9 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
(1) Main CPU calculation result	The result and expected value match.
(2) Communication between output ICs	Possible to communicate

Time Needed for Diagnosis:

(1): 192 ms

(2): 2500 ms

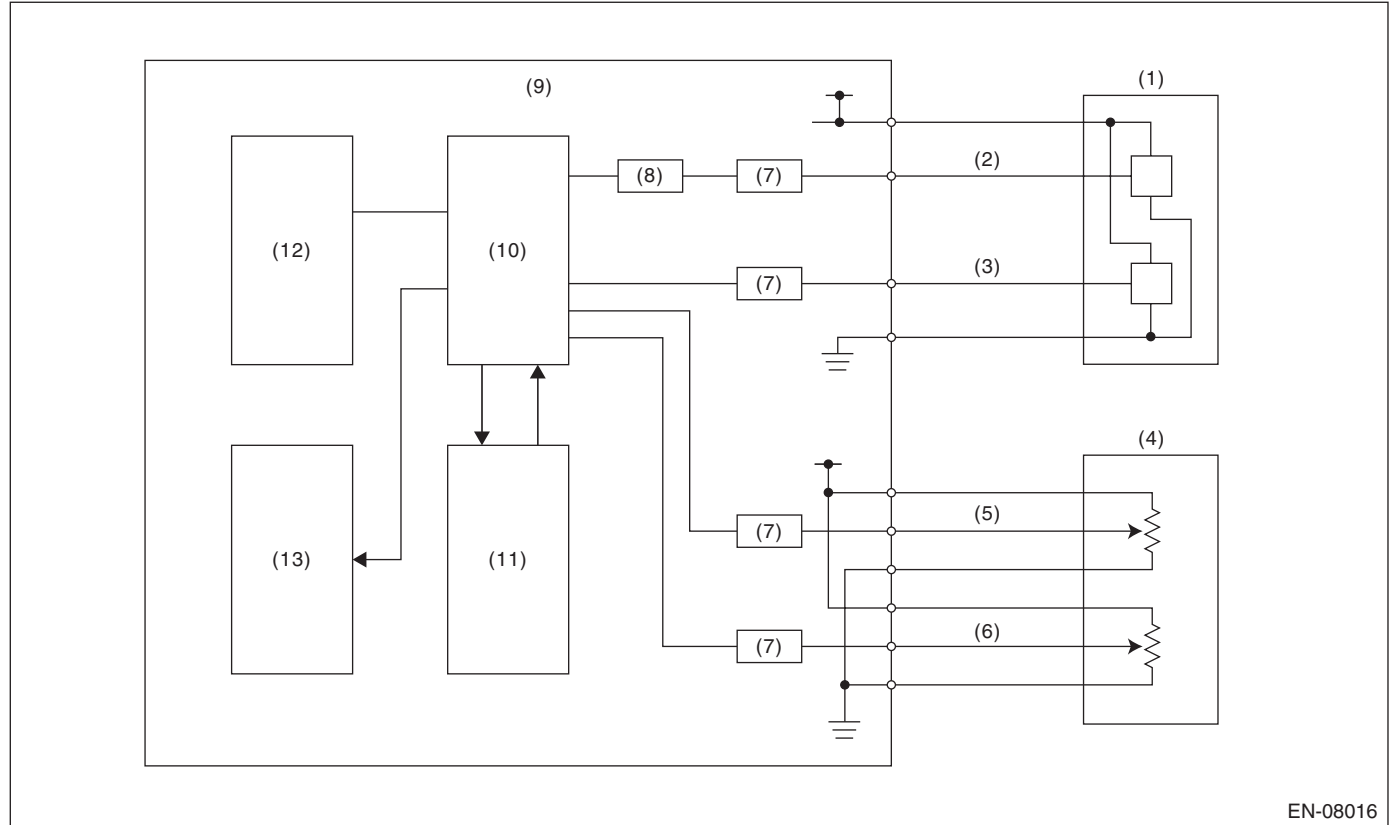
Malfunction Indicator Light Illumination: Illuminates as soon as a malfunction occurs.

DL:DTC P060A INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Judge as NG when the monitoring IC operation is abnormal. (Monitoring IC malfunction)

2. COMPONENT DESCRIPTION



(1) Throttle position sensor	(6) Accelerator pedal position sensor 2	(10) CPU
(2) Throttle position sensor 1	(7) I/F circuit	(11) Monitoring IC
(3) Throttle position sensor 2	(8) Amplifier circuit	(12) EEPROM
(4) Accelerator pedal position sensor	(9) Engine control module (ECM)	(13) Output IC
(5) Accelerator pedal position sensor 1		

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 6 \text{ V}$

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
Monitoring IC operation	The result and expected value match.

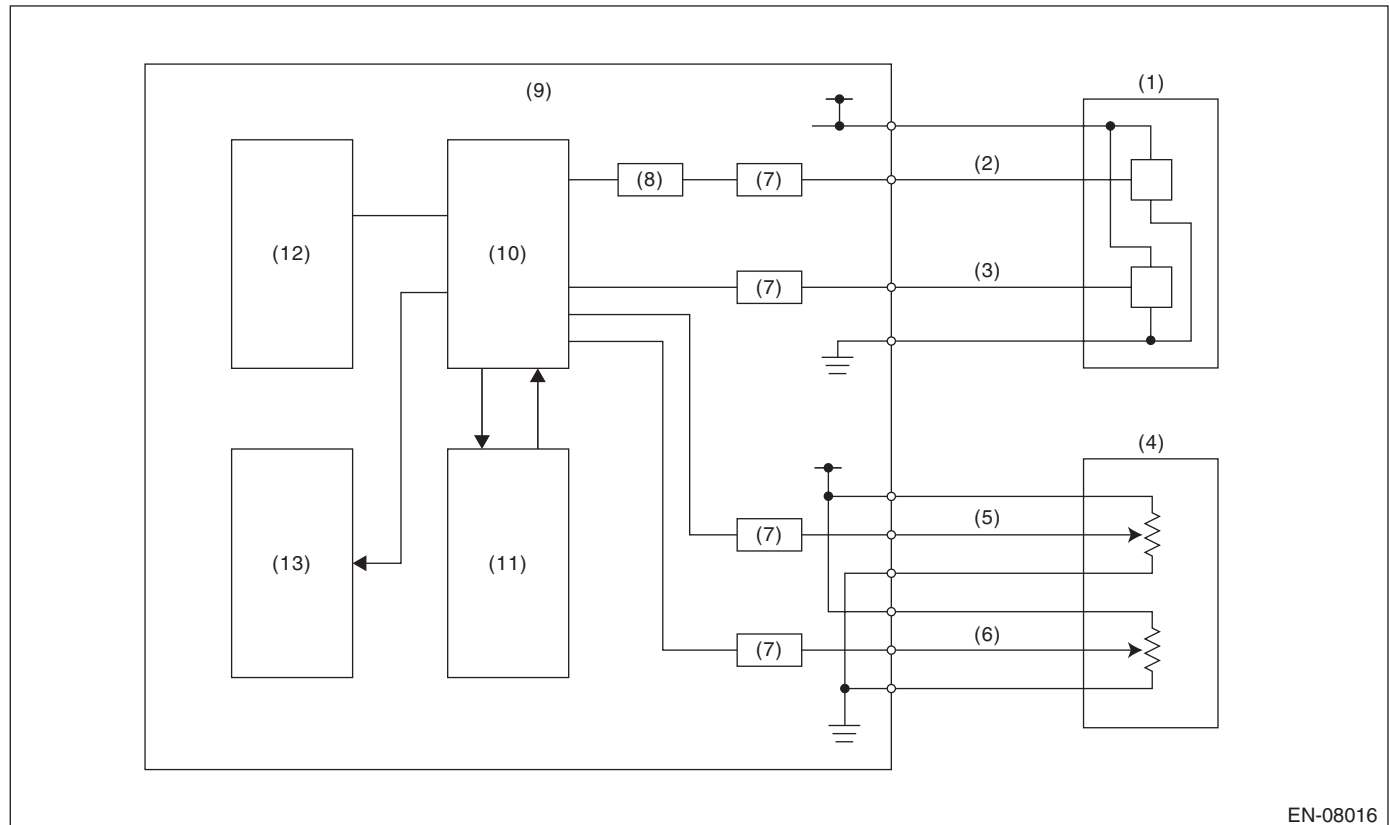
Time Needed for Diagnosis: 200 ms

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

DM:DTC P060B INTERNAL CONTROL MODULE A/D PROCESSING PERFORMANCE**1. OUTLINE OF DIAGNOSIS**

Judge as NG when any one of the followings is established.

- (1) If the input amplifier circuit of throttle position sensor 1 is abnormal (quadruple amplification problem).
- (2) If the A/D converter operation is abnormal (ADC malfunction).

2. COMPONENT DESCRIPTION

EN-08016

(1) Throttle position sensor	(6) Accelerator pedal position sensor 2	(10) CPU
(2) Throttle position sensor 1	(7) I/F circuit	(11) Monitoring IC
(3) Throttle position sensor 2	(8) Amplifier circuit	(12) EEPROM
(4) Accelerator pedal position sensor	(9) Engine control module (ECM)	(13) Output IC
(5) Accelerator pedal position sensor 1		

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	$\geq 6 \text{ V}$

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
(1) Throttle position sensor 1 opening angle – (Throttle position sensor 1 opening angle after passing amplifier/4)	< 3 °
(2) Standard voltage – Readings of voltage value	< 0.078125 V

Time Needed for Diagnosis:

(1): 24 ms

(2): 200 ms

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

DN:DTC P0616 STARTER RELAY CIRCUIT LOW**1. OUTLINE OF DIAGNOSIS**

Detect abnormal continuity in the starter SW.

Judge as OFF NG when the starter SW signal remains OFF.

2. ENABLE CONDITIONS

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 following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 8 \text{ V}$
Vehicle speed	$< 1 \text{ km/h (0.6 MPH)}$
Engine condition	Change from pre-start to post-start
Starter SW signal	No ON experience

Time Needed for Diagnosis: Less than 1 second

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

• Normality Judgment

Judge as OFF OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 8 \text{ V}$
Vehicle speed	$< 1 \text{ km/h (0.6 MPH)}$
Engine condition	Change from pre-start to post-start
Starter SW signal	ON Experience exists

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

DO:DTC P0617 STARTER RELAY CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect abnormal continuity in the starter SW.

Judge as ON NG when the starter SW signal remains ON.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 8\text{ V}$
Engine condition	After engine starting
Starter SW signal	ON

Time Needed for Diagnosis: 30000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 8\text{ V}$
Starter SW signal	OFF

Time Needed for Diagnosis: Less than 1 second

GENERAL DESCRIPTION

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
EEPROM writing	Writing completed

Time Needed for Diagnosis: 48 ms

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

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

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

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of 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 CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	≥ 10.9 V
Starter relay	OFF

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously in 2 seconds after starting the engine.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

Judge NG when the malfunction criteria below are completed determined times or more after the neutral SW change.

Judgment Value

Malfunction Criteria	Threshold Value
Neutral switch signal (while changing from a to b below) Driving condition change a) Engine speed 600 rpm — 900 rpm & Vehicle speed = 0 km/h (0 MPH) b) Engine speed 1600 rpm — 2550 rpm & Vehicle speed ≥ 64 km/h (39.8 MPH)	LOW (ON) continues. From a) to b)

Time Needed for Diagnosis: 3 time(s)

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

• Normality Judgment

Judge as OK and clear 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) Driving condition change a) Engine speed 600 rpm — 900 rpm & Vehicle speed = 0 km/h (0 MPH) b) Engine speed 1600 rpm — 2550 rpm & Vehicle speed ≥ 64 km/h (39.8 MPH)	Changes to HIGH (OFF). From a) to b)

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

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

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of 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 CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	≥ 10.9 V
Starter relay	OFF

3. GENERAL DRIVING CYCLE

Perform the diagnosis continuously in 2 seconds after starting the engine.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

Judge NG when the malfunction criteria below are completed determined times or more after the neutral SW change.

Judgment Value

Malfunction Criteria	Threshold Value
Neutral switch signal (while changing from a to b below) Driving condition change a) Engine speed 600 rpm — 900 rpm & Vehicle speed = 0 km/h (0 MPH) b) Engine speed 1600 rpm — 2550 rpm & Vehicle speed ≥ 64 km/h (39.8 MPH)	HIGH (OFF) continues. From a) to b)

Time Needed for Diagnosis: 3 time(s)

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

• Normality Judgment

Judge as OK and clear 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) Driving condition change a) Engine speed 600 rpm — 900 rpm & Vehicle speed = 0 km/h (0 MPH) b) Engine speed 1600 rpm — 2550 rpm & Vehicle speed ≥ 64 km/h (39.8 MPH)	Changes to LOW (ON). From a) to b)

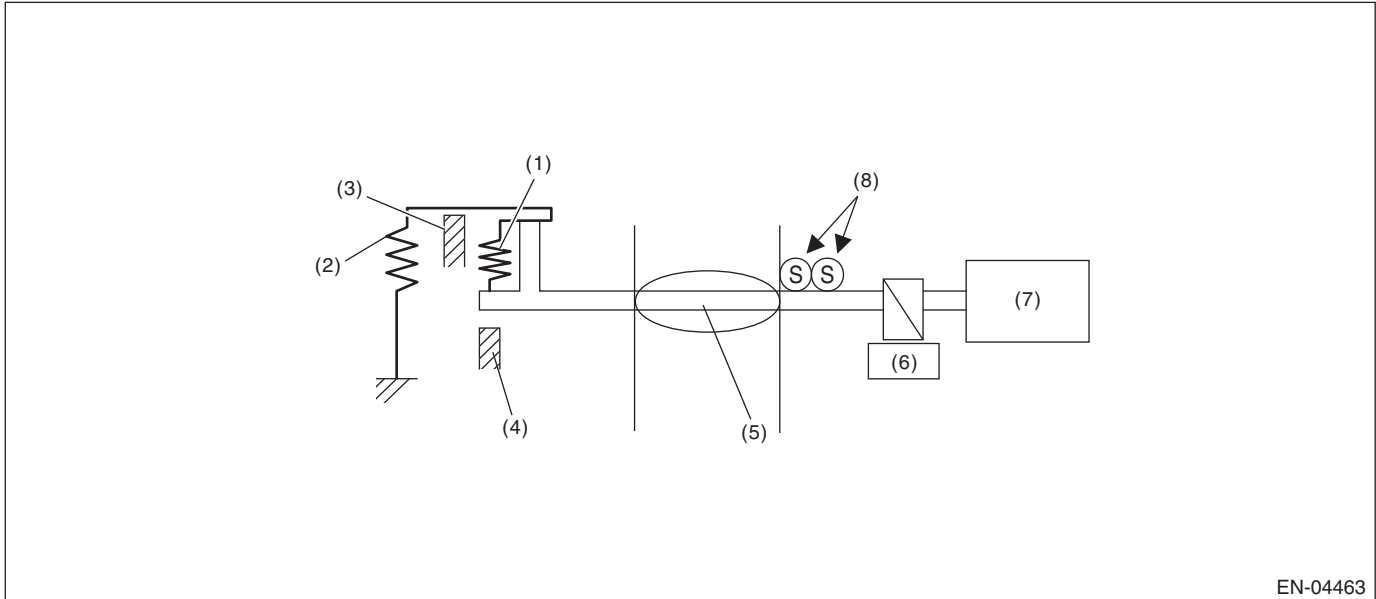
Time Needed for Diagnosis: Less than 1 second

DS: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-04463

(1) Opener spring	(4) Full closed stopper	(7) DC motor
(2) Return spring	(5) Throttle valve	(8) Main and sub throttle position sensor
(3) Intermediate stopper	(6) Gear	

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 6 \text{ V}$
Throttle position sensor	Normal

4. GENERAL DRIVING CYCLE

- Ignition switch ON → OFF
- Ignition switch OFF → ON (Only after clearing memory)

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Opening variation after continuity is set to OFF	$< 2^{\circ}$

Time Needed for Diagnosis: 24 ms

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

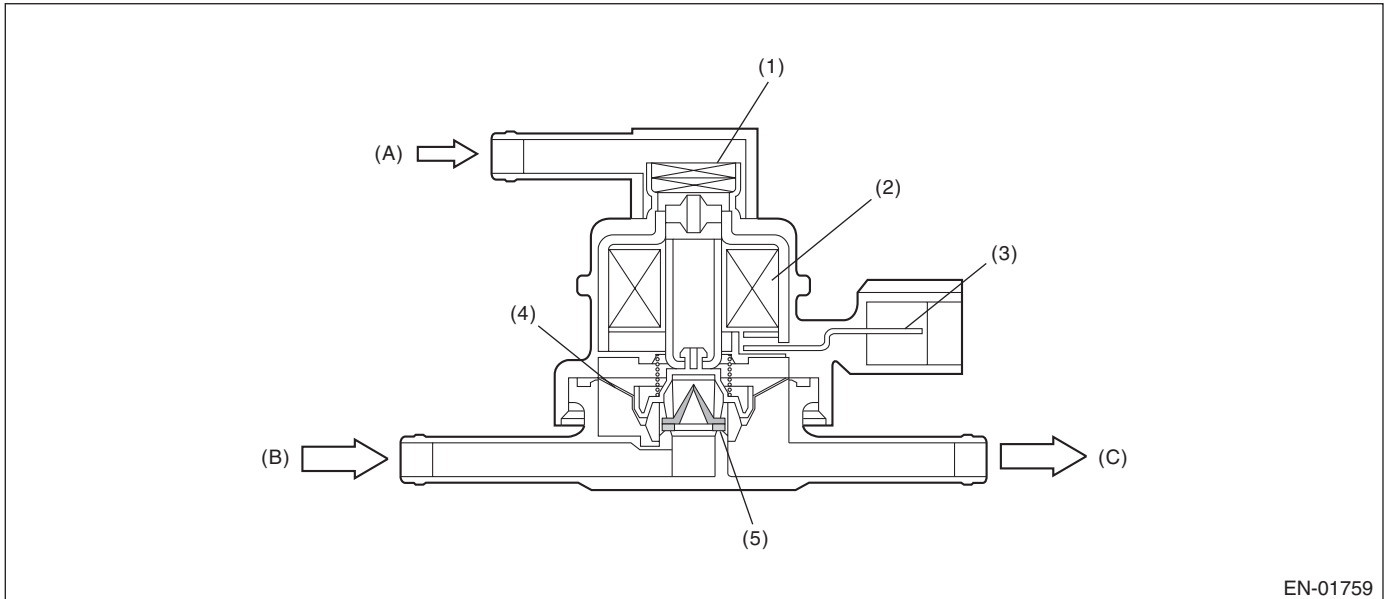
Malfunction Criteria	Threshold Value
Opening variation after continuity is set to OFF	$\geq 2^{\circ}$

Time Needed for Diagnosis: 3400 ms

DT: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

(A) Atmospheric pressure

(B) Shut-off valve

(C) To fuel tank

(1) Filter

(3) Connector terminal

(5) Valve

(2) Coil

(4) Diaphragm

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	≥ 1 s
Terminal output voltage when ECM outputs OFF signal	Low

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	≥ 1 s
Terminal output voltage when ECM outputs OFF signal	High

Time Needed for Diagnosis: Less than 1 second

**DU:DTC P1410 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE
STUCK OPEN****1. OUTLINE OF DIAGNOSIS**

Always detect abnormality that both combination valve electromagnetic valve and the reed valve are open failure.

Calculate the integrated value of Max./Min. value and output voltage deviation of the secondary air delivery pipe pressure sensor output voltage in a given time after engine start. Judge as NG if the integrated value and the difference between Max. and Min. values are large.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Engine speed	≥ 500 rpm and < 10000 rpm
Elapsed time after starting the engine	≥ 9000 ms
After secondary air system stops	≥ 9000 ms
Amount of intake air	≥ 2 g/s (0.07 oz/s) and < 400 g/s (14.11 oz/s)
Battery voltage	≥ 10.9 V
Engine load	> 0 g/rev
After fuel cut	≥ 1000 ms

3. GENERAL DRIVING CYCLE

Perform continuous diagnosis when air flow amount is large during the secondary air pump stop after engine start.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

4. DIAGNOSTIC METHOD

When both combination valve electromagnetic valve and the reed valve are open failure, the failure appears as pulses in the secondary air delivery pipe pressure sensor output. Detect abnormality by capturing these pulses using the following method.

• Abnormality Judgment

Calculate Max./Min. value of the secondary air delivery pipe pressure sensor output voltage and the sum of the output voltage deviation for the given time. Compare the difference between Max. and Min. values with threshold value and also compare the sum value with the threshold value. If both values exceed the threshold value, count up NG counter and then judge as NG if the counter reaches the given times.

Judgment Value

Malfunction Criteria	Threshold Value
Pipe inner pressure difference between Max. and Min.	> 0.05 V
Sum of the pipe inner pressure variation value every 4 milliseconds	> 5 V
Barometric pressure variation value	< 26.7 kPa (200 mmHg, 7.9 inHg)

Time Needed for Diagnosis: 2000 ms × 20 time(s)

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

• Normality Judgment

Judge as OK and clear NG if neither exceeds the threshold value, or if either of the two exceeds the threshold value.

Judgment Value

Malfunction Criteria	Threshold Value
Pipe inner pressure difference between Max. and Min.	≤ 0.05 V
Sum of the pipe inner pressure variation value every 4 milliseconds	≤ 5 V

Time Needed for Diagnosis: 2000 ms

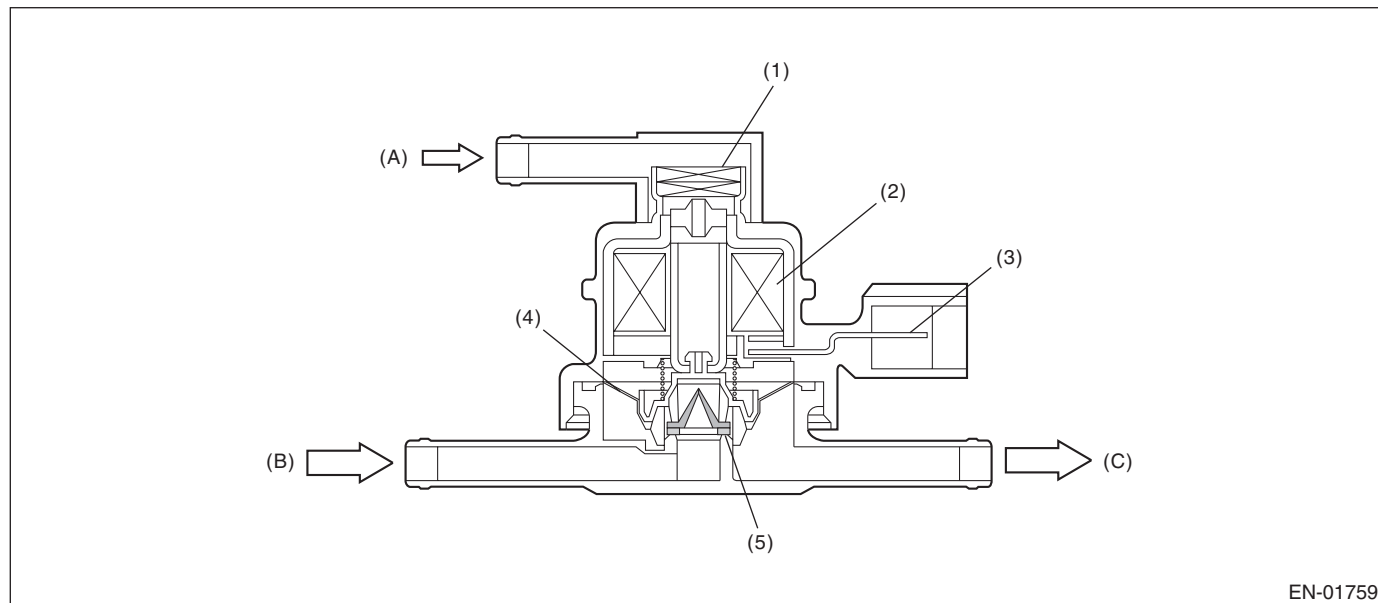
DV:DTC P1420 FUEL TANK PRESSURE CONTROL SOL. VALVE CIRCUIT HIGH

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



(A) Atmospheric pressure

(B) Shut-off valve

(C) To fuel tank

(1) Filter

(3) Connector terminal

(5) Valve

(2) Coil

(4) Diaphragm

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	≥ 1 s
Terminal output voltage when ECM outputs ON signal	High

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

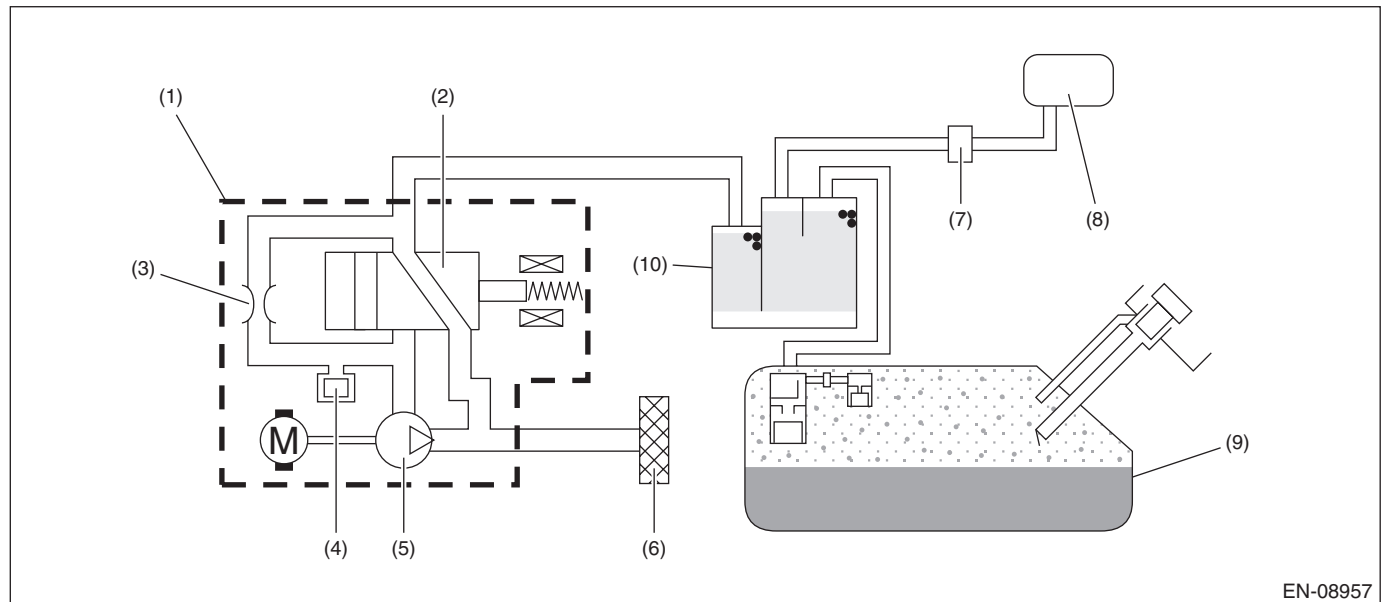
Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Elapsed time after starting the engine	≥ 1 s
Terminal output voltage when ECM outputs ON signal	Low

Time Needed for Diagnosis: Less than 1 second

DW:DTC P1449 EVAPORATIVE EMISSION CONT. SYS. AIR FILTER CLOG**1. OUTLINE OF DIAGNOSIS**

Detect the drain filter clogging by the pressure change during purge introduction.

Judge as drain filter clogging malfunction if the pressure in the evaporative emission system piping suddenly decreases by the purging.

2. COMPONENT DESCRIPTION

(1) ELCM	(5) Vacuum pump	(9) Fuel tank
(2) Switching valve	(6) Drain filter	(10) Canister
(3) Reference orifice (0.02 inch orifice)	(7) Purge control solenoid valve	
(4) Pressure sensor	(8) Intake manifold	

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Elapsed time after starting the engine	$\geq 20000 \text{ ms}$
Continuous time of $ \text{Pressure sensor output value} - \text{Pressure sensor output value 64 ms ago} \leq 0.7 \text{ kPa (5 mmHg, 0.2 inHg)}$	$\geq 5120 \text{ ms} + 13000 \text{ ms}$
Establishing time for following conditions	$\geq 10000 \text{ ms}$
• ELCM vacuum pump	Not in operation
• ELCM switching valve	Open

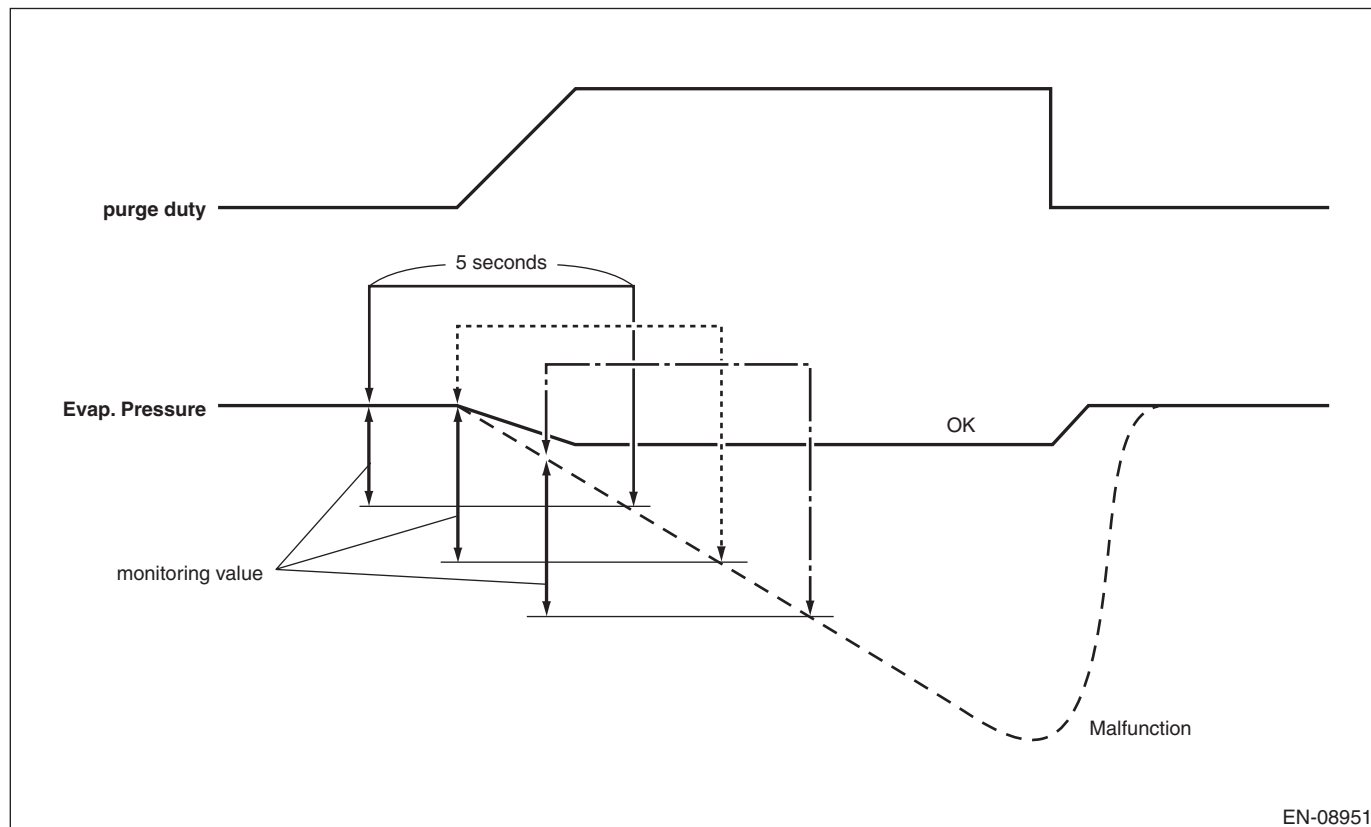
4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously when purging is performed after 20000 ms have passed since the engine started.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD



EN-08951

Calculate the difference between the ELCM pressure sensor output value as of 5 seconds ago and the current one, and if the value is greater than judgment value, detect and judge as filter clogging trouble.

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Pressure sensor output value as of 5 seconds ago – Current pressure sensor output value	> Value from Map
Number of above conditions established	> 2 time(s)

Map

Vehicle speed km/h (MPH)	0 (0)	20 (12.4)	40 (24.9)	60 (37.3)	80 (49.7)	100 (62.1)	120 (74.6)	300 (186.4)
Pressure sensor output value as of 5 seconds ago – Current pressure sensor output value kPa (mmHg, inHg)	0.8 (5.864 , 0.2)	0.8 (5.864 , 0.2)	0.9 (6.757 , 0.3)	1 (7.649 , 0.3)	1 (7.649 , 0.3)	1 (7.649 , 0.3)	1 (7.649 , 0.3)	1.6 (11.647 , 0.5)

Time Needed for Diagnosis: Approx. 5 seconds

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Pressure sensor output value as of 5 seconds ago – Current pressure sensor output value	≤ Value from Map

DX:DTC P1451 EVAPORATIVE EMISSION CONT. SYS.

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0455. <Ref. to GD(H4DOTC)-161, DTC P0455 EVAPORATIVE EMISSION SYSTEM LEAK DETECTED (LARGE LEAK), Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

DY:DTC P2004 INTAKE MANIFOLD RUNNER CONTROL STUCK OPEN (BANK 1)

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of tumble generator valve motor function.

Judge open fixing malfunction when the opening degree is large even after finishing the tumble generator valve closing driving.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Engine coolant temperature	$\geq -40 \text{ }^{\circ}\text{C}$ ($-40 \text{ }^{\circ}\text{F}$)
Ambient air temperature	$\geq -40 \text{ }^{\circ}\text{C}$ ($-40 \text{ }^{\circ}\text{F}$)

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Tumble generator valve opening	$\geq 64.3 \text{ }^{\circ}$
Tumble generator valve "close" signal output	$\geq 3200 \text{ ms}$

Time Needed for Diagnosis: 3000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Tumble generator valve opening	$< 64.3 \text{ }^{\circ}$
Tumble generator valve "close" signal output	$\geq 3200 \text{ ms}$

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

DZ:DTC P2005 INTAKE MANIFOLD RUNNER CONTROL STUCK OPEN (BANK 2)

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of tumble generator valve motor function.

Judge open fixing malfunction when the opening degree is large even after finishing the tumble generator valve closing driving.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Engine coolant temperature	$\geq -40 \text{ }^{\circ}\text{C}$ ($-40 \text{ }^{\circ}\text{F}$)
Ambient air temperature	$\geq -40 \text{ }^{\circ}\text{C}$ ($-40 \text{ }^{\circ}\text{F}$)

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Tumble generator valve opening	$\geq 64.3 \text{ }^{\circ}$
Tumble generator valve "close" signal output	$\geq 3200 \text{ ms}$

Time Needed for Diagnosis: 3000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Tumble generator valve opening	$< 64.3 \text{ }^{\circ}$
Tumble generator valve "close" signal output	$\geq 3200 \text{ ms}$

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

EA:DTC P2006 INTAKE MANIFOLD RUNNER CONTROL STUCK CLOSED (BANK 1)

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of tumble generator valve motor function.

Judge close fixing malfunction when the opening degree is small even after finishing the tumble generator valve open driving.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Engine coolant temperature	$\geq -40 \text{ }^{\circ}\text{C}$ ($-40 \text{ }^{\circ}\text{F}$)
Ambient air temperature	$\geq -40 \text{ }^{\circ}\text{C}$ ($-40 \text{ }^{\circ}\text{F}$)

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Tumble generator valve opening	$< 64.3 \text{ }^{\circ}$
Tumble generator valve "open" signal output	$\geq 4600 \text{ ms}$

Time Needed for Diagnosis: 3000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Tumble generator valve opening	$\geq 64.3 \text{ }^{\circ}$
Tumble generator valve "open" signal output	$\geq 4600 \text{ ms}$

Time Needed for Diagnosis: Less than 1 second

**EB:DTC P2007 INTAKE MANIFOLD RUNNER CONTROL STUCK CLOSED
(BANK 2)****1. OUTLINE OF DIAGNOSIS**

Detect the malfunction of tumble generator valve motor function.

Judge close fixing malfunction when the opening degree is small even after finishing the tumble generator valve open driving.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 10.9 \text{ V}$
Engine coolant temperature	$\geq -40 \text{ }^{\circ}\text{C}$ ($-40 \text{ }^{\circ}\text{F}$)
Ambient air temperature	$\geq -40 \text{ }^{\circ}\text{C}$ ($-40 \text{ }^{\circ}\text{F}$)

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD**• Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Tumble generator valve opening	$< 64.3 \text{ }^{\circ}$
Tumble generator valve "open" signal output	$\geq 4600 \text{ ms}$

Time Needed for Diagnosis: 3000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Tumble generator valve opening	$\geq 64.3 \text{ }^{\circ}$
Tumble generator valve "open" signal output	$\geq 4600 \text{ ms}$

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

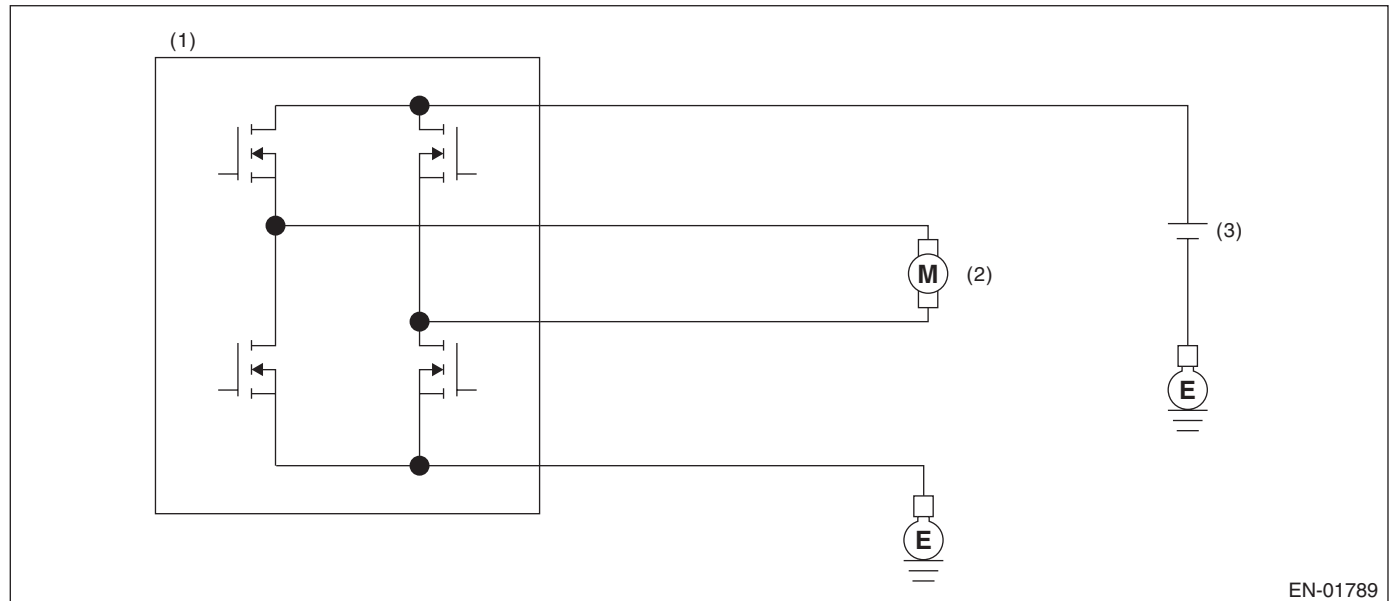
EC:DTC P2008 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT / OPEN (BANK 1)

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of tumble generator valve motor.

Judge as NG when the open signal is sent from IC after tumble generator valve driving IC diagnosis.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)

(2) Tumble generator valve

(3) Battery

3. ENABLE CONDITIONS

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

At the main IC, check the sent signal at each timing which occurs immediately after the tumble generator valve output is set to ON → OFF, and judge open NG when the open NG signal is sent $96\text{ ms} \times 20\text{ time(s)}$ in a row.

Judgment Value

Malfunction Criteria	Threshold Value
Open NG signal input	Low

Time Needed for Diagnosis: $96\text{ ms} \times 20\text{ time(s)}$

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

• Normality Judgment

Judge as OK and clear the NG when the OK signal is sent.

Judgment Value

Malfunction Criteria	Threshold Value
Open NG signal input	High

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

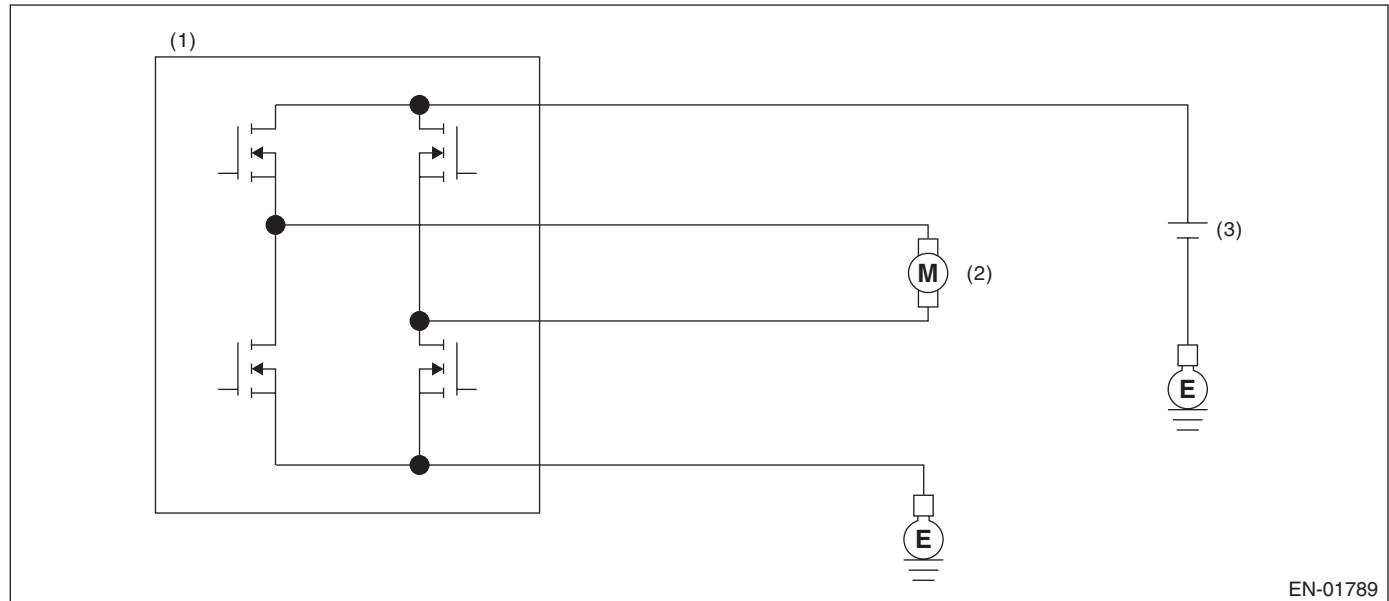
ED:DTC P2009 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT LOW (BANK 1)

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of tumble generator valve motor.

Judge as NG when the overcurrent signal is sent from IC after tumble generator valve driving IC diagnosis.

2. COMPONENT DESCRIPTION



(1) Engine control module (ECM)

(2) Tumble generator valve

(3) Battery

3. ENABLE CONDITIONS

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

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

• Abnormality Judgment

At the main IC, check the sent signal at each timing which occurs just before the tumble generator valve output is set to ON → OFF, and judge open NG when the open NG signal is sent $96 \text{ ms} \times 10 \text{ time(s)}$ in a row.

Judgment Value

Malfunction Criteria	Threshold Value
Overcurrent NG signal input	Low

Time Needed for Diagnosis: $96 \text{ ms} \times 10 \text{ time(s)}$

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

• Normality Judgment

Judge as OK and clear the NG when the OK signal is sent.

Judgment Value

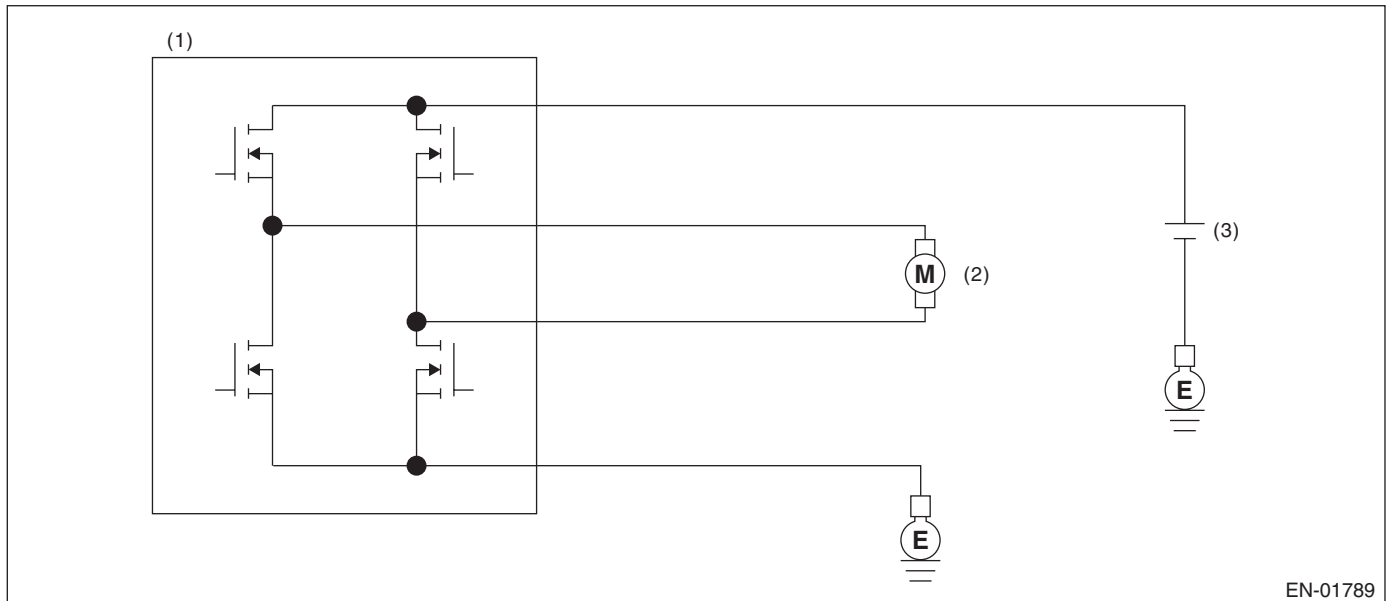
Malfunction Criteria	Threshold Value
Overcurrent NG signal input	High

Time Needed for Diagnosis: Less than 1 second

**EE:DTC P2011 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT / OPEN
(BANK 2)****1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of tumble generator valve motor.

Judge as NG when the open signal is sent from IC after tumble generator valve driving IC diagnosis.

2. COMPONENT DESCRIPTION

(1) Engine control module (ECM)

(2) Tumble generator valve

(3) Battery

3. ENABLE CONDITIONS

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

At the main IC, check the sent signal at each timing which occurs immediately after the tumble generator valve output is set to ON → OFF, and judge open NG when the open NG signal is sent $96\text{ ms} \times 20\text{ time(s)}$ in a row.

Judgment Value

Malfunction Criteria	Threshold Value
Open NG signal input	Low

Time Needed for Diagnosis: $96\text{ ms} \times 20\text{ time(s)}$

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

• Normality Judgment

Judge as OK and clear the NG when the OK signal is sent.

Judgment Value

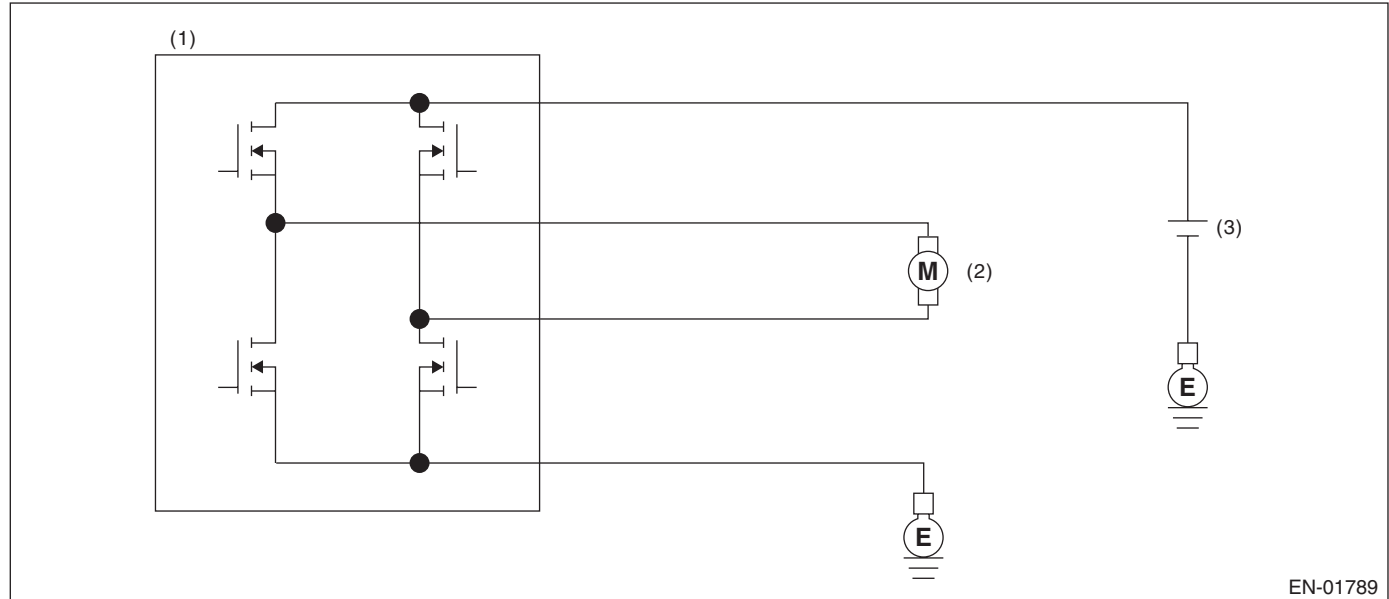
Malfunction Criteria	Threshold Value
Open NG signal input	High

Time Needed for Diagnosis: Less than 1 second

EF:DTC P2012 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT LOW (BANK 2)**1. OUTLINE OF DIAGNOSIS**

Detect the open or short circuit of tumble generator valve motor.

Judge as NG when the overcurrent signal is sent from IC after tumble generator valve driving IC diagnosis.

2. COMPONENT DESCRIPTION

(1) Engine control module (ECM)

(2) Tumble generator valve

(3) Battery

3. ENABLE CONDITIONS

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

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD**• Abnormality Judgment**

At the main IC, check the sent signal at each timing which occurs just before the tumble generator valve output is set to ON → OFF, and judge open NG when the open NG signal is sent $96 \text{ ms} \times 10 \text{ time(s)}$ in a row.

Judgment Value

Malfunction Criteria	Threshold Value
Overcurrent NG signal input	Low

Time Needed for Diagnosis: $96 \text{ ms} \times 10 \text{ time(s)}$

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

• Normality Judgment

Judge as OK and clear the NG when the OK signal is sent.

Judgment Value

Malfunction Criteria	Threshold Value
Overcurrent NG signal input	High

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

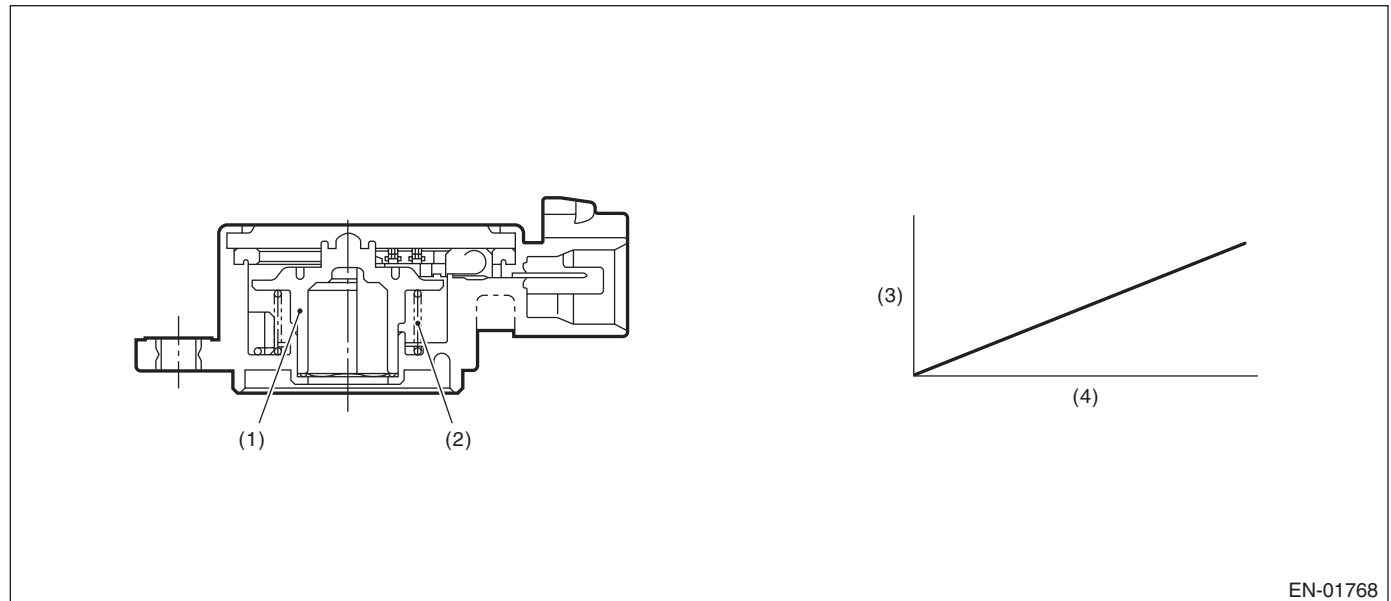
EG:DTC P2016 TUMBLE GENERATED VALVE POSITION SENSOR 1 CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of tumble generator valve position sensor.

Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



EN-01768

(1) Rotor

(3) Voltage (V)

(4) Tumble generator valve opening (°)

(2) Return spring

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.264 V

Time Needed for Diagnosis: 500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 0.264 V

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

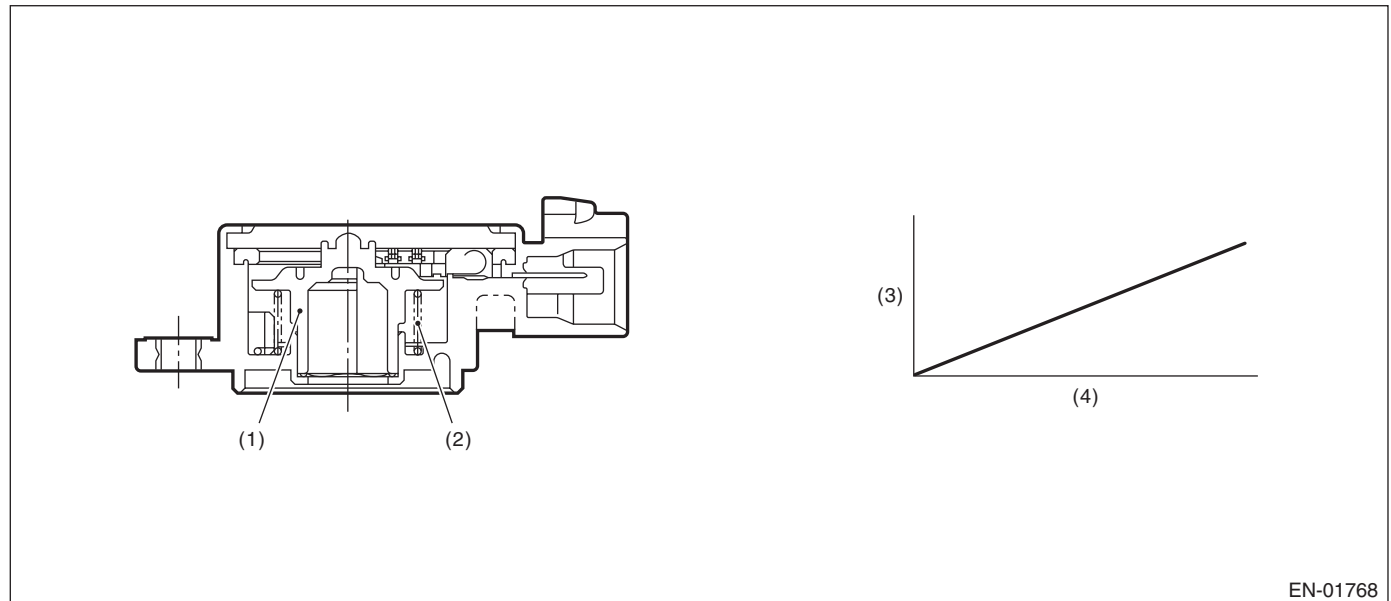
EH:DTC P2017 TUMBLE GENERATED VALVE POSITION SENSOR 1 CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of tumble generator valve position sensor.

Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



EN-01768

(1) Rotor

(3) Voltage (V)

(4) Tumble generator valve opening (°)

(2) Return spring

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 4.783 V

Time Needed for Diagnosis: 500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 4.783 V

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

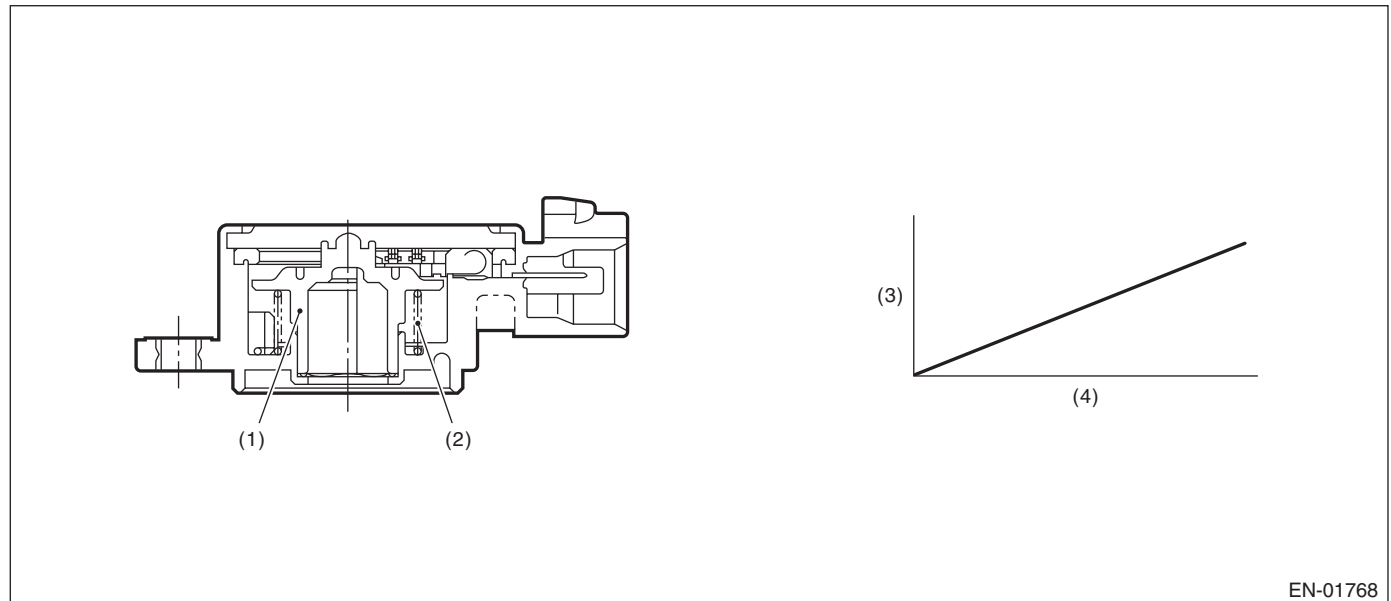
EI: DTC P2021 TUMBLE GENERATED VALVE POSITION SENSOR 2 CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of tumble generator valve position sensor.

Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



EN-01768

(1) Rotor

(3) Voltage (V)

(4) Tumble generator valve opening (°)

(2) Return spring

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	< 0.264 V

Time Needed for Diagnosis: 500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	≥ 0.264 V

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

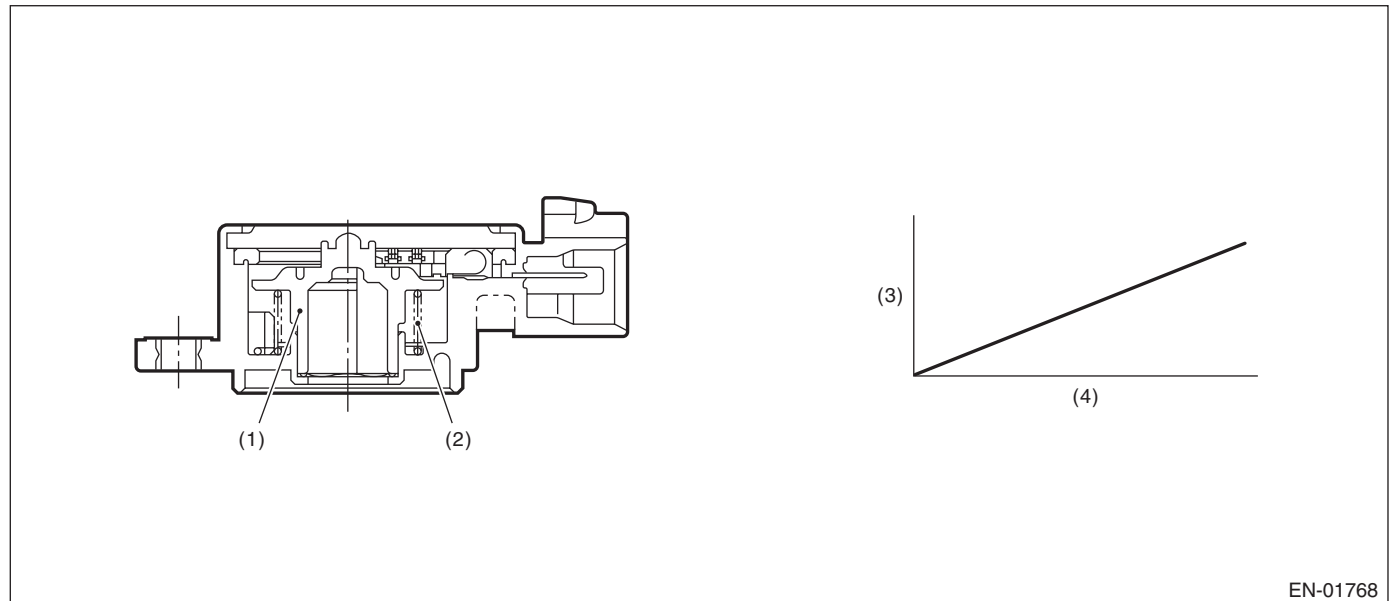
EJ:DTC P2022 TUMBLE GENERATED VALVE POSITION SENSOR 2 CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of tumble generator valve position sensor.

Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



EN-01768

(1) Rotor

(3) Voltage (V)

(4) Tumble generator valve opening (°)

(2) Return spring

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	$\geq 4.783 \text{ V}$

Time Needed for Diagnosis: 500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Output voltage	$< 4.783 \text{ V}$

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

EK:DTC P2088 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 1)

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the oil flow control solenoid valve.

Judge as NG when the current is small even though the duty signal is large.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 10.9 \text{ V}$
Oil flow control solenoid valve control duty	$\geq 99.61 \%$
Oil control solenoid valve control present current	$< 0.306 \text{ A}$

Time Needed for Diagnosis: 2000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 10.9 \text{ V}$
Target current value of the oil flow control solenoid valve	$\geq 0.14 \text{ A}$
Target current value of the oil flow control solenoid valve – oil flow control solenoid valve control current value	$< 0.08 \text{ A}$

Time Needed for Diagnosis: 2000 ms

EL:DTC P2089 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 1)**1. OUTLINE OF DIAGNOSIS**

Detect open or short circuit of oil flow control solenoid valve.

Judge as NG when the current is large even though the duty signal is small.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD**• Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 10.9 \text{ V}$
Oil flow control solenoid valve control duty	$< 0.39 \%$
Oil control solenoid valve control present current	$\geq 0.306 \text{ A}$

Time Needed for Diagnosis: 2000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 10.9 \text{ V}$
Target current value of the oil flow control solenoid valve – oil flow control solenoid valve control current value	$< 0.08 \text{ A}$

Time Needed for Diagnosis: 2000 ms

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

EM:DTC P2090 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 1)

1. OUTLINE OF DIAGNOSIS

Detect open or short circuit of the oil flow control solenoid valve.

Judge as NG when the current is small even though the duty signal is large.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Oil flow control solenoid valve control duty	≥ 99.61 %
Oil control solenoid valve control present current	< 0.306 A

Time Needed for Diagnosis: 2000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Target current value of the oil flow control solenoid valve	≥ 0.14 A
Target current value of the oil flow control solenoid valve – oil flow control solenoid valve control current value	< 0.08 A

Time Needed for Diagnosis: 2000 ms

EN:DTC P2091 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 1)**1. OUTLINE OF DIAGNOSIS**

Detect open or short circuit of oil flow control solenoid valve.

Judge as NG when the current is large even though the duty signal is small.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD**• Abnormality Judgment**

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 10.9 \text{ V}$
Oil flow control solenoid valve control duty	$< 0.39 \%$
Oil control solenoid valve control present current	$\geq 0.306 \text{ A}$

Time Needed for Diagnosis: 2000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	$\geq 10.9 \text{ V}$
Target current value of the oil flow control solenoid valve – oil flow control solenoid valve control current value	$< 0.08 \text{ A}$

Time Needed for Diagnosis: 2000 ms

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

EO:DTC P2092 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 2)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P2088. <Ref. to GD(H4DOTC)-234, DTC P2088 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

EP:DTC P2093 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 2)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P2089. <Ref. to GD(H4DOTC)-235, DTC P2089 INTAKE CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

EQ:DTC P2094 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 2)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P2090. <Ref. to GD(H4DOTC)-236, DTC P2090 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT LOW (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

ER:DTC P2095 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 2)

1. OUTLINE OF DIAGNOSIS

NOTE:

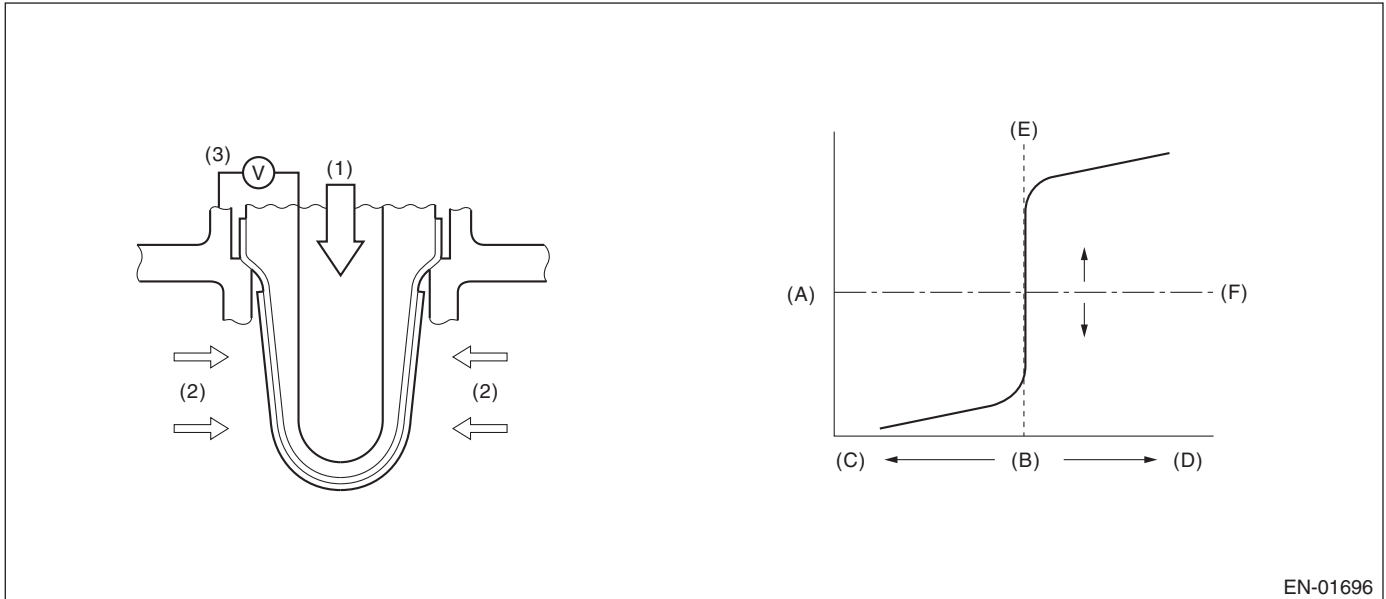
For the detection standard, refer to DTC P2091. <Ref. to GD(H4DOTC)-237, DTC P2091 EXHAUST CAMSHAFT POSITION ACTUATOR CONTROL CIRCUIT HIGH (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

ES:DTC P2096 POST CATALYST FUEL TRIM SYSTEM TOO LEAN (BANK 1)

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of fuel system from the size of the sub feedback learning value.
Control the sub feedback learning and judge as NG when the learning value is in the lean zone.

2. COMPONENT DESCRIPTION



EN-01696

(A) Electromotive force	(B) Air fuel ratio	(C) Lean
(D) Rich	(E) Theoretical air fuel ratio	(F) Comparative voltage
(1) Atmosphere	(2) Exhaust gas	(3) Electromotive force

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Conditions for carrying out the sub feedback learning	Completed
Continuous time when all conditions are established.	≥ 1 s

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously when the vehicle is idling or running at a constant speed of 80 km/h (50 MPH) or more.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Sub feedback learning value	< -0.024 (Models without SI-DRIVE) < -0.037 (Models with SI-DRIVE)

Time Needed for Diagnosis: 1 s × 1 time(s)

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Sub feedback learning value	≥ -0.024 + 0.004 (Models without SI-DRIVE) ≥ -0.037 + 0 (Models with SI-DRIVE)

Time Needed for Diagnosis: 1 s

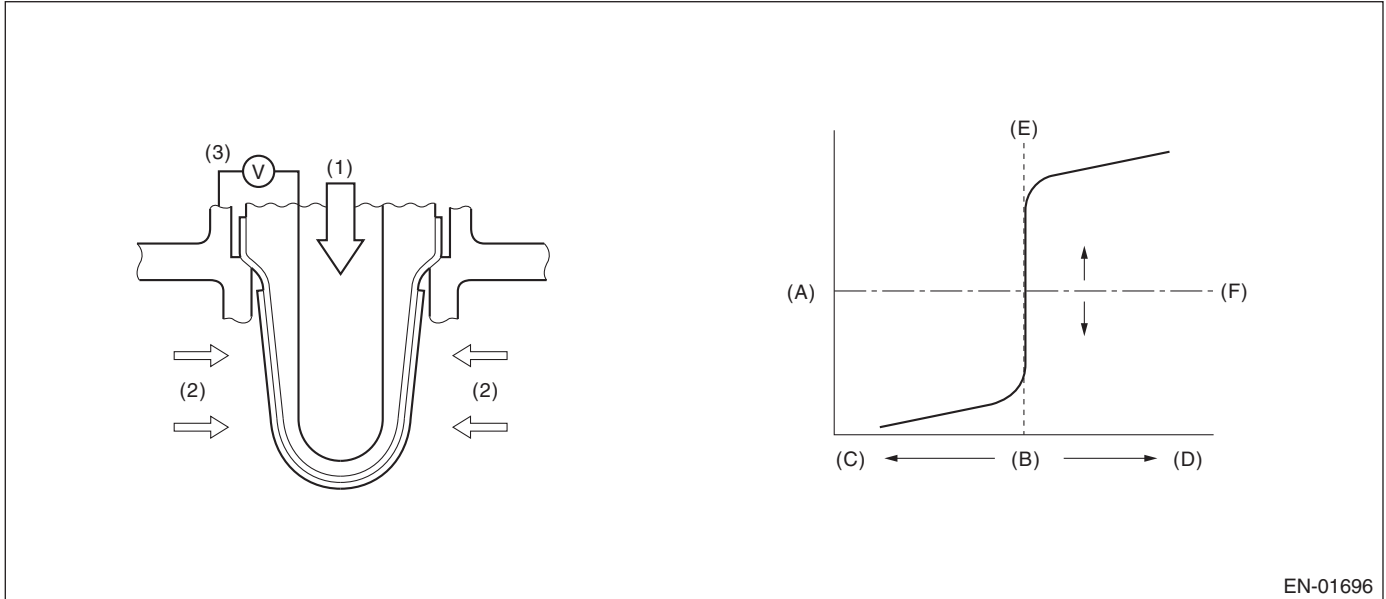
ET:DTC P2097 POST CATALYST FUEL TRIM SYSTEM TOO RICH (BANK 1)

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of fuel system from the size of the sub feedback learning value.

Sub feedback learning is being performed. When the learning value goes to the rich side, judge as NG.

2. COMPONENT DESCRIPTION



EN-01696

(A) Electromotive force

(B) Air fuel ratio

(C) Lean

(D) Rich

(E) Theoretical air fuel ratio

(F) Comparative voltage

(1) Atmosphere

(2) Exhaust gas

(3) Electromotive force

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Conditions for carrying out the sub feedback learning	Completed
Continuous time when all conditions are established.	≥ 1 s

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously when the vehicle is idling or running at a constant speed of 80 km/h (50 MPH) or more.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Sub feedback learning value	≥ 0.028 (Models without SI-DRIVE) ≥ 0.023 (Models with SI-DRIVE)

Time Needed for Diagnosis: 1 s × 1 time(s)

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Sub feedback learning value	$< 0.028 + -0.01$ (Models without SI-DRIVE) $< 0.023 + 0$ (Models with SI-DRIVE)

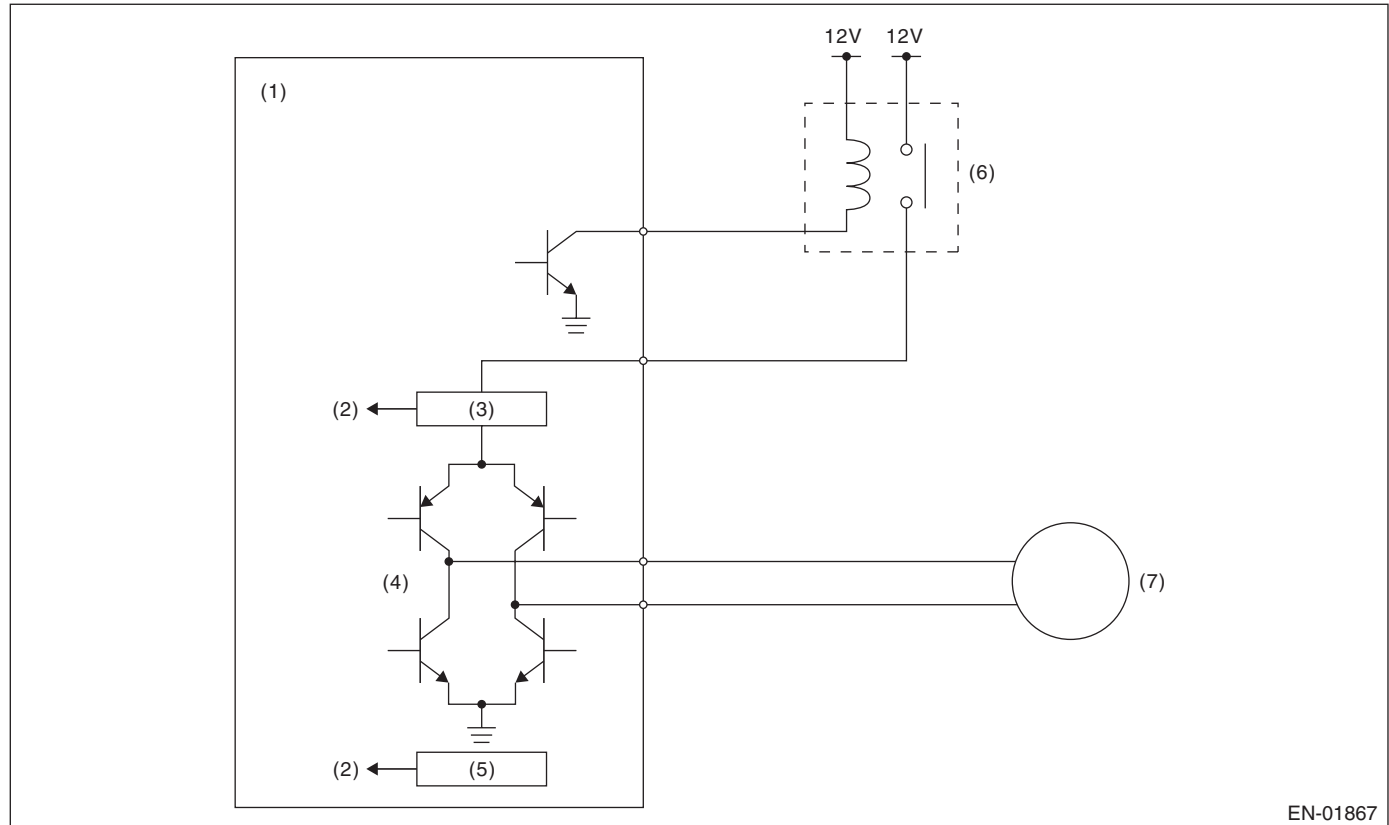
Time Needed for Diagnosis: 1 s

EU: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 CONDITIONS

Secondary Parameters	Enable Conditions
Under control of electronic throttle control	ON
CPU communication line sub → main normal judgment	Normal

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Motor current or Drive circuit inner temperature	> 8 A > 175°C (347°F)

Time Needed for Diagnosis: 512 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

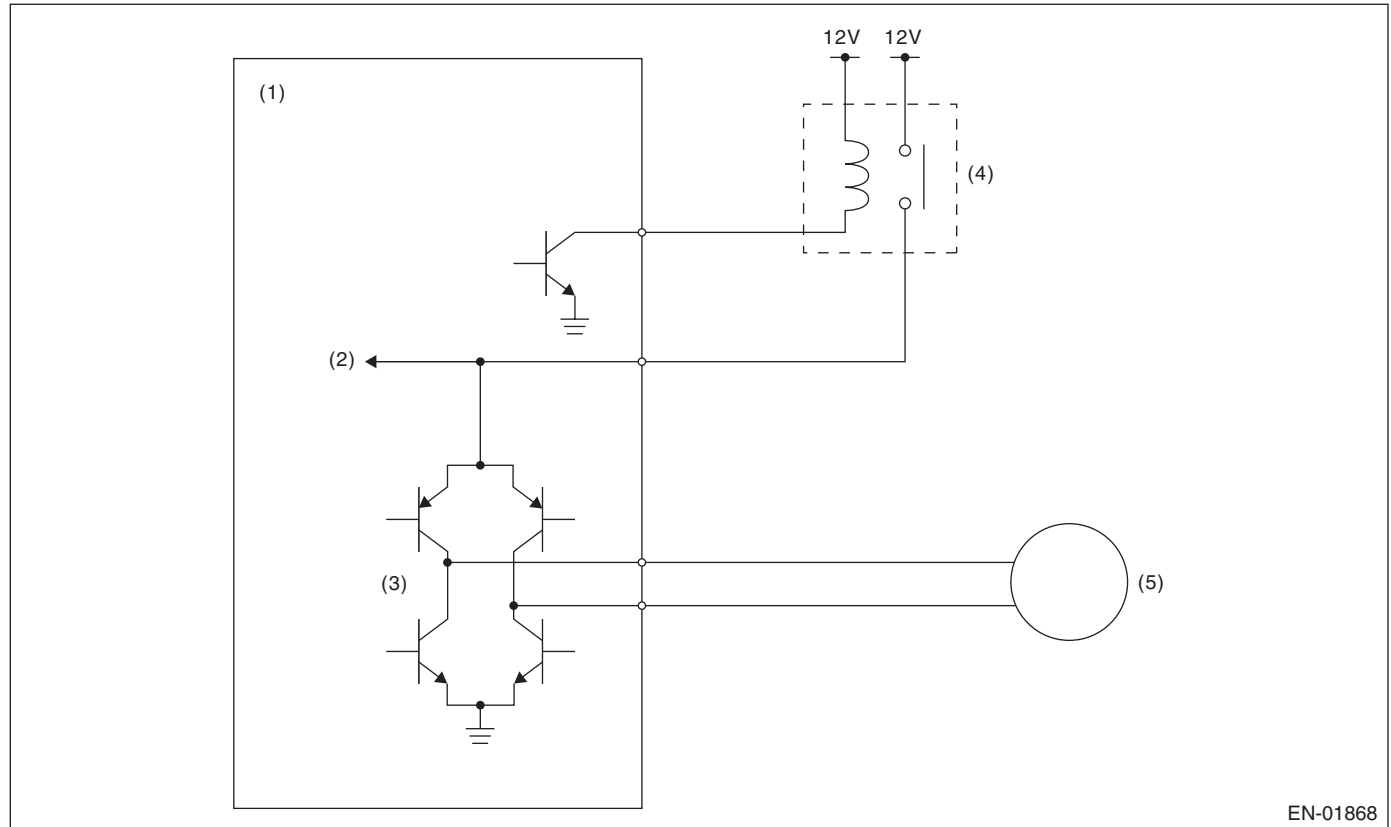
Judgment Value

Malfunction Criteria	Threshold Value
Motor current Drive circuit inner temperature	≤ 8 A ≤ 175°C (347°F)

Time Needed for Diagnosis: 2000 ms

EV: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 CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 11 \text{ V}$
Electronic throttle control relay output	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Motor power voltage	$\leq 5 \text{ V}$

Time Needed for Diagnosis: 352 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

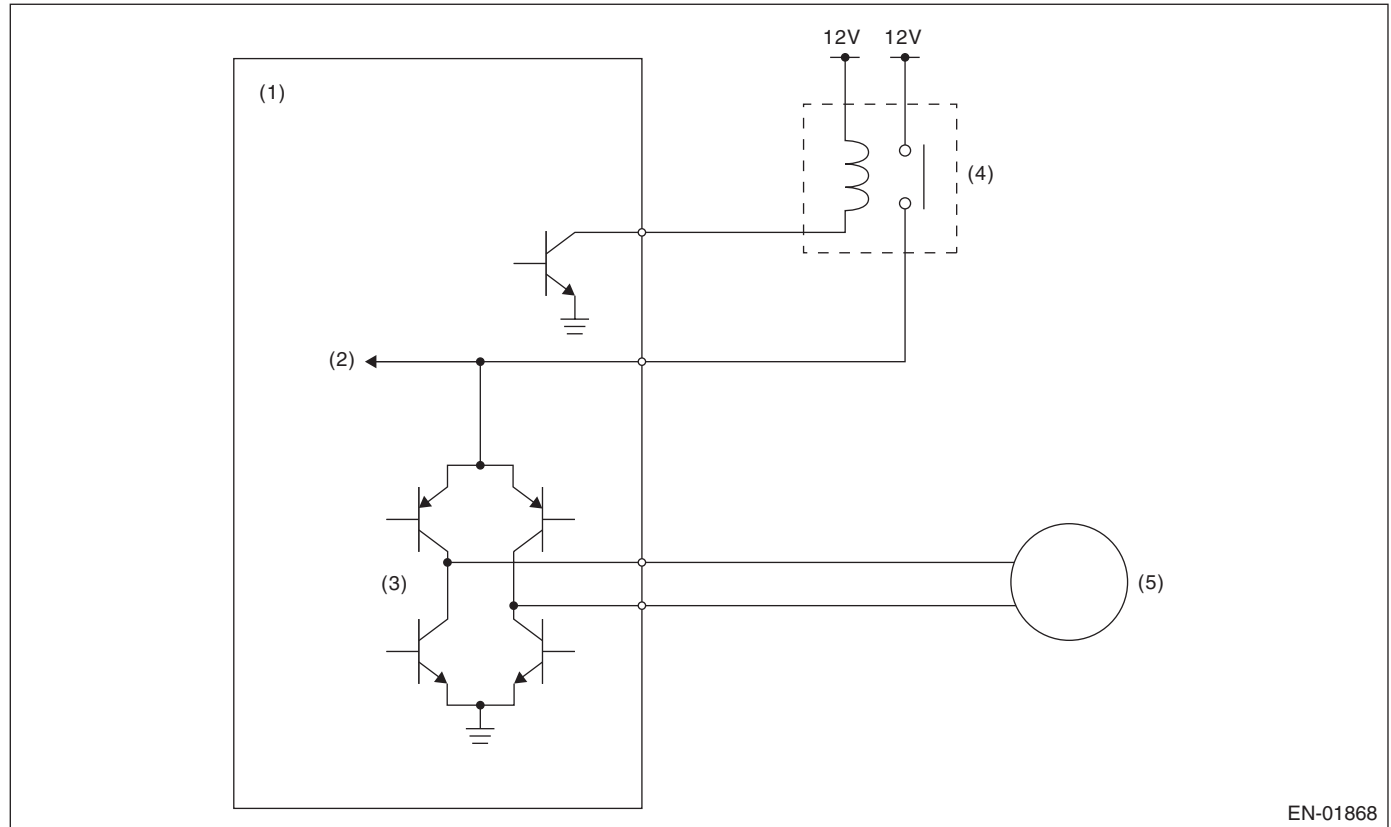
Judgment Value

Malfunction Criteria	Threshold Value
Motor power voltage	$> 5 \text{ V}$

Time Needed for Diagnosis: 2000 ms

EW: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 electronic 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 CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 6\text{ V}$
Electronic throttle control 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

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Motor power voltage	$\geq 5 \text{ V}$

Time Needed for Diagnosis: 600 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

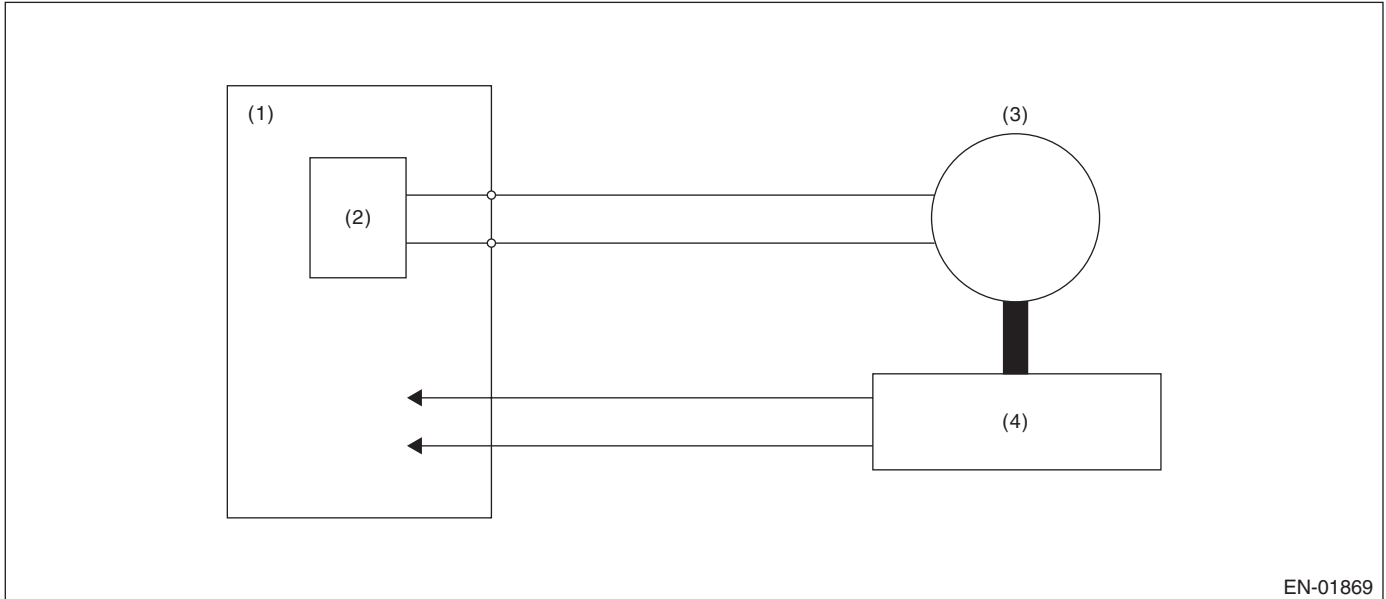
Judgment Value

Malfunction Criteria	Threshold Value
Motor power voltage	$< 5 \text{ V}$

Time Needed for Diagnosis: 400 ms

EX: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

(1) Engine control module (ECM)

(3) Motor

(4) Throttle position sensor

(2) Drive circuit

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition switch	ON → OFF
Ignition switch (only after clear memory)	OFF → ON

4. GENERAL DRIVING CYCLE

Perform the diagnosis at full closed point learning.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Throttle sensor opening angle at full close point learning	< 9.884 ° or > 20.116 °
or Throttle opening angle when the ignition switch is ON – Throttle minimum stop position	< 0.887 ° (models without SI-DRIVE) < 1.637 ° (models with SI-DRIVE)

Time Needed for Diagnosis: 8 ms — 80 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

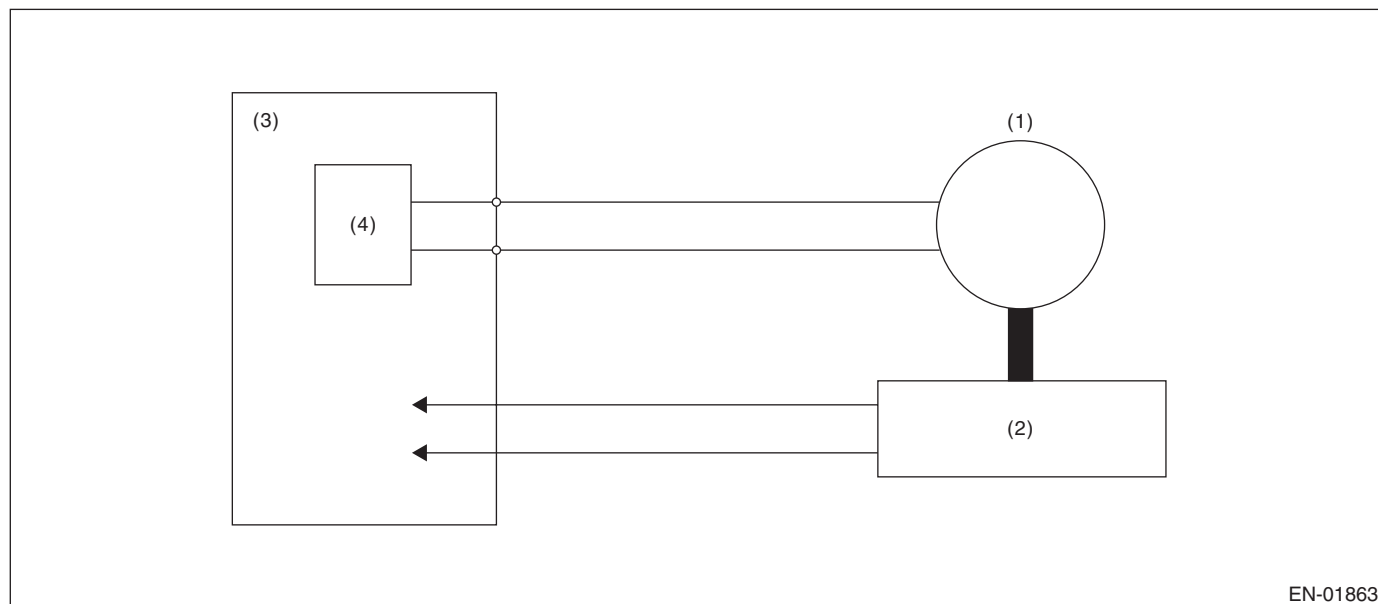
Judgment Value

Malfunction Criteria	Threshold Value
Throttle sensor opening angle at full close point learning	≥ 9.884 ° and ≤ 20.116 °
Throttle opening angle when the ignition switch is ON – Throttle minimum stop position	≥ 0.887 ° (models without SI-DRIVE) ≥ 1.637 ° (models with SI-DRIVE)

Time Needed for Diagnosis: 8 ms

EY:DTC P2119 THROTTLE ACTUATOR CONTROL THROTTLE BODY RANGE/ PERFORMANCE**1. OUTLINE OF DIAGNOSIS**

Judge as NG when the target opening angle and actual opening angle is mismatched or the current to motor is the specified duty or more for specified time continuously.

2. COMPONENT DESCRIPTION

EN-01863

(1) Motor

(3) Engine control module (ECM)

(4) Drive circuit

(2) Throttle position sensor

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition switch	ON
Normal operation of electronic throttle control	ON

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously when the electronic throttle control is operating.

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

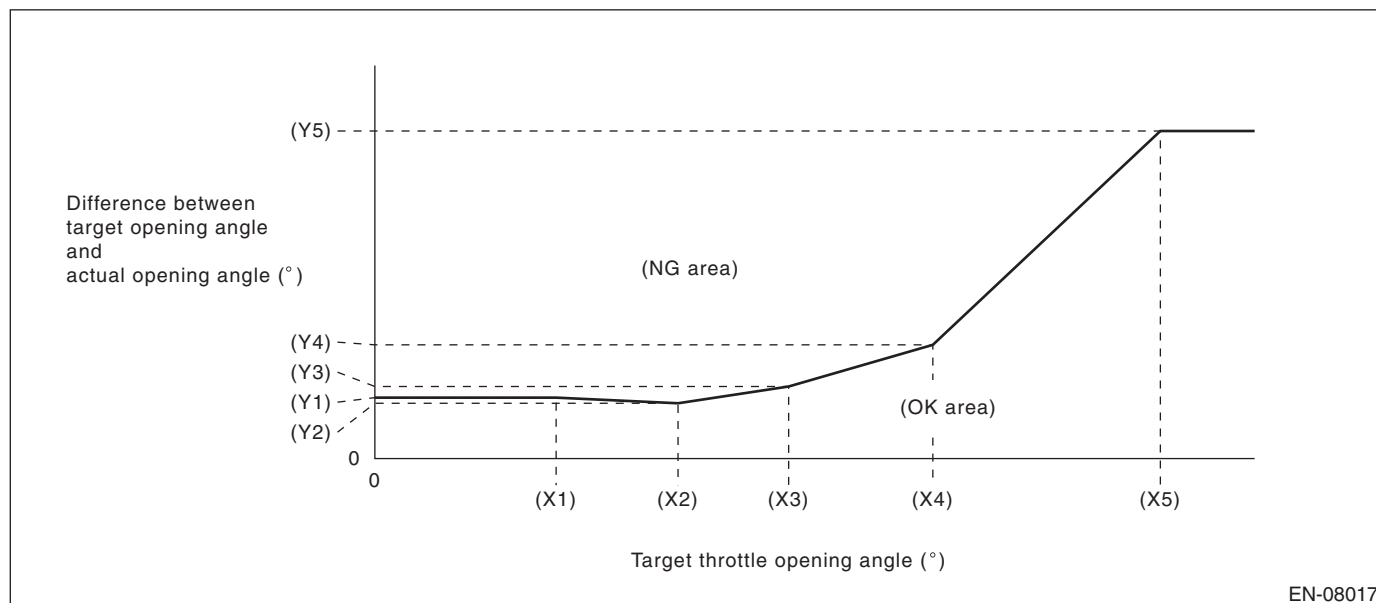
Malfunction Criteria	Threshold Value
Difference between target opening angle and actual opening angle	Within OK range of Details of Judgment value
Output duty to drive circuit	< 95 %

Time Needed for Diagnosis:

- Difference between target opening angle and actual opening angle:
 - NG judgment: See **Details of Judgment time**
 - OK judgment: 2000 ms
- Output duty to drive circuit: 2000 ms

Details of Judgment Value

Models without SI-DRIVE



EN-08017

(X1) 6.915 °
(X4) 21.285 °

(X2) 11.565 °
(X5) 29.965 °

(X3) 15.785 °

(Y1) 4.65 °
(Y4) 8.68 °

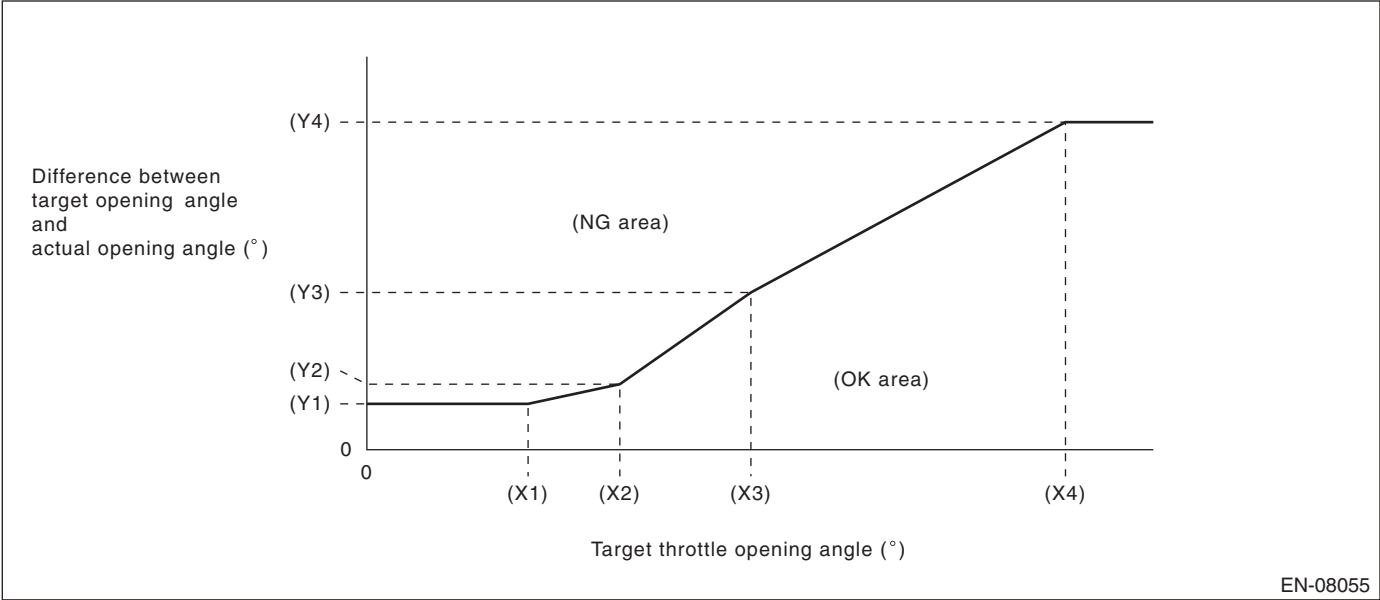
(Y2) 4.22 °
(Y5) 25 °

(Y3) 5.5 °

Diagnostic Trouble Code (DTC) Detecting Criteria

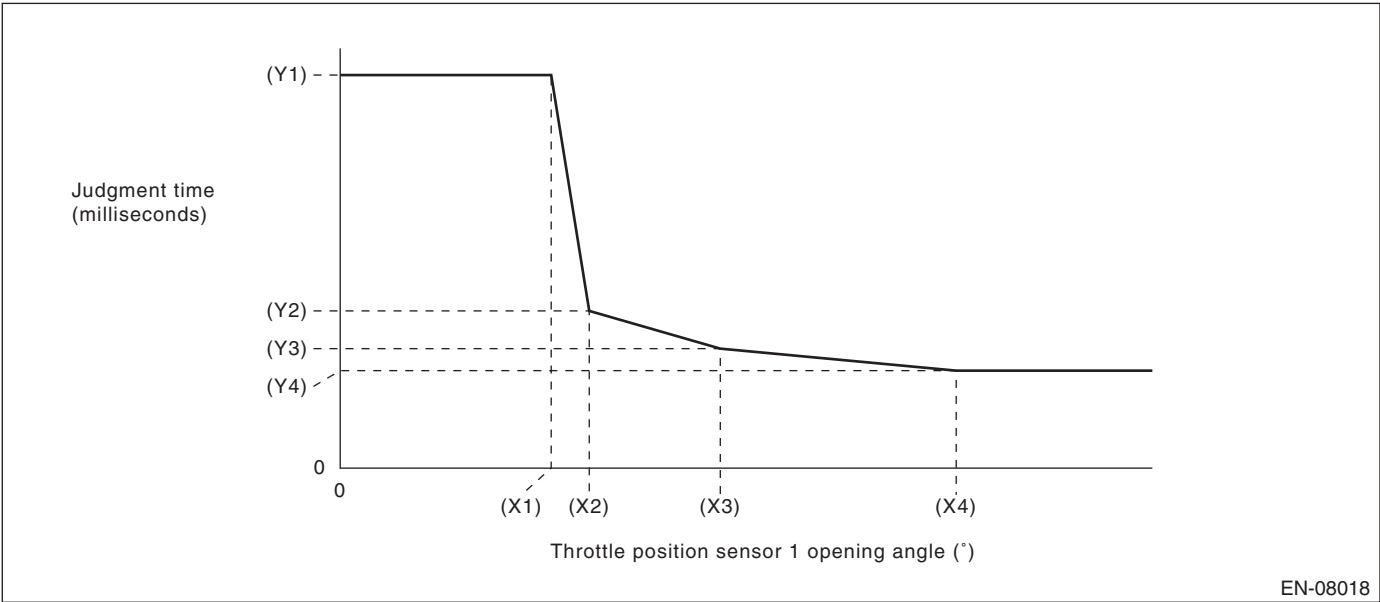
GENERAL DESCRIPTION

Models with SI-DRIVE



(X1) 6.15 °	(X2) 9.65 °	(X3) 14.65 °
(X4) 26.65 °		
(Y1) 3.5 °	(Y2) 5 °	(Y3) 12 °
(Y4) 25 °		

Details of Judgment time Models without SI-DRIVE

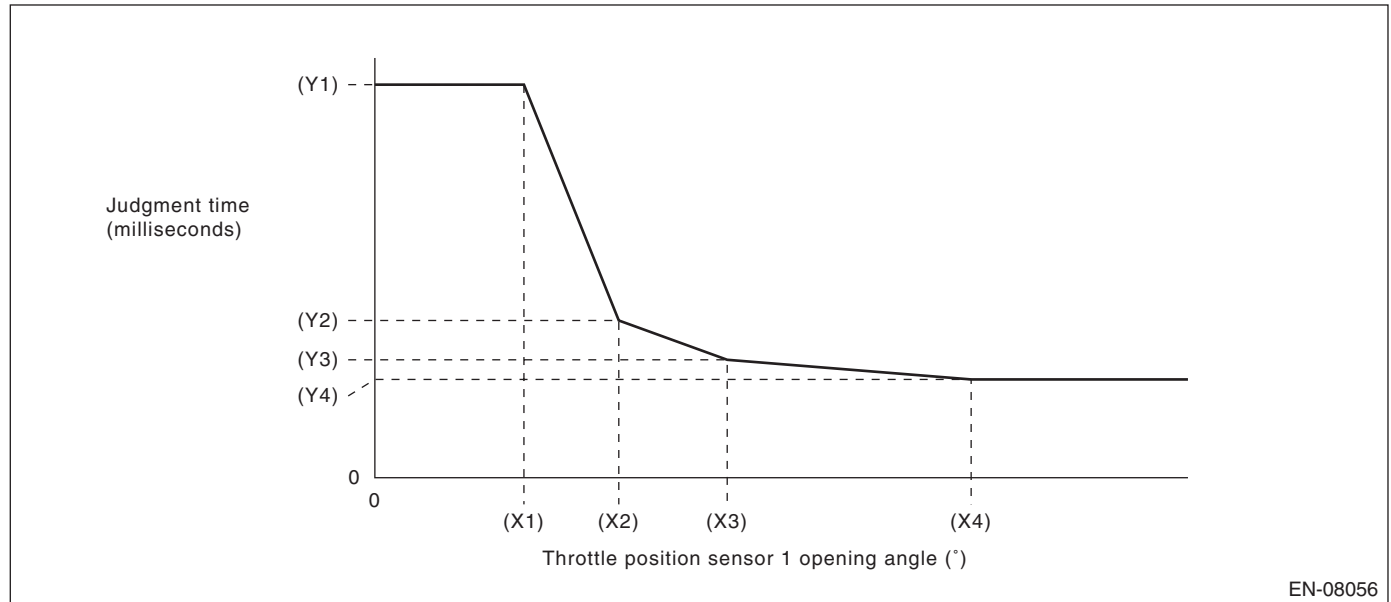


(X1) 8.049999237 °	(X2) 9.5 °	(X3) 14.5 °
(X4) 23.5 °		
(Y1) 1000 ms	(Y2) 400 ms	(Y3) 304 ms
(Y4) 248 ms		

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

Models with SI-DRIVE



(X1) 5.5 °

(X2) 9 °

(X3) 13 °

(X4) 22 °

(Y1) 1000 ms

(Y2) 400 ms

(Y3) 300 ms

(Y4) 250 ms

NOTE:

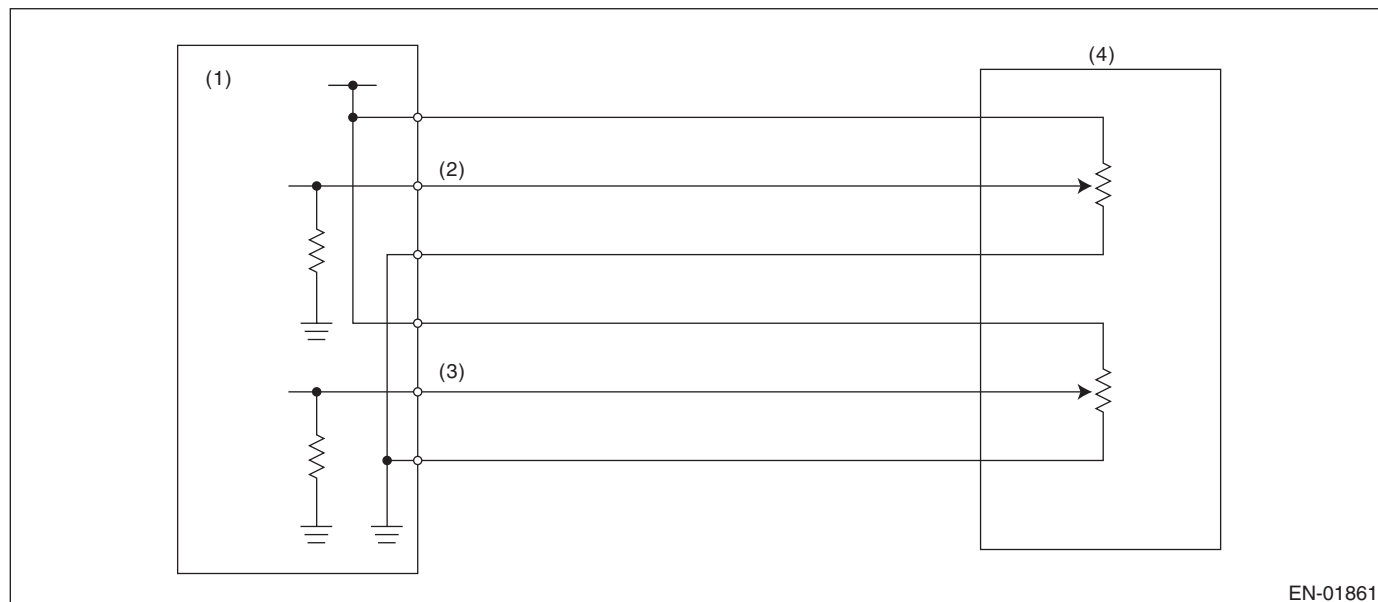
Judgment time when actual opening angle $\leq$ target opening angle is always 1000 milliseconds.

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

**EZ: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 out of specification.

2. COMPONENT DESCRIPTION

(1) Engine control module (ECM)

(3) Accelerator pedal position sensor
2 signal

(4) Accelerator pedal position sensor

(2) Accelerator pedal position sensor
1 signal

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	$\geq 6\text{ V}$

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 1 input voltage	< 0.301 V

Time Needed for Diagnosis: 100 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

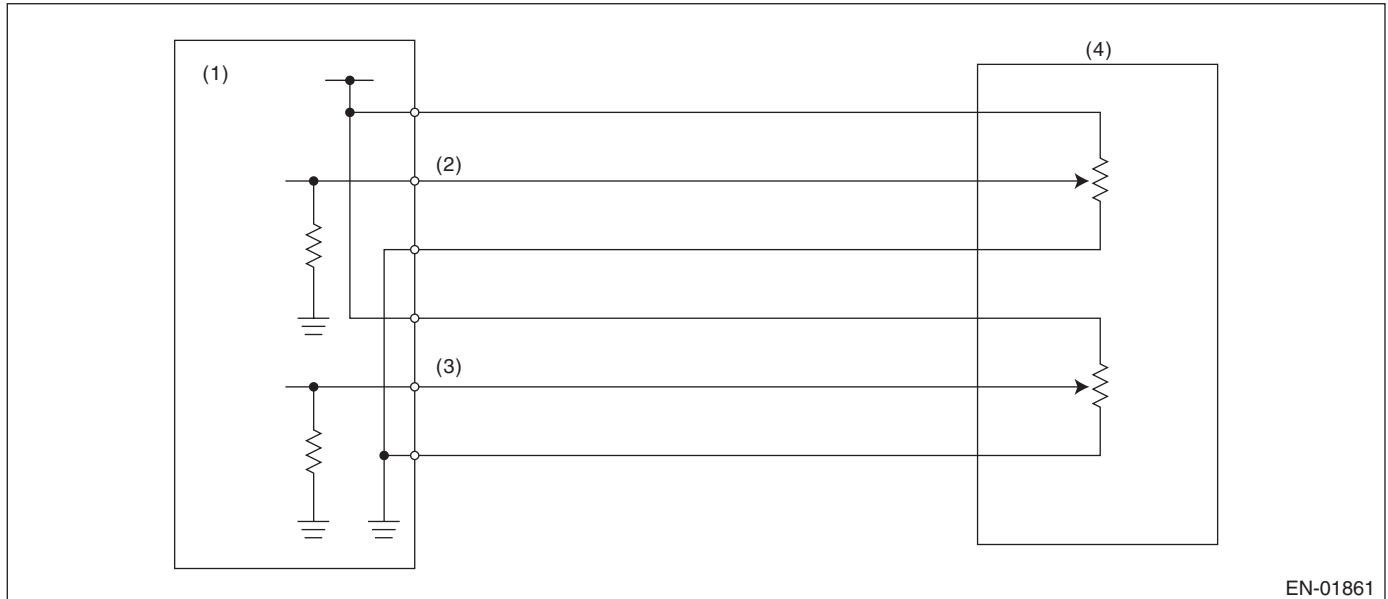
Malfunction Criteria	Threshold Value
Sensor 1 input voltage	≥ 0.301 V

Time Needed for Diagnosis: 100 ms

**FA: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 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 CONDITIONS

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	$\geq 6 \text{ V}$

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 1 input voltage	≥ 4.783 V

Time Needed for Diagnosis: 32 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

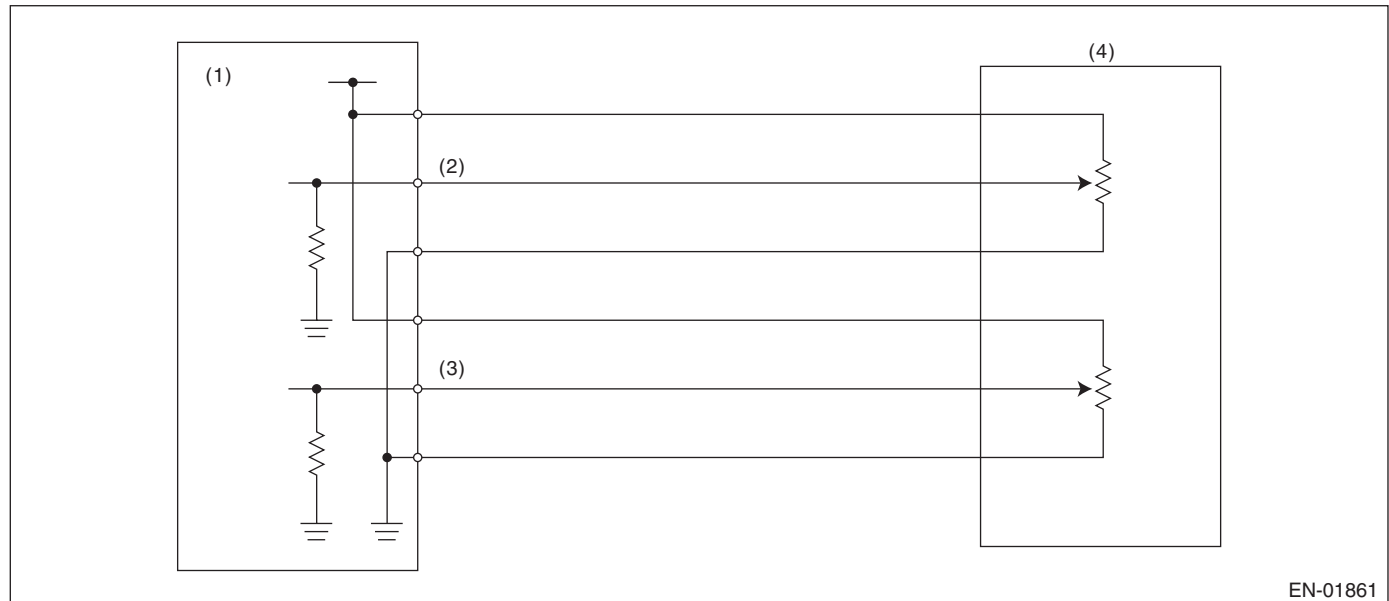
Malfunction Criteria	Threshold Value
Sensor 1 input voltage	< 4.783 V

Time Needed for Diagnosis: 32 ms

**FB: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 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 CONDITIONS

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	$\geq 6 \text{ V}$

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 2 input voltage	< 0.301 V

Time Needed for Diagnosis: 100 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

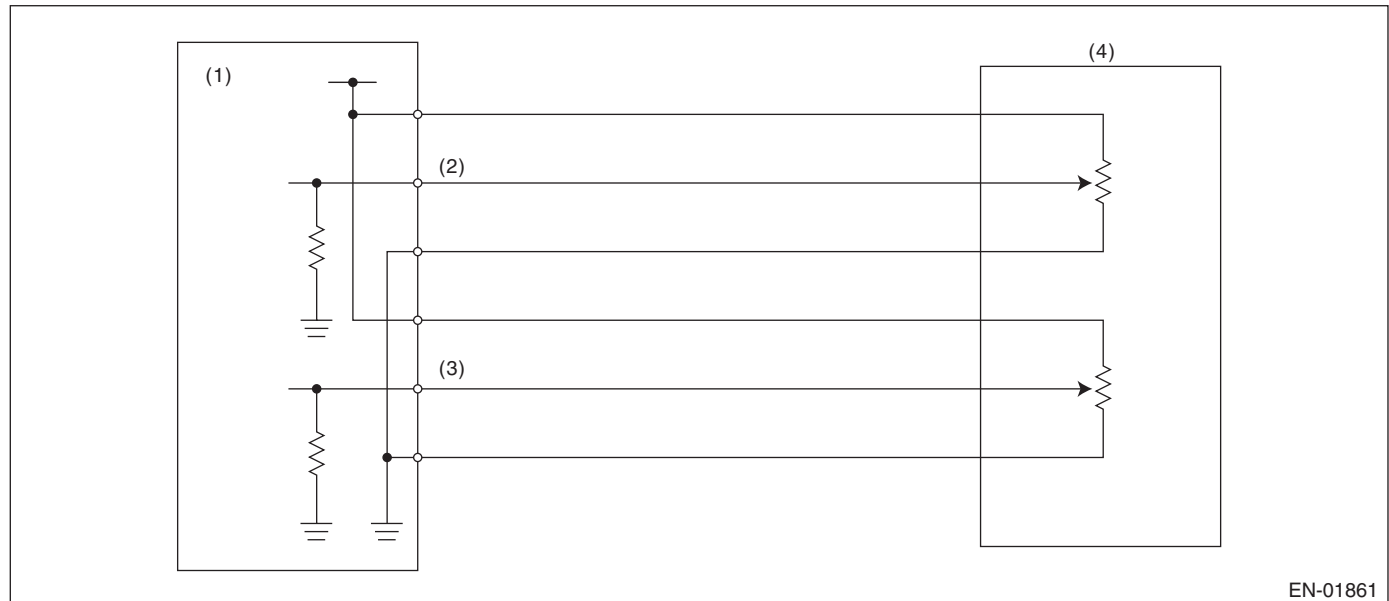
Malfunction Criteria	Threshold Value
Sensor 2 input voltage	≥ 0.301 V

Time Needed for Diagnosis: 100 ms

**FC: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 out of specification.

2. COMPONENT DESCRIPTION

(1) Engine control module (ECM)

(3) Accelerator pedal position sensor
2 signal

(4) Accelerator pedal position sensor

(2) Accelerator pedal position sensor
1 signal

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	$\geq 6\text{ V}$

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Sensor 2 input voltage	≥ 4.783 V

Time Needed for Diagnosis: 100 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

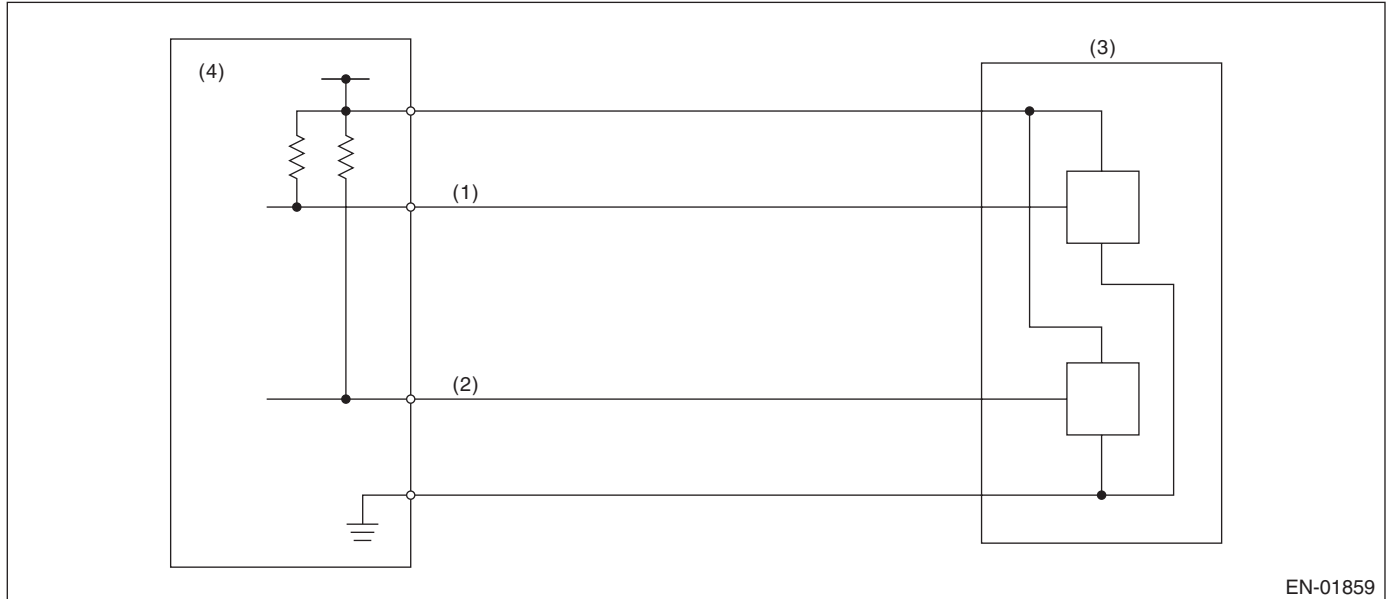
Judgment Value

Malfunction Criteria	Threshold Value
Sensor 2 input voltage	< 4.783 V

Time Needed for Diagnosis: 100 ms

FD: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

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 CONDITIONS

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	$\geq 6 \text{ V}$

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

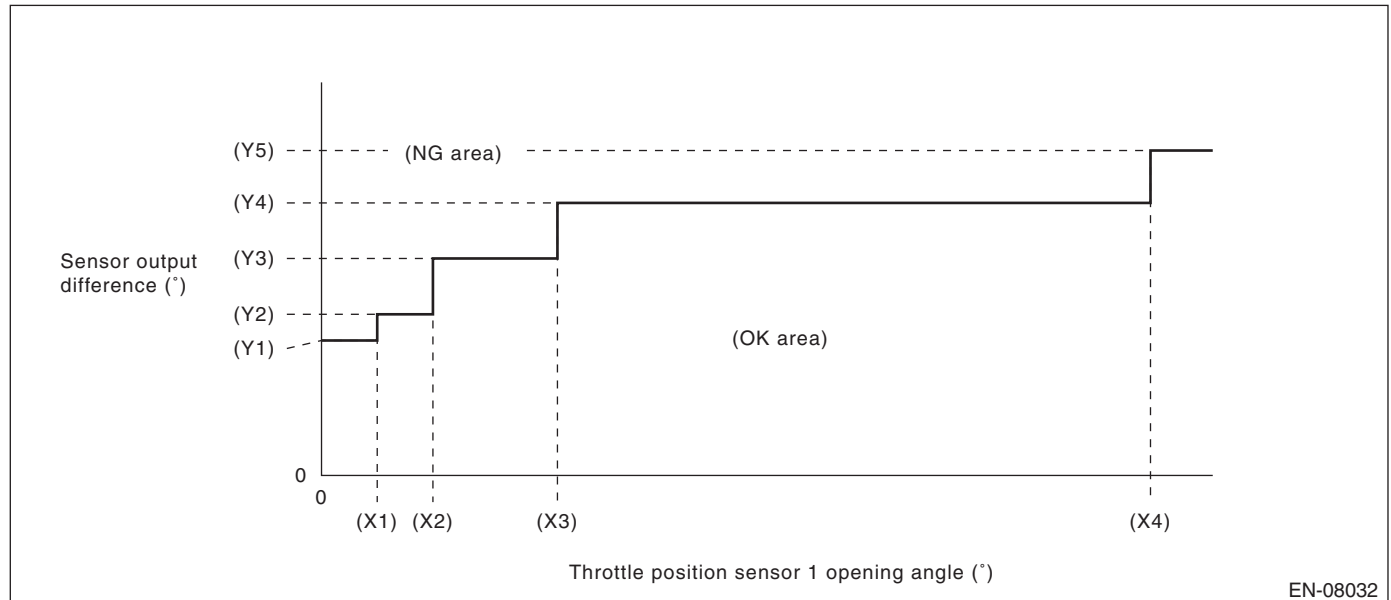
• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal difference between two sensors	Within NG range of Details of Judgment value

Details of Judgment Value



(X1) 2.125 °	(X2) 4.25 °	(X3) 9 °
(X4) 31.625 °		
(Y1) 5.15 °	(Y2) 6.15 °	(Y3) 8.28 °
(Y4) 10.4 °	(Y5) 12.4 °	

Time Needed for Diagnosis: 212 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

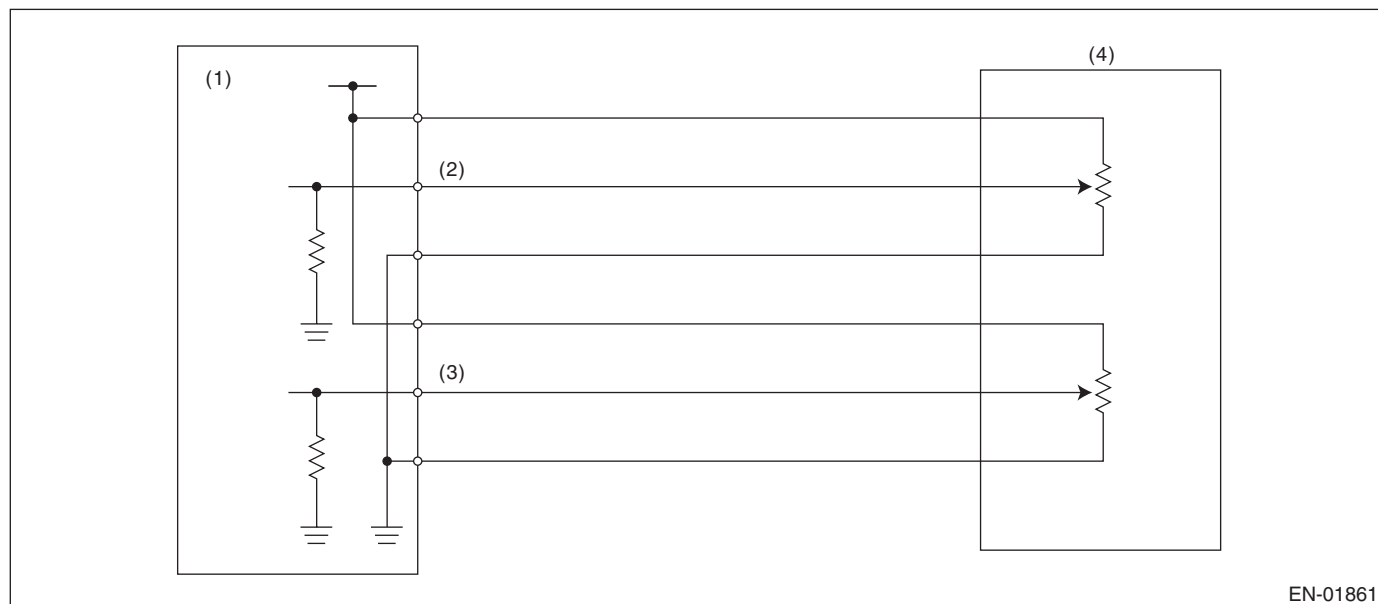
Judgment Value

Malfunction Criteria	Threshold Value
Signal difference between two sensors	Within OK range of Details of Judgment value

Time Needed for Diagnosis: 24 ms

FE:DTC P2138 THROTTLE/PEDAL POSITION SENSOR/SWITCH “D”/“E” VOLT-AGE CORRELATION**1. OUTLINE OF DIAGNOSIS**

Judge as NG when the signal level of accelerator pedal position sensor 1 is different from the accelerator pedal position sensor 2.

2. COMPONENT DESCRIPTION

(1) Engine control module (ECM)

(3) Accelerator pedal position sensor 2 signal

(4) Accelerator pedal position sensor

(2) Accelerator pedal position sensor 1 signal

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Ignition switch	ON
Battery voltage	$\geq 6\text{ V}$

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

5. DIAGNOSTIC METHOD

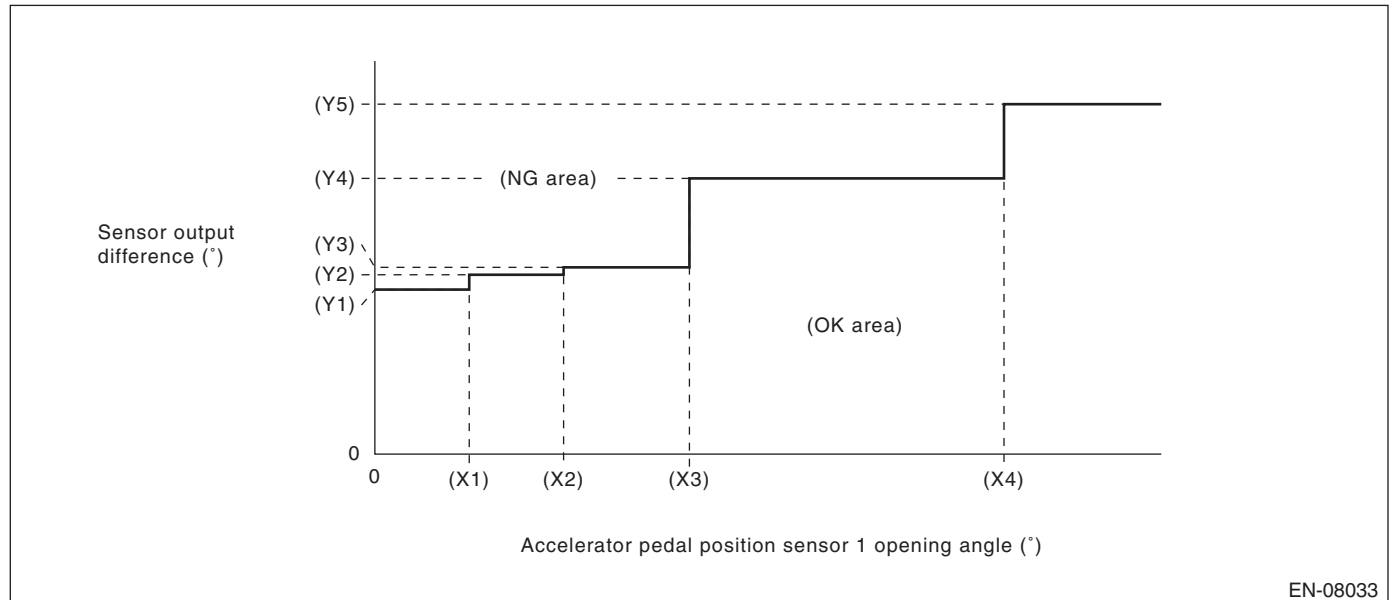
• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Signal difference between two sensors	Within NG range of Details of Judgment value

Details of Judgment Value



(X1) 0.6 °	(X2) 1.2 °	(X3) 2 °
(X4) 4 °		
(Y1) 1.465 °	(Y2) 1.597 °	(Y3) 1.663 °
(Y4) 2.455 °	(Y5) 3.116 °	

Time Needed for Diagnosis: 116 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Signal difference between two sensors	Within OK range of Details of Judgment value

Time Needed for Diagnosis: 116 ms

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

FF:DTC P2195 O2 SENSOR SIGNAL BIASED/STUCK LEAN (BANK 1 SENSOR 1)

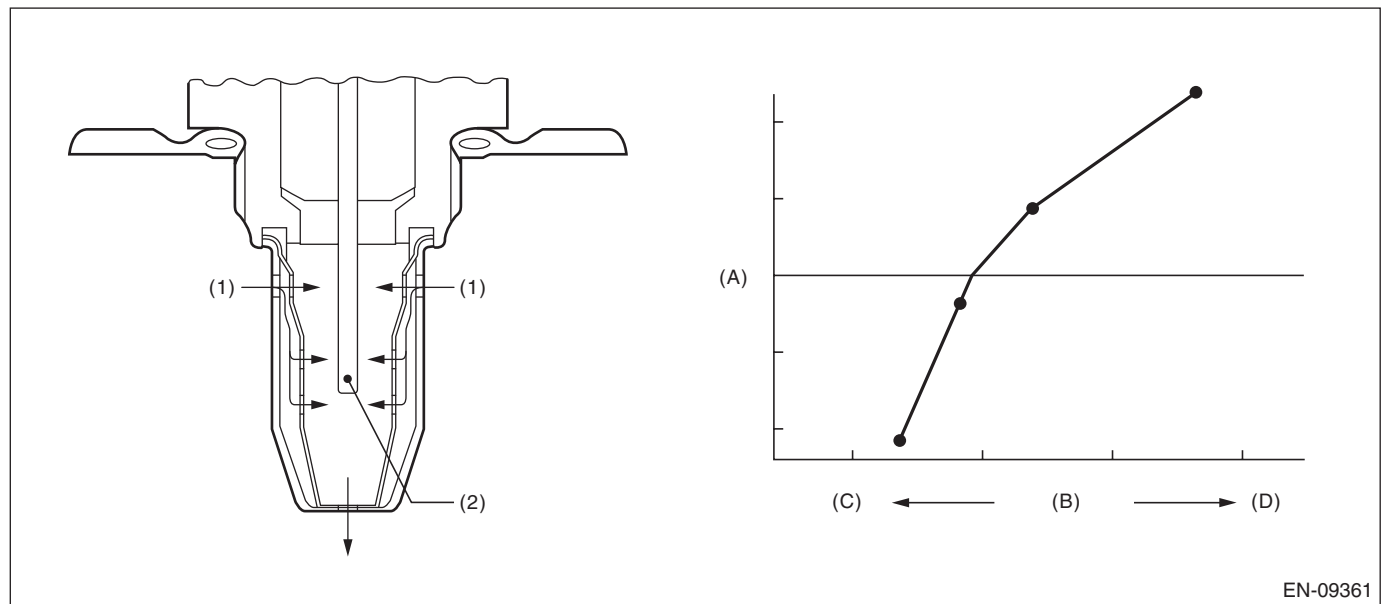
1. OUTLINE OF DIAGNOSIS

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-09361

(A) Electromotive force

(B) Air fuel ratio

(C) Rich

(D) Lean

(1) Exhaust gas

(2) ZrO₂

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Time needed for all secondary parameters to be in enable conditions	≥ 4096 ms
Battery voltage	≥ 10.9 V
Atmospheric pressure	≥ 75 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.
Elapsed time after starting the engine	≥ 0 ms
Engine coolant temperature	≥ -40 °C (-40 °F)
Vehicle speed	≥ 20 km/h (12.4 MPH)
Amount of intake air	≥ 6 g/s (0.21 oz/s)
Load change at 180°C	< 255 g/rev (8.99 oz/rev)
Front oxygen (A/F) sensor impedance	0Ω — 50Ω
Learning value of evaporation gas density	< 1
Total time of operating canister purge	≥ 0 s
Targeted lambda value load compensation coefficient	-1 — 1

4. GENERAL DRIVING CYCLE

Perform diagnosis continuously at a constant speed of 20 km/h (12.4 MPH) or more after 0 ms have passed since the engine started.

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
λ value	< 0.85

Time Needed for Diagnosis: 10000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
λ value	≥ 0.85

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

FG:DTC P2196 O2 SENSOR SIGNAL BIASED/STUCK RICH (BANK 1 SENSOR 1)

1. OUTLINE OF DIAGNOSIS

Detect that λ value remains high.

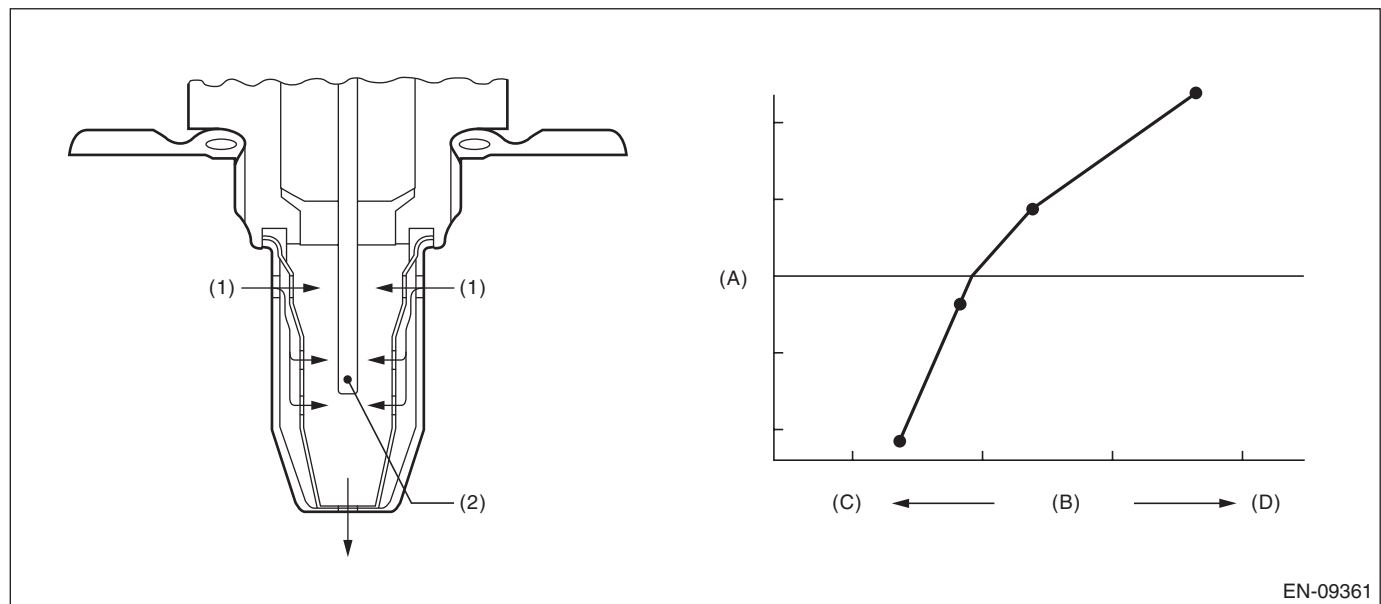
Judge as NG when lambda value is abnormal in accordance with λ value of front oxygen (A/F) sensor and running conditions such as vehicle speed, amount of intake air, engine coolant temperature, sub feedback control, etc.

λ value = Actual air fuel ratio/Theoretical air fuel ratio

$\lambda > 1$: Lean

$\lambda < 1$: Rich

2. COMPONENT DESCRIPTION



(A) Electromotive force

(B) Air fuel ratio

(C) Rich

(D) Lean

(1) Exhaust gas

(2) ZrO_2

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Time needed for all secondary parameters to be in enable conditions	≥ 4096 ms
Battery voltage	≥ 10.9 V
Atmospheric pressure	≥ 75 kPa (563 mmHg, 22.2 inHg)
Rear oxygen sensor sub feedback	Execution
Rear oxygen sensor output voltage – Feedback target voltage or Rear oxygen sensor sub feedback compensation coefficient or Rear oxygen sensor sub feedback compensation coefficient	-0.2 V — 0.1 V On Min. On Max.
Elapsed time after starting the engine	≥ 0 ms
Engine coolant temperature	≥ -40 °C (-40 °F)
Vehicle speed	≥ 20 km/h (12.4 MPH)
Amount of intake air	≥ 6 g/s (0.21 oz/s)
Load change at 180°CA	< 255 g/rev (8.99 oz/rev)
Front oxygen (A/F) sensor impedance	0Ω — 50Ω
Learning value of evaporation gas density	< 1
Total time of operating canister purge	≥ 0 s
Targeted lambda value load compensation coefficient	-1 — 1

4. GENERAL DRIVING CYCLE

Perform diagnosis continuously at a constant speed of 20 km/h (12.4 MPH) or more after 0 ms have passed since the engine started.

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
λ value	> 1.15

Time Needed for Diagnosis: 10000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
λ value	≤ 1.15

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

FH:DTC P219A BANK 1 AIR-FUEL RATIO IMBALANCE

1. OUTLINE OF DIAGNOSIS

Detect malfunction of air fuel ratio deviation between cylinders from main feedback learning value, sub feedback learning value and engine speed variation.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	> 10.9 V
Atmospheric pressure	> 75 kPa (563 mmHg, 22.2 inHg)
A/F main learning system	In operation
Engine speed	> 550 rpm
Engine coolant temperature	> 75 °C (167 °F)
Intake air temperature	< 200 °C (392 °F)
Engine load	> Value of Map 1
Engine load change	< 0.02 g/rev (0 oz/rev)
Evaporative system leak check	Not in operation
Cumulative time of canister purge after engine start	≥ 0 s
Learning value of EVAP conc.	< 1
Vehicle dynamic control or AT torque control	Not in operation
Intake manifold pressure change at 180°CA	< Value of Map 2
Throttle position change during 16 milliseconds	< 14 °
Fuel shut-off function	Not in operation

Map 1

Engine speed (rpm)	Idling	650	1000	1500	2000	2500	3000	3500	4000	4500
Measured value (g (oz)/rev)	na	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Map 2 (Models without SI-DRIVE)

rpm	750	1000	1500	2000	2500	3000	3500	4000
kPa (mmHg, inHg)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)

rpm	4500	5000	5500	6000	6500	6700
kPa (mmHg, inHg)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)

Map 2 (Models with SI-DRIVE)

rpm	700	1000	1500	2000	2500	3000	3500	4000
kPa (mmHg, inHg)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)

rpm	4500	5000	5500	6000	6500	6700
kPa (mmHg, inHg)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)	13.3 (100, 3.9)

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

4. DIAGNOSTIC METHOD

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Models without SI-DRIVE

Malfunction Criteria	Threshold Value
Rich	
Main feedback learning value	< -0.16
Sub feedback learning value	< -0.0124
When any one of the followings is established.	
• Any one of the rich side misfire counters for each cylinder when in idling	> 8 time(s)
• Total of the rich side misfire counters for each cylinder when in idling	> 8 time(s)
• Any one of the rich side misfire counters for each cylinder when not in idling	> 18 time(s)
• Total of the rich side misfire counters for each cylinder when not in idling	> 18 time(s)
Lean	
Main feedback learning value	> 0.075
Sub feedback learning value	< 0
When any one of the followings is established.	
• Any one of the lean side misfire counters for each cylinder when in idling	> 113 time(s)
• Total of the lean side misfire counters for each cylinder when in idling	> 65535 time(s)
• Any one of the lean side misfire counters for each cylinder when not in idling	> 127 time(s)
• Total of the lean side misfire counters for each cylinder when not in idling	> 65535 time(s)

Models with SI-DRIVE

Malfunction Criteria	Threshold Value
Rich	
Main feedback learning value	< -0.14
Sub feedback learning value	< -0.017
When any one of the followings is established.	
• Any one of the rich side misfire counters for each cylinder when in idling	> 9 time(s)
• Total of the rich side misfire counters for each cylinder when in idling	> 9 time(s)
• Any one of the rich side misfire counters for each cylinder when not in idling	> 20 time(s)
• Total of the rich side misfire counters for each cylinder when not in idling	> 20 time(s)
Lean	
Main feedback learning value	> 0
Sub feedback learning value	< 100
When any one of the followings is established.	
• Any one of the lean side misfire counters for each cylinder when in idling	> 177 time(s)
• Total of the lean side misfire counters for each cylinder when in idling	> 65535 time(s)
• Any one of the lean side misfire counters for each cylinder when not in idling	> 192 time(s)
• Total of the lean side misfire counters for each cylinder when not in idling	> 65535 time(s)

Time Needed for Diagnosis: 1000 engine revs.

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

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Models without SI-DRIVE

Malfunction Criteria	Threshold Value
Rich	
Main feedback learning value	≥ -0.16
or	
Sub feedback learning value	≥ -0.0124
or	
All of the following conditions are established.	
• Any one of the rich side misfire counters for each cylinder when in idling	$\leq 8 \text{ time(s)}$
• Total of the rich side misfire counters for each cylinder when in idling	$\leq 8 \text{ time(s)}$
• Any one of the rich side misfire counters for each cylinder when not in idling	$\leq 18 \text{ time(s)}$
• Total of the rich side misfire counters for each cylinder when not in idling	$\leq 18 \text{ time(s)}$
Lean	
Main feedback learning value	≤ 0.075
or	
Sub feedback learning value	≥ 0
or	
All of the following conditions are established.	
• Any one of the lean side misfire counters for each cylinder when in idling	$\leq 113 \text{ time(s)}$
• Total of the lean side misfire counters for each cylinder when in idling	$\leq 65535 \text{ time(s)}$
• Any one of the lean side misfire counters for each cylinder when not in idling	$\leq 127 \text{ time(s)}$
• Total of the lean side misfire counters for each cylinder when not in idling	$\leq 65535 \text{ time(s)}$

Models with SI-DRIVE

Malfunction Criteria	Threshold Value
Rich	
Main feedback learning value	≥ -0.14
or	
Sub feedback learning value	≥ -0.017
or	
All of the following conditions are established.	
• Any one of the rich side misfire counters for each cylinder when in idling	$\leq 9 \text{ time(s)}$
• Total of the rich side misfire counters for each cylinder when in idling	$\leq 9 \text{ time(s)}$
• Any one of the rich side misfire counters for each cylinder when not in idling	$\leq 20 \text{ time(s)}$
• Total of the rich side misfire counters for each cylinder when not in idling	$\leq 20 \text{ time(s)}$
Lean	
Main feedback learning value	≤ 0
or	
Sub feedback learning value	≥ 100
or	
All of the following conditions are established.	
• Any one of the lean side misfire counters for each cylinder when in idling	$\leq 177 \text{ time(s)}$
• Total of the lean side misfire counters for each cylinder when in idling	$\leq 65535 \text{ time(s)}$
• Any one of the lean side misfire counters for each cylinder when not in idling	$\leq 192 \text{ time(s)}$
• Total of the lean side misfire counters for each cylinder when not in idling	$\leq 65535 \text{ time(s)}$

Time Needed for Diagnosis: 1000 engine revs.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

FI: DTC P2257 AIR SYSTEM CONTROL "A" CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Judge as NG when the ECM output level differs from the actual terminal level.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Ignition	ON
Terminal output voltage when ECM outputs OFF signal	LOW

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Ignition	ON
Terminal output voltage when ECM outputs OFF signal	HIGH

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

FJ: DTC P2258 AIR SYSTEM CONTROL "A" CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Judge as NG when the ECM output level differs from the actual terminal level.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Ignition	ON
Terminal output voltage when ECM outputs ON signal	HIGH

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9 V
Ignition	ON
Terminal output voltage when ECM outputs ON signal	LOW

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

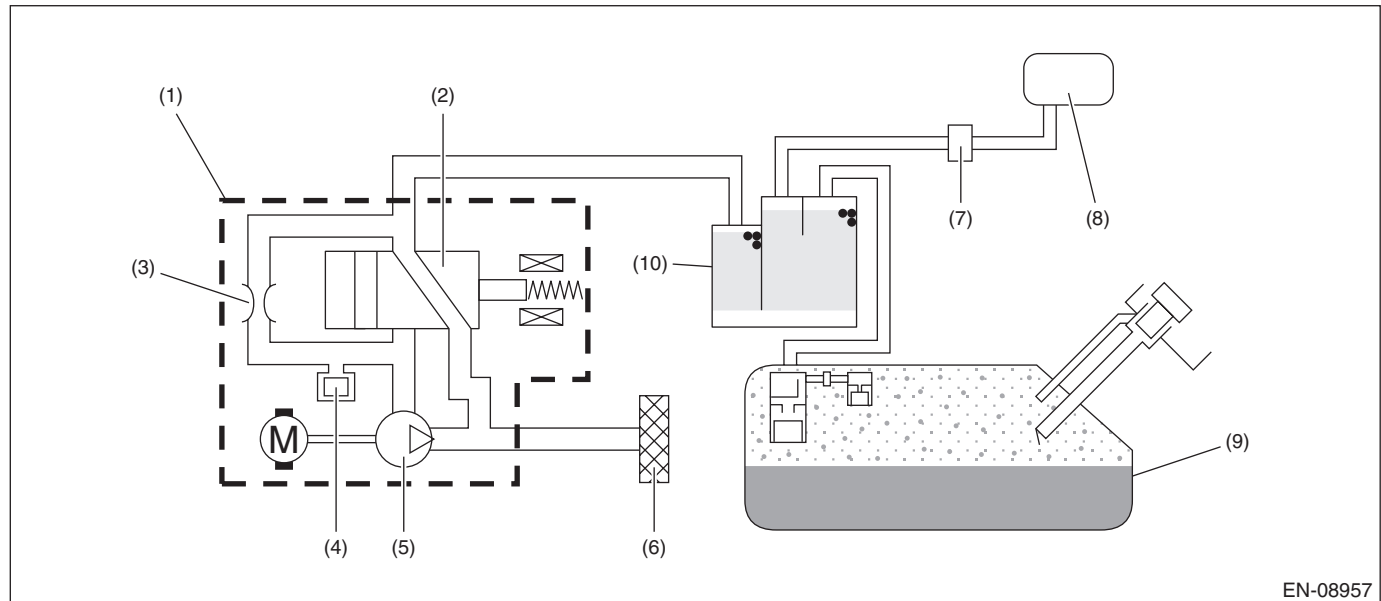
FK:DTC P2401 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM vacuum pump.

Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM	(5) Vacuum pump	(9) Fuel tank
(2) Switching valve	(6) Drain filter	(10) Canister
(3) Reference orifice (0.02 inch orifice)	(7) Purge control solenoid valve	
(4) Pressure sensor	(8) Intake manifold	

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

5. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9
Terminal output voltage when ECM outputs OFF signal	Low

Time Needed for Diagnosis: 2500 ms

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

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9
Terminal output voltage when ECM outputs OFF signal	High

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

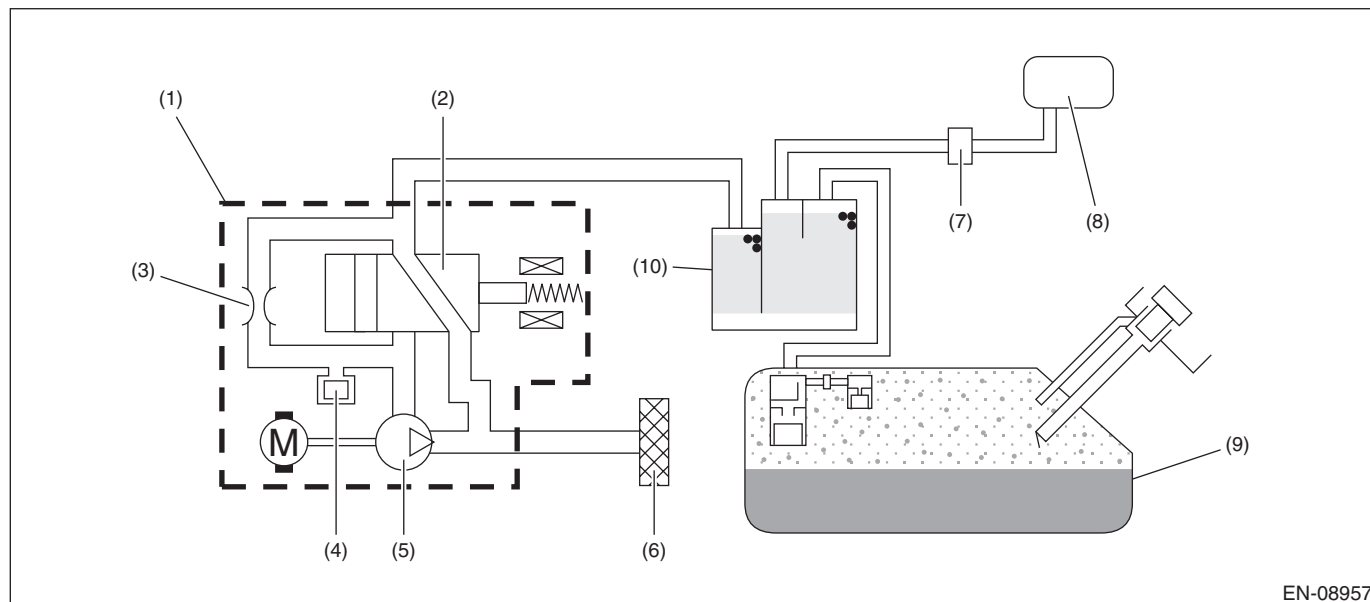
FL:DTC P2402 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM vacuum pump.

Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM	(5) Vacuum pump	(9) Fuel tank
(2) Switching valve	(6) Drain filter	(10) Canister
(3) Reference orifice (0.02 inch orifice)	(7) Purge control solenoid valve	
(4) Pressure sensor	(8) Intake manifold	

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9
Terminal output voltage when ECM outputs ON signal	High

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9
Terminal output voltage when ECM outputs ON signal	Low

Time Needed for Diagnosis: Less than 1 second

FM:DTC P2404 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP SENSE CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0455. <Ref. to GD(H4DOTC)-161, DTC P0455 EVAPORATIVE EMISSION SYSTEM LEAK DETECTED (LARGE LEAK), Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

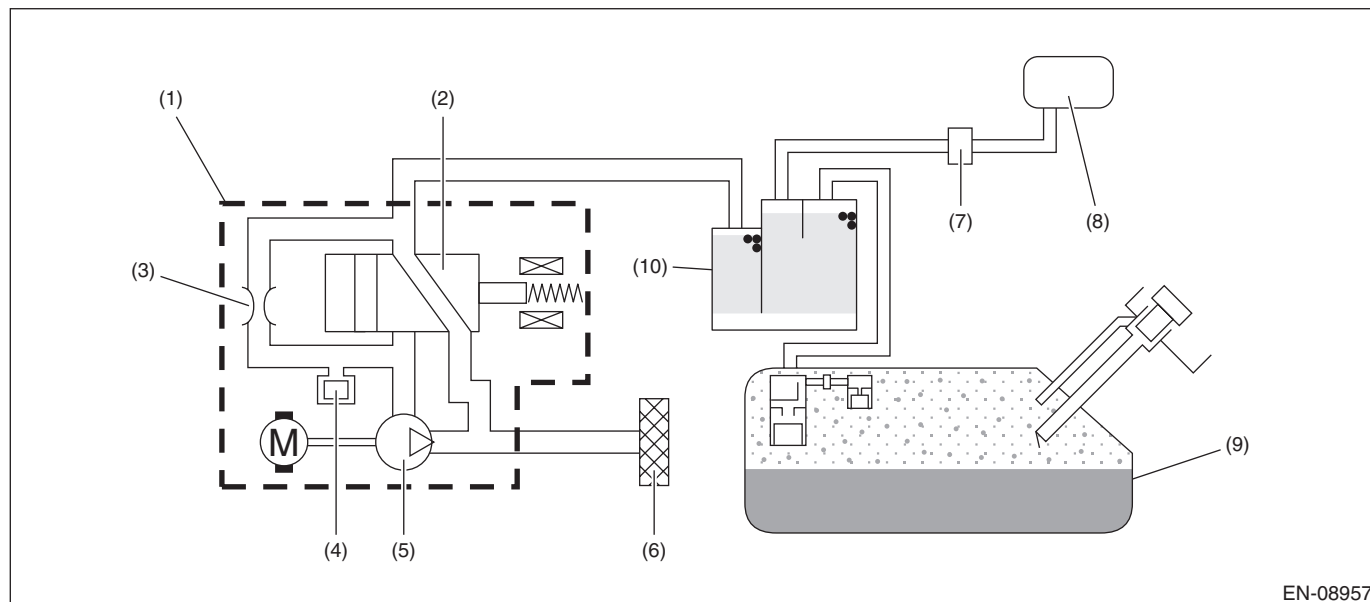
FN:DTC P2419 EVAPORATIVE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM switching valve.

Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM	(5) Vacuum pump	(9) Fuel tank
(2) Switching valve	(6) Drain filter	(10) Canister
(3) Reference orifice (0.02 inch orifice)	(7) Purge control solenoid valve	
(4) Pressure sensor	(8) Intake manifold	

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9
Terminal output voltage when ECM outputs OFF signal	Low

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9
Terminal output voltage when ECM outputs OFF signal	High

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

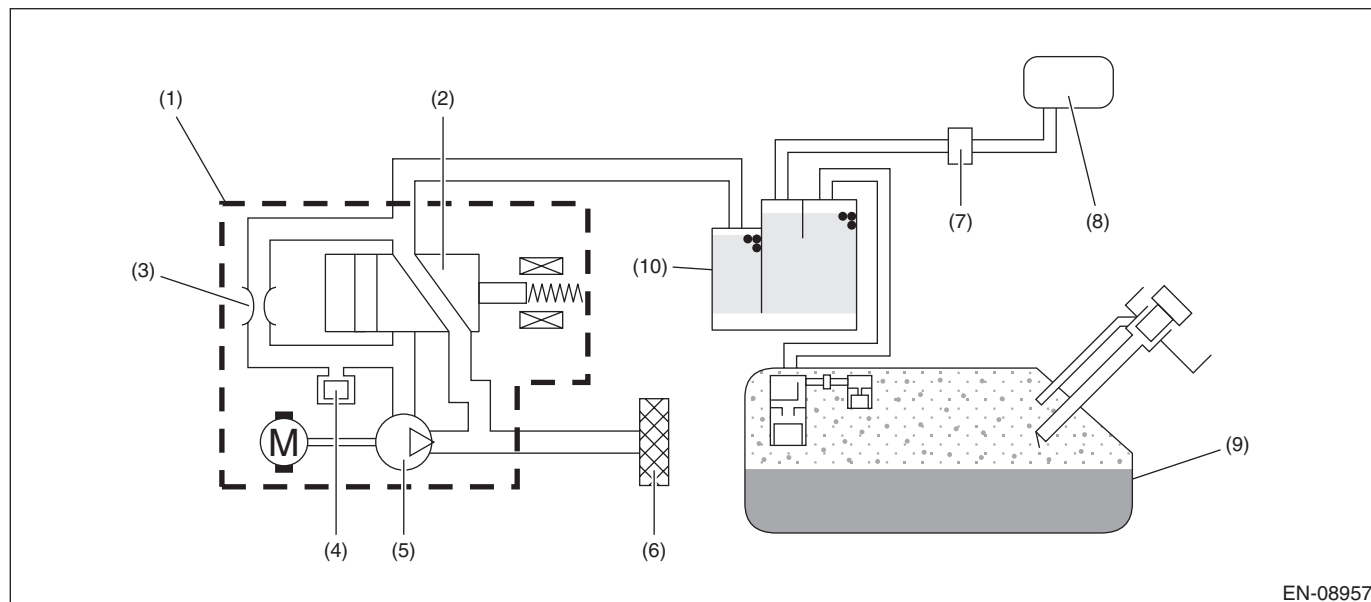
FO:DTC P2420 EVAPORATIVE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Detect the open or short circuit of the ELCM switching valve.

Judge as NG if out of specification.

2. COMPONENT DESCRIPTION



(1) ELCM	(5) Vacuum pump	(9) Fuel tank
(2) Switching valve	(6) Drain filter	(10) Canister
(3) Reference orifice (0.02 inch orifice)	(7) Purge control solenoid valve	
(4) Pressure sensor	(8) Intake manifold	

3. ENABLE CONDITIONS

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

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9
Terminal output voltage when ECM outputs ON signal	High

Time Needed for Diagnosis: 2500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	≥ 10.9
Terminal output voltage when ECM outputs ON signal	Low

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

FP:DTC P2431 SECONDARY AIR INJECTION SYSTEM AIR FLOW /PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect the malfunction of secondary air pressure sensor output property.

Judge as NG when the secondary air pressure sensor output is largely different from the intake manifold pressure at engine start.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Engine speed	< 300 rpm
Vehicle speed	< 1 km/h (0.6 MPH)
After secondary air system stops	≥ 2976 ms

3. GENERAL DRIVING CYCLE

Perform the diagnosis with ignition switch ON.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Secondary air pipe pressure – Intake manifold pressure	≥ 26.7 kPa (200 mmHg, 7.9 inHg)
Intake manifold pressure at engine start – Intake manifold pressure	< 1.3 kPa (9.99 mmHg, 0.4 inHg)

Time Needed for Diagnosis: 328 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Secondary air pipe pressure – Intake manifold pressure	< 26.7 kPa (200 mmHg, 7.9 inHg)

Time Needed for Diagnosis: 262 ms

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

FQ:DTC P2432 SECONDARY AIR INJECTION SYSTEM AIR FLOW /PRESSURE SENSOR CIRCUIT LOW

1. OUTLINE OF DIAGNOSIS

Judge as NG if out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Output voltage	< 0.573 V

Time Needed for Diagnosis: 500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Output voltage	≥ 0.573 V

Time Needed for Diagnosis: Less than 1 second

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

FR:DTC P2433 SECONDARY AIR INJECTION SYSTEM AIR FLOW /PRESSURE SENSOR CIRCUIT HIGH

1. OUTLINE OF DIAGNOSIS

Judge as NG if out of specification.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Output voltage	> 4.916 V

Time Needed for Diagnosis: 500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Output voltage	≤ 4.916 V

Time Needed for Diagnosis: Less than 1 second

FS:DTC P2440 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN (BANK1)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0410. <Ref. to GD(H4DOTC)-139, DTC P0410 SECONDARY AIR INJECTION SYSTEM, Diagnostic Trouble Code (DTC) Detecting Criteria.>

FT:DTC P2441 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK CLOSED (BANK1)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0410. <Ref. to GD(H4DOTC)-139, DTC P0410 SECONDARY AIR INJECTION SYSTEM, Diagnostic Trouble Code (DTC) Detecting Criteria.>

FU:DTC P2442 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK OPEN (BANK2)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0410. <Ref. to GD(H4DOTC)-139, DTC P0410 SECONDARY AIR INJECTION SYSTEM, Diagnostic Trouble Code (DTC) Detecting Criteria.>

FV:DTC P2443 SECONDARY AIR INJECTION SYSTEM SWITCHING VALVE STUCK CLOSED (BANK2)

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC P0410. <Ref. to GD(H4DOTC)-139, DTC P0410 SECONDARY AIR INJECTION SYSTEM, Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

FW:DTC P2444 SECONDARY AIR INJECTION SYSTEM PUMP STUCK ON

1. OUTLINE OF DIAGNOSIS

Detect the secondary air pump malfunction (always ON).

After the secondary air pump turns to OFF, judge as NG if the secondary air pipe pressure is higher than that before the secondary air pump operation.

2. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
Battery voltage	$\geq 7\text{ V}$
Engine	In operation

3. GENERAL DRIVING CYCLE

Always perform the diagnosis continuously.

4. DIAGNOSTIC METHOD

• Abnormality Judgment

If the duration of time while the following conditions are met is longer than the time indicated, judge as NG.

Judgment Value

Malfunction Criteria	Threshold Value
Time since secondary air control completion	$\geq 3000\text{ ms}$ and $\leq 8000\text{ ms}$
Secondary air pipe pressure – Secondary air pipe pressure before operation	$> 6.7\text{ kPa}$ (50 mmHg, 2 inHg)

Time Needed for Diagnosis: 8000 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Time since secondary air control completion	$\geq 3000\text{ ms}$ and $\leq 8000\text{ ms}$
Secondary air pipe pressure – Secondary air pipe pressure before operation	$\leq 6.7\text{ kPa}$ (50 mmHg, 2 inHg)

Time Needed for Diagnosis: 8000 ms

Diagnostic Trouble Code (DTC) Detecting Criteria

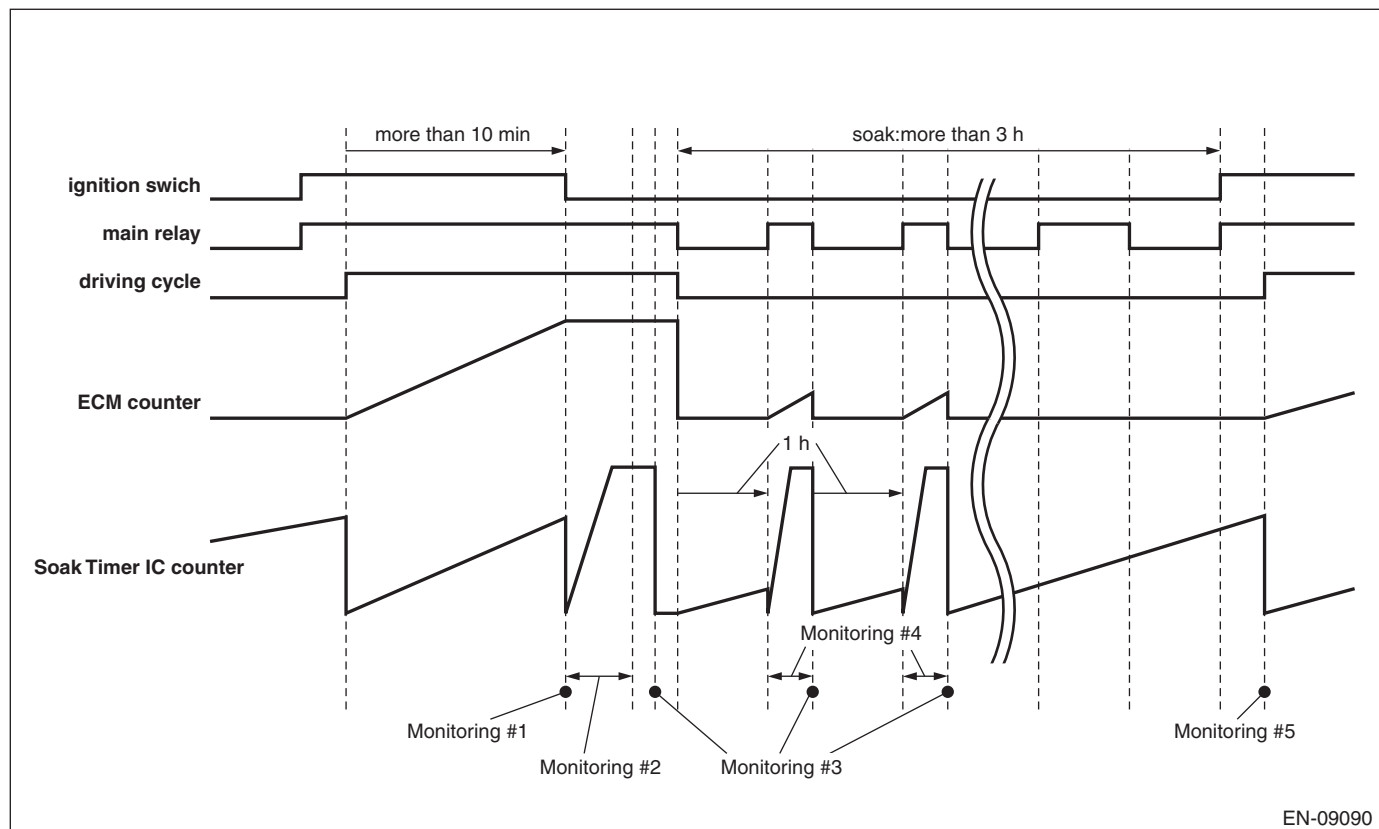
GENERAL DESCRIPTION

FX:DTC P2610 ECM/PCM INTERNAL ENGINE OFF TIMER PERFORMANCE

1. OUTLINE OF DIAGNOSIS

Detect malfunction of soaking timer IC by the five diagnoses below.

Monitor Number	Explanation	Time required for diagnosis
Monitor #1 <Timer diagnosis>	Perform diagnosis of the soaking timer IC accuracy	196 ms
Monitor #2 <Full count diagnosis>	Perform diagnosis of the soaking timer IC counter function	4000 ms
Monitor #3 <Soaking timer IC setting diagnosis>	Perform diagnosis of communication between ECM and soaking timer IC	196 ms
Monitor #4 <Timer diagnosis (during soaking)>	Perform diagnosis of the soaking timer IC accuracy during soaking	3000 ms
Monitor #5 <Wake-up diagnosis>	Perform diagnosis of wake-up function	64 ms



EN-09090

2. COMPONENT DESCRIPTION

The soaking timer IC is built into the ECM.

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
<Timer diagnosis>	
Battery voltage	$\geq 10.9 \text{ V}$
Ignition switch	OFF
Elapsed time after starting the engine	$> 600 \text{ s}$
< Full count diagnosis & soaking timer IC setting diagnosis>	
Battery voltage	$\geq 10.9 \text{ V}$
Ignition switch	OFF
<Timer diagnosis (during soaking)>	
Battery voltage	$\geq 10.9 \text{ V}$
Ignition switch	OFF
Number of wake-up	$= 1, 2, 3, 4, 6, 8$ time(s)
<Wake-up diagnosis>	
Ignition switch	ON
Wake-up activation time setting	Completed
Time in the soaking timer IC	$> 3600 \text{ s}$

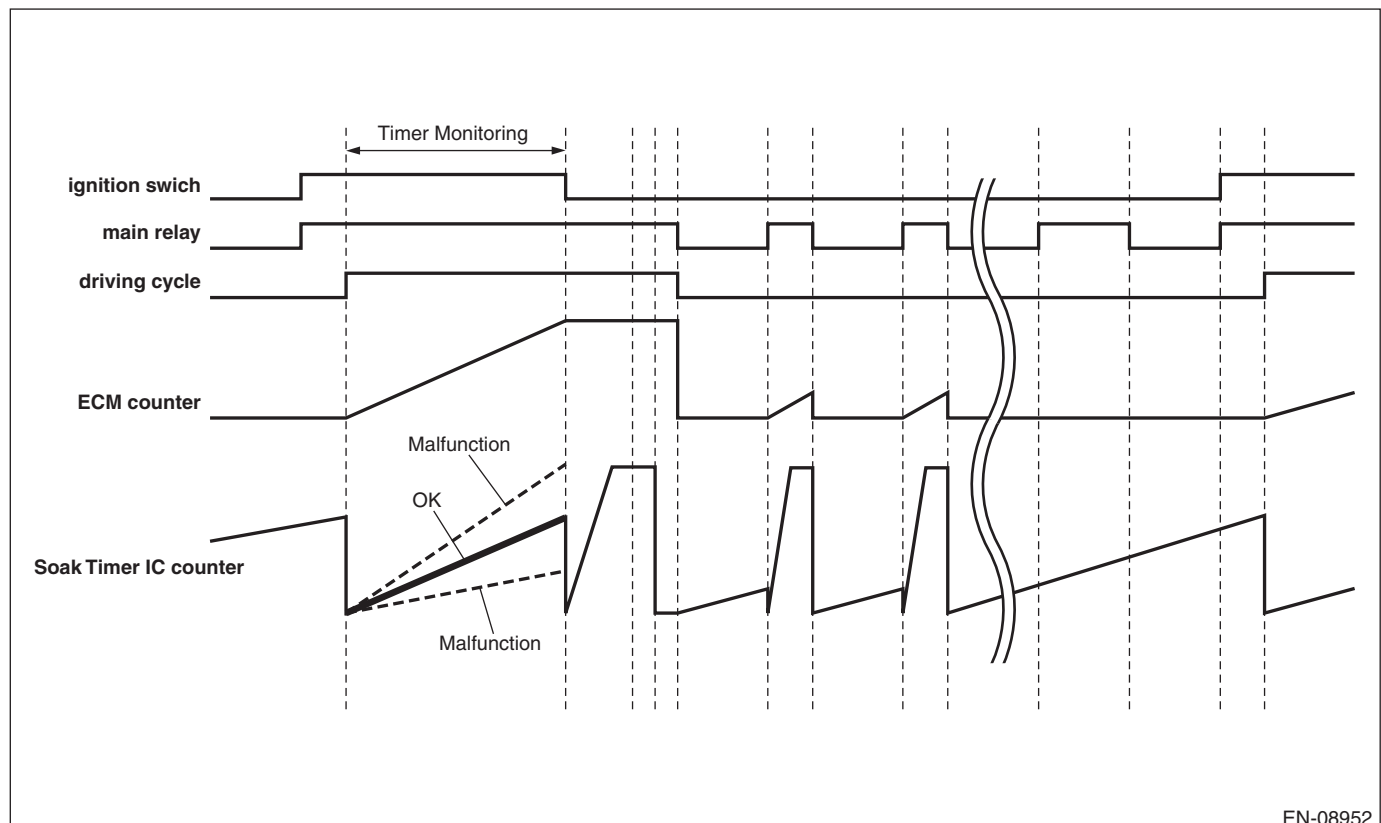
4. GENERAL DRIVING CYCLE

Perform the diagnosis only once when the ignition switch is OFF and when the ignition switch is ON after the soaking of one hour or more.

5. DIAGNOSTIC METHOD

<Timer diagnosis>

Start the count up operation of counters in ECM and in soaking timer IC when the engine is started. Judge as timer malfunction if the difference between the counter in ECM and counter in soaking timer IC exceeds the allowable limit when the ignition switch is OFF.



EN-08952

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
$ \text{osoaktimcpu} - \text{osoaktimic} / \text{osoaktimcpu}$	> 0.24
osoaktimcpu = Counter in ECM osoaktimic = Counter in soaking timer IC	

• Normality Judgment

Judge as OK when the following conditions are established.

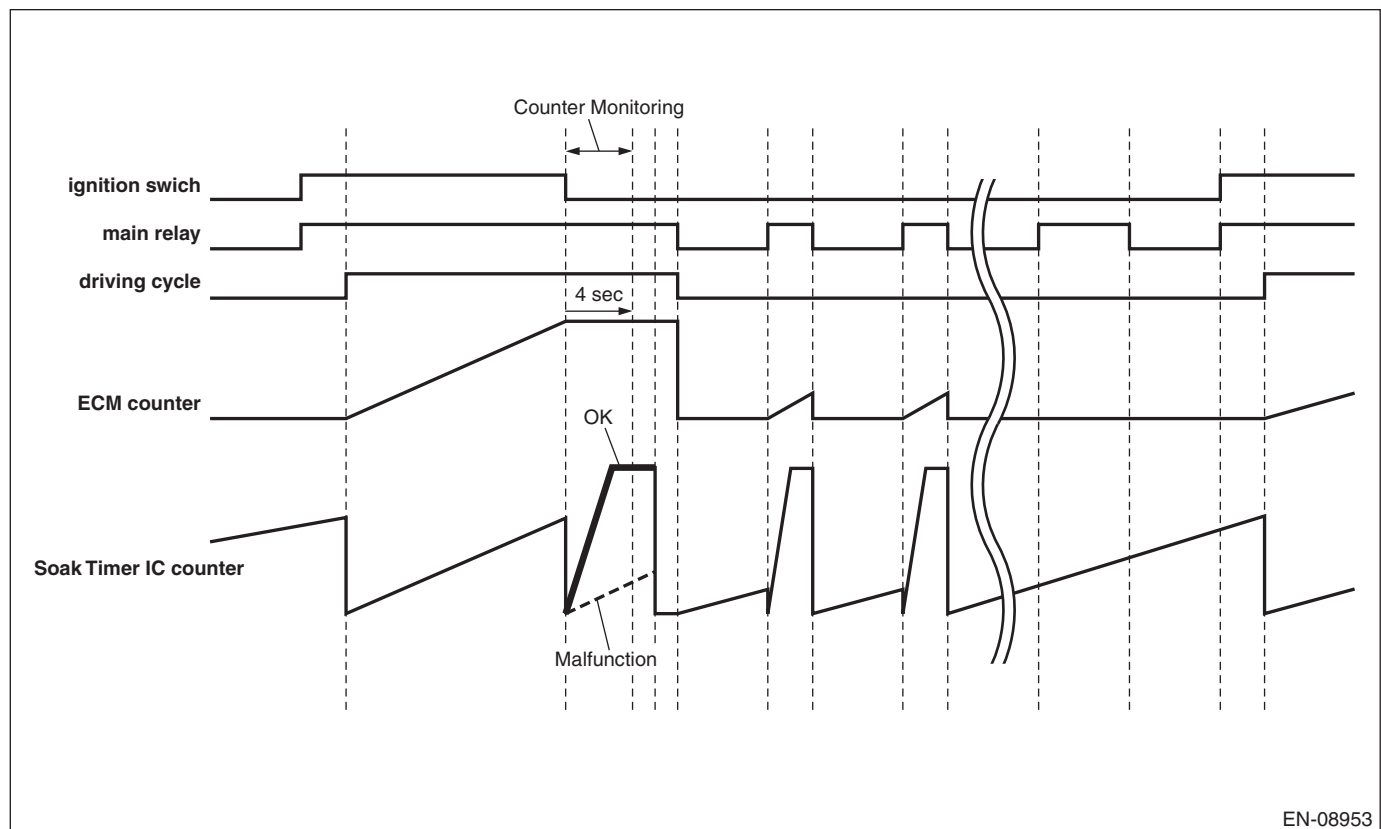
Judgment Value

Malfunction Criteria	Threshold Value
$ \text{osoaktimcpu} - \text{osoaktimic} / \text{osoaktimcpu}$	≤ 0.24

<Full count diagnosis>

Reset the counter in soaking timer IC and start the count up operation.

Judge as full count diagnosis malfunction if counter in soaking timer IC is not \$3FF (1023 count) after 4 seconds.



EN-08953

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
osoakfcntic	$\neq \$3FF$ (1023 count)
osoakfcntic = Counter in soaking timer IC	

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

• Normality Judgment

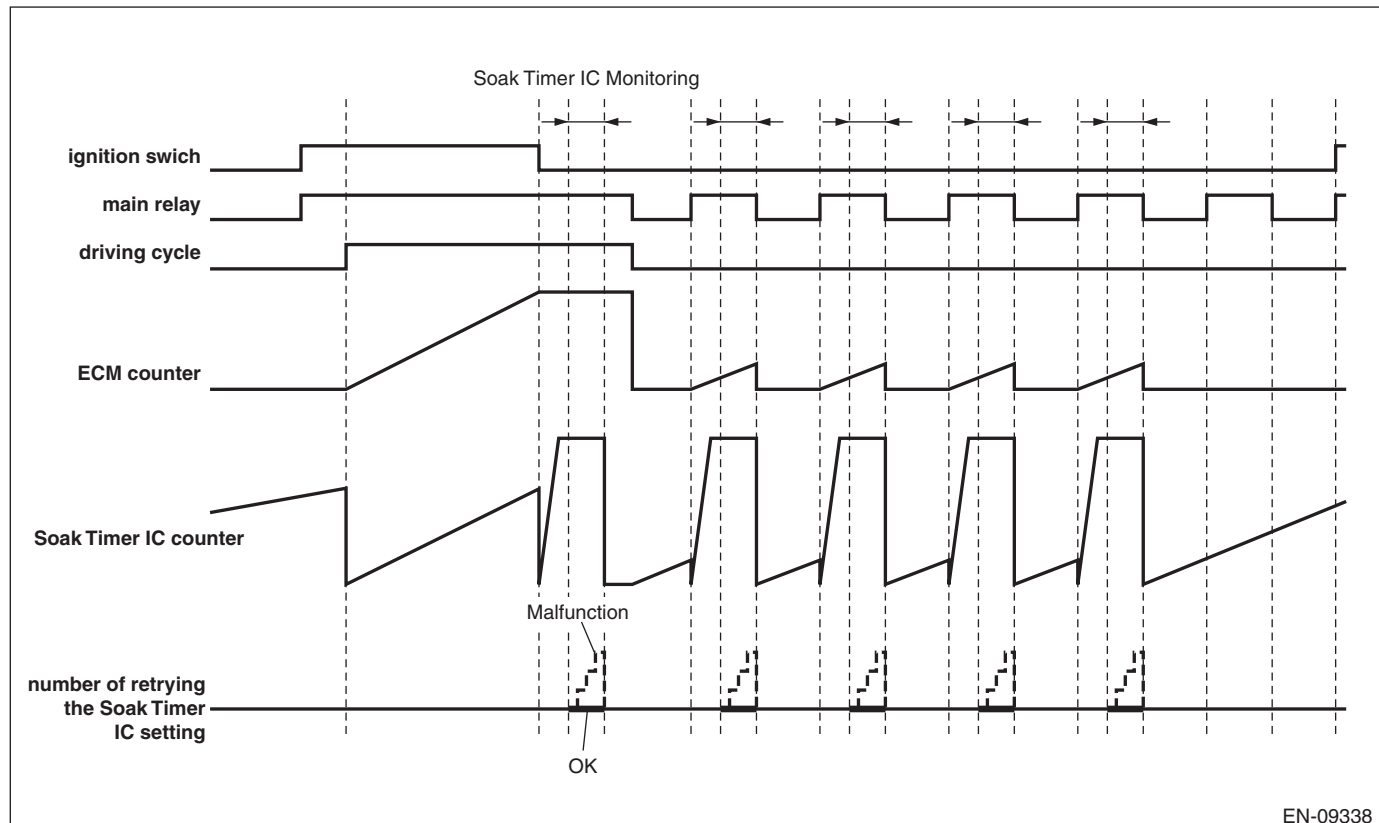
Judge as OK when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
osoakfcntic	= \$3FF (1023 count)

<Soaking timer IC setting diagnosis>

When setting the activation setting time to soaking timer IC, compare the writing value to soaking timer IC with read out value. Judge as malfunction if the values do not match 3 times in a row.



EN-09338

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Writing value and read out value when setting the soaking timer	Unmatch
Number of retrying the soaking timer setting	≥ 3 times

• Normality Judgment

Judge as OK when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Writing value and read out value when setting the soaking timer	Match

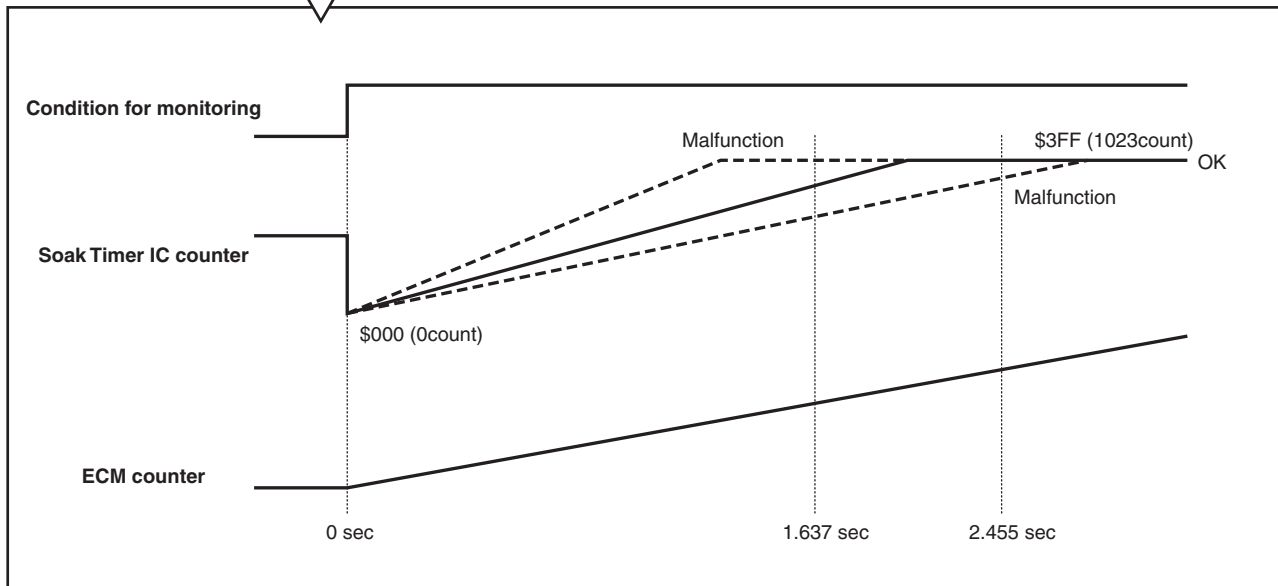
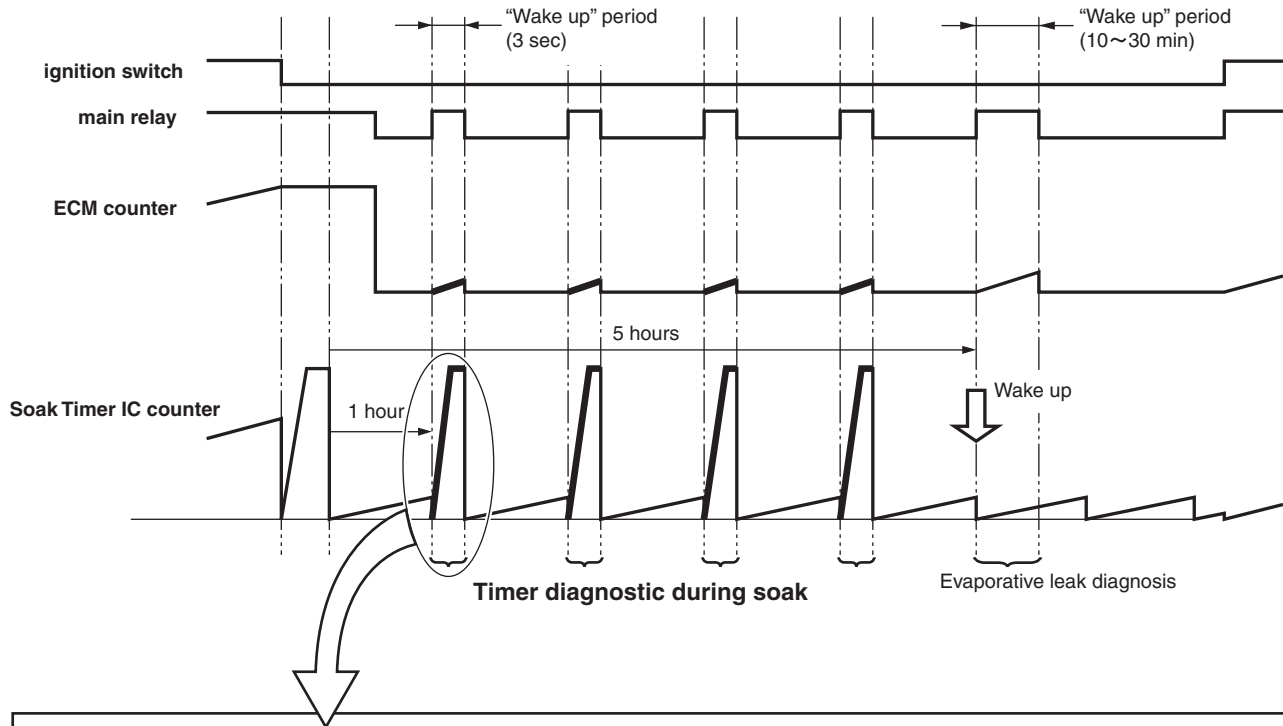
Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

<Timer diagnosis (during soaking)>

Wake-up at the predetermined interval until 5, 7 or 9.5 hours have passed after the ignition switch is OFF, and compare the counter in soaking timer IC with the counter in ECM.

Judge as malfunction if the counter in soaking timer IC is counted up to maximum value (1023 count) when the counter in ECM is 1637 ms, or if the counter in soaking timer IC is not counted up to maximum value (1023 count) when the counter in ECM is 2455 ms.



EN-08981

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
When any one of the followings is established.	
• All of the following conditions are established. Counter in ECM Counter in soaking timer IC	≤ 1637 ms $= \$3FF$ (1023 count)
• All of the following conditions are established. Counter in ECM Counter in soaking timer IC	≥ 2455 ms $\neq \$3FF$ (1023 count)

• Normality Judgment

Judge as OK when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Following conditions are established.	
• All of the following conditions are established. Counter in ECM Counter in soaking timer IC	≤ 1637 ms $\neq \$3FF$ (1023 count)
• All of the following conditions are established. Counter in ECM Counter in soaking timer IC	≥ 2455 ms $= \$3FF$ (1023 count)

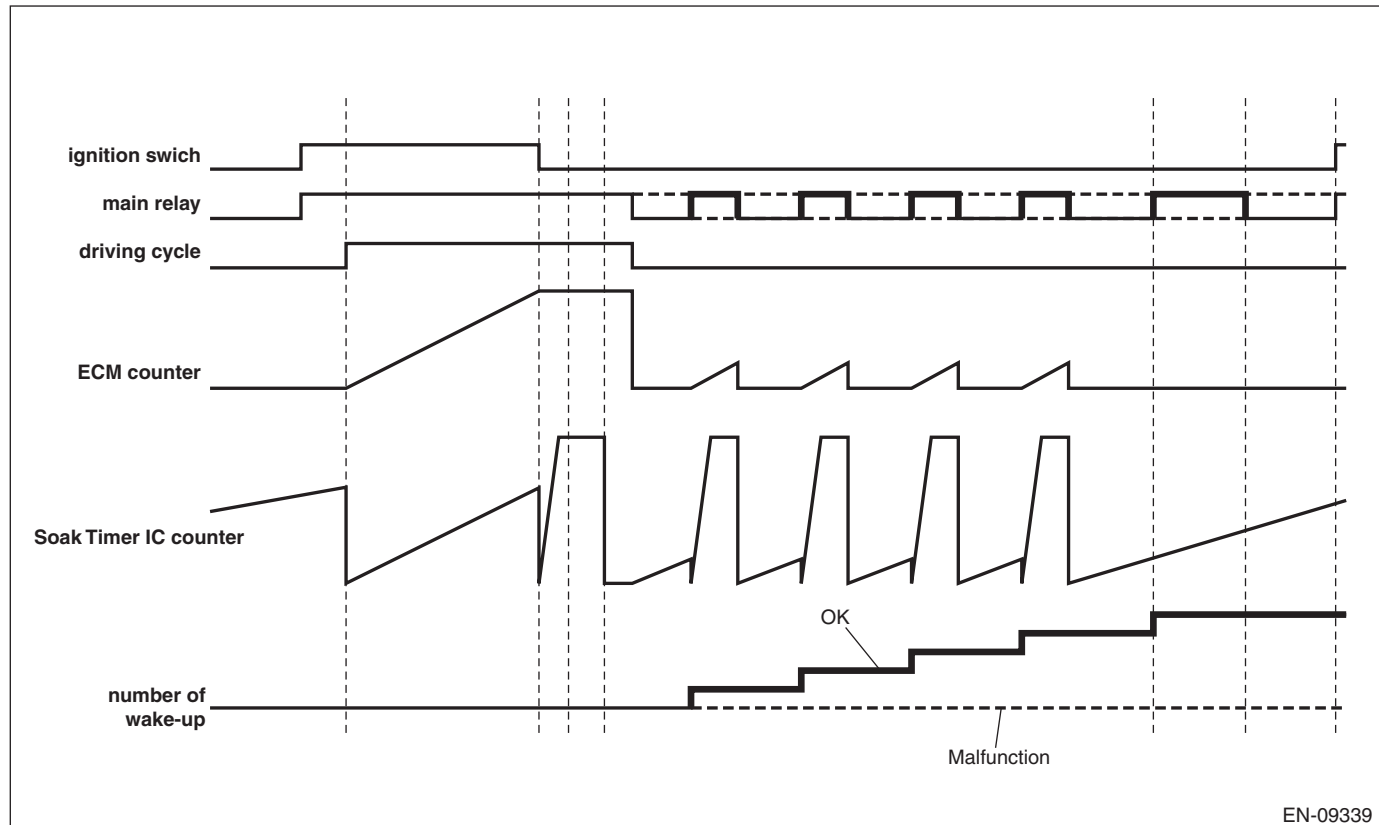
Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

<Wake-up diagnosis>

Store the number of wake-up activation when the ECM wakes up by the soaking timer IC.

Next time when the ignition switch is ON, if the number of wake-up activation does not reach the predetermined value even though the counter in soaking timer IC operates 1 hour or more, judge as wake-up malfunction.



• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Number of wake-up	< Wake-up indication count

• Normality Judgment

Judge as OK when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Number of wake-up	$\geq$ Wake-up indication count

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Driving cycle	Completed
When any one of the followings is established.	
• Timer diagnosis	NG
• Full count diagnosis	NG
• Soaking timer IC setting diagnosis	NG
• Timer diagnosis (during soaking)	NG
• Wake-up diagnosis	NG

Time Needed for Diagnosis: Approx. 5 — 9.5 hours

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

• Normality Judgment

Judge as OK and clear the NG if the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Ignition switch	ON
Driving cycle	Completed
All of the following conditions are established.	
• Timer diagnosis	OK
• Full count diagnosis	OK
• Soaking timer IC setting diagnosis	OK
• Timer diagnosis (during soaking)	OK
• Wake-up diagnosis	OK

Time Needed for Diagnosis: Approx. 5 — 9.5 hours

FY:DTC U0073 CAN FAILURE, BUS 'OFF' DETECTION**1. OUTLINE OF DIAGNOSIS**

Detect malfunction of CAN communication.

Judge as NG when CAN communication failure has occurred.

2. COMPONENT DESCRIPTION

(Common Specifications)

CAN Protocol 2.0 B (Active)

Frame Format: 11 Bit ID Frame (Standard Frame)

Conforms to ISO11898

Communication Speed: 500 kbps

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

5. DIAGNOSTIC METHOD

- Abnormality Judgment**

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	> 10.9 V
Starter switch	OFF
Engine	run
bus off flag or error warning flag	set (error)

Time Needed for Diagnosis: 436 ms

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

- Normality Judgment**

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Engine	run
bus off flag or error warning flag	clear (No error)

Time Needed for Diagnosis: 1000 ms

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

FZ:DTC U0122 CAN (VDC) DATA NOT LOADED

1. OUTLINE OF DIAGNOSIS

Detect malfunction of CAN communication.

Judge as NG when CAN communication failure has occurred between VDC CM and body integrated unit.

2. COMPONENT DESCRIPTION

(Common Specifications)

CAN Protocol 2.0 B (Active)

Frame Format: 11 Bit ID Frame (Standard Frame)

Conforms to ISO11898

Communication Speed: 500 kbps

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

5. DIAGNOSTIC METHOD

• Abnormality Judgment

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	> 10.9 V
Starter switch	OFF
Engine	run
ID received from control module connected to CAN	None during 500 milliseconds

Time Needed for Diagnosis: 500 ms

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

• Normality Judgment

Judge as OK and clear the NG if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Engine	run
ID received from control module connected to CAN	Yes

Time Needed for Diagnosis: 1000 ms

GA:DTC U0140 CAN (BCU) DATA NOT LOADED

1. OUTLINE OF DIAGNOSIS

NOTE:

For the detection standard, refer to DTC U0122. <Ref. to GD(H4DOTC)-298, DTC U0122 CAN (VDC) DATA NOT LOADED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

GB:DTC U0416 CAN (VDC) DATA ABNORMAL**1. OUTLINE OF DIAGNOSIS**

Detect malfunction of CAN communication.

Judge as NG when data received from VDC CM and body integrated unit is not normal.

2. COMPONENT DESCRIPTION

(Common Specifications)

CAN Protocol 2.0 B (Active)

Frame Format: 11 Bit ID Frame (Standard Frame)

Conforms to ISO11898

Communication Speed: 500 kbps

3. ENABLE CONDITIONS

Secondary Parameters	Enable Conditions
None	

4. GENERAL DRIVING CYCLE

Perform the diagnosis continuously after starting the engine.

5. DIAGNOSTIC METHOD

- Abnormality Judgment**

Judge as NG when the following conditions are established.

Judgment Value

Malfunction Criteria	Threshold Value
Battery voltage	> 10.9 V
Starter switch	OFF
Engine	run
Data updated from control module connected to CAN	None during 2000 milliseconds

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 if the continuous time while the following conditions are established is more than the predetermined time.

Judgment Value

Malfunction Criteria	Threshold Value
Engine	run
Data updated from control module connected to CAN	Yes

Time Needed for Diagnosis: 1000 ms

GC:DTC U0422 CAN (BCU) DATA ABNORMAL**1. OUTLINE OF DIAGNOSIS**

NOTE:

For the detection standard, refer to DTC U0416. <Ref. to GD(H4DOTC)-299, DTC U0416 CAN (VDC) DATA ABNORMAL, Diagnostic Trouble Code (DTC) Detecting Criteria.>

Diagnostic Trouble Code (DTC) Detecting Criteria

GENERAL DESCRIPTION

TRANSMISSION SECTION

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.

CONTROL SYSTEMS	CS
MANUAL TRANSMISSION AND DIFFERENTIAL	5MT
MANUAL TRANSMISSION AND DIFFERENTIAL	6MT
MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)	6MT(diag)
CLUTCH SYSTEM	CL

CONTROL SYSTEMS

CS

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