

ENGINE (DIAGNOSTICS)

EN(H4DO)(diag)

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Basic Diagnostic Procedure

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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(H4DO)(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(H4DO)(diag)-62, 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(H4DO)(diag)-352, INSPECTION, 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(H4DO)(diag)-36, 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 "Basic Diagnostic Procedure" of LAN system <Ref. to LAN(diag)-2, Basic Diagnostic Procedure.>
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(H4DO)(diag)-43, 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, time stamp, and freeze frame data, then repair the trouble cause. <Ref. to EN(H4DO)(diag)-83, List of Diagnostic Trouble Code (DTC).> After repair, go to the next step. Go to step 5. NOTE: • For the time stamp, refer to LAN section. <Ref. to LAN(diag)-6, TIME STAMP, CAUTION, General Description.> • Depending on DTCs, time stamp may not be stored.	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(H4DO)(diag)-60, Malfunction Indicator Light.>

Basic Diagnostic Procedure

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Step	Check	Yes	No
5 PERFORM DIAGNOSIS. 1) Perform the Clear Memory Mode. <Ref. to EN(H4DO)(diag)-58, Clear Memory Mode.> 2) Perform the Inspection Mode or Drive Cycle. <Ref. to EN(H4DO)(diag)-44, Inspection Mode.> <Ref. to EN(H4DO)(diag)-47, 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(H4DO)(diag)-92, 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 ☐ Sedimentor 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 harness connectors or spark plug cords: ☐ Yes / ☐ No
• What:
d) Intentional connecting or disconnecting of hoses: ☐ Yes / ☐ No
• What:
e) Installing of other parts except genuine parts: ☐ Yes / ☐ No
• What: • Where:
f) Occurrence of noise: ☐ Yes / ☐ No
• From where: • What kind:
g) Occurrence of smell: ☐ Yes / ☐ No
• From where: • What kind:
h) Intrusion of water into engine compartment or passenger compartment: ☐ Yes / ☐ No
i) Troubles occurred
☐ Engine does not start. ☐ Engine stalls during idling. ☐ Engine stalls while driving. ☐ Engine speed decreases. ☐ Engine speed does not decrease. ☐ Rough idling ☐ Poor acceleration ☐ Back fire ☐ After fire ☐ Does not shift. ☐ Excessive shift shock



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(H4DO)(diag)-58, 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:

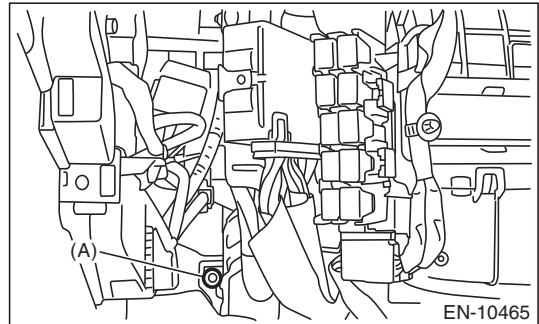
When replacing the ECM, be careful not to use the ECM of wrong specification to avoid any damage on the fuel injection system.

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(H4DO)(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, release the fuel pressure. <Ref. to FU(H4DO)-106, 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. When engine control system diagnosis is finished, perform the VDC memory clearance procedure of self-diagnosis function. <Ref. to VDC(diag)-23, 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 has no contamination, corrosion or looseness and is properly connected to the engine.



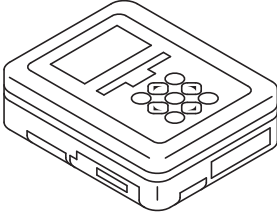
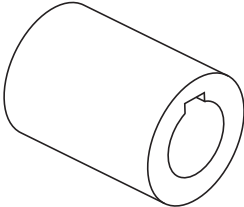
C: NOTE

- 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)

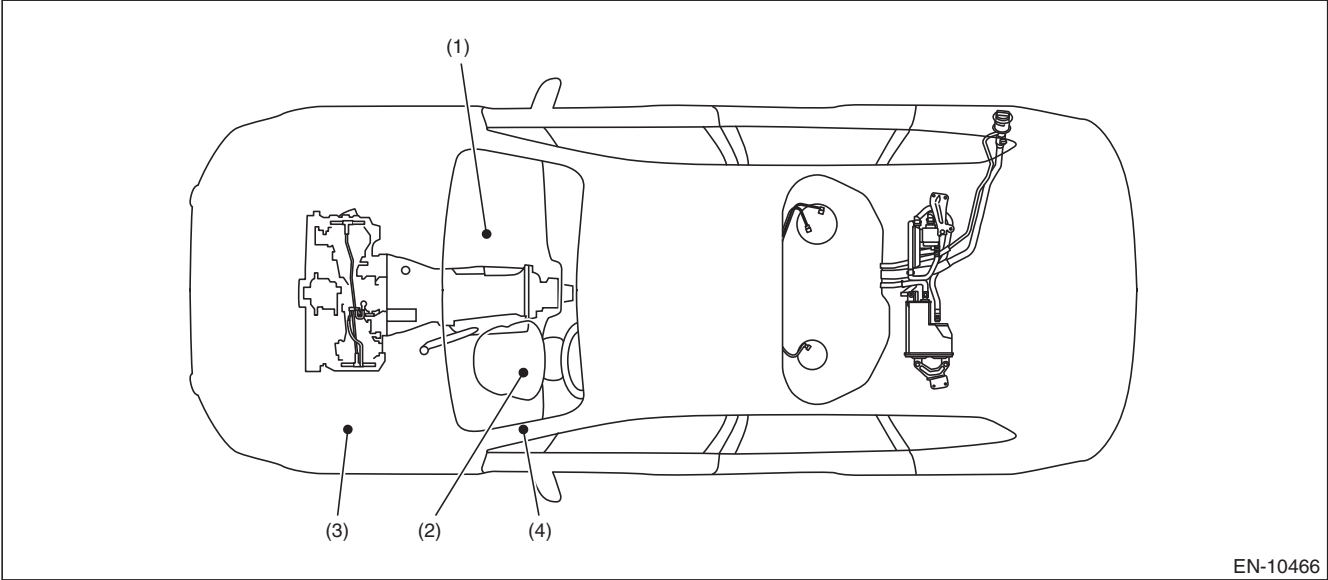
D: PREPARATION TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST1B022XU0	1B022XU0	SUBARU SELECT MONITOR III KIT	Used for troubleshooting the electrical system.
 ST18252AA000	18252AA000	CRANKSHAFT SOCKET	Used for rotating crankshaft.

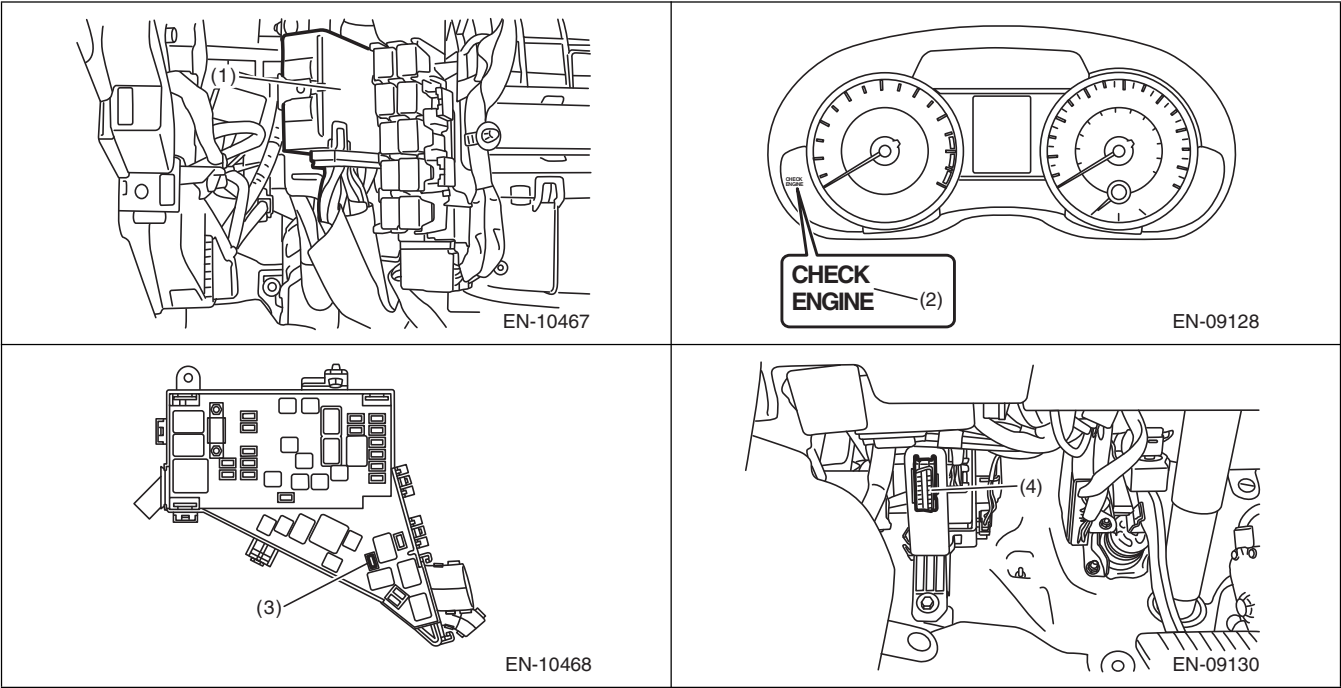
4. Electrical Component Location

A: LOCATION

1. CONTROL MODULE



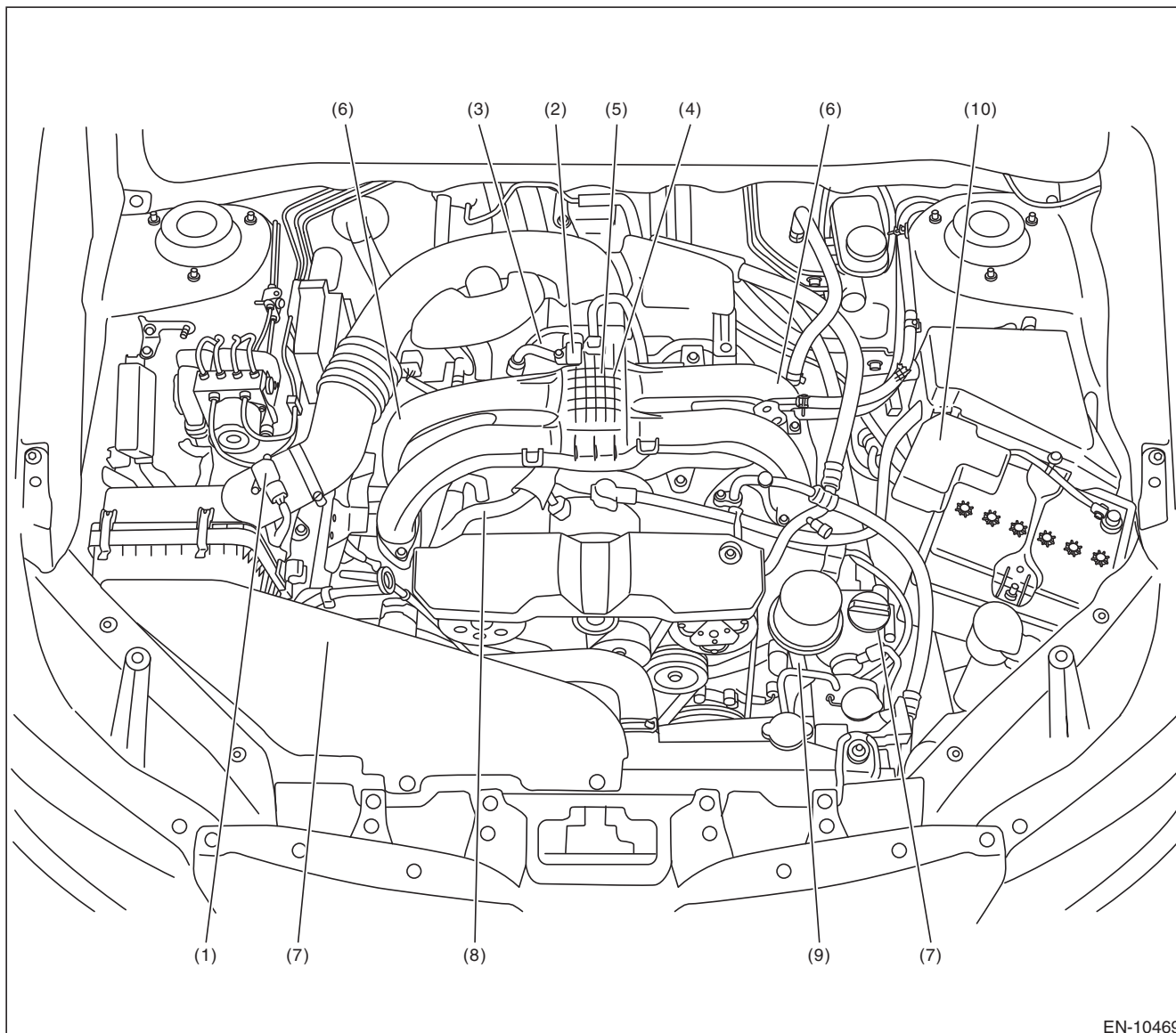
- (1) Engine control module (ECM) (3) Delivery mode fuse (4) Data link connector
(2) Malfunction indicator light



Electrical Component Location

ENGINE (DIAGNOSTICS)

2. SENSOR

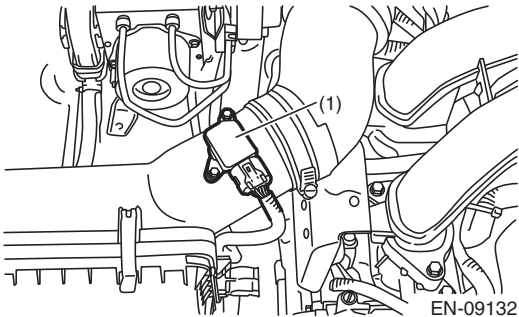


EN-10469

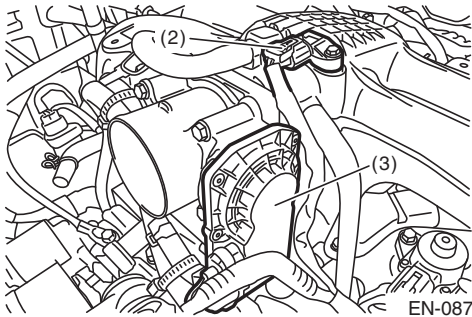
- | | | |
|---|---|---|
| (1) Mass air flow and intake air temperature sensor | (5) Crankshaft position sensor | (9) Engine oil temperature sensor |
| (2) Manifold absolute pressure sensor | (6) Tumble generator valve actuators (with built-in opening angle switch) | (10) Battery current & temperature sensor |
| (3) Electronic throttle control | (7) Intake camshaft position sensor | |
| (4) Knock sensor | (8) Engine coolant temperature sensor | |

Electrical Component Location

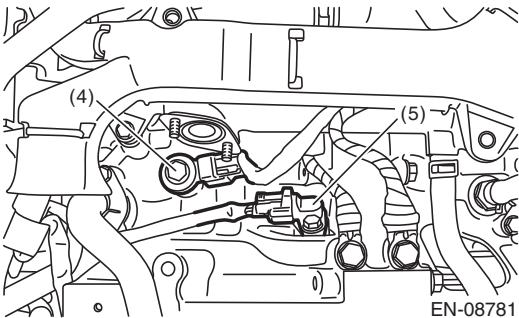
ENGINE (DIAGNOSTICS)



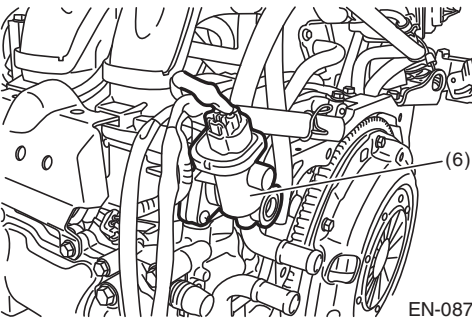
EN-09132



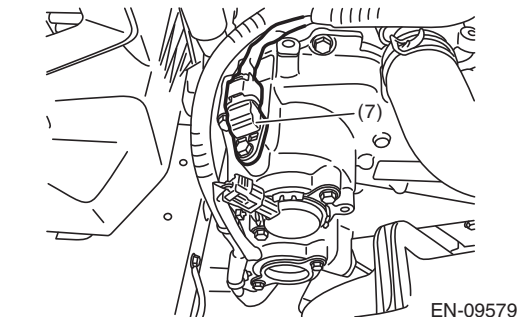
EN-08780



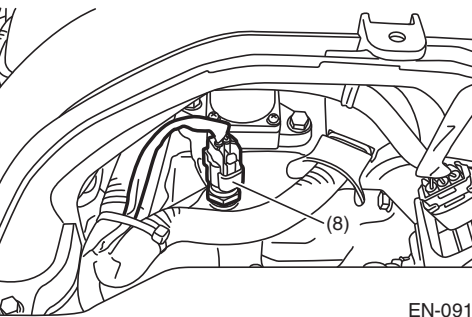
EN-08781



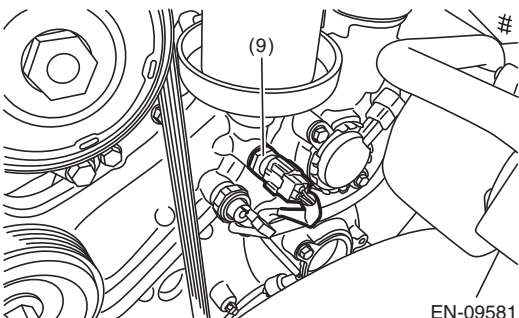
EN-08782



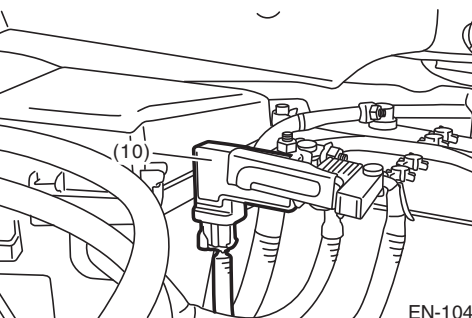
EN-09579



EN-09133



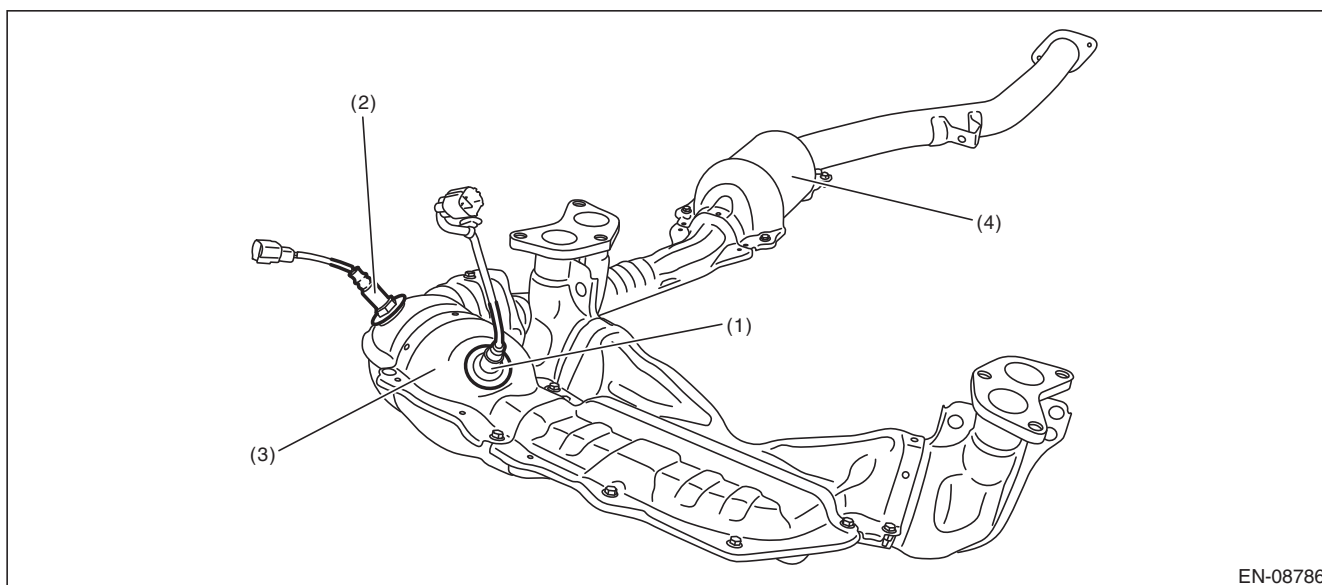
EN-09581



EN-10470

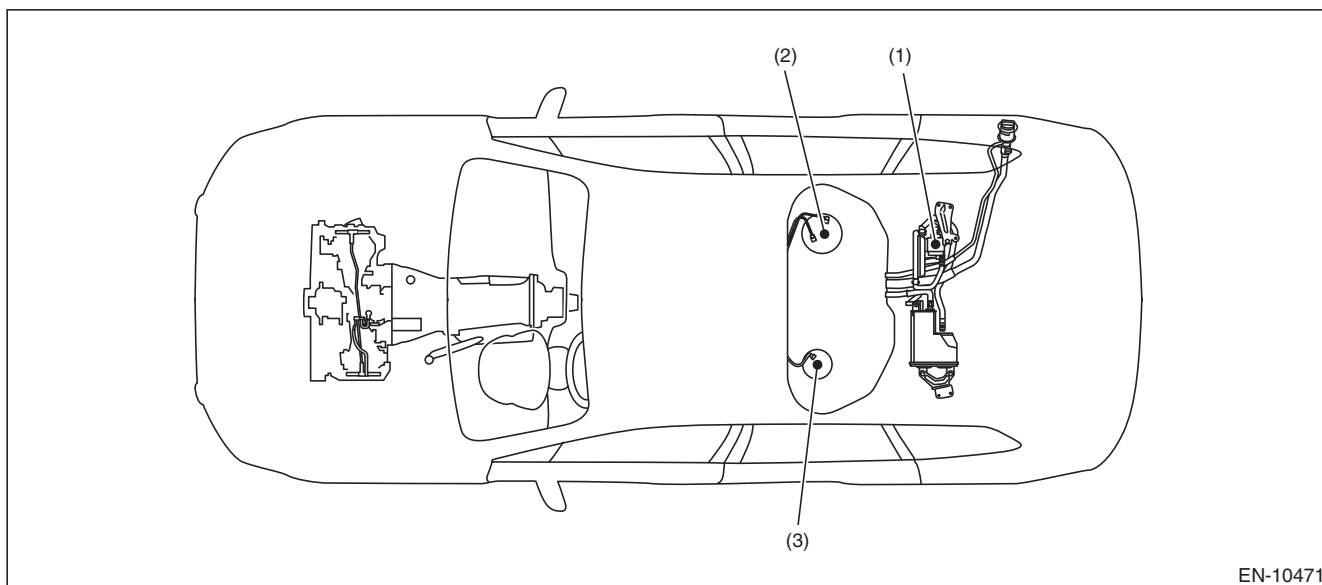
Electrical Component Location

ENGINE (DIAGNOSTICS)



EN-08786

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

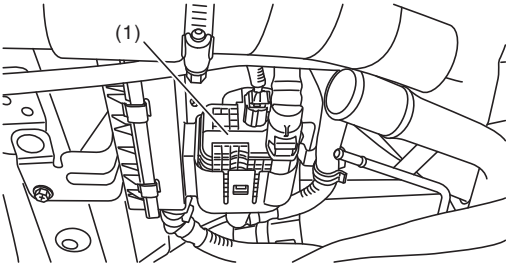
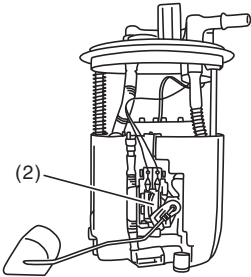
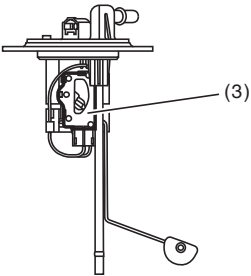


EN-10471

- (1) Leak check valve ASSY (with built-in pressure sensor)
- (2) Fuel level sensor
- (3) Fuel sub level sensor

Electrical Component Location

ENGINE (DIAGNOSTICS)

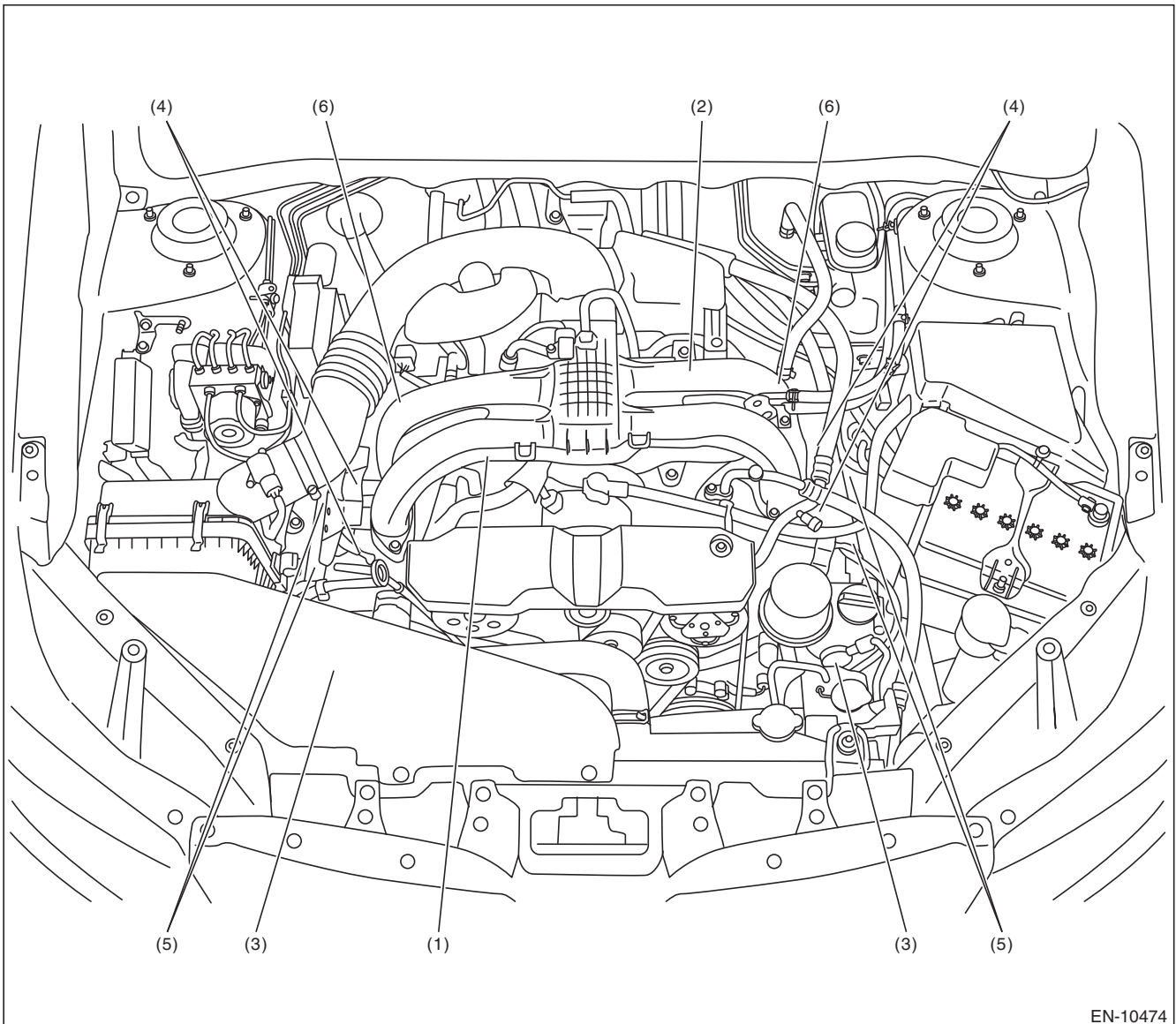
 EN-10472	 EN-10473
 EN-08790	SUBARU.



Electrical Component Location

ENGINE (DIAGNOSTICS)

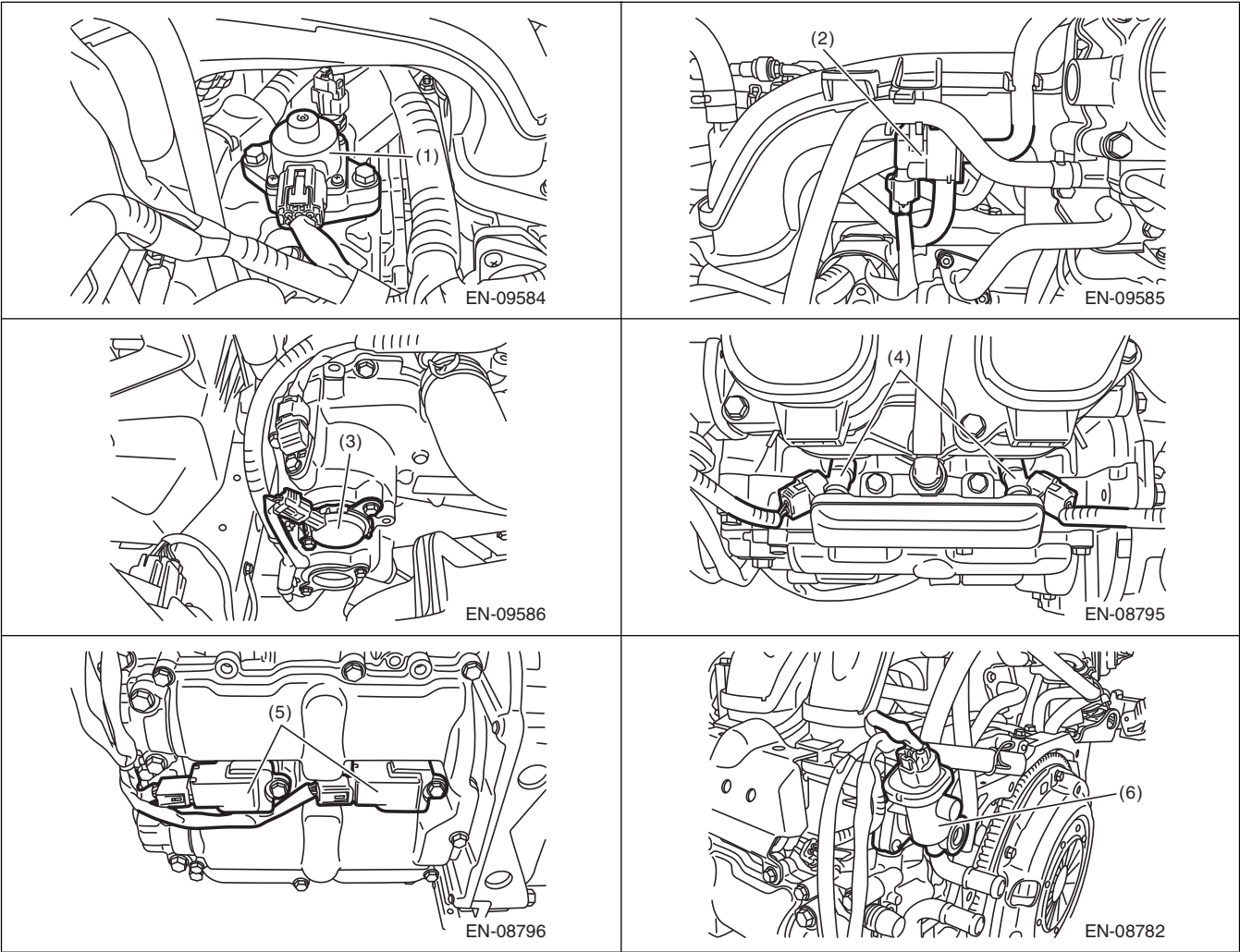
3. SOLENOID VALVE, ACTUATOR, EMISSION CONTROL SYSTEM PARTS AND IGNITION SYSTEM PARTS



- | | | |
|----------------------------------|---------------------------------|-------------------------------------|
| (1) EGR control valve | (3) Intake oil control solenoid | (5) Ignition coil |
| (2) Purge control solenoid valve | (4) Fuel injector | (6) Tumble generator valve actuator |

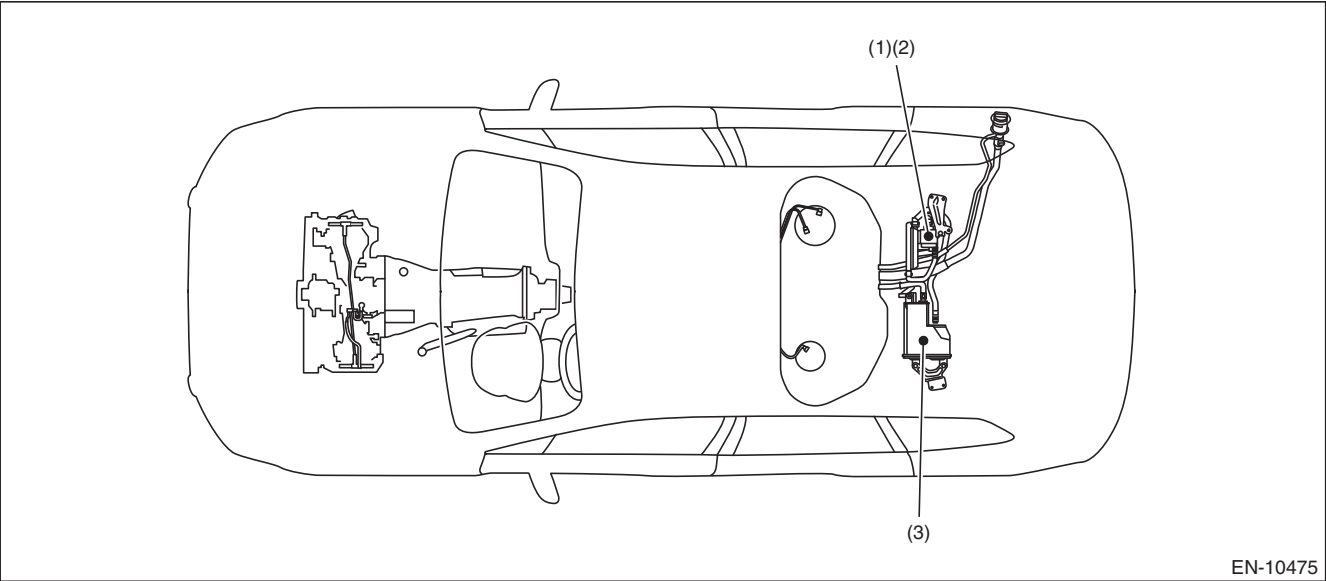
Electrical Component Location

ENGINE (DIAGNOSTICS)



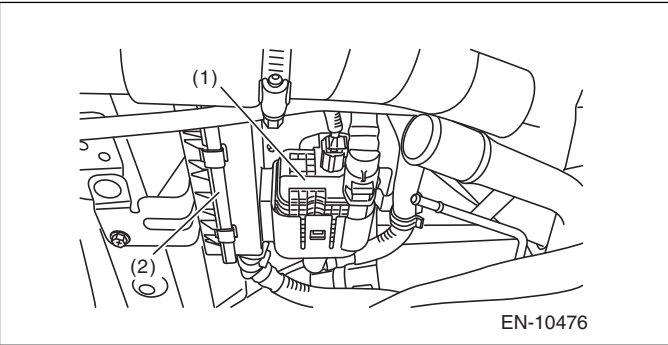
Electrical Component Location

ENGINE (DIAGNOSTICS)

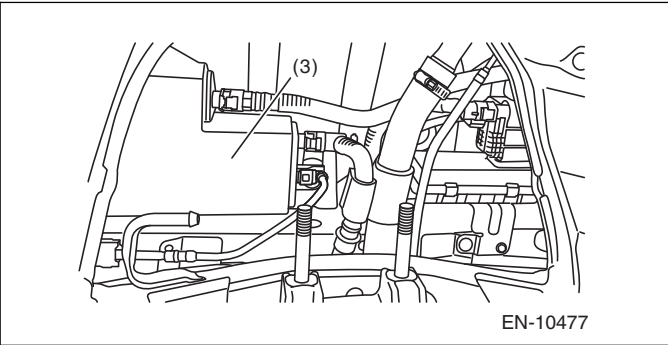


EN-10475

- (1) Leak check valve ASSY (2) Drain filter (3) Canister



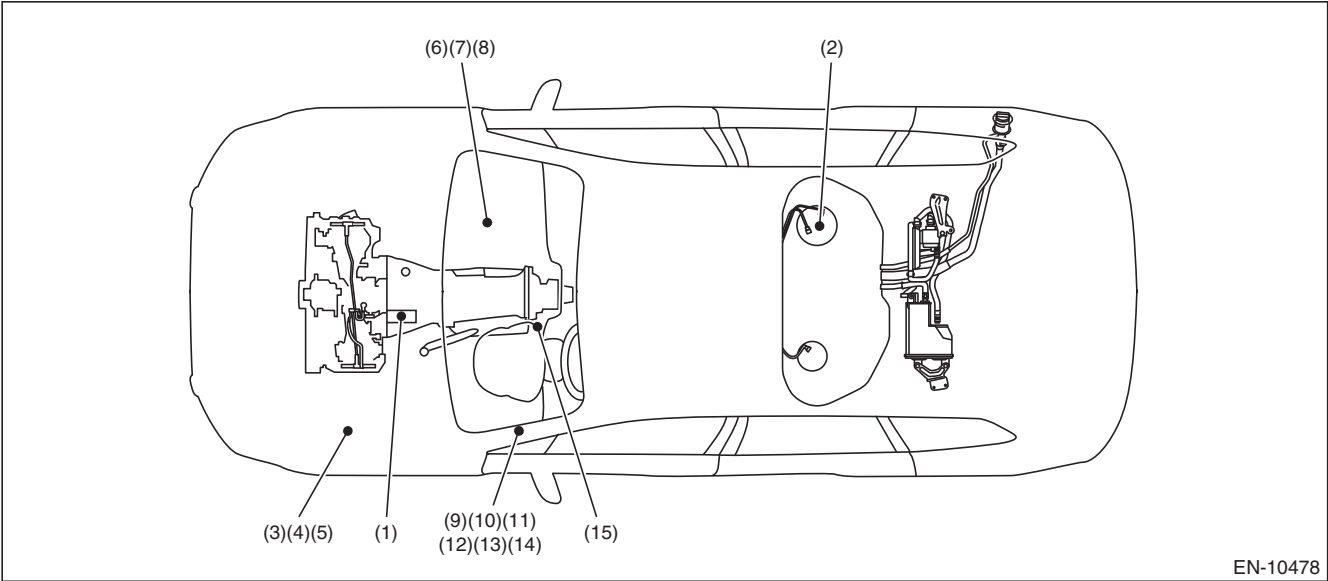
EN-10476



EN-10477

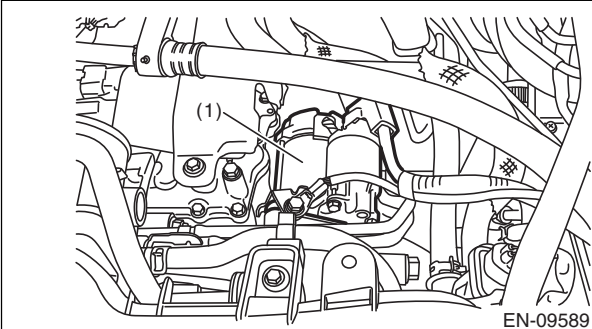
Electrical Component Location

ENGINE (DIAGNOSTICS)

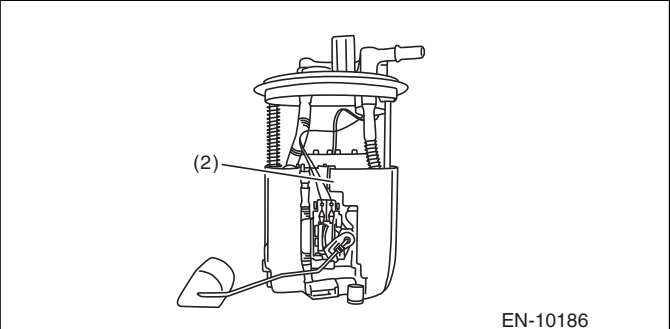


EN-10478

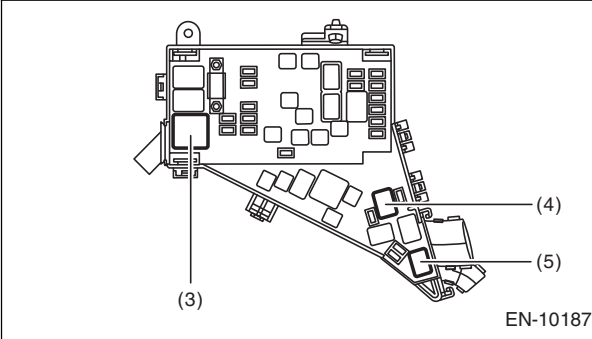
- | | | |
|-------------------------------|--|---|
| (1) Starter | (6) Main relay | (11) Starter relay |
| (2) Fuel pump | (7) IG relay | (12) Starter cut relay (model with push button start) |
| (3) Radiator main fan relay 1 | (8) Fuel pump relay | (13) IG relay 1 (push button start) (model with push button start) |
| (4) Radiator main fan relay 2 | (9) A/F, oxygen sensor relay | (14) Starter relay (push button start) (model with push button start) |
| (5) Radiator sub fan relay | (10) Electronic throttle control relay | (15) Push button ignition switch (model with push button start) |



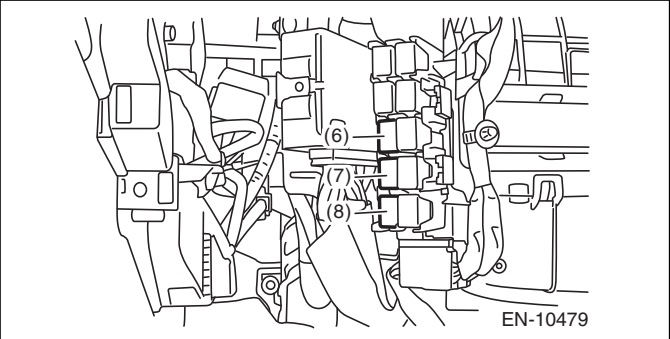
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EN-10186



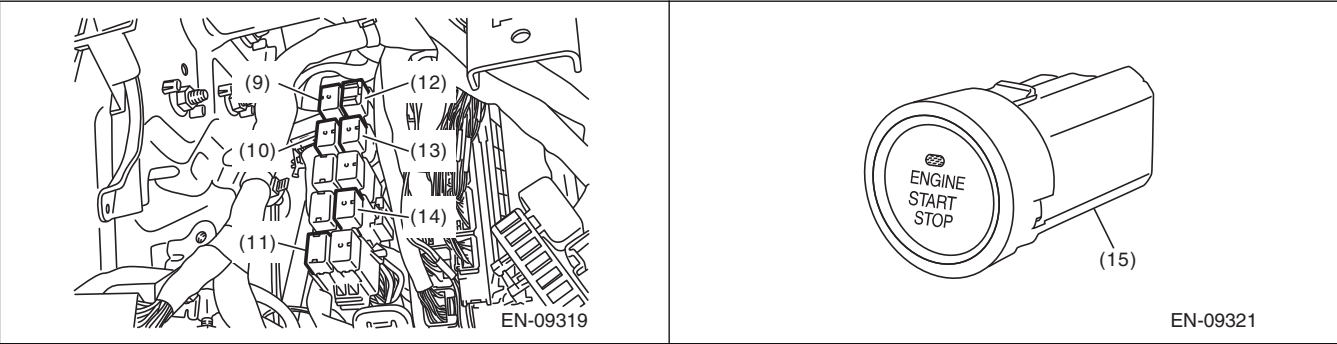
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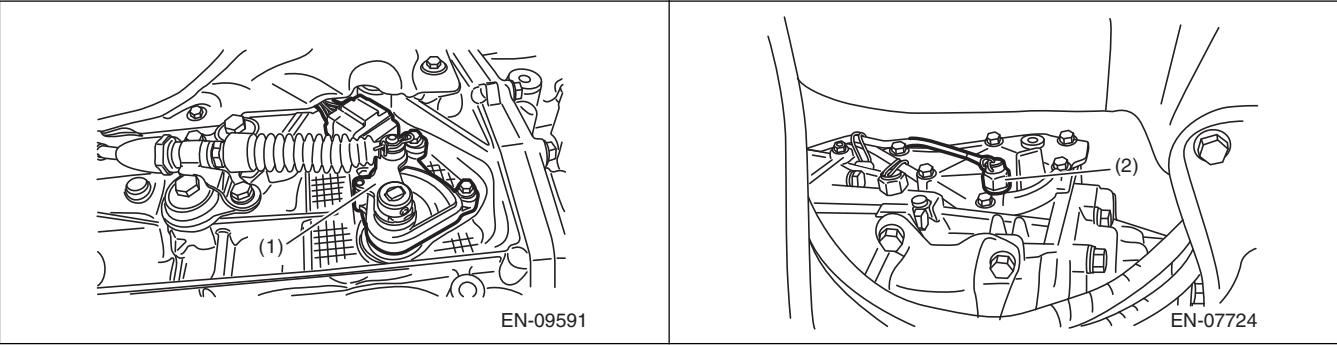
EN-10479

Electrical Component Location

ENGINE (DIAGNOSTICS)



4. TRANSMISSION



- (1) Inhibitor switch (CVT model)
- (2) Neutral position switch (MT model)

Provided Exclusively on Ebay
by Seller "4SubaruManuals"

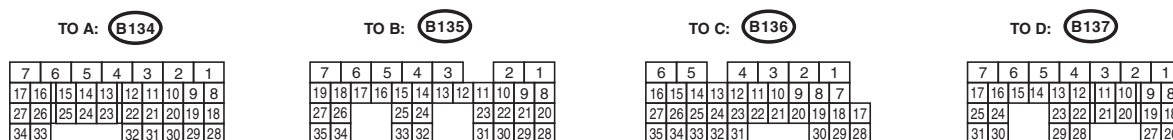


Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

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

A: ELECTRICAL SPECIFICATION



EN-05288

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Crankshaft position sensor	Signal (+)	B136	16	0	-7 — +7	Waveform
	Signal (-)	B136	27	0	0	—
	Shield	B136	35	0	0	—
Front oxygen (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	30	0	0	—
Rear oxygen sensor	Signal	B136	21	0	0 — 0.9	—
	Shield	B136	30	0	0	—
Front oxygen (A/F) sensor heater signal		B136	5	—	—	Waveform
Rear oxygen sensor heater signal		B134	6	0 — 13	—	Waveform
Engine coolant temperature sensor	Signal	B134	30	1.0 — 1.4	1.0 — 1.4	After engine is warmed up.
Air flow sensor	Signal	B137	22	—	0.3 — 4.5	—
	Shield	B137	28	0	0	—
	Ground	B137	29	0	0	—
Intake air temperature sensor signal		B137	12	0.3 — 4.6	0.3 — 4.6	—
Engine oil temperature sensor signal		B134	20	1.0 — 1.4	1.0 — 1.4	After engine is warmed up.
Starter switch		B137	17	0	0	Model without push button start Cranking: 8 — 14 Model with push button start Cranking: waveform

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Accessory cut request		B135	32	10 — 13	12 — 14	Model with push button start Cranking: 0
Starter switch 2		B137	14	0	0	Model with push button start Cranking: 8 — 14
Starter cut relay		B135	34	0	0	Model with push button start Cranking: 8 — 14
Ignition switch		B137	27	10 — 13	12 — 14	—
Neutral position switch		B137	16	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	—
Delivery mode switch		B137	13	10 — 13	12 — 14	When fuse is installed: 0
Knock sensor	Signal	B136	28	2.5	2.5	—
	Shield	B136	29	0	0	—
Back-up power supply		B137	2	10 — 13	12 — 14	Ignition switch "OFF": 10 — 13
Control module power supply		B136	6	10 — 13	12 — 14	—
		B137	1	10 — 13	12 — 14	—
Sensor power supply		B134	19	5	5	—
		B135	22	5	5	—
Ignition control	#1	B134	21	0	0 or 5	Waveform
	#2	B134	10	0	0 or 5	Waveform
	#3	B134	31	0	0 or 5	Waveform
	#4	B134	8	0	0 or 5	Waveform
Fuel injector	#1	B134	12	10 — 13	1 — 14	Waveform
	#2	B134	22	10 — 13	1 — 14	Waveform
	#3	B134	32	10 — 13	1 — 14	Waveform
	#4	B134	13	10 — 13	1 — 14	Waveform
Fuel pump relay control		B135	19	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
A/C relay control		B135	35	ON: 0.5 or less OFF: 10 — 13	ON: 0.5 or less OFF: 12 — 14	—
A/C switch		B137	26	ON: 10 — 13 OFF: 0	ON: 12 — 14 OFF: 0	Manual A/C model
Blower fan switch		B137	20	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	Manual A/C model
A/C middle pressure switch		B137	8	ON: 0 OFF: 10 — 13	ON: 0 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	Model with push button start Waveform
Purge control solenoid valve		B134	11	ON: 1 or less OFF: 10 — 13	ON: 1 or less OFF: 12 — 14	Waveform

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
EGR control valve	Signal 1	B136	11	0 or 10 — 13	0 or 12 — 14	—
	Signal 2	B136	13	0 or 10 — 13	0 or 12 — 14	—
	Signal 3	B136	31	0 or 10 — 13	0 or 12 — 14	—
	Signal 4	B136	32	0 or 10 — 13	0 or 12 — 14	—
Manifold absolute pressure sensor signal		B136	20	3.4 — 3.8	1.1 — 1.6	—
Electronic throttle control	Main	B134	18	Approx. 0.7	Approx. 0.6 — 0.7 (After engine is warmed up.)	Fully closed: Approx. 0.6 Fully open: Approx. 4.0
	Sub	B134	28	Approx. 1.6	Approx. 1.5 — 1.6 (After engine is warmed up.)	Fully closed: Approx. 1.5 Fully open: Approx. 4.2
Electronic throttle control motor (+)		B134	2	Duty waveform	Duty waveform	Drive frequency: 500 Hz
Electronic throttle control motor (—)		B134	1	Duty waveform	Duty waveform	Drive frequency: 500 Hz
Electronic throttle control motor power supply		B135	7	10 — 13	12 — 14	—
Electronic throttle control motor relay		B135	17	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	When ignition switch is turned to ON: ON
Intake oil control solenoid (LH)		B134	16	ON: 0 OFF: 10 — 13	ON: 0 OFF: 10 — 13	—
Intake oil control solenoid (RH)		B134	17	ON: 0 OFF: 10 — 13	ON: 0 OFF: 10 — 13	—
Intake camshaft position sensor (LH)		B136	15	0 or 5	0 or 5	Waveform
Intake camshaft position sensor (RH)		B136	26	0 or 5	0 or 5	Waveform
Camshaft position sensor ground		B136	34	0	0	—
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	—
	Sub signal sensor	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	—
Starter relay		B135	26	ON: 0 OFF: 10 — 13	ON: 0 OFF: 12 — 14	ON: cranking
Clutch switch		B137	15	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	MT model



Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description	Connector No.	Terminal No.	Signal (V)		Note
			Ignition SW ON (engine OFF)	Engine ON (idling)	
Brake switch 1 (brake switch)	B137	7	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)	B137	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	B137	30	When operating nothing: 3.5 — 4.5 When operating RES/ACC: 2.5 — 3.5 When operating following distance setting: 1.5 — 2.5 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 following distance setting: 1.5 — 2.5 When operating SET/COAST: 0.5 — 1.5 When operating CANCEL: 0 — 0.5	—
Cruise control main switch	B137	23	ON: 0 OFF: 5	ON: 0 OFF: 5	—
CAN communication	(Hi)	B137	19	—	—
	(Lo)	B137	18	—	—
Self-shutoff control	B135	13	0	0	—
Oil level switch	B136	24	0	0	Oil level LOW: 10 — 14
Generator control	B135	18	0 — 6.5	0 — 6.5	—
Battery current sensor	B137	11	2.6 — 2.8	2.4 — 2.6	After engine is warmed up. (New battery)
Battery temperature sensor	B137	24	1.1 — 2.4	1.1 — 2.4	When battery temperature is 20 — 50°C (68 — 122°F)
Tumble generator valve opening angle switch signal (LH)	B136	9	Fully closed: 0.5 or less Fully opened: 9.5 or more	Fully closed: 0.5 or less Fully opened: 9.5 or more	—
Tumble generator valve (LH open)	B134	23	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 opening angle switch signal (RH)	B136	23	Fully closed: 0.5 or less Fully opened: 9.5 or more	Fully closed: 0.5 or less Fully opened: 9.5 or more	—
Tumble generator valve (RH open)	B134	25	0 or 10 — 13	0 or 12 — 14	—
Tumble generator valve (RH closed)	B134	14	0 or 10 — 13	0 or 12 — 14	—
Immobilizer communication	B135	25	—	—	—

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
ELCM	Switching valve	B135	1	10 — 13	12 — 14	Operating: 0
	Pressure sensor	B135	20	1 — 4	1 — 4	When ignition switch is turned to ON: atmospheric pressure
	Vacuum pump	B135	8	10 — 13	12 — 14	Operating: 0
Ground	Sensor	B134	29	0	0	—
		B135	30	0	0	—
	Engine 1	B134	4	0	0	—
	Engine 2	B134	3	0	0	—
	Engine 3	B136	1	0	0	—
	Engine 4	B136	2	0	0	—
	Engine 5	B136	3	0	0	—
	Body	B137	4	0	0	—



Engine Control Module (ECM) I/O Signal

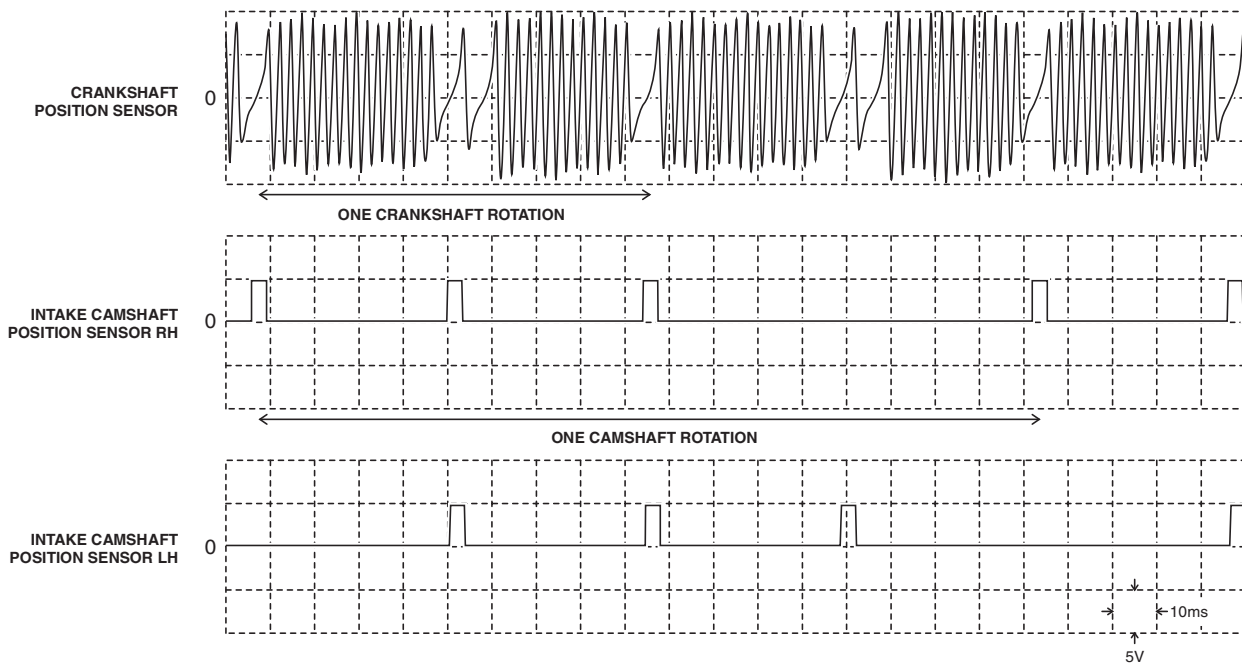
ENGINE (DIAGNOSTICS)

Input/output name:

- Crankshaft position sensor
- Intake camshaft position sensor RH
- Intake camshaft position sensor LH

Measuring condition:

- After warming-up
- At idling

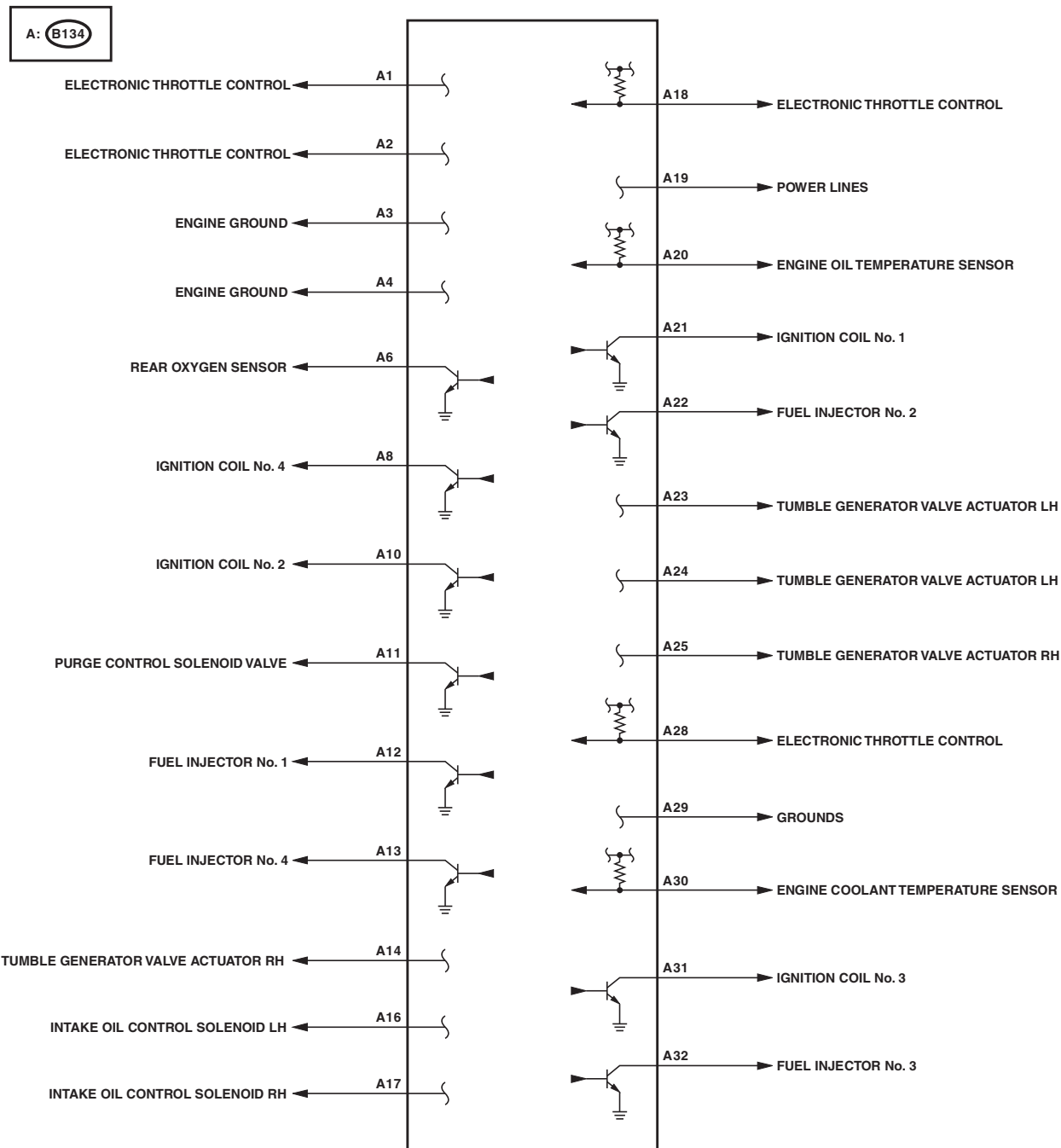


EN-08773



Engine Control Module (ECM) I/O Signal

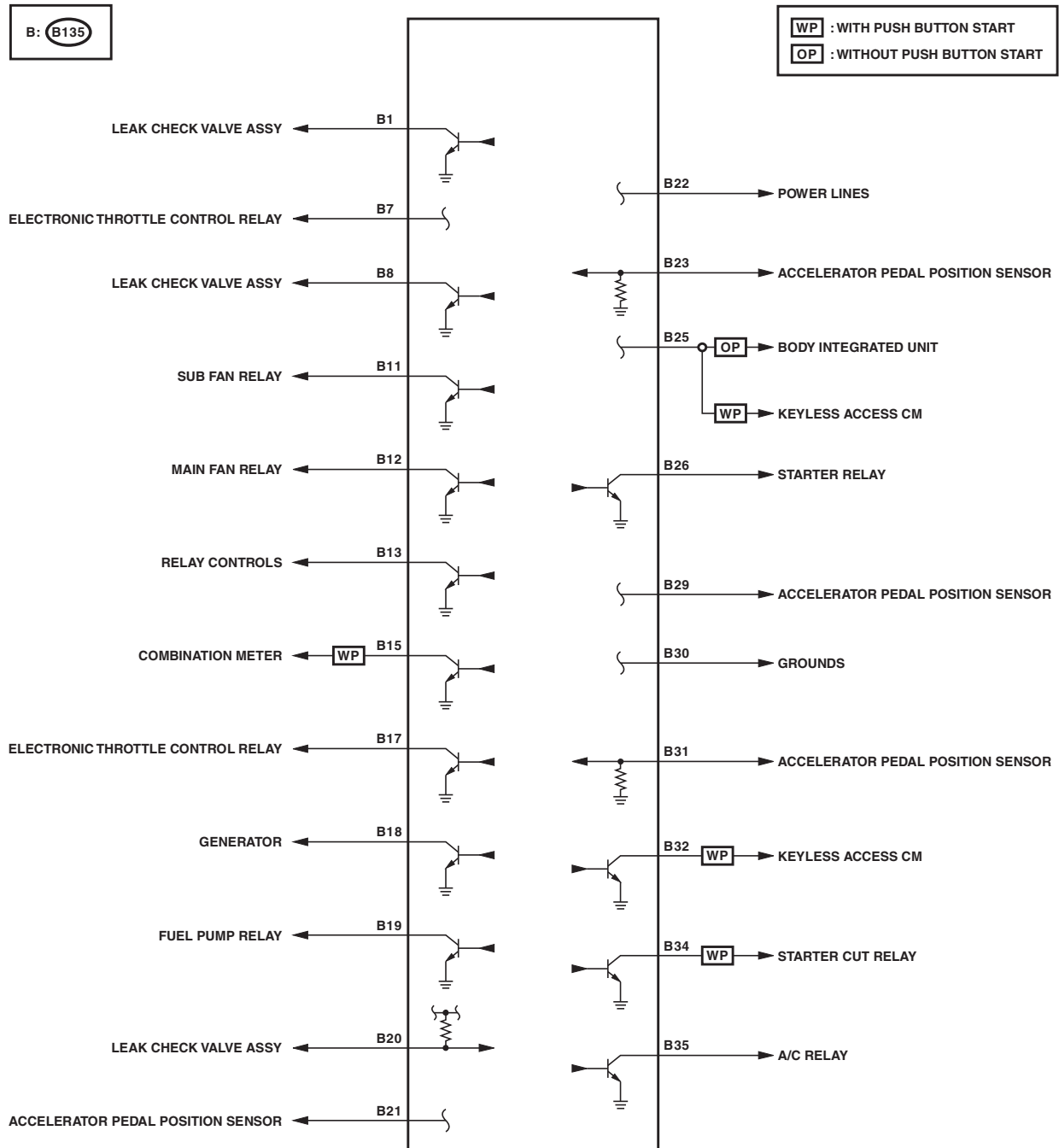
ENGINE (DIAGNOSTICS)



EN-09847

Engine Control Module (ECM) I/O Signal

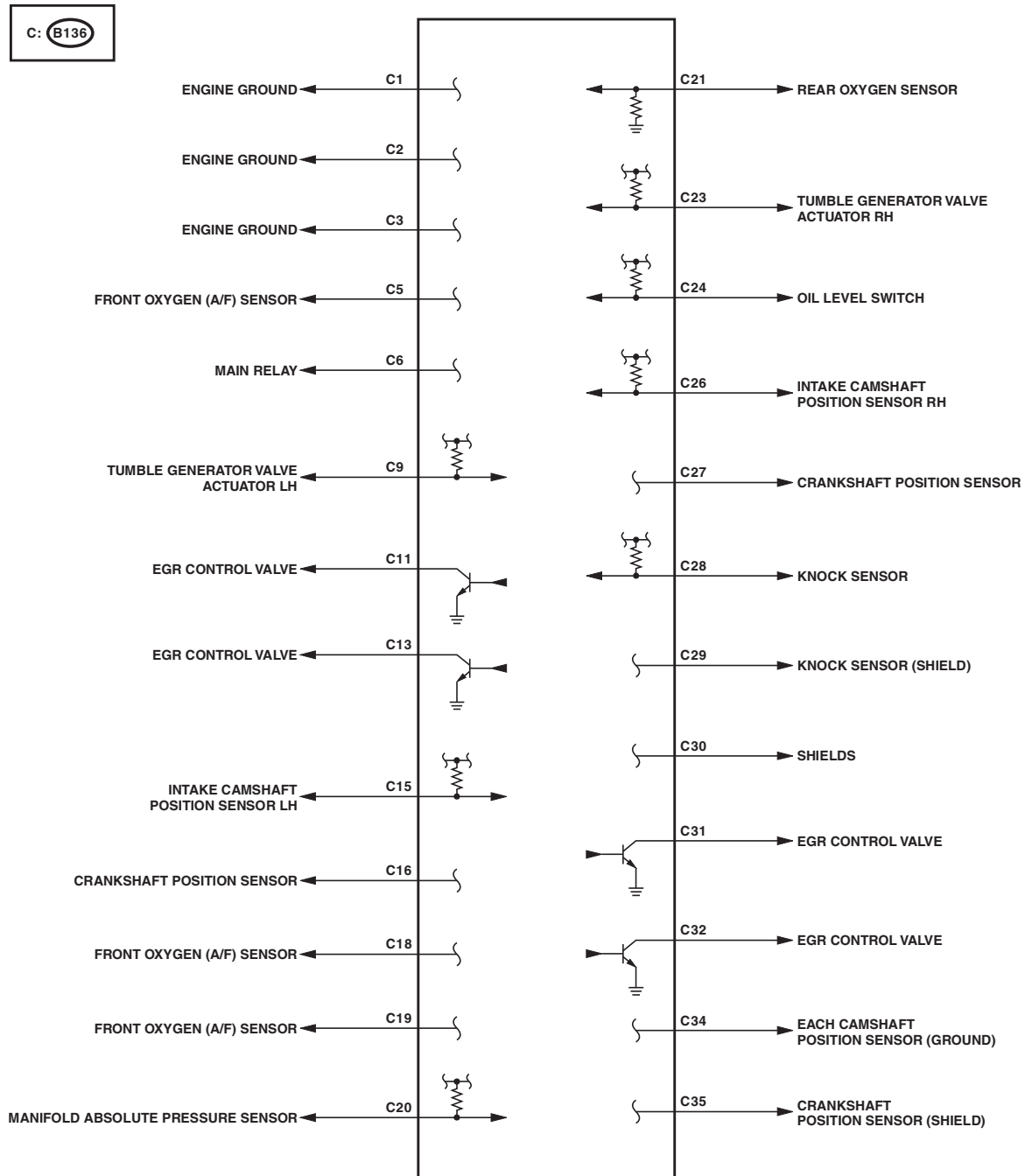
ENGINE (DIAGNOSTICS)



EN-10480

Engine Control Module (ECM) I/O Signal

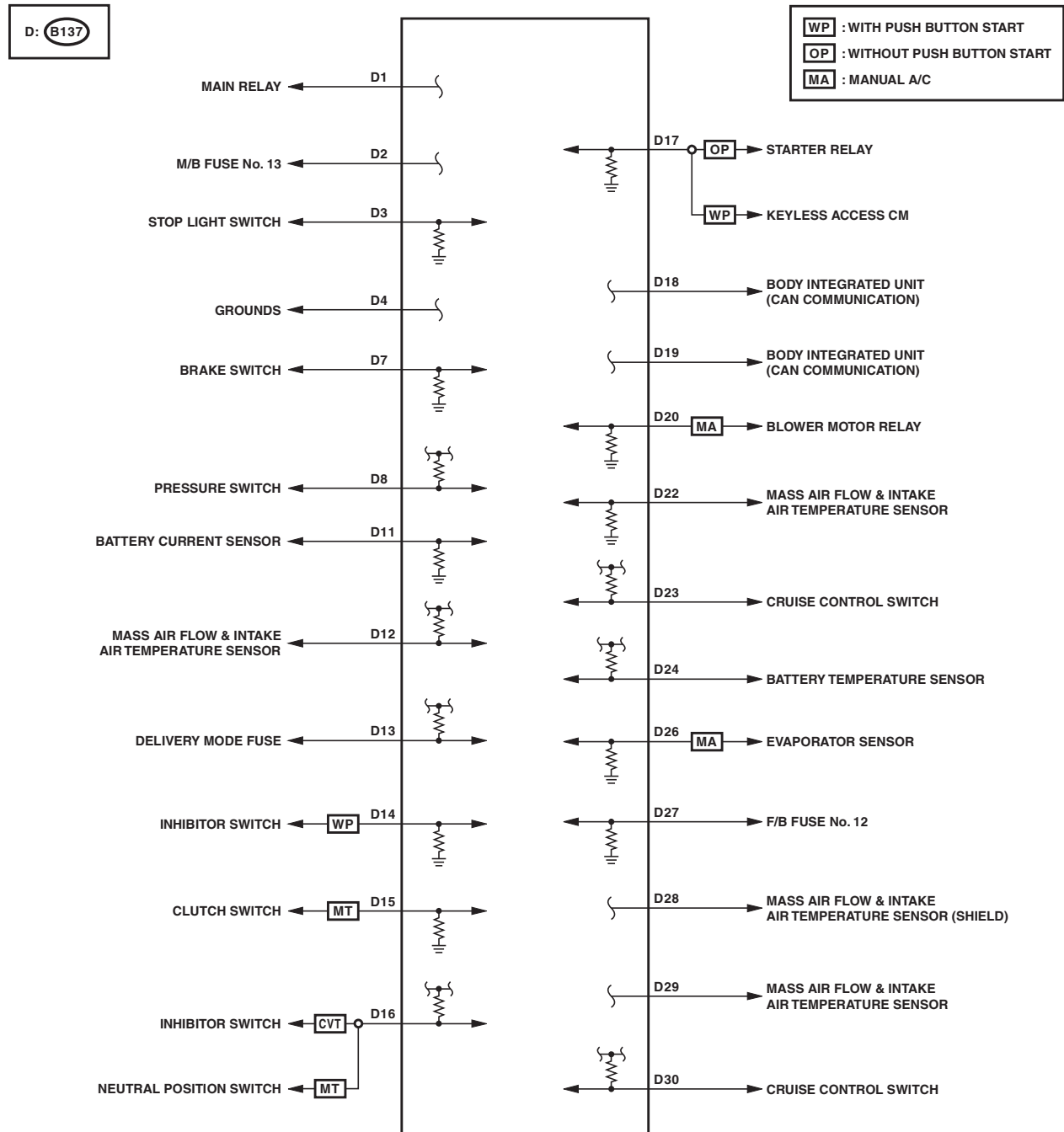
ENGINE (DIAGNOSTICS)



EN-10481

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)



EN-10482

Engine Condition Data

ENGINE (DIAGNOSTICS)

6. Engine Condition Data

A: ELECTRICAL SPECIFICATION

Contents	Specifications
Engine load	13.6 — 40.5 (%): Idling
	14.7 — 29.8 (%): 2,500 rpm racing

Measuring condition:

- After engine is warmed up.
- Set the select lever in “P” range or “N” range, or the shift lever in neutral.
- Turn the A/C to OFF.
- Turn all the accessory switches to OFF.

Data Link Connector

ENGINE (DIAGNOSTICS)

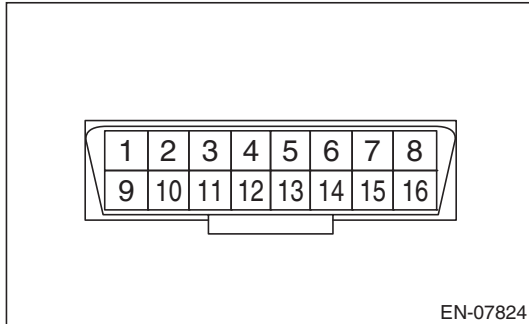
7. Data Link Connector

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.



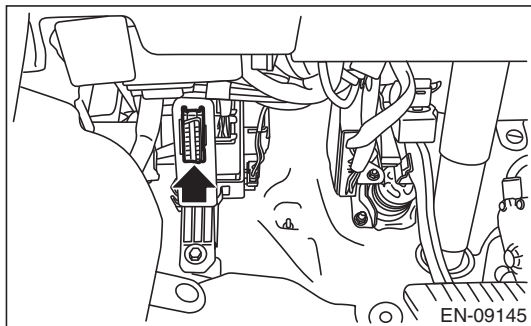
Terminal No.	Contents	Terminal No.	Contents
1	Empty	9	Empty
2	Empty	10	Empty
3	Empty	11	Empty
4	Ground	12	Empty
5	Ground	13	Empty
6	CAN communication (Hi)	14	CAN communication (Lo)
7	Empty	15	Empty
8	Empty	16	Power supply

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(H4DO)(diag)-83, 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	Intake air amount	g/s
\$11	Throttle valve opening angle	%
\$13	Air fuel ratio sensor	—
\$15	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor (Bank 1 Sensor 2)	V and %
\$1C	Supporting OBD system	—
\$1F	Elapsed time after starting the engine	sec
\$21	Travel distance after the malfunction indicator light illuminates	miles
\$24	A/F value and A/F sensor output voltage (Bank 1 Sensor 1)	— and V
\$2C	Target EGR	%
\$2D	EGR deviation	%
\$2E	Evaporative purge	%
\$2F	Fuel level	%
\$30	Number of warm ups after DTC clear	—
\$31	Travel distance after DTC clear	miles
\$33	Barometric pressure	kPa
\$34	A/F value and A/F sensor current (Bank 1 Sensor 1)	— and mA
\$3C	Catalyst temperature #1	°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 operating time while malfunction indicator lit	min
\$4E	Elapsed time after DTC clear	min
\$51	Fuel used	—
\$5A	Relative accelerator opening angle	%
\$65	Neutral status	—



General Scan Tool

ENGINE (DIAGNOSTICS)

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 (Bank 1 Sensor 1)	%
\$07	Long term fuel trim (Bank 1 Sensor 1)	%
\$0B	Intake manifold absolute pressure	kPa
\$0C	Engine speed	rpm
\$0D	Vehicle speed	MPH
\$0E	Ignition timing advance	°
\$0F	Intake air temperature	°C
\$10	Intake air amount	g/s
\$11	Throttle valve opening angle	%
\$13	Air fuel ratio sensor	—
\$15	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor (Bank 1 Sensor 2)	V and %
\$1C	Supporting OBD system	—
\$1F	Elapsed time after starting the engine	sec
\$2C	Target EGR	%
\$2D	EGR deviation	%
\$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 instruction 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(H4DO)(diag)-83, List of Diagnostic Trouble Code (DTC).>



General Scan Tool

ENGINE (DIAGNOSTICS)

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

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	
	\$91	\$20	A/F sensor response failure (Bank 1 Sensor 1)
	\$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	Oxygen sensor delay failure (Bank 1 Sensor 2)
	\$D1	\$10	
	\$D2	\$01	
\$21	\$89	\$20	Catalyst deterioration diagnosis (Bank 1)
\$31	\$8A	\$FD	EGR system diagnosis
\$35	\$8B	\$9D	VVT monitor (Bank 1)
	\$8C	\$9D	
	\$8D	\$9D	
	\$8E	\$9D	
	\$D3	\$9D	
	\$D4	\$9D	
	\$D5	\$9D	
	\$D6	\$9D	



General Scan Tool

ENGINE (DIAGNOSTICS)

OBDMID	TID	SID	Diagnostic item
\$36	\$8B	\$9D	VVT monitor (Bank 2)
	\$8C	\$9D	
	\$8D	\$9D	
	\$8E	\$9D	
	\$D3	\$9D	
	\$D4	\$9D	
	\$D5	\$9D	
\$3C	\$D6	\$9D	Evaporative emission control system (0.02 inch leak)
	\$96	\$FE	
	\$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)
\$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 \$09

Perform "Active Test" of the on-board system.

9. MODE \$09

Refer to the data of the vehicle specification.

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

9. Subaru Select Monitor

A: OPERATION

1. HOW TO USE SUBARU SELECT MONITOR

NOTE:

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

2. DISPLAY CURRENT ENGINE DATA

NOTE:

- For detailed operation procedures, refer to "PC application help for Subaru Select Monitor".
- A list of the support data is shown in the following table.
- *: For models without cruise control, the brake switch signal does not change.

Content	Display	Note (at idling)	Unit of measure
Engine speed signal	Engine Speed	650 rpm	rpm
Intake air amount	Mass Air Flow	2.5 g/s	g/s or lb/m
Vehicle speed signal	Vehicle Speed	0 km/h	km/h or MPH
Throttle position signal	Throttle Opening Angle	13%	%
Acceleration opening angle signal	Accel opening angle	0.0%	%
A/F sensor output lambda 1	A/F Sensor #1	1.00	—
#1 Cylinder ignition timing	Ignition timing adv. #1	15.5°	°
Engine coolant temperature signal	Coolant Temp.	96°C	°C or °F
Injection 1 pulse width	Fuel Injection #1 Pulse	2.56 ms	ms
Short term fuel trim by front oxygen (A/F) sensor (bank 1)	Short term fuel trim B1	0.8%	%
Long term fuel trim by front oxygen (A/F) sensor (bank 1)	Long term fuel trim B1	1.6%	%
Learned value of ignition timing	Learned Ignition Timing	0.0 deg	deg
Intake manifold absolute pressure signal	Mani. Absolute Pressure	32 kPa	kPa, mmHg, inHg or psig
Oxygen sensor (bank 1 sensor 2)	Oxygen sensor #12	0.7 V	V
AVCS advance angle amount RH	VVT Adv. Ang. Amount R	0 deg	deg
AVCS advance angle amount LH	VVT Adv. Ang. Amount L	0 deg	deg
Intake AVCS specified position learning value (bank 1)	VVT Initial Position Learning Value #1	60°CA	°CA
Intake AVCS specified position learning value (bank 2)	VVT Initial Position Learning Value #2	60°CA	°CA
ECM power supply voltage	ECU ACC	14.176 V	V
Target engine speed	Target engine speed	650 rpm	rpm
A/F target lambda	Target Equivalence Ratio	0.996	—
Engine oil temperature signal	Oil Temperature	96°C	°C or °F
Intake air temperature signal	Intake Air Temp.	50°C	°C or °F
Ambient temperature	Ambient Temperature	Ambient Temp for A/C	°C or °F
Engine load data	Calculated load value	15.3%	%
Absolute load	Absolute Load Value	14.9%	%
Atmospheric pressure signal	Atmospheric pressure	101 kPa	kPa, mmHg, inHg or psig
Intake manifold relative pressure	Mani. Relative Pressure	(Air intake absolute pressure – Atmospheric pressure)	kPa, mmHg, inHg or psig
Target throttle opening angle	Target Throttle Opening Angle	16 deg	deg
Actual throttle opening angle	Actual Throttle Opening Angle	16 deg	deg
Target throttle opening angle	Target Throttle Opening Angle	0.0%	%

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

Content	Display	Note (at idling)	Unit of measure
Relative throttle opening angle	Relative Throttle Pos.	1.6%	%
Electronic throttle control motor voltage	Throttle Motor Voltage	14.2 V	V
Main throttle position sensor voltage	Main-Throttle Sensor	0.66 V	V
Sub throttle position sensor voltage	Sub-Throttle Sensor	1.52 V	V
Throttle motor duty	Throttle Motor Duty	-14%	%
Main accelerator opening angle	Main Accelerator Pedal Position	0.0%	%
Sub accelerator opening angle	Sub Accelerator Pedal Position	0.0%	%
Main accelerator pedal position sensor voltage	Main-Accelerator Sensor	0.66 V	V
Sub accelerator pedal position sensor voltage	Sub-Accelerator Sensor	0.66 V	V
Mass air flow voltage	Air Flow Sensor Voltage	1.2 V	V
Fuel level signal	Fuel Level	—	%
Fuel level sensor resistance	Fuel level resistance	—	Ω
Evaporative purge	Evap Purge	0%	%
Purge control solenoid duty ratio	CPC Valve Duty Ratio	0%	%
Generator duty ratio	ALT Duty	67%	%
Alternator control mode	Alternator control mode	High/Mid/Low	—
Battery current value	Battery current value	10 A	A
Battery temperature signal	Battery temperature	29°C	°C or °F
Knock sensor correction	Knocking Correction	0.0 deg	deg
Air fuel ratio control system for bank 1	Fuel system for Bank 1	CL_normal	—
A/F sensor current value 1	A/F Sensor #1 Current	0.00 mA	mA
A/F sensor resistance value 1	A/F Sensor #1 Resistance	50 Ω	Ω
A/F correction #3	A/F Correction #3	0.00%	%
Number of EGR steps	No. of EGR steps	0 STEP	STEP
Target EGR	Commanded EGR	0%	%
EGR error	EGR Error	0%	%
Oil control solenoid duty ratio RH	OCV Duty R	55.3%	%
Oil control solenoid duty ratio LH	OCV Duty L	56.1%	%
Oil control solenoid current RH	OCV Current R	736 mA	mA
Oil control solenoid current LH	OCV Current L	768 mA	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	—
Total number of ignition switch ON	IGN Counter	—	times
Count	Count	Common	—
Elapsed time after ignition switch ON	past time after IG on	—	ms
Elapsed time after engine start	Time Since Engine Start	—	sec
Travel distance after DTC clear	Meter since DTC cleared	—	km/mile
Engine operating time while malfunction indicator light lit	Time while MIL lighted	—	min
Elapsed time after DTC clear	Time since DTC cleared	—	min
Number of warm ups after DTC clear	Number of warm-ups	—	times
Travel distance after the malfunction indicator light illuminates	Lighted MI lamp history	—	km/mile
Odometer	Odometer	—	km



Subaru Select Monitor

ENGINE (DIAGNOSTICS)

Content	Display	Note (at idling)	Unit of measure
Learning value of main accelerator sensor at fully closed position	Main Accelerator Sensor Learning Value at Closed Position	4.96 deg	deg
Learning value of sub accelerator sensor at fully closed position	Sub Accelerator Sensor Learning Value at Closed Position	4.56 deg	deg
Memory vehicle speed	Memorized Cruise Speed	0 km/h	km/h or MPH
Catalyst temperature #1	Catalyst temperature #11	305.1°C	°C or °F
Type of fuel	Type of fuel	GAS	—
Neutral condition	AT drive status / MT gear status	NEUT	—
X mode (CVT model)	X Mode	OFF	—
Neutral position switch signal	Neutral switch	Neutral	—
Electronic throttle control motor relay signal	ETC Motor Relay	ON	—
Clutch switch signal	Clutch switch	OFF	—
Stop light switch signal	Stop Light Switch	OFF (when OFF)	—
Brake switch signal*	Brake Switch	OFF (when OFF)	—
Soft idle switch signal	Idle Switch Signal	Idle	—
Ignition switch signal	Ignition switch	ON	—
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)	—
Radiator fan relay 2 signal	Radiator Fan Relay #2	OFF (when OFF)	—
Air conditioning switch signal	A/C Switch	OFF (when OFF)	—
Starter switch signal	Starter Switch	OFF	—
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)	—
Wiper switch signal	Wiper Switch	OFF (when OFF)	—
Tumble generator valve output signal	TGV Output	OFF	—
Tumble generator valve driving signal	TGV Drive	Close	—
AT/MT identification terminal	AT Vehicle ID Signal	ON/OFF	—
Delivery mode terminal	Delivery Mode Connector	OFF	—
Rear oxygen monitor	Rear O2 Rich Signal	ON/OFF	—
Knocking signal	Knocking Signal	OFF	—
Crankshaft position sensor signal	Crankshaft Position Sig.	ON	—
Camshaft position sensor signal	Camshaft Position Sig.	ON	—
AT coordinate retard angle demand signal	Retard Signal from AT	OFF	—
AT coordinate fuel cut demand signal	Fuel Cut signal from AT	OFF	—
Vehicle dynamics control (VDC) torque down prohibition output	Ban of Torque Down	ON	—
Vehicle dynamics control (VDC) torque down demand	Request Torque Down VDC	OFF	—
Permission signal in coordination with AT	Torque Permission Signal	ON (OFF on MT vehicles)	—
SET/COAST switch signal	SET/COAST Switch	OFF (when OFF)	—
RES/ACC switch signal	RESUME/ACCEL Switch	OFF (when OFF)	—
Main switch signal	Main switch	OFF (when OFF)	—
Distance change switch (model with EyeSight)	distance change SW	OFF (when OFF)	—
Cruise control cancel switch signal	CC Cancel SW	OFF (when OFF)	—
Fuel pump relay signal	Fuel Pump Relay	ON	—



Subaru Select Monitor

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Content	Display	Note (at idling)	Unit of measure
All cylinders fuel cut	All Cylinders Fuel cut	OFF	—
Request for shift pattern during low water temperature	Shift Pattern Demand for Low Water Temperature	OFF	—
Oil level switch signal	Oil level switch	HIGH level	—
ELCM switching valve drive signal	ELCM switching valve	Open	—
ELCM vacuum pump drive signal	ELCM pump	OFF	—
Condition of malfunction indicator light	MI(MIL)	OFF	—
Number of diagnosis code	Number of DTCs	0	—
A/F correction (bank 1 sensor 2)	Short term fuel trim #12	0.0%	%
Front oxygen (A/F) sensor (bank 1 sensor 1)	Oxygen sensor #11	Support	—
Oxygen sensor (Bank 1 Sensor 2)	Oxygen sensor #12	Support	—
A/F lambda signal (Bank 1 Sensor 1)	A/F Sensor #11	1.001	—
A/F sensor output signal (Bank 1 Sensor 1)	A/F Sensor #11	2.193 V	V
A/F lambda signal (Bank 1 Sensor 1)	A/F Sensor #11	1.001	—
A/F sensor current (Bank 1 Sensor 1)	A/F Sensor #11	0.00	mA
Absolute throttle opening angle 2	Absolute Throttle Pos.#2	30.6%	%
Absolute accelerator opening angle 1	Accelerator Pedal Pos.#1	13.3%	%
Absolute accelerator opening angle 2	Accelerator Pedal Pos.#2	13.3%	%
Relative acceleration opening angle	Relative Accelera. Pos.	0%	%
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)	NO	—
Test of evaporative emission purge control system	Evaporative purge system(Rdy)	N/A	—
Secondary air system test	Secondary air system(Supp)	NO	—
Secondary air system test	Secondary air system(Rdy)	N/A	—
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)	YES	—
Test of EGR system	EGR system(Rdy)	NO	—
Monitoring test of misfire	Misfire monitoring(Enable)	YES	—
Monitoring test of misfire	Misfire monitoring(Comp)	NO	—
Monitoring test of fuel system	Fuel system monitoring(Enable)	YES	—
Monitoring test of fuel system	Fuel system monitoring(Comp)	NO	—



Subaru Select Monitor

ENGINE (DIAGNOSTICS)

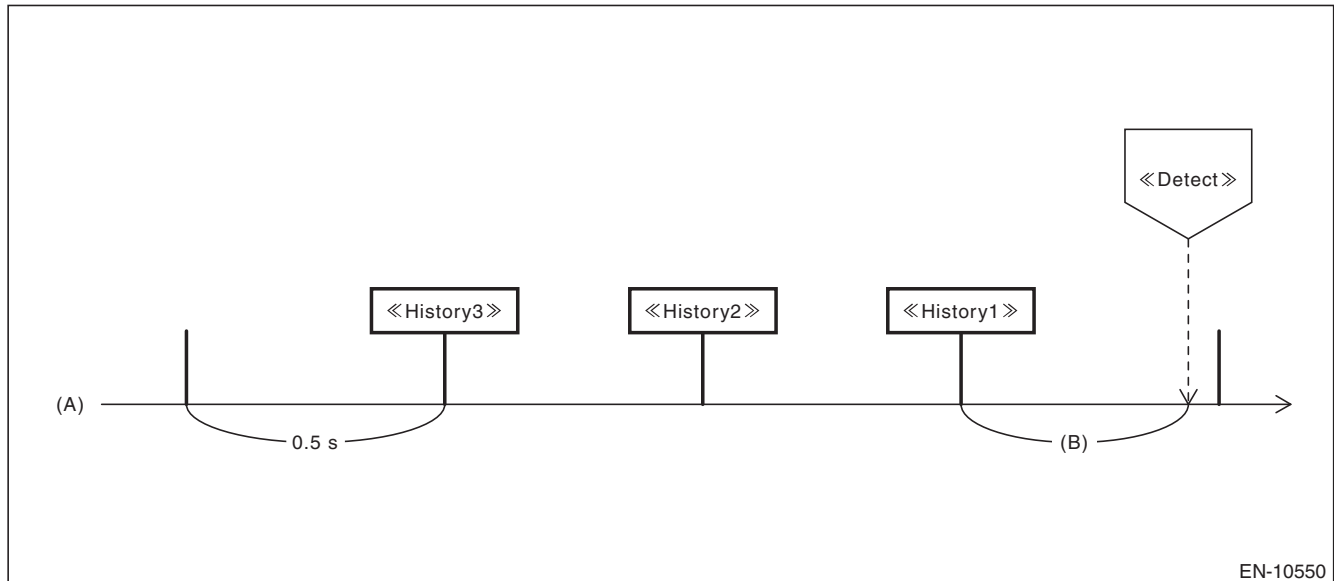
Content	Display	Note (at idling)	Unit of measure
Monitoring test of comprehensive component	Component monitoring(Enable)	YES	—
Monitoring test of comprehensive component	Component monitoring(Comp)	NO	—
Test of catalyst	Catalyst Diagnosis(Enable)	YES	—
Test of catalyst	Catalyst Diagnosis(Comp)	NO	—
Test 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)	N/A	—
Test of evaporative emission purge control system	Evaporative purge system(Comp)	N/A	—
Secondary air system test	Secondary air system(Enable)	N/A	—
Secondary air system test	Secondary air system(Comp)	N/A	—
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	—
Test of oxygen sensor heater	O2 Heater Diagnosis(Comp)	NO	—
Test of EGR system	EGR system(Enable)	YES	—
Test of EGR system	EGR system(Comp)	NO	—
Number of counts for denominator of diagnosis frequency	General Denominator	—	times
Number of counts for ignition cycle	IG counter	—	times
On-board diagnostic system	OBD System	OBD/OBD2	—



3. DISPLAY OF ENGINE FREEZE FRAME DATA

NOTE:

- ECM captures the freeze frame data every 0.5 seconds and always keeps the latest three cords. Time-series freeze frame data includes the latest three freeze frame data and the freeze frame data when the DTC is detected.
- In the time-series freeze frame data, the following freeze frame data are displayed: «Detect», «History1», «History2», and «History3».
- Time lag between the freeze frame data of «Detect» and the freeze frame data of «History1» changes within the range of 0 — 0.5 seconds. This is because the freeze frame data of «Detect» is recorded when the DTC is actually detected, while the freeze frame data of «History1» is updated every 0.5 seconds.



(A) 0.5 seconds timer

(B) Changes within the range of 0 — 0.5 seconds, depending on the timing of DTC detection.

- When more than one DTCs are recorded, the time-series freeze frame data is recorded only for the first-detected DTC, and for the next DTC, just the freeze frame data of «Detect» is recorded. And for the subsequent DTCs, no freeze frame data is recorded.
- When performing diagnosis, you can utilize the time-series freeze frame data to guess the vehicle status when the DTC was detected.
- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

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

Contents	Display	Unit of measure
Total number of ignition switch ON	IGN Counter	times
Count	Count	—
Elapsed time after ignition switch ON	IG-ON Elapsed Time	ms
Air fuel ratio control system for bank 1	Fuel system for Bank 1	—
Oxygen sensor (Bank 1 Sensor 2)	Oxygen sensor #12	V
A/F correction (Bank 1 Sensor 2)	Short term fuel trim #12	%
Front oxygen (A/F) sensor (Bank 1 Sensor 1)	Oxygen sensor #11	—
Oxygen sensor (Bank 1 Sensor 2)	Oxygen sensor #12	—
Neutral condition	AT drive status	—
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	kPa, mmHg, inHg or psig
Engine speed signal	Engine Speed	rpm
Vehicle speed signal	Vehicle Speed	km/h or MPH
#1 Cylinder ignition timing	Ignition timing adv. #1	°
Intake air temperature signal	Intake Air Temp.	°C or °F
Intake air amount	Mass Air Flow	g/s or lb/m
Throttle position signal	Throttle Opening Angle	%
On-board diagnostic system	OBD System	—
Elapsed time after engine start	Time Since Engine Start	sec
Target EGR	Commanded EGR	%
EGR error	EGR Error	%
Evaporative purge	Evap Purge	%
Fuel level signal	Fuel Level	%
Atmospheric pressure signal	Atmosphere Pressure	kPa, mmHg, 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	%
Actual throttle opening angle	Actual Throttle Opening Angle	deg

4. 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.

10. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1. SUBARU SELECT MONITOR

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(H4DO)(diag)-83, List of Diagnostic Trouble Code (DTC).>

2. 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(H4DO)(diag)-83, List of Diagnostic Trouble Code (DTC).>

NOTE:

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



Inspection Mode

ENGINE (DIAGNOSTICS)

11. Inspection Mode

A: PROCEDURE

Perform the diagnosis shown in the following DTC table.

When performing the diagnosis not listed in "List of Diagnostic Trouble Code (DTC)", refer to the item on the drive cycle. <Ref. to EN(H4DO)(diag)-47, 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	—
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)	—
P0197	Engine Oil Temperature Sensor Low	—
P0198	Engine Oil Temperature Sensor High	—
P0222	Throttle/Pedal Position Sensor/Switch "B" Circuit Low	—
P0223	Throttle/Pedal Position Sensor/Switch "B" Circuit High	—
P0327	Knock Sensor 1 Circuit Low (Bank 1 or Single Sensor)	—
P0328	Knock Sensor 1 Circuit High (Bank 1 or Single Sensor)	—
P0335	Crankshaft Position Sensor "A" Circuit	—
P0336	Crankshaft Position Sensor "A" Circuit Range/Performance	—
P0340	Camshaft Position Sensor "A" Circuit (Bank 1 or Single Sensor)	—
P0341	Camshaft Position Sensor "A" Circuit Range/Performance (Bank 1 or Single Sensor)	—
P0345	Camshaft Position Sensor "A" Circuit (Bank 2)	—
P0346	Camshaft Position Sensor "A" Circuit Range/Performance (Bank 2)	—
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	—
P0512	Starter Request Circuit	—
P0516	Battery Temperature Sensor Circuit Low	—
P0517	Battery Temperature Sensor Circuit High	—

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Inspection Mode

ENGINE (DIAGNOSTICS)

DTC	Item	Condition
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	EEPROM Failure	—
P081A	Starter Disable Circuit Low	—
P1160	Return Spring Failure	—
P1530	Battery Current Sensor Circuit Low	—
P1531	Battery Current Sensor Circuit High	—
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	—
U0073	Control Module Communication Bus "A" Off	—
U0101	Lost Communication With TCM	—
U0122	Lost Communication With Vehicle Dynamics Control Module	—
U0155	Lost Communication With Instrument Panel Cluster (IPC) Control Module	—
U0402	Invalid Data Received From TCM	—
U0416	Invalid Data Received From Vehicle Dynamics Control Module	—
U0423	Invalid Data Received From Instrument Panel Cluster Control Module	—

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) Perform the Clear Memory Mode. <Ref. to EN(H4DO)(diag)-58, Clear Memory Mode.>

3) Read the diagnostic trouble code (DTC) and check that no DTC is displayed. <Ref. to EN(H4DO)(diag)-43, Read Diagnostic Trouble Code (DTC).>

NOTE:

If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis using "Diagnostic Procedure with Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO)(diag)-92, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> After solving the DTC, repeat from step 2).

4) Start the engine, and run the engine at idle for 10 seconds or more.

5) Read the readiness code using Subaru Select Monitor and check that the concerned DTC is not displayed. For detailed operation procedures, refer to "PC application help for Subaru Select Monitor".

NOTE:

- The readiness code shows self-diagnosis status of each DTC. If any DTC is displayed when you select the readiness code, the self-diagnosis of the DTC is not executed or completed. After the self-diagnosis is complete, DTC will no longer be displayed regardless of the diagnostic result.
- Self-diagnosis is executed every time when the ignition switch is turned to ON. Therefore, even after the self-diagnosis is complete and nothing is displayed on the readiness code display, if you turn the ignition switch to ON again after turning it OFF, some DTCs may be displayed on the readiness code display.
- After you repair a DTC and perform the Inspection Mode or the drive cycle, use the readiness code to check if the self-diagnosis of the DTC is completed. If the concerned DTC is displayed, the self-diagnosis of the DTC is not complete. Repeat from step 4).

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Inspection Mode

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6) Read the diagnostic trouble code (DTC) and check the DTC. <Ref. to EN(H4DO)(diag)-43, Read Diagnostic Trouble Code (DTC).>

NOTE:

If the DTC is displayed on the screen, the trouble is still present. Perform the diagnosis using "Diagnostic Procedure with Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO)(diag)-92, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> After solving the DTC, repeat from step 2).

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(H4DO)(diag)-58, Clear Memory Mode.>

NOTE:

Perform the drive cycle after warming up the engine except when the engine coolant temperature at engine start is specified.

2. DRIVE CYCLE A

DTC	Item	Condition
P0125	Insufficient Coolant Temperature for Closed Loop Fuel Control	«Coolant Temp.» at engine start: Less than 15°C (5°F)
P0128	Coolant Thermostat (Engine Coolant Temperature Below Thermostat Regulating Temperature)	—
P0141	O2 Sensor Heater Circuit (Bank1 Sensor2)	—
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)	—
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.
P0196	Engine Oil Temperature Sensor Circuit Range/Performance	«Oil Temperature» at engine start: Less than 40°C (104°F)
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.
P2195	O2 Sensor Signal Biased/Stuck Lean (Bank 1 Sensor 1)	—
P2196	O2 Sensor Signal Biased/Stuck Rich (Bank 1 Sensor 1)	—

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.
- 3) Read the temporary code using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO)(diag)-43, OPERATION, Read Diagnostic Trouble Code (DTC).>

Drive Cycle

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3. DRIVE CYCLE B

DTC	Item	Condition
P0010	"A" Camshaft Position Actuator Circuit/Open (Bank 1)	—
P0020	"A" Camshaft Position Actuator Circuit/Open (Bank 2)	—
P0137	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 2)	—
P0138	O2 Sensor Circuit High Voltage (Bank 1 Sensor 2)	—
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.
P0201	Cylinder 1 - Injector Circuit	—
P0202	Cylinder 2 - Injector Circuit	—
P0203	Cylinder 3 - Injector Circuit	—
P0204	Cylinder 4 - Injector Circuit	—
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.
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	—
P0500	Vehicle Speed Sensor "A"	—
P0506	Idle Air Control System RPM Lower Than Expected	—
P0507	Idle Air Control System RPM Higher Than Expected	—
P0700	Transmission Control System (MIL Request)	—
P1532	Battery Charging System	—
P2006	Intake Manifold Runner Control Stuck Closed (Bank 1)	—
P2007	Intake Manifold Runner Control Stuck Closed (Bank 2)	—
P2009	Intake Manifold Runner Control Circuit Low (Bank 1)	—
P2012	Intake Manifold Runner Control Circuit Low (Bank 2)	—
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.
P2135	Throttle/Pedal Position Sensor/Switch "A"/"B" Voltage Correlation	—
P2138	Throttle/Pedal Position Sensor/Switch "D"/"E" Voltage Correlation	—
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.
- 3) Read the temporary code using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO)(diag)-43, OPERATION, Read Diagnostic Trouble Code (DTC).>

Drive Cycle

ENGINE (DIAGNOSTICS)

4. DRIVE CYCLE C

DTC	Item	Condition
P000A	A Camshaft Position Slow Response (Bank 1)	—
P000C	A Camshaft Position Slow Response (Bank 2)	—
P0011	Intake Camshaft Position - Timing Over-Advanced or System Performance (Bank 1)	—
P0021	Intake Camshaft Position - Timing Over-Advanced or System Performance (Bank 2)	—
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)	—
P0140	O2 Sensor Circuit No Activity Detected (Bank1 Sensor2)	—
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.
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.
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.
P0400	Exhaust Gas Recirculation Flow	—
P0441	Evaporative Emission Cont. Sys. Incorrect Purge Flow	—
P0851	Park/Neutral Switch Input Circuit Low	—
P0852	Park/Neutral Switch Input Circuit High	—
P1449	Evaporative Emission Cont. Sys. Air Filter Clog	—
P1492	EGR Solenoid Valve Signal #1 Circuit Malfunction (Low Input)	—
P1493	EGR Solenoid Valve Signal #1 Circuit Malfunction (High Input)	—
P1494	EGR Solenoid Valve Signal #2 Circuit Malfunction (Low Input)	—
P1495	EGR Solenoid Valve Signal #2 Circuit Malfunction (High Input)	—
P1496	EGR Solenoid Valve Signal #3 Circuit Malfunction (Low Input)	—
P1497	EGR Solenoid Valve Signal #3 Circuit Malfunction (High Input)	—
P1498	EGR Solenoid Valve Signal #4 Circuit Malfunction (Low Input)	—
P1499	EGR Solenoid Valve Signal #4 Circuit Malfunction (High Input)	—
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.

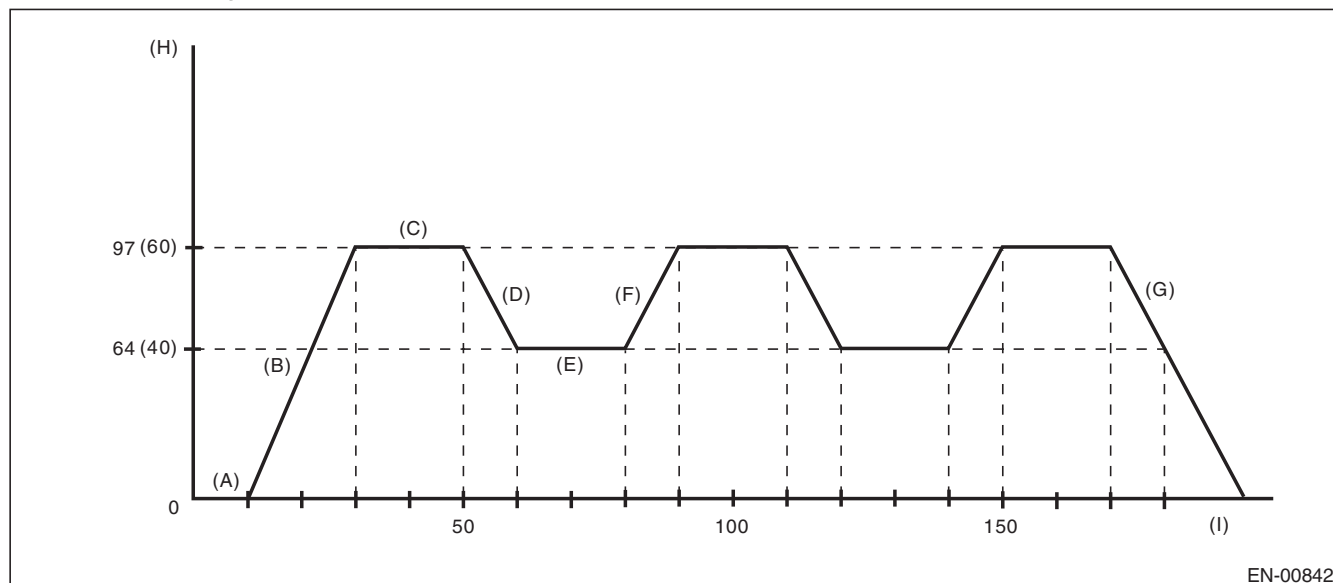


Drive Cycle

ENGINE (DIAGNOSTICS)

Diagnostic procedure:

1) Drive according to the drive pattern described below.



- | | | |
|---|--|--|
| (A) Shift the select lever to "P" range or the shift lever to the neutral position, and cool down the engine by idling it for 10 seconds or more. | (D) Decelerate with fully closed throttle to 64 km/h (40 MPH) or less. | (G) Stop vehicle with the 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. |

2) Read the temporary code using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO)(diag)-43, OPERATION, Read Diagnostic Trouble Code (DTC).>

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(H4DO)(diag)-58, 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.)

4) Read the temporary code using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO)(diag)-43, OPERATION, Read Diagnostic Trouble Code (DTC).>

Drive Cycle

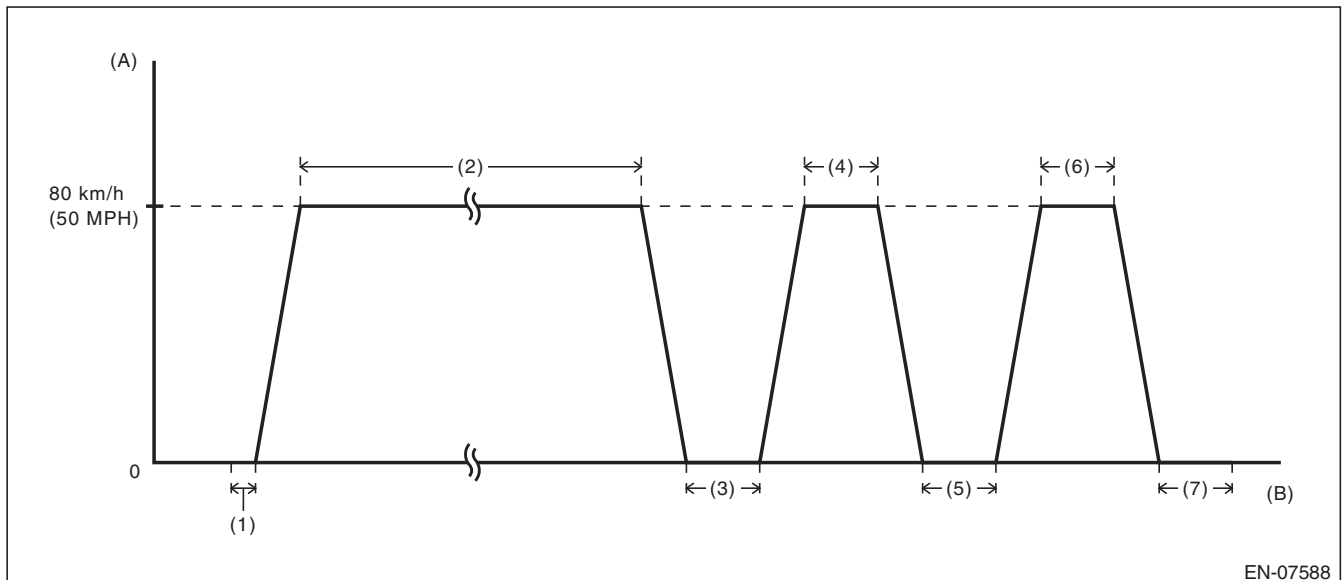
ENGINE (DIAGNOSTICS)

6. DRIVE CYCLE F

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

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.



(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).
- 3) Read the temporary code using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO)(diag)-43, OPERATION, Read Diagnostic Trouble Code (DTC).>

Drive Cycle

ENGINE (DIAGNOSTICS)

7. DRIVE CYCLE H

DTC	Item	Condition
P0116	Engine Coolant Temp. Sensor Circuit Range/Performance	6 hours have elapsed since ignition switch is OFF under a completely warmed up condition.
P0451	Evaporative Emission System Pressure Sensor/Switch Range/Performance	60 seconds have elapsed since ignition switch is OFF.
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(H4DO)(diag)-58, Clear Memory Mode.>
- 2) With the ignition switch ON (engine stopped), read the values in «Coolant Temp.» and «Intake Air Temp.» <Ref. to EN(H4DO)(diag)-36, DISPLAY CURRENT ENGINE DATA, OPERATION, 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.
 - For CVT models, hold the select lever to “P” range or “N” range at idling, and for MT models, the shift lever in the neutral position at idling.
- 4) Read the temporary code using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO)(diag)-43, OPERATION, Read Diagnostic Trouble Code (DTC).>

8. 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.

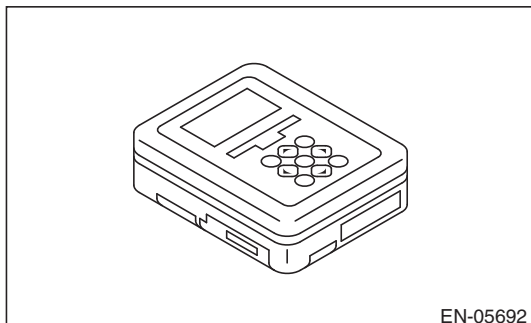
NOTE:

- 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.

- Perform MODE \$08 when using a general scan tool.

Diagnostic procedure:

1) Prepare the Subaru Select Monitor kit. <Ref. to EN(H4DO)(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:

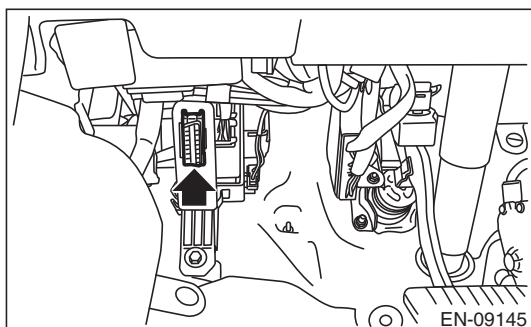
The dedicated port for the Subaru Select Monitor means the USB port which was used to install the Subaru Select Monitor.

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.

Drive Cycle

ENGINE (DIAGNOSTICS)

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, use Subaru Select Monitor to check that the values in «Coolant Temp.» and «Intake Air Temp.» are within the specified range. If the conditions are satisfied, make the necessary preparation for the drive cycle again. <Ref. to EN(H4DO)(diag)-47, 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.

NOTE:

Perform MODE \$06 and check when using a general scan tool.

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 the pending code 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 the pending code using the Subaru Select Monitor.

19) When the evaporative system leak test is completed correctly, read the pending code with the ignition switch turned to ON position. If the DTC is recorded, check the appropriate DTC. <Ref. to EN(H4DO)(diag)-43, OPERATION, Read Diagnostic Trouble Code (DTC).>

NOTE:

- Perform MODE \$07 when using a general scan tool.
- The pending code will be cleared by turning ignition switch to OFF.

9. DRIVE CYCLE J

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

Diagnostic procedure:

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 or general scan tool. <Ref. to EN(H4DO)(diag)-43, OPERATION, Read Diagnostic Trouble Code (DTC).>

Drive Cycle

ENGINE (DIAGNOSTICS)

10.DRIVE CYCLE K

DTC	Item	Condition
P0458	Evaporative Emission System Purge Control Valve Circuit Low	—
P2401	Evaporative Emission System Leak Detection Pump Control Circuit Low	«Coolant Temp.»: 5 — 45°C (41 — 113°F) «Intake Air Temp.»: 5 — 50°C (41 — 122°F)
P2419	Evaporative Emission System Switching Valve Control Circuit Low	

Diagnostic procedure:

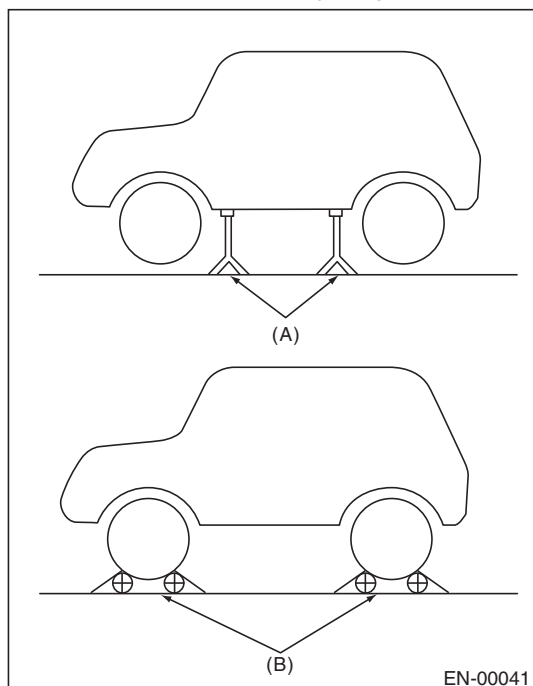
1) Lift up the vehicle using a garage jack and place it on rigid racks, or drive the vehicle onto free rollers.

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.

NOTE:

On vehicles equipped with EyeSight, turn the pre-collision function to OFF.



(A) Rigid rack

(B) Free roller

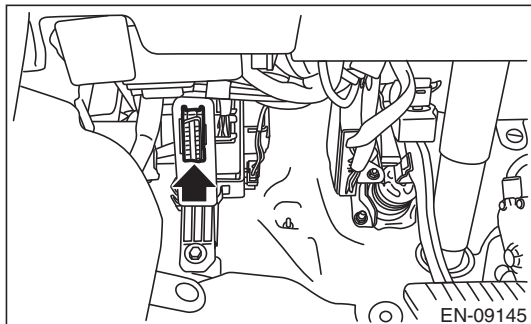
Drive Cycle

ENGINE (DIAGNOSTICS)

2) Connect the Subaru Select Monitor or 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.



3) Start the engine.

NOTE:

Ensure the selector lever is placed in the "P" range before starting.

4) Turn the neutral position switch to ON using select lever.

5) Depress the brake pedal to turn the brake switch ON.

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

7) Shift the select lever in the "D" range 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)-23, Clear Memory Mode.>
- 8) Read the temporary code using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO)(diag)-43, OPERATION, Read Diagnostic Trouble Code (DTC).>

11.DRIVE CYCLE N

DTC	Item	Condition
P0016	Crankshaft Position - Camshaft Position Correlation (Bank1)	«Coolant Temp.»: 80°C (176°F) or more
P0018	Crankshaft Position - Camshaft Position Correlation (Bank2)	

WARNING:

When performing drive cycle N on a public road, pay sufficient attention to the traffic condition and give the highest priority to safe driving.

1) Check the data in condition column of table by using the Subaru Select Monitor or general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO)(diag)-36, DISPLAY CURRENT ENGINE DATA, OPERATION, Subaru Select Monitor.>

- General scan tool

For detailed operation procedures, refer to the general scan tool operation manual.

2) While the conditions in the list are satisfied, race the engine at the speed of approx. 2,500 rpm for 40 seconds or more.

3) Start the vehicle, then accelerate the vehicle to 50 km/h (31.1 MPH) or more.

Drive Cycle

ENGINE (DIAGNOSTICS)

4) When the speed reaches 50 km/h (31.1 MPH) or more, release the accelerator pedal, the brake pedal and the clutch pedal (MT model) to decelerate the vehicle without shifting the gear. At this time, select an appropriate gear beforehand so that the engine speed can decrease from 2,500 rpm to 1,900 rpm for 5 seconds or more.

NOTE:

- The vehicle speed does not matter so long as the engine speed can maintain from 2,500 rpm to 1,900 rpm for 5 seconds or more.

Example: On a downhill grade, it can be performed with a low speed gear and at a low vehicle speed.

- When it is performed with the electrical load such as the air conditioner, etc. turned OFF or the vehicle driven on a downhill grade, the engine speed decreases slowly. Therefore, the continuous time can be maintained easily.

5) Bring the vehicle to a stop in a safe place, and idle it for 5 minutes or more.

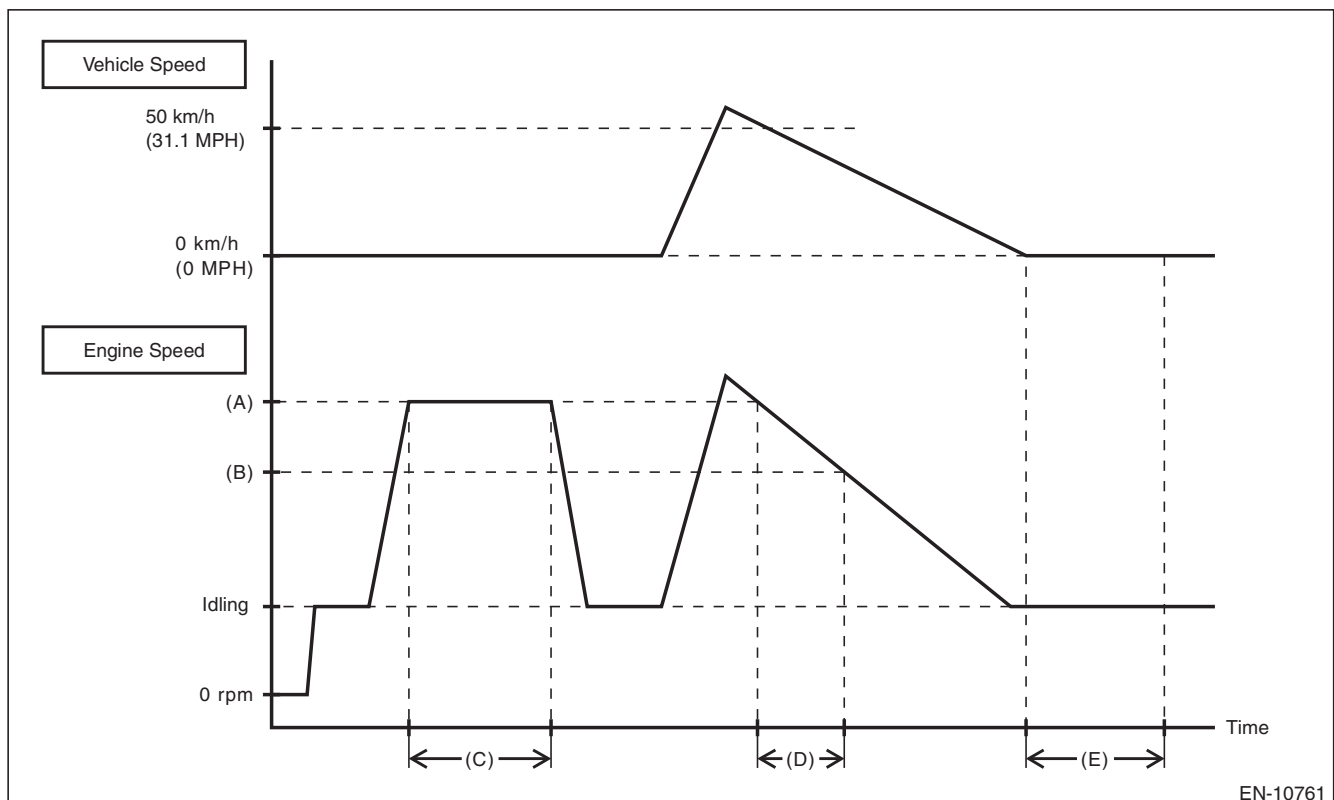
NOTE:

Driving method while vehicle is driven to a stop at safe place is not restricted.

6) With the vehicle idling, read the temporary diagnostic code of DTC using Subaru Select Monitor or general scan tool.

NOTE:

- Refer to "Read Diagnostic Trouble Code (DTC)" for detailed operation procedure. <Ref. to EN(H4DO)(diag)-43, Read Diagnostic Trouble Code (DTC).>
- In the step 6), if the DTC is not displayed on the Subaru Select Monitor or general scan tool display screen, the trouble is resolved.



(A) 2,500 rpm
(D) 5 seconds or more

(B) 1,900 rpm
(E) 5 minutes or more

(C) 40 seconds or more

Clear Memory Mode

ENGINE (DIAGNOSTICS)

13. Clear Memory Mode

A: OPERATION

1. SUBARU SELECT MONITOR

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. GENERAL SCAN TOOL

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

NOTE:

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

System Operation Check Mode

ENGINE (DIAGNOSTICS)

14. System Operation Check Mode

A: OPERATION

CAUTION:

After executing the system operation check mode, execute the Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>.

1. ENGINE

NOTE:

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

Item		SSM display		Execution condition
Activating the actuator ON/OFF	Activating the fuel pump ON/OFF	Fuel Pump	ON ↔ OFF	Ignition switch is ON (engine OFF)
	Activating the purge control solenoid valve ON/OFF	CPC Solenoid Valve	ON ↔ OFF	
	Activating the radiator fan relay ON/OFF	Radiator Fan Relay	ON ↔ OFF	
	Activating the A/C relay ON/OFF	A/C Relay	ON ↔ OFF	
	Activating the ELCM switching valve	ELCM switching valve	ON ↔ OFF	
	Activating the ELCM vacuum pump	ELCM pump	ON ↔ OFF	
Fuel pump control	Fuel pump OFF operation	OFF drive	OFF	At idling
Fixing the timing of idle ignition		Fixed Idle Ignition Timing	16.0°	At idling
Idle speed control		Idle Speed Control	500 — 2000 rpm	At idling
Injector control	Stopping fuel injection (Cylinder selection)	Injection Stop Mode	Injector 1 Injector 2 Injector 3 Injector 4	At idling
	Fuel injection amount control (All cylinders)	Injection Quantity Control	0 — 20%	At idling
EGR control valve control		EGR Valve Control	0 — 255 STEP	At idling
Alternator control		Alternator control	Low mode Middle mode High mode	At idling

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

15. Malfunction Indicator Light

A: PROCEDURE

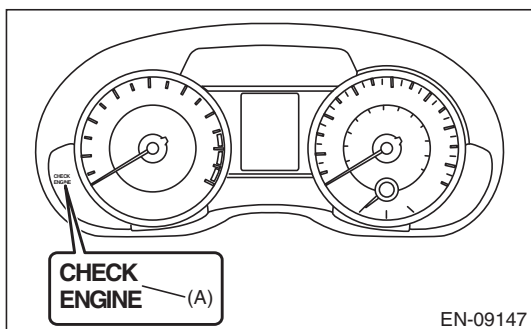
1. Activation of malfunction indicator light. <Ref. to EN(H4DO)(diag)-60, ACTIVATION OF MALFUNCTION INDICATOR LIGHT, Malfunction Indicator Light.>
↓
2. Malfunction indicator light does not come on. <Ref. to EN(H4DO)(diag)-61, MALFUNCTION INDICATOR LIGHT DOES NOT COME ON, Malfunction Indicator Light.>
↓
3. Malfunction indicator light does not go off <Ref. to EN(H4DO)(diag)-61, MALFUNCTION INDICATOR LIGHT DOES NOT GO OFF, Malfunction Indicator Light.>

B: ACTIVATION OF MALFUNCTION INDICATOR LIGHT

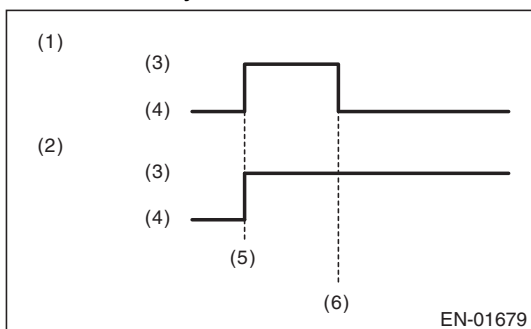
1) When the ignition switch is turned to ON (engine OFF), the malfunction indicator light (A) in the combination meter illuminates.

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(H4DO)(diag)-61, 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.



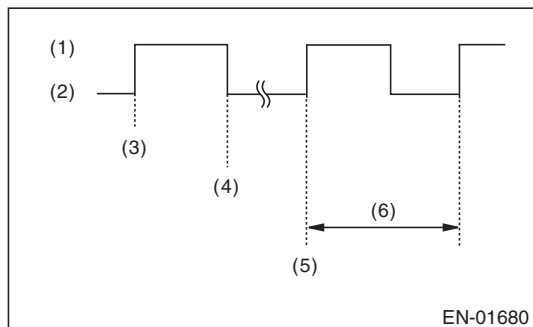
- (1) No faulty
- (2) Trouble occurs
- (3) ON
- (4) OFF
- (5) Ignition switch ON
- (6) Engine start

EN(H4DO)(diag)-60

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

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.

NOTE:

Refer to IDI section for diagnostic procedure. <Ref. to IDI(diag)-2, Basic Diagnostic Procedure.>

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(H4DO)(diag)-43, OPERATION, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO)(diag)-83, List of Diagnostic Trouble Code (DTC).> <Ref. to LAN(diag)-99, List of Diagnostic Trouble Code (DTC).>	Check the combination meter system. <Ref. to IDI(diag)-2, Basic Diagnostic Procedure.>

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

16.Diagnostics for Engine Starting Failure

A: PROCEDURE

1. Check of the fuel amount
↓
2. Inspection of starter motor circuit <Ref. to EN(H4DO)(diag)-63, STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
3. Inspection of ECM power supply and ground line <Ref. to EN(H4DO)(diag)-73, 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(H4DO)(diag)-76, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>
↓
5. Inspection of fuel pump circuit <Ref. to EN(H4DO)(diag)-78, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
6. Inspection of fuel injector circuit <Ref. to EN(H4DO)(diag)-81, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

EN(H4DO)(diag)-62



Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

B: STARTER MOTOR CIRCUIT

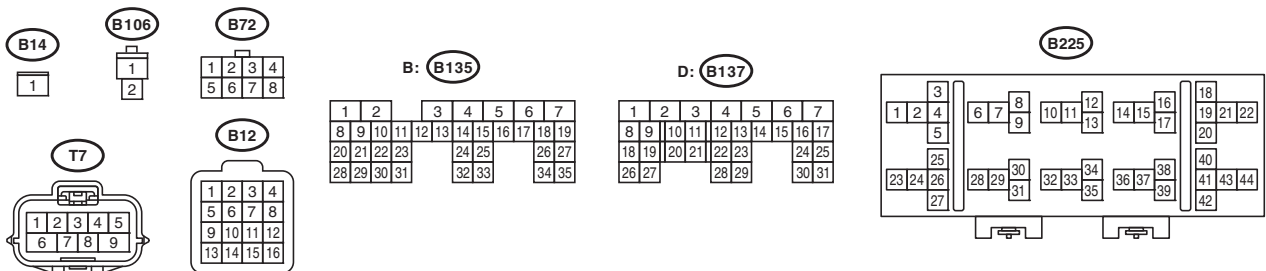
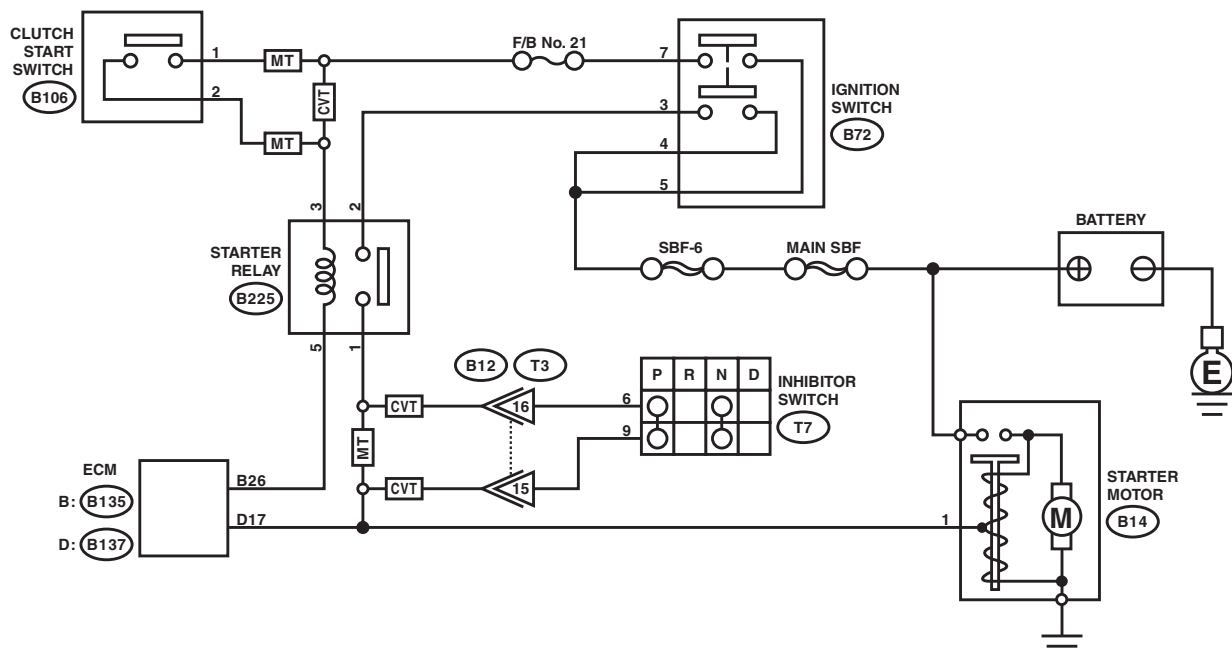
1. MODEL WITHOUT PUSH BUTTON START

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10483

Step	Check	Yes	No
1 CHECK BATTERY. Check the battery. <Ref. to SC(H4DO)-63, Battery.>	Is the battery OK?	Go to step 2.	Charge or replace the battery. <Ref. to SC(H4DO)-63, Battery.>
2 CHECK OPERATION OF STARTER MOTOR.	Does the starter motor operate?	Go to step 3.	Go to step 4.

EN(H4DO)(diag)-63

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
3 CHECK DTC.	Is DTC displayed? <Ref. to EN(H4DO)(diag)-43, OPERATION, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO)(diag)-83, List of Diagnostic Trouble Code (DTC).>	Check ignition control system. <Ref. to EN(H4DO)(diag)-76, 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) Turn the ignition switch to START. 4) Measure the voltage between the starter motor connector and the engine ground. Connector & terminal (B14) No. 1 (+) — Engine ground (-): NOTE: • For CVT model, place the select lever in "P" range or "N" range. • For model with clutch start switch, depress the clutch pedal.	Is the voltage 10 V or more?	Check the starter motor. <Ref. to SC(H4DO)-8, Starter.>	Go to step 5.
5 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 power supply voltage between ignition switch connector and chassis ground. Connector & terminal (B72) No. 4 (+) — Chassis ground (-): (B72) No. 5 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 6.	Repair the power supply circuit.
6 CHECK IGNITION SWITCH. Measure the resistance between ignition switch terminals after turning the ignition switch to START position. Terminals No. 3 — No. 4: No. 5 — No. 7:	Is the resistance less than 1 Ω ?	Go to step 7.	Replace the ignition switch. <Ref. to SL-58, REPLACEMENT, Ignition Key Lock.>
7 CHECK INPUT VOLTAGE OF STARTER RELAY. 1) Turn the ignition switch to OFF. 2) Remove the starter relay. 3) Connect the connector to ignition switch. 4) Measure the voltage between starter relay connector and chassis ground after turning the ignition switch to START position. Connector & terminal (B225) No. 2 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 8.	Repair the open circuit of harness between starter relay and ignition switch connector.
8 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 and starter relay connector. Connector & terminal (B135) No. 26 — (B225) No. 5:	Is the resistance less than 1 Ω ?	Go to step 9.	Repair the open circuit of harness between ECM and starter relay connector.

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
9 CHECK STARTER RELAY. 1) Connect the battery to starter relay terminals No. 3 and No. 5. 2) Measure the resistance between starter relay terminals. <i>Terminals</i> <i>No. 1 — No. 2:</i>	Is the resistance less than 1 Ω ?	Go to step 10.	Replace the starter relay. <Ref. to EN(H4DO)(diag)-9, Electrical Component Location.>
10 CHECK TRANSMISSION TYPE.	Is the transmission type CVT?	Go to step 11.	Go to step 15.
11 CHECK INPUT VOLTAGE OF STARTER RELAY. Measure the voltage between starter relay connector and chassis ground after turning the ignition switch to START position. <i>Connector & terminal</i> <i>(B225) No. 3 (+) — Chassis ground (-):</i>	Is the voltage 10 V or more?	Go to step 12.	Check the following item and repair if necessary. • Blown out of fuse • Open or short circuit to ground in harness between starter relay and ignition switch connector
12 CHECK HARNESS BETWEEN STARTER RELAY AND INHIBITOR SWITCH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from inhibitor switch. 3) Measure the resistance of harness between starter relay connector and inhibitor switch connector. <i>Connector & terminal</i> <i>(B225) No. 1 — (T7) No. 6:</i>	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 starter relay connector and inhibitor switch connector • Poor contact of coupling connector
13 CHECK HARNESS BETWEEN INHIBITOR SWITCH AND STARTER MOTOR. Measure the resistance of harness between the inhibitor switch connector and starter motor. <i>Connector & terminal</i> <i>(T7) No. 9 — (B14) No. 1:</i>	Is the resistance less than 1 Ω ?	Go to step 14.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between inhibitor switch connector and starter motor • Poor contact of coupling connector
14 CHECK INHIBITOR SWITCH. 1) Place the select lever in "P" range and "N" range. 2) Measure the resistance between inhibitor switch terminals. <i>Terminals</i> <i>No. 6 — No. 9:</i>	Is the resistance less than 1 Ω ?	Check the engine control module (ECM) power supply and ground line. <Ref. to EN(H4DO)(diag)-73, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>	Replace the inhibitor switch. <Ref. to CVT(TR580)-91, Inhibitor Switch.>

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
15 CHECK INPUT VOLTAGE OF CLUTCH START SWITCH. 1) Disconnect the connector from clutch start switch. 2) Turn the ignition switch to START. 3) Measure the voltage between the clutch start switch connector and chassis ground. <i>Connector & terminal</i> <i>(B106) No. 1 (+) — Chassis ground (-):</i>	Is the voltage 10 V or more?	Go to step 16.	Check the following item and repair if necessary. • Blown out of fuse • Open or short circuit to ground in harness between ignition switch connector and clutch start switch connector
16 CHECK CLUTCH START SWITCH. 1) Turn the ignition switch to OFF. 2) Measure the resistance between clutch start switch terminals while keeping the clutch pedal depressed. <i>Terminals</i> <i>No. 1 — No. 2:</i>	Is the resistance less than 1 Ω ?	Go to step 17.	Replace the clutch start switch. <Ref. to CL-29, Clutch Switch.>
17 CHECK HARNESS BETWEEN STARTER RELAY AND CLUTCH START SWITCH. Measure the resistance of harness between starter relay and clutch start switch connector. <i>Connector & terminal</i> <i>(B225) No. 3 — (B106) No. 2:</i>	Is the resistance less than 1 Ω ?	Go to step 18.	Repair the open circuit in harness between starter relay and clutch start switch connector.
18 CHECK HARNESS BETWEEN STARTER RELAY CONNECTOR AND STARTER MOTOR CONNECTOR. Measure the resistance of harness between starter relay connector and starter motor connector. <i>Connector & terminal</i> <i>(B225) No. 1 — (B14) No. 1:</i>	Is the resistance less than 1 Ω ?	Check the engine control module (ECM) power supply and ground line. <Ref. to EN(H4DO)(diag)-73, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>	Repair the open circuit in harness between starter relay connector and starter motor connector.

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

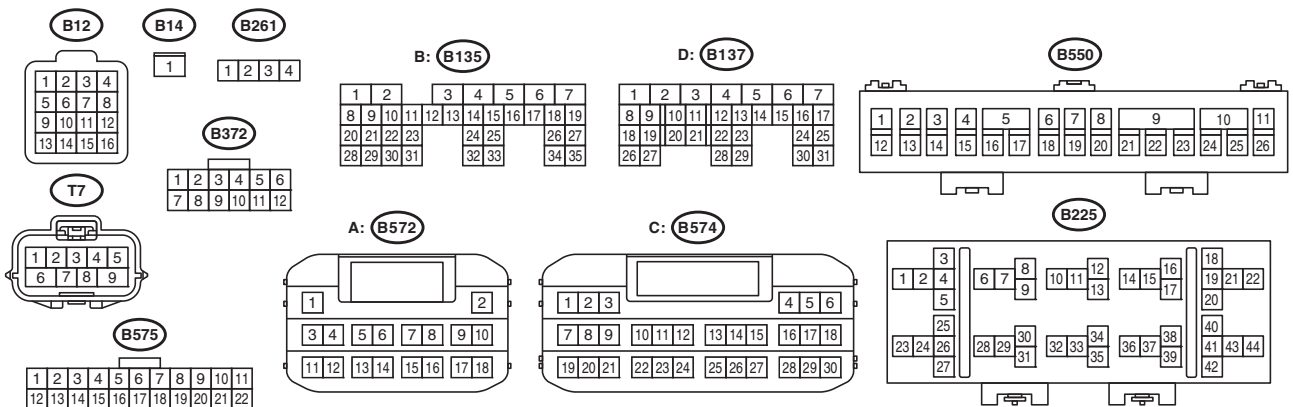
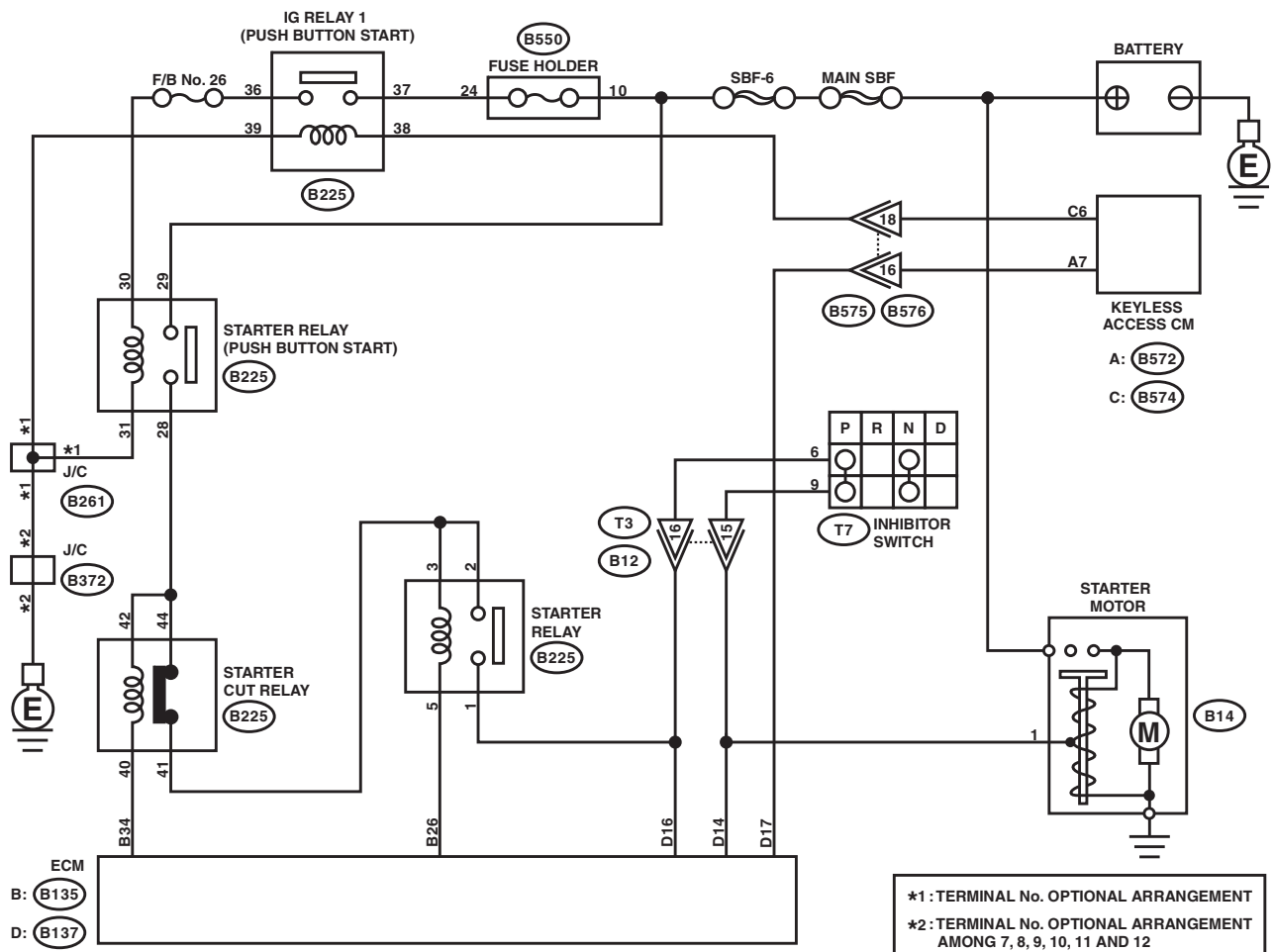
2. MODEL WITH PUSH BUTTON START

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



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Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK BATTERY. Check the battery. <Ref. to SC(H4DO)-63, Battery.>	Is the battery OK?	Go to step 2.	Charge or replace the battery. <Ref. to SC(H4DO)-63, Battery.>
2 CHECK OPERATION OF STARTER MOTOR.	Does the starter motor operate?	Go to step 3.	Go to step 4.
3 CHECK DTC.	Is DTC displayed? <Ref. to EN(H4DO)(diag)-43, OPERATION, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO)(diag)-83, List of Diagnostic Trouble Code (DTC).>	Check ignition control system. <Ref. to EN(H4DO)(diag)-76, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>
4 CHECK PUSH BUTTON IGNITION SWITCH. Press the push button ignition switch twice with the ignition OFF (ACC OFF). NOTE: Release the brake pedal.	Does the ignition turn to ON?	Go to step 5.	Check the push button start system. <Ref. to KPS(diag)-88, INSPECTION, General Diagnostic Table.>
5 CHECK PUSH BUTTON IGNITION SWITCH. 1) Depress the brake pedal. NOTE: Shift the select lever to "P" range. 2) Check the push button ignition switch indicator.	Does the indicator turn to green?	Go to step 6.	Check the brake signal circuit. <Ref. to CC(diag)-17, 12, Diagnostic Procedure with Cancel Code.>
6 CHECK START SWITCH SIGNAL. 1) Read the waveform of «Starter SW» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO)(diag)-36, Subaru Select Monitor.> 2) Press the push button ignition switch once with the brake pedal depressed.	Does waveform of the «Starter SW» occur?	Go to step 10.	Go to step 7.
7 CHECK HARNESS BETWEEN ECM AND KEYLESS ACCESS CM. 1) Turn the ignition to OFF. 2) Disconnect the connectors from ECM and keyless access CM. 3) Measure the resistance of harness between ECM and keyless access CM. Connector & terminal (B137) No. 17 — (B572) No. 7:	Is the resistance less than 1 Ω?	Go to step 8.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and keyless access CM • Poor contact of coupling connector
8 CHECK HARNESS BETWEEN ECM AND KEYLESS ACCESS CM. Measure the resistance between ECM and chassis ground. Connector & terminal (B137) No. 17 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 9.	Repair the short circuit to ground in harness between ECM and keyless access CM.

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
9 CHECK START SWITCH SIGNAL. 1) Connect the connector to ECM and keyless access CM. 2) Read the waveform of start switch signal using an oscilloscope. 3) Press the push button ignition switch once with the brake pedal depressed. Connector & terminal (B137) No. 17 (+) — Chassis ground (-):	Does waveform of the start switch signal occur?	Repair the poor contact of ECM connector.	Repair the poor contact of keyless access CM connector.
10 CHECK INPUT SIGNAL FOR STARTER MOTOR. 1) Turn the ignition to OFF. 2) Disconnect the connector from starter motor. 3) Place the select lever in "P" range or "N" range. 4) Press the push button ignition switch once with the brake pedal depressed. 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(H4DO)-8, Starter.>	Go to step 11.
11 CHECK IG RELAY 1 (PUSH BUTTON START) POWER SUPPLY. 1) Remove the IG relay 1 (push button start). 2) Turn the ignition to ON. 3) Measure the voltage between the IG relay 1 (push button start) connector and chassis ground. Connector & terminal (B225) No. 37 (+) — Chassis ground (-): (B225) No. 38 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 12.	Check the following item and repair or replace if necessary. • Blown out of fuse • Open circuit or short circuit to ground in harness between IG relay 1 (push button start) connector and keyless access CM • Open circuit or short circuit to ground in harness between IG relay 1 (push button start) connector and battery • Poor contact of coupling connector
12 CHECK HARNESS BETWEEN IG RELAY 1 (PUSH BUTTON START) CONNECTOR AND CHASSIS GROUND. 1) Turn the ignition to OFF. 2) Measure the resistance of harness between the IG relay 1 (push button start) connector and chassis ground. Connector & terminal (B225) No. 39 — Chassis ground:	Is the resistance less than 5 Ω?	Go to step 13.	Check the following item and repair or replace if necessary. • Open circuit in harness between IG relay 1 (push button start) connector and chassis ground • Poor contact of joint connector



Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
13 CHECK IG RELAY 1 (PUSH BUTTON START). 1) Connect the battery to IG relay 1 (push button start) terminals No. 38 and No. 39. 2) Measure the resistance between IG relay 1 (push button start) terminals. Terminals No. 36 — No. 37:	Is the resistance less than 1 Ω ?	Go to step 14.	Replace the IG relay 1 (push button start). <Ref. to SL-101, IG Relay1 (Push Button Start).>
14 CHECK STARTER RELAY (PUSH BUTTON START) POWER SUPPLY. 1) Install the IG relay 1 (push button start). 2) Remove the starter relay (push button start). 3) Turn the ignition to ON. 4) Measure the voltage between starter relay (push button start) connector and chassis ground. Connector & terminal (B225) No. 29 (+) — Chassis ground (–): (B225) No. 30 (+) — Chassis ground (–):	Is the voltage 10 V or more?	Go to step 15.	Check the following item and repair or replace if necessary. • Blown-out of fuse (F/B No. 26) • Open circuit or short circuit to ground in harness between starter relay (push button start) connector and IG relay 1 (push button start) connector • Open circuit or short circuit to ground in harness between starter relay (push button start) connector and battery
15 CHECK HARNESS BETWEEN STARTER RELAY (PUSH BUTTON START) CONNECTOR AND CHASSIS GROUND. 1) Turn the ignition to OFF. 2) Measure the resistance of harness between starter relay (push button start) connector and chassis ground. Connector & terminal (B225) No. 31 — Chassis ground:	Is the resistance less than 5 Ω ?	Go to step 16.	Check the following item and repair or replace if necessary. • Open circuit in harness between starter relay (push button start) connector and chassis ground • Poor contact of joint connector
16 CHECK STARTER RELAY (PUSH BUTTON START). 1) Connect the battery to starter relay (push button start) terminals No. 30 and No. 31. 2) Measure the resistance between starter relay (push button start) terminals. Terminals No. 28 — No. 29:	Is the resistance less than 1 Ω ?	Go to step 17.	Replace the starter relay (push button start). <Ref. to SL-99, Starter Relay (Push Button Start).>
17 CHECK HARNESS BETWEEN STARTER RELAY (PUSH BUTTON START) CONNECTOR AND STARTER CUT RELAY CONNECTOR. 1) Remove the starter cut relay. 2) Measure the resistance of harness between starter relay (push button start) connector and starter cut relay connector. Connector & terminal (B225) No. 28 — (B225) No. 42: (B225) No. 28 — (B225) No. 44:	Is the resistance less than 1 Ω ?	Go to step 18.	Repair the open circuit in harness between starter relay (push button start) connector and starter cut relay connector.

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
18 CHECK HARNESS BETWEEN ECM AND STARTER CUT RELAY CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance between starter cut relay connector and chassis ground. Connector & terminal (B225) No. 40 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 19.	Repair the short circuit to ground in harness between ECM and starter cut relay connector.
19 CHECK STARTER CUT RELAY. Measure the resistance between starter cut relay terminals. Terminals No. 41 — No. 44:	Is the resistance less than 1 Ω?	Go to step 20.	Replace the starter cut relay. <Ref. to SL-106, Starter Cut Relay.>
20 CHECK HARNESS BETWEEN STARTER CUT RELAY CONNECTOR AND STARTER RELAY CONNECTOR. 1) Remove the starter relay. 2) Measure the resistance of harness between starter cut relay connector and starter relay connector. Connector & terminal (B225) No. 41 — (B225) No. 2: (B225) No. 41 — (B225) No. 3:	Is the resistance less than 1 Ω?	Go to step 21.	Repair the open circuit in harness between starter cut relay connector and starter relay connector.
21 CHECK HARNESS BETWEEN ECM AND STARTER RELAY CONNECTOR. Measure the resistance of harness between ECM and starter relay connector. Connector & terminal (B135) No. 26 — (B225) No. 5:	Is the resistance less than 1 Ω?	Go to step 22.	Repair the open circuit of harness between ECM and starter relay connector.
22 CHECK STARTER RELAY. 1) Connect the battery to starter relay terminals No. 3 and No. 5. 2) Measure the resistance between starter relay terminals. Terminals No. 1 — No. 2:	Is the resistance less than 1 Ω?	Go to step 23.	Replace the starter relay. <Ref. to EN(H4DO)(diag)-9, LOCATION, Electrical Component Location.>
23 CHECK HARNESS BETWEEN STARTER RELAY CONNECTOR AND INHIBITOR SWITCH CONNECTOR. 1) Disconnect the connector from inhibitor switch. 2) Measure the resistance of harness between starter relay connector and inhibitor switch connector. Connector & terminal (B225) No. 1 — (T7) No. 6:	Is the resistance less than 1 Ω?	Go to step 24.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between starter relay connector and inhibitor switch connector • Poor contact of coupling connector
24 CHECK INHIBITOR SWITCH. 1) Place the select lever in "P" range or "N" range. 2) Measure the resistance between inhibitor switch terminals. Terminals No. 6 — No. 9:	Is the resistance less than 1 Ω?	Go to step 25.	Replace the inhibitor switch. <Ref. to CVT(TR580)-91, Inhibitor Switch.>

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
25 CHECK HARNESS BETWEEN ECM AND INHIBITOR SWITCH CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM and inhibitor switch connector. <i>Connector & terminal</i> <i>(B137) No. 16 — (T7) No. 6:</i> <i>(B137) No. 14 — (T7) No. 9:</i>	Is the resistance less than 1 Ω ?	Go to step 26.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and inhibitor switch connector • Poor contact of coupling connector
26 CHECK NEUTRAL POSITION SWITCH SIGNAL. 1) Connect all relays and connectors to their proper positions. 2) Read the value of «Neutral Position Switch» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO)(diag)-36, Subaru Select Monitor.> 3) Turn the ignition to ON. 4) Place the select lever in "P" range or "N" range.	Is «Neutral» displayed?	Check the engine control module (ECM) power supply and ground line. <Ref. to EN(H4DO)(diag)-73, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between inhibitor switch connector and starter motor connector • Poor contact of coupling connector

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

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

CAUTION:

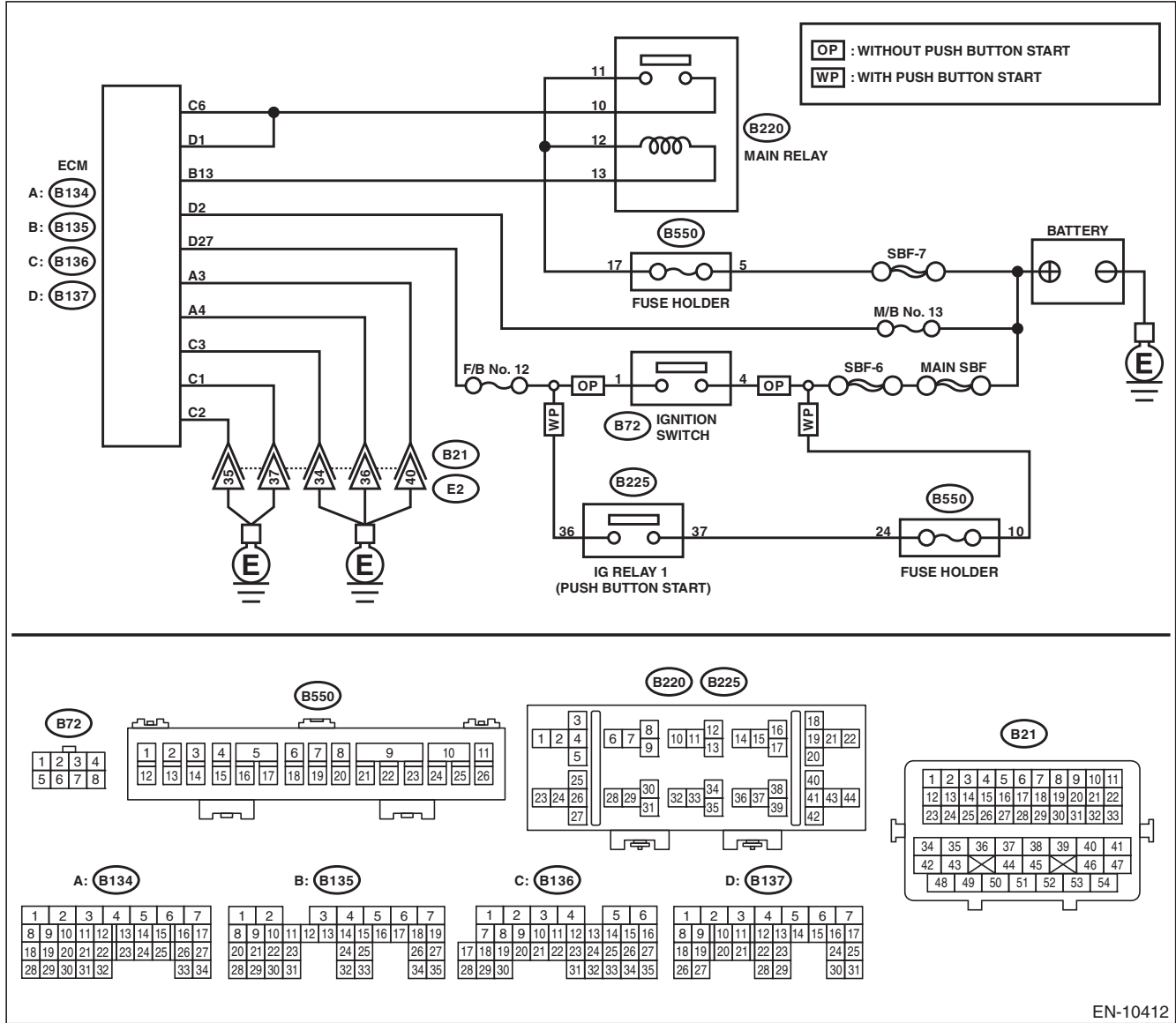
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



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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. 12 and No. 13. 4) Measure the resistance between main relay terminals. Terminals No. 10 — No. 11:	Is the resistance less than 1 Ω?	Go to step 2.	Replace the main relay. <Ref. to FU(H4DO)-96, Main Relay.>
2 CHECK GROUND CIRCUIT FOR ECM. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM and chassis ground. Connector & terminal (B134) No. 3 — Chassis ground: (B134) No. 4 — Chassis ground: (B136) No. 1 — Chassis ground: (B136) No. 2 — Chassis ground: (B136) 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 terminal • Poor contact of coupling connector
3 CHECK INPUT VOLTAGE OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground. Connector & terminal (B137) No. 2 (+) — Chassis ground (-): (B137) No. 27 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 4.	Repair the open or ground shortcircuit 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. 11 (+) — Chassis ground (-): (B220) No. 12 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 5.	Repair the open or ground shortcircuit 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 and chassis ground. Connector & terminal (B135) No. 13 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 6.	Repair the open circuit in harness between ECM 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 and chassis ground. Connector & terminal (B136) No. 6 (+) — Chassis ground (-): (B137) No. 1 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Check ignition control system. <Ref. to EN(H4DO)(diag)-76, 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 and main relay connector • Poor contact of main relay connector • Poor contact of ECM connector

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

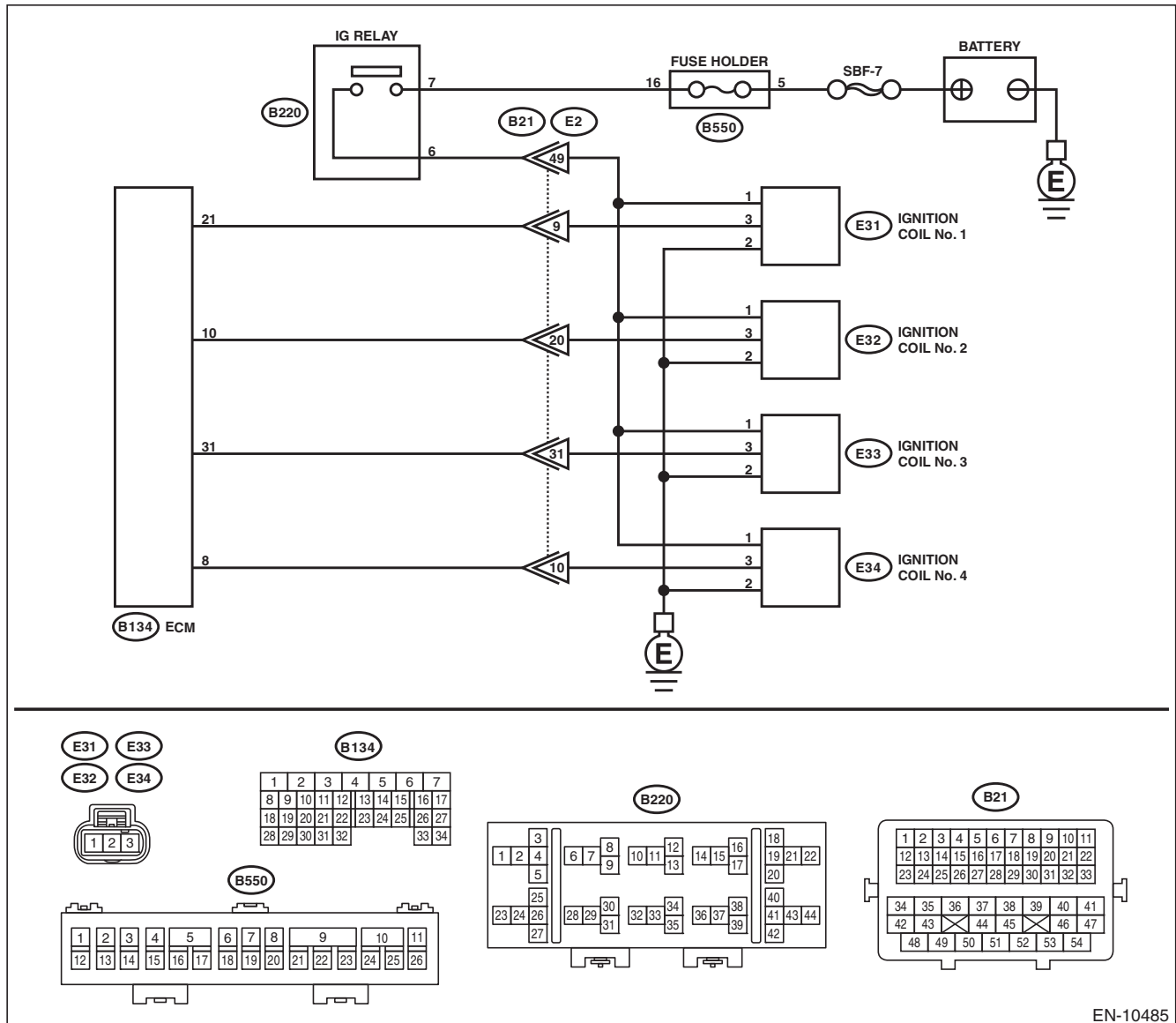
D: IGNITION CONTROL SYSTEM

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10485

Step	Check	Yes	No
1	CHECK SPARK PLUG CONDITION. 1) Remove the spark plug. <Ref. to IG(H4DO)-4, REMOVAL, Spark Plug.> 2) Check the spark plug condition. <Ref. to IG(H4DO)-5, INSPECTION, Spark Plug.>	Go to step 2.	Replace the spark plug. <Ref. to IG(H4DO)-4, 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(H4DO)-106, 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(H4DO)(diag)-78, 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 voltage between ignition coil connector and engine ground. Connector & terminal (E31) No. 1 (+) — Engine ground (-): (E32) No. 1 (+) — Engine ground (-): (E33) No. 1 (+) — Engine ground (-): (E34) No. 1 (+) — Engine 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 or short circuit to ground in harness of 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 of harness between ignition coil connector and engine ground. Connector & terminal (E31) No. 2 — Engine ground: (E32) No. 2 — Engine ground: (E33) No. 2 — Engine ground: (E34) No. 2 — Engine ground:	Is the resistance less than 5 Ω?	Go to step 5.	Repair the open circuit in harness between ignition coil connector and engine grounding terminal.
5 CHECK HARNESS BETWEEN ECM AND IGNITION COIL CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM and ignition coil connector. Connector & terminal (B134) No. 21 — (E31) No. 3: (B134) No. 10 — (E32) No. 3: (B134) No. 31 — (E33) No. 3: (B134) No. 8 — (E34) No. 3:	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 and ignition coil connector • Poor contact of coupling connector
6 CHECK HARNESS BETWEEN ECM AND IGNITION COIL CONNECTOR. Measure the resistance of harness between ECM and engine ground. Connector & terminal: (B134) No. 21 — Engine ground: (B134) No. 10 — Engine ground: (B134) No. 31 — Engine ground: (B134) No. 8 — Engine ground:	Is the resistance 1 MΩ or more?	Go to step 7.	Repair the ground short circuit of harness between ECM and ignition coil connector.
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(H4DO)-9, Ignition Coil.>



Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

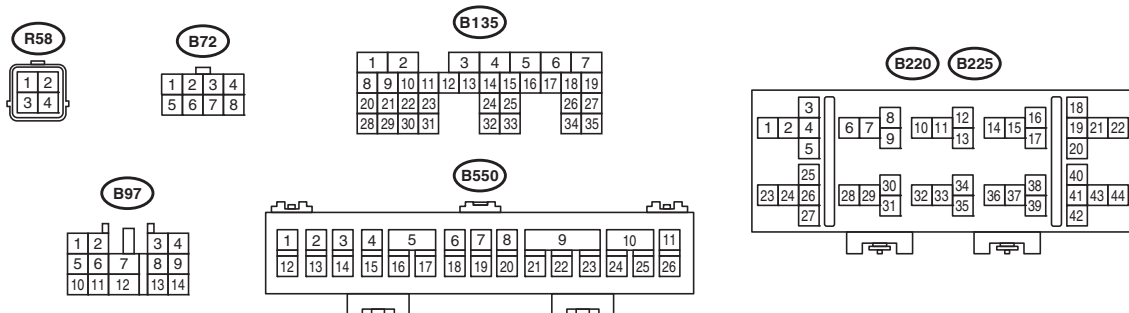
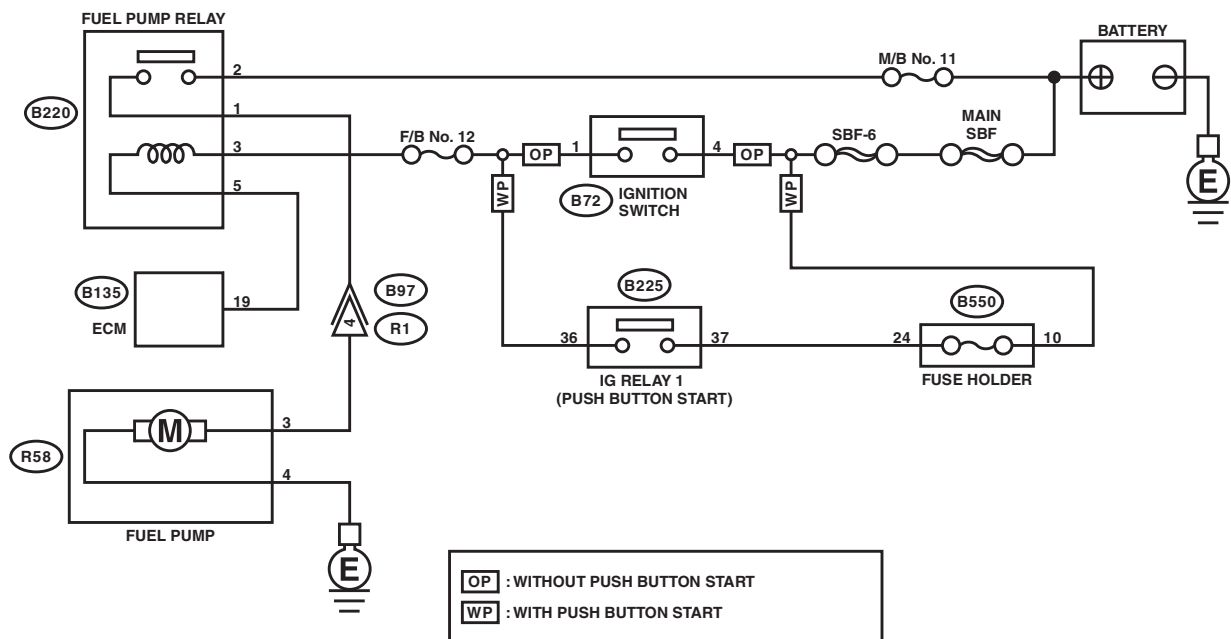
E: FUEL PUMP CIRCUIT

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10414

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK OPERATING SOUND OF FUEL PUMP. Check if the fuel pump operates for two seconds when turning the ignition switch to ON. NOTE: Fuel pump operation can be executed using the Subaru Select Monitor. For detailed procedures, refer to "SYSTEM OPERATION CHECK MODE". <Ref. to EN(H4DO)(diag)-59, System Operation Check Mode.>	Does the fuel pump emit operating sound?	Check the fuel injector circuit. <Ref. to EN(H4DO)(diag)-81, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step 2.
2 CHECK GROUND CIRCUIT OF FUEL PUMP. 1) Turn the ignition switch to OFF. 2) Remove the fuel pump access hole lid. 3) Disconnect the connector from fuel pump. 4) Measure the resistance of harness between fuel pump and chassis ground. Connector & terminal (R58) No. 4 — Chassis ground:	Is the resistance less than 5 Ω?	Go to step 3.	Repair the open circuit in harness between fuel pump connector and chassis ground terminal.
3 CHECK POWER SUPPLY TO FUEL PUMP. 1) Turn the ignition switch to ON. 2) Measure the voltage of power supply circuit between fuel pump connector and chassis ground. Connector & terminal (R58) No. 3 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Replace the fuel pump. <Ref. to FU(H4DO)-134, Fuel Pump.>	Go to step 4.
4 CHECK HARNESS BETWEEN FUEL PUMP AND FUEL PUMP RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between fuel pump connector and fuel pump relay connector. Connector & terminal (R58) No. 3 — (B220) 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 in harness between fuel pump connector and fuel pump relay connector • Poor contact of coupling connector
5 CHECK HARNESS BETWEEN FUEL PUMP AND FUEL PUMP RELAY CONNECTOR. Measure the resistance of harness between fuel pump connector and fuel pump relay connector. Connector & terminal (R58) No. 3 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 6.	Repair the short circuit to ground in harness between fuel pump connector and fuel pump relay connector.
6 CHECK FUEL PUMP RELAY. 1) Remove the fuel pump relay. 2) Connect the battery to fuel pump relay terminals No. 3 and No. 5. 3) Measure the resistance between fuel pump relay terminals. Terminals No. 1 — No. 2:	Is the resistance less than 1 Ω?	Go to step 7.	Replace the fuel pump relay. <Ref. to FU(H4DO)-104, Fuel Pump Relay.>



Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK HARNESS BETWEEN ECM AND FUEL PUMP RELAY CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM and fuel pump relay connector. <i>Connector & terminal</i> <i>(B135) No. 19 — (B220) No. 5:</i>	Is the resistance less than 1 Ω ?	Go to step 8.	Repair the open circuit of harness between ECM and fuel pump relay connector.
8 CHECK POWER SUPPLY OF FUEL PUMP RELAY. 1) Turn the ignition switch to ON. 2) Measure the voltage between fuel pump relay connector and chassis ground. <i>Connector & terminal</i> <i>(B220) No. 2 (+) — Chassis ground (-):</i> <i>(B220) No. 3 (+) — Chassis ground (-):</i>	Is the voltage 10 V or more?	Repair the poor contact of ECM connector.	Repair the open or ground short circuit of harness of power supply circuit.

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

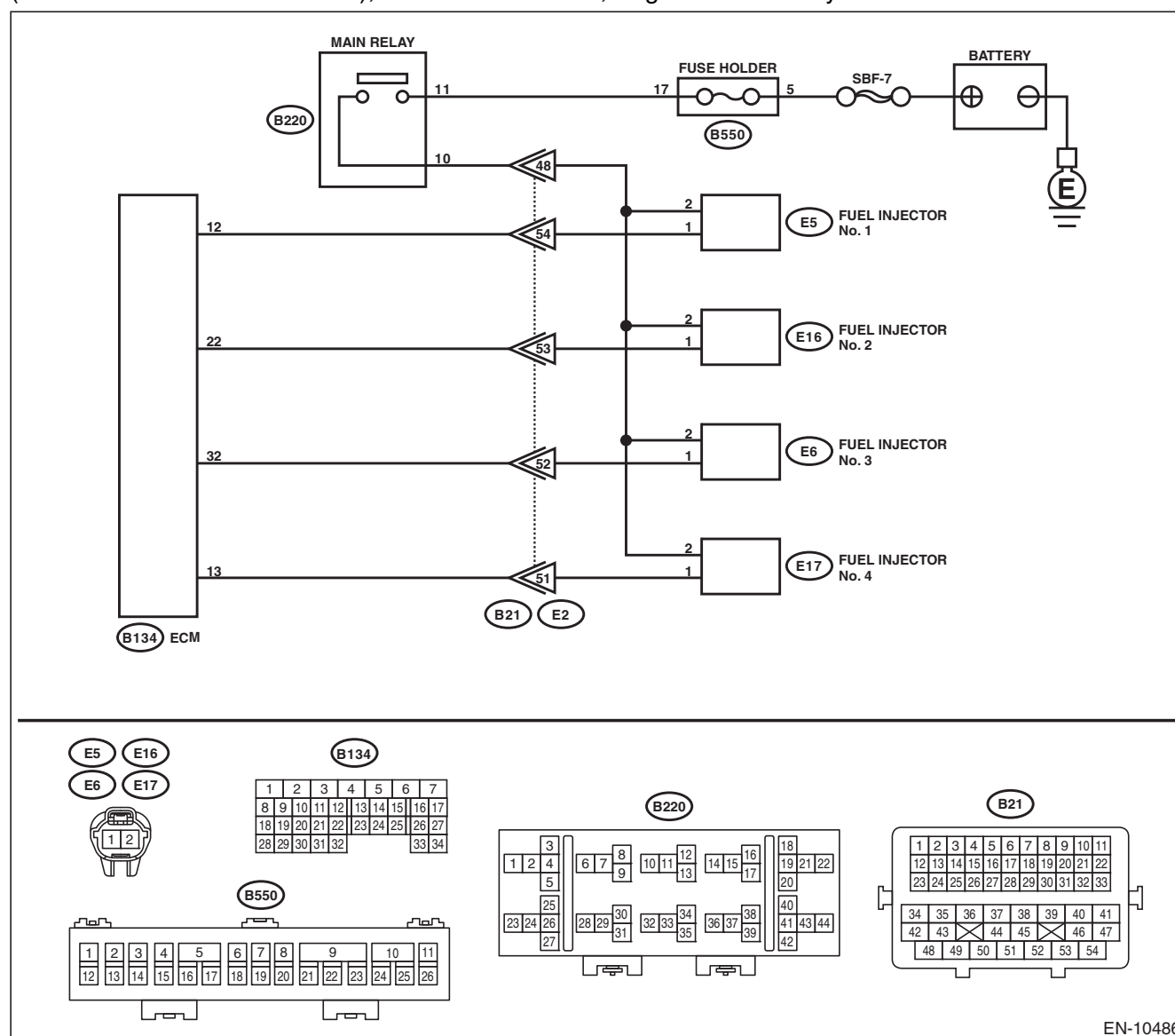
F: FUEL INJECTOR CIRCUIT

CAUTION:

- Check or repair only faulty parts.
- After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



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 to listen to sounds for this check.	Does the fuel injector emit operating sound? Check the fuel pressure. <Ref. to ME(H4DO)-31, INSPECTION, Fuel Pressure.>	Go to step 2.

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK POWER SUPPLY TO EACH FUEL INJECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector. 3) Turn the ignition switch to ON. 4) Measure the power supply voltage between fuel injector terminal and engine ground. Connector & terminal #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?	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 and fuel injector connector. Connector & terminal #1 (B134) No. 12 — (E5) No. 1: #2 (B134) No. 22 — (E16) No. 1: #3 (B134) No. 32 — (E6) No. 1: #4 (B134) No. 13 — (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 and fuel injector connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. Measure the resistance between ECM and chassis ground. Connector & terminal #1 (B134) No. 12 — Chassis ground: #2 (B134) No. 22 — Chassis ground: #3 (B134) No. 32 — Chassis ground: #4 (B134) No. 13 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM and fuel injector connector.
5 CHECK EACH FUEL INJECTOR. Measure the resistance between each fuel injector terminals. Terminals No. 1 — No. 2:	Is the resistance 5 — 20 Ω ?	Go to step 6.	Replace the faulty fuel injector. <Ref. to FU(H4DO)-73, 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(H4DO)(diag)-352, INSPECTION, General Diagnostic Table.>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

17. List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Note
B1570	Antenna	<Ref. to IM(diag)-16, DTC B1570 ANTENNA, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1571	Reference Code Incompatibility	<Ref. to IM(diag)-19, DTC B1571 REFERENCE CODE INCOMPATIBILITY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> <Ref. to KPS(diag)-83, DTC B1571 REFERENCE CODE INCOMPATIBILITY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1572	IMM Circuit Failure (Except Antenna Circuit)	<Ref. to IM(diag)-20, DTC B1572 IMM CIRCUIT FAILURE (EXCEPT ANTENNA CIRCUIT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).> <Ref. to KPS(diag)-84, DTC B1572 IMM CIRCUIT FAILURE (EXCEPT ANTENNA CIRCUIT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1574	Key Communication Failure	<Ref. to IM(diag)-23, DTC B1574 KEY COMMUNICATION FAILURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1575	Incorrect Immobilizer Key	<Ref. to IM(diag)-23, DTC B1575 INCORRECT IMMOBILIZER KEY, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B1576	EGI Control Module EEPROM	<Ref. to IM(diag)-24, DTC B1576 EGI CONTROL MODULE EEPROM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> <Ref. to KPS(diag)-86, 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).> <Ref. to KPS(diag)-87, 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).>
P000A	A Camshaft Position Slow Response (Bank 1)	<Ref. to EN(H4DO)(diag)-92, DTC P000A A CAMSHAFT POSITION SLOW RESPONSE (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P000C	A Camshaft Position Slow Response (Bank 2)	<Ref. to EN(H4DO)(diag)-92, DTC P000C A CAMSHAFT POSITION SLOW RESPONSE (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0010	"A" Camshaft Position Actuator Circuit/Open (Bank 1)	<Ref. to EN(H4DO)(diag)-93, DTC P0010 "A" CAMSHAFT POSITION ACTUATOR CIRCUIT/OPEN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0011	Intake Camshaft Position - Timing Over-Advanced or System Performance (Bank 1)	<Ref. to EN(H4DO)(diag)-95, DTC P0011 INTAKE CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0016	Crankshaft Position - Camshaft Position Correlation (Bank1)	<Ref. to EN(H4DO)(diag)-96, DTC P0016 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION (BANK1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0018	Crankshaft Position - Camshaft Position Correlation (Bank2)	<Ref. to EN(H4DO)(diag)-98, DTC P0018 CRANKSHAFT POSITION - CAMSHAFT POSITION CORRELATION (BANK2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0020	"A" Camshaft Position Actuator Circuit/Open (Bank 2)	<Ref. to EN(H4DO)(diag)-100, DTC P0020 "A" CAMSHAFT POSITION ACTUATOR CIRCUIT/OPEN (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0021	Intake Camshaft Position - Timing Over-Advanced or System Performance (Bank 2)	<Ref. to EN(H4DO)(diag)-102, DTC P0021 INTAKE CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0030	HO2S Heater Control Circuit (Bank 1 Sensor 1)	<Ref. to EN(H4DO)(diag)-103, DTC P0030 HO2S HEATER CONTROL CIRCUIT (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

EN(H4DO)(diag)-83



List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Note
P0031	HO2S Heater Control Circuit Low (Bank 1 Sensor 1)	<Ref. to EN(H4DO)(diag)-105, 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(H4DO)(diag)-107, 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(H4DO)(diag)-109, 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(H4DO)(diag)-111, DTC P0038 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0068	MAP/MAF - Throttle Position Correlation	<Ref. to EN(H4DO)(diag)-113, 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(H4DO)(diag)-114, 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(H4DO)(diag)-115, 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(H4DO)(diag)-117, 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(H4DO)(diag)-119, 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(H4DO)(diag)-121, 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(H4DO)(diag)-123, 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(H4DO)(diag)-124, 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(H4DO)(diag)-126, 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(H4DO)(diag)-128, 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(H4DO)(diag)-129, DTC P0117 ENGINE COOLANT TEMPERATURE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0118	Engine Coolant Temperature Circuit High	<Ref. to EN(H4DO)(diag)-131, 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(H4DO)(diag)-133, 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(H4DO)(diag)-136, 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(H4DO)(diag)-139, DTC P0125 INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Note
P0128	Coolant Thermostat (Engine Coolant Temperature Below Thermostat Regulating Temperature)	<Ref. to EN(H4DO)(diag)-140, 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(H4DO)(diag)-141, 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(H4DO)(diag)-143, 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(H4DO)(diag)-145, 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(H4DO)(diag)-147, DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0138	O2 Sensor Circuit High Voltage (Bank 1 Sensor 2)	<Ref. to EN(H4DO)(diag)-149, 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(H4DO)(diag)-151, 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(H4DO)(diag)-152, 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(H4DO)(diag)-152, 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(H4DO)(diag)-152, 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(H4DO)(diag)-153, 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(H4DO)(diag)-155, 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(H4DO)(diag)-156, 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(H4DO)(diag)-156, 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(H4DO)(diag)-156, 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(H4DO)(diag)-156, 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(H4DO)(diag)-156, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0172	System Too Rich (Bank 1)	<Ref. to EN(H4DO)(diag)-157, DTC P0172 SYSTEM TOO RICH (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0196	Engine Oil Temperature Sensor Circuit Range/Performance	<Ref. to EN(H4DO)(diag)-159, DTC P0196 ENGINE OIL TEMPERATURE SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>



List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Note
P0197	Engine Oil Temperature Sensor Low	<Ref. to EN(H4DO)(diag)-160, DTC P0197 ENGINE OIL TEMPERATURE SENSOR LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0198	Engine Oil Temperature Sensor High	<Ref. to EN(H4DO)(diag)-162, DTC P0198 ENGINE OIL TEMPERATURE SENSOR HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0201	Cylinder 1 - Injector Circuit	<Ref. to EN(H4DO)(diag)-164, DTC P0201 INJECTOR #1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0202	Cylinder 2 - Injector Circuit	<Ref. to EN(H4DO)(diag)-166, DTC P0202 INJECTOR #2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0203	Cylinder 3 - Injector Circuit	<Ref. to EN(H4DO)(diag)-166, DTC P0203 INJECTOR #3, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0204	Cylinder 4 - Injector Circuit	<Ref. to EN(H4DO)(diag)-166, DTC P0204 INJECTOR #4, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0222	Throttle/Pedal Position Sensor/Switch "B" Circuit Low	<Ref. to EN(H4DO)(diag)-167, 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(H4DO)(diag)-170, DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0300	Random/Multiple Cylinder Misfire Detected	<Ref. to EN(H4DO)(diag)-173, DTC P0300 RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0301	Cylinder 1 Misfire Detected	<Ref. to EN(H4DO)(diag)-177, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0302	Cylinder 2 Misfire Detected	<Ref. to EN(H4DO)(diag)-177, DTC P0302 CYLINDER 2 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0303	Cylinder 3 Misfire Detected	<Ref. to EN(H4DO)(diag)-177, DTC P0303 CYLINDER 3 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0304	Cylinder 4 Misfire Detected	<Ref. to EN(H4DO)(diag)-178, 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(H4DO)(diag)-183, DTC P0327 KNOCK SENSOR 1 CIRCUIT LOW (BANK 1 OR SINGLE SENSOR), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0328	Knock Sensor 1 Circuit High (Bank 1 or Single Sensor)	<Ref. to EN(H4DO)(diag)-185, DTC P0328 KNOCK SENSOR 1 CIRCUIT HIGH (BANK 1 OR SINGLE SENSOR), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0335	Crankshaft Position Sensor "A" Circuit	<Ref. to EN(H4DO)(diag)-187, DTC P0335 CRANKSHAFT POSITION SENSOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0336	Crankshaft Position Sensor "A" Circuit Range/Performance	<Ref. to EN(H4DO)(diag)-189, DTC P0336 CRANKSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0340	Camshaft Position Sensor "A" Circuit (Bank 1 or Single Sensor)	<Ref. to EN(H4DO)(diag)-190, 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(H4DO)(diag)-192, 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(H4DO)(diag)-193, 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(H4DO)(diag)-195, 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(H4DO)(diag)-196, DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Note
P0352	Ignition Coil B Primary/Secondary Circuit	<Ref. to EN(H4DO)(diag)-198, 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(H4DO)(diag)-198, 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(H4DO)(diag)-198, DTC P0354 IGNITION COIL D PRIMARY/SECONDARY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0400	Exhaust Gas Recirculation Flow	<Ref. to EN(H4DO)(diag)-199, DTC P0400 EXHAUST GAS RECIRCULATION FLOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0420	Catalyst System Efficiency Below Threshold (Bank 1)	<Ref. to EN(H4DO)(diag)-200, 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(H4DO)(diag)-205, 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(H4DO)(diag)-206, 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(H4DO)(diag)-207, 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(H4DO)(diag)-209, 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(H4DO)(diag)-211, 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(H4DO)(diag)-212, 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(H4DO)(diag)-213, 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(H4DO)(diag)-215, 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(H4DO)(diag)-217, 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(H4DO)(diag)-217, 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(H4DO)(diag)-218, DTC P0463 FUEL LEVEL SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0500	Vehicle Speed Sensor "A"	<Ref. to EN(H4DO)(diag)-218, 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(H4DO)(diag)-219, 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(H4DO)(diag)-220, 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(H4DO)(diag)-221, DTC P050A COLD START IDLE AIR CONTROL SYSTEM PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>



List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Note
P050B	Cold Start Ignition Timing Performance	<Ref. to EN(H4DO)(diag)-230, DTC P050B COLD START IGNITION TIMING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0512	Starter Request Circuit	<Ref. to EN(H4DO)(diag)-231, DTC P0512 STARTER REQUEST CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0516	Battery Temperature Sensor Circuit Low	<Ref. to EN(H4DO)(diag)-234, DTC P0516 BATTERY TEMPERATURE SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0517	Battery Temperature Sensor Circuit High	<Ref. to EN(H4DO)(diag)-236, DTC P0517 BATTERY TEMPERATURE SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0560	System Voltage	<Ref. to EN(H4DO)(diag)-238, DTC P0560 SYSTEM VOLTAGE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0604	Internal Control Module Random Access Memory (RAM) Error	<Ref. to EN(H4DO)(diag)-240, 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(H4DO)(diag)-240, DTC P0605 INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0606	Control Module Processor	<Ref. to EN(H4DO)(diag)-241, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P060A	Internal Control Module Monitoring Processor Performance	<Ref. to EN(H4DO)(diag)-242, 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(H4DO)(diag)-242, DTC P060B INTERNAL CONTROL MODULE A/D PROCESSING PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0616	Starter Relay Circuit Low	<Ref. to EN(H4DO)(diag)-243, DTC P0616 STARTER RELAY CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0617	Starter Relay Circuit High	<Ref. to EN(H4DO)(diag)-248, DTC P0617 STARTER RELAY CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P062F	EEPROM Failure	<Ref. to EN(H4DO)(diag)-253, DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0700	Transmission Control System (MIL Request)	<Ref. to EN(H4DO)(diag)-253, DTC P0700 TRANSMISSION CONTROL SYSTEM (MIL REQUEST), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P081A	Starter Disable Circuit Low	<Ref. to EN(H4DO)(diag)-254, DTC P081A STARTER DISABLE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0851	Park/Neutral Switch Input Circuit Low (AT Model)	<Ref. to EN(H4DO)(diag)-257, DTC P0851 PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW (AT MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0851	Neutral Switch Input Circuit Low (MT Model)	<Ref. to EN(H4DO)(diag)-259, DTC P0851 NEUTRAL SWITCH INPUT CIRCUIT LOW (MT MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0852	Park/Neutral Switch Input Circuit High (AT Model)	<Ref. to EN(H4DO)(diag)-261, DTC P0852 PARK/NEUTRAL SWITCH INPUT CIRCUIT HIGH (AT MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0852	Neutral Switch Input Circuit High (MT Model)	<Ref. to EN(H4DO)(diag)-263, DTC P0852 NEUTRAL SWITCH INPUT CIRCUIT HIGH (MT MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1160	Return Spring Failure	<Ref. to EN(H4DO)(diag)-264, DTC P1160 RETURN SPRING FAILURE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1449	Evaporative Emission Cont. Sys. Air Filter Clog	<Ref. to EN(H4DO)(diag)-265, DTC P1449 EVAPORATIVE EMISSION CONT. SYS. AIR FILTER CLOG, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>



List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Note
P1451	Evaporative Emission Cont. Sys.	<Ref. to EN(H4DO)(diag)-266, DTC P1451 EVAPORATIVE EMISSION CONT. SYS., Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1492	EGR Solenoid Valve Signal #1 Circuit Malfunction (Low Input)	<Ref. to EN(H4DO)(diag)-267, DTC P1492 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1493	EGR Solenoid Valve Signal #1 Circuit Malfunction (High Input)	<Ref. to EN(H4DO)(diag)-267, DTC P1493 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1494	EGR Solenoid Valve Signal #2 Circuit Malfunction (Low Input)	<Ref. to EN(H4DO)(diag)-267, DTC P1494 EGR SOLENOID VALVE SIGNAL #2 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1495	EGR Solenoid Valve Signal #2 Circuit Malfunction (High Input)	<Ref. to EN(H4DO)(diag)-267, DTC P1495 EGR SOLENOID VALVE SIGNAL #2 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1496	EGR Solenoid Valve Signal #3 Circuit Malfunction (Low Input)	<Ref. to EN(H4DO)(diag)-267, DTC P1496 EGR SOLENOID VALVE SIGNAL #3 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1497	EGR Solenoid Valve Signal #3 Circuit Malfunction (High Input)	<Ref. to EN(H4DO)(diag)-267, DTC P1497 EGR SOLENOID VALVE SIGNAL #3 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1498	EGR Solenoid Valve Signal #4 Circuit Malfunction (Low Input)	<Ref. to EN(H4DO)(diag)-268, DTC P1498 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1499	EGR Solenoid Valve Signal #4 Circuit Malfunction (High Input)	<Ref. to EN(H4DO)(diag)-270, DTC P1499 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1530	Battery Current Sensor Circuit Low	<Ref. to EN(H4DO)(diag)-272, DTC P1530 BATTERY CURRENT SENSOR CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1531	Battery Current Sensor Circuit High	<Ref. to EN(H4DO)(diag)-274, DTC P1531 BATTERY CURRENT SENSOR CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1532	Battery Charging System	<Ref. to EN(H4DO)(diag)-276, DTC P1532 BATTERY CHARGING SYSTEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2004	Intake Manifold Runner Control Stuck Open (Bank 1)	<Ref. to EN(H4DO)(diag)-279, 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(H4DO)(diag)-280, 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(H4DO)(diag)-281, 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(H4DO)(diag)-282, DTC P2007 INTAKE MANIFOLD RUNNER CONTROL STUCK CLOSED (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2009	Intake Manifold Runner Control Circuit Low (Bank 1)	<Ref. to EN(H4DO)(diag)-283, DTC P2009 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT LOW (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2012	Intake Manifold Runner Control Circuit Low (Bank 2)	<Ref. to EN(H4DO)(diag)-285, DTC P2012 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT LOW (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2096	Post Catalyst Fuel Trim System Too Lean (Bank 1)	<Ref. to EN(H4DO)(diag)-287, 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(H4DO)(diag)-294, DTC P2097 POST CATALYST FUEL TRIM SYSTEM TOO RICH (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Note
P2101	Throttle Actuator Control Motor Circuit Range/Performance	<Ref. to EN(H4DO)(diag)-301, 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(H4DO)(diag)-307, 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(H4DO)(diag)-309, 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(H4DO)(diag)-310, 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(H4DO)(diag)-310, 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(H4DO)(diag)-311, 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(H4DO)(diag)-313, 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(H4DO)(diag)-315, 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(H4DO)(diag)-317, 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(H4DO)(diag)-319, 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(H4DO)(diag)-322, 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(H4DO)(diag)-324, 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(H4DO)(diag)-326, 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(H4DO)(diag)-328, DTC P219A BANK 1 AIR-FUEL RATIO IMBALANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P2401	Evaporative Emission System Leak Detection Pump Control Circuit Low	<Ref. to EN(H4DO)(diag)-340, 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(H4DO)(diag)-342, 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(H4DO)(diag)-344, 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(H4DO)(diag)-347, 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(H4DO)(diag)-349, DTC P2420 EVAPORATIVE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Note
P2610	ECM/PCM Internal Engine Off Timer Performance	<Ref. to EN(H4DO)(diag)-351, DTC P2610 ECM/PCM INTERNAL ENGINE OFF TIMER PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0073	Control Module Communication Bus "A" Off	<Ref. to EN(H4DO)(diag)-351, DTC U0073 CONTROL MODULE COMMUNICATION BUS "A" OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0101	Lost Communication With TCM	<Ref. to EN(H4DO)(diag)-351, DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	Lost Communication With Vehicle Dynamics Control Module	<Ref. to EN(H4DO)(diag)-351, DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0155	Lost Communication With Instrument Panel Cluster (IPC) Control Module	<Ref. to EN(H4DO)(diag)-351, DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0402	Invalid Data Received From TCM	<Ref. to EN(H4DO)(diag)-351, DTC U0402 INVALID DATA RECEIVED FROM TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	Invalid Data Received From Vehicle Dynamics Control Module	<Ref. to EN(H4DO)(diag)-351, DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0423	Invalid Data Received From Instrument Panel Cluster Control Module	<Ref. to EN(H4DO)(diag)-351, DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

18. Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC P000A A CAMSHAFT POSITION SLOW RESPONSE (BANK 1)

NOTE:

For the diagnostic procedure, refer to DTC P0011. <Ref. to EN(H4DO)(diag)-95, DTC P0011 INTAKE CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

B: DTC P000C A CAMSHAFT POSITION SLOW RESPONSE (BANK 2)

NOTE:

For the diagnostic procedure, refer to DTC P0021. <Ref. to EN(H4DO)(diag)-102, DTC P0021 INTAKE CAMSHAFT POSITION - TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

ENGINE (DIAGNOSTICS)

DTC DETECTING CONDITION:

- TROUBLE SYMPTOM:**

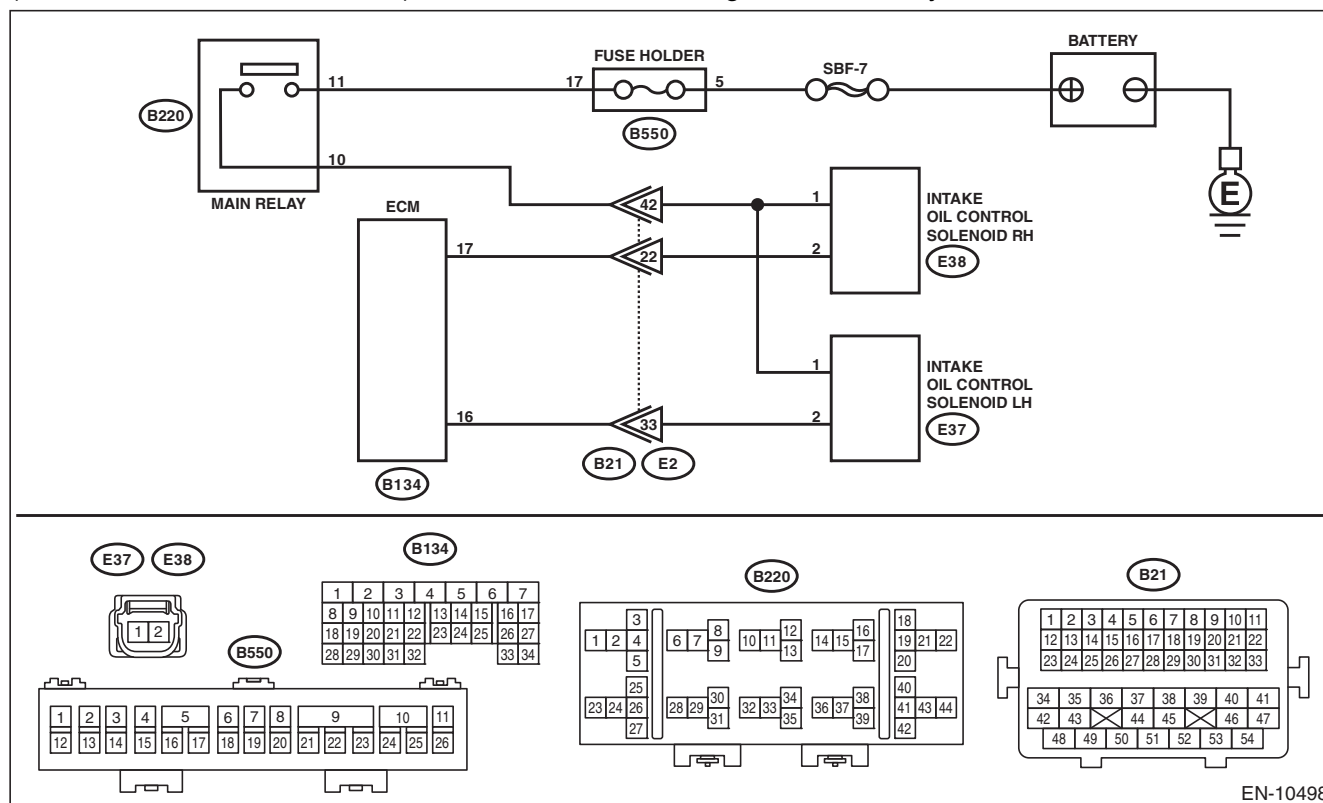
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



Step	Check	Yes	No
1 CHECK OUTPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground. Connector & terminal (B134) No. 17 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 2.	Go to step 3.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
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 poor contact of connector, temporary open or short circuit of harness may be the cause.
3	CHECK POWER SUPPLY TO THE INTAKE OIL CONTROL SOLENOID RH. Measure the voltage between intake oil control solenoid RH connector and engine ground. Connector & terminal (E38) 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 INTAKE OIL CONTROL SOLENOID RH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and intake oil control solenoid RH. 3) Measure the resistance between intake oil control solenoid RH connector and engine ground. Connector & terminal (E38) No. 2 — Engine ground:	Is the resistance 1 M Ω or more?	Go to step 5. Repair the short circuit to ground in harness between ECM and intake oil control solenoid RH connector.
5	CHECK HARNESS BETWEEN ECM AND INTAKE OIL CONTROL SOLENOID RH CONNECTOR. Measure the resistance of harness between ECM and intake oil control solenoid RH. Connector & terminal (B134) No. 17 — (E38) 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 and intake oil control solenoid RH connector • Poor contact of coupling connector
6	CHECK INTAKE OIL CONTROL SOLENOID RH. Measure the resistance between intake oil control solenoid RH terminals. Terminals No. 1 — No. 2:	Is the resistance 6 — 12 Ω ?	Repair the poor contact of intake oil control solenoid RH connector. Replace the intake oil control solenoid RH. <Ref. to FU(H4DO)-62, Oil Control Solenoid.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

D: 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(H4DO)-14, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-36, 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. • Intake cam sprocket (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(H4DO)(diag)-36, 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. • Intake cam sprocket (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(H4DO)-14, REPLACEMENT, Engine Oil.> <Ref. to LU(H4DO)-64, Engine Oil Filter.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

E: 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(H4DO)-15, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR ANY OTHER DTC ON DISPLAY.	Is DTC other than P0016 or P0018 displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO)(diag)-83, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK INTAKE OIL CONTROL SOLENOID RH. Check the intake oil control solenoid RH. <Ref. to FU(H4DO)-63, INSPECTION, Oil Control Solenoid.>	Is the intake oil control solenoid RH normal?	Go to step 3.	Replace the intake oil control solenoid RH. <Ref. to FU(H4DO)-62, Oil Control Solenoid.>
3 CHECK INSTALLATION CONDITION OF TIMING CHAIN. Using ST and by turning the crankshaft, align the alignment marks of crank sprocket, intake cam sprocket and exhaust cam sprocket. <Ref. to ME(H4DO)-117, Timing Chain Assembly.> ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain installed in the proper position?	Go to step 4.	Correct the installation condition of timing chain. <Ref. to ME(H4DO)-117, Timing Chain Assembly.>
4 CHECK CAM CARRIER FILTER. Check the filter installed to the cam carrier. <Ref. to ME(H4DO)-201, INSPECTION, Cam Carrier.>	Is the cam carrier filter normal?	Replace the intake cam sprocket RH. <Ref. to ME(H4DO)-137, Cam Sprocket.> After the operation is complete, go to the next step. Go to step 5.	Replace the cam carrier filter. <Ref. to ME(H4DO)-161, Cam Carrier.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK CURRENT DATA. 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.> 2) Start the engine and warm up completely. 3) Using the Subaru Select Monitor, read the values of «VVT Initial Position Learning Value #1» and «VVT Adv. Ang. Amount R» while the vehicle is in stable condition for 30 seconds or more with the engine idling. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO)(diag)-36, Subaru Select Monitor.> 4) Calculate the values using the following formula. Ignore the unit at this time. $ «VVT \text{ Initial Position Learning Value \#1}» - (60 + «VVT \text{ Adv. Ang. Amount R}») $	Is the calculation result less than 10?	Go to step 6.	Replace the ECM. <Ref. to FU(H4DO)-94, Engine Control Module (ECM).>
6 CHECK DTC. 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.> 2) Perform drive cycle N. <Ref. to EN(H4DO)(diag)-56, DRIVE CYCLE N, PROCEDURE, Drive Cycle.>	Is the same DTC as current diagnosis output?	Replace the ECM. <Ref. to FU(H4DO)-94, Engine Control Module (ECM).>	End.



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

F: 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(H4DO)-16, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

Step	Check	Yes	No
1 CHECK FOR ANY OTHER DTC ON DISPLAY.	Is DTC other than P0016 or P0018 displayed?	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(H4DO)(diag)-83, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK INTAKE OIL CONTROL SOLENOID LH. Check the intake oil control solenoid LH. <Ref. to FU(H4DO)-63, INSPECTION, Oil Control Solenoid.>	Is the intake oil control solenoid LH normal?	Go to step 3.	Replace the intake oil control solenoid LH. <Ref. to FU(H4DO)-62, Oil Control Solenoid.>
3 CHECK INSTALLATION CONDITION OF TIMING CHAIN. Using ST and by turning the crankshaft, align the alignment marks of crank sprocket, intake cam sprocket and exhaust cam sprocket. <Ref. to ME(H4DO)-117, Timing Chain Assembly.> ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain installed in the proper position?	Go to step 4.	Correct the installation condition of timing chain. <Ref. to ME(H4DO)-117, Timing Chain Assembly.>
4 CHECK CAM CARRIER FILTER. Check the filter installed to the cam carrier. <Ref. to ME(H4DO)-201, INSPECTION, Cam Carrier.>	Is the cam carrier filter normal?	Replace the intake cam sprocket LH. <Ref. to ME(H4DO)-137, Cam Sprocket.> After the operation is complete, go to the next step. Go to step 5.	Replace the cam carrier filter. <Ref. to ME(H4DO)-161, Cam Carrier.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK CURRENT DATA. 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.> 2) Start the engine and warm up completely. 3) Using the Subaru Select Monitor, read the values of «VVT Initial Position Learning Value #2» and «VVT Adv. Ang. Amount L» while the vehicle is in stable condition for 30 seconds or more with the engine idling. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO)(diag)-36, Subaru Select Monitor.> 4) Calculate the values using the following formula. Ignore the unit at this time. $ «VVT \text{ Initial Position Learning Value \#2}» - (60 + «VVT \text{ Adv. Ang. Amount L}») $	Is the calculation result less than 10?	Go to step 6.	Replace the ECM. <Ref. to FU(H4DO)-94, Engine Control Module (ECM).>
6 CHECK DTC. 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.> 2) Perform drive cycle N. <Ref. to EN(H4DO)(diag)-56, DRIVE CYCLE N, PROCEDURE, Drive Cycle.>	Is the same DTC as current diagnosis output?	Replace the ECM. <Ref. to FU(H4DO)-94, Engine Control Module (ECM).>	End.



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

G: DTC P0020 "A" CAMSHAFT POSITION ACTUATOR CIRCUIT/OPEN (BANK 2)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-16, DTC P0020 "A" CAMSHAFT POSITION ACTUATOR CIRCUIT/OPEN (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

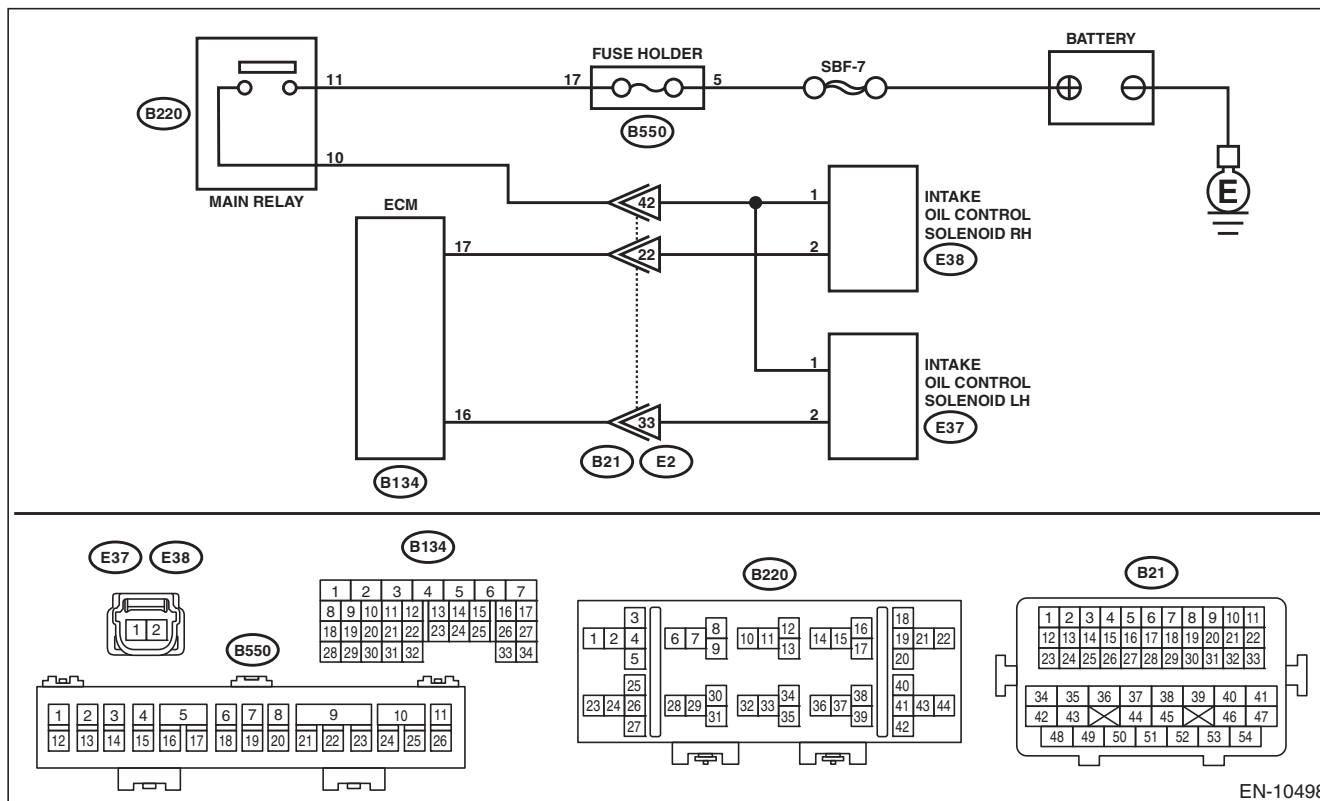
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10498

Step	Check	Yes	No	
1	CHECK OUTPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground. Connector & terminal (B134) No. 16 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 2.	Go to step 3.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
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 poor contact of connector, temporary open or short circuit of harness may be the cause.
3	CHECK POWER SUPPLY TO THE INTAKE OIL CONTROL SOLENOID LH. Measure the voltage between intake oil control solenoid LH connector and engine ground. Connector & terminal (E37) 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 INTAKE OIL CONTROL SOLENOID LH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and intake oil control solenoid LH. 3) Measure the resistance between intake oil control solenoid LH connector and engine ground. Connector & terminal (E37) 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 and intake oil control solenoid LH connector.
5	CHECK HARNESS BETWEEN ECM AND INTAKE OIL CONTROL SOLENOID LH CONNECTOR. Measure the resistance of harness between ECM and intake oil control solenoid LH. Connector & terminal (B134) No. 16 — (E37) 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 and intake oil control solenoid LH connector • Poor contact of coupling connector
6	CHECK INTAKE OIL CONTROL SOLENOID LH. Measure the resistance between intake oil control solenoid LH terminals. Terminals No. 1 — No. 2:	Is the resistance 6 — 12 Ω?	Repair the poor contact of intake oil control solenoid LH connector. Replace the intake oil control solenoid LH. <Ref. to FU(H4DO)-62, Oil Control Solenoid.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

H: 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(H4DO)-16, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-36, 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. • Intake cam sprocket (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(H4DO)(diag)-36, 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. • Intake cam sprocket (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(H4DO)-14, REPLACEMENT, Engine Oil.> <Ref. to LU(H4DO)-64, 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:

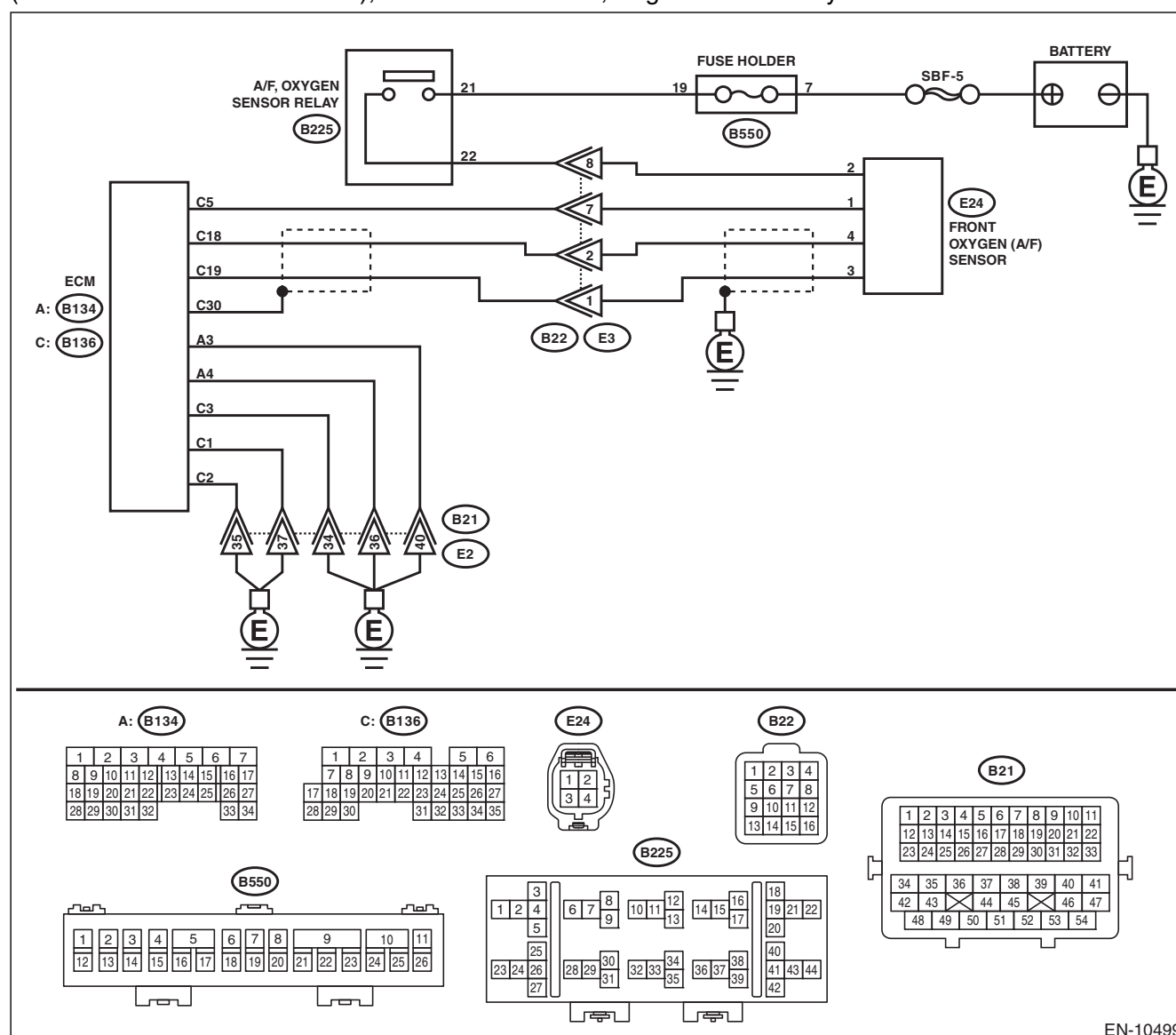
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-17, DTC P0030 HO2S HEATER CONTROL CIRCUIT (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10499

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. 1) Start and warm up the engine. 2) Turn the ignition switch to OFF. 3) Disconnect the connectors from ECM and front oxygen (A/F) sensor. 4) Measure the resistance of harness between ECM and front oxygen (A/F) sensor connector. Connector & terminal (B136) No. 5 — (E24) No. 1: (B136) No. 19 — (E24) No. 3: (B136) No. 18 — (E24) 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 and front oxygen (A/F) sensor connector • Poor contact of coupling connector
2 CHECK FRONT OXYGEN (A/F) SENSOR. Measure the resistance between front oxygen (A/F) sensor terminals. Terminals No. 1 — No. 2:	Is the resistance 2 — 3 Ω ?	Go to step 3.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO)-87, 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(H4DO)-87, Front Oxygen (A/F) Sensor.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

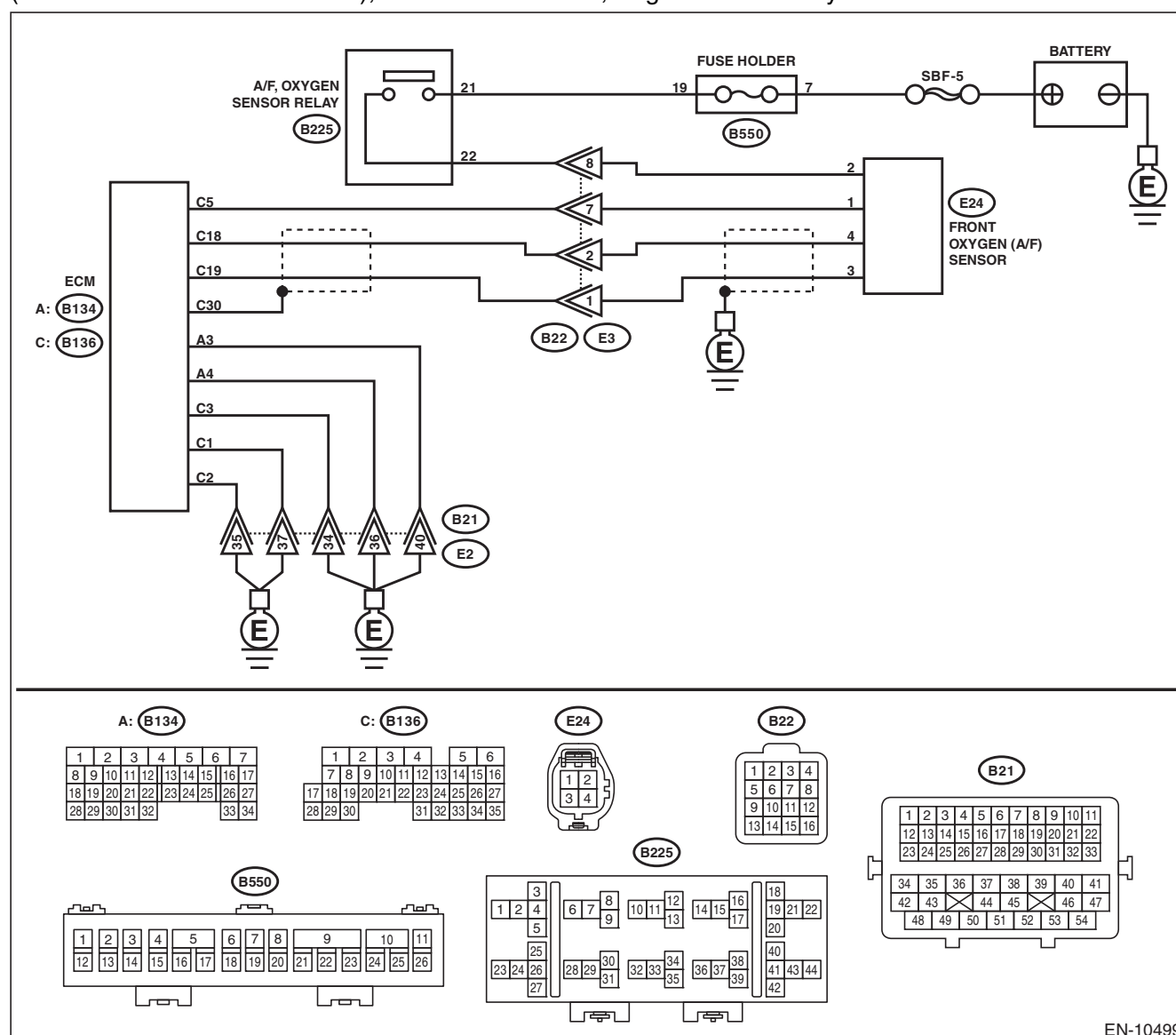
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-19, DTC P0031 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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. <i>Connector & terminal</i> <i>(E24) No. 2 (+) — Engine ground (-):</i>	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 connector and front oxygen (A/F) 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 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 and front oxygen (A/F) sensor connector. <i>Connector & terminal</i> <i>(B136) No. 5 — (E24) No. 1:</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 ECM and front oxygen (A/F) sensor connector • Poor contact of coupling connector
3 CHECK GROUND CIRCUIT FOR ECM. Measure the resistance of harness between ECM and chassis ground. <i>Connector & terminal</i> <i>(B134) No. 3 — Chassis ground:</i> <i>(B134) No. 4 — Chassis ground:</i> <i>(B136) No. 1 — Chassis ground:</i> <i>(B136) No. 2 — Chassis ground:</i> <i>(B136) No. 3 — Chassis ground:</i>	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 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. <i>Terminals</i> <i>No. 1 — No. 2:</i>	Is the resistance 2 — 3 Ω ?	Repair the poor contact of ECM connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO)-87, 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:

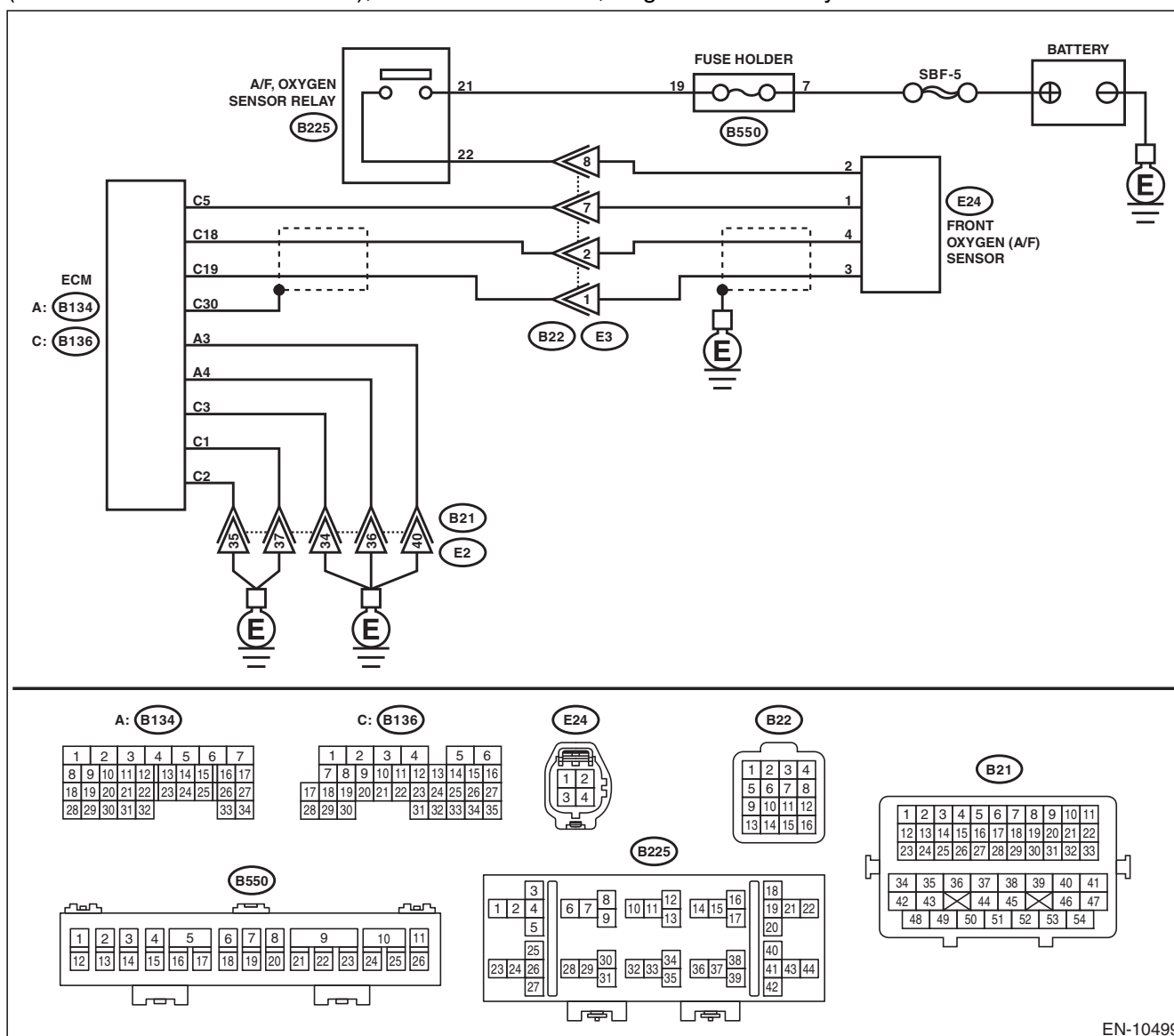
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-21, DTC P0032 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10499

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the voltage between ECM and chassis ground. <i>Connector & terminal</i> <i>(B136) No. 5 (+) — Chassis ground (–):</i>	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM and front oxygen (A/F) sensor connector.	Go to step 2.
2 CHECK GROUND CIRCUIT FOR ECM. 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM and chassis ground. <i>Connector & terminal</i> <i>(B134) No. 3 — Chassis ground:</i> <i>(B134) No. 4 — Chassis ground:</i> <i>(B136) No. 1 — Chassis ground:</i> <i>(B136) No. 2 — Chassis ground:</i> <i>(B136) 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 and engine ground • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

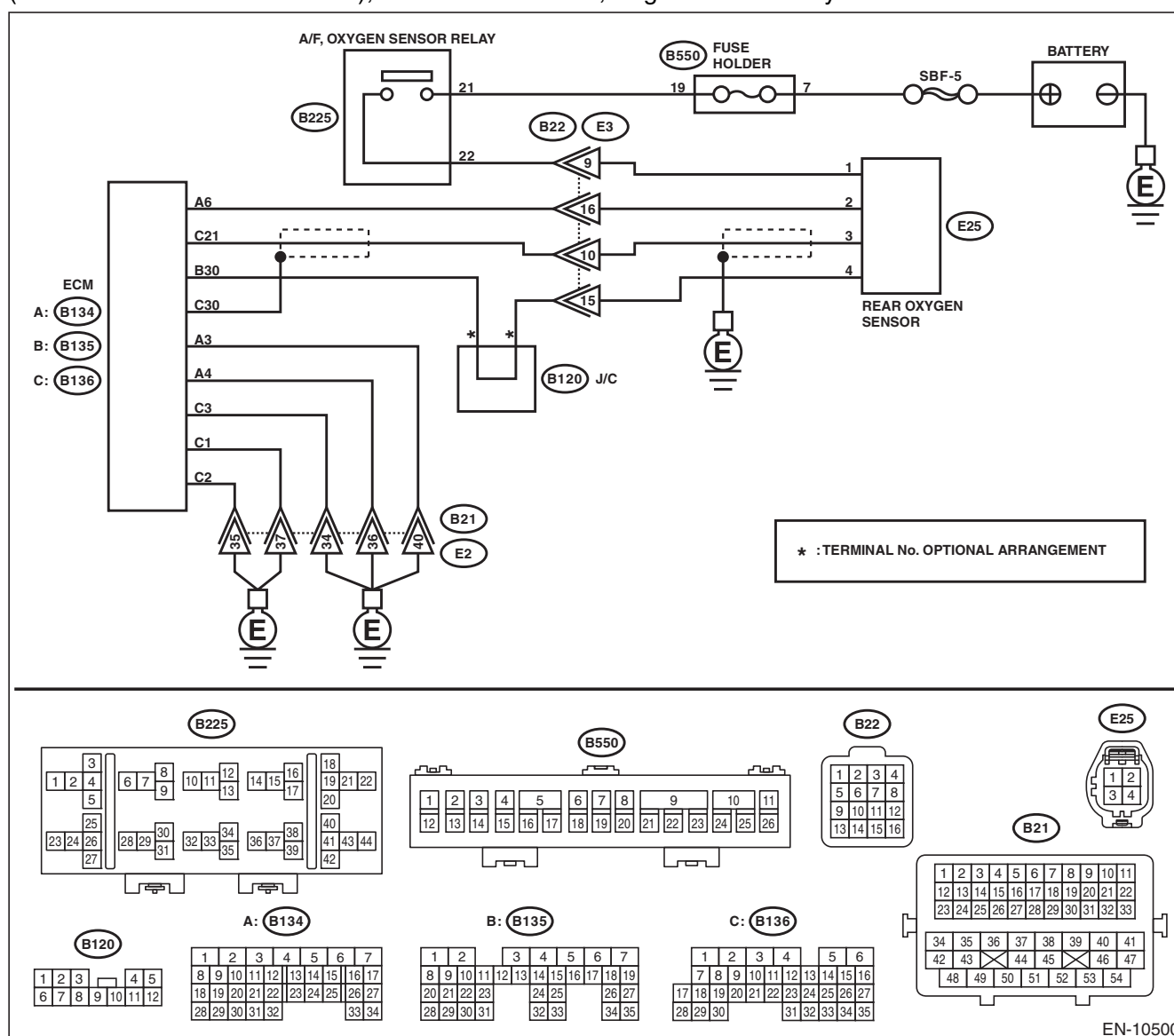
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-23, DTC P0037 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10500

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 (E25) No. 1 (+) — Engine ground (-):	Is the voltage 10 V or more?	Go to step 2.	Repair the power supply line. Or replace the main relay. NOTE: In this case, repair the following item: • Open circuit in harness between A/F, oxygen sensor relay connector 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 and oxygen sensor connector. Connector & terminal (B134) No. 6 — (E25) 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 and rear oxygen sensor connector • Poor contact of coupling connector
3 CHECK GROUND CIRCUIT FOR ECM. Measure the resistance of harness between ECM and chassis ground. Connector & terminal (B134) No. 3 — Chassis ground: (B134) No. 4 — Chassis ground: (B136) No. 1 — Chassis ground: (B136) No. 2 — Chassis ground: (B136) 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 and engine ground • Poor contact of coupling connector
4 CHECK REAR OXYGEN SENSOR. Measure the resistance between rear oxygen sensor terminals. Terminals No. 2 — No. 1:	Is the resistance 5 — 7 Ω ?	Repair the poor contact of ECM connector.	Replace the rear oxygen sensor. <Ref. to FU(H4DO)-91, 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:

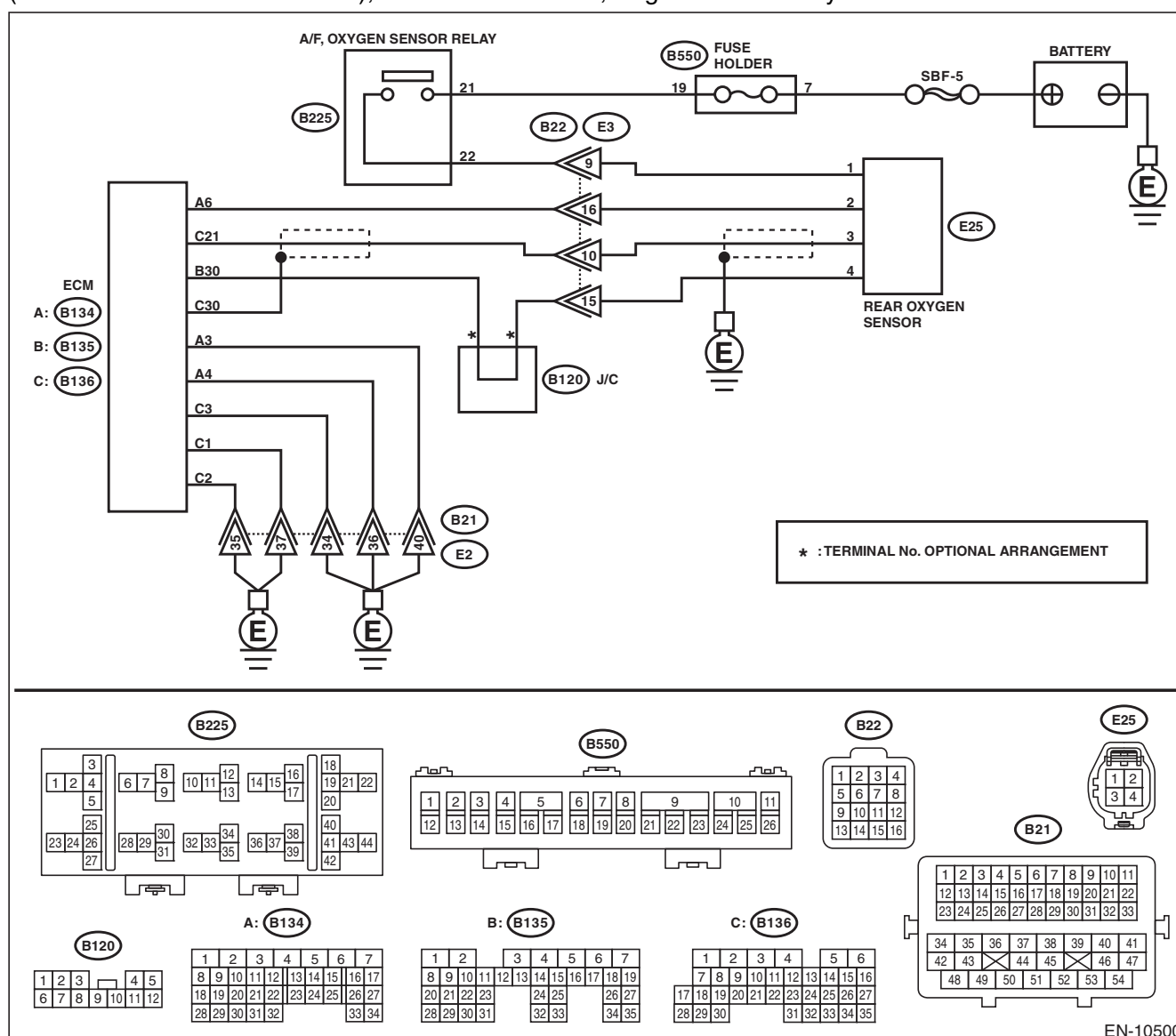
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-25, DTC P0038 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10500

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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 and chassis ground. Connector & terminal (B134) No. 6 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM and rear oxygen sensor connector.	Go to step 2.
2 CHECK GROUND CIRCUIT FOR ECM. 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM and chassis ground. Connector & terminal (B134) No. 3 — Chassis ground: (B134) No. 4 — Chassis ground: (B136) No. 1 — Chassis ground: (B136) No. 2 — Chassis ground: (B136) 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 and engine ground • Poor contact of coupling connector



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

N: DTC P0068 MAP/MAF - THROTTLE POSITION CORRELATION

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-27, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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) For CVT models, set the select lever to “P” range or “N” range, and for MT models, place the shift lever in the 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(H4DO)(diag)-36, 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(H4DO)-70, 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(H4DO)(diag)-36, 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(H4DO)-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(H4DO)-70, Manifold Absolute Pressure Sensor.>	Replace the electronic throttle control. <Ref. to FU(H4DO)-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 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-29, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-83, List of Diagnostic Trouble Code (DTC).>	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO)-68, Mass Air Flow and Intake Air Temperature Sensor.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-31, DTC P0102 MASS OR VOLUME AIR FLOW CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

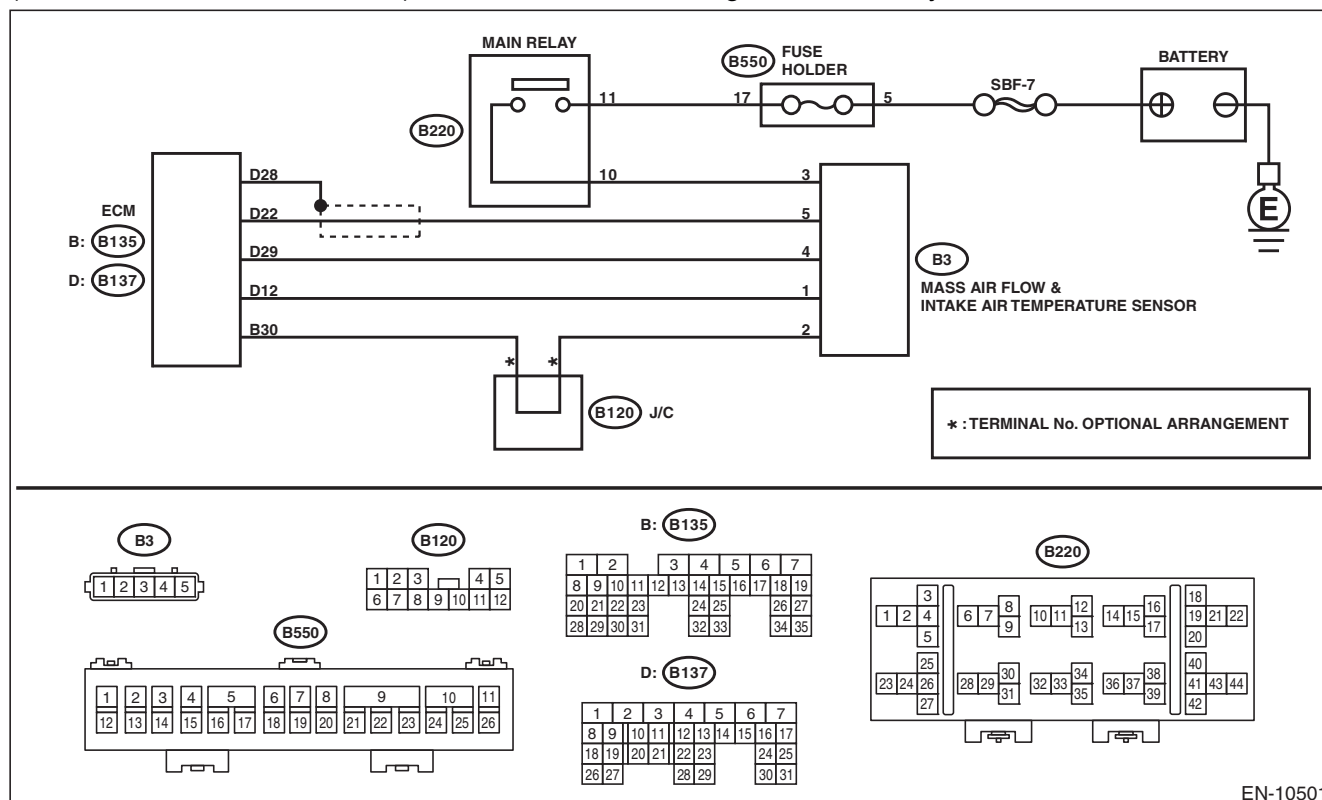
- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10501

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(H4DO)(diag)-36, 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 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 and the mass air flow and intake air temperature sensor connector. Connector & terminal (B137) No. 22 — (B3) No. 5:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit in harness between ECM 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 and chassis ground. Connector & terminal (B137) No. 22 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM and mass air flow and intake air temperature sensor connector.
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(H4DO)-68, Mass Air Flow and Intake Air Temperature Sensor.>

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-32, DTC P0103 MASS OR VOLUME AIR FLOW CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

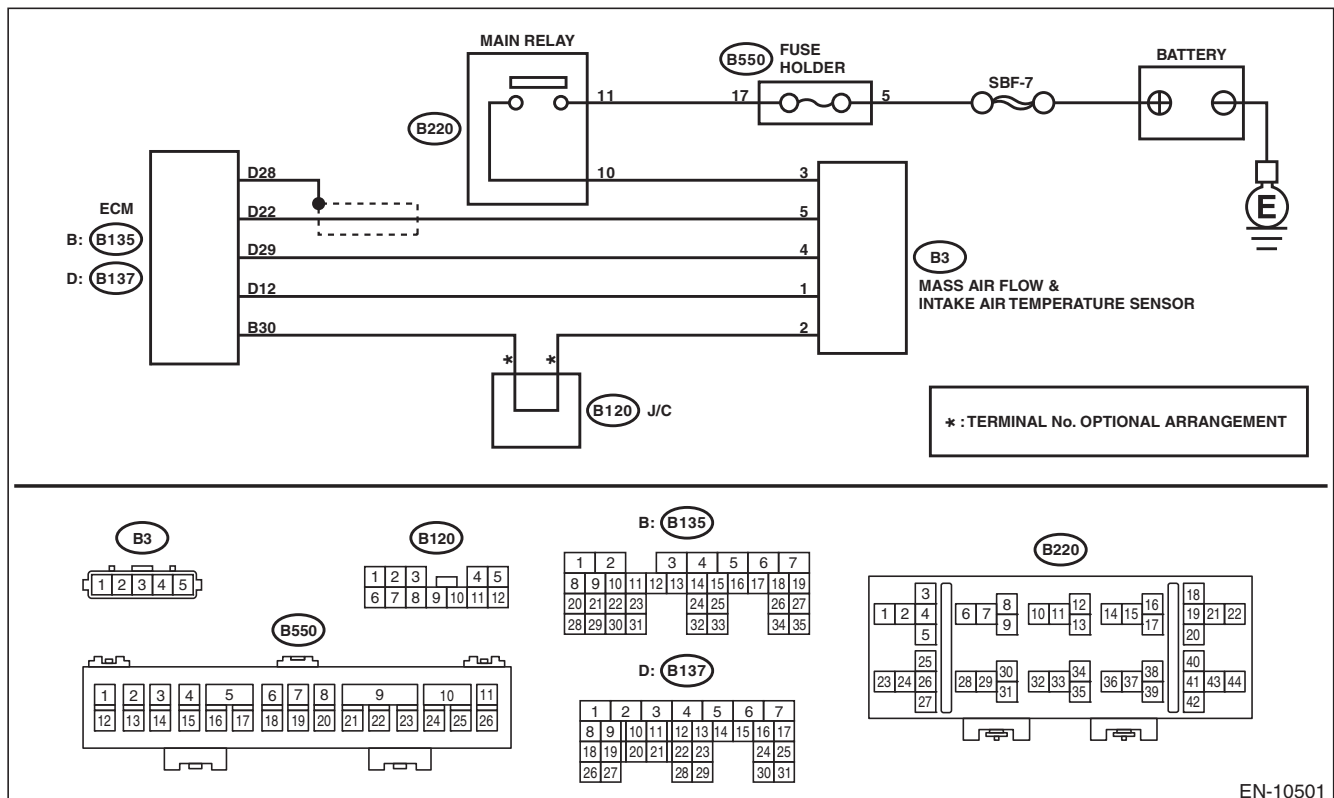
- Improper idling
- Engine stalls.
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), 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 «Air Flow Sensor Voltage» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DO)(diag)-36, 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(H4DO)(diag)-36, 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 and 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 and 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(H4DO)-68, 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:

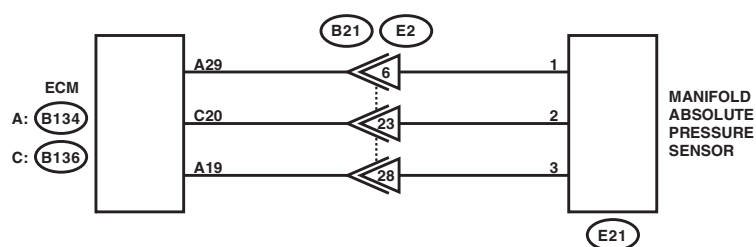
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-33, DTC P0107 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), 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	

C: B136

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	

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	

EN-10279

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(H4DO)(diag)-36, 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 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 and manifold absolute pressure sensor connector. Connector & terminal (B136) No. 20 — (E21) 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 of harness between ECM 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 and chassis ground. Connector & terminal (B136) No. 20 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 5.	Repair ground short circuit of harness between ECM and manifold absolute pressure sensor connector.
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(H4DO)-70, Manifold Absolute Pressure Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

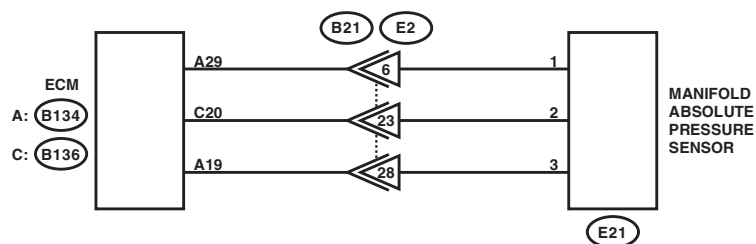
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-34, DTC P0108 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), 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	

C: B136

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	

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	

EN-10279

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(H4DO)(diag)-36, 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(H4DO)(diag)-36, 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 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 (E21) No. 1 — 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 and manifold absolute pressure sensor connector • Poor contact of ECM connector • Poor contact of coupling connector
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(H4DO)-70, 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 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-35, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-36, 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(H4DO)-68, Mass Air Flow and Intake Air Temperature Sensor.>	Check for DTC P0125. <Ref. to EN(H4DO)(diag)-139, DTC P0125 INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

U: DTC P0112 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-38, DTC P0112 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

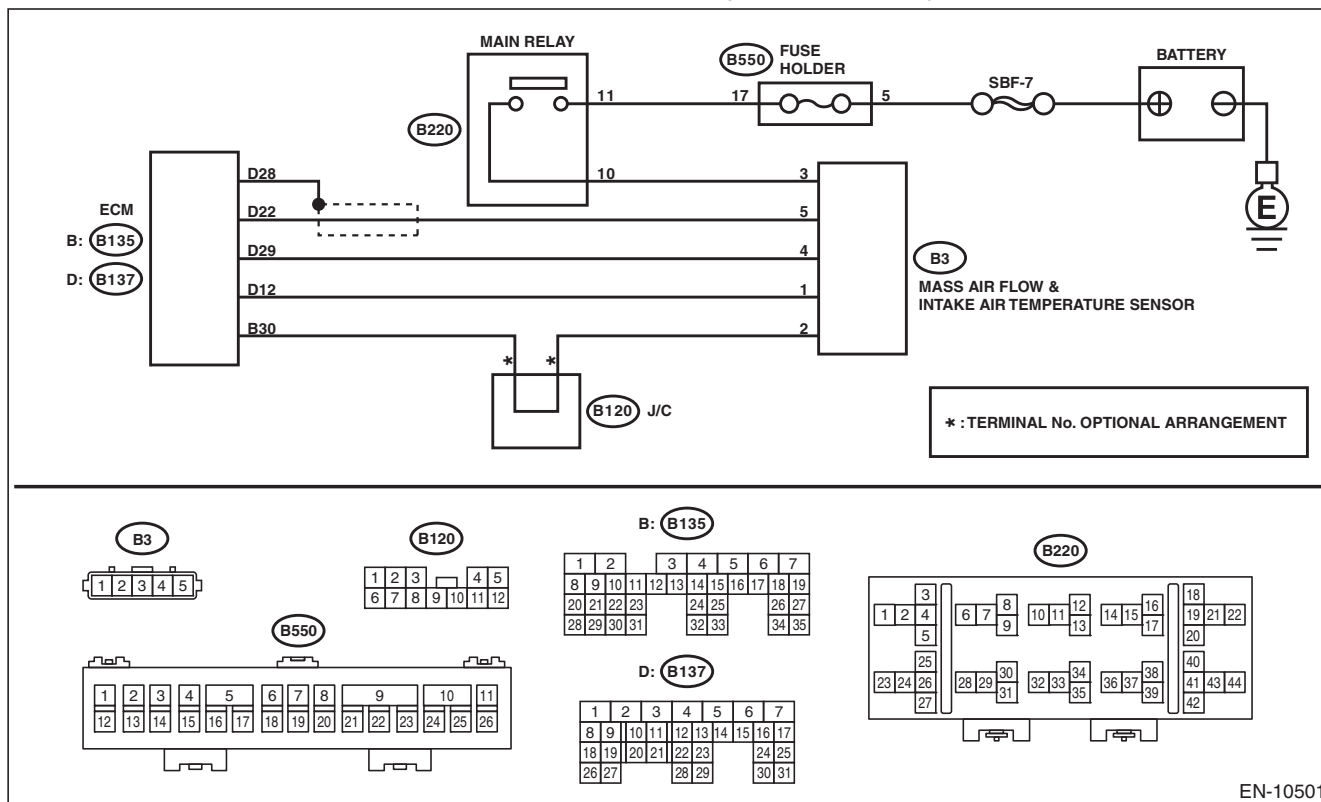
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), 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(H4DO)(diag)-36, 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 and chassis ground. Connector & terminal (B137) No. 12 — Chassis ground:	Is the resistance 1 MΩ or more?	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO)-68, Mass Air Flow and Intake Air Temperature Sensor.>	Repair the short circuit to ground in harness between ECM and mass air flow and intake air temperature sensor connector.



ENGINE (DIAGNOSTICS)

V: DTC P0113 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-39, DTC P0113 INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

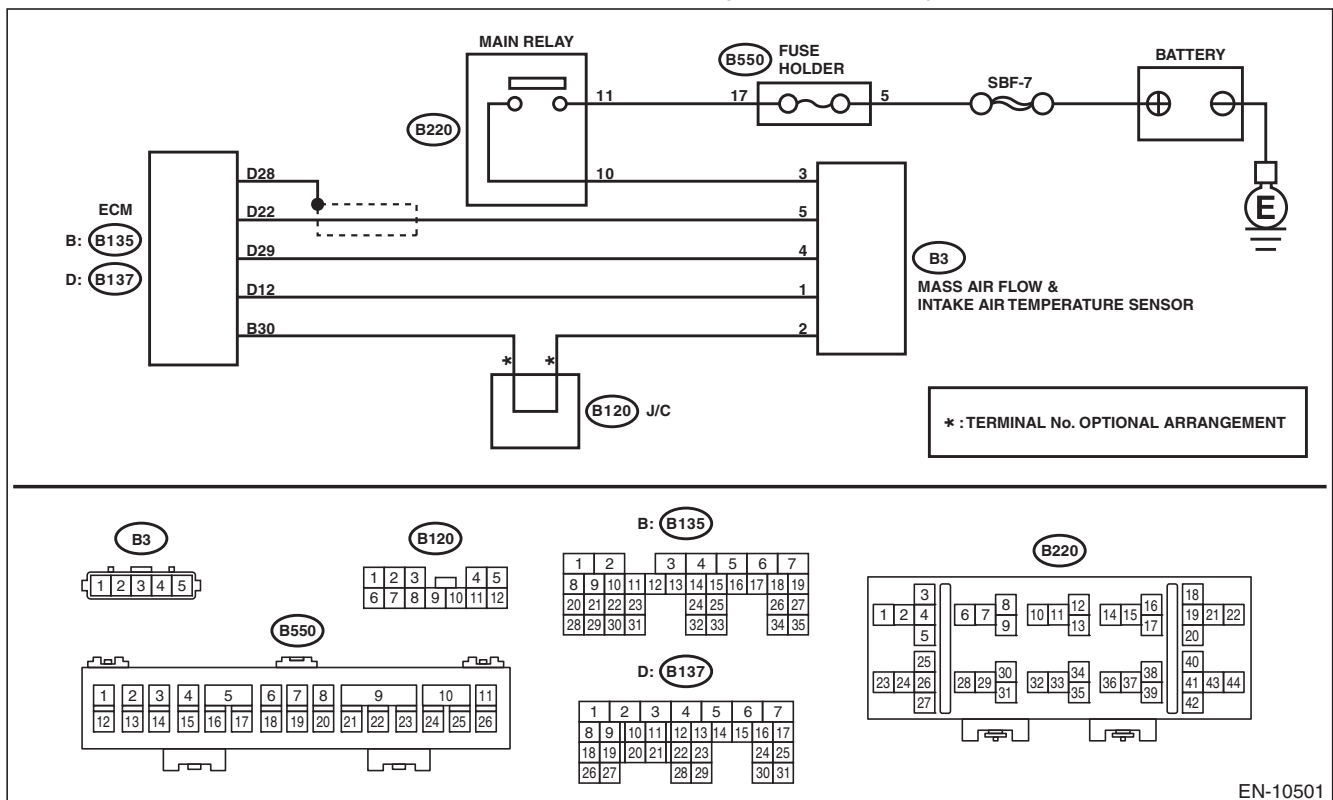
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), 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(H4DO)(diag)-36, 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.» -40°C (-40°F) 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 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 and the mass air flow and intake air temperature sensor connector. Connector & terminal (B137) No. 12 — (B3) No. 1: (B135) No. 30 — (B3) 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 and 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 and chassis ground. Connector & terminal (B137) No. 12 (+) — Chassis ground (-):	Is the voltage 5 V or more?	Repair the short circuit of harness to power supply between ECM and mass air flow and intake air temperature sensor connector.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO)-68, Mass Air Flow and Intake Air Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-40, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-83, 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(H4DO)-50, 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(H4DO)-42, DTC P0117 ENGINE COOLANT TEMPERATURE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

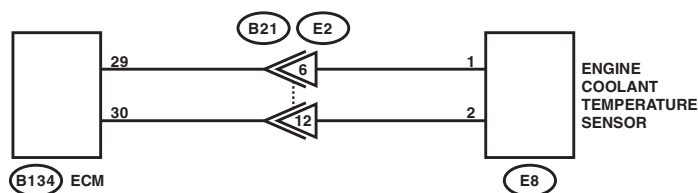
- Hard to start
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



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	

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		

EN-10280

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(H4DO)(diag)-36, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant 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 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 and chassis ground. Connector & terminal (B134) No. 30 — Chassis ground:	Is the resistance 1 MΩ or more?	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO)-50, Engine Coolant Temperature Sensor.>	Repair short circuit in harness to ground between ECM 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(H4DO)-43, DTC P0118 ENGINE COOLANT TEMPERATURE CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

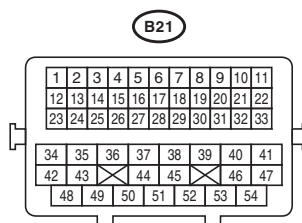
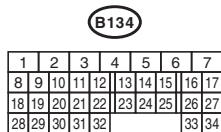
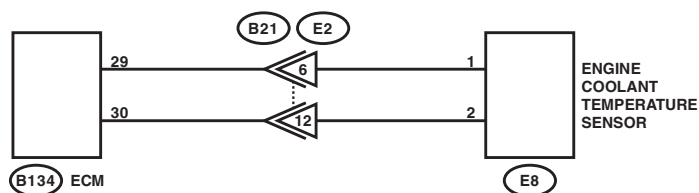
- Hard to start
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10280

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(H4DO)(diag)-36, Subaru Select Monitor.> • General scan tool For detailed operation procedures, refer to the general scan tool operation manual.	Is the value of «Coolant Temp.» -40°C (-40°F) 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 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 and engine coolant temperature sensor connector. Connector & terminal (B134) No. 30 — (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 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 and chassis ground. Connector & terminal (B134) No. 30 (+) — Chassis ground (-):	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM and engine coolant temperature sensor connector.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO)-50, 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(H4DO)-44, 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:

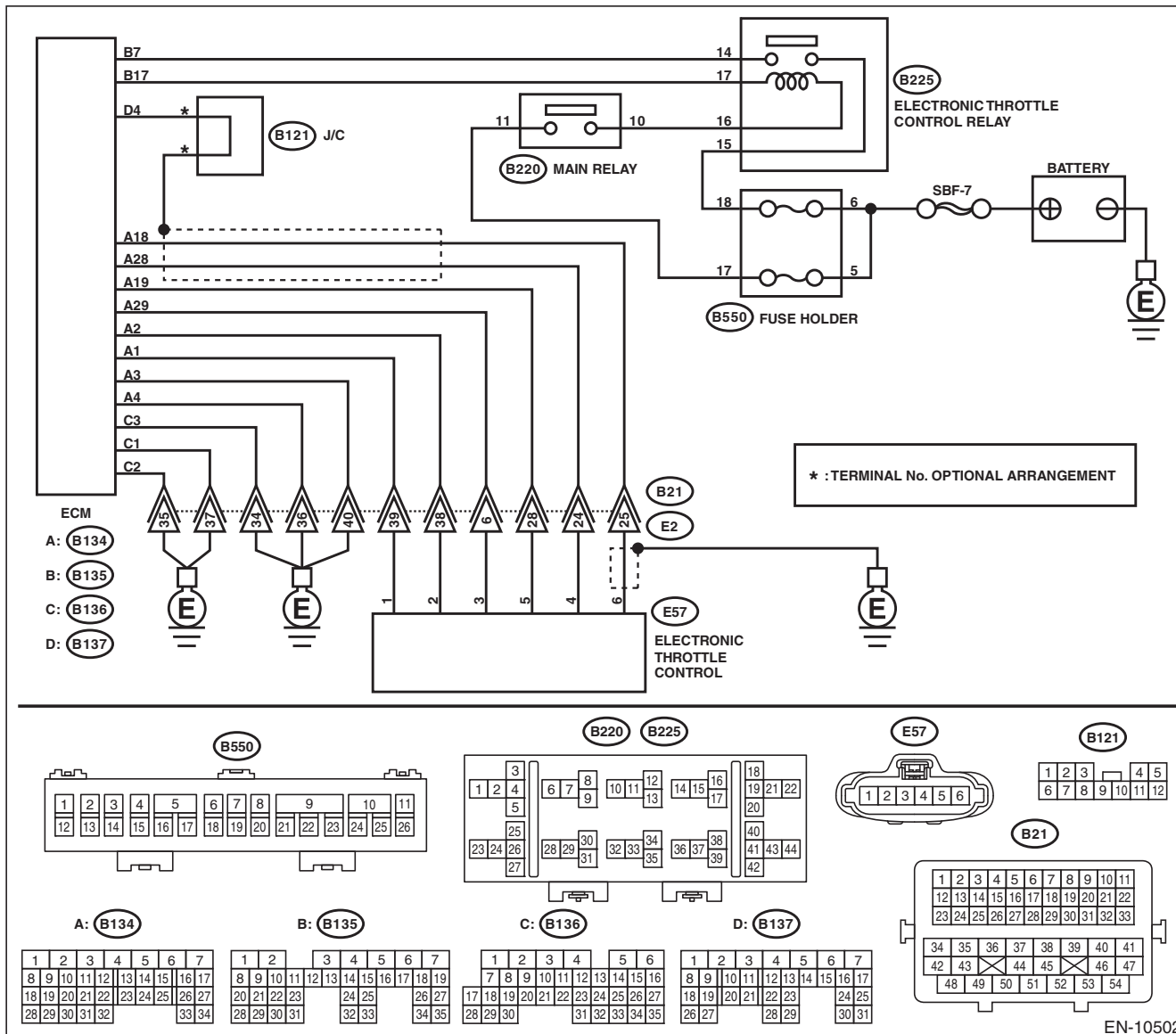
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10502

	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 and chassis ground. Connector & terminal (B134) No. 19 — Chassis ground: (B134) No. 18 — Chassis ground: (B134) No. 18 — (B137) No. 4:	Is the resistance 1 MΩ or more?	Go to step 2.	Repair the short circuit to ground in harness between ECM 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 MΩ or more?	Replace the electronic throttle control. <Ref. to FU(H4DO)-15, Throttle Body.>	Repair the short circuit to ground in harness between ECM and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(H4DO)-94, Engine Control Module (ECM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-45, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

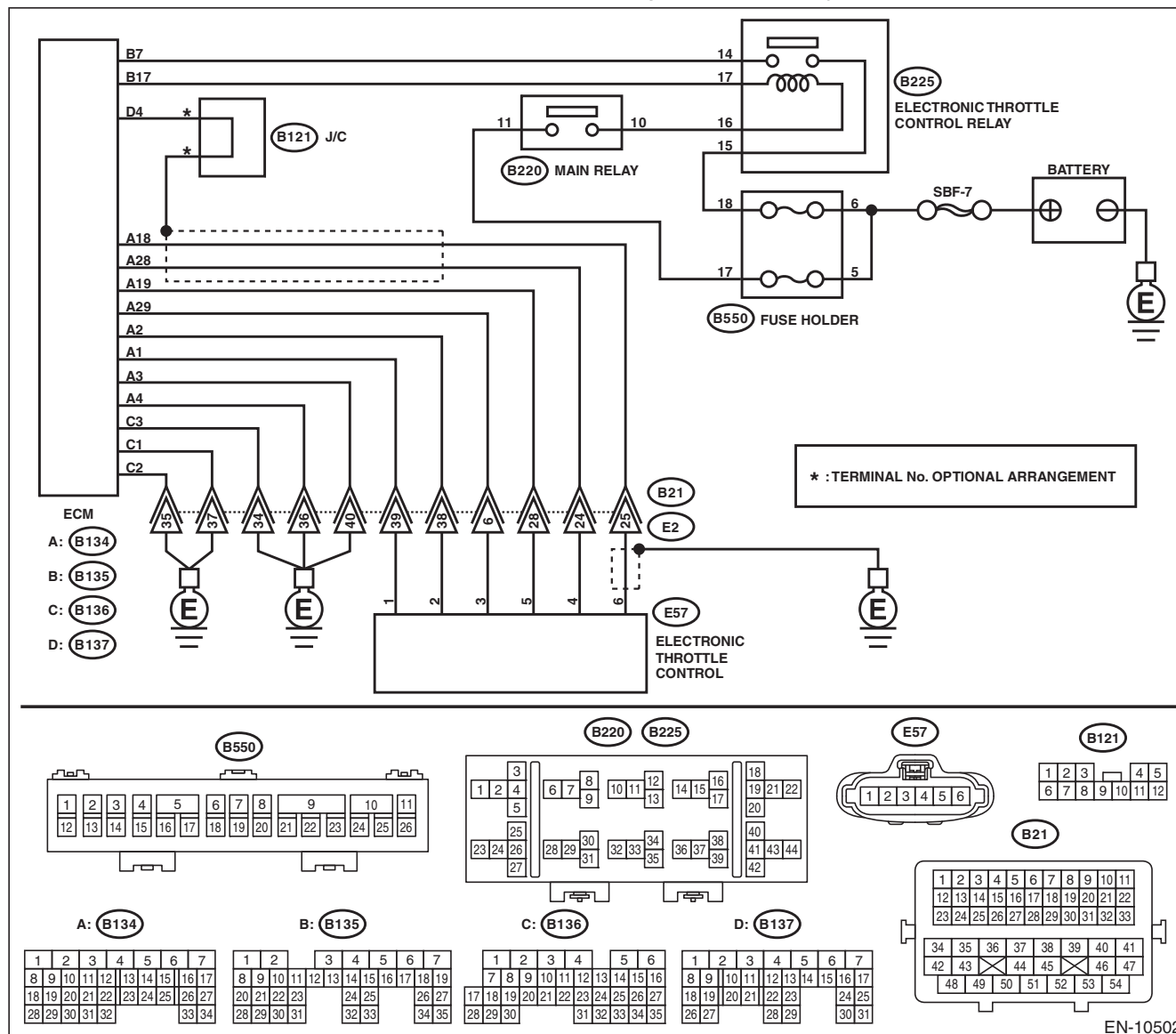


Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10502

	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 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 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 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 harness between ECM 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(H4DO)-15, Throttle Body.>	Repair the short circuit to power in harness between ECM 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 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-46, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)-14, REPLACEMENT, Engine Coolant.>
3 CHECK THERMOSTAT.	Does the thermostat remain opened?	Replace the thermostat. <Ref. to CO(H4DO)-40, Thermostat.>	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO)-50, Engine Coolant Temperature Sensor.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-48, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-83, 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(H4DO)-14, 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(H4DO)-64, Radiator Main Fan and Fan Motor.> and <Ref. to CO(H4DO)-67, Radiator Sub Fan and Fan Motor.>	Replace the thermostat. <Ref. to CO(H4DO)-40, 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:

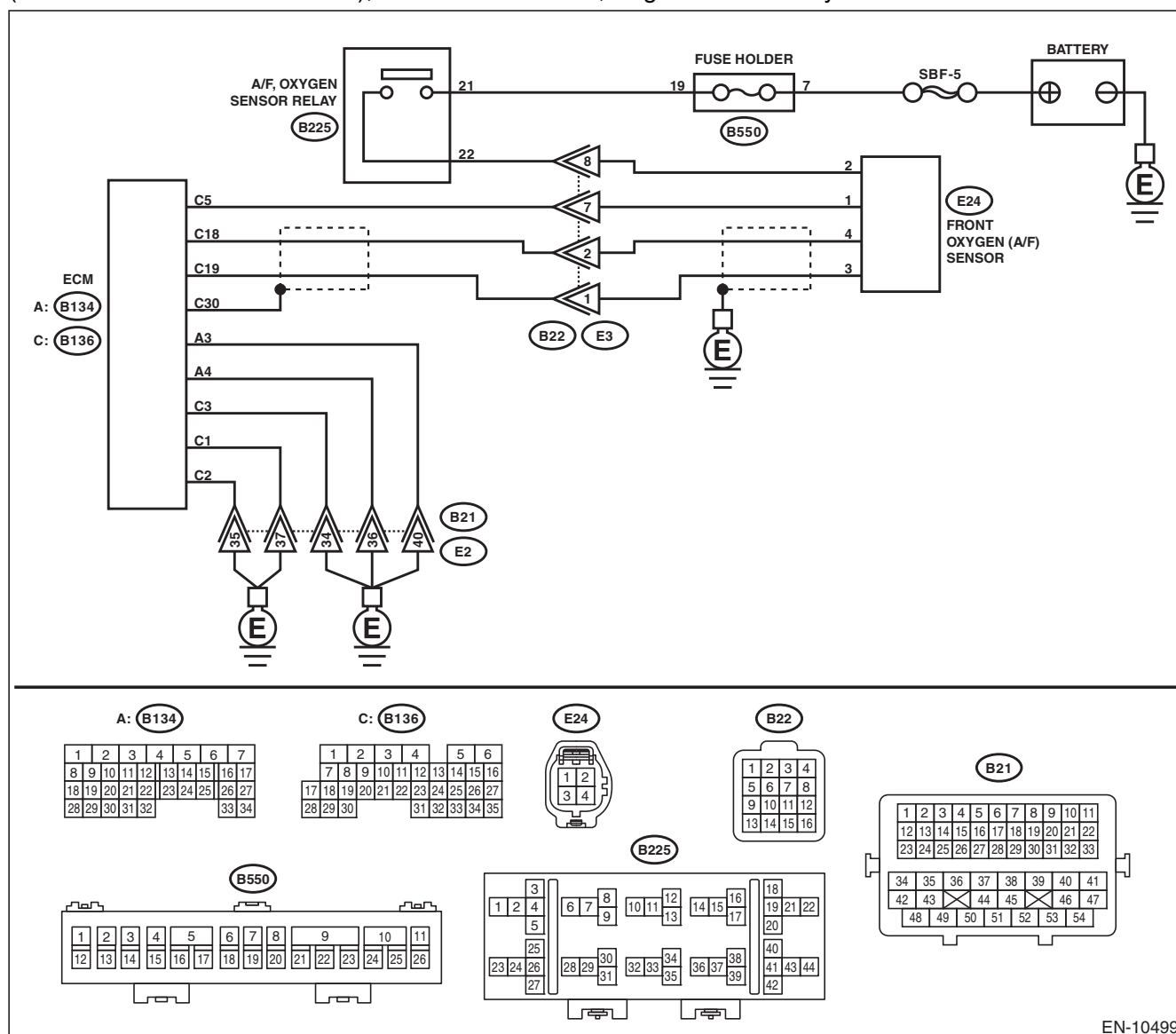
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-52, DTC P0131 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10499

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

	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.
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 and chassis ground. Connector & terminal (B136) No. 18 — Chassis ground: (B136) No. 19 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the ground short circuit of harness between ECM 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(H4DO)-87, Front Oxygen (A/F) Sensor.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

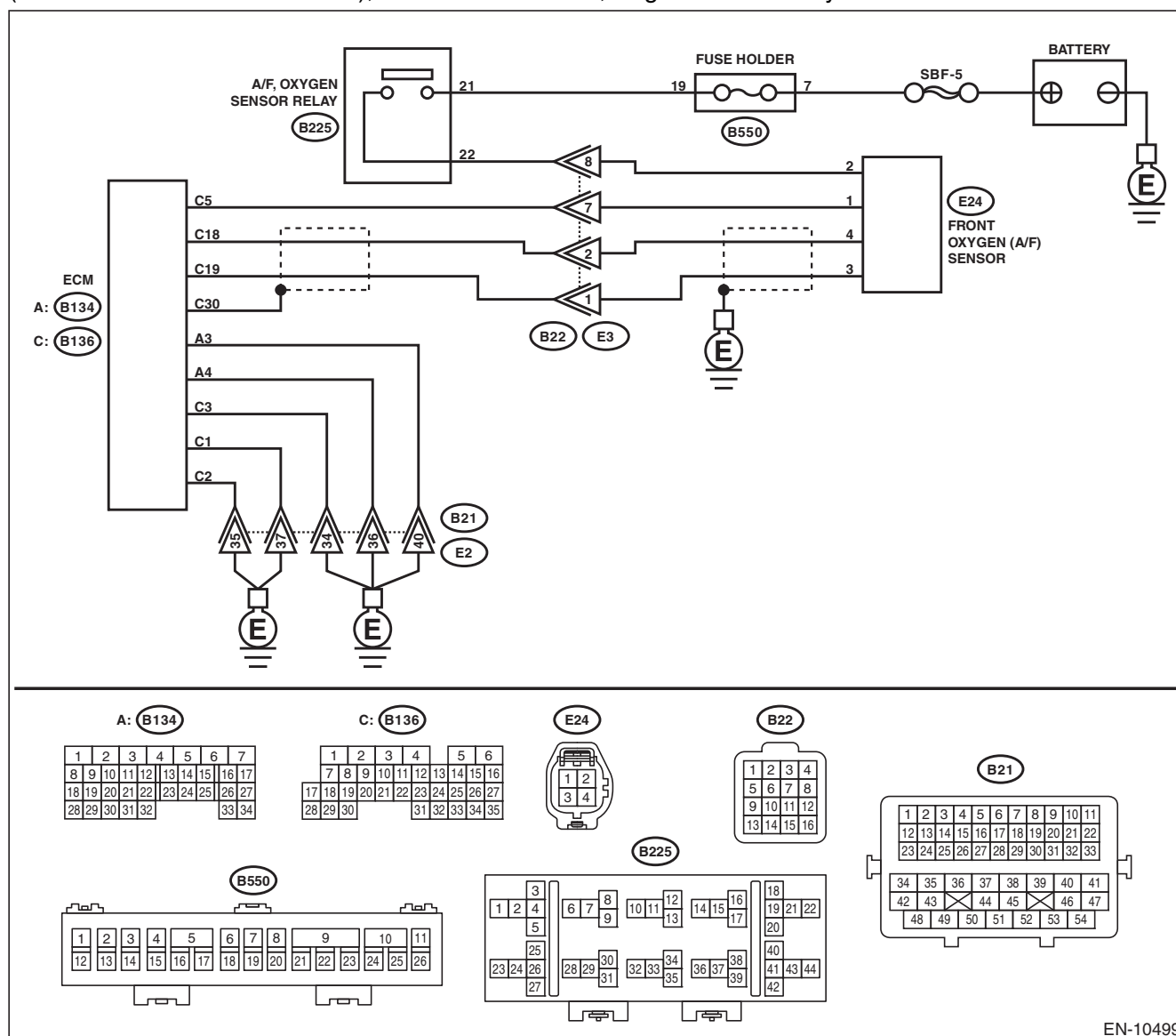
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-54, DTC P0132 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10499

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

	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.
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 and chassis ground. Connector & terminal (B136) No. 18 (+) — Chassis ground (–): (B136) No. 19 (+) — Chassis ground (–):	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM and front oxygen (A/F) sensor connector.	Replace the front oxygen (A/F) sensor. <Ref. to FU(H4DO)-87, Front Oxygen (A/F) Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

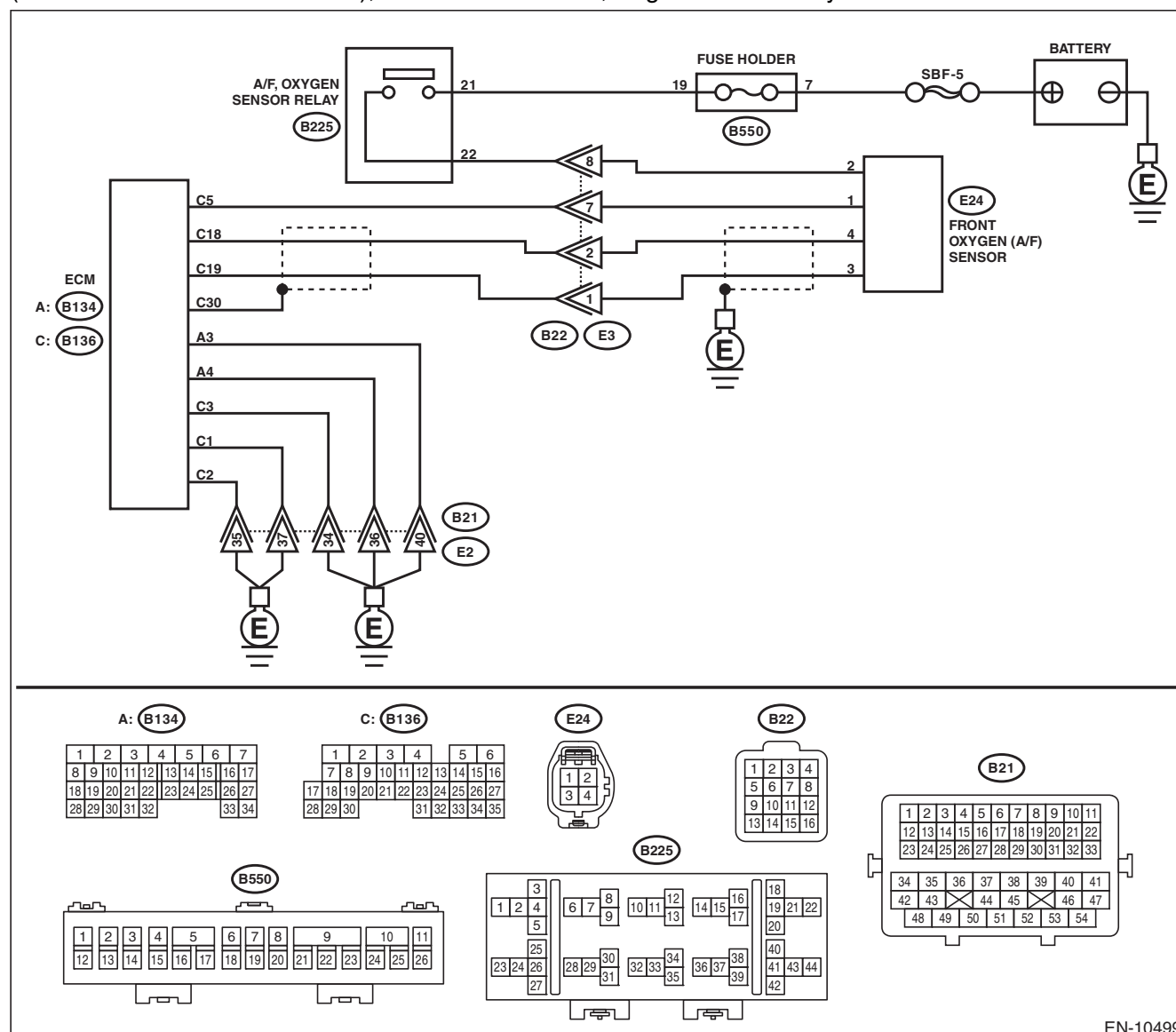
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-56, DTC P0134 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10499

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and front oxygen (A/F) sensor connector. 3) Measure the resistance of harness between ECM and front oxygen (A/F) sensor connector. Connector & terminal (B136) No. 19 — (E24) No. 3: (B136) No. 18 — (E24) 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 and front oxygen (A/F) sensor connector • Poor contact of coupling connector
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(H4DO)-87, 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:

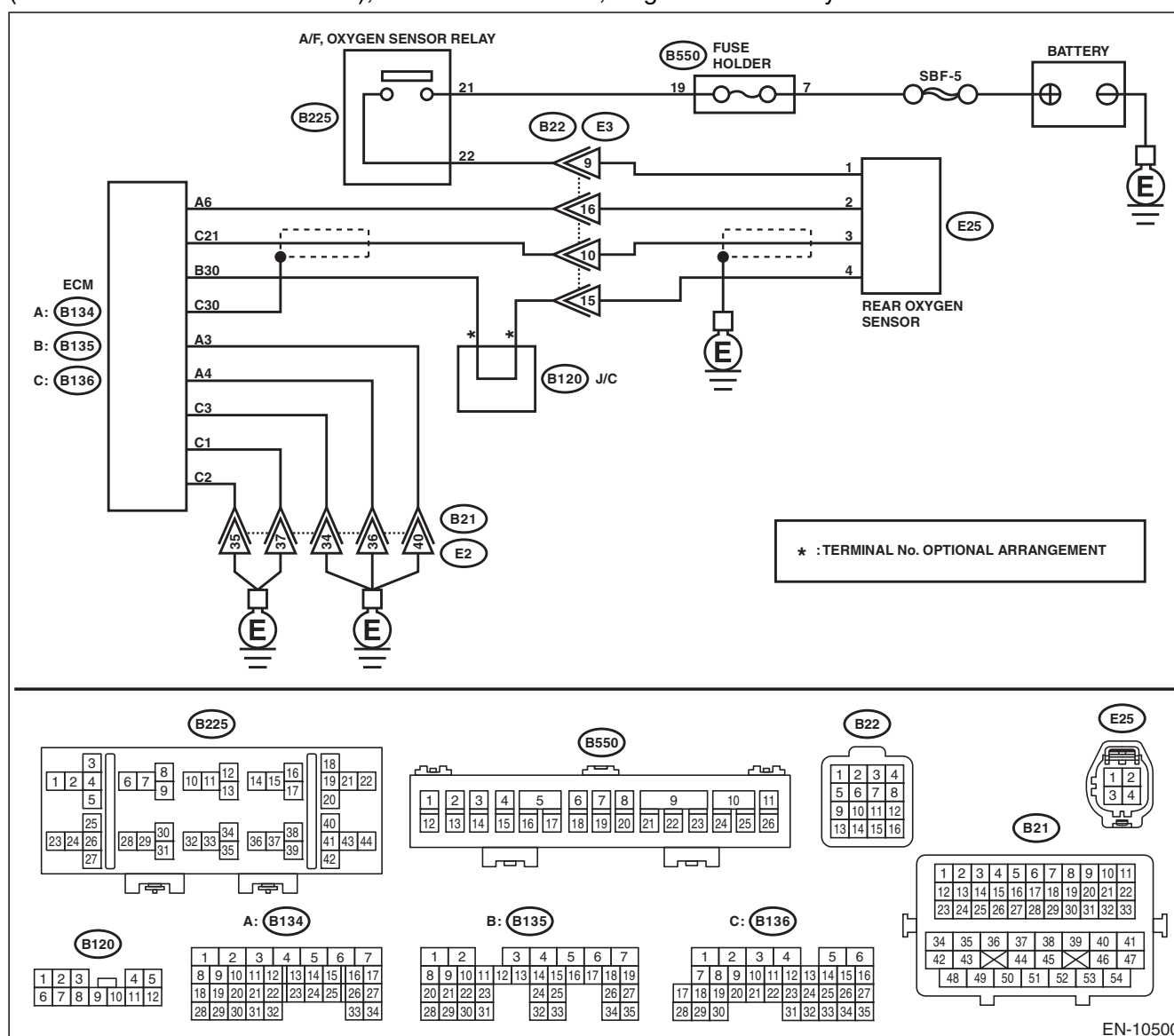
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-58, DTC P0137 O2 SENSOR CIRCUIT LOW VOLTAGE (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10500

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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(H4DO)(diag)-36, 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.
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 and rear oxygen sensor connector. Connector & terminal (B136) No. 21 — (E25) No. 3: (B135) No. 30 — (E25) 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 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 (E25) No. 3 (+) — Chassis ground (-):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4DO)-91, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and rear oxygen sensor connector • Poor contact of coupling connector • Poor contact of ECM 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(H4DO)-91, Rear Oxygen Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

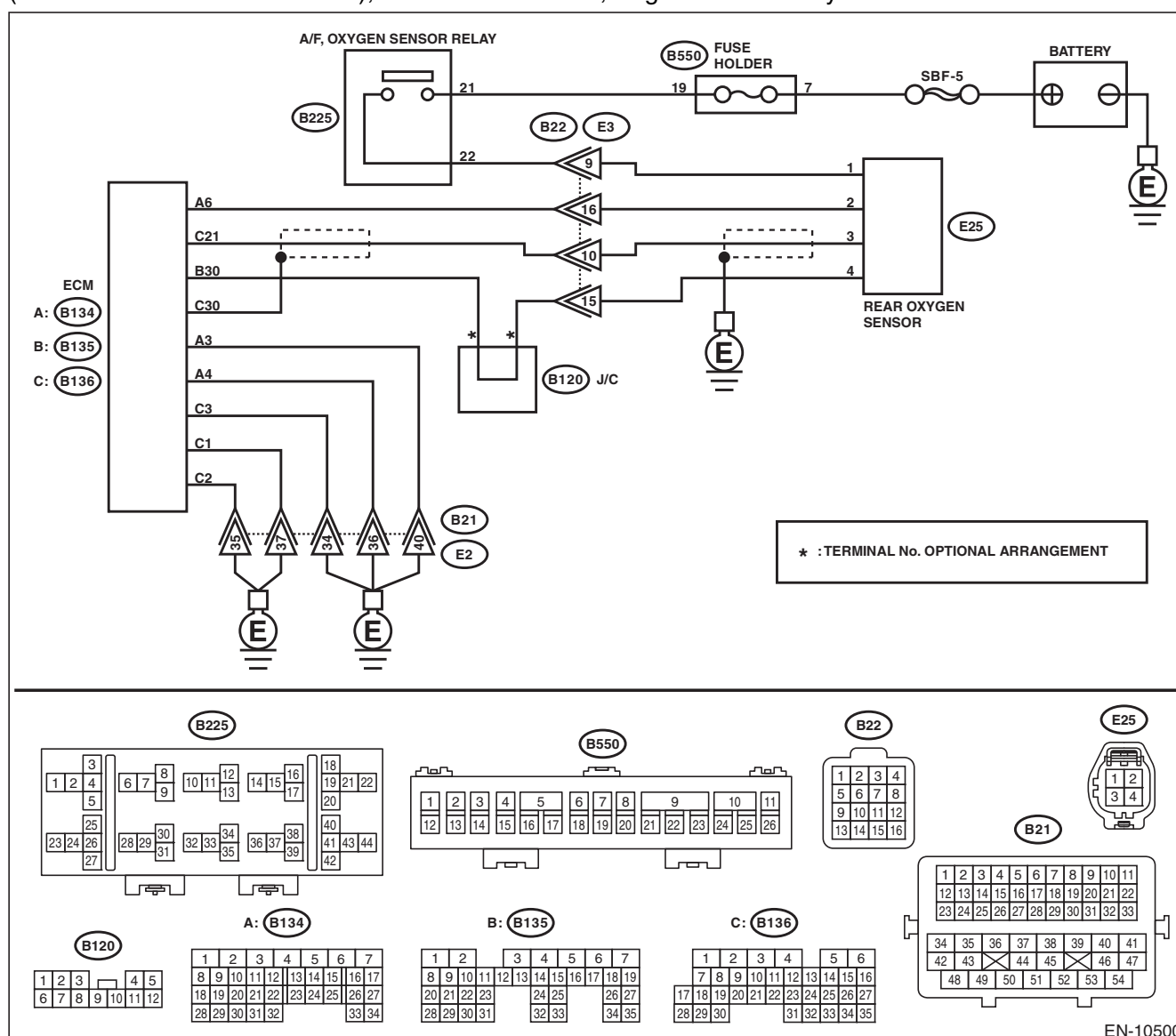
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-60, DTC P0138 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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(H4DO)(diag)-36, 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.
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 and rear oxygen sensor connector. Connector & terminal (B136) No. 21 — (E25) No. 3: (B135) No. 30 — (E25) 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 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 (E25) No. 3 (+) — Chassis ground (-):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4DO)-91, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: - Open circuit in harness between ECM and rear oxygen sensor connector - Poor contact of coupling connector - Poor contact of ECM 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(H4DO)-91, Rear Oxygen Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AI: DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 2)

DTC DETECTING CONDITION:

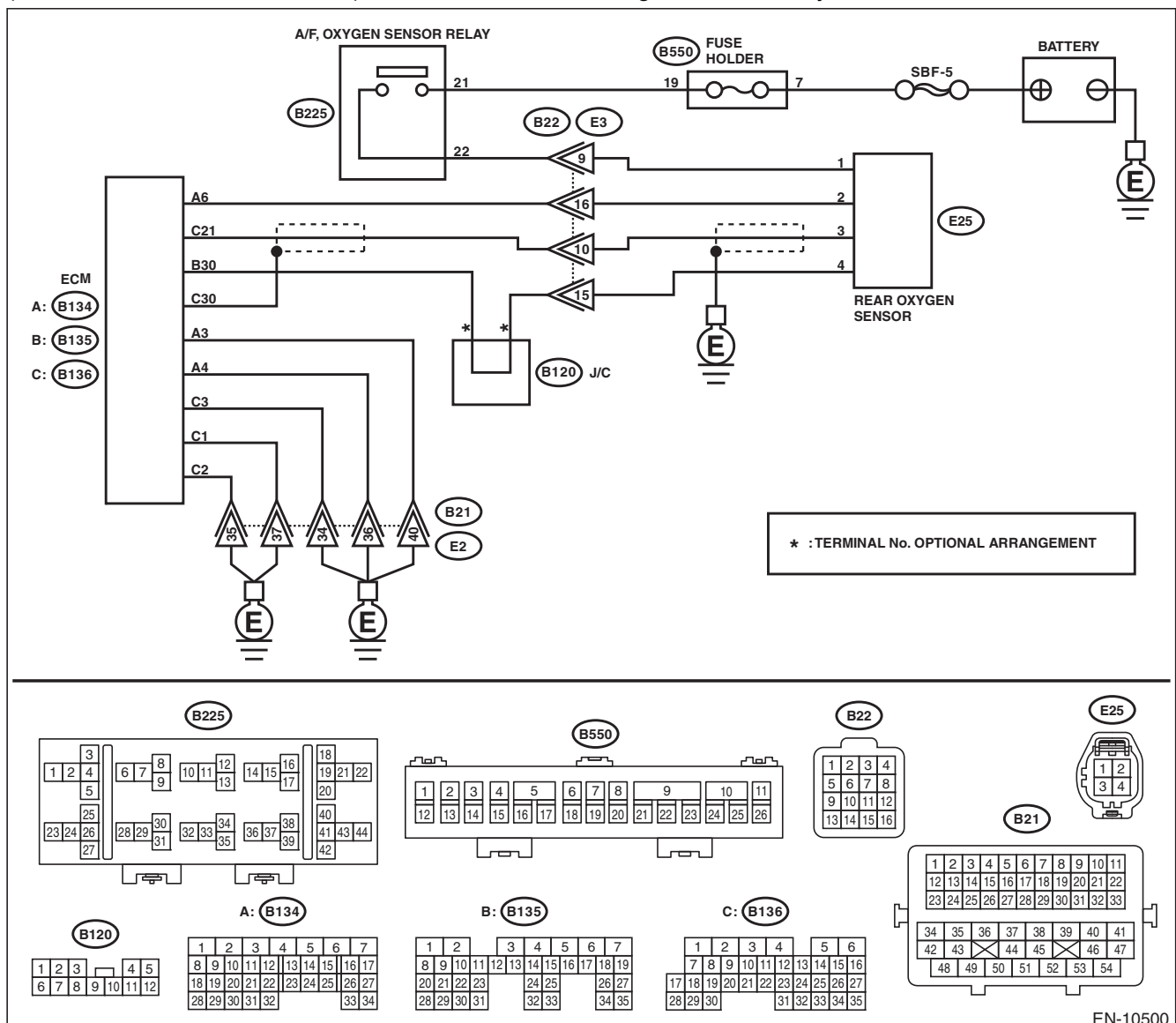
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-61, DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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 and rear oxygen sensor connector. <i>Connector & terminal</i> <i>(B136) No. 21 — (E25) No. 3:</i>	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 and rear oxygen sensor connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. Measure the resistance between rear oxygen sensor connector and chassis ground. <i>Connector & terminal</i> <i>(E25) No. 3 — Chassis ground:</i>	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the ground short circuit of harness between ECM and rear oxygen sensor connector.
3 CHECK REAR OXYGEN SENSOR. Measure the resistance between rear oxygen sensor terminals. <i>Terminals</i> <i>No. 3 — No. 4</i>	Is the resistance less than 1 Ω?	Replace the rear oxygen sensor. <Ref. to FU(H4DO)-91, 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(H4DO)(diag)-151, 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(H4DO)(diag)-151, 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(H4DO)(diag)-151, DTC P013A O2 SENSOR SLOW RESPONSE - RICH TO LEAN (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

EN(H4DO)(diag)-152

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

DTC DETECTING CONDITION:

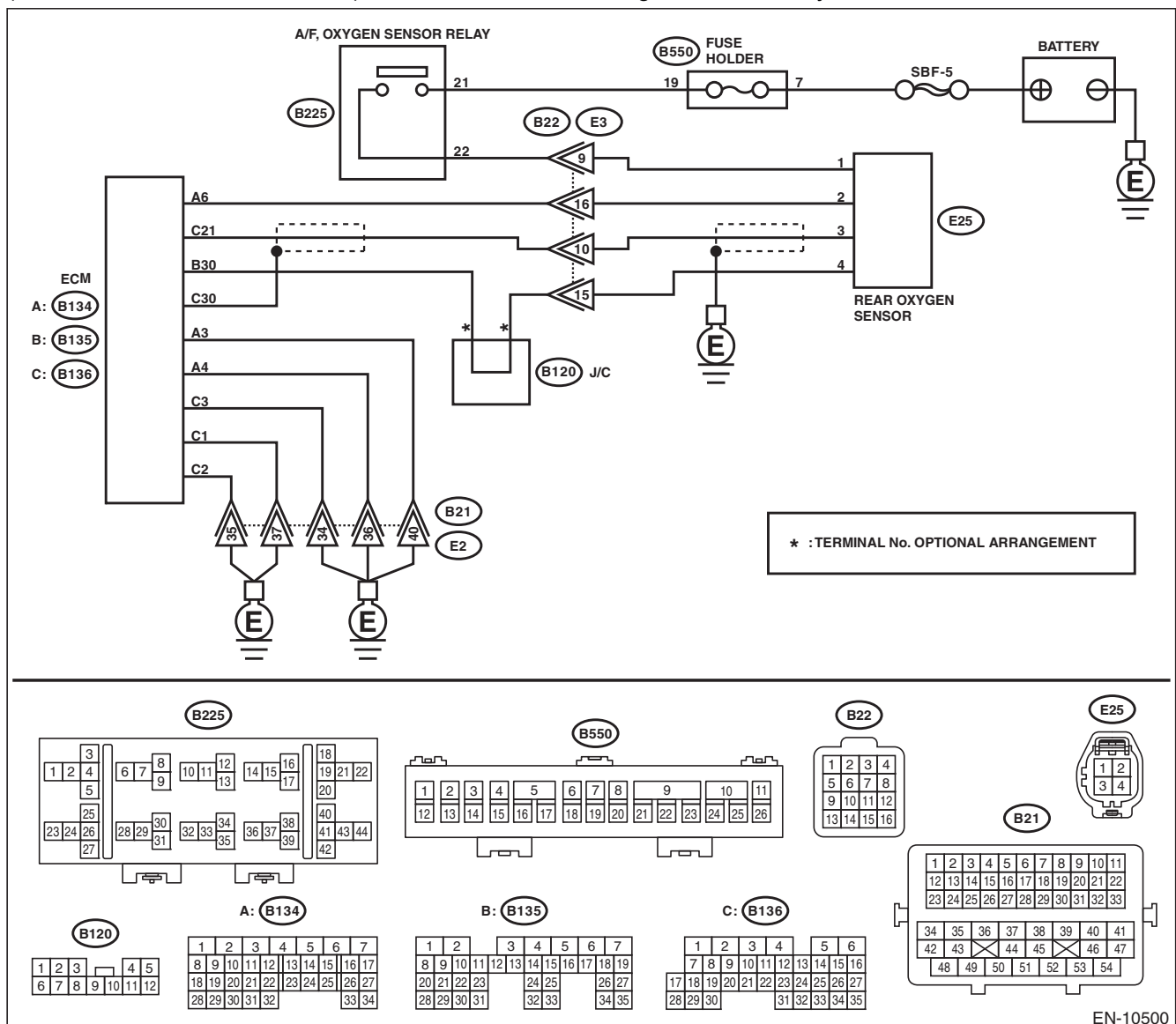
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-69, DTC P0140 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK1 SENSOR2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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(H4DO)(diag)-36, 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.
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(H4DO)(diag)-36, 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 and rear oxygen sensor connector. Connector & terminal (B136) No. 21 — (E25) No. 3: (B135) No. 30 — (E25) 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 and rear oxygen sensor 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 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 (E25) No. 3 (+) — Chassis ground (-):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4DO)-91, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and rear oxygen sensor connector • Poor contact of coupling connector • Poor contact of ECM 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(H4DO)-91, Rear Oxygen Sensor.>

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

Refer to DTC P0037 for diagnostic procedure. <Ref. to EN(H4DO)(diag)-109, 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 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-73, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)-87, 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(H4DO)(diag)-156, 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(H4DO)(diag)-156, 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(H4DO)(diag)-156, 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)

Refer to DTC P0172 for diagnostic procedure. <Ref. to EN(H4DO)(diag)-157, DTC P0172 SYSTEM TOO RICH (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AT:DTC P0172 SYSTEM TOO RICH (BANK 1)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-86, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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. <Ref. to ME(H4DO)-31, INSPECTION, Fuel Pressure.> CAUTION: Release fuel pressure before removing the fuel pressure gauge.	Is the measured value 340 — 400 kPa (3.5 — 4.1 kg/cm ² , 49 — 58 psi)?	Go to step 4.	Repair the following item. Fuel pressure is too high: • Clogged fuel line or bent hose Fuel pressure is too low: • Improper fuel pump discharge • Clogged fuel line
4	CHECK ENGINE COOLANT TEMPERATURE SENSOR. 1) Start the engine and warm up completely. 2) Read the 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(H4DO)(diag)-36, 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 5.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO)-50, Engine Coolant Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the 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(H4DO)(diag)-36, 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 6.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO)-68, Mass Air Flow and Intake Air Temperature Sensor.>
6 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the 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(H4DO)(diag)-36, 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(H4DO)-68, Mass Air Flow and Intake Air Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-88, DTC P0196 ENGINE OIL TEMPERATURE SENSOR 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-83, List of Diagnostic Trouble Code (DTC).>	Replace the engine oil temperature sensor. <Ref. to FU(H4DO)-52, Engine Oil Temperature Sensor.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AV:DTC P0197 ENGINE OIL TEMPERATURE SENSOR LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-90, DTC P0197 ENGINE OIL TEMPERATURE SENSOR LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

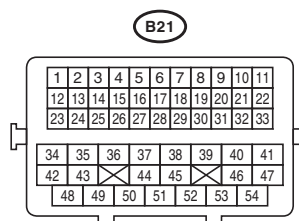
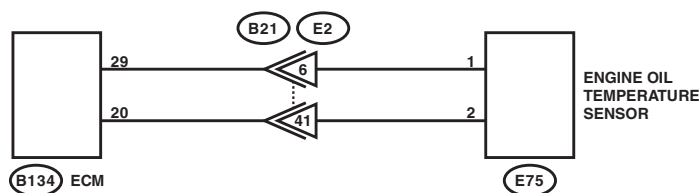
- Hard to start
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10282

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 «Oil Temperature» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DO)(diag)-36, Subaru Select Monitor.>	Is the value of «Oil Temperature» 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 OIL TEMPERATURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and engine oil temperature sensor. 3) Measure the resistance between ECM and chassis ground. Connector & terminal (B134) No. 20 — Chassis ground:	Is the resistance 1 MΩ or more?	Replace the engine oil temperature sensor. <Ref. to FU(H4DO)-52, Engine Oil Temperature Sensor.>	Repair the short circuit to ground in the harness between the ECM and engine oil temperature sensor connector.



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AW:DTC P0198 ENGINE OIL TEMPERATURE SENSOR HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-92, DTC P0198 ENGINE OIL TEMPERATURE SENSOR HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

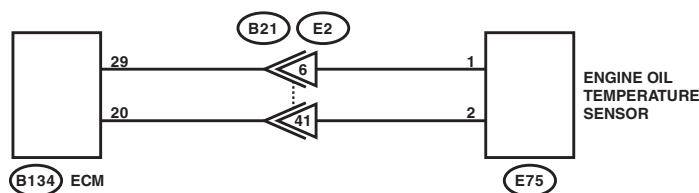
- Hard to start
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



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	

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		

EN-10282

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 «Oil Temperature» using Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DO)(diag)-36, Subaru Select Monitor.>	Is the value of «Oil Temperature» -40°C (-40°F) 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 FOR POOR CONTACT. Check for poor contact between the ECM and engine oil temperature sensor connectors.	Is there poor contact of the ECM or engine oil temperature sensor connectors?	Repair the poor contact of ECM or engine oil temperature sensor connector.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND ENGINE OIL TEMPERATURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and engine oil temperature sensor. 3) Measure the resistance of the harness between the ECM and engine oil temperature sensor connector. Connector & terminal (B134) No. 20 — (E75) No. 2: (B134) No. 29 — (E75) No. 1:	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 and engine oil temperature sensor connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN ECM AND ENGINE OIL TEMPERATURE SENSOR CONNECTOR. 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM and chassis ground. Connector & terminal (B134) No. 20 (+) — Chassis ground (-):	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM and engine oil temperature sensor connector.	Replace the engine oil temperature sensor. <Ref. to FU(H4DO)-52, Engine Oil Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

AX:DTC P0201 INJECTOR #1

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-94, DTC P0201 INJECTOR #1, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

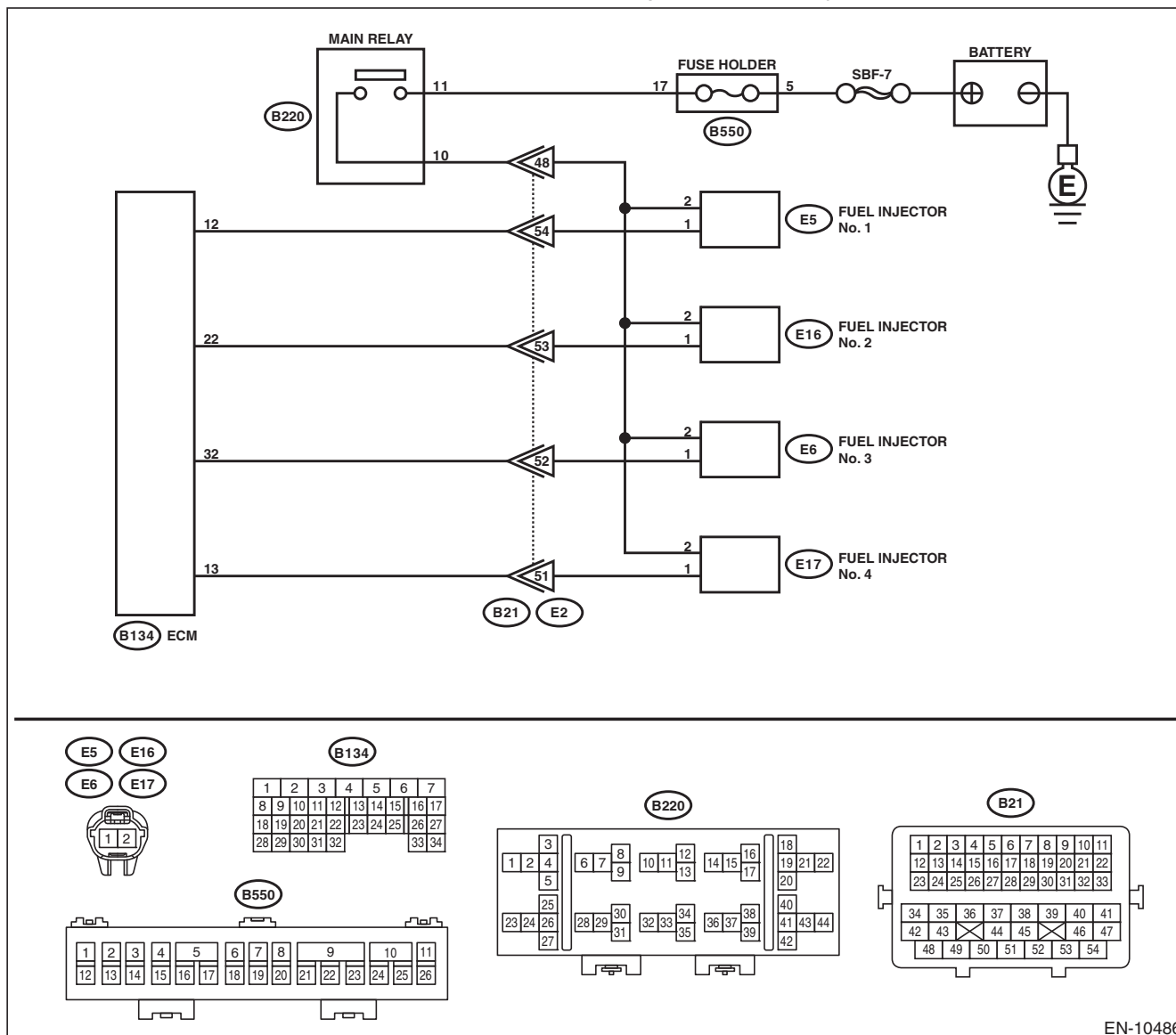
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10486

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. 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 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. 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 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. 12 — (E5) No. 1: DTC P0202; (B134) No. 22 — (E16) No. 1: DTC P0203; (B134) No. 32 — (E6) No. 1: DTC P0204; (B134) No. 13 — (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 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(H4DO)-73, 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.

AY:DTC P0202 INJECTOR #2

NOTE:

For the diagnostic procedure, refer to DTC P0201. <Ref. to EN(H4DO)(diag)-164, DTC P0201 INJECTOR #1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AZ:DTC P0203 INJECTOR #3

NOTE:

For the diagnostic procedure, refer to DTC P0201. <Ref. to EN(H4DO)(diag)-164, DTC P0201 INJECTOR #1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BA:DTC P0204 INJECTOR #4

NOTE:

For the diagnostic procedure, refer to DTC P0201. <Ref. to EN(H4DO)(diag)-164, DTC P0201 INJECTOR #1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BB:DTC P0222 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-96, 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:

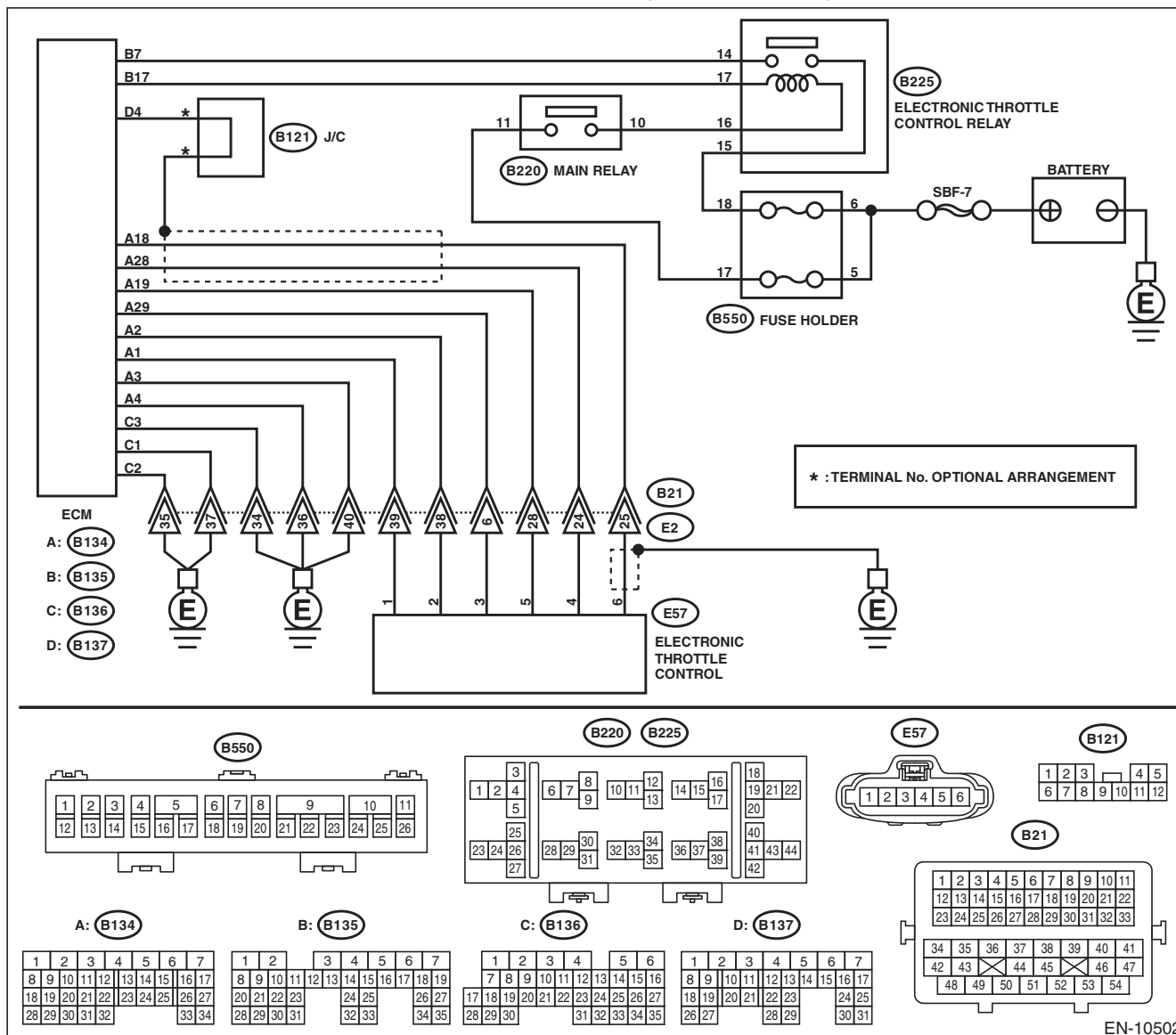
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10502

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 and chassis ground. Connector & terminal (B134) No. 19 — Chassis ground: (B134) No. 28 — Chassis ground: (B134) No. 28 — (B137) No. 4:	Go to step 2.	Repair the short circuit to ground in harness between ECM 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 MΩ or more?	Replace the electronic throttle control. <Ref. to FU(H4DO)-15, Throttle Body.>	Repair the short circuit to ground in harness between ECM and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(H4DO)-94, Engine Control Module (ECM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BC:DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-98, DTC P0223 THROTTLE/PEDAL POSITION SENSOR/SWITCH "B" CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

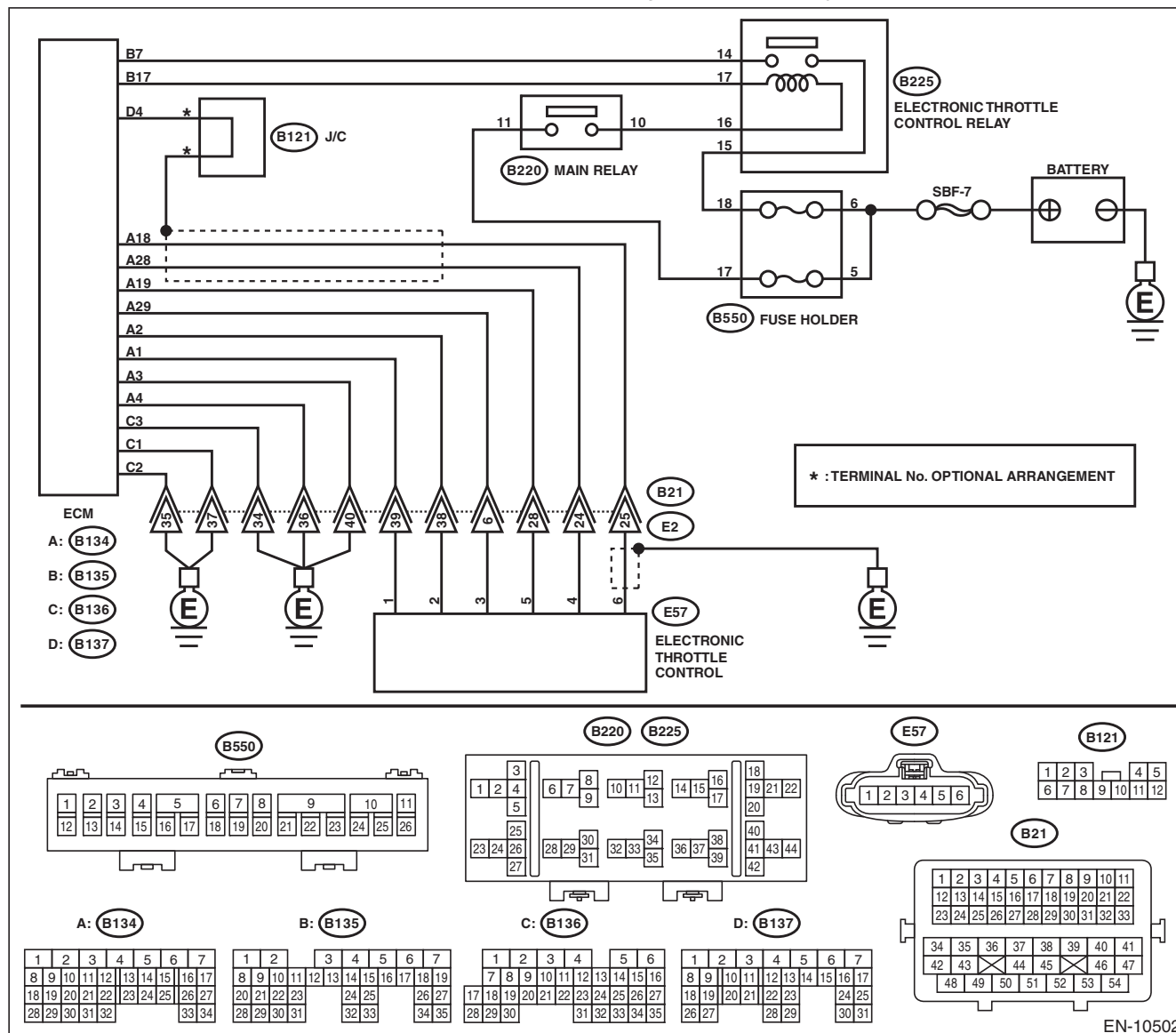
- Improper idling
- Poor driving performance
- Engine stalls.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10502

	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 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 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 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 harness between ECM 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(H4DO)-15, Throttle Body.>	Repair the short circuit to power in harness between ECM and electronic throttle control connector.



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BD:DTC P0300 RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- Immediately at fault recognition (A misfire which could damage catalyst occurs.)
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-99, DTC P0300 RANDOM/MULTIPLE CYLINDER MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine stalls.
- Improper idling
- Rough driving

CAUTION:

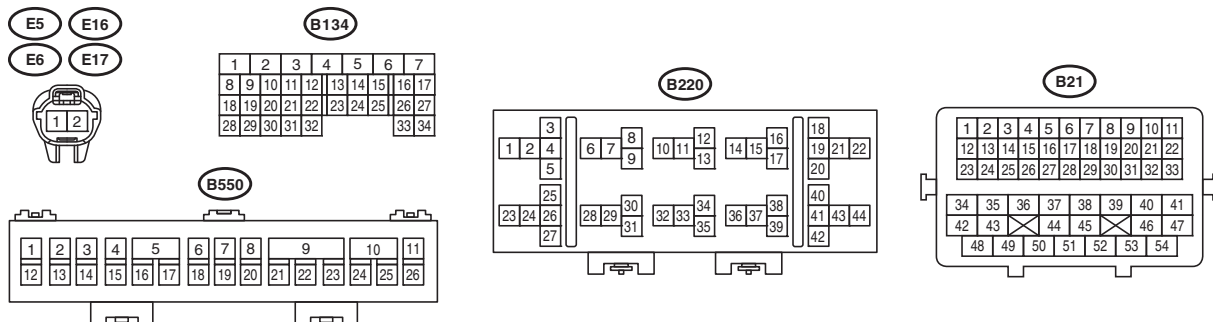
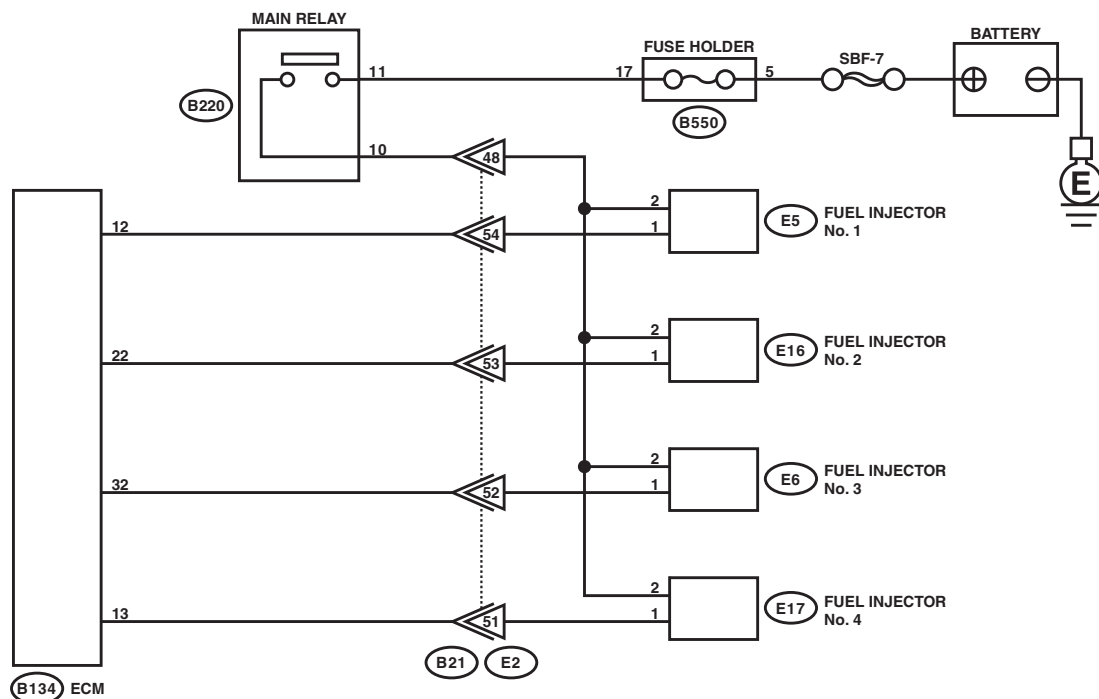
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10486

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 (B134) No. 12 (+) — Chassis ground (-): #2 (B134) No. 22 (+) — Chassis ground (-): #3 (B134) No. 32 (+) — 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 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 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 (B134) No. 12 — (E5) No. 1: #2 (B134) No. 22 — (E16) No. 1: #3 (B134) No. 32 — (E6) No. 1: #4 (B134) No. 13 — (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 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(H4DO)-73, 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 main relay connector and fuel injector connector • 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 (B134) No. 12 (+) — Chassis ground (-): #2 (B134) No. 22 (+) — Chassis ground (-): #3 (B134) No. 32 (+) — 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 and fuel injector connector.	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. <i>Terminals</i> <i>No. 1 — No. 2:</i>	Is the resistance 5 — 20 Ω ?	Go to step 8.	Replace the faulty fuel injector. <Ref. to FU(H4DO)-73, Fuel Injector.>
8 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(H4DO)-59, INSTALLATION, Camshaft Position Sensor.> <Ref. to FU(H4DO)-55, INSTALLATION, Crankshaft Position Sensor.>	Go to step 9.
9 CHECK CRANKSHAFT POSITION SENSOR PLATE.	Is the crankshaft position sensor plate rusted or does it have broken teeth?	Replace the crankshaft position sensor plate. <Ref. to ME(H4DO)-249, Cylinder Block.>	Go to step 10.
10 CHECK INSTALLATION CONDITION OF TIMING CHAIN. Turn the crankshaft using ST, and align the alignment mark on crank sprocket with alignment mark on cylinder block. ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain dislocated from its proper position?	Correct the installation condition of timing chain. <Ref. to ME(H4DO)-117, Timing Chain Assembly.>	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. <Ref. to EN(H4DO)(diag)-58, 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 • Ignition coil • Fuel injector • Compression ratio • Skipping timing chain teeth
			Go to DTC P0171. <Ref. to EN(H4DO)(diag)-156, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BE:DTC P0301 CYLINDER 1 MISFIRE DETECTED

NOTE:

For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(H4DO)(diag)-178, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BF:DTC P0302 CYLINDER 2 MISFIRE DETECTED

NOTE:

For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(H4DO)(diag)-178, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BG:DTC P0303 CYLINDER 3 MISFIRE DETECTED

NOTE:

For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(H4DO)(diag)-178, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

EN(H4DO)(diag)-177



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BH:DTC P0304 CYLINDER 4 MISFIRE DETECTED

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- Immediately at fault recognition (A misfire which could damage catalyst occurs.)
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-109, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

- Engine stalls.
- Improper idling
- Rough driving

CAUTION:

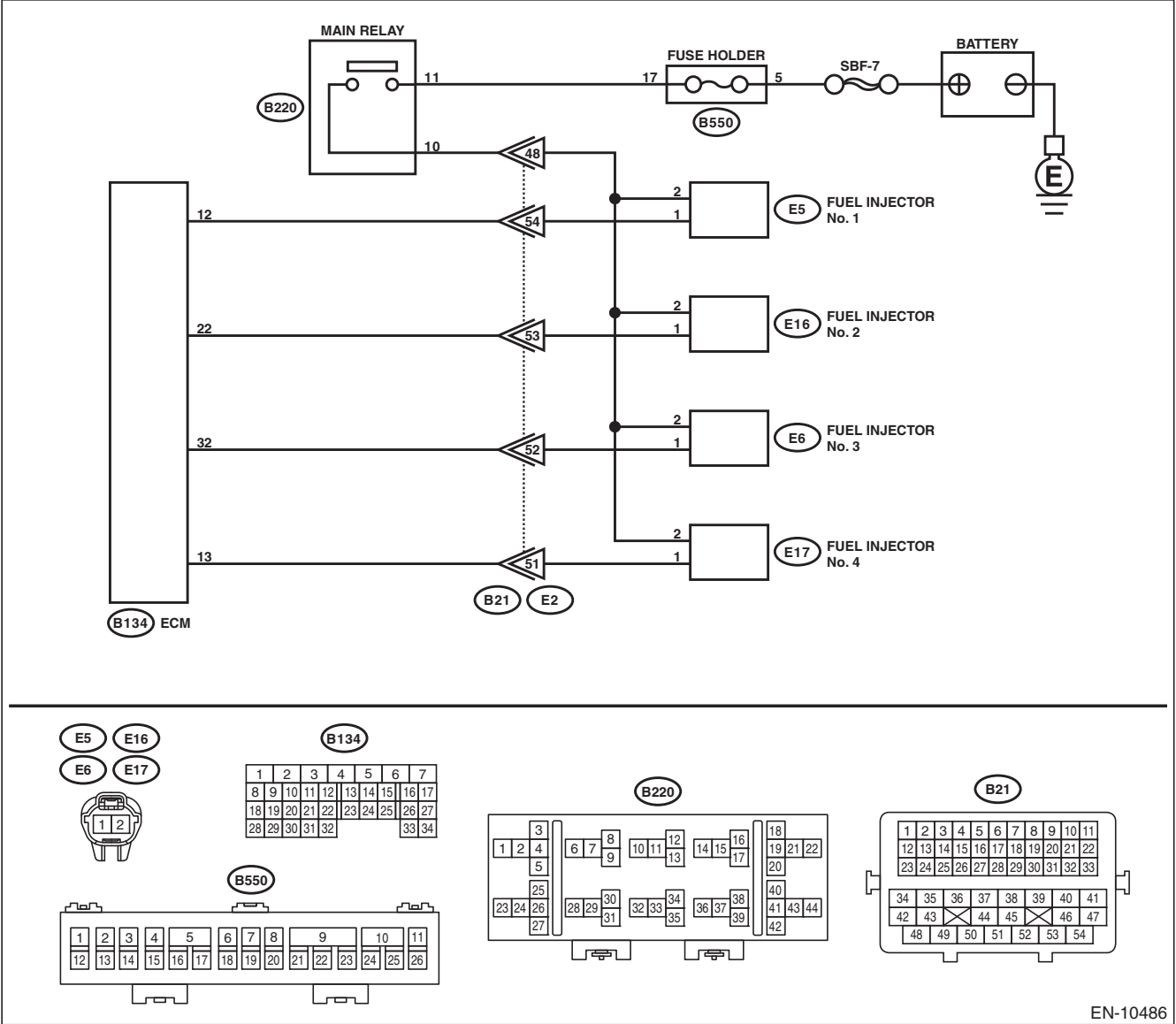
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10486

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. 12 (+) — Chassis ground (—): #2 (B134) No. 22 (+) — Chassis ground (—): #3 (B134) No. 32 (+) — Chassis ground (—): #4 (B134) No. 13 (+) — Chassis ground (—):	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. 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 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. 12 — (E5) No. 1: #2 (B134) No. 22 — (E16) No. 1: #3 (B134) No. 32 — (E6) No. 1: #4 (B134) No. 13 — (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 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(H4DO)-73, Fuel Injector.>
5 CHECK POWER SUPPLY LINE. 1) Turn the ignition switch to ON. 2) Measure the voltage between fuel injector and engine ground on faulty cylinders. Connector & terminal #1 (E5) No. 2 (+) — Engine ground (-): #2 (E16) No. 2 (+) — Engine ground (-): #3 (E6) No. 2 (+) — Engine ground (-): #4 (E17) No. 2 (+) — Engine ground (-):	Is the voltage 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 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. 12 (+) — Chassis ground (-): #2 (B134) No. 22 (+) — Chassis ground (-): #3 (B134) No. 32 (+) — 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 and fuel injector connector.	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 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(H4DO)-73, Fuel Injector.>
8 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(H4DO)-59, INSTALLATION, Camshaft Position Sensor.> <Ref. to FU(H4DO)-55, INSTALLATION, Crankshaft Position Sensor.>	Go to step 9.
9 CHECK CRANKSHAFT POSITION SENSOR PLATE.	Is the crankshaft position sensor plate rusted or does it have broken teeth?	Replace the crankshaft position sensor plate. <Ref. to ME(H4DO)-249, Cylinder Block.>	Go to step 10.
10 CHECK INSTALLATION CONDITION OF TIMING CHAIN. Turn the crankshaft using ST, and align the alignment mark on crank sprocket with alignment mark on cylinder block. ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain dislocated from its proper position?	Correct the installation condition of timing chain. <Ref. to ME(H4DO)-117, Timing Chain Assembly.>	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. <Ref. to EN(H4DO)(diag)-58, 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 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 • Skipping timing chain teeth	Go to DTC P0171. <Ref. to EN(H4DO)(diag)-156, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-110, DTC P0327 KNOCK SENSOR 1 CIRCUIT LOW (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

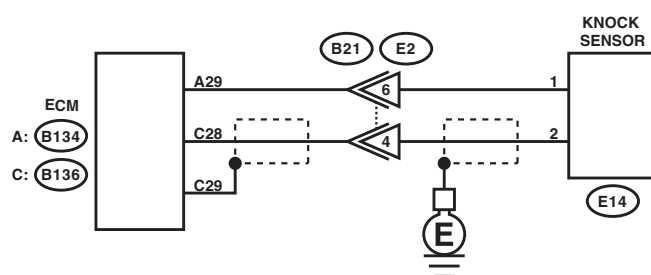
- Poor driving performance
- Knocking occurs

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), 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	

C: B136

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	

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				

EN-10283

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 (B136) No. 28 — (B134) No. 29:	Is the resistance less than 500 kΩ?	Go to step 2.	Go to step 3.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
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 less than 500 k Ω ?	Replace the knock sensor. <Ref. to FU(H4DO)-64, Knock Sensor.>	Repair the short circuit to ground in harness between ECM 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 and chassis ground. <i>Connector & terminal</i> <i>(B136) No. 28 (+) — Chassis ground (-):</i>	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 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)

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-112, DTC P0328 KNOCK SENSOR 1 CIRCUIT HIGH (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

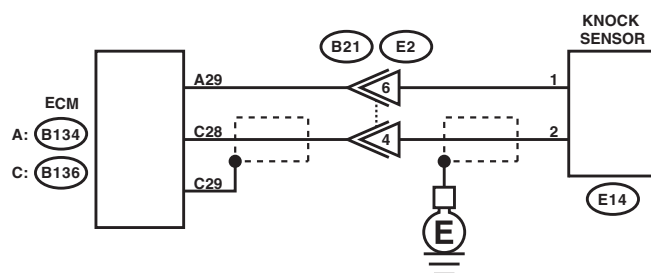
- Poor driving performance
- Knocking occurs

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), 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	

C: B136

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	

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				

EN-10283

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 (B136) No. 28 — (B134) No. 29:	Is the resistance 600 kΩ or more?	Go to step 2.	Repair the poor contact of ECM connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
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(H4DO)-64, Knock Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and knock sensor connector • Poor contact of knock sensor connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BK:DTC P0335 CRANKSHAFT POSITION SENSOR "A" CIRCUIT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-114, DTC P0335 CRANKSHAFT POSITION SENSOR "A" CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

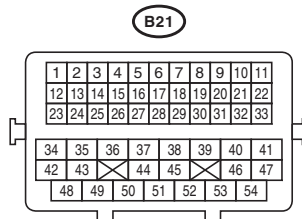
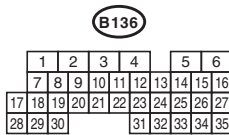
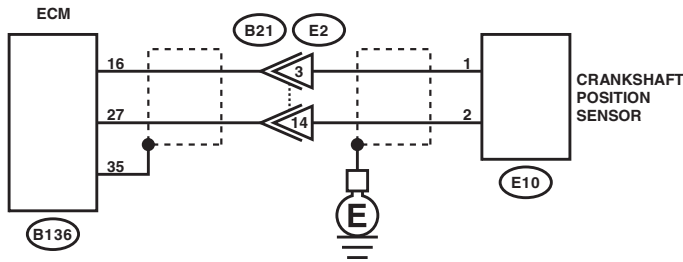
- Engine stalls.
- Failure of engine to start

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10284

Step	Check	Yes	No	
1	CHECK INSTALLATION 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(H4DO)-55, INSTALLATION, Crankshaft Position Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
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. <i>Terminals</i> <i>No. 1 — No. 2:</i>	Is the resistance between 1 and 4 k Ω ?	Go to step 3.	Replace the crankshaft position sensor. <Ref. to FU(H4DO)-54, 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 and crankshaft position sensor connector. <i>Connector & terminal</i> <i>(B136) No. 16 — (E10) No. 1:</i> <i>(B136) No. 27 — (E10) No. 2:</i>	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 and crankshaft position sensor connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-116, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)-55, INSTALLATION, Crankshaft Position Sensor.>
2 CHECK CRANKSHAFT POSITION SENSOR PLATE.	Is there crack or damage in the crankshaft position sensor plate teeth?	Replace the crankshaft position sensor plate. <Ref. to ME(H4DO)-249, Cylinder Block.>	Go to step 3.
3 CHECK INSTALLATION CONDITION OF TIMING CHAIN. Turn the crankshaft, and align alignment mark on crank sprocket with alignment mark on cylinder block. ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain dislocated from its proper position?	Correct the installation condition of timing chain. <Ref. to ME(H4DO)-117, Timing Chain Assembly.>	Replace the crankshaft position sensor. <Ref. to FU(H4DO)-54, Crankshaft Position Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-118, DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 1 OR SINGLE SENSOR), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

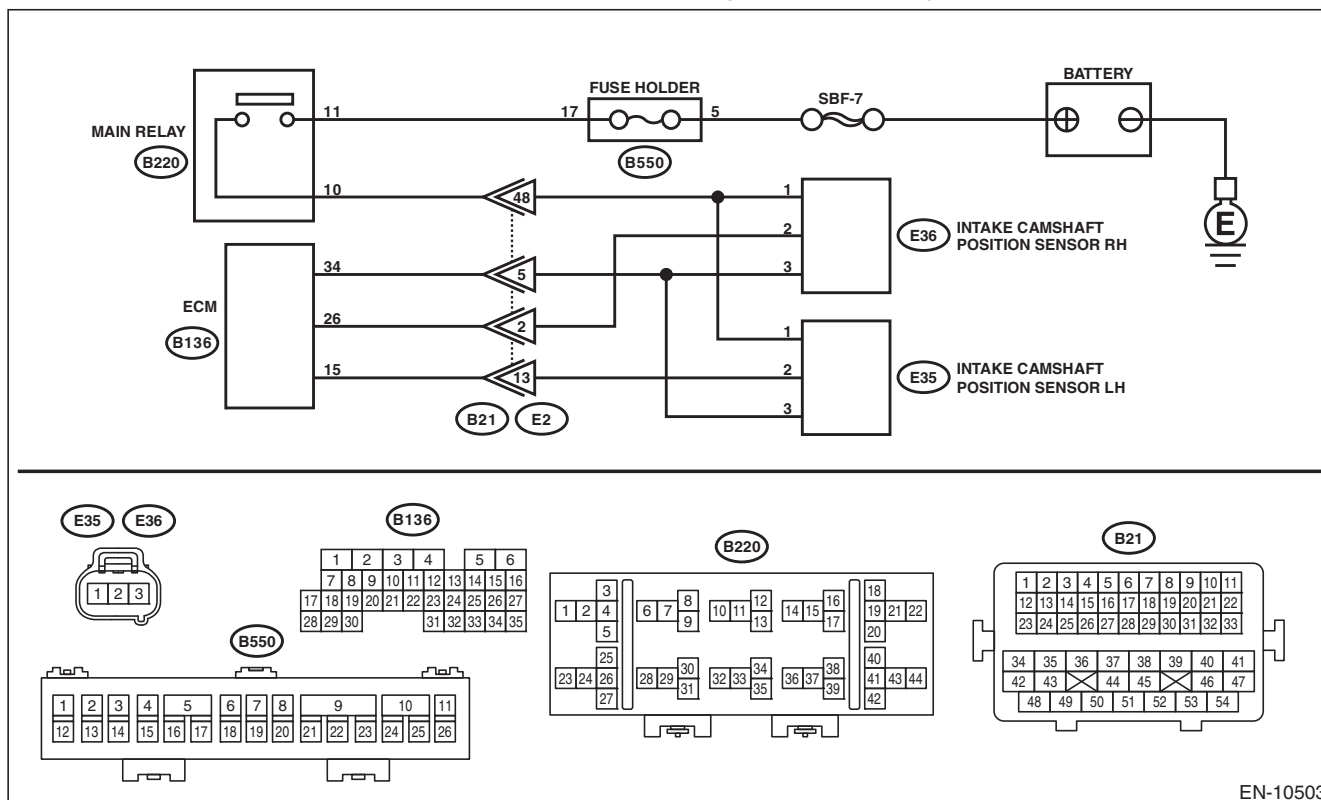
- Engine stalls.
- Failure of engine to start

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), 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. <i>Connector & terminal</i> <i>(E36) No. 1 (+) — Engine ground (-):</i>	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 and camshaft position sensor connector. <i>Connector & terminal</i> <i>(B136) No. 26 — (E36) No. 2:</i> <i>(B136) No. 34 — (E36) No. 3:</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 ECM 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. <i>Connector & terminal</i> <i>(E36) No. 2 — Engine ground:</i>	Is the resistance 1 MΩ or more?	Go to step 4.	Repair short circuit to ground in harness between ECM 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. <i>Connector & terminal</i> <i>(E36) No. 2 (+) — Engine ground (-):</i>	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM 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(H4DO)-59, INSTALLATION, Camshaft Position Sensor.>
6 CHECK CAMSHAFT POSITION SENSOR. Check the waveform of the camshaft position sensor. <Ref. to EN(H4DO)(diag)-19, Engine Control Module (ECM) I/O Signal.>	Is there any abnormality in waveform?	Replace the camshaft position sensor. <Ref. to FU(H4DO)-59, 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)

BN: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(H4DO)(diag)-190, 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)

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-122, DTC P0345 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

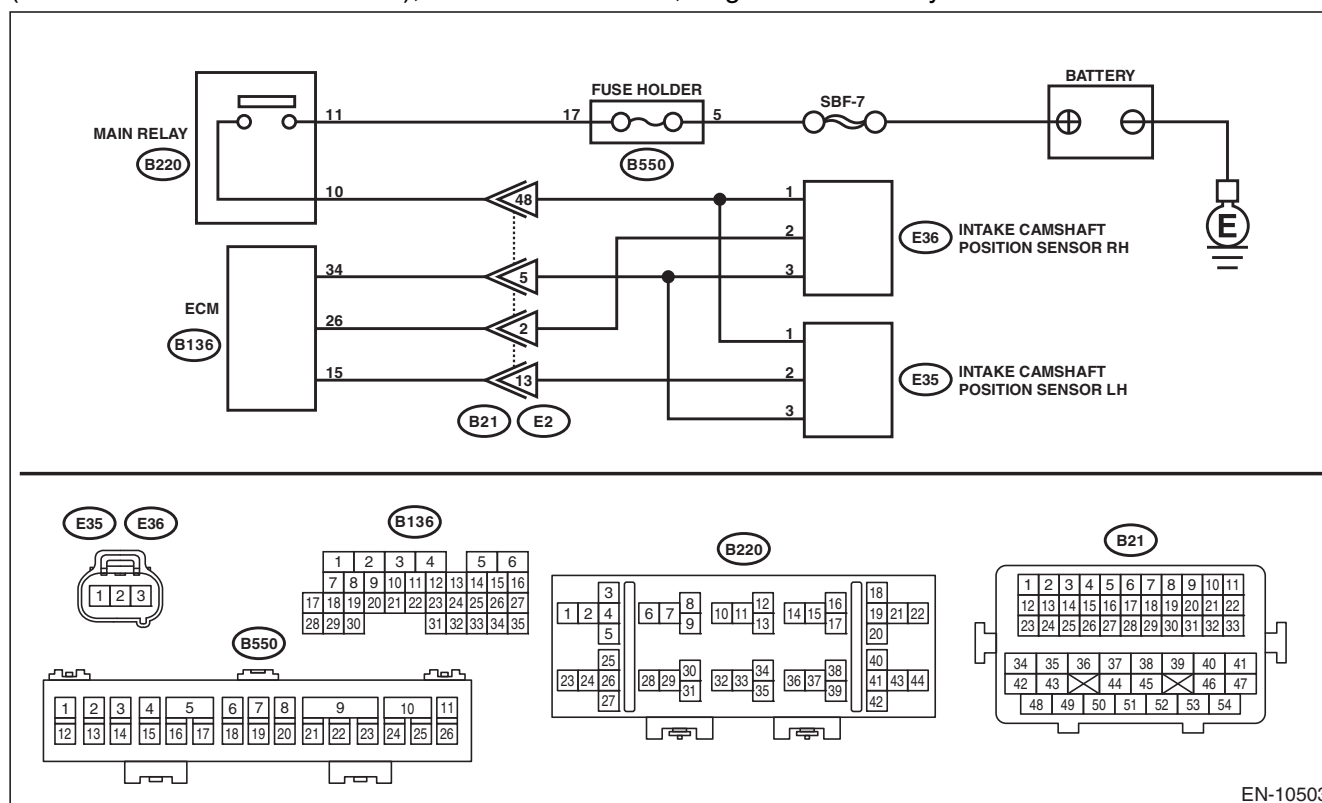
- Engine stalls.
- Failure of engine to start

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), 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. <i>Connector & terminal</i> <i>(E35) No. 1 (+) — Engine ground (-):</i>	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 and camshaft position sensor connector. <i>Connector & terminal</i> <i>(B136) No. 15 — (E35) No. 2:</i> <i>(B136) No. 34 — (E35) No. 3:</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 ECM 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. <i>Connector & terminal</i> <i>(E35) No. 2 — Engine ground:</i>	Is the resistance 1 M Ω or more?	Go to step 4.	Repair short circuit to ground in harness between ECM 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. <i>Connector & terminal</i> <i>(E35) No. 2 (+) — Engine ground (-):</i>	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between ECM 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(H4DO)-59, INSTALLATION, Camshaft Position Sensor.>
6 CHECK CAMSHAFT POSITION SENSOR. Check the waveform of the camshaft position sensor. <Ref. to EN(H4DO)(diag)-19, Engine Control Module (ECM) I/O Signal.>	Is there any abnormality in waveform?	Replace the camshaft position sensor. <Ref. to FU(H4DO)-59, 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)

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

NOTE:

For the diagnostic procedure, refer to DTC P0345. <Ref. to EN(H4DO)(diag)-193, DTC P0345 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BQ:DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-123, DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

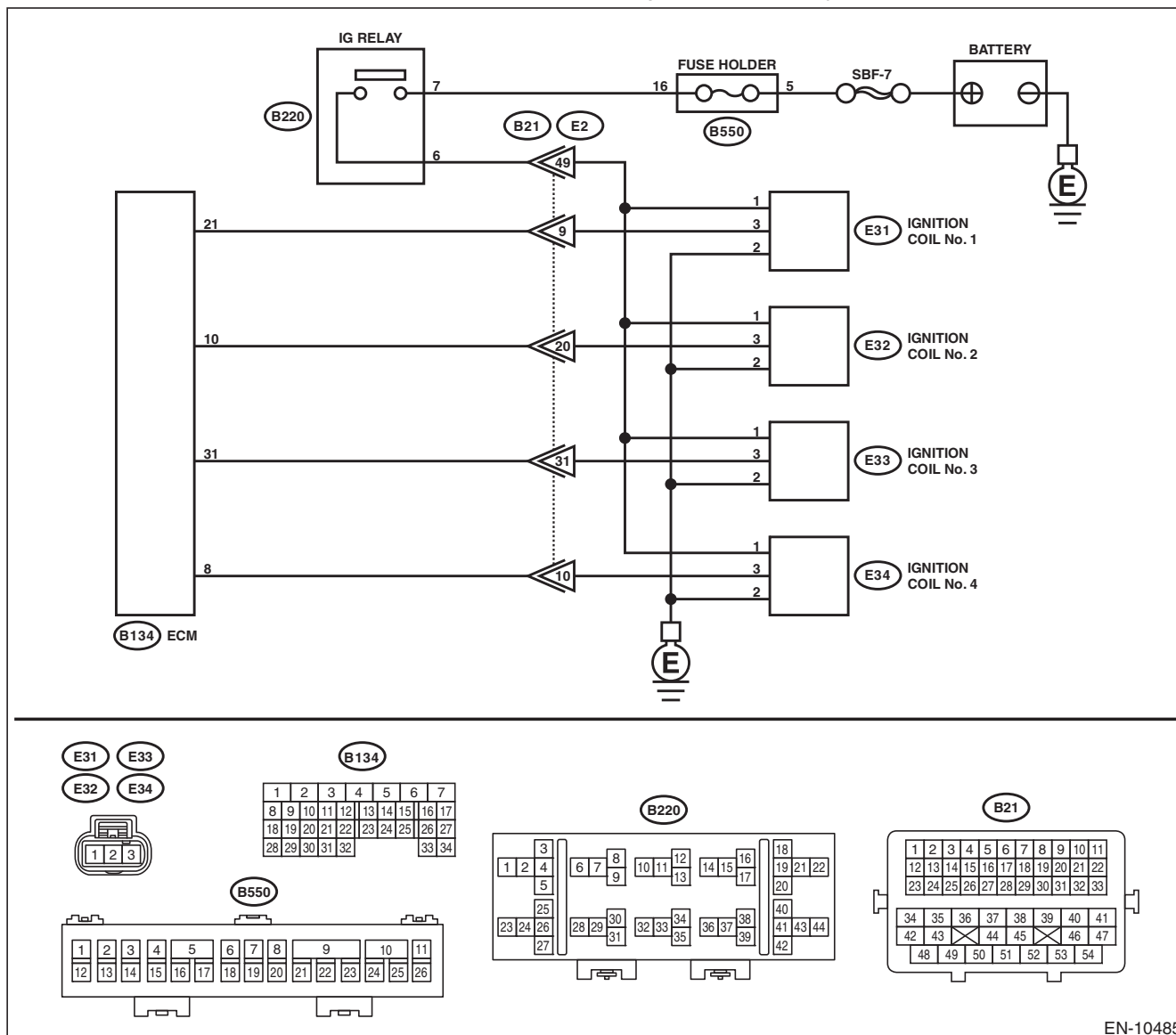
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10485

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. 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 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 IG relay connector • Poor contact of coupling connector • Faulty IG relay
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. 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 resistance 1 MΩ 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. 3: DTC P0352; (B134) No. 10 — (E32) No. 3: DTC P0353; (B134) No. 31 — (E33) No. 3: DTC P0354; (B134) No. 8 — (E34) No. 3:	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.
6 CHECK SPARK PLUG CONDITION. 1) Remove the spark plug of the corresponding cylinder. <Ref. to IG(H4DO)-4, REMOVAL, Spark Plug.> 2) Check the spark plug condition. <Ref. to IG(H4DO)-5, INSPECTION, Spark Plug.>	Is the spark plug condition normal?	Replace the ignition coil. <Ref. to IG(H4DO)-9, Ignition Coil.>	Replace the spark plug. <Ref. to IG(H4DO)-4, Spark Plug.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BR:DTC P0352 IGNITION COIL B PRIMARY/SECONDARY CIRCUIT

NOTE:

For the diagnostic procedure, refer to DTC P0351. <Ref. to EN(H4DO)(diag)-196, DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BS:DTC P0353 IGNITION COIL C PRIMARY/SECONDARY CIRCUIT

NOTE:

For the diagnostic procedure, refer to DTC P0351. <Ref. to EN(H4DO)(diag)-196, DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BT:DTC P0354 IGNITION COIL D PRIMARY/SECONDARY CIRCUIT

NOTE:

For the diagnostic procedure, refer to DTC P0351. <Ref. to EN(H4DO)(diag)-196, DTC P0351 IGNITION COIL A PRIMARY/SECONDARY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BU:DTC P0400 EXHAUST GAS RECIRCULATION FLOW

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-125, DTC P0400 EXHAUST GAS RECIRCULATION FLOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

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

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

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(H4DO)(diag)-36, 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» 53.3 kPa (400 mmHg, 15.75 inHg) or more?	Make sure that the EGR control valve, manifold absolute pressure sensor and throttle body are installed securely.	Go to step 2.
2 CHECK EGR CONTROL VALVE. Remove the EGR control valve.	Are there any holes, clogged lines or foreign matters in the EGR system?	Repair the EGR system.	Replace EGR control valve. <Ref. to EC(H4DO)-22, EGR Control Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-128, DTC P0420 CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

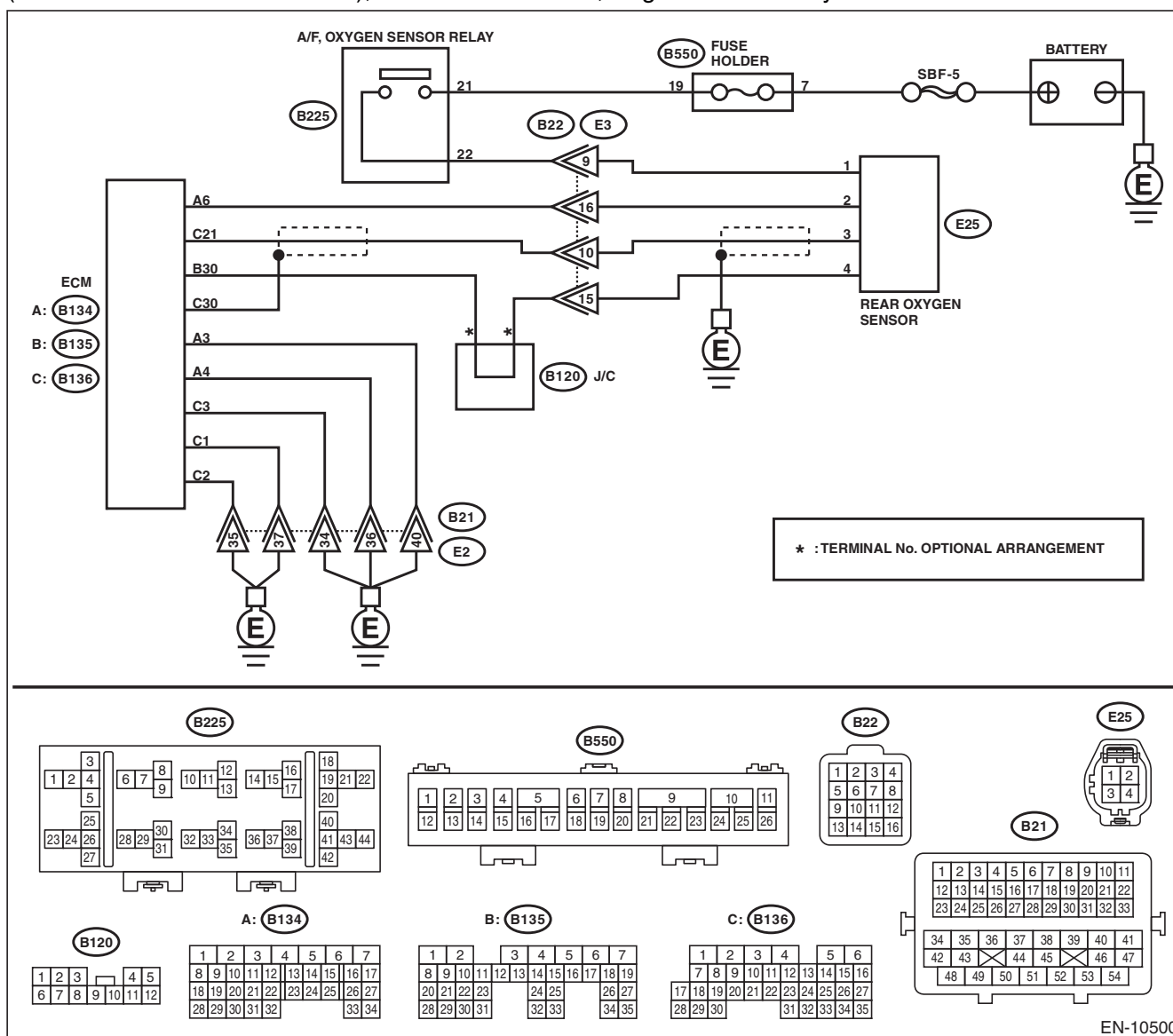
- Engine stalls.
- Idle mixture is out of specifications.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

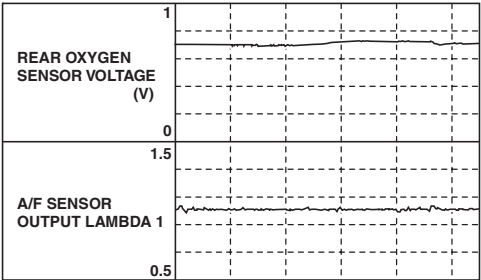
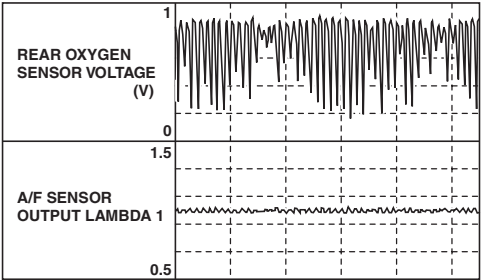
WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



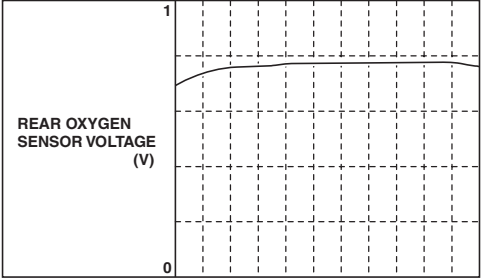
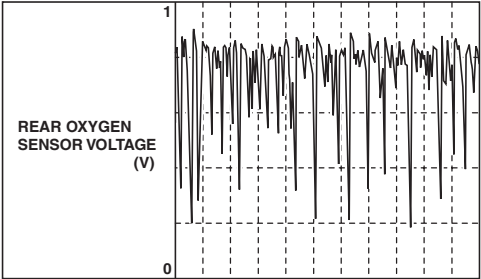
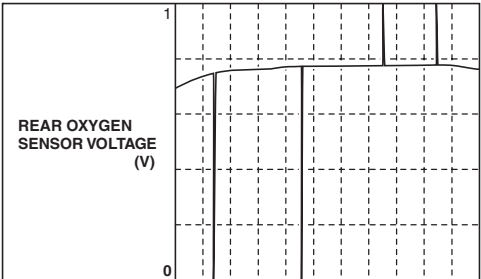
Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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(H4DO)-2, General Description.>	Go to step 2.
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(H4DO)-7, 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 and rear oxygen sensor connector. Connector & terminal (B136) No. 21 — (E25) No. 3: (B135) No. 30 — (E25) 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 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(H4DO)-13, 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(H4DO)-358, INSPECTION, Engine Trouble in General.> After repairing the engine, replace the front catalytic converter. <Ref. to EX(H4DO)-6, Front 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(H4DO)-5, 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 front catalytic converter. <Ref. to EX(H4DO)-6, Front 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(H4DO)-171, INSPECTION, Fuel System Trouble in General.> 2) Check throttle body. <Ref. to FU(H4DO)-17, INSPECTION, Throttle Body.> 3) Check intake manifold. <Ref. to FU(H4DO)-41, INSPECTION, Intake Manifold.>	Is there any fault in the fuel system?	After repairing the fuel system, replace the front catalytic converter. <Ref. to EX(H4DO)-6, Front 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(H4DO)(diag)-83, List of Diagnostic Trouble Code (DTC).> After checking the DTC, replace the front catalytic converter. <Ref. to EX(H4DO)-6, Front 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(H4DO)-91, Rear Oxygen Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BW:DTC P0441 EVAPORATIVE EMISSION CONT. SYS. INCORRECT PURGE FLOW

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-130, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-83, 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: For detailed procedures, refer to "System Operation Check Mode". <Ref. to EN(H4DO)(diag)-59, System Operation Check Mode.>	Does the purge control solenoid valve operate?	Go to step 3.	Replace the purge control solenoid valve. <Ref. to EC(H4DO)-17, Purge Control Solenoid Valve.>
3 CHECK EVAPORATIVE EMISSION CONTROL SYSTEM LINE. Turn the ignition switch to OFF.	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)

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

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-134, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-83, 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(H4DO)(diag)-36, 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 2.1 kPa (15.8 mmHg, 0.62 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(H4DO)-35, Leak Check Valve Assembly.> • If deviations in value for «Mani. Absolute Pressure» is larger: Replace the manifold absolute pressure sensor. <Ref. to FU(H4DO)-70, 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.



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

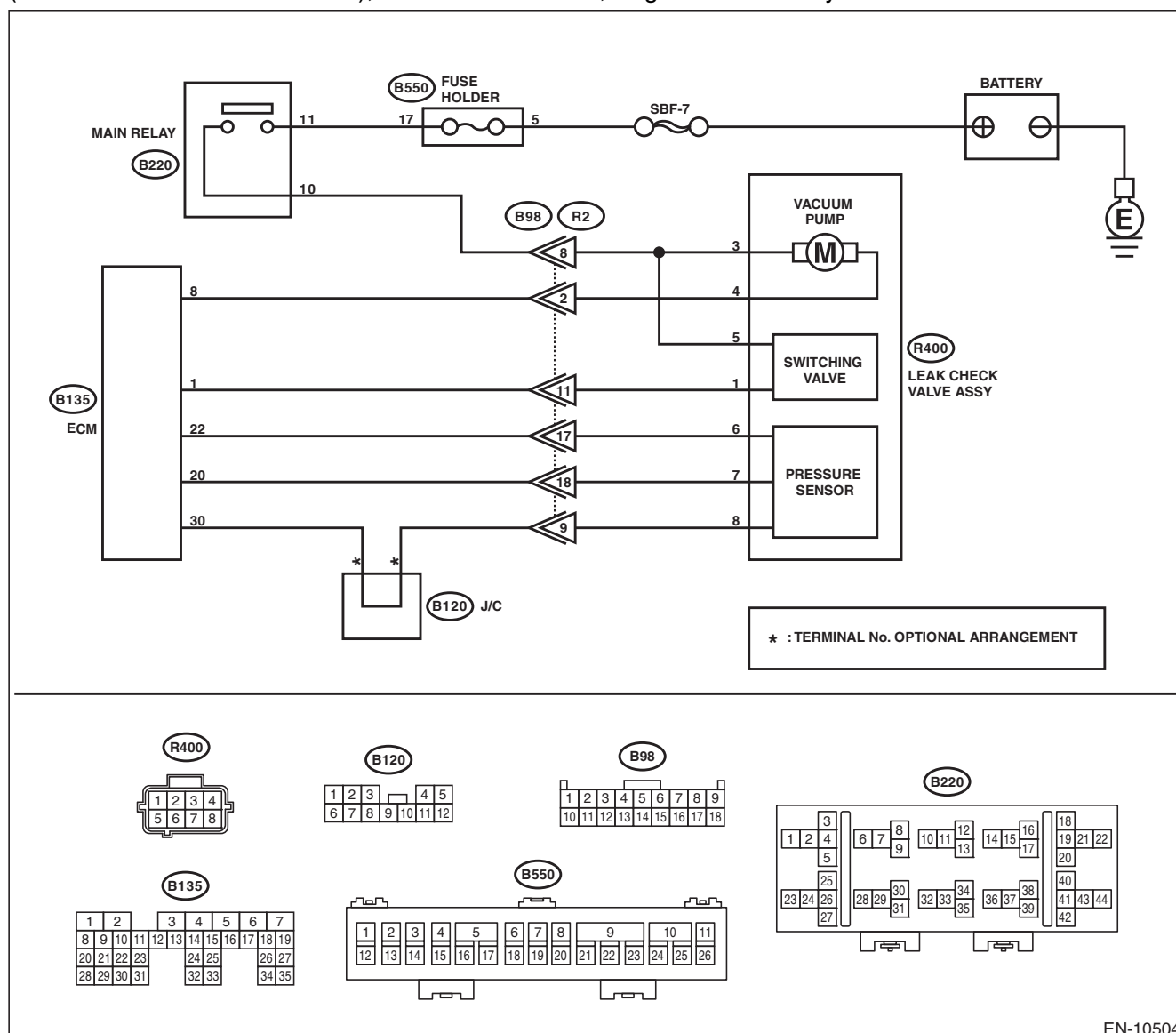
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-136, DTC P0452 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/SWITCH LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10504

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(H4DO)(diag)-36, 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 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 and chassis ground. Connector & terminal (B135) No. 20 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 4.	Repair the short circuit to ground in harness between ECM 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(H4DO)-35, Leak Check Valve Assembly.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

BZ:DTC P0453 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/ SWITCH HIGH

DTC DETECTING CONDITION:

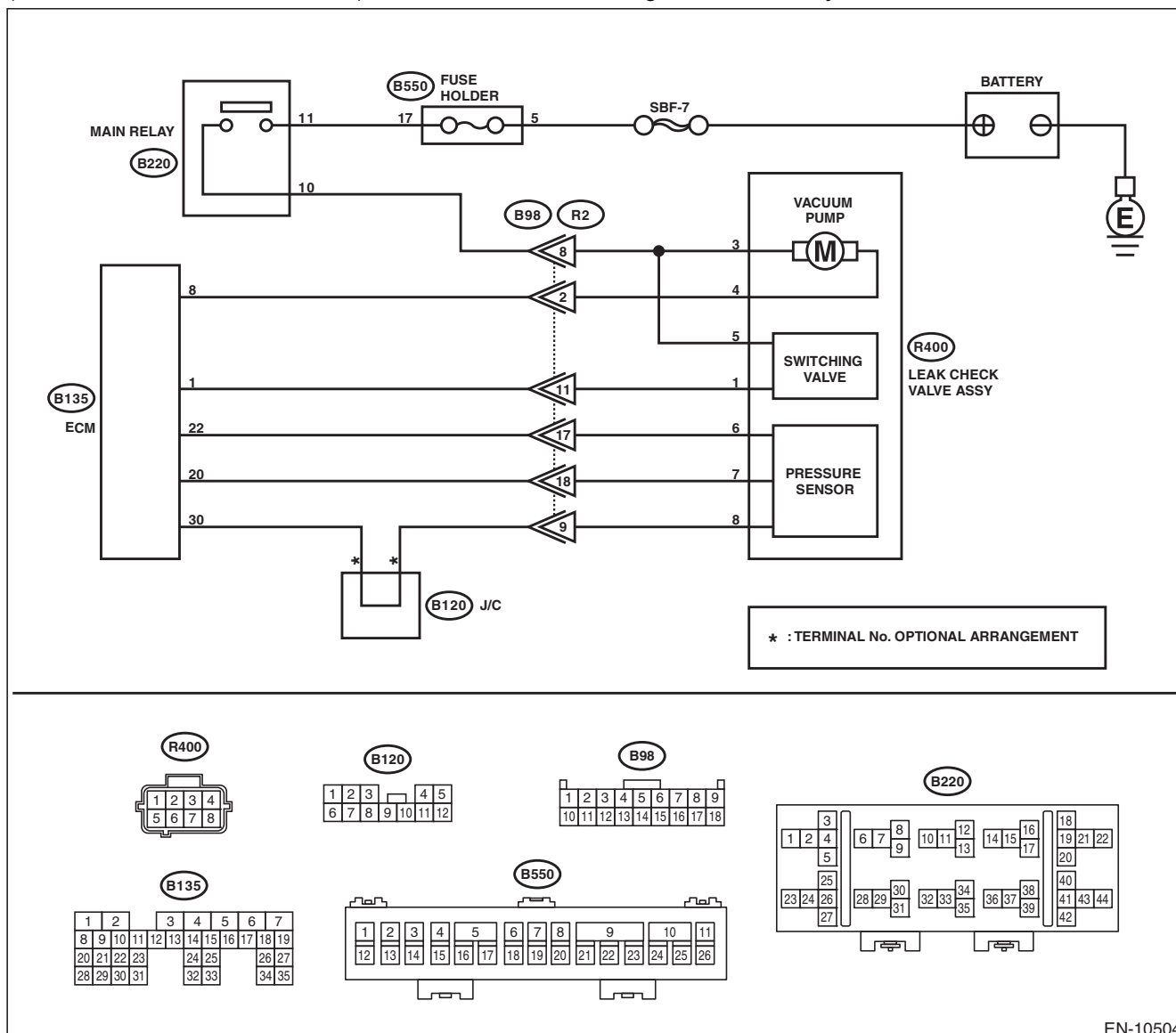
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-138, DTC P0453 EVAPORATIVE EMISSION SYSTEM PRESSURE SENSOR/SWITCH HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10504

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(H4DO)(diag)-36, 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 and the leak check valve assembly connector. Connector & terminal (B135) No. 20 — (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 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(H4DO)-52, 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 and leak check valve assembly connector.	Replace the leak check valve assembly. <Ref. to EC(H4DO)-35, Leak Check Valve Assembly.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-140, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)-127, 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(H4DO)-20, 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(H4DO)-17, 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(H4DO)-162, Fuel Delivery and Evaporation Lines.>	Go to step 6.
6	CHECK CANISTER.	Are there holes on the canister?	Replace the canister. <Ref. to EC(H4DO)-9, 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(H4DO)-35, Leak Check Valve Assembly.>	Go to step 8.



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
8 CHECK FUEL TANK. Remove the fuel tank. <Ref. to FU(H4DO)-112, Fuel Tank.>	Are there damage or holes on the fuel tank?	Repair or replace the fuel tank. <Ref. to FU(H4DO)-112, 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.

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

NOTE:

For the diagnostic procedure, refer to DTC P0455. <Ref. to EN(H4DO)(diag)-211, DTC P0455 EVAPORATIVE EMISSION SYSTEM LEAK DETECTED (LARGE LEAK), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-147, DTC P0458 EVAPORATIVE EMISSION SYSTEM PURGE CONTROL VALVE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

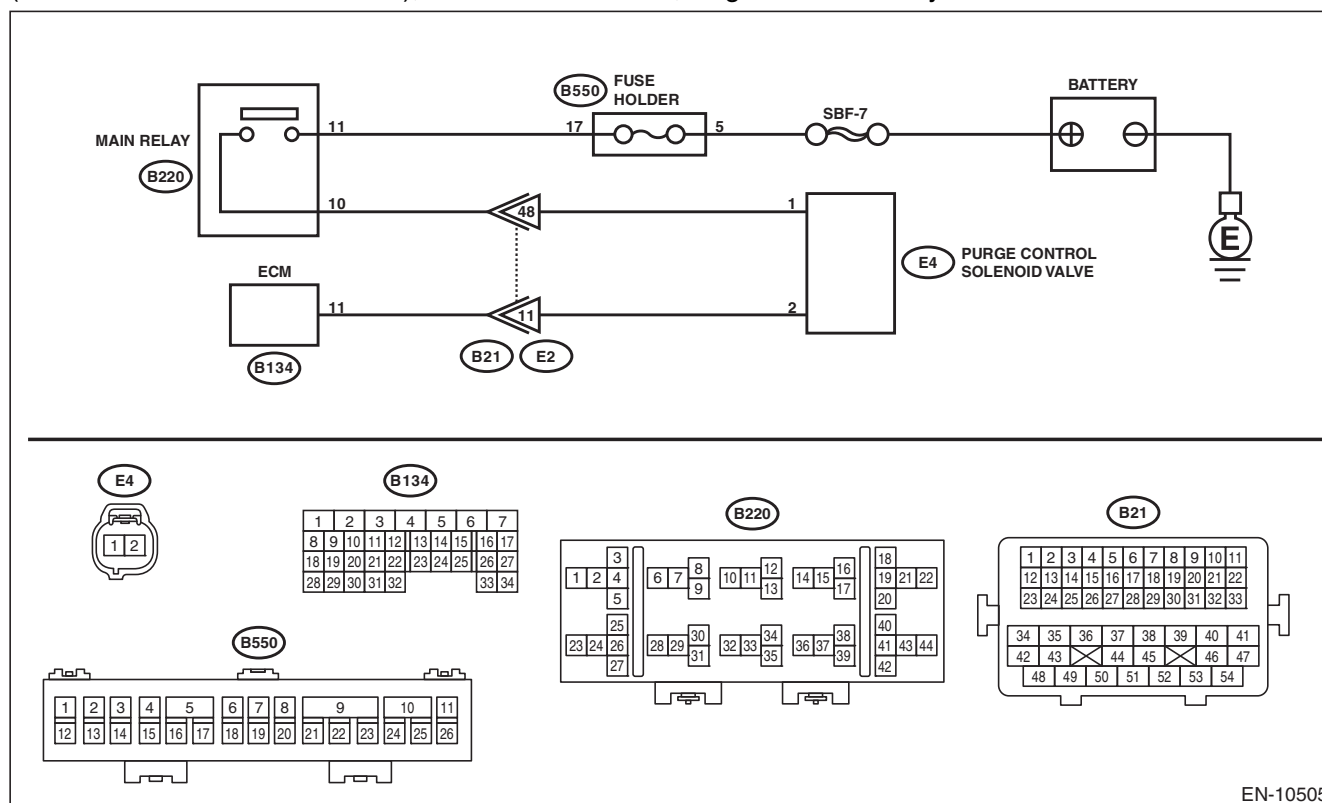
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



Step	Check	Yes	No
1	CHECK OUTPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground. Connector & terminal (B134) No. 11 (+) — Chassis ground (-):	Go to step 2.	Go to step 3.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
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. 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 ground short circuit of harness between ECM and purge control solenoid valve connector.
5	CHECK HARNESS BETWEEN ECM AND PURGE CONTROL SOLENOID VALVE CONNECTOR. Measure the resistance of harness between ECM and purge control solenoid valve. Connector & terminal (B134) No. 11 — (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 and purge control solenoid valve connector • Poor contact of coupling connector
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(H4DO)-17, Purge Control Solenoid Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-149, DTC P0459 EVAPORATIVE EMISSION SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

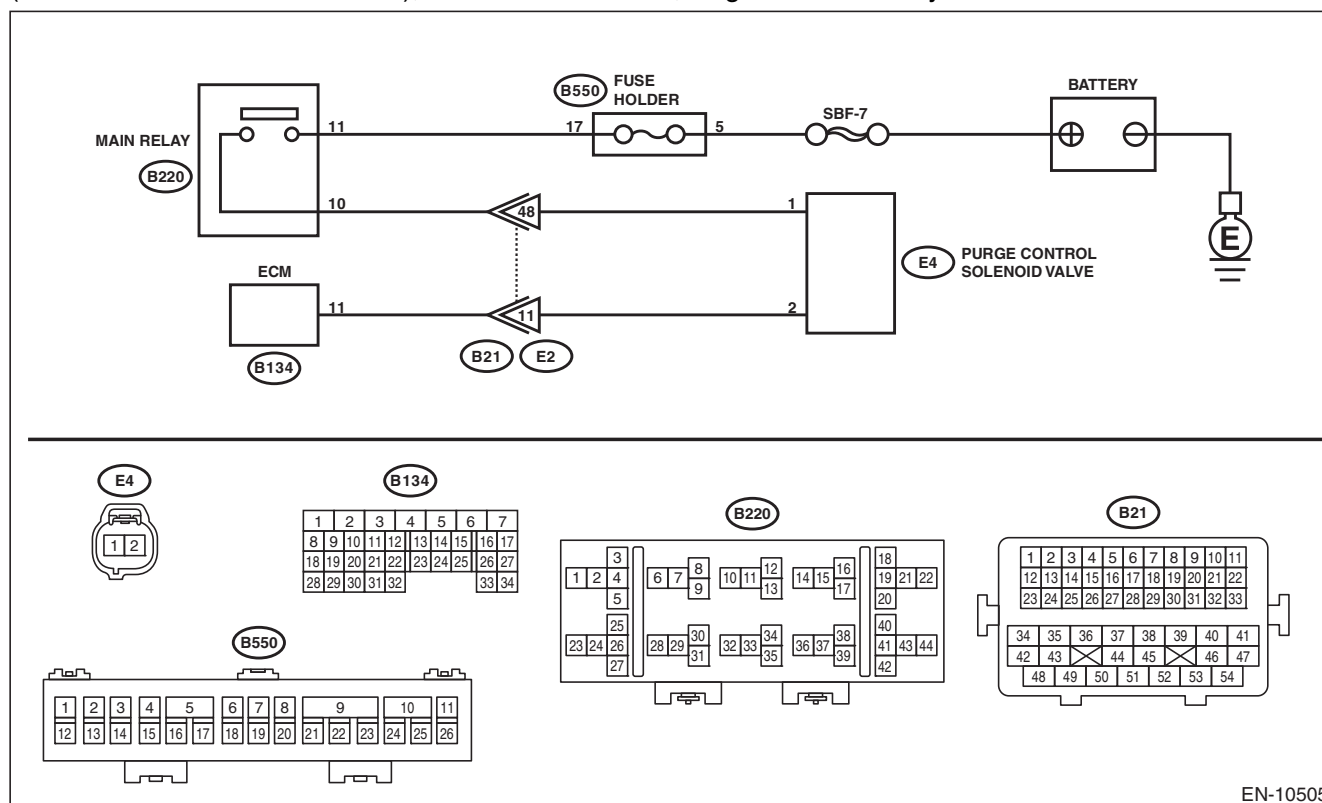
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



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 and chassis ground. Connector & terminal (B134) No. 11 (+) — Chassis ground (-):	Is the voltage 10 V or more? Repair the short circuit to power in the harness between ECM and purge control solenoid valve connector.	Go to step 2.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK PURGE CONTROL SOLENOID VALVE. 1) Turn the ignition switch to OFF. 2) Measure the resistance between purge control solenoid valve terminals. <i>Terminals</i> <i>No. 1 — No. 2:</i>	Is the resistance less than 1 Ω ?	Replace the purge control solenoid valve. <Ref. to EC(H4DO)-17, Purge Control Solenoid Valve.>	Repair the poor contact of ECM connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CE:DTC P0461 FUEL LEVEL SENSOR "A" CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-151, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-83, List of Diagnostic Trouble Code (DTC).>	Replace the fuel level sensor and fuel sub level sensor. <Ref. to FU(H4DO)-141, Fuel Level Sensor.> <Ref. to FU(H4DO)-144, Fuel Sub Level Sensor.>

CF:DTC P0462 FUEL LEVEL SENSOR "A" CIRCUIT LOW

NOTE:

For the diagnostic procedure, refer to DTC P0463. <Ref. to EN(H4DO)(diag)-218, DTC P0463 FUEL LEVEL SENSOR "A" CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CG: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(H4DO)-155, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(diag)-2, Basic Diagnostic Procedure.>	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.

CH:DTC P0500 VEHICLE SPEED SENSOR "A"

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-157, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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)-36, List of Diagnostic Trouble Code (DTC).>	Repair the poor contact of ECM connector.



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-158, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-83, 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(H4DO)-4, Air Cleaner Element.>	Go to step 3.
3 CHECK ELECTRONIC THROTTLE CONTROL. 1) Remove the electronic throttle control. <Ref. to FU(H4DO)-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(H4DO)(diag)-301, 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)

CJ:DTC P0507 IDLE AIR CONTROL SYSTEM RPM HIGHER THAN EXPECTED

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-159, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-83, 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(H4DO)-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(H4DO)(diag)-301, 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)

CK:DTC P050A COLD START IDLE AIR CONTROL SYSTEM PERFORMANCE

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-160, 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:

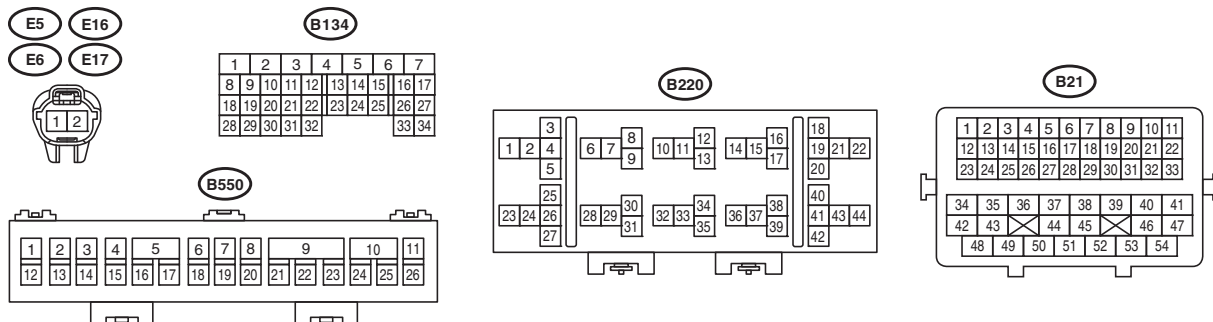
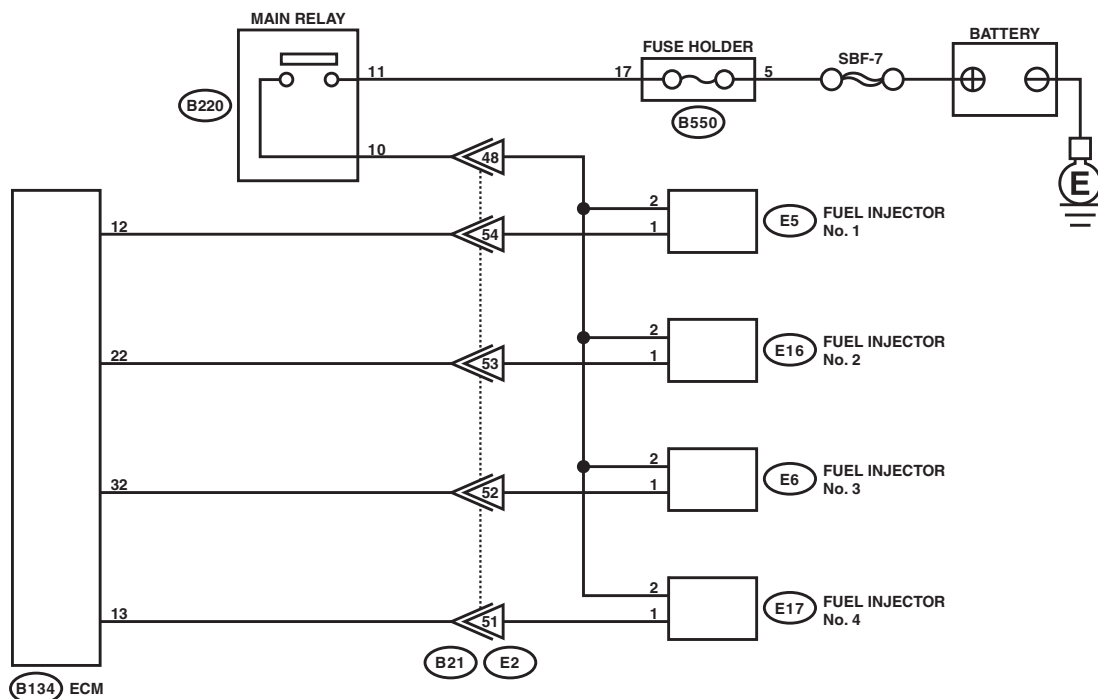
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

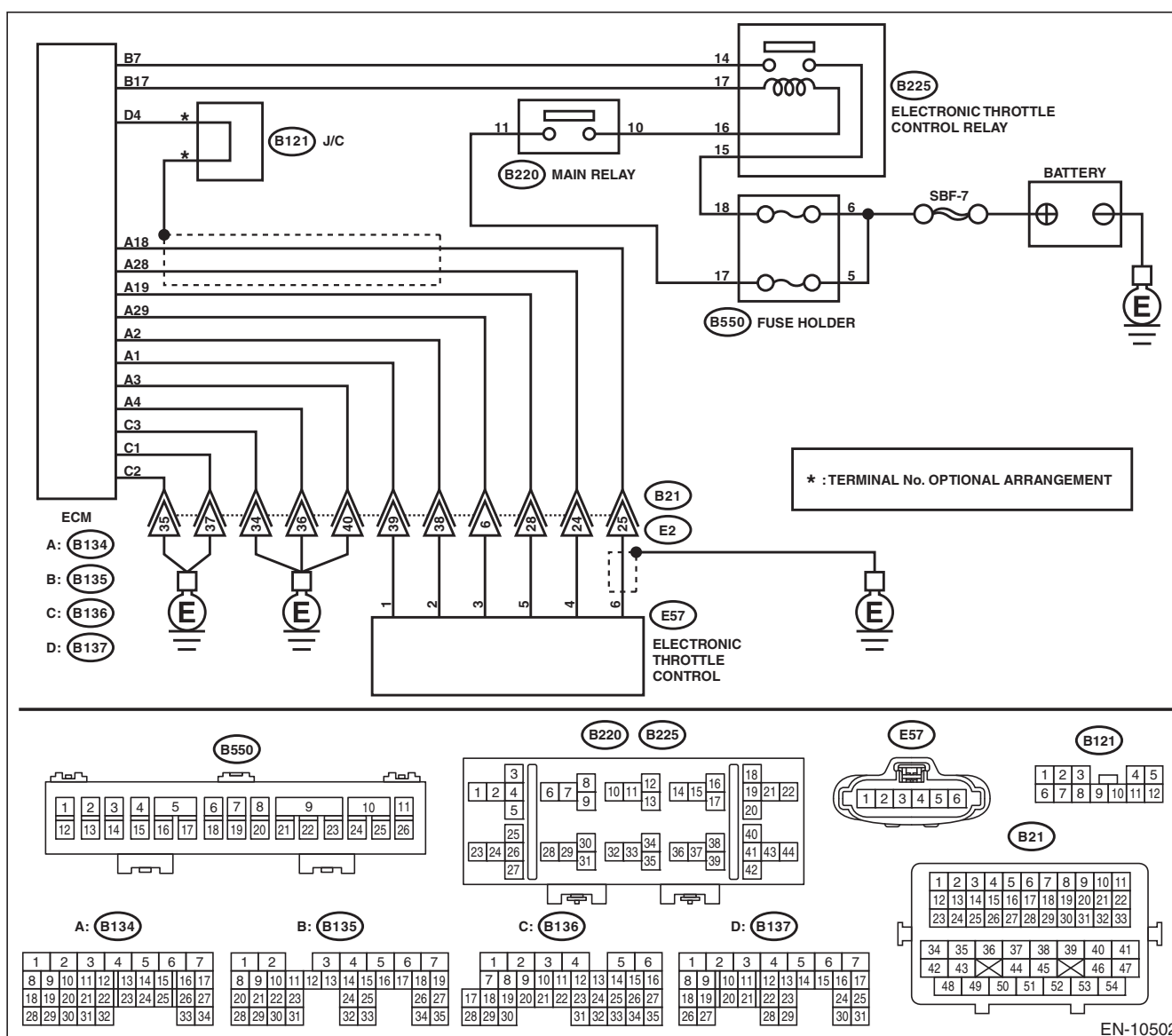
ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10486



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(H4DO)(diag)-83, 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(H4DO)-14, REPLACEMENT, 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. <Ref. to ME(H4DO)-31, INSPECTION, Fuel Pressure.> CAUTION: Release fuel pressure before removing the fuel pressure gauge.	Is the measured value 340 — 400 kPa (3.5 — 4.1 kg/cm ² , 49 — 58 psi)?	Go to step 6.	Repair the following item. Fuel pressure is too high: • Clogged fuel line or bent hose Fuel pressure is too low: • Improper fuel pump discharge • Clogged fuel line
6	CHECK ENGINE COOLANT TEMPERATURE SENSOR. 1) Start the engine and warm up completely. 2) Read the 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(H4DO)(diag)-36, 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 7.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO)-50, Engine Coolant Temperature Sensor.>
7	CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For CVT models, set the select lever to “P” range or “N” range, and for MT models, place the shift lever in the 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(H4DO)(diag)-36, 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 8.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO)-68, Mass Air Flow and Intake Air Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
8 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the 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(H4DO)(diag)-36, 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 9.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO)-68, Mass Air Flow and Intake Air Temperature Sensor.>
9 CHECK OUTPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground on faulty cylinders. Connector & terminal #1 (B134) No. 12 (+) — Chassis ground (-): #2 (B134) No. 22 (+) — Chassis ground (-): #3 (B134) No. 32 (+) — Chassis ground (-): #4 (B134) No. 13 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 14.	Go to step 10.
10 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. 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 11.	Repair the short circuit to ground in harness between ECM and fuel injector connector.
11 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. 12 — (E5) No. 1: #2 (B134) No. 22 — (E16) No. 1: #3 (B134) No. 32 — (E6) No. 1: #4 (B134) No. 13 — (E17) No. 1:	Is the resistance less than 1 Ω?	Go to step 12.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and fuel injector connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
12 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 13.	Replace the faulty fuel injector. <Ref. to FU(H4DO)-73, Fuel Injector.>
13 CHECK POWER SUPPLY LINE. 1) Turn the ignition switch to ON. 2) Measure the voltage between fuel injector and engine ground on faulty cylinders. Connector & terminal #1 (E5) No. 2 (+) — Engine ground (-): #2 (E16) No. 2 (+) — Engine ground (-): #3 (E6) No. 2 (+) — Engine ground (-): #4 (E17) No. 2 (+) — Engine ground (-):	Is the voltage 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
14 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. 12 (+) — Chassis ground (-): #2 (B134) No. 22 (+) — Chassis ground (-): #3 (B134) No. 32 (+) — Chassis ground (-): #4 (B134) No. 13 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between the ECM and fuel injector.	Go to step 15.
15 CHECK FUEL INJECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance between fuel injector terminals on faulty cylinder. Terminals No. 1 — No. 2:	Is the resistance 5 — 20 Ω?	Go to step 16.	Replace the faulty fuel injector. <Ref. to FU(H4DO)-73, Fuel Injector.>
16 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(H4DO)-59, INSTALLATION, Camshaft Position Sensor.> <Ref. to FU(H4DO)-55, INSTALLATION, Crankshaft Position Sensor.>	Go to step 17.
17 CHECK CRANKSHAFT POSITION SENSOR PLATE.	Is the crankshaft position sensor plate rusted or does it have broken teeth?	Replace the crankshaft position sensor plate. <Ref. to ME(H4DO)-249, Cylinder Block.>	Go to step 18.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
18 CHECK INSTALLATION CONDITION OF TIMING CHAIN. Turn the crankshaft using ST, and align the alignment mark on crank sprocket with alignment mark on cylinder block. ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain dislocated from its proper position?	Correct the installation condition of timing chain. <Ref. to ME(H4DO)-117, Timing Chain Assembly.>	Go to step 19.
19 CHECK ELECTRONIC THROTTLE CONTROL RELAY. 1) Turn the ignition switch to OFF. 2) Remove the electronic throttle control relay. 3) Connect the battery to terminals No. 16 and No. 17 of electronic throttle control relay. 4) Measure the resistance between electronic throttle control relay terminals. Terminals No. 14 — No. 15:	Is the resistance less than 1 Ω?	Go to step 20.	Replace the electronic throttle control relay. <Ref. to FU(H4DO)-102, Electronic Throttle Control Relay.>
20 CHECK POWER SUPPLY OF ELECTRONIC THROTTLE CONTROL RELAY. Measure the voltage between electronic throttle control relay connector and chassis ground. Connector & terminal (B225) No. 15 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 21.	Repair the open or ground short circuit of power supply circuit.
21 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY 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 (B225) No. 17 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM and electronic throttle control relay connector.	Go to step 22.
22 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 (B225) No. 14 — Chassis ground: (B225) No. 17 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 23.	Repair the short circuit in harness to ground between ECM and electronic throttle control relay connector.
23 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR. Measure the resistance of harness between ECM and electronic throttle control relay connector. Connector & terminal (B135) No. 17 — (B225) No. 17: (B135) No. 7 — (B225) No. 14:	Is the resistance less than 1 Ω?	Go to step 24.	Repair the open circuit in harness between ECM and electronic throttle control relay connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
24 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 and chassis ground. <i>Connector & terminal</i> <i>(B134) No. 19 — Chassis ground:</i> <i>(B134) No. 18 — Chassis ground:</i> <i>(B134) No. 18 — (B137) No. 4:</i> <i>(B134) No. 28 — Chassis ground:</i> <i>(B134) No. 28 — (B137) No. 4:</i>	Is the resistance 1 MΩ or more?	Go to step 25.	Repair the short circuit to ground in harness between ECM and electronic throttle control connector.
25 CHECK SHORT CIRCUIT INSIDE THE ECM. 1) Connect the connector to ECM. 2) Measure the resistance between electronic throttle control connector and engine ground. <i>Connector & terminal</i> <i>(E57) No. 6 — Engine ground:</i> <i>(E57) No. 4 — Engine ground:</i>	Is the resistance 1 MΩ or more?	Go to step 26.	Repair the short circuit to ground in harness between ECM and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(H4DO)-94, Engine Control Module (ECM).>
26 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM and electronic throttle control connector. <i>Connector & terminal</i> <i>(B134) No. 18 — (E57) No. 6:</i> <i>(B134) No. 28 — (E57) No. 4:</i> <i>(B134) No. 29 — (E57) No. 3:</i>	Is the resistance less than 1 Ω?	Go to step 27.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and electronic throttle control connector • Poor contact of coupling connector
27 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. <i>Connector & terminal</i> <i>(E57) No. 3 — Engine ground:</i>	Is the resistance less than 5 Ω?	Go to step 28.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
28 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. <i>Connector & terminal</i> <i>(E57) No. 6 (+) — Engine ground (-):</i> <i>(E57) No. 4 (+) — Engine ground (-):</i>	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM and electronic throttle control connector.	Go to step 29.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
29 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. <i>Connector & terminal</i> <i>(B134) No. 19 — (B134) No. 18:</i> <i>(B134) No. 19 — (B134) No. 28:</i>	Is the resistance 1 MΩ or more?	Go to step 30.	Repair the short circuit to power in harness between ECM and electronic throttle control connector.
30 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(H4DO)(diag)-36, Subaru Select Monitor.>	Is the value of «Main-Throttle Sensor» 0.81 — 0.87 V?	Go to step 31.	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(H4DO)-15, Throttle Body.>
31 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(H4DO)(diag)-36, Subaru Select Monitor.>	Is the value of «Sub-Throttle Sensor» 1.64 — 1.70 V?	Go to step 32.	Repair the poor contact of electronic throttle control connector. Replace the electronic throttle control if defective. <Ref. to FU(H4DO)-15, Throttle Body.>
32 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 and electronic throttle control connector. <i>Connector & terminal</i> <i>(B134) No. 2 — (E57) No. 2:</i> <i>(B134) No. 1 — (E57) No. 1:</i>	Is the resistance less than 1 Ω?	Go to step 33.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and electronic throttle control connector • Poor contact of coupling connector
33 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 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. <i>Connector & terminal</i> <i>(E57) No. 2 (+) — Engine ground (-):</i> <i>(E57) No. 1 (+) — Engine ground (-):</i>	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM and electronic throttle control connector.	Go to step 34.



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
34 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 electronic throttle control connector and engine ground. Connector & terminal (E57) No. 2 — Engine ground: (E57) No. 1 — Engine ground:	Is the resistance 1 MΩ or more?	Go to step 35.	Repair the short circuit to ground in harness between ECM and electronic throttle control connector.
35 CHECK HARNESS BETWEEN ELECTRONIC THROTTLE CONTROL CONNECTOR. Measure the resistance between electronic throttle control connectors. Connector & terminal (E57) No. 2 — (E57) No. 1:	Is the resistance 1 MΩ or more?	Go to step 36.	Repair the short circuit of harness between ECM and electronic throttle control connector.
36 CHECK ELECTRONIC THROTTLE CONTROL GROUND CIRCUIT. Measure the resistance between ECM and chassis ground. Connector & terminal (B134) No. 3 — Chassis ground: (B134) No. 4 — Chassis ground: (B136) No. 1 — Chassis ground: (B136) No. 2 — Chassis ground: (B136) No. 3 — Chassis ground:	Is the resistance less than 5 Ω?	Go to step 37.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and engine ground • Poor contact of coupling connector
37 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 38.	Replace the electronic throttle control. <Ref. to FU(H4DO)-15, Throttle Body.>
38 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(H4DO)-15, Throttle Body.>

CL:DTC P050B COLD START IGNITION TIMING PERFORMANCE

NOTE:

For the diagnostic procedure, refer to DTC P050A. <Ref. to EN(H4DO)(diag)-221, 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)

CM:DTC P0512 STARTER REQUEST CIRCUIT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-165, DTC P0512 STARTER REQUEST CIRCUIT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Failure of engine to start

CAUTION:

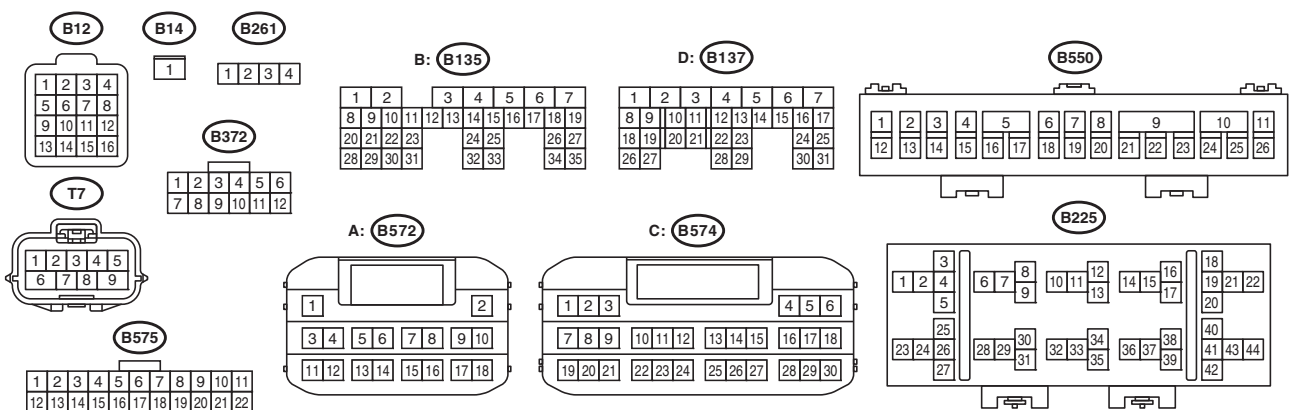
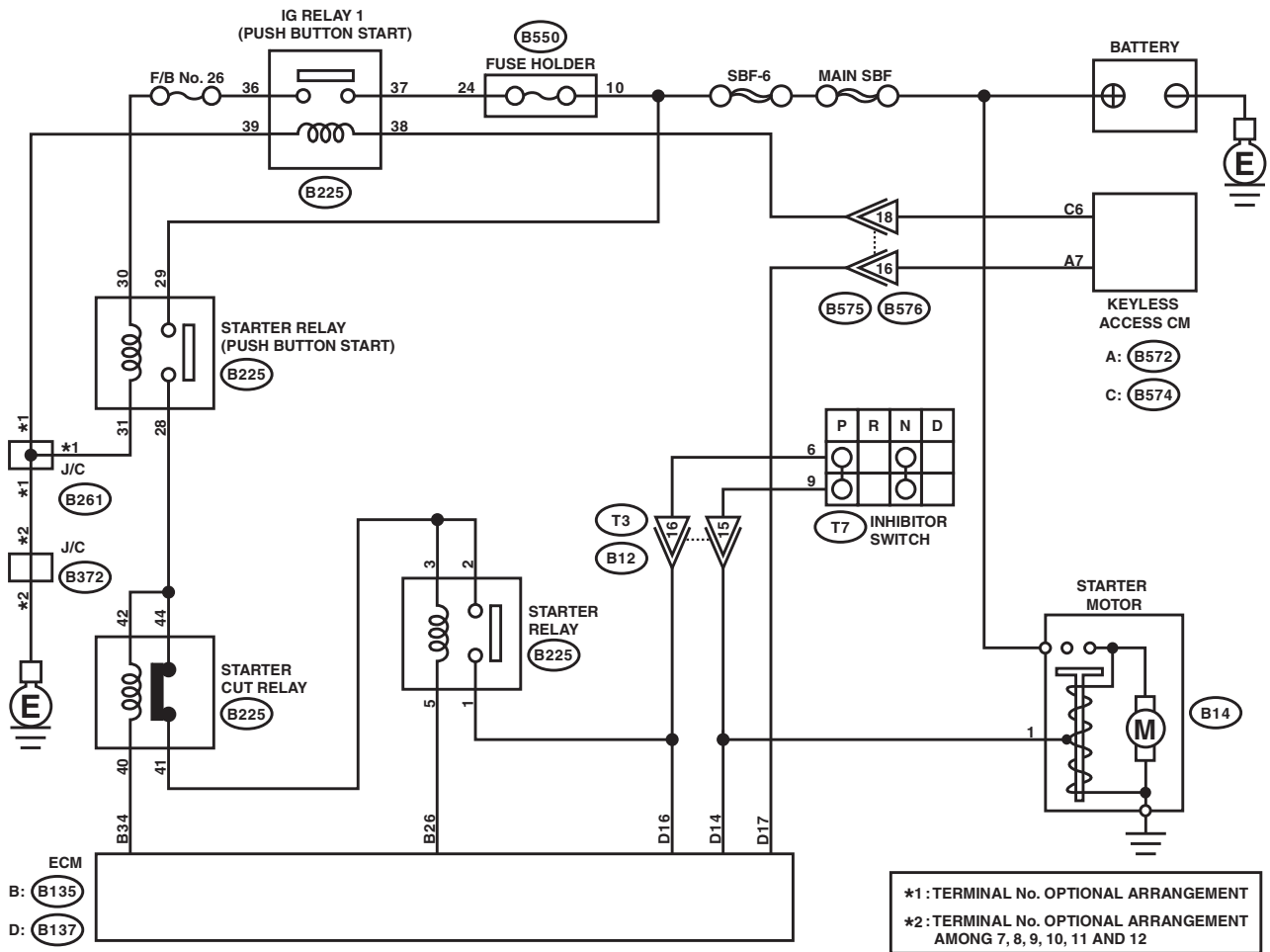
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10484

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK PUSH BUTTON IGNITION SWITCH. Operate the push button ignition switch.	Does it operate smoothly without catch?	Go to step 2.	Replace the push button ignition switch. <Ref. to SL-96, Push Button Ignition Switch.>
2 CHECK DTC. 1) Clear the memory using the Subaru Select Monitor. <Ref. to EN(H4DO)(diag)-58, Clear Memory Mode.> 2) Start and idle the engine for three minutes or more.	Is the same DTC as current diagnosis output?	Go to step 3.	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.
3 CHECK HARNESS BETWEEN ECM AND KEYLESS ACCESS CM. 1) Turn the ignition to OFF. 2) Disconnect the connector from ECM. 3) Turn the ignition to ON. 4) Measure the voltage between ECM and chassis ground. Connector & terminal (B137) No. 17 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power supply in harness between ECM and keyless access CM.	Repair the poor contact of ECM connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CN:DTC P0516 BATTERY TEMPERATURE SENSOR CIRCUIT LOW

DTC DETECTING CONDITION:

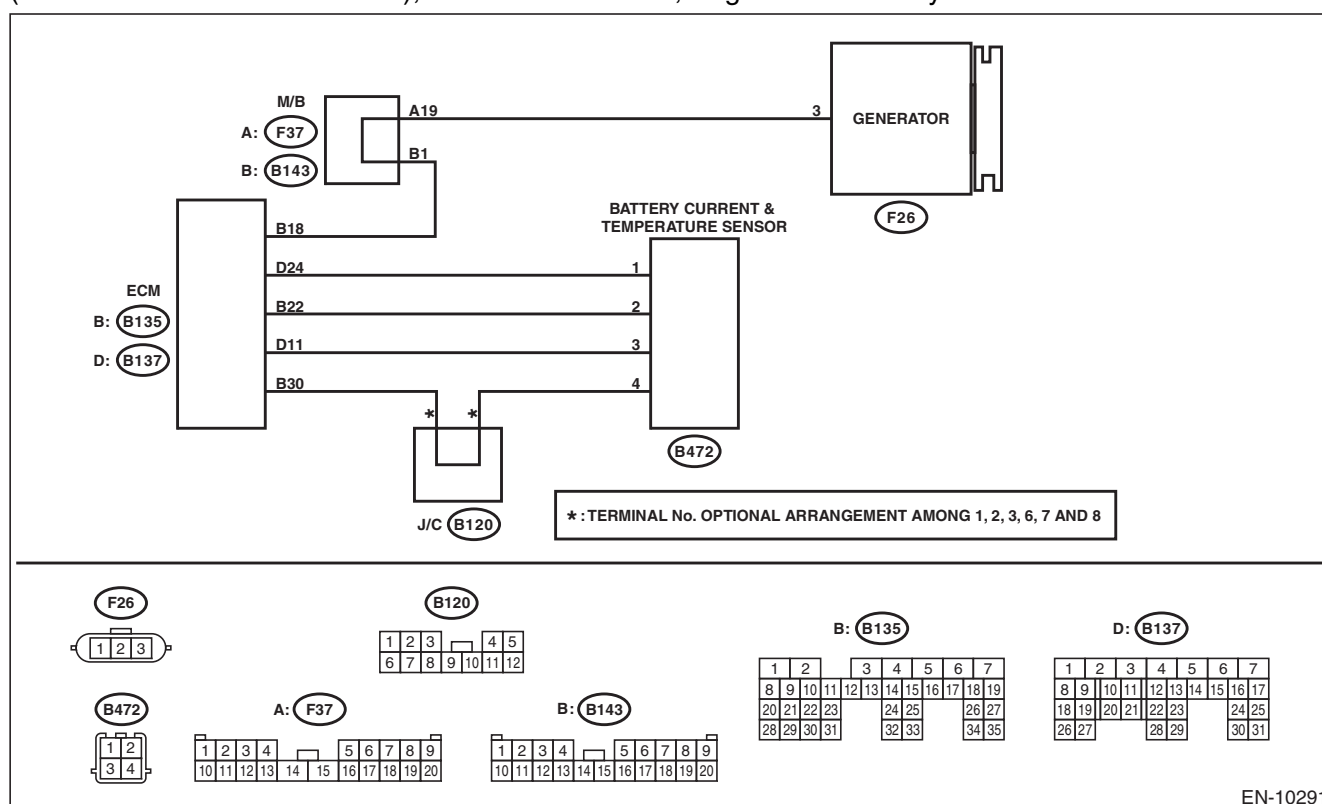
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-166, DTC P0516 BATTERY TEMPERATURE SENSOR CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10291

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 «Battery temperature» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO)(diag)-36, Subaru Select Monitor.>	Is the value of «Battery temperature» 100°C (212°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 BATTERY TEMPERATURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and battery temperature sensor. 3) Measure the resistance between ECM and chassis ground. Connector & terminal (B137) No. 24 — Chassis ground:	Is the resistance 1 MΩ or more?	Replace the battery temperature sensor. <Ref. to SC(H4DO)-67, Battery Current & Temperature Sensor.>	Repair the short circuit to ground in the harness between the ECM and battery temperature sensor connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CO:DTC P0517 BATTERY TEMPERATURE SENSOR CIRCUIT HIGH

DTC DETECTING CONDITION:

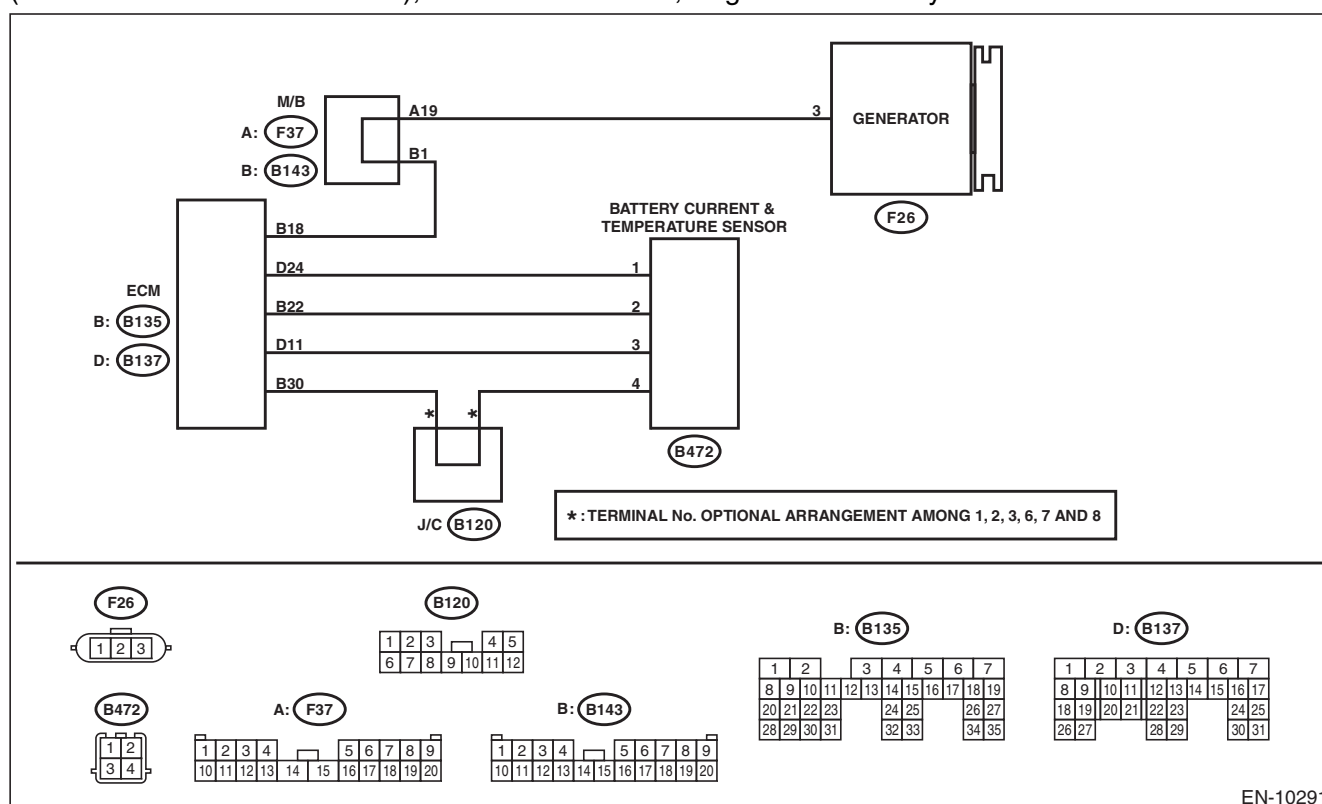
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-168, DTC P0517 BATTERY TEMPERATURE SENSOR CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10291

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 «Battery temperature» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO)(diag)-36, Subaru Select Monitor.>	Is the value of «Battery temperature» -40°C (-40°F) 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 FOR POOR CONTACT. Check for poor contact between the ECM and battery temperature sensor connectors.	Is there poor contact of the ECM or battery temperature sensor connectors?	Repair any poor contact between the ECM and battery temperature sensor connectors.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND BATTERY TEMPERATURE SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and battery temperature sensor. 3) Measure the resistance of the harness between the ECM and battery temperature sensor connector. Connector & terminal (B137) No. 24 — (B472) No. 1: (B135) No. 30 — (B472) 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 and battery temperature sensor connector • Poor contact of joint connector
4 CHECK HARNESS BETWEEN ECM AND BATTERY TEMPERATURE SENSOR CONNECTOR. 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM and chassis ground. Connector & terminal (B137) No. 24 (+) — Chassis ground (-):	Is the voltage 5 V or more?	Repair the short circuit to power in the harness between the ECM and battery temperature sensor connector.	Replace the battery temperature sensor. <Ref. to SC(H4DO)-67, Battery Current & Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CP:DTC P0560 SYSTEM VOLTAGE

DTC DETECTING CONDITION:

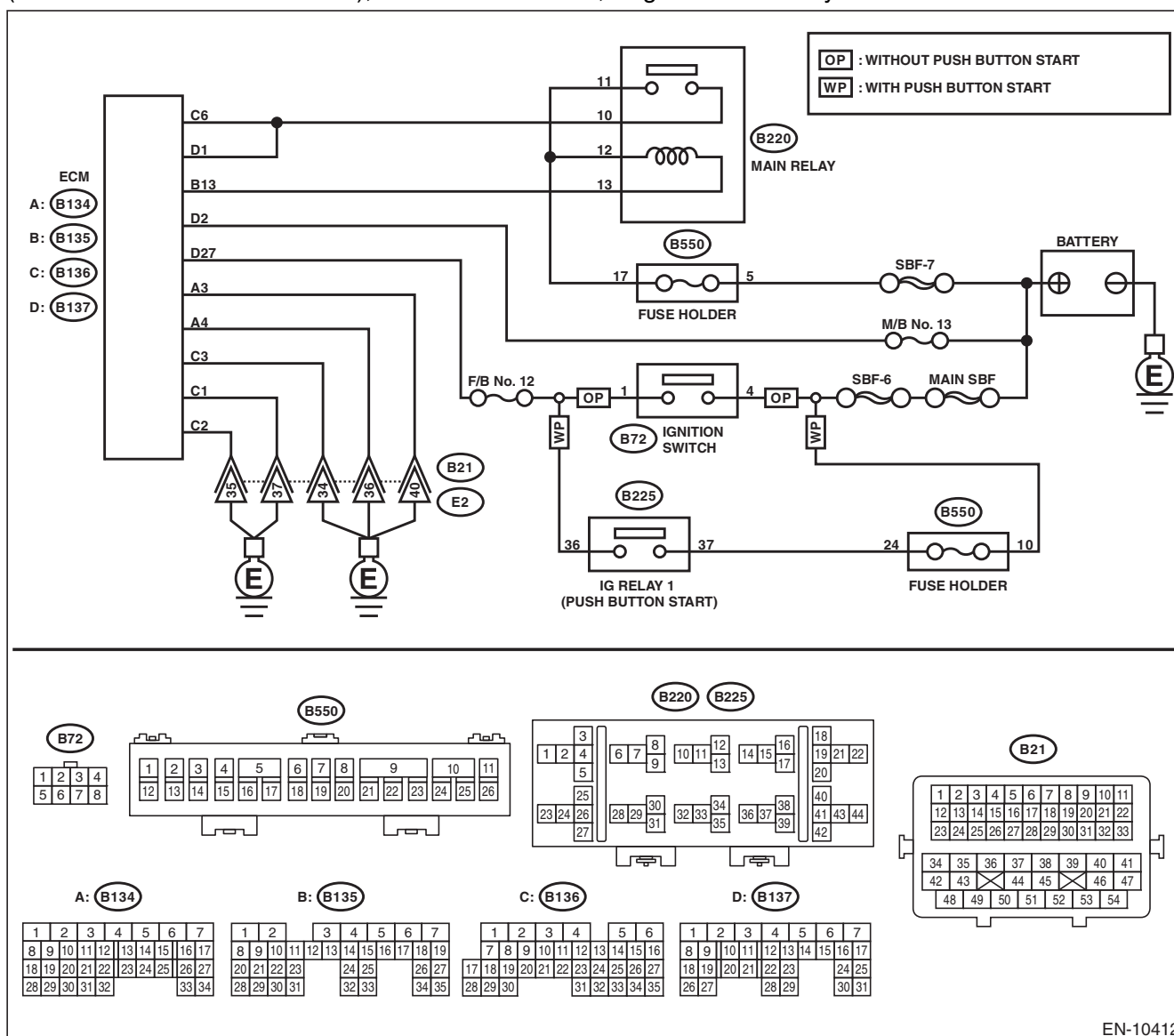
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-170, DTC P0560 SYSTEM VOLTAGE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10412

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK INPUT SIGNAL OF ECM. 1) Turn the ignition switch to OFF. 2) Measure the voltage between ECM and chassis ground. <i>Connector & terminal</i> <i>(B137) No. 2 (+) — Chassis ground (-):</i>	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 and chassis ground. <i>Connector & terminal</i> <i>(B137) No. 2 — Chassis ground:</i>	Is the resistance 1 MΩ or more?	Go to step 3.	Repair the ground short circuit of harness between ECM and battery terminal.
3 CHECK FUSE NO. 13 (MAIN FUSE BOX).	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 and battery • Poor contact of ECM connector • Poor contact of battery terminal

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-171, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-83, 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.

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

NOTE:

For the diagnostic procedure, refer to DTC P0606. <Ref. to EN(H4DO)(diag)-241, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CS:DTC P0606 CONTROL MODULE PROCESSOR

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-173, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

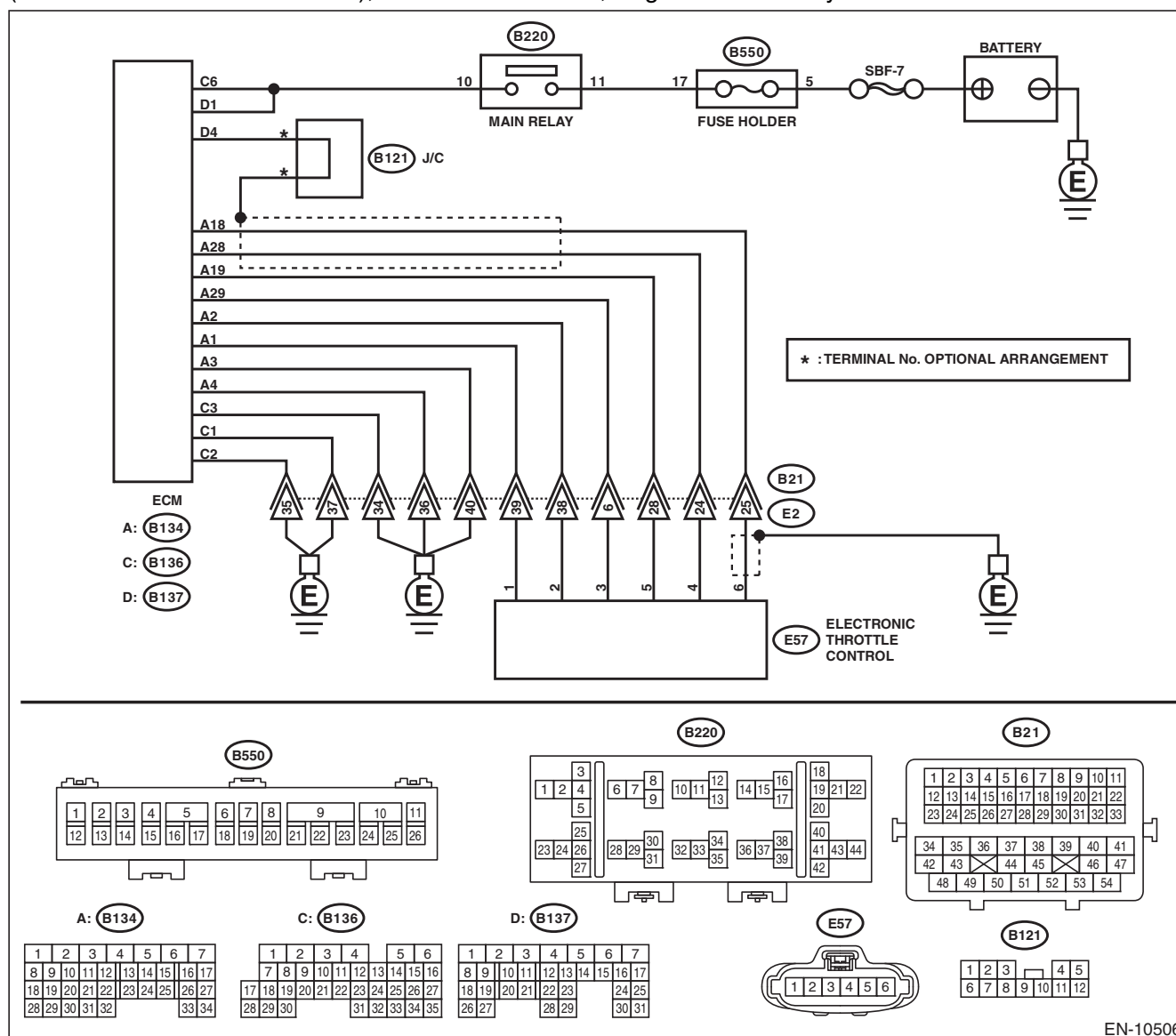
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



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 and chassis ground. Connector & terminal (B136) No. 6 (+) — Chassis ground (-): (B137) No. 1 (+) — Chassis ground (-):	Is the voltage 10 — 13 V?	Go to step 2.	Repair the open or ground shortcircuit of power supply circuit.
2 CHECK INPUT VOLTAGE OF ECM. 1) Start the engine. 2) Measure the voltage between ECM and chassis ground. Connector & terminal (B136) No. 6 (+) — Chassis ground (-): (B137) No. 1 (+) — Chassis ground (-):	Is the voltage 13 — 15 V?	Go to step 3.	Repair the open or ground shortcircuit 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 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 and electronic throttle control connector • Poor contact of coupling connector
4 CHECK ECM GROUND HARNESS. 1) Connect all connectors. 2) Turn the ignition to ON. 3) Measure the voltage between ECM and chassis ground. Connector & terminal (B134) No. 3 (+) — Chassis ground (-): (B134) No. 4 (+) — Chassis ground (-): (B136) No. 1 (+) — Chassis ground (-): (B136) No. 2 (+) — Chassis ground (-): (B136) 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 • Loose engine ground terminal • Poor contact of coupling connector

CT:DTC P060A INTERNAL CONTROL MODULE MONITORING PROCESSOR PERFORMANCE

NOTE:

For the diagnostic procedure, refer to DTC P0606. <Ref. to EN(H4DO)(diag)-241, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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

NOTE:

For the diagnostic procedure, refer to DTC P0606. <Ref. to EN(H4DO)(diag)-241, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CV:DTC P0616 STARTER RELAY CIRCUIT LOW

1. MODEL WITHOUT PUSH BUTTON START

DTC DETECTING CONDITION:

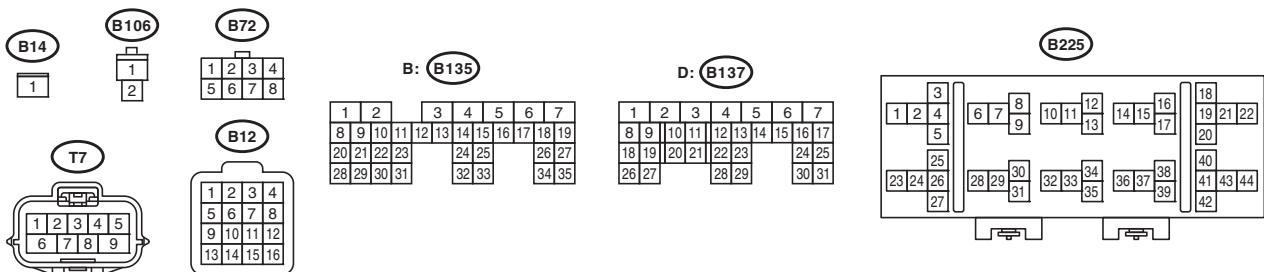
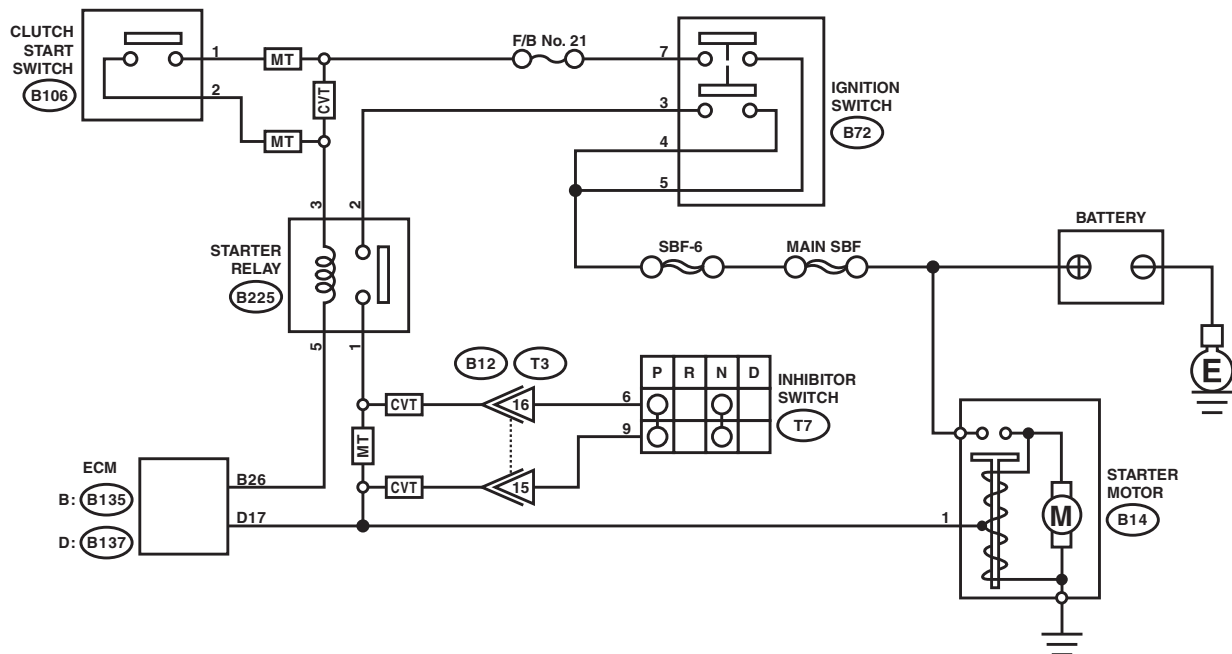
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-179, DTC P0616 STARTER RELAY CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10483

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(H4DO)(diag)-83, 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) Remove the starter relay. 3) Disconnect the connectors from ECM and starter motor. 4) Measure the resistance of harness between ECM and starter relay connector. Connector & terminal (B137) No. 17 — (B225) No. 1: NOTE: For CVT model, place the select lever in "P" range or "N" range.	Is the resistance less than 1 Ω ?	Go to step 3.	NOTE: Check the following item and repair or replace if necessary. • Open circuit of harness between ECM and starter relay connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN ECM AND STARTER RELAY CONNECTOR. Measure the resistance between ECM and chassis ground. Connector & terminal (B137) No. 17 — 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 and starter relay connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

2. MODEL WITH PUSH BUTTON START

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-179, DTC P0616 STARTER RELAY CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Failure of engine to start

CAUTION:

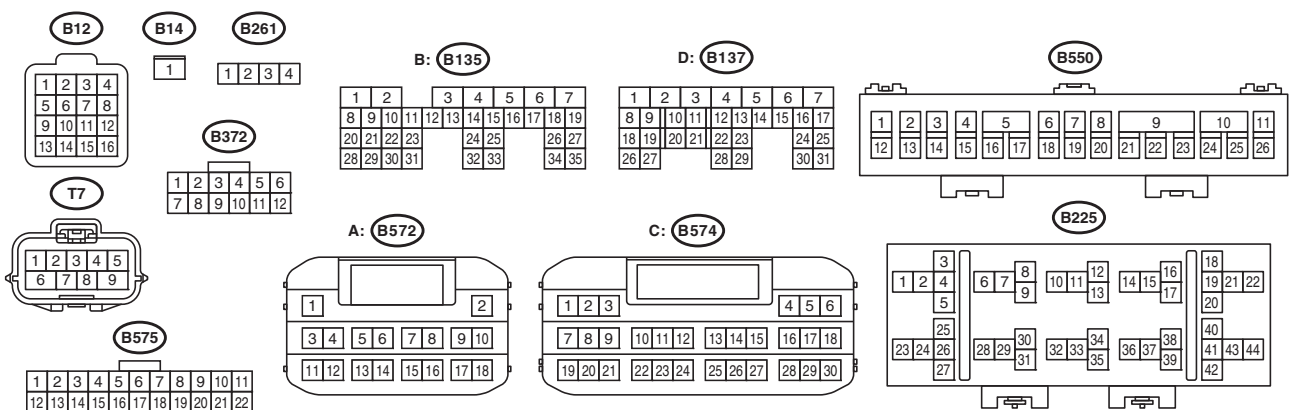
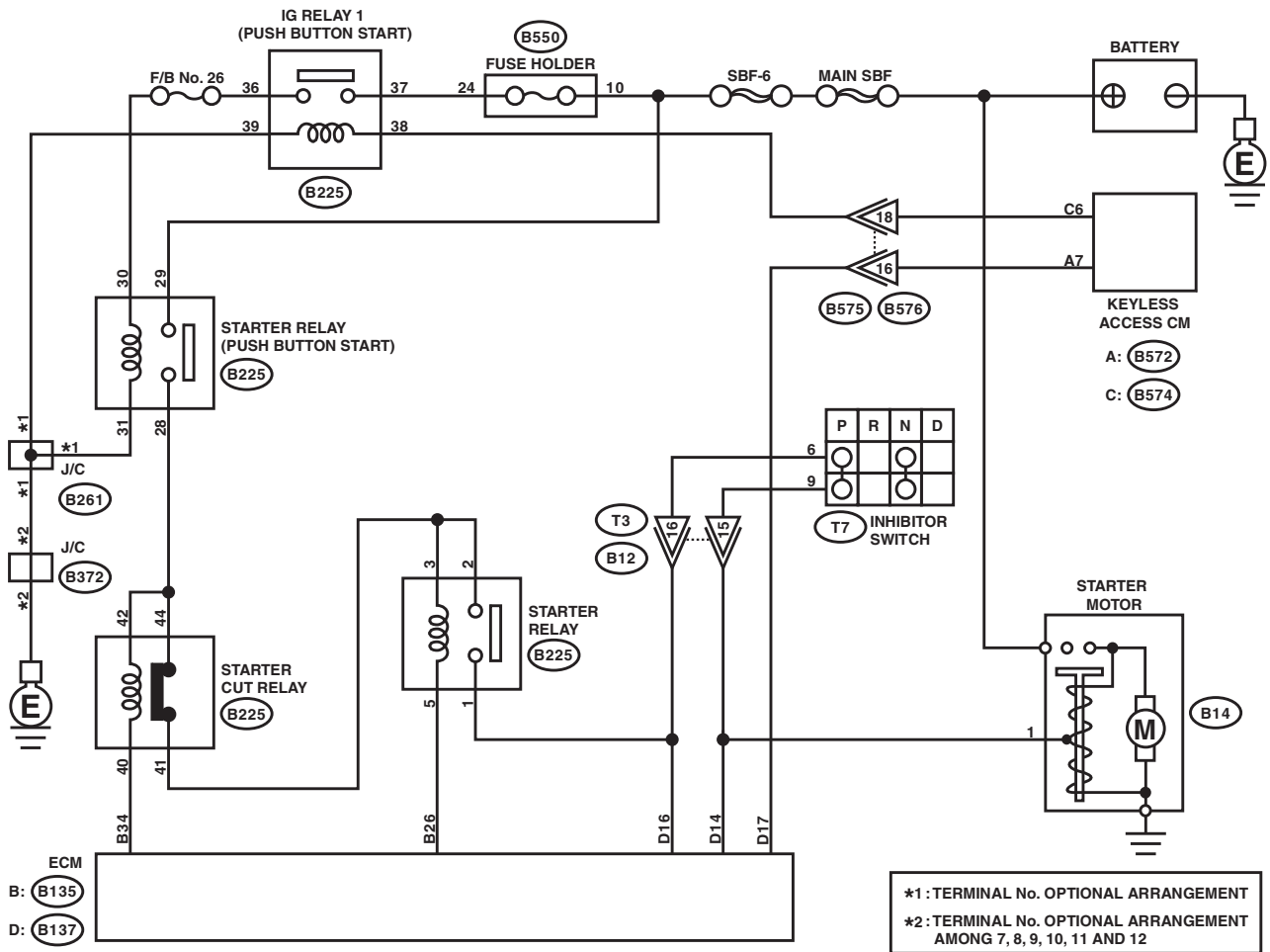
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10484

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND STARTER RELAY CONNECTOR. 1) Turn the ignition to OFF. 2) Disconnect the connector from ECM. 3) Remove the starter relay. 4) Measure the resistance of harness between ECM and starter relay connector. NOTE: Place the select lever in "P" range or "N" range. Connector & terminal (B137) No. 14 — (B225) No. 1:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and starter relay connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND STARTER RELAY CONNECTOR. 1) Disconnect the connector from starter motor. 2) Measure the resistance between ECM and chassis ground. Connector & terminal (B137) No. 14 — 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 and starter relay connector.



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CW:DTC P0617 STARTER RELAY CIRCUIT HIGH

1. MODEL WITHOUT PUSH BUTTON START

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-180, DTC P0617 STARTER RELAY CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

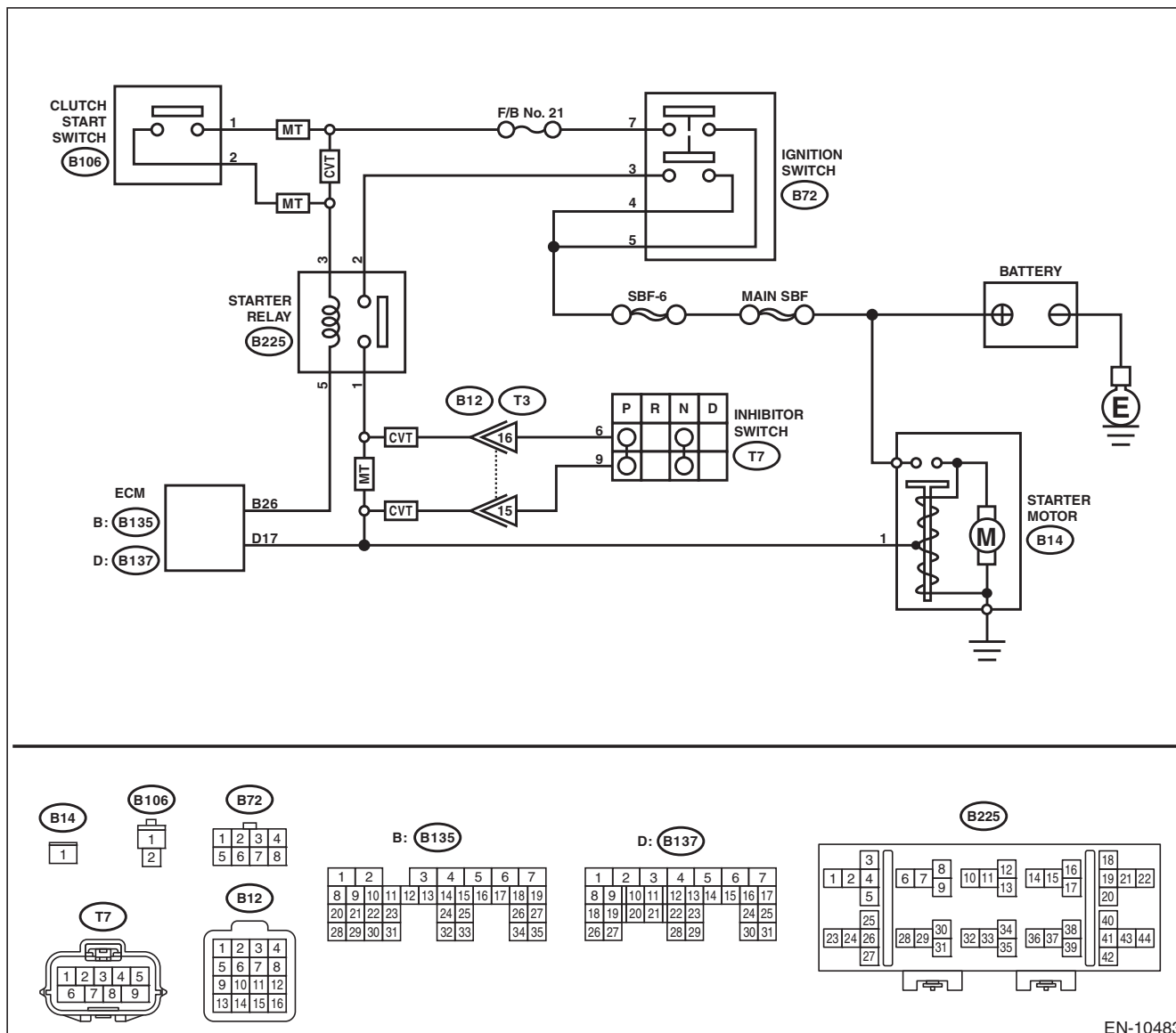
Failure of engine to start

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10483

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(H4DO)(diag)-83, 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 connector from ECM. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground. Connector & terminal (B137) No. 17 (+) — Chassis ground (–): NOTE: For CVT model, place the select lever in “P” range or “N” range.	Is the voltage 10 V or more?	Repair the short circuit to power supply in harness between ECM and starter relay connector.	Repair the poor contact of ECM connector.



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

2. MODEL WITH PUSH BUTTON START

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-180, DTC P0617 STARTER RELAY CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Failure of engine to start

CAUTION:

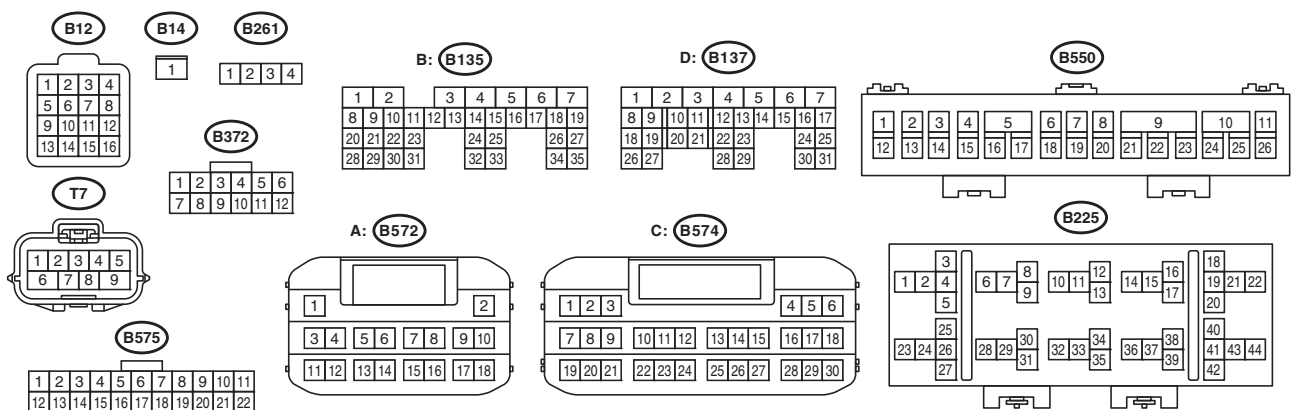
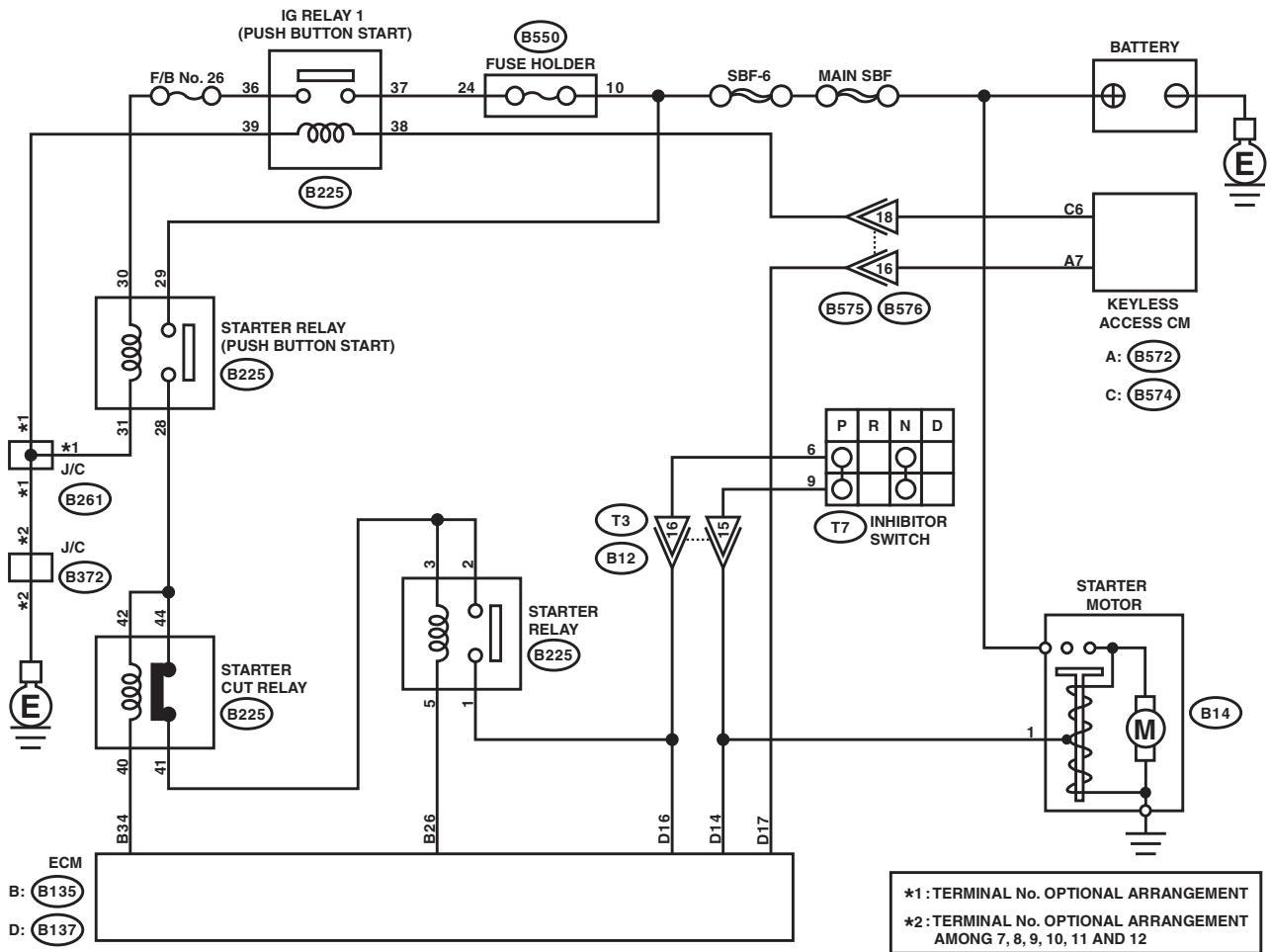
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10484

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

	Step	Check	Yes	No
1	CHECK STARTER MOTOR. 1) Turn the ignition to ON. 2) Check the starter motor condition.	Is the starter motor rotating?	Go to step 2.	Repair the short circuit to power supply. NOTE: In this case, repair the following harnesses: • Short circuit to power supply in harness between ECM and starter relay connector • Short circuit to power supply in harness between ECM and starter motor • Short circuit to power supply in harness between starter relay connector and starter motor
2	CHECK HARNESS BETWEEN STARTER CUT RELAY CONNECTOR AND STARTER RELAY CONNECTOR. 1) Turn the ignition to OFF. 2) Disconnect the connector from starter motor. 3) Remove the starter cut relay, starter relay and inhibitor relay. 4) Turn the ignition to ON. 5) Measure the voltage between starter relay connector and chassis ground. Connector & terminal (B225) No. 3 (+) — Chassis ground (–):	Is the voltage 10 V or more?	Repair the short circuit to power supply in harness between starter cut relay connector and starter relay connector.	Go to step 3.
3	CHECK STARTER CUT RELAY. 1) Connect the battery to starter cut relay terminals No. 40 and No. 42. 2) Measure the resistance between starter cut relay terminals. Terminals No. 41 — No. 44:	Is the resistance 1 MΩ or more?	Go to step 6.	Replace the starter cut relay. <Ref. to SL-106, Starter Cut Relay.> Go to step 4.
4	CHECK HARNESS BETWEEN ECM AND STARTER RELAY CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM and chassis ground. Connector & terminal (B135) No. 26 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM and starter relay connector.
5	CHECK STARTER RELAY. Measure the resistance between starter relay terminals. Terminals No. 1 — No. 2:	Is the resistance 1 MΩ or more?	Go to step 6.	Replace the starter relay. <Ref. to EN(H4DO)(diag)-9, LOCATION, Electrical Component Location.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK HARNESS BETWEEN ECM, STARTER RELAY CONNECTOR AND STARTER MOTOR. 1) Disconnect the connector from ECM. 2) Turn the ignition to ON. 3) Measure the voltage between ECM and chassis ground. <i>Connector & terminal</i> <i>(B137) No. 14 (+) — Chassis ground (–):</i>	Is the voltage 10 V or more?	Repair the short circuit to power supply. NOTE: In this case, repair the following harnesses: • Short circuit to power supply in harness between ECM and starter relay connector • Short circuit to power supply in harness between ECM and starter motor • Short circuit to power supply in harness between starter relay connector and starter motor	Repair the poor contact of ECM connector.

CX:DTC P062F INTERNAL CONTROL MODULE EEPROM ERROR

NOTE:

For the diagnostic procedure, refer to DTC P0606. <Ref. to EN(H4DO)(diag)-241, DTC P0606 CONTROL MODULE PROCESSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

CY:DTC P0700 TRANSMISSION CONTROL SYSTEM (MIL REQUEST)

NOTE:

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

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

CZ:DTC P081A STARTER DISABLE CIRCUIT LOW

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-184, DTC P081A STARTER DISABLE CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

Failure of engine to start

CAUTION:

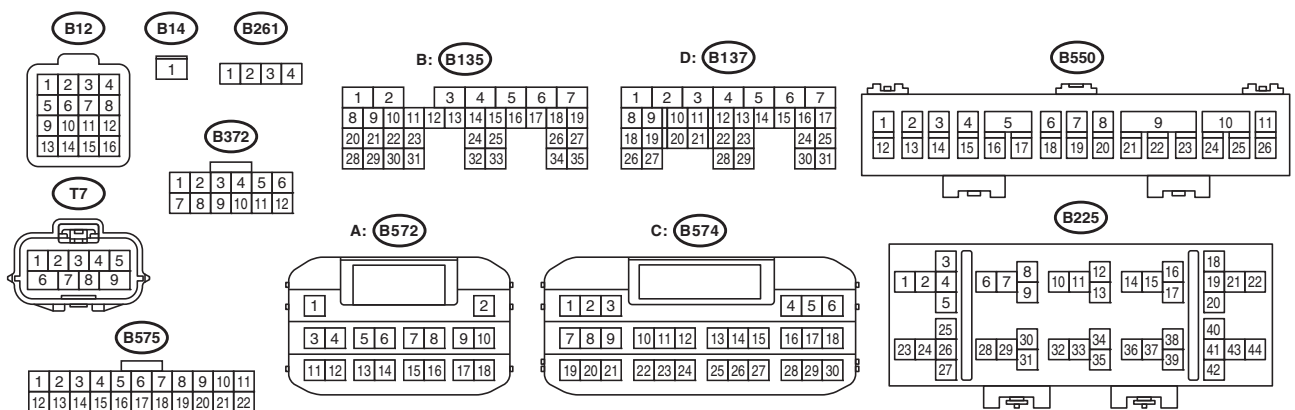
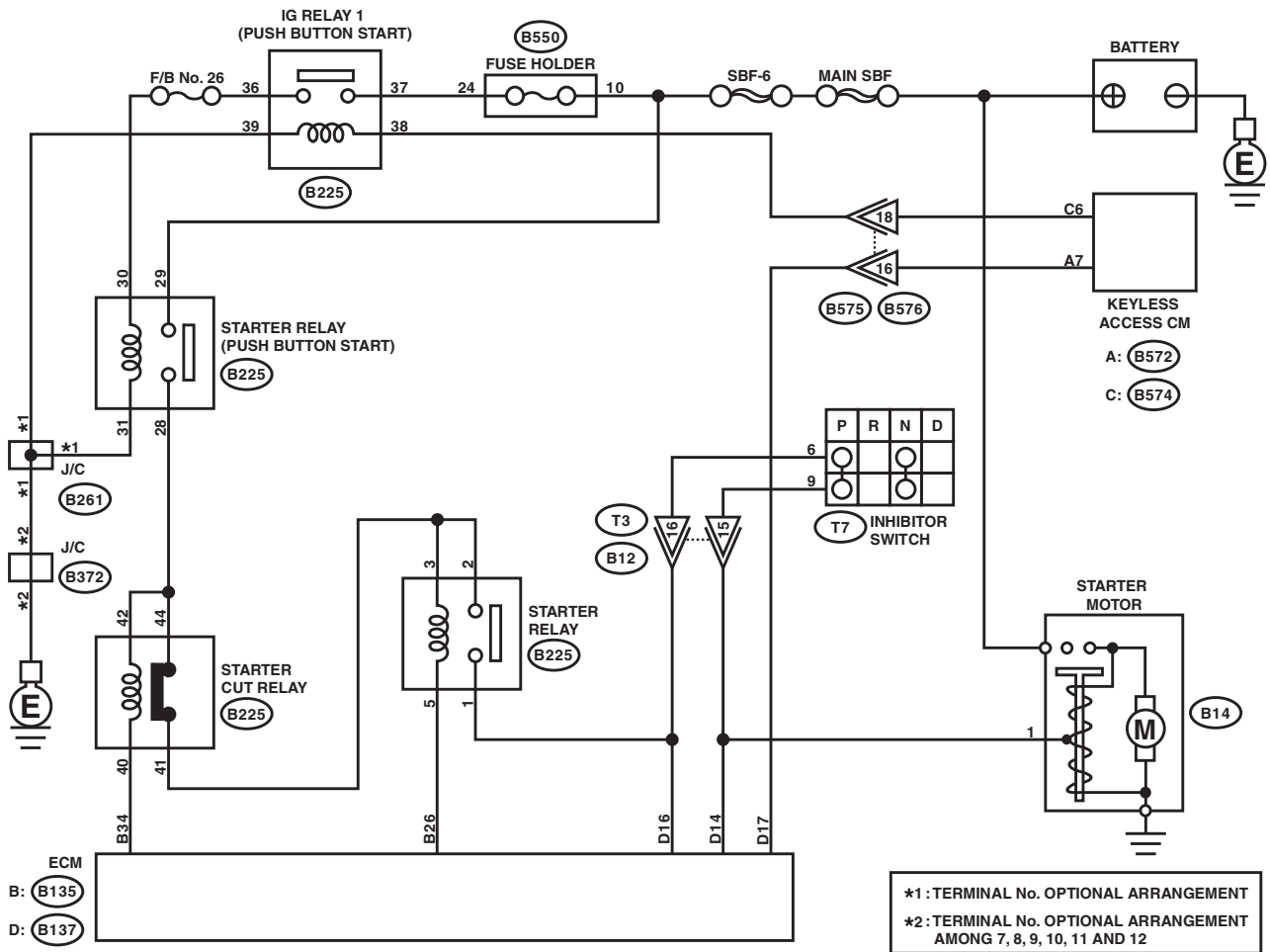
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10484

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN STARTER RELAY (PUSH BUTTON START) CONNECTOR AND STARTER CUT RELAY CONNECTOR. 1) Turn the ignition to OFF. 2) Remove the starter relay (push button start) and starter cut relay. 3) Measure the resistance of harness between starter relay (push button start) connector and starter cut relay connector. Connector & terminal (B225) No. 28 — (B225) No. 42:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the open circuit in harness between starter relay (push button start) connector and starter cut relay connector.
2 CHECK HARNESS BETWEEN ECM AND STARTER CUT RELAY CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM and starter cut relay connector. Connector & terminal (B135) No. 34 — (B225) No. 40:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit of harness between ECM and starter cut relay connector.
3 CHECK STARTER CUT RELAY. 1) Connect the battery to starter cut relay terminals No. 40 and No. 42. 2) Measure the resistance between starter cut relay terminals. Terminals No. 41 — No. 44:	Is the resistance 1 M Ω or more?	Repair the poor contact of ECM connector.	Replace the starter cut relay. <Ref. to SL-106, Starter Cut Relay.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-185, DTC P0851 PARK/NEUTRAL SWITCH INPUT CIRCUIT LOW (AT MODEL), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

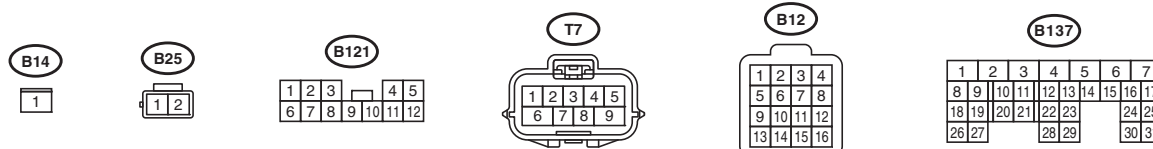
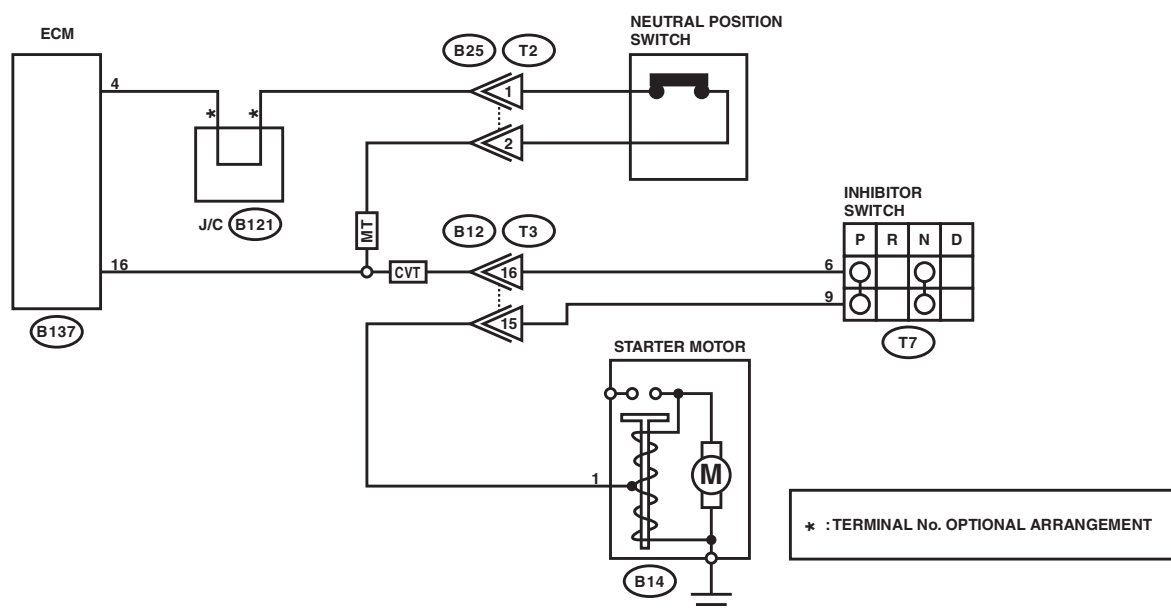
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10507

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK SELECT CABLE.	Is there any fault in select cable?	Repair or adjust the select cable. <Ref. to CS-46, Select Cable.>	Go to step 2.
2 CHECK INPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Place the select lever in other than "P" range and "N" range. 3) Measure the voltage between ECM and chassis ground. Connector & terminal (B137) No. 16 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the poor contact of ECM connector.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND TRANSMISSION HARNESS CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and transmission harness connector (T3). 3) Measure the resistance between ECM and chassis ground. Connector & terminal (B137) No. 16 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 4.	Repair the ground short circuit of harness between ECM and transmission harness connector.
4 CHECK TRANSMISSION HARNESS CONNECTOR. 1) Disconnect the connector from inhibitor switch. 2) Measure the resistance between transmission harness connector and engine ground. Connector & terminal (T3) No. 16 — Engine ground:	Is the resistance 1 MΩ or more?	Replace the inhibitor switch. <Ref. to CVT(TR580)-91, Inhibitor Switch.>	Repair short circuit to ground in harness between transmission harness connector and inhibitor switch connector.



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-186, DTC P0851 NEUTRAL SWITCH INPUT CIRCUIT LOW (MT MODEL), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

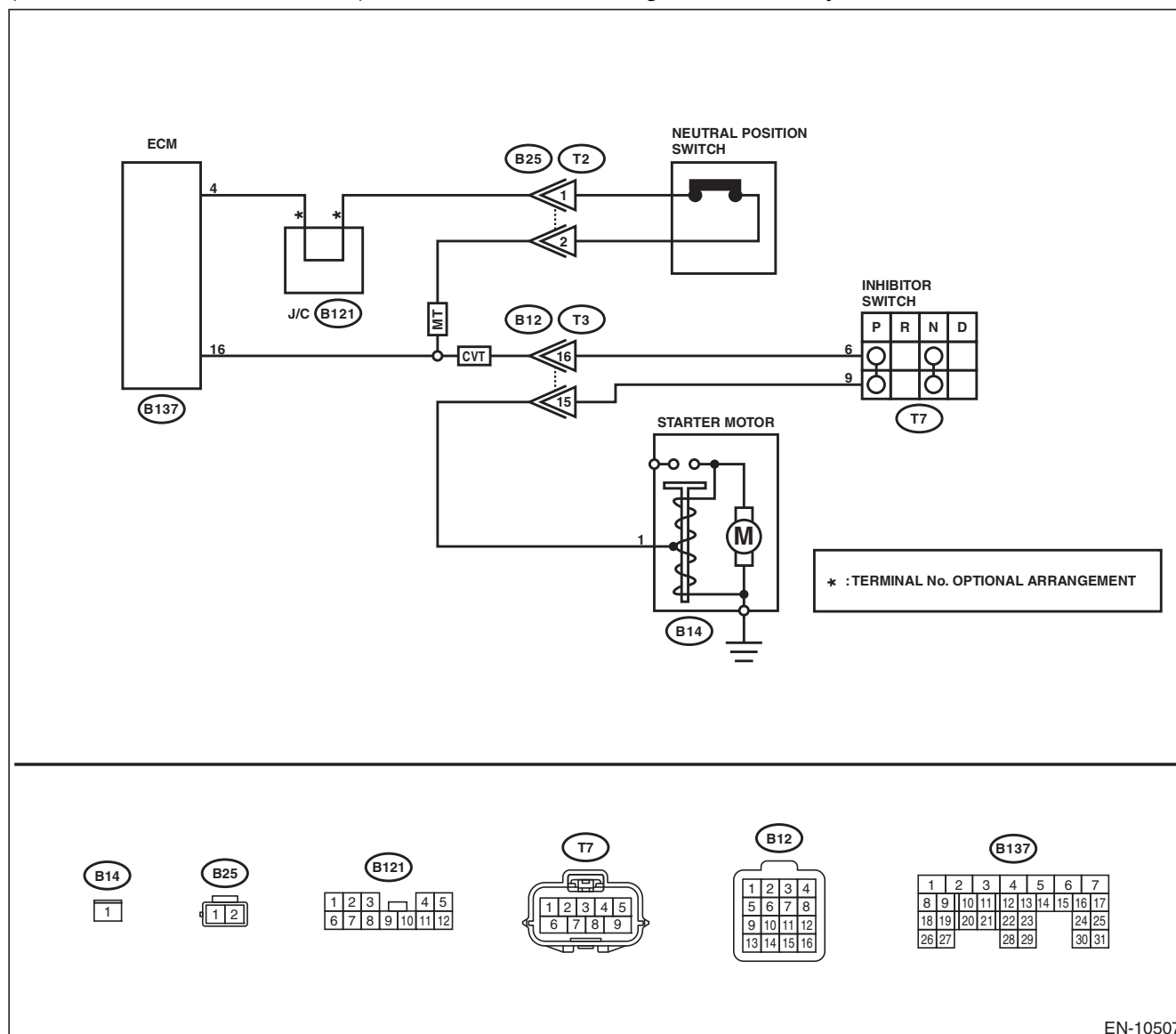
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10507

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 and chassis ground. Connector & terminal (B137) No. 16 (+) — 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 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 and chassis ground. Connector & terminal (B137) No. 16 — Chassis ground:	Is the resistance 1 MΩ or more?	Replace the neutral position switch. <Ref. to 6MT-40, Switches and Harness.>	Repair the short circuit to ground harness between ECM and neutral position switch connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-187, DTC P0852 PARK/NEUTRAL SWITCH INPUT CIRCUIT HIGH (AT MODEL), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

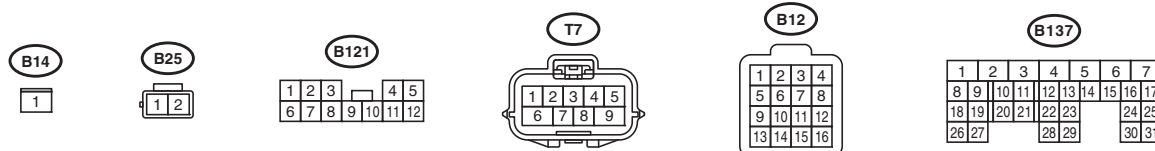
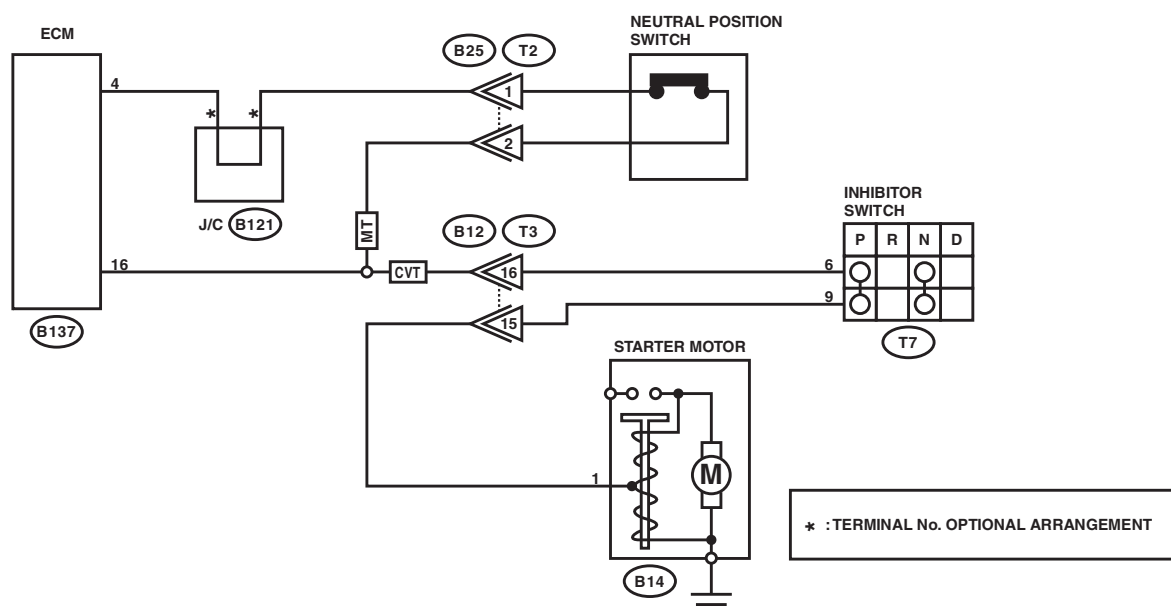
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10507

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK SELECT CABLE.	Is there any fault in select cable?	Repair or adjust the select cable. <Ref. to CS-46, Select Cable.>	Go to step 2.
2 CHECK INPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground with select lever at "P" range and "N" range. Connector & terminal (B137) No. 16 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Repair the poor contact of ECM connector.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND INHIBITOR SWITCH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and inhibitor switch. 3) Measure the resistance of harness between ECM and inhibitor switch connector. Connector & terminal (B137) No. 16 — (T7) 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 ECM and inhibitor switch connector • Poor contact of coupling connector
4 CHECK INHIBITOR SWITCH GROUND LINE. Measure the resistance of harness between inhibitor switch connector and engine ground. Connector & terminal (T7) No. 9 — Engine ground:	Is the resistance less than 5 Ω?	Replace the inhibitor switch. <Ref. to CVT(TR580)-91, Inhibitor Switch.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between inhibitor switch connector and starter motor ground line • Poor contact of coupling connector • Poor contact of starter motor connector • Poor contact of starter motor ground • Starter motor

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

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-188, DTC P0852 NEUTRAL SWITCH INPUT CIRCUIT HIGH (MT MODEL), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

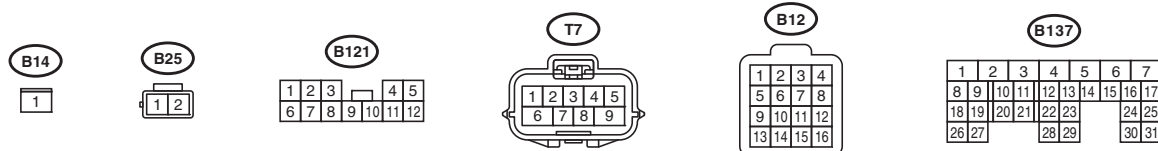
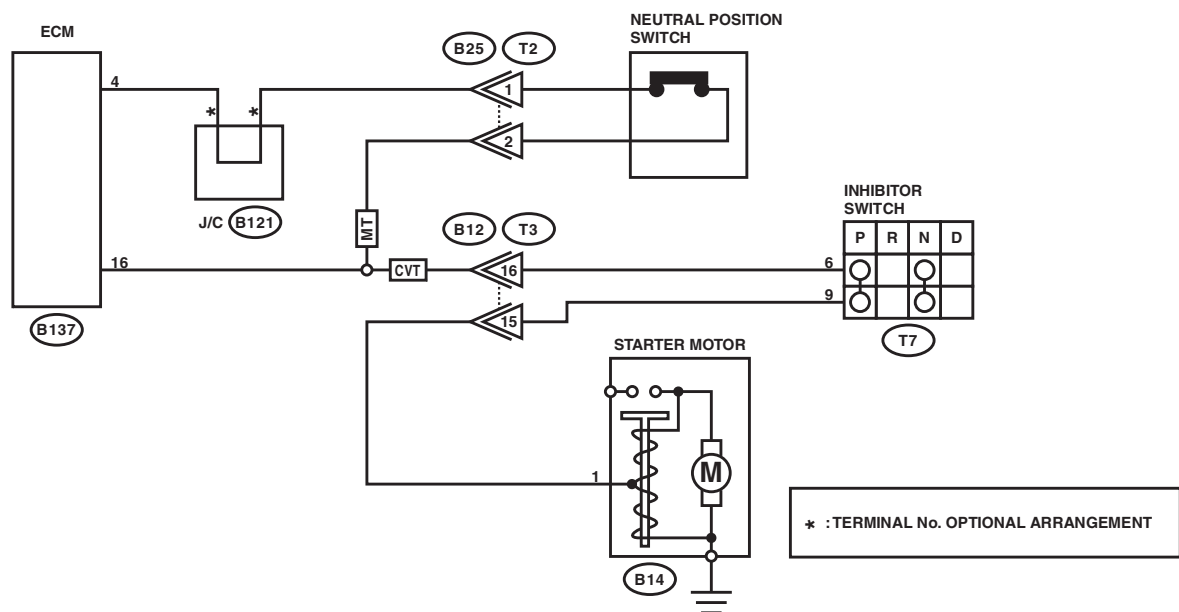
Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10507

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK INPUT SIGNAL OF ECM. 1) Turn the ignition switch to ON. 2) Place the shift lever in neutral. 3) Measure the voltage between ECM and chassis ground. Connector & terminal (B137) No. 16 (+) — Chassis ground (–):	Is the voltage less than 1 V?	Repair the poor contact of ECM connector.	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 neutral position switch. 3) Measure the resistance of harness between ECM and neutral position switch connector. Connector & terminal (B137) No. 16 — (B25) No. 2: (B137) No. 4 — (B25) No. 1:	Is the resistance less than 1 Ω?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and neutral position switch connector • Poor contact of coupling connector
3 CHECK NEUTRAL POSITION SWITCH. 1) Place the shift lever in neutral. 2) Measure the resistance between neutral position switch terminals. Terminals No. 1 — No. 2:	Is the resistance less than 1 Ω?	Repair the poor contact of neutral position switch connector.	Replace the neutral position switch. <Ref. to 6MT-40, Switches and Harness.>

DE:DTC P1160 RETURN SPRING FAILURE

NOTE:

For the diagnostic procedure, refer to DTC P2101. <Ref. to EN(H4DO)(diag)-301, 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)

DF: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(H4DO)-191, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-83, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK DRAIN TUBE OF LEAK CHECK VALVE ASSEMBLY.	Is the drain tube of leak check valve assembly clogged?	Replace the drain tube of leak check valve assembly. <Ref. to EC(H4DO)-35, Leak Check Valve Assembly.>	Go to step 3.
3 CHECK HOSES BETWEEN LEAK CHECK VALVE ASSEMBLY AND DRAIN FILTER.	Are the hoses between the leak check valve assembly and drain filter clogged?	Replace the hose between leak check valve assembly and drain filter. <Ref. to EC(H4DO)-9, Canister.> <Ref. to EC(H4DO)-34, Drain Filter.>	Go to step 4.
4 CHECK DRAIN FILTER.	Is the drain filter clogged?	Replace the drain filter. <Ref. to EC(H4DO)-34, Drain Filter.>	Replace the leak check valve assembly. <Ref. to EC(H4DO)-35, Leak Check Valve Assembly.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DG:DTC P1451 EVAPORATIVE EMISSION CONT. SYS.

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-193, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)-9, 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(H4DO)-9, Canister.> <Ref. to FU(H4DO)-112, Fuel Tank.>	Replace the canister. <Ref. to EC(H4DO)-9, 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(H4DO)(diag)-52, DRIVE CYCLE I, PROCEDURE, Drive Cycle.>	Is DTC P1451 displayed on the display?	Replace the leak check valve assembly. <Ref. to EC(H4DO)-35, Leak Check Valve Assembly.>	End.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

NOTE:

For the diagnostic procedure, refer to DTC P1498. <Ref. to EN(H4DO)(diag)-268, DTC P1498 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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

NOTE:

For the diagnostic procedure, refer to DTC P1499. <Ref. to EN(H4DO)(diag)-270, DTC P1499 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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

NOTE:

For the diagnostic procedure, refer to DTC P1498. <Ref. to EN(H4DO)(diag)-268, DTC P1498 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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

NOTE:

For the diagnostic procedure, refer to DTC P1499. <Ref. to EN(H4DO)(diag)-270, DTC P1499 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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

NOTE:

For the diagnostic procedure, refer to DTC P1498. <Ref. to EN(H4DO)(diag)-268, DTC P1498 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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

NOTE:

For the diagnostic procedure, refer to DTC P1499. <Ref. to EN(H4DO)(diag)-270, DTC P1499 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-194, DTC P1492 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.> <Ref. to GD(H4DO)-198, DTC P1494 EGR SOLENOID VALVE SIGNAL #2 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.> <Ref. to GD(H4DO)-198, DTC P1496 EGR SOLENOID VALVE SIGNAL #3 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.> <Ref. to GD(H4DO)-198, DTC P1498 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

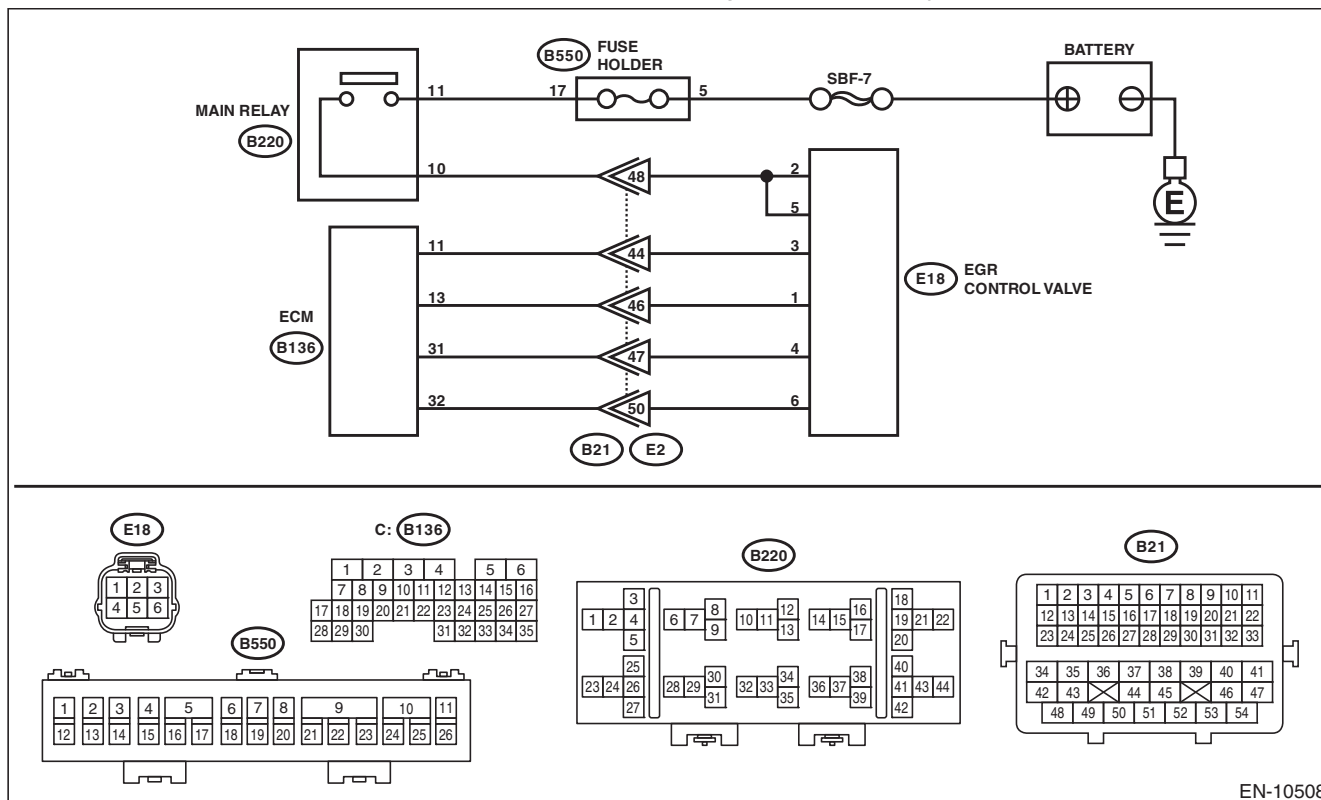
- Improper idling
- Poor driving performance
- Engine breathing

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK POWER SUPPLY TO EGR CONTROL VALVE. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the EGR control valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between EGR control valve connector and engine ground. Connector & terminal (E18) No. 2 (+) — Engine ground (-): (E18) No. 5 (+) — 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 EGR control valve and main relay connector • Poor contact of coupling connector
2 CHECK HARNESS BETWEEN ECM AND EGR CONTROL VALVE CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance between ECM and EGR control valve connector. Connector & terminal DTC P1492; (B136) No. 11 — (E18) No. 3: DTC P1494; (B136) No. 13 — (E18) No. 1: DTC P1496; (B136) No. 31 — (E18) No. 4: DTC P1498; (B136) No. 32 — (E18) No. 6:	Is the resistance less than 1 Ω?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and EGR control valve connector • Poor contact of coupling connector
3 CHECK HARNESS BETWEEN ECM AND EGR CONTROL VALVE CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM and chassis ground. Connector & terminal DTC P1492; (B136) No. 11 — Chassis ground: DTC P1494; (B136) No. 13 — Chassis ground: DTC P1496; (B136) No. 31 — Chassis ground: DTC P1498; (B136) No. 32 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 4.	Repair the ground short in harness between ECM and EGR control valve connector.
4 CHECK FOR POOR CONTACT. Check poor contact between ECM and EGR control valve connector.	Is there poor contact in ECM or EGR control valve connector?	Repair the poor contact of ECM or EGR control valve connector.	Replace EGR control valve. <Ref. to EC(H4DO)-22, EGR Control Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-196, DTC P1493 EGR SOLENOID VALVE SIGNAL #1 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.> <Ref. to GD(H4DO)-198, DTC P1495 EGR SOLENOID VALVE SIGNAL #2 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.> <Ref. to GD(H4DO)-198, DTC P1497 EGR SOLENOID VALVE SIGNAL #3 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.> <Ref. to GD(H4DO)-198, DTC P1499 EGR SOLENOID VALVE SIGNAL #4 CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

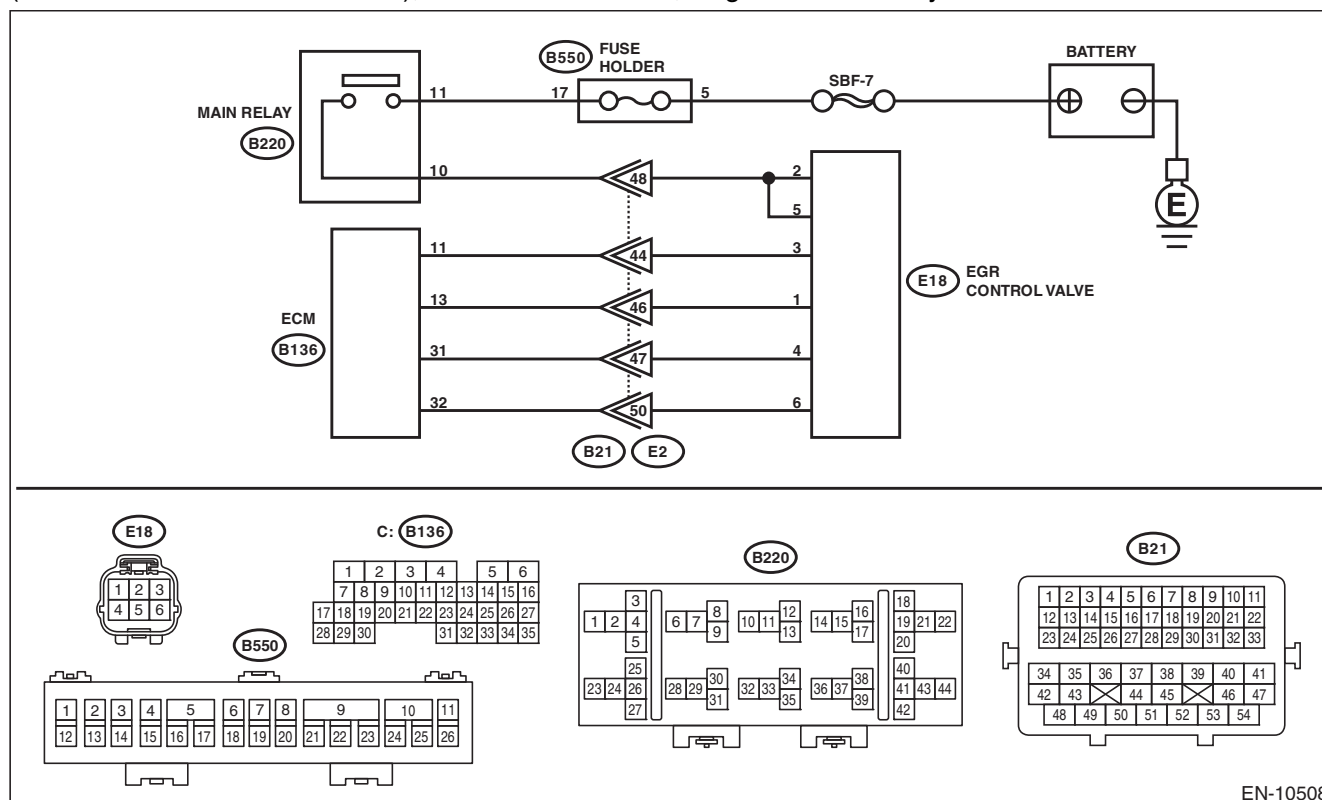
- Improper idling
- Poor driving performance
- Engine breathing

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10508

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND EGR CONTROL VALVE CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and EGR control valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM and chassis ground. <i>Connector & terminal</i> <i>DTC P1493; (B136) No. 11 (+) — Chassis ground (-):</i> <i>DTC P1495; (B136) No. 13 (+) — Chassis ground (-):</i> <i>DTC P1497; (B136) No. 31 (+) — Chassis ground (-):</i> <i>DTC P1499; (B136) No. 32 (+) — Chassis ground (-):</i>	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between the ECM and EGR control valve connector.	Go to step 2.
2 CHECK EGR CONTROL VALVE. Measure the resistance between EGR control valve terminals. <i>Terminals</i> <i>DTC P1493; No. 2 — No. 3:</i> <i>DTC P1495; No. 2 — No. 1:</i> <i>DTC P1497; No. 5 — No. 4:</i> <i>DTC P1499; No. 5 — No. 6:</i>	Is the resistance 20 Ω or more?	Repair the poor contact of ECM connector.	Replace EGR control valve. <Ref. to EC(H4DO)-22, EGR Control Valve.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DP:DTC P1530 BATTERY CURRENT SENSOR CIRCUIT LOW

DTC DETECTING CONDITION:

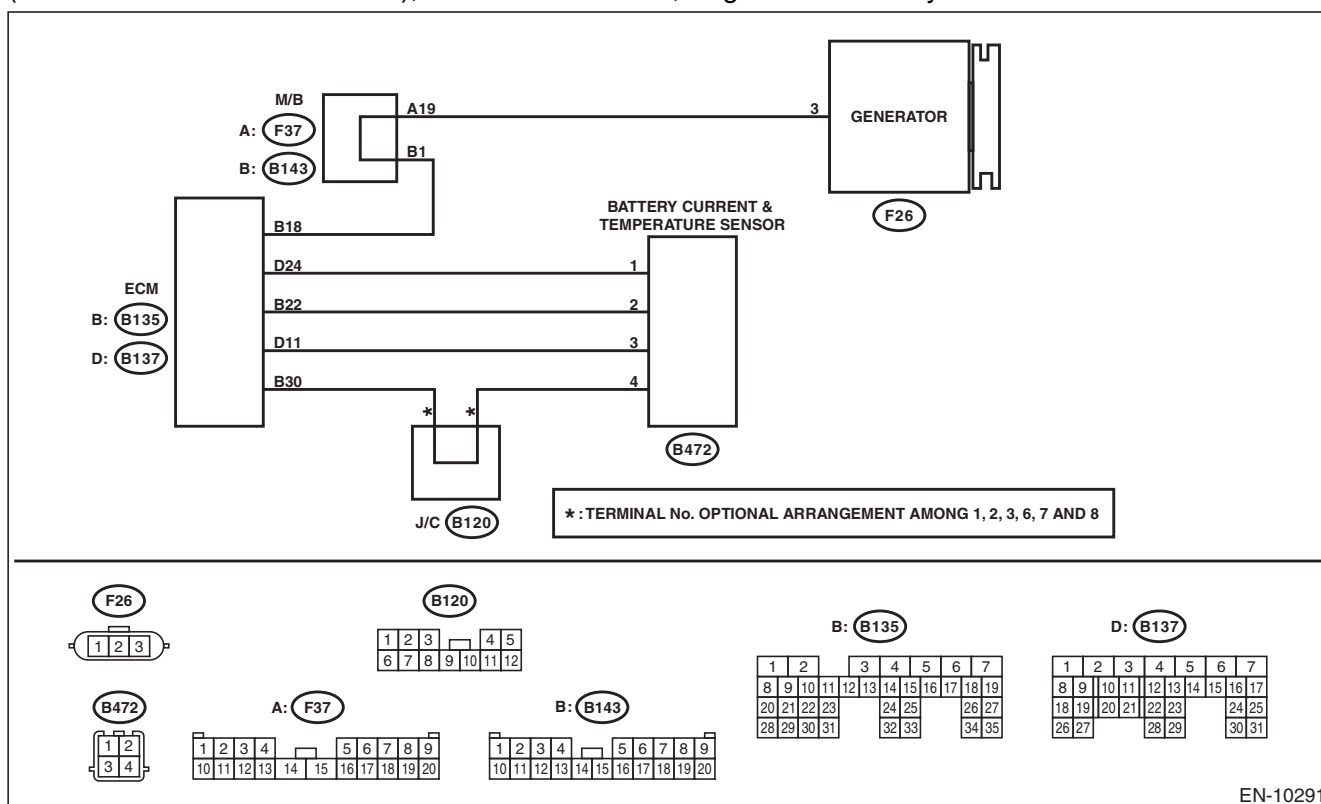
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-199, DTC P1530 BATTERY CURRENT SENSOR CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10291

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 «Battery current value» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO)(diag)-36, Subaru Select Monitor.>	Is the value of «Battery current value» 100 A 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 BATTERY CURRENT SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM and battery current sensor. 3) Measure the resistance of the harness between the ECM and battery current sensor connector. Connector & terminal (B135) No. 22 — (B472) No. 2: (B137) No. 11 — (B472) No. 3:	Is the resistance less than 1 Ω?	Go to step 3.	Repair the open circuit in the harness between the ECM and battery current sensor connector.
3 CHECK HARNESS BETWEEN ECM AND BATTERY CURRENT SENSOR CONNECTOR. Measure the resistance between ECM and chassis ground. Connector & terminal (B135) No. 22 — Chassis ground: (B137) No. 11 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 4.	Repair the short circuit to ground in the harness between the ECM and battery current sensor connector.
4 CHECK FOR POOR CONTACT. Check for poor contact between the ECM and battery current sensor connectors.	Is there poor contact of the ECM or battery current sensor connectors?	Repair any poor contact between the ECM and battery current sensor connectors.	Replace the battery current sensor. <Ref. to SC(H4DO)-67, Battery Current & Temperature Sensor.>

ENGINE (DIAGNOSTICS)

DQ:DTC P1531 BATTERY CURRENT SENSOR CIRCUIT HIGH

DTC DETECTING CONDITION:

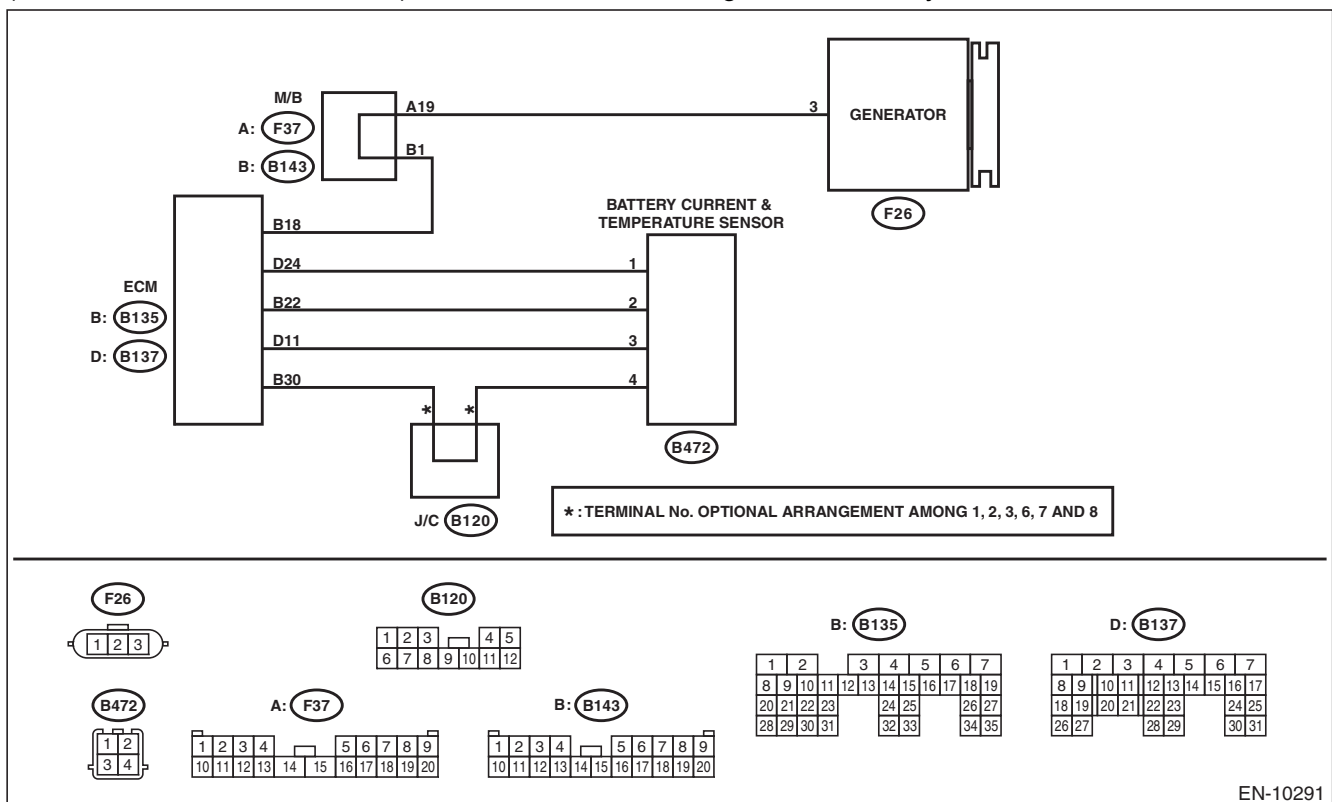
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-201, DTC P1531 BATTERY CURRENT SENSOR CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), 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 «Battery current value» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO)(diag)-36, Subaru Select Monitor.>	Is the value of «Battery current value» –100 A 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 HARNESS BETWEEN ECM AND BATTERY CURRENT SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the battery current sensor. 3) Start the engine. 4) Read the value of «Battery current value» using the Subaru Select Monitor. NOTE: For detailed operation procedures, refer to "Current Data Display For Engine". <Ref. to EN(H4DO)(diag)-36, Subaru Select Monitor.>	Is the value of «Battery current value» –100 A or less?	Repair the short circuit to power in the harness between the ECM and battery current sensor connector.	Go to step 3.
3 CHECK HARNESS BETWEEN ECM AND BATTERY CURRENT SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance of the harness between the battery current sensor connector and engine ground. Connector & terminal (B472) 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 and battery current sensor connector • Poor contact of joint connector
4 CHECK FOR POOR CONTACT. Check for poor contact of the battery current sensor connector.	Is there poor contact of the battery current sensor connector?	Repair the poor contact of the battery current sensor connector.	Replace the battery current sensor. <Ref. to SC(H4DO)-67, Battery Current & Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2	CHECK BATTERY TERMINAL.	Remove the wiring of electrical parts connected to the positive and negative terminals of battery. NOTE: Directly connecting electrical parts to the battery may cause erroneous operation of the battery current sensor.	Go to step 3.
3	CHECK INSTALLATION CONDITION OF V-BELT. Check the installation condition of V-belt. <Ref. to ME(H4DO)-89, INSPECTION, V-belt.>	Is the V-belt installed properly?	Go to step 4.
4	CHECK BATTERY VOLTAGE. 1) Start the engine. 2) Select "High mode" from "Alternator control" in "System Operation Check Mode", and measure the battery voltage after 10 seconds or more have passed. NOTE: For detailed procedures, refer to "System Operation Check Mode". <Ref. to EN(H4DO)(diag)-59, System Operation Check Mode.> 3) Select "Low mode" from "Alternator control" in "System Operation Check Mode", and measure the battery voltage. CAUTION: Do not continue the "Low mode" operation for one minute or more. NOTE: For detailed procedures, refer to "System Operation Check Mode". <Ref. to EN(H4DO)(diag)-59, System Operation Check Mode.>	Does battery voltage lower from 13.9 — 14.8 V to 12.2 — 13.1 V between step 2) and step 3)?	Go to step 7.
5	CHECK HARNESS BETWEEN ECM AND GENERATOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and generator. 3) Measure the resistance of harness between ECM and generator connector. Connector & terminal (B135) No. 18 — (F26) No. 3:	Is the resistance less than 1 Ω?	Go to step 6.
6	CHECK HARNESS BETWEEN ECM AND GENERATOR CONNECTOR. Measure the resistance between generator connector and engine ground. Connector & terminal (F26) No. 3 — Engine ground:	Is the resistance 1 MΩ or more?	Go to step 7.
7	CHECK BATTERY CURRENT SENSOR.	Has water entered the connector?	Completely remove any water inside.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
8 CHECK HARNESS BETWEEN ECM AND BATTERY CURRENT SENSOR CONNECTOR. 1) Disconnect the connectors from the ECM and battery current sensor. 2) Measure the resistance of the harness between the ECM and battery current sensor connector. <i>Connector & terminal</i> <i>(B135) No. 22 — (B472) No. 2:</i> <i>(B137) No. 11 — (B472) No. 3:</i>	Is the resistance less than 1 Ω ?	Go to step 9.	Repair the open circuit in the harness between the ECM and battery current sensor connector.
9 CHECK HARNESS BETWEEN ECM AND BATTERY CURRENT SENSOR CONNECTOR. Measure the resistance between ECM and chassis ground. <i>Connector & terminal</i> <i>(B135) No. 22 — Chassis ground:</i> <i>(B137) No. 11 — Chassis ground:</i>	Is the resistance 1 M Ω or more?	Go to step 10.	Repair the short circuit to ground in the harness between the ECM and battery current sensor connector.
10 CHECK HARNESS BETWEEN ECM AND BATTERY CURRENT SENSOR CONNECTOR. Measure the resistance between ECM connectors. <i>Connector & terminal</i> <i>(B135) No. 22 — (B137) No. 11:</i>	Is the resistance 1 M Ω or more?	Go to step 11.	Repair the short circuit to power in the harness between the ECM and battery current sensor connector.
11 CHECK HARNESS BETWEEN ECM AND BATTERY CURRENT SENSOR CONNECTOR. 1) Connect the connector to ECM. 2) Measure the resistance of the harness between the battery current sensor connector and engine ground. <i>Connector & terminal</i> <i>(B472) No. 4 — Engine ground:</i>	Is the resistance less than 5 Ω ?	Go to step 12.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and battery current sensor connector • Poor contact of joint connector
12 CHECK FOR POOR CONTACT. Check for poor contact of the battery current sensor connector.	Is there poor contact of the battery current sensor connector?	Repair the poor contact of the battery current sensor connector.	Replace the battery current sensor. <Ref. to SC(H4DO)-67, Battery Current & Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DS:DTC P2004 INTAKE MANIFOLD RUNNER CONTROL STUCK OPEN (BANK 1)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-206, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-83, 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.	Is there any dirt or clogging with foreign objects in the tumble generator valve?	Clean the tumble generator valve.	Replace the tumble generator valve RH. <Ref. to FU(H4DO)-79, Tumble Generator Valve Assembly.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-207, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-83, 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.	Is there any dirt or clogging with foreign objects in the tumble generator valve?	Clean the tumble generator valve.	Replace the tumble generator valve LH. <Ref. to FU(H4DO)-79, Tumble Generator Valve Assembly.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DU:DTC P2006 INTAKE MANIFOLD RUNNER CONTROL STUCK CLOSED (BANK 1)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-208, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-83, 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.	Is there any dirt or clogging with foreign objects in the tumble generator valve?	Clean the tumble generator valve.	Replace the tumble generator valve RH. <Ref. to FU(H4DO)-79, Tumble Generator Valve Assembly.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DV:DTC P2007 INTAKE MANIFOLD RUNNER CONTROL STUCK CLOSED (BANK 2)

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-209, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-83, 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.	Is there any dirt or clogging with foreign objects in the tumble generator valve?	Clean the tumble generator valve.	Replace the tumble generator valve LH. <Ref. to FU(H4DO)-79, Tumble Generator Valve Assembly.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DW:DTC P2009 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT LOW (BANK 1)

DTC DETECTING CONDITION:

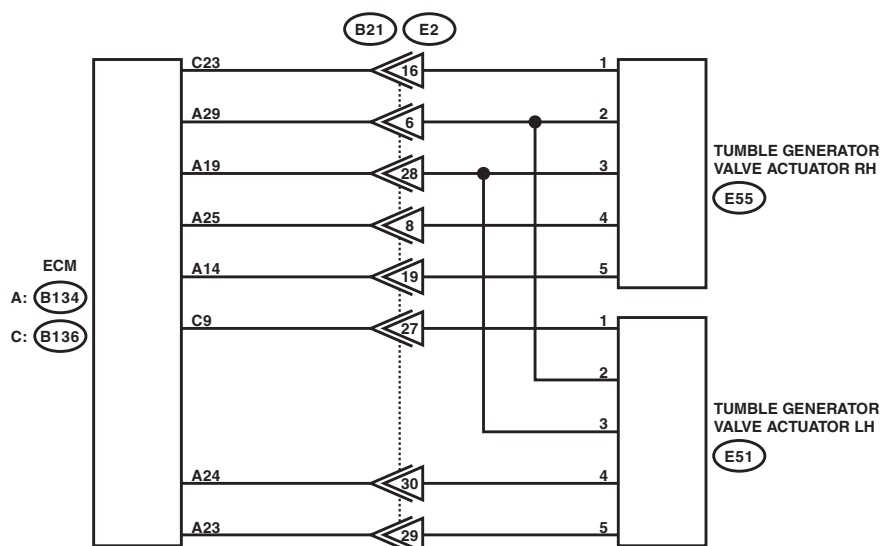
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-210, DTC P2009 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT LOW (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



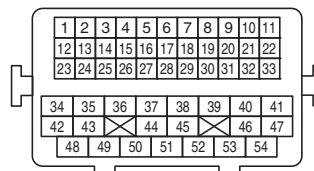
A: B134

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	

C: B136

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	

B21



EN-10440

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

	Step	Check	Yes	No
1	CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ACTUATOR RH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the voltage between ECM and chassis ground. Connector & terminal (B134) No. 25 (+) — Chassis ground (-): (B134) No. 14 (+) — Chassis ground (-):	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM and tumble generator valve actuator RH connector.	Replace the tumble generator valve actuator RH. <Ref. to FU(H4DO)-85, Tumble Generator Valve Actuator.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DX:DTC P2012 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT LOW (BANK 2)

DTC DETECTING CONDITION:

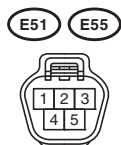
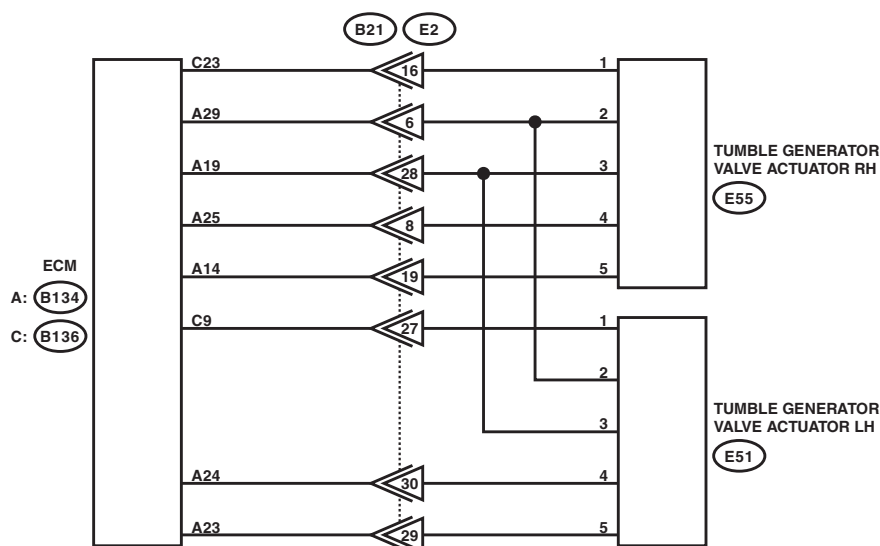
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-211, DTC P2012 INTAKE MANIFOLD RUNNER CONTROL CIRCUIT LOW (BANK 2), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



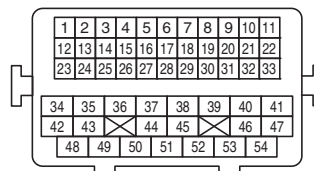
A: B134

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	

C: B136

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	

B21



EN-10440

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ACTUATOR LH CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the voltage between ECM 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 and tumble generator valve actuator LH connector.	Replace the tumble generator valve actuator LH. <Ref. to FU(H4DO)-85, Tumble Generator Valve Actuator.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DY:DTC P2096 POST CATALYST FUEL TRIM SYSTEM TOO LEAN (BANK 1)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-212, DTC P2096 POST CATALYST FUEL TRIM SYSTEM TOO LEAN (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

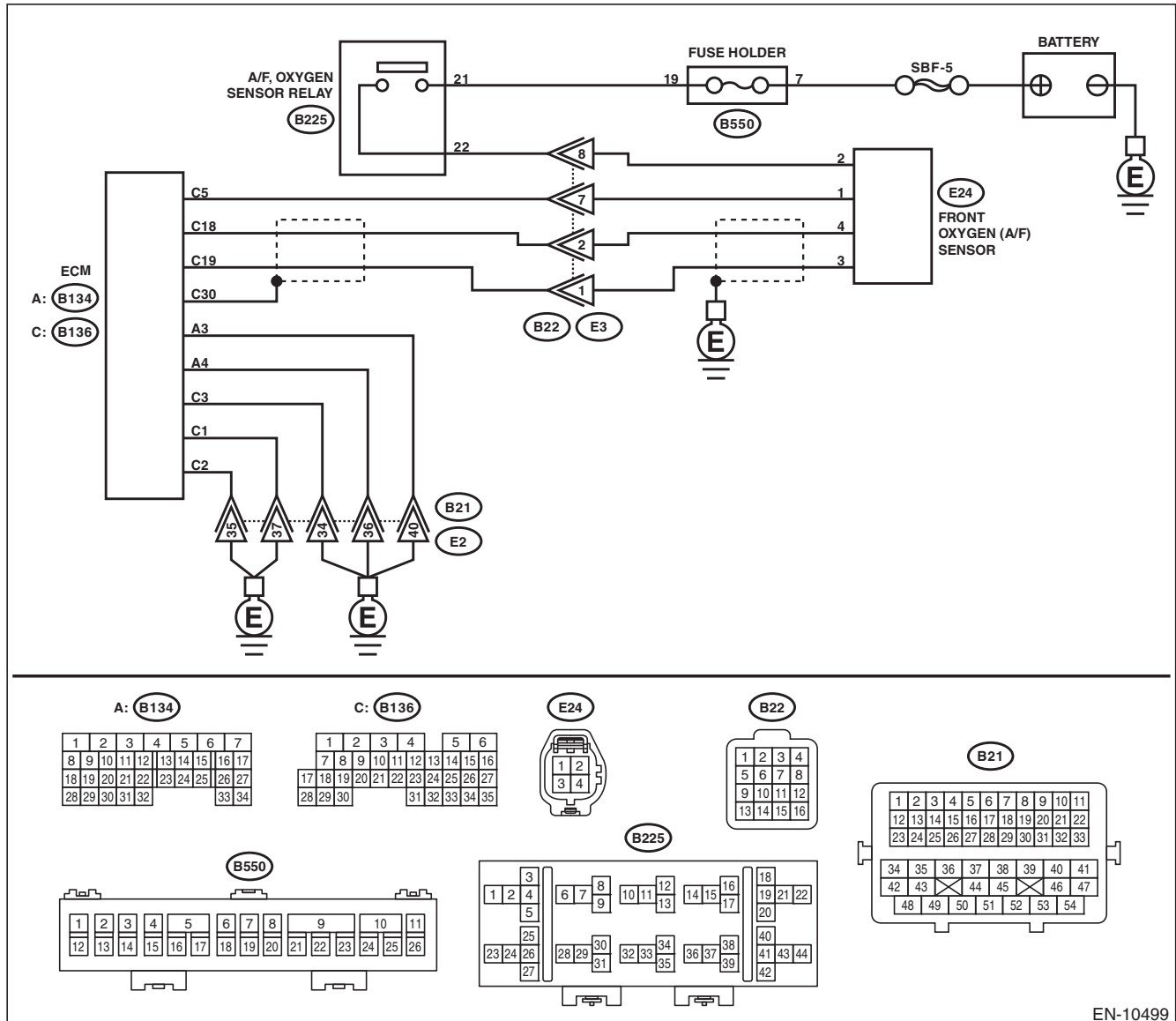
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

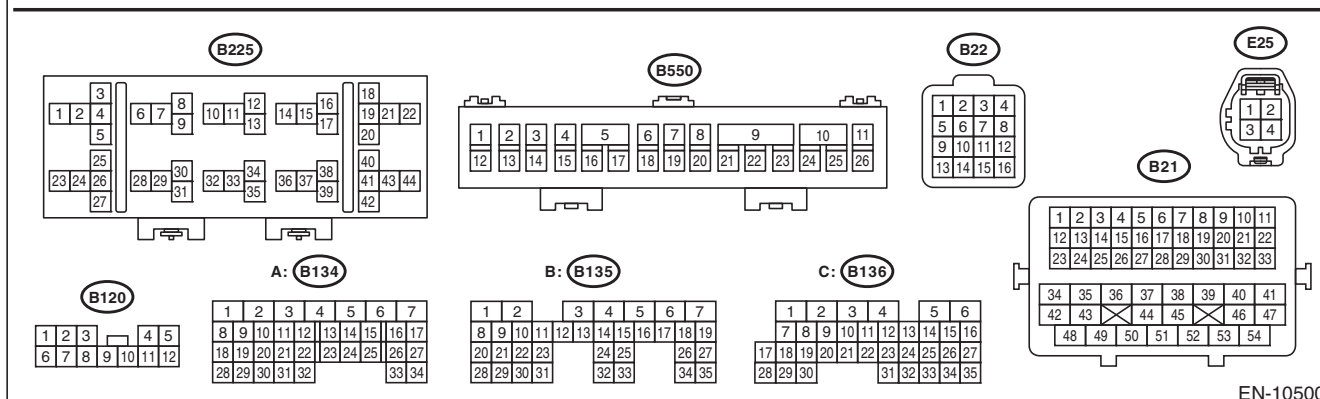
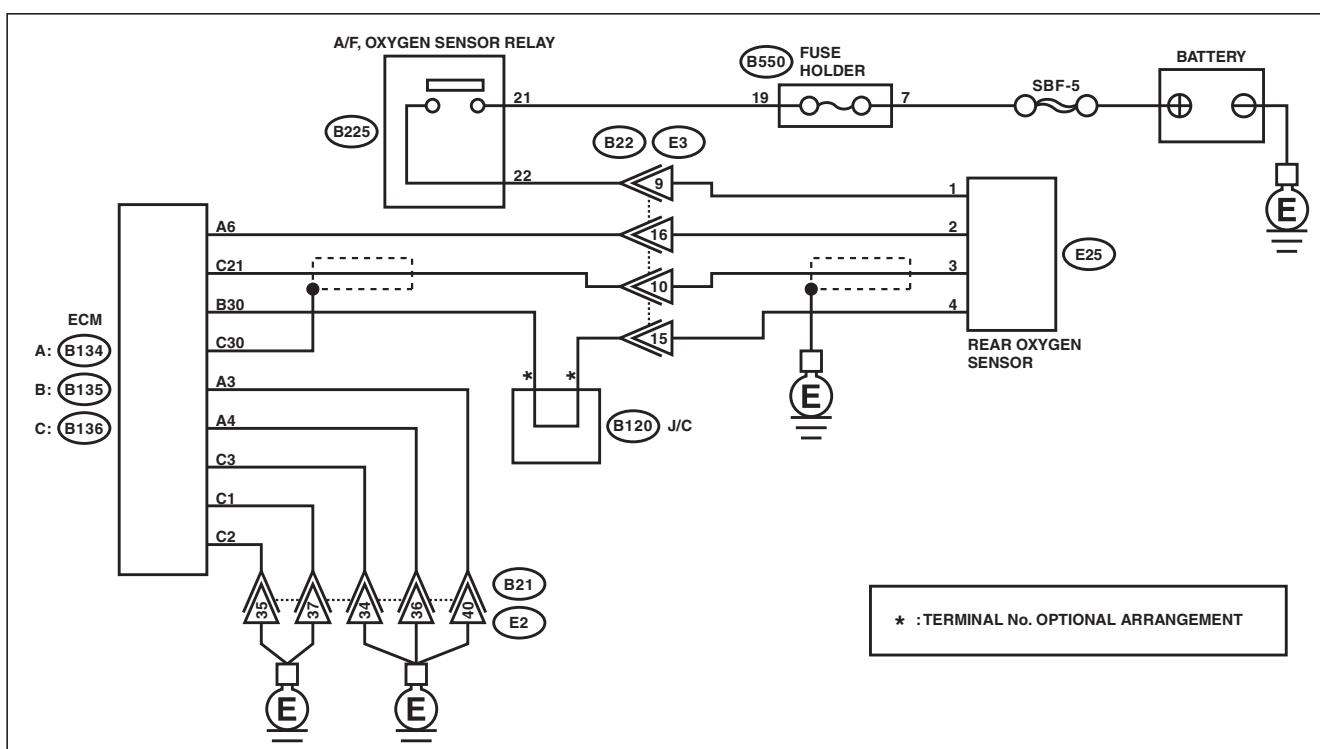
ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10499



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(H4DO)(diag)-83, 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 and front oxygen (A/F) sensor connector. Connector & terminal (B136) No. 19 — (E24) No. 3: (B136) No. 18 — (E24) 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 and front oxygen (A/F) sensor connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. Measure the resistance between ECM 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 5.	Repair the ground short circuit of harness between ECM and front oxygen (A/F) sensor connector.
5 CHECK OUTPUT SIGNAL FOR ECM. 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. Connector & terminal (E24) No. 3 (+) — 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 (E24) No. 4 (+) — 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 (E24) No. 3 (+) — Chassis ground (-): (E24) No. 4 (+) — Chassis ground (-):	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4DO)-94, 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.
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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
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. <Ref. to ME(H4DO)-31, INSPECTION, Fuel Pressure.> CAUTION: Release fuel pressure before removing the fuel pressure gauge.	Is the measured value 340 — 400 kPa (3.5 — 4.1 kg/cm ² , 49 — 58 psi)?	Go to step 11.	Repair the following item. Fuel pressure is too high: • Clogged fuel line or bent hose Fuel pressure is too low: • Improper fuel pump discharge • Clogged fuel line
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(H4DO)(diag)-36, 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(H4DO)-50, 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) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the 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(H4DO)(diag)-36, 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(H4DO)-68, Mass Air Flow and Intake Air Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
13 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the 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(H4DO)(diag)-36, 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(H4DO)-68, Mass Air Flow and Intake Air Temperature Sensor.>
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. (MT model) • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DO)(diag)-36, 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. (MT model) • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DO)(diag)-36, 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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
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(H4DO)(diag)-36, 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(H4DO)-87, Front Oxygen (A/F) Sensor.>	Go to step 18.
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 and rear oxygen sensor connector. Connector & terminal (B136) No. 21 — (E25) No. 3: (B135) No. 30 — (E25) 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 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 (E25) No. 3 (+) — Chassis ground (-):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4DO)-91, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and rear oxygen sensor connector • Poor contact of ECM connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DZ:DTC P2097 POST CATALYST FUEL TRIM SYSTEM TOO RICH (BANK 1)

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-214, DTC P2097 POST CATALYST FUEL TRIM SYSTEM TOO RICH (BANK 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

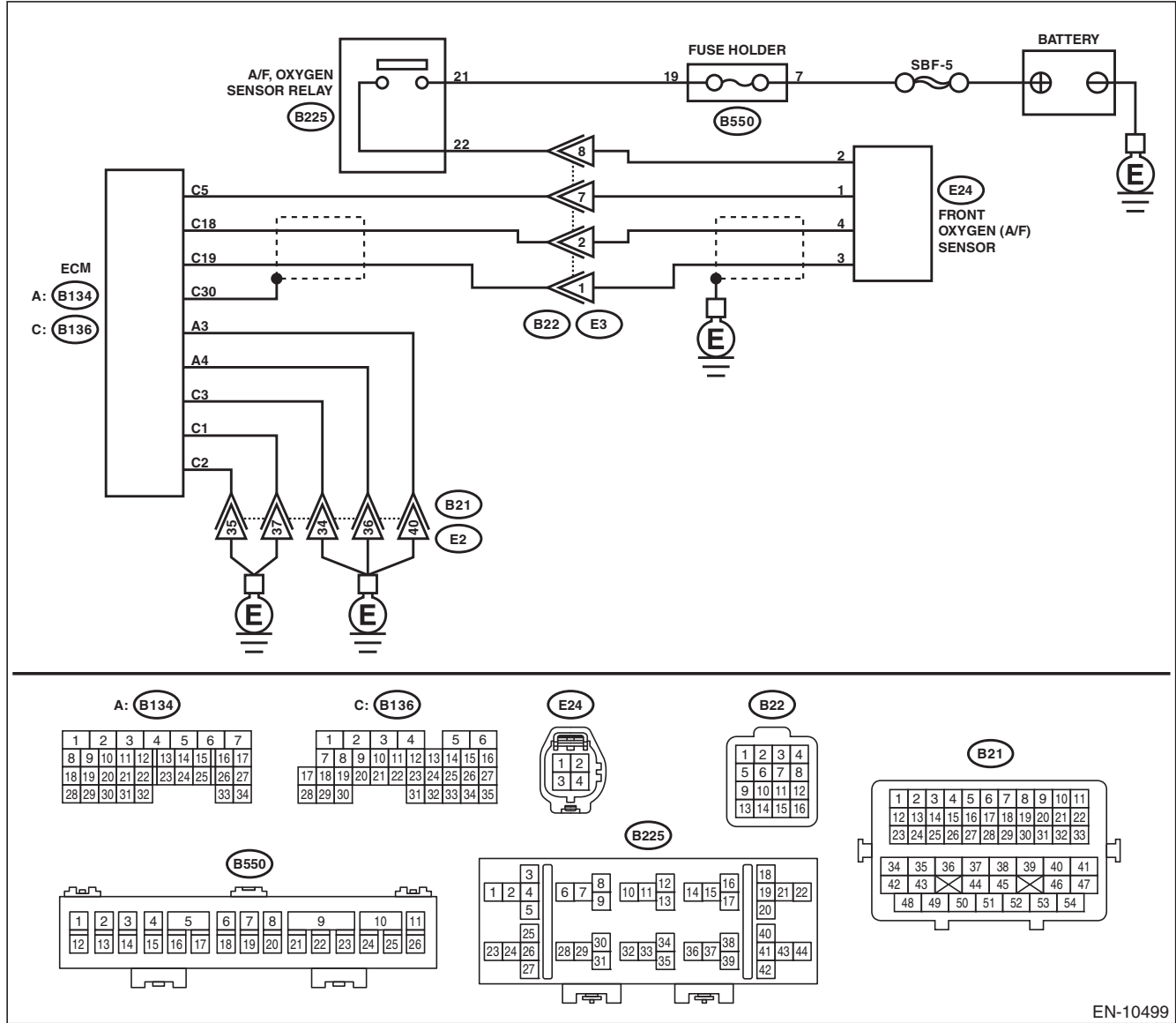
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

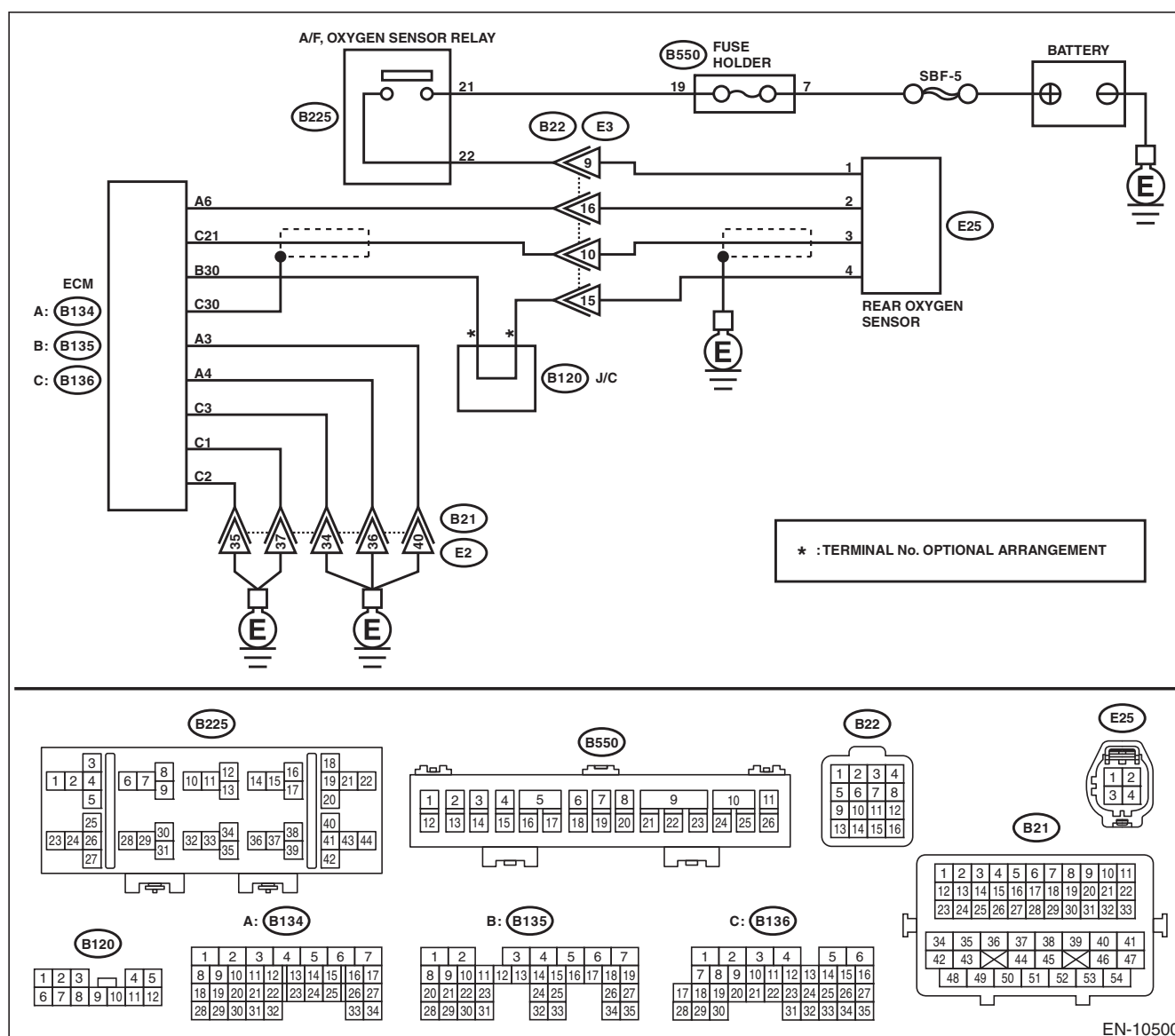
- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10499

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(H4DO)(diag)-83, 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 and front oxygen (A/F) sensor connector. Connector & terminal (B136) No. 19 — (E24) No. 3: (B136) No. 18 — (E24) 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 and front oxygen (A/F) sensor connector • Poor contact of coupling connector
4 CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR. Measure the resistance between ECM 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 5.	Repair the ground short circuit of harness between ECM and front oxygen (A/F) sensor connector.
5 CHECK OUTPUT SIGNAL FOR ECM. 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between front oxygen (A/F) sensor connector and chassis ground. Connector & terminal (E24) No. 3 (+) — 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 (E24) No. 4 (+) — 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 (E24) No. 3 (+) — Chassis ground (–): (E24) No. 4 (+) — Chassis ground (–):	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4DO)-94, 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.
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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
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. <Ref. to ME(H4DO)-31, INSPECTION, Fuel Pressure.> CAUTION: Release fuel pressure before removing the fuel pressure gauge.	Is the measured value 340 — 400 kPa (3.5 — 4.1 kg/cm ² , 49 — 58 psi)?	Go to step 11.	Repair the following item. Fuel pressure is too high: • Clogged fuel line or bent hose Fuel pressure is too low: • Improper fuel pump discharge • Clogged fuel line
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(H4DO)(diag)-36, 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(H4DO)-50, 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) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the 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(H4DO)(diag)-36, 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(H4DO)-68, Mass Air Flow and Intake Air Temperature Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
13 CHECK MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR. 1) Start the engine and warm up engine until coolant temperature is higher than 75°C (167°F). 2) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the 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(H4DO)(diag)-36, 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(H4DO)-68, Mass Air Flow and Intake Air Temperature Sensor.>
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. (MT model) • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DO)(diag)-36, 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. (MT model) • Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DO)(diag)-36, 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.



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
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(H4DO)(diag)-36, 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(H4DO)-87, Front Oxygen (A/F) Sensor.>	Go to step 18.
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 and rear oxygen sensor connector. Connector & terminal (B136) No. 21 — (E25) No. 3: (B135) No. 30 — (E25) 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 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 (E25) No. 3 (+) — Chassis ground (-):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4DO)-91, Rear Oxygen Sensor.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and rear oxygen sensor connector • Poor contact of ECM connector • Poor contact of coupling connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-216, 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:

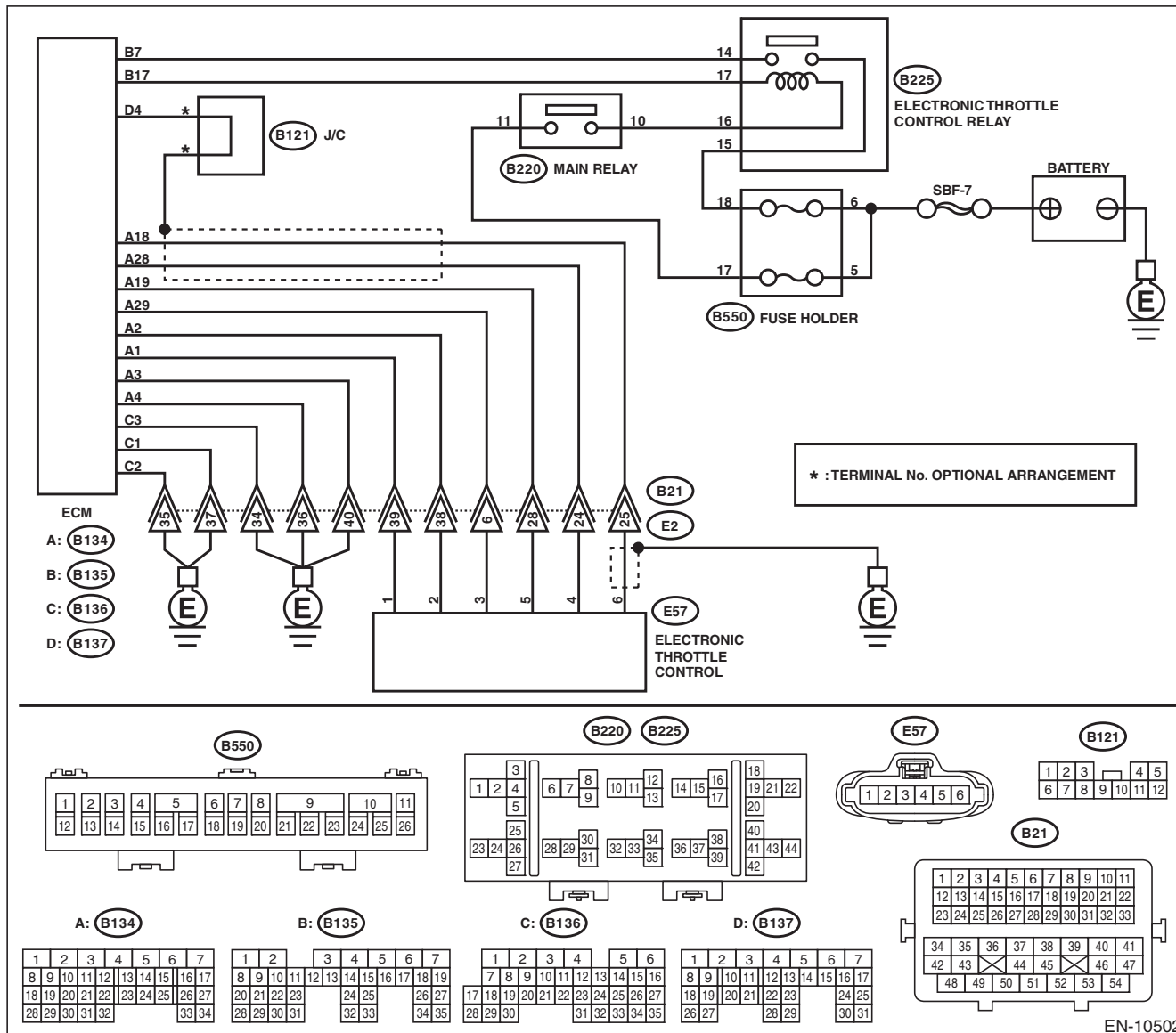
After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



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. 16 and No. 17 of electronic throttle control relay. 4) Measure the resistance between electronic throttle control relay terminals. Terminals No. 14 — No. 15:	Is the resistance less than 1 Ω?	Go to step 2.
			Replace the electronic throttle control relay. <Ref. to FU(H4DO)-102, 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. <i>Connector & terminal</i> <i>(B225) No. 15 (+) — Chassis ground (-):</i>	Is the voltage 10 V or more?	Go to step 3.	Repair the open or ground shortcircuit 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. <i>Connector & terminal</i> <i>(B225) No. 17 (+) — Chassis ground (-):</i>	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM 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. <i>Connector & terminal</i> <i>(B225) No. 14 — Chassis ground:</i> <i>(B225) No. 17 — Chassis ground:</i>	Is the resistance 1 MΩ or more?	Go to step 5.	Repair the short circuit in harness to ground between ECM and electronic throttle control relay connector.
5 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR. Measure the resistance between ECM and electronic throttle control relay connector. <i>Connector & terminal</i> <i>(B135) No. 17 — (B225) No. 17:</i> <i>(B135) No. 7 — (B225) No. 14:</i>	Is the resistance less than 1 Ω?	Go to step 6.	Repair the open circuit in harness between ECM 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 and chassis ground. <i>Connector & terminal</i> <i>(B134) No. 19 — Chassis ground:</i> <i>(B134) No. 18 — Chassis ground:</i> <i>(B134) No. 18 — (B137) No. 4:</i> <i>(B134) No. 28 — Chassis ground:</i> <i>(B134) No. 28 — (B137) No. 4:</i>	Is the resistance 1 MΩ or more?	Go to step 7.	Repair the short circuit to ground in harness between ECM and electronic throttle control connector.
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. <i>Connector & terminal</i> <i>(E57) No. 6 — Engine ground:</i> <i>(E57) No. 4 — Engine ground:</i>	Is the resistance 1 MΩ or more?	Go to step 8.	Repair the short circuit to ground in harness between ECM and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(H4DO)-94, Engine Control Module (ECM).>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
8 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM and electronic throttle control connector. <i>Connector & terminal</i> <i>(B134) No. 18 — (E57) No. 6:</i> <i>(B134) No. 28 — (E57) No. 4:</i> <i>(B134) No. 29 — (E57) No. 3:</i>	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 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. <i>Connector & terminal</i> <i>(E57) No. 3 — Engine ground:</i>	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 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. <i>Connector & terminal</i> <i>(E57) No. 6 (+) — Engine ground (-):</i> <i>(E57) No. 4 (+) — Engine ground (-):</i>	Is the voltage 5 V or more?	Repair the short circuit to power in harness between ECM and electronic throttle control connector.	Go to step 11.
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. <i>Connector & terminal</i> <i>(B134) No. 19 — (B134) No. 18:</i> <i>(B134) No. 19 — (B134) No. 28:</i>	Is the resistance 1 M Ω or more?	Go to step 12.	Repair the short circuit to power in harness between ECM 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(H4DO)(diag)-36, 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(H4DO)-15, Throttle Body.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
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(H4DO)(diag)-36, 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(H4DO)-15, Throttle Body.>
14 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 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 and electronic throttle control connector • Poor contact of coupling connector
15 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL CONNECTOR. 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 harness between ECM and electronic throttle control connector.	Go to step 16.
16 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 electronic throttle control connector and engine ground. Connector & terminal (E57) No. 2 — Engine ground: (E57) No. 1 — Engine ground:	Is the resistance 1 MΩ or more?	Go to step 17.	Repair the short circuit to ground in harness between ECM and electronic throttle control connector.
17 CHECK ELECTRONIC THROTTLE CONTROL CONNECTOR HARNESS. Measure the resistance between electronic throttle control connectors. Connector & terminal (E57) No. 2 — (E57) No. 1:	Is the resistance 1 MΩ or more?	Go to step 18.	Repair the short circuit of harness between ECM and electronic throttle control connector.
18 CHECK ELECTRONIC THROTTLE CONTROL GROUND CIRCUIT. Measure the resistance between ECM and chassis ground. Connector & terminal (B134) No. 3 — Chassis ground: (B134) No. 4 — Chassis ground: (B136) No. 1 — Chassis ground: (B136) No. 2 — Chassis ground: (B136) 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 and engine ground • Poor contact of coupling connector



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
19 CHECK ELECTRONIC THROTTLE CONTROL. Measure the resistance between electronic throttle control terminals. <i>Terminals</i> <i>No. 2 — No. 1:</i>	Is the resistance 50 Ω or less?	Go to step 20.	Replace the electronic throttle control. <Ref. to FU(H4DO)-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(H4DO)-15, Throttle Body.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

EB:DTC P2102 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT LOW

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-218, DTC P2102 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

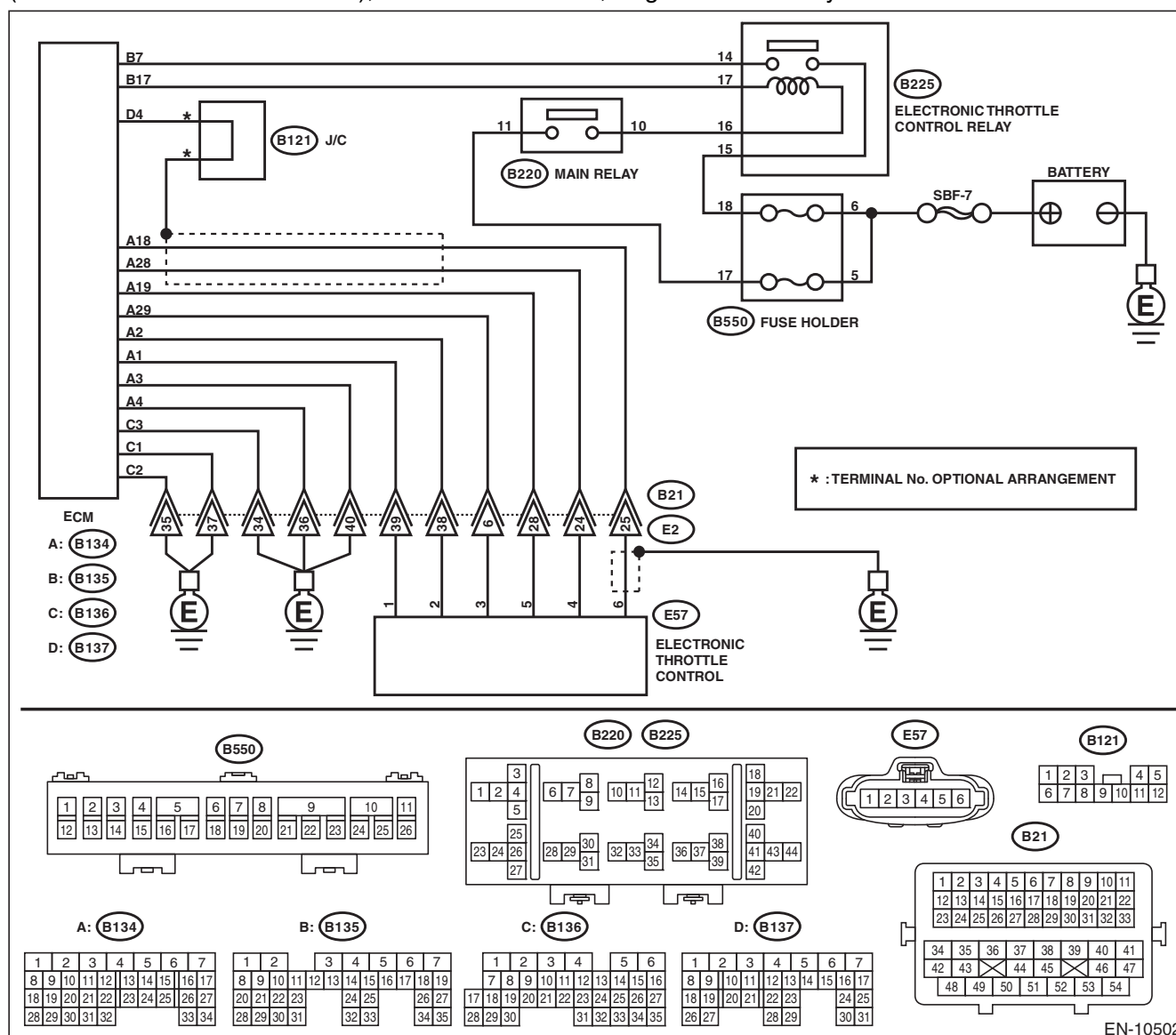
- Improper idling
- Poor driving performance
- Engine stalls.

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



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. 16 and No. 17 of electronic throttle control relay. 4) Measure the resistance between electronic throttle control relay terminals. Terminals No. 14 — No. 15:	Is the resistance less than 1 Ω ?	Go to step 2.	Replace the electronic throttle control relay. <Ref. to FU(H4DO)-102, 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 (B225) No. 15 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 3.	Repair the open or ground shortcircuit 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 (B225) No. 17 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM 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 (B225) No. 14 — Chassis ground: (B225) No. 15 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 5.	Repair the short circuit in harness to ground between ECM and electronic throttle control relay connector.
5 CHECK HARNESS BETWEEN ECM AND ELECTRONIC THROTTLE CONTROL RELAY CONNECTOR. Measure the resistance between ECM and electronic throttle control relay connector. Connector & terminal (B135) No. 17 — (B225) No. 17: (B135) No. 7 — (B225) No. 14:	Is the resistance less than 1 Ω ?	Repair the poor contact of ECM connector.	Repair the open circuit in harness between ECM and electronic throttle control relay connector.

EC:DTC P2103 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT HIGH

DTC DETECTING CONDITION:

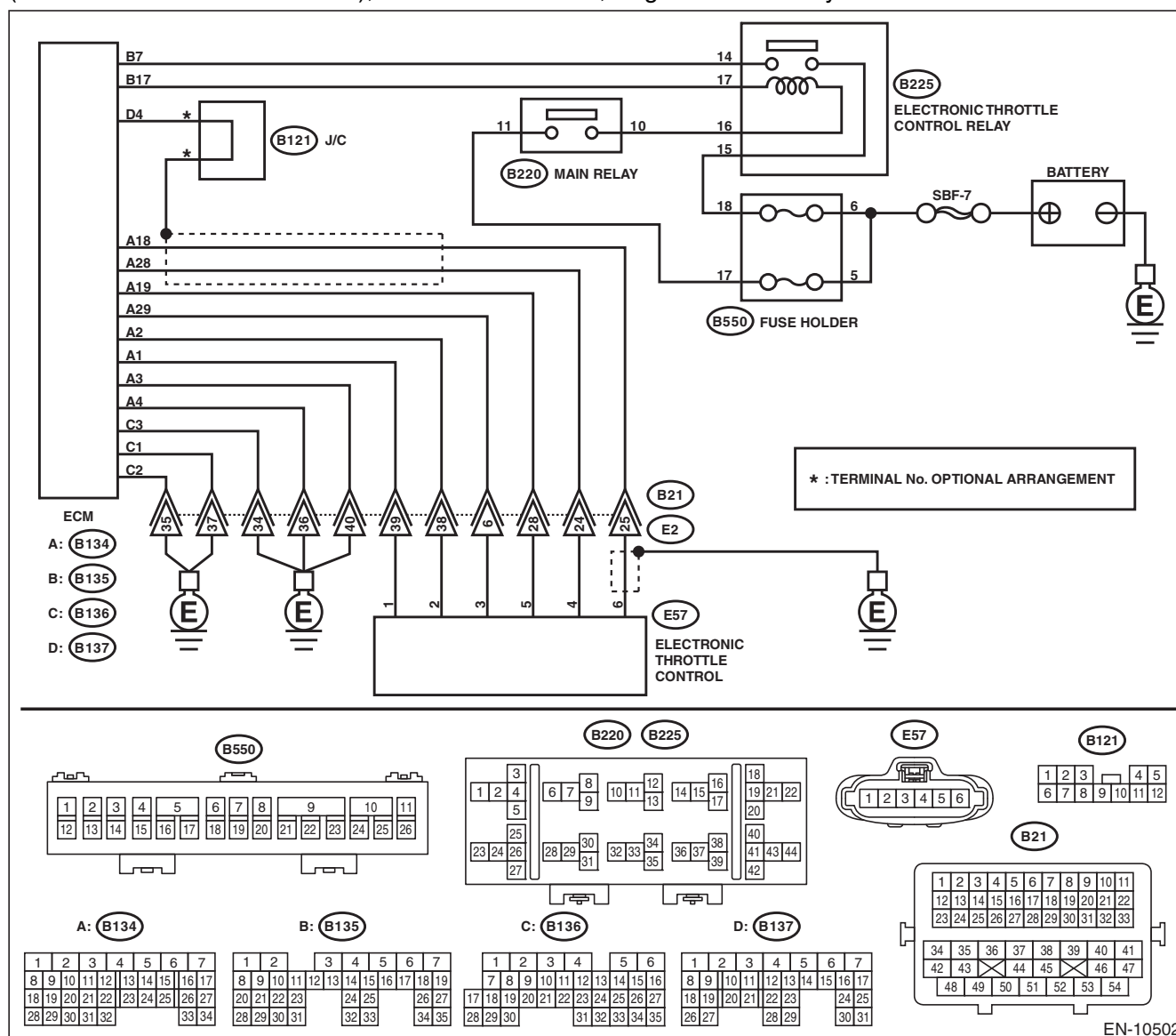
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-220, DTC P2103 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



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. 14 — No. 15:	Is the resistance 1 MΩ or more?	Go to step 2.	Replace the electronic throttle control relay. <Ref. to FU(H4DO)-102, 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 (B225) No. 14 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Repair the short circuit to power in the harness between ECM 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 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 in harness to ground between ECM and electronic throttle control relay connector.

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

NOTE:

For the diagnostic procedure, refer to DTC P2101. <Ref. to EN(H4DO)(diag)-301, DTC P2101 THROTTLE ACTUATOR CONTROL MOTOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

EE:DTC P2119 THROTTLE ACTUATOR CONTROL THROTTLE BODY RANGE/PERFORMANCE

NOTE:

For the diagnostic procedure, refer to DTC P2101. <Ref. to EN(H4DO)(diag)-301, 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)

EF:DTC P2122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT LOW INPUT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-226, DTC P2122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

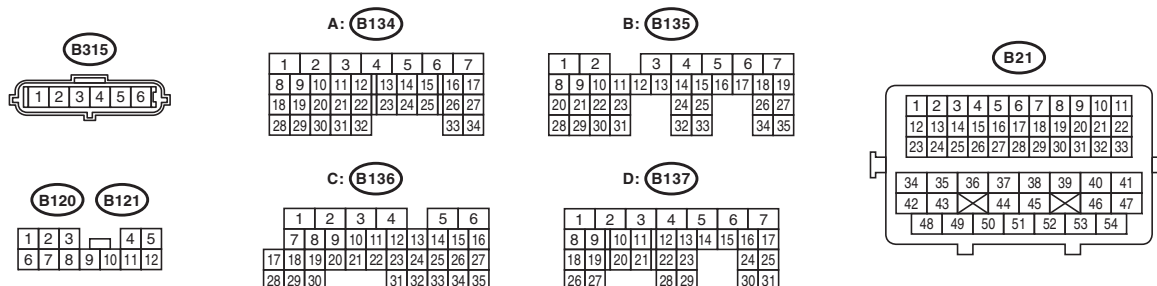
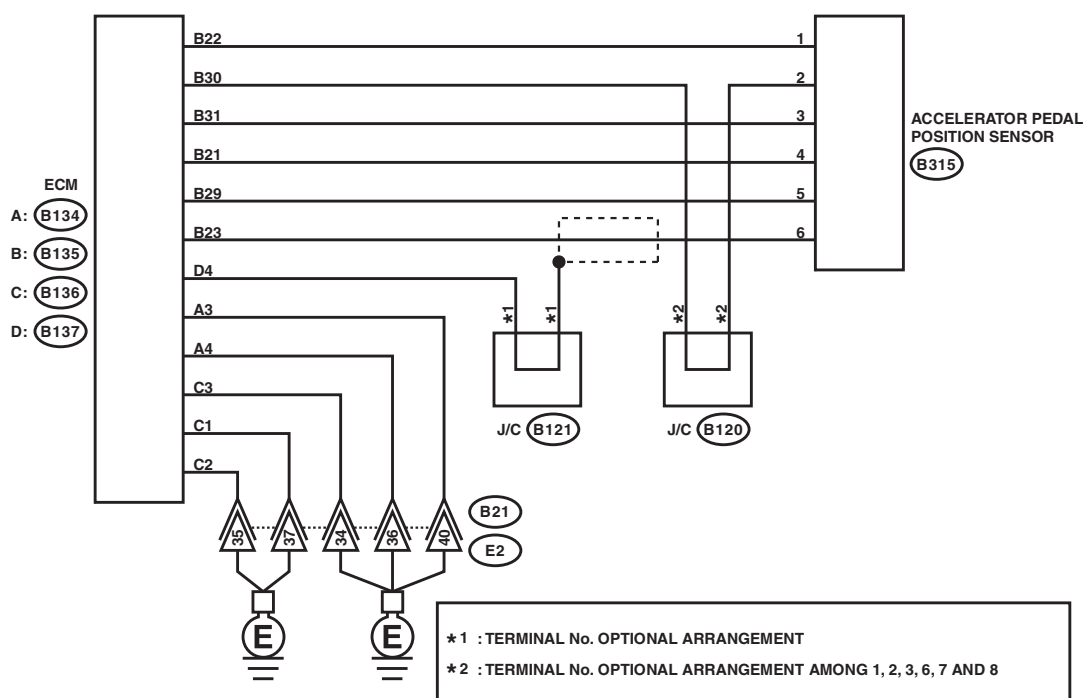
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10308

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 and chassis ground. <i>Connector & terminal</i> <i>(B135) No. 21 — Chassis ground:</i> <i>(B135) No. 23 — Chassis ground:</i> <i>(B135) No. 23 — (B137) No. 4:</i>	Is the resistance 1 MΩ or more?	Go to step 2.	Repair the short circuit to ground in harness between ECM 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. <i>Connector & terminal</i> <i>(B315) No. 6 — Chassis ground:</i>	Is the resistance 1 MΩ or more?	Replace the accelerator pedal. <Ref. to SP(H4DO)-4, Accelerator Pedal.>	Repair the short circuit to ground in harness between ECM and accelerator pedal position sensor connector. Replace the ECM if defective. <Ref. to FU(H4DO)-94, Engine Control Module (ECM).>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

EG:DTC P2123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT HIGH INPUT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-228, DTC P2123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "D" CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

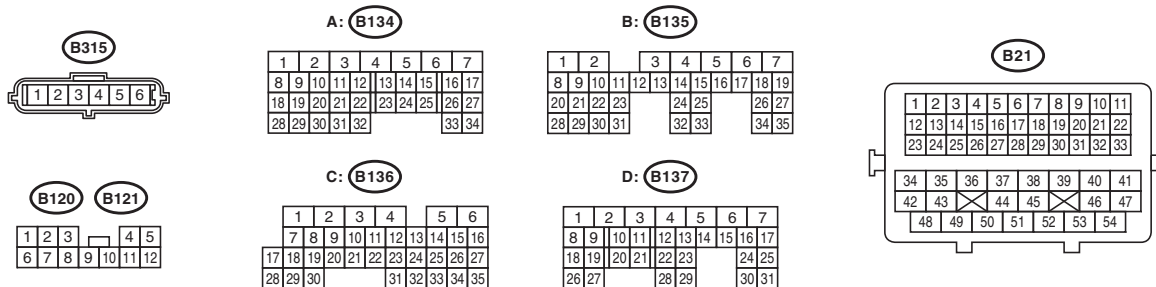
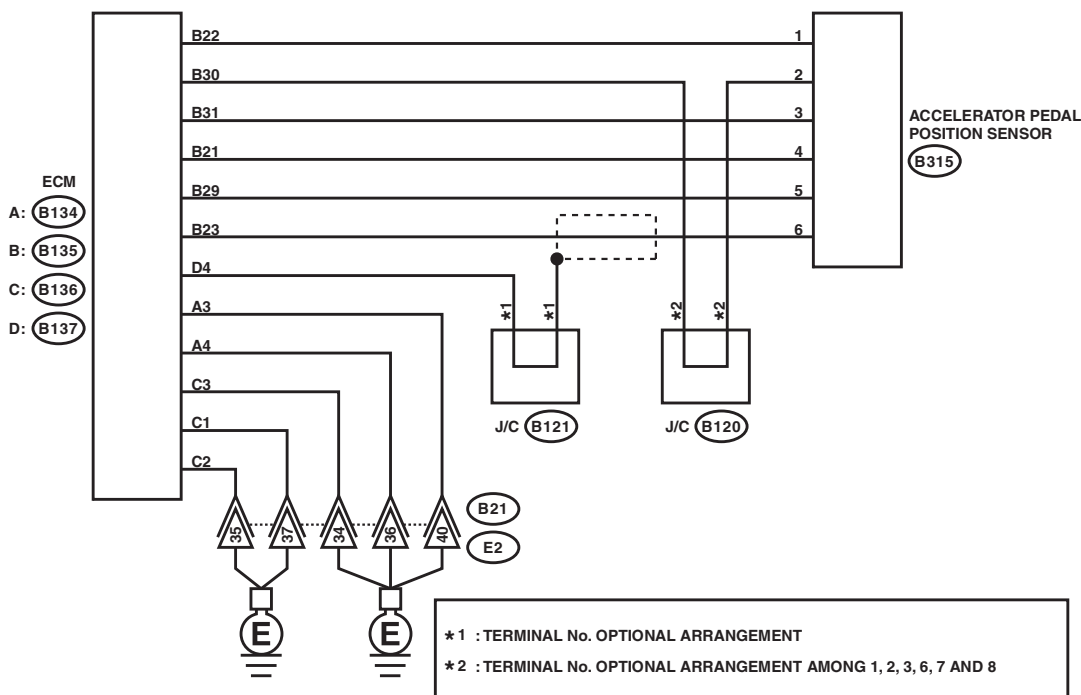
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10308

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 and accelerator pedal position sensor connector. <i>Connector & terminal</i> <i>(B135) No. 23 — (B315) No. 6:</i> <i>(B135) No. 29 — (B315) No. 5:</i>	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the open circuit in harness between ECM 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. <i>Connector & terminal</i> <i>(B315) No. 5 — Chassis ground:</i>	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 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. <i>Connector & terminal</i> <i>(B315) No. 6 (+) — Chassis ground (–):</i>	Is the voltage 5 V or more?	Repair the short circuit to power supply in the harness between the ECM 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. <i>Connector & terminal</i> <i>(B135) No. 21 — (B135) No. 23:</i>	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(H4DO)-4, Accelerator Pedal.>	Repair the short circuit to power supply in the harness between the ECM and accelerator pedal position sensor connector.

EH:DTC P2127 THROTTLE/PEDAL POSITION SENSOR/SWITCH “E” CIRCUIT LOW INPUT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-230, DTC P2127 THROTTLE/PEDAL POSITION SENSOR/SWITCH “E” CIRCUIT LOW INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

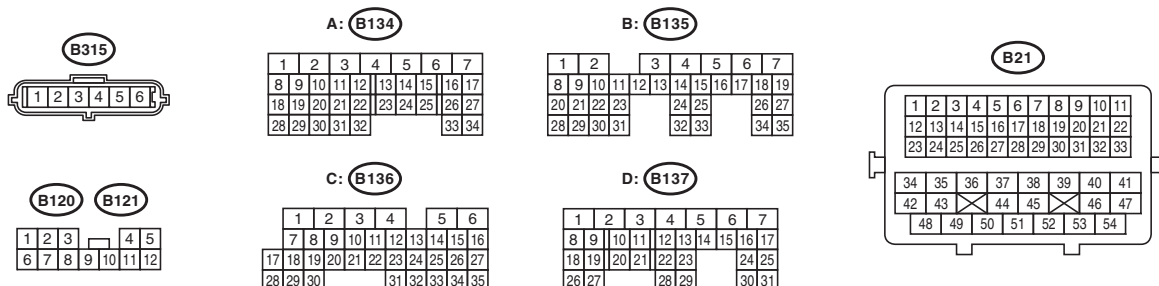
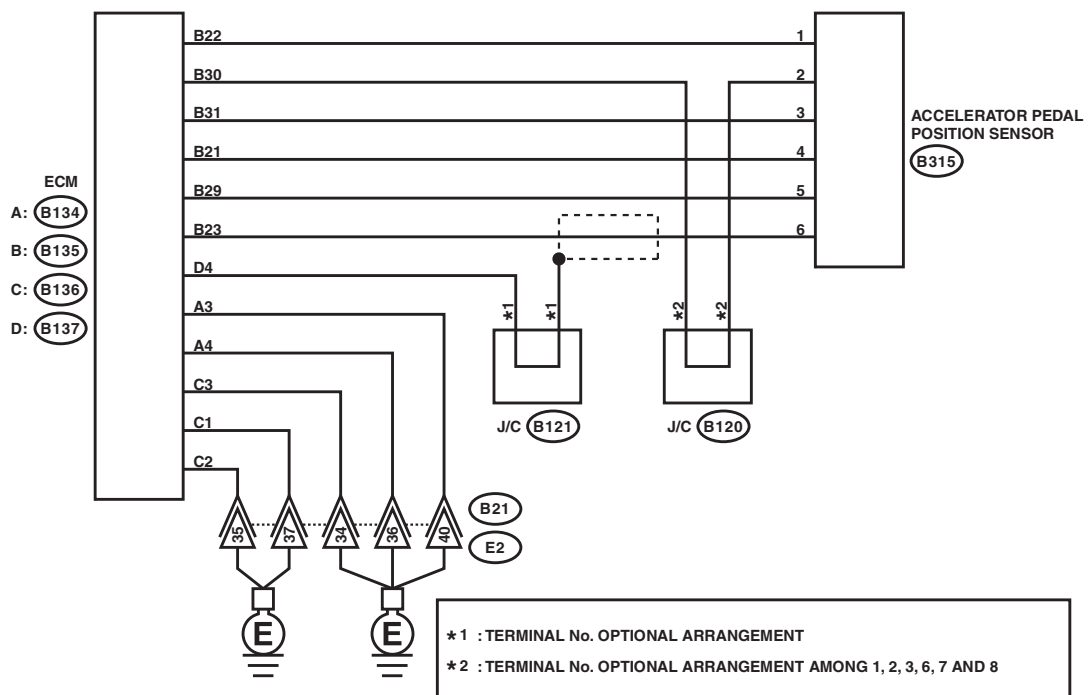
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10308

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 and chassis ground. <i>Connector & terminal</i> <i>(B135) No. 22 — Chassis ground:</i> <i>(B135) No. 31 — Chassis ground:</i>	Is the resistance 1 MΩ or more?	Go to step 2.	Repair the short circuit to ground in harness between ECM 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. <i>Connector & terminal</i> <i>(B315) No. 3 — Chassis ground:</i>	Is the resistance 1 MΩ or more?	Replace the accelerator pedal. <Ref. to SP(H4DO)-4, Accelerator Pedal.>	Repair the short circuit to ground in harness between ECM and accelerator pedal position sensor connector. Replace the ECM if defective. <Ref. to FU(H4DO)-94, Engine Control Module (ECM).>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

EI: DTC P2128 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT HIGH INPUT

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-232, DTC P2128 THROTTLE/PEDAL POSITION SENSOR/SWITCH "E" CIRCUIT HIGH INPUT, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

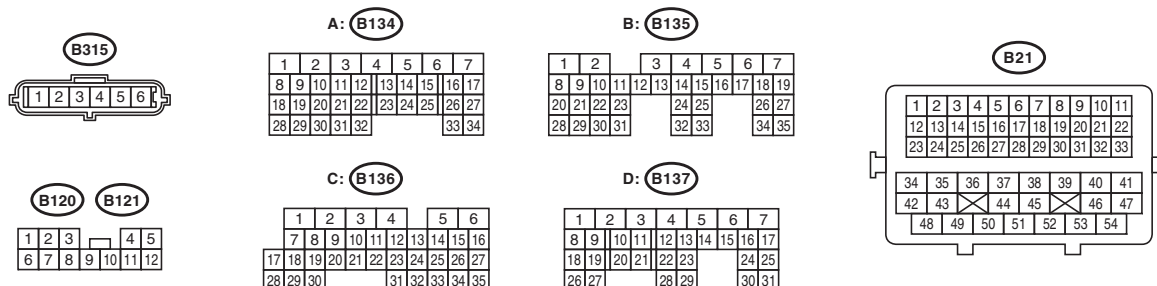
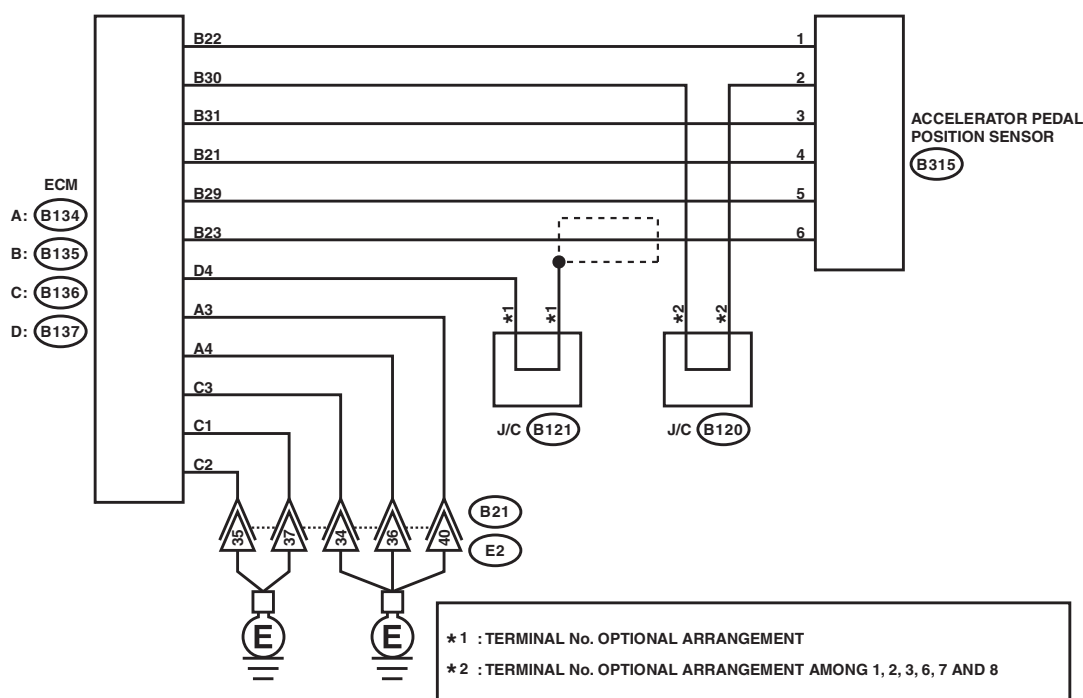
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10308

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 and accelerator pedal position sensor connector. <i>Connector & terminal</i> <i>(B135) No. 31 — (B315) No. 3:</i> <i>(B135) No. 30 — (B315) No. 2:</i>	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 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. <i>Connector & terminal</i> <i>(B315) No. 2 — Chassis ground:</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 of harness between ECM 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. <i>Connector & terminal</i> <i>(B315) No. 3 (+) — Chassis ground (-):</i>	Is the voltage 5 V or more?	Repair the short circuit to power supply in the harness between the ECM 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. <i>Connector & terminal</i> <i>(B135) No. 22 — (B135) No. 31:</i>	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(H4DO)-4, Accelerator Pedal.>	Repair the short circuit to power supply in the harness between the ECM and accelerator pedal position sensor connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-234, DTC P2135 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A"/"B" VOLTAGE CORRELATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

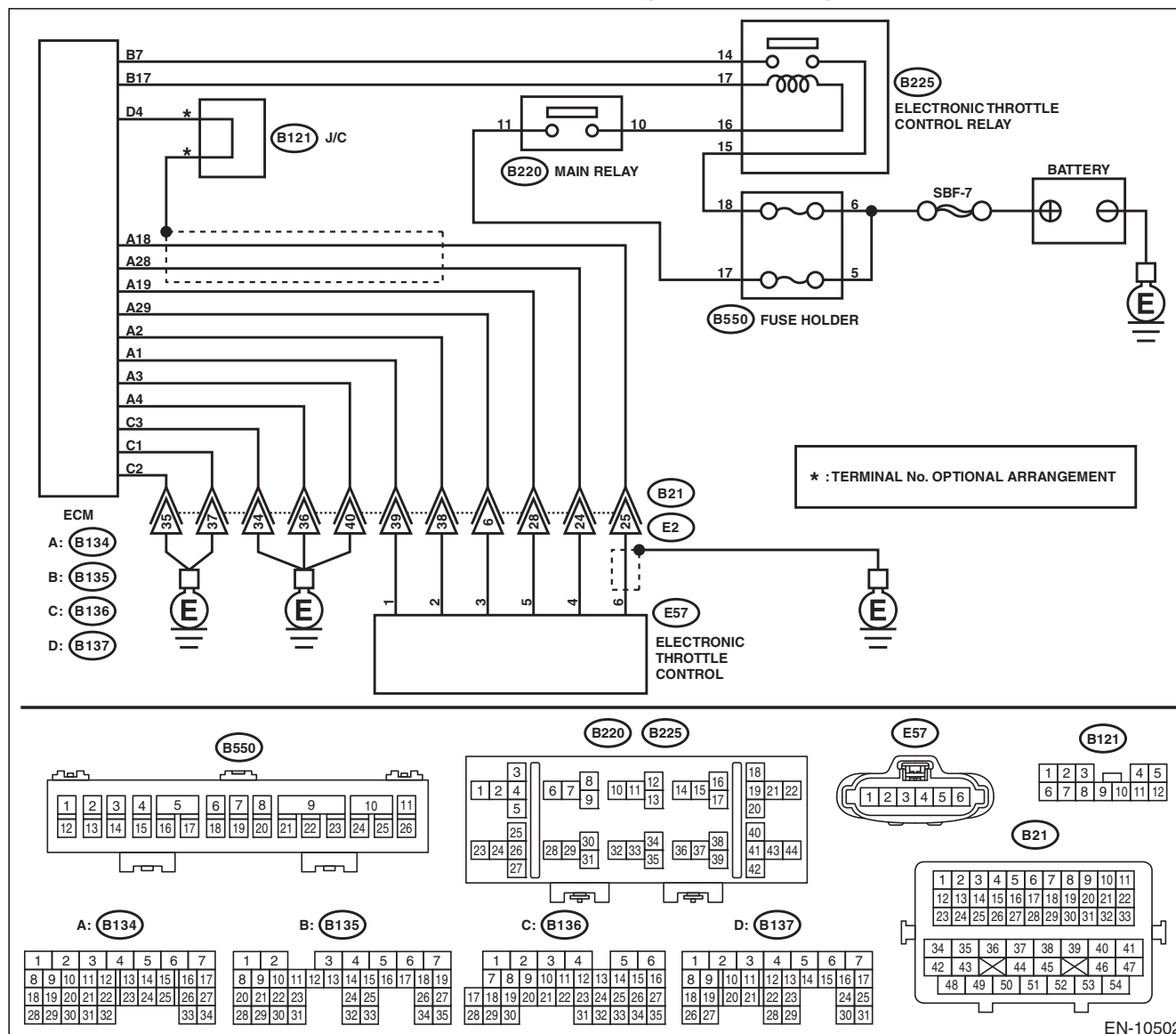
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), 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 and chassis ground. Connector & terminal (B134) No. 19 — Chassis ground: (B134) No. 18 — Chassis ground: (B134) No. 18 — (B137) No. 4: (B134) No. 28 — Chassis ground: (B134) No. 28 — (B137) No. 4:	Is the resistance 1 MΩ or more?	Go to step 2.	Repair the short circuit to ground in harness between ECM 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 short circuit to ground in harness between ECM and electronic throttle control connector. Replace the ECM if defective. <Ref. to FU(H4DO)-94, 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 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 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 and engine ground • Poor contact of ECM connector • Poor contact of coupling connector
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 harness between ECM and electronic throttle control connector.	Go to step 6.



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
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. <i>Connector & terminal</i> <i>(B134) No. 19 — (B134) No. 18:</i> <i>(B134) No. 19 — (B134) No. 28:</i>	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(H4DO)-15, Throttle Body.>	Repair the short circuit to power in harness between ECM and electronic throttle control connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

EK:DTC P2138 THROTTLE/PEDAL POSITION SENSOR/SWITCH “D”/“E” VOLT-AGE CORRELATION

DTC DETECTING CONDITION:

- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-236, DTC P2138 THROTTLE/PEDAL POSITION SENSOR/SWITCH “D”/“E” VOLTAGE CORRELATION, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

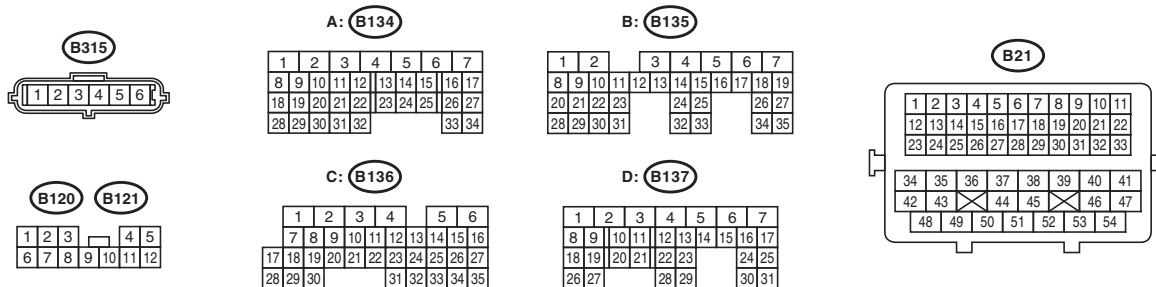
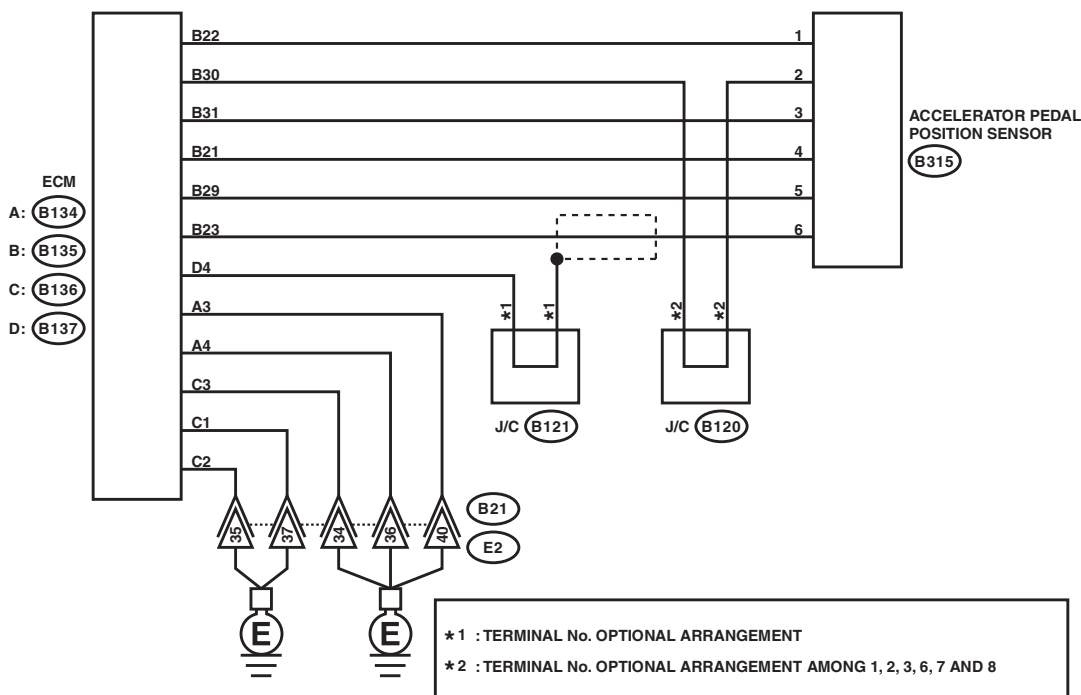
- Improper idling
- Poor driving performance

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10308

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 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(H4DO)-4, Accelerator Pedal.>	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and accelerator pedal position sensor connector • Short circuit to ground in harness between ECM 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 in harness between ECM and accelerator pedal position sensor connector • Open circuit of harness between ECM and engine ground • Poor contact of ECM connector • Poor contact of joint connector

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

EL:DTC P2195 O2 SENSOR SIGNAL BIASED/STUCK LEAN (BANK 1 SENSOR 1)

DTC DETECTING CONDITION:

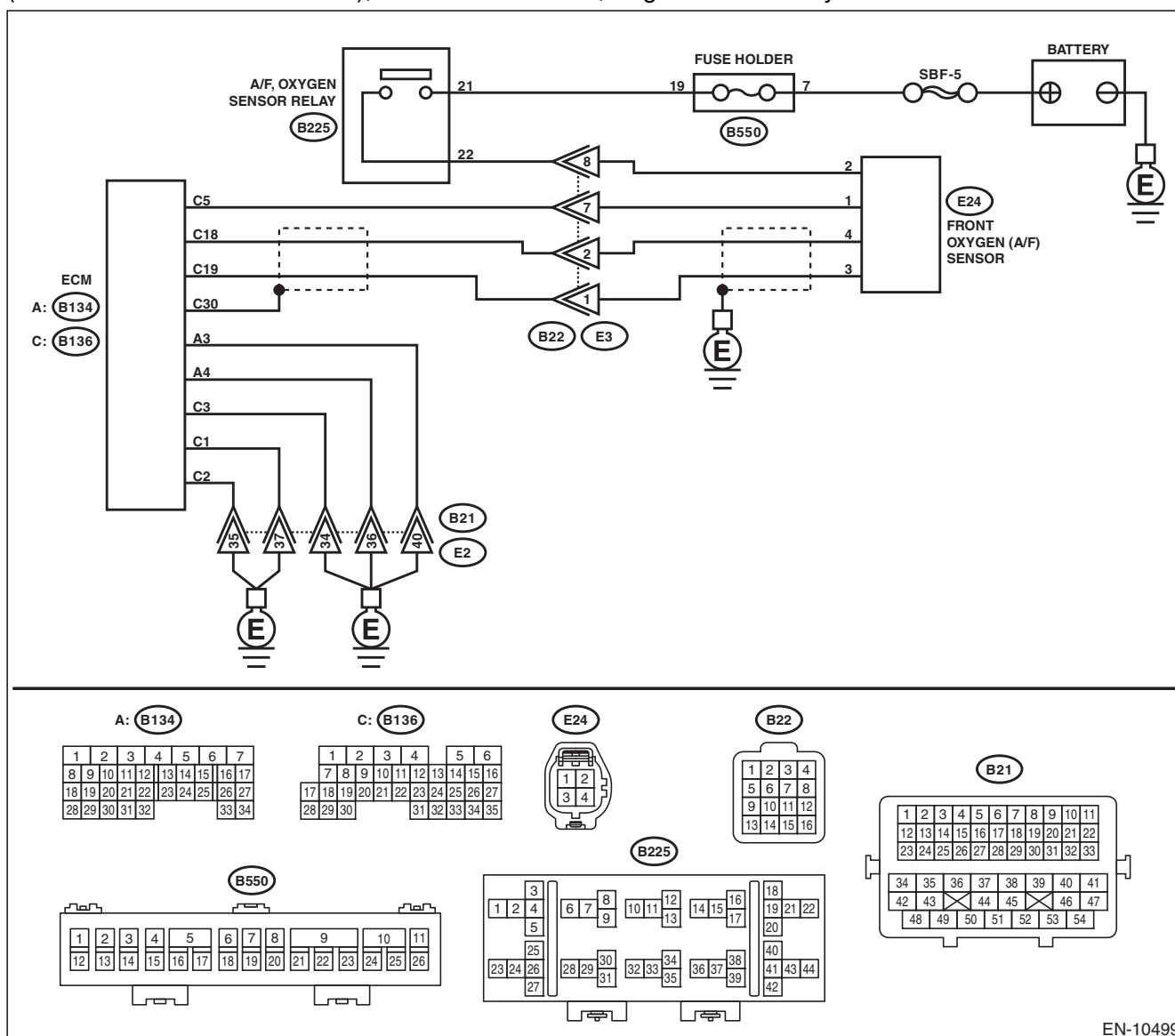
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-238, DTC P2195 O2 SENSOR SIGNAL BIASED/STUCK LEAN (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10499

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

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.
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 and front oxygen (A/F) sensor connector. Connector & terminal (B136) No. 19 — (E24) No. 3: (B136) No. 18 — (E24) 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 and front oxygen (A/F) sensor connector • Poor contact of coupling 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(H4DO)-87, Front Oxygen (A/F) Sensor.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

EM:DTC P2196 O2 SENSOR SIGNAL BIASED/STUCK RICH (BANK 1 SENSOR 1)

DTC DETECTING CONDITION:

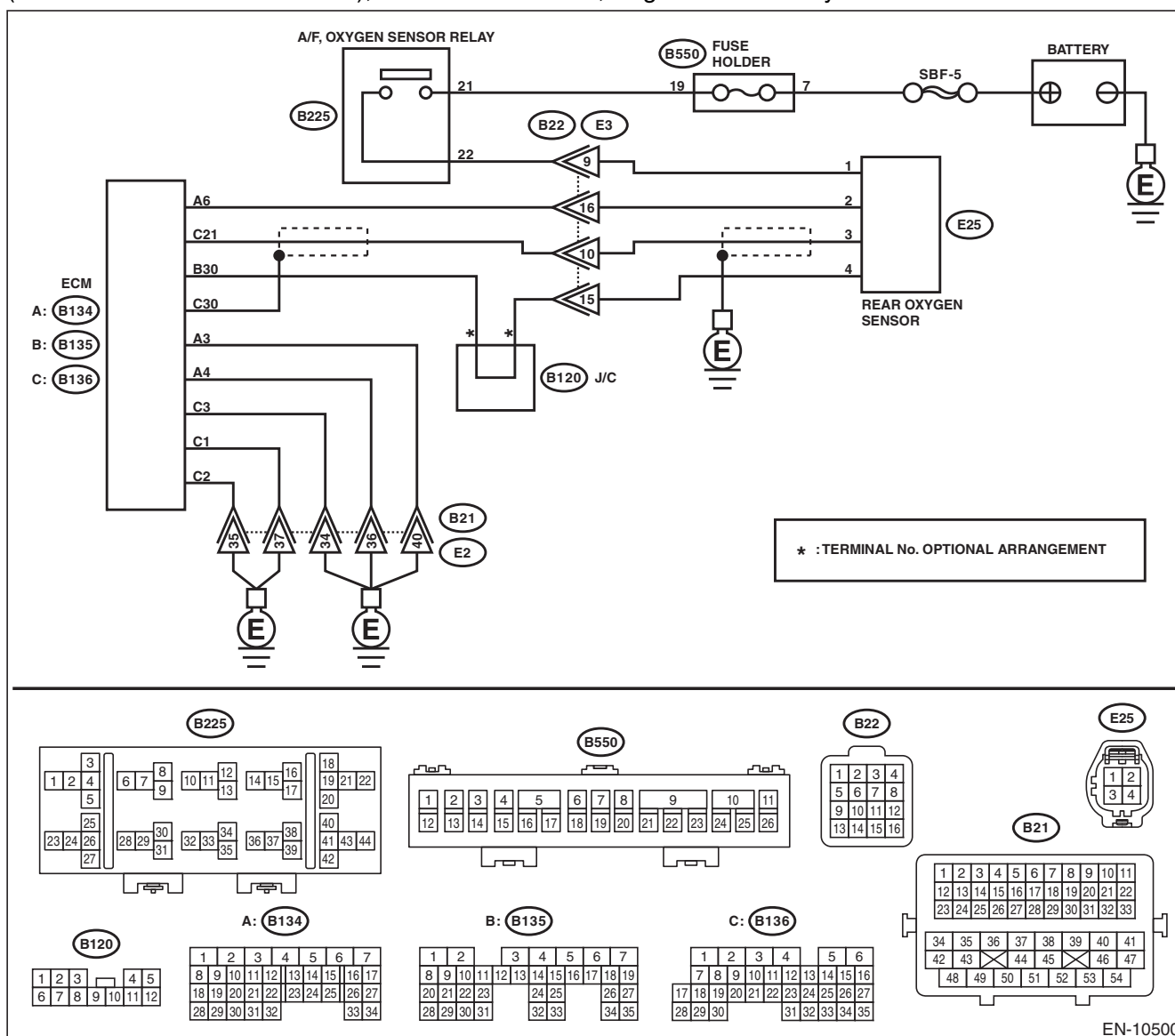
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-240, DTC P2196 O2 SENSOR SIGNAL BIASED/STUCK RICH (BANK 1 SENSOR 1), Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

	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.
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 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 ground short circuit of harness between ECM and front oxygen (A/F) sensor connector.
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 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 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(H4DO)-87, Front Oxygen (A/F) Sensor.>
5	CHECK OUTPUT SIGNAL FOR ECM. Measure the voltage between ECM 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 and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4DO)-94, Engine Control Module (ECM).>	Repair the poor contact of ECM connector.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

EN:DTC P219A BANK 1 AIR-FUEL RATIO IMBALANCE

DTC DETECTING CONDITION:

- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-242, DTC P219A BANK 1 AIR-FUEL RATIO IMBALANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

TROUBLE SYMPTOM:

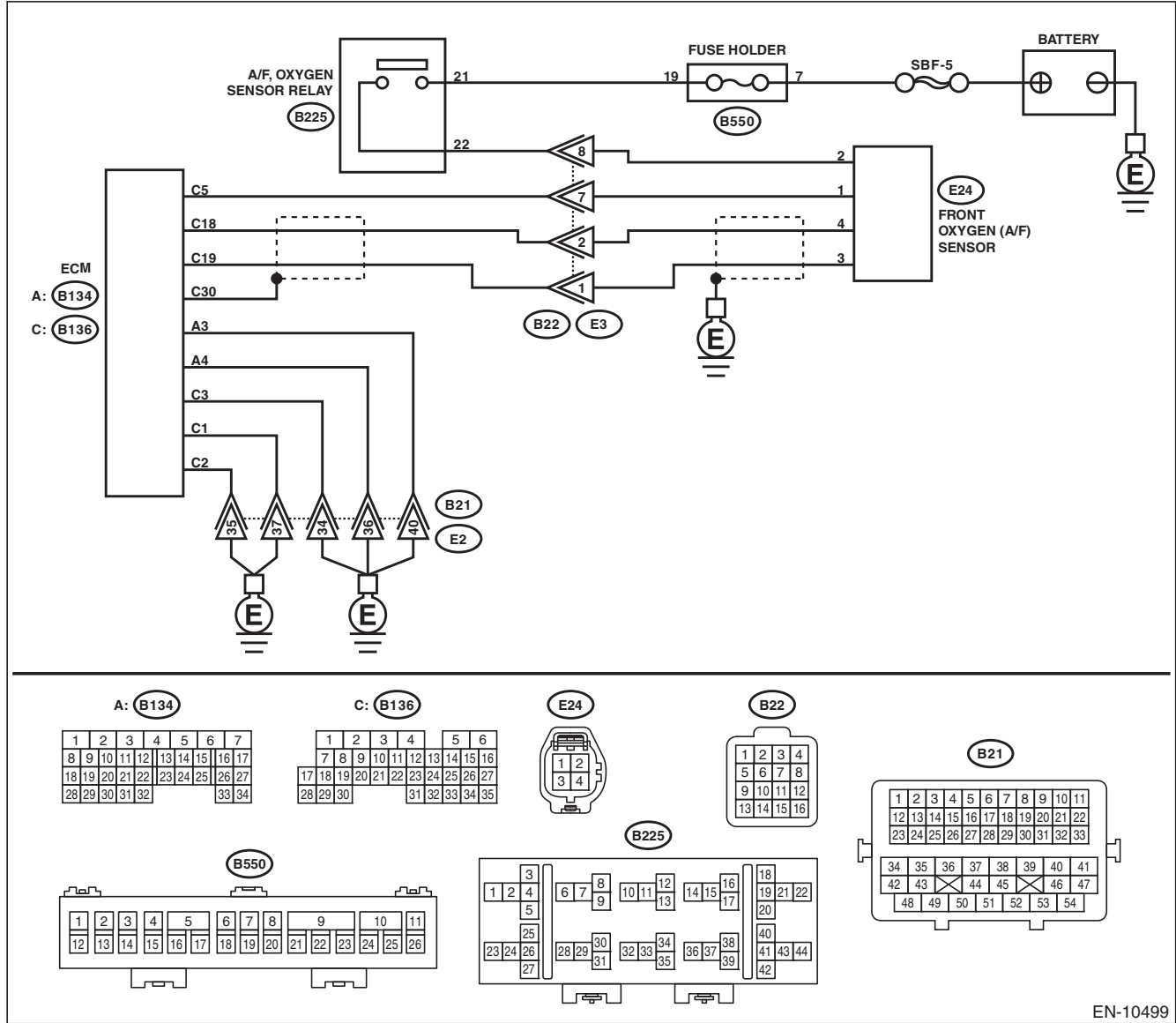
- Engine stalls.
- Improper idling

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

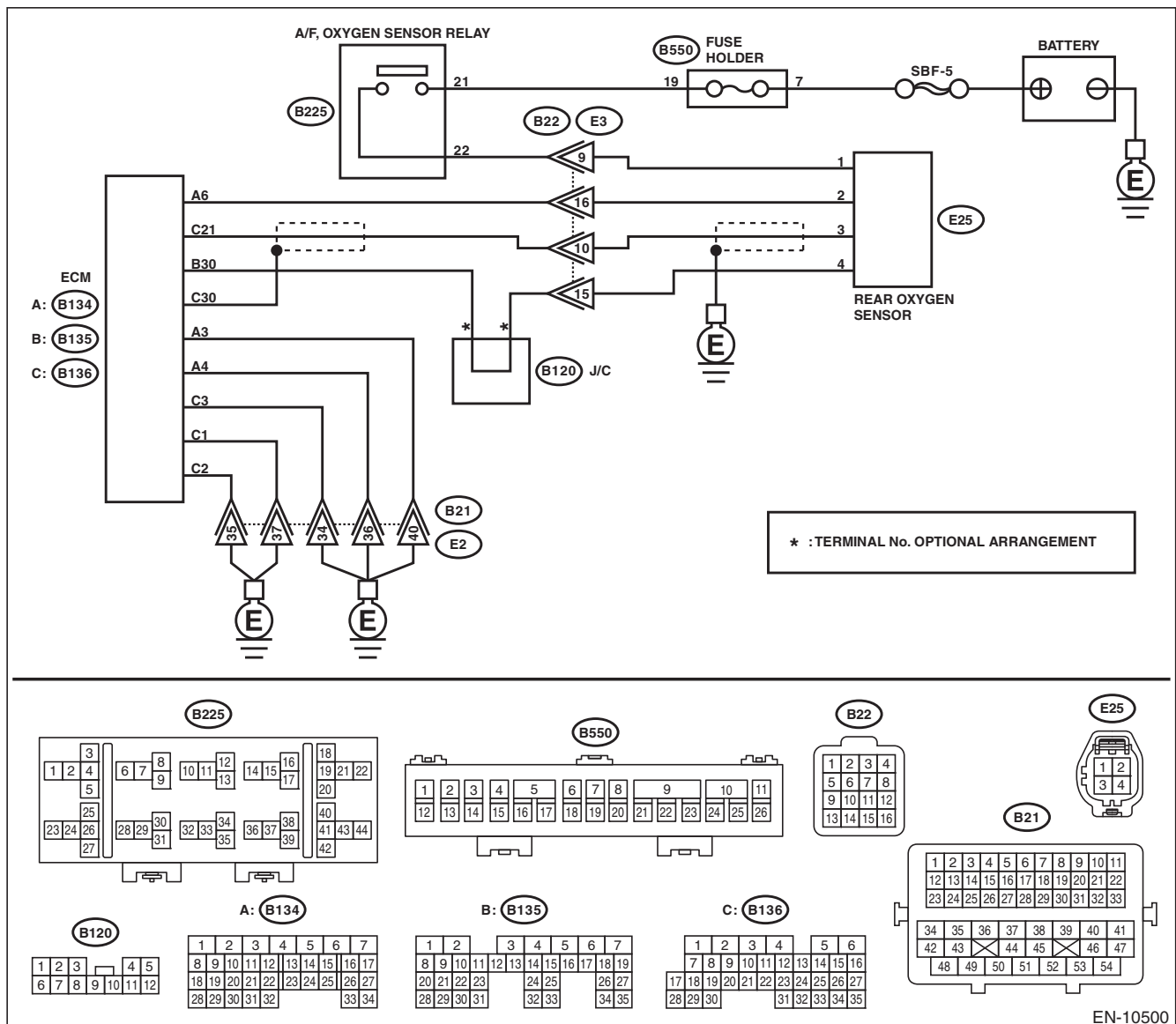
WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

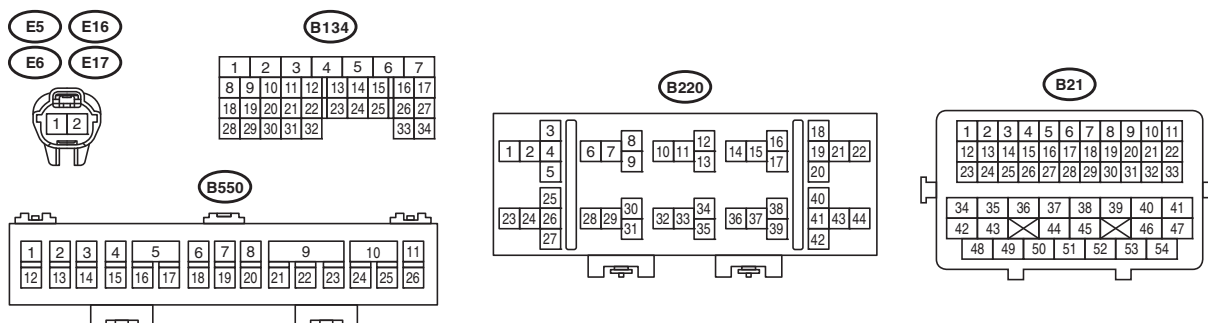
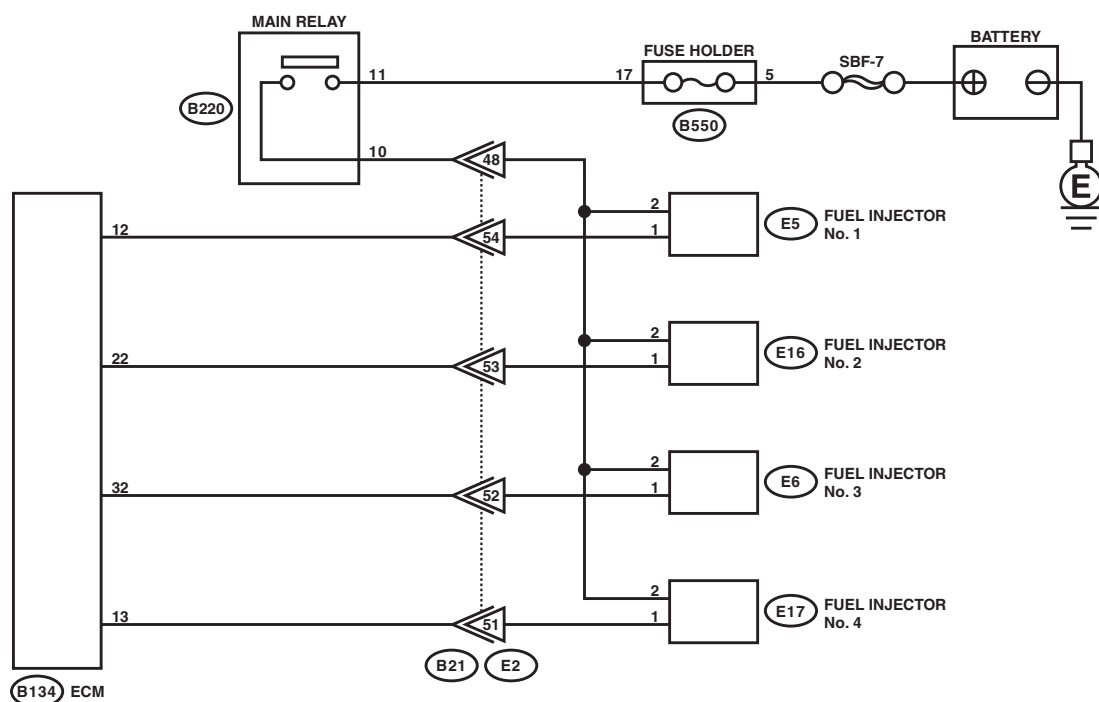
ENGINE (DIAGNOSTICS)



EN-10500

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)



EN-10486

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 and front oxygen (A/F) sensor connector. Connector & terminal (B136) No. 19 — (E24) No. 3: (B136) No. 18 — (E24) 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 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 and chassis ground. <i>Connector & terminal</i> <i>(B136) No. 19 — Chassis ground:</i> <i>(B136) No. 18 — Chassis ground:</i>	Is the resistance 1 MΩ or more?	Go to step 4.	Repair the ground short circuit of harness between ECM 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. <i>Connector & terminal</i> <i>(E24) No. 3 (+) — Chassis ground (-):</i>	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. <i>Connector & terminal</i> <i>(E24) No. 4 (+) — Chassis ground (-):</i>	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. <i>Connector & terminal</i> <i>(E24) No. 3 (+) — Chassis ground (-):</i> <i>(E24) No. 4 (+) — Chassis ground (-):</i>	Is the voltage 8 V or more?	Repair the short circuit to power in the harness between ECM and front oxygen (A/F) sensor connector. After repair, replace the ECM. <Ref. to FU(H4DO)-94, 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.
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. <Ref. to ME(H4DO)-31, INSPECTION, Fuel Pressure.> CAUTION: Release fuel pressure before removing the fuel pressure gauge.	Is the measured value 340 — 400 kPa (3.5 — 4.1 kg/cm ² , 49 — 58 psi)?	Go to step 10.	Repair the following item. Fuel pressure is too high: • Clogged fuel line or bent hose Fuel pressure is too low: • Improper fuel pump discharge • Clogged fuel line

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
10 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(H4DO)(diag)-36, 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 11.	Replace the engine coolant temperature sensor. <Ref. to FU(H4DO)-50, Engine Coolant Temperature Sensor.>
11 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) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the 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(H4DO)(diag)-36, 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 12.	Replace the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO)-68, Mass Air Flow and Intake Air Temperature Sensor.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
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) For CVT models, set the select lever to "P" range or "N" range, and for MT models, place the shift lever in the 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(H4DO)(diag)-36, 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 13.	Check the mass air flow and intake air temperature sensor. <Ref. to FU(H4DO)-68, Mass Air Flow and Intake Air Temperature Sensor.>
13 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 (MT model) - Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DO)(diag)-36, 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 14.	Go to step 15.
14 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 (MT model) - Subaru Select Monitor For detailed operation procedures, refer to "READ CURRENT DATA FOR ENGINE". <Ref. to EN(H4DO)(diag)-36, 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 16.	Go to step 15.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
15 CHECK REAR OXYGEN SENSOR CONNECTOR AND COUPLING CONNECTOR.	Has water entered the connector?	Completely remove any water inside.	Go to step 17.
16 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(H4DO)(diag)-36, 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(H4DO)-87, Front Oxygen (A/F) Sensor.>	Go to step 17.
17 CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and rear oxygen sensor. 3) Measure the resistance of harness between ECM and rear oxygen sensor connector. Connector & terminal (B136) No. 21 — (E25) No. 3: (B135) No. 30 — (E25) No. 4:	Is the resistance less than 1 Ω?	Go to step 18.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and rear oxygen sensor connector • Poor contact of coupling connector
18 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 (E25) No. 3 (+) — Chassis ground (-):	Is the voltage 0.2 — 0.5 V?	Replace the rear oxygen sensor. <Ref. to FU(H4DO)-87, Front Oxygen (A/F) Sensor.>	Go to step 19.
19 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. 12 (+) — Chassis ground (-): #2 (B134) No. 22 (+) — Chassis ground (-): #3 (B134) No. 32 (+) — Chassis ground (-): #4 (B134) No. 13 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 24.	Go to step 20.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
20 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. <i>Connector & terminal</i> <i>#1 (E5) No. 1 — Engine ground:</i> <i>#2 (E16) No. 1 — Engine ground:</i> <i>#3 (E6) No. 1 — Engine ground:</i> <i>#4 (E17) No. 1 — Engine ground:</i>	Is the resistance 1 MΩ or more?	Go to step 21.	Repair the short circuit to ground in harness between ECM and fuel injector connector.
21 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. Measure the resistance of harness between ECM and fuel injector connector on faulty cylinders. <i>Connector & terminal</i> <i>#1 (B134) No. 12 — (E5) No. 1:</i> <i>#2 (B134) No. 22 — (E16) No. 1:</i> <i>#3 (B134) No. 32 — (E6) No. 1:</i> <i>#4 (B134) No. 13 — (E17) No. 1:</i>	Is the resistance less than 1 Ω?	Go to step 22.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and fuel injector connector • Poor contact of coupling connector
22 CHECK FUEL INJECTOR. Measure the resistance between fuel injector terminals on faulty cylinder. <i>Terminals</i> <i>No. 1 — No. 2:</i>	Is the resistance 5 — 20 Ω?	Go to step 23.	Replace the faulty fuel injector. <Ref. to FU(H4DO)-73, Fuel Injector.>
23 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. <i>Connector & terminal</i> <i>#1 (E5) No. 2 (+) — Engine ground (-):</i> <i>#2 (E16) No. 2 (+) — Engine ground (-):</i> <i>#3 (E6) No. 2 (+) — Engine ground (-):</i> <i>#4 (E17) No. 2 (+) — Engine ground (-):</i>	Is the voltage 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
24 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. <i>Connector & terminal</i> <i>#1 (B134) No. 12 (+) — Chassis ground (-):</i> <i>#2 (B134) No. 22 (+) — Chassis ground (-):</i> <i>#3 (B134) No. 32 (+) — Chassis ground (-):</i> <i>#4 (B134) No. 13 (+) — Chassis ground (-):</i>	Is the voltage 10 V or more?	Repair the short circuit to power in harness between ECM and fuel injector connector.	Go to step 25.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
25 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 26.	Replace the faulty fuel injector. <Ref. to FU(H4DO)-73, Fuel Injector.>
26 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(H4DO)-59, INSTALLATION, Camshaft Position Sensor.> <Ref. to FU(H4DO)-55, INSTALLATION, Crankshaft Position Sensor.>	Go to step 27.
27 CHECK CRANKSHAFT POSITION SENSOR PLATE.	Is the crankshaft position sensor plate rusted or does it have broken teeth?	Replace the crankshaft position sensor plate. <Ref. to ME(H4DO)-249, Cylinder Block.>	Go to step 28.
28 CHECK INSTALLATION CONDITION OF TIMING CHAIN. Turn the crankshaft using ST, and align the alignment mark on crank sprocket with alignment mark on cylinder block. ST 18252AA000 CRANKSHAFT SOCKET	Is the timing chain dislocated from its proper position?	Correct the installation condition of timing chain. <Ref. to ME(H4DO)-117, Timing Chain Assembly.>	Go to step 29.
29 CHECK FUEL LEVEL.	Is the fuel meter indication higher than the "Lower" level?	Go to step 30.	Refill the fuel so that the fuel meter indication is higher than the "Lower" level, and proceed to the next step. Go to step 30.
30 CHECK STATUS OF MALFUNCTION INDICATOR LIGHT. 1) Clear the memory using the Subaru Select Monitor or general scan tool. <Ref. to EN(H4DO)(diag)-58, 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 32.	Go to step 31.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
31 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
32 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 33 .
33 CHECK MISFIRE SYMPTOM. 1) Turn the ignition switch to ON. 2) Check for DTC. <Ref. to EN(H4DO)(diag)-43, Read Diagnostic Trouble Code (DTC).>	Does the Subaru Select Monitor or general scan tool indicate only one DTC?	Go to step 36 .	Go to step 34 .
34 CHECK DTC.	Is DTC P0301 and P0303 displayed on the Subaru Select Monitor or general scan tool?	Go to step 37 .	Go to step 35 .
35 CHECK DTC.	Is DTC P0302 and P0304 displayed on the Subaru Select Monitor or general scan tool?	Go to step 38 .	Go to step 39 .
36 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(H4DO)(diag)-156, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
37 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(H4DO)(diag)-156, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
38 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(H4DO)(diag)-156, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
39 CYLINDER AT RANDOM.	Is the engine idle rough?	Go to DTC P0171. <Ref. to EN(H4DO)(diag)-156, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Repair or replace faulty parts. NOTE: Check the following items. • Spark plug • Ignition coil • Fuel injector • Compression ratio



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

EO:DTC P2401 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:

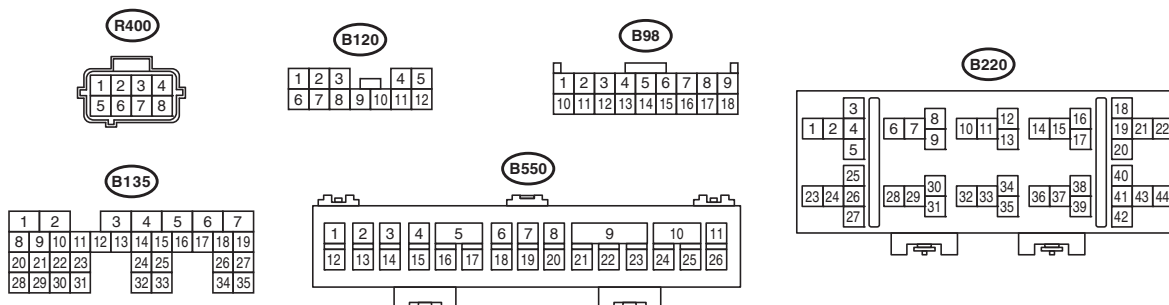
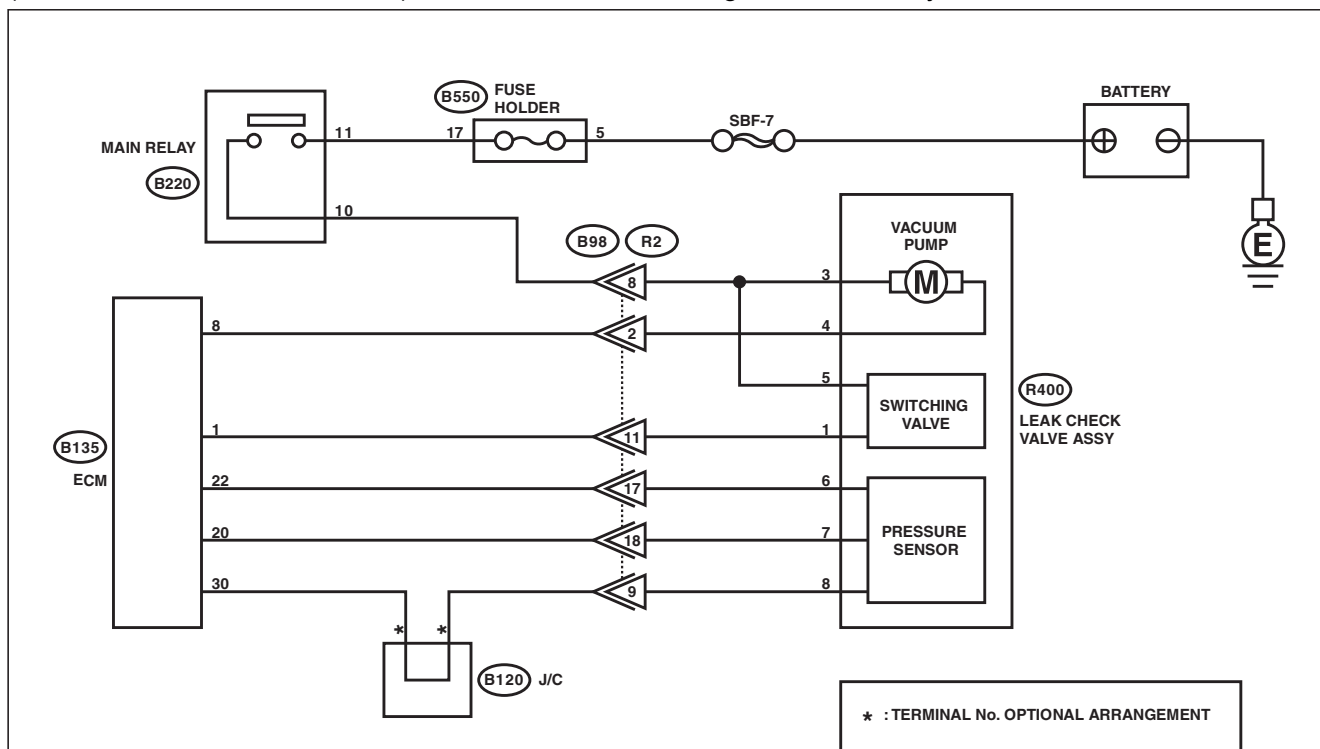
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-249, DTC P2401 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10504

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 and chassis ground. Connector & terminal (B135) No. 8 (+) — 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 MΩ or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM and leak check valve assembly connector.
5 CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR. Measure the resistance of harness between ECM and the leak check valve assembly connector. Connector & terminal (B135) No. 8 — (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 and the leak check valve assembly connector • Poor contact of coupling connector
6 CHECK LEAK CHECK VALVE ASSEMBLY. Check the vacuum pump of the leak check valve assembly. <Ref. to EC(H4DO)-52, 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(H4DO)-35, Leak Check Valve Assembly.>



ENGINE (DIAGNOSTICS)

EP:DTC P2402 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:

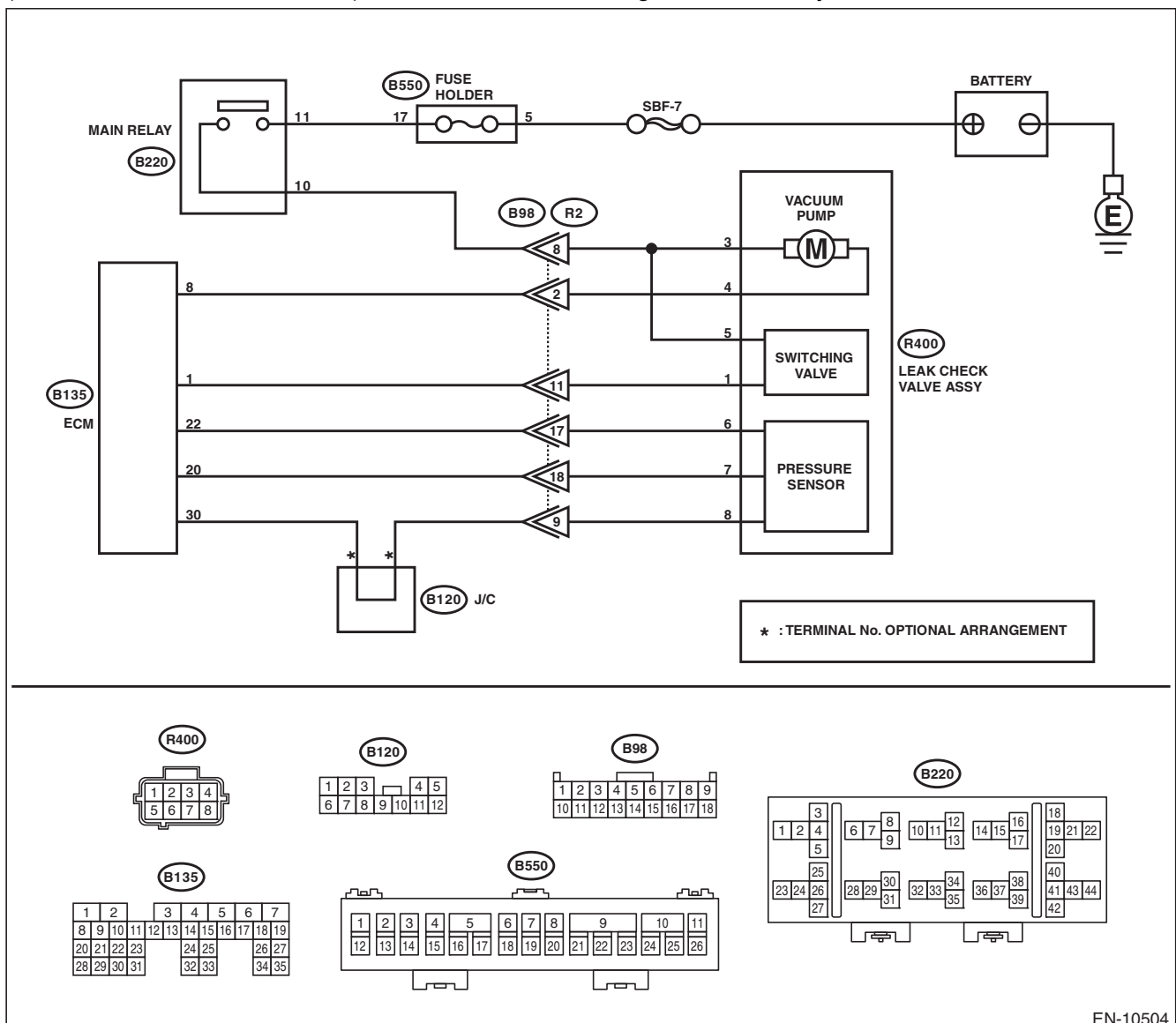
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-251, DTC P2402 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP CONTROL CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), 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 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(H4DO)-52, 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(H4DO)-35, Leak Check Valve Assembly.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

EQ:DTC P2404 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP SENSE CIRCUIT RANGE/PERFORMANCE

DTC DETECTING CONDITION:

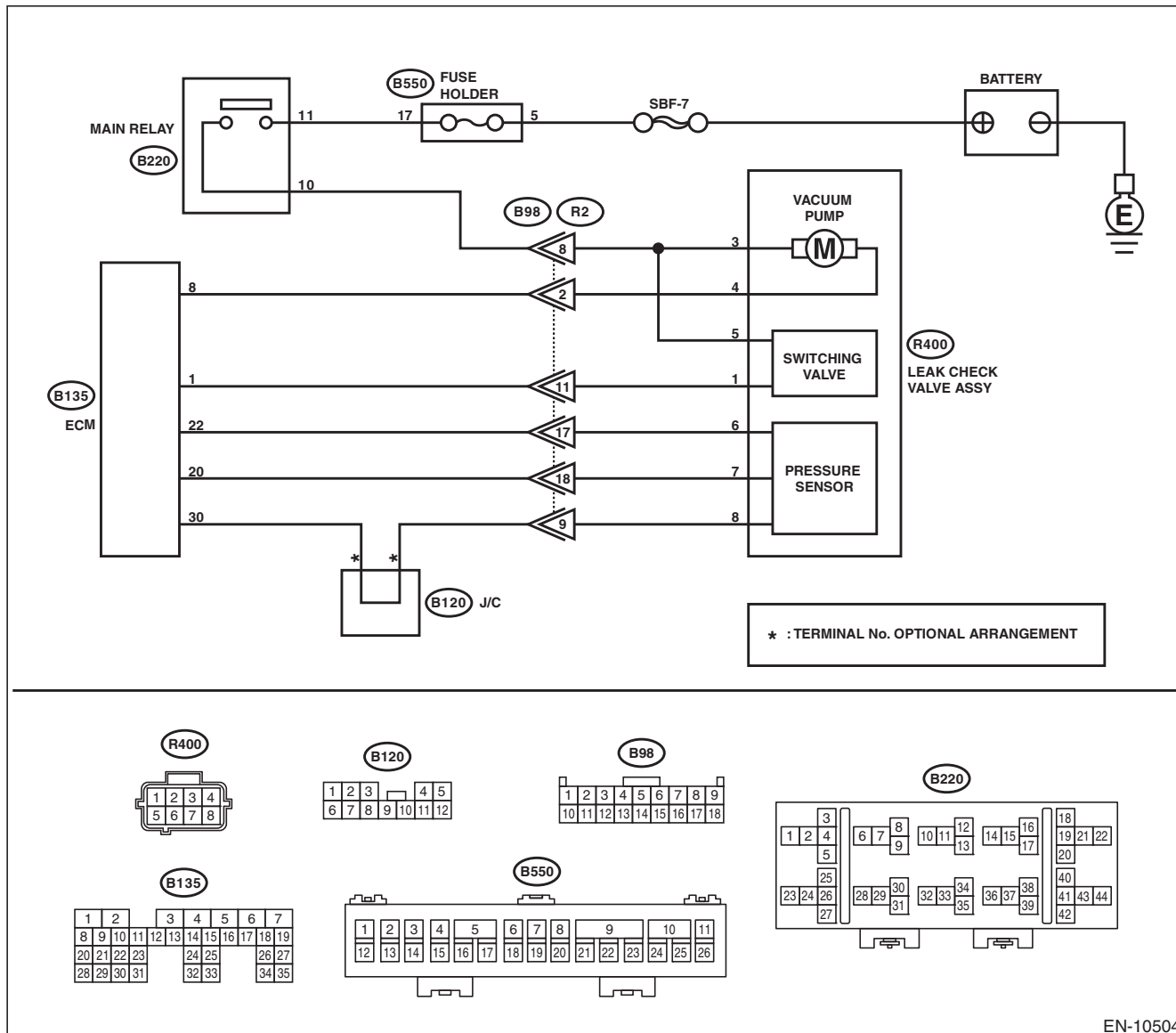
- Detected when two consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-252, DTC P2404 EVAPORATIVE EMISSION SYSTEM LEAK DETECTION PUMP SENSE CIRCUIT RANGE/PERFORMANCE, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10504

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(H4DO)(diag)-83, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
2 CHECK ELCM PUMP. Operate the ELCM pump using the Subaru Select Monitor. NOTE: For detailed procedures, refer to "System Operation Check Mode". <Ref. to EN(H4DO)(diag)-59, System 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 and the leak check valve assembly connector. Connector & terminal (B135) No. 8 — (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 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 and chassis ground. Connector & terminal (B135) No. 8 — Chassis ground:	Is the resistance 1 MΩ or more?	Replace the leak check valve assembly. <Ref. to EC(H4DO)-35, Leak Check Valve Assembly.>	Repair the short circuit to ground in harness between ECM and leak check valve assembly connector.
6 CHECK ELCM SWITCHING VALVE. Operate the ELCM switching valve using the Subaru Select Monitor. NOTE: For detailed procedures, refer to "System Operation Check Mode". <Ref. to EN(H4DO)(diag)-59, System Operation Check Mode.>	Does the ELCM switching valve operate?	Go to step 10.	Go to step 7.



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
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. <i>Connector & terminal</i> <i>(R400) No. 5 (+) — Chassis ground (–):</i>	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 and the leak check valve assembly connector. <i>Connector & terminal</i> <i>(B135) No. 1 — (R400) No. 1:</i>	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 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 and chassis ground. <i>Connector & terminal</i> <i>(B135) No. 1 — Chassis ground:</i>	Is the resistance 1 MΩ or more?	Replace the leak check valve assembly. <Ref. to EC(H4DO)-35, Leak Check Valve Assembly.>	Repair the short circuit to ground in harness between ECM and leak check valve assembly connector.
10 CHECK EVAPORATIVE EMISSION CONTROL SYSTEM. Perform drive cycle I. <Ref. to EN(H4DO)(diag)-52, DRIVE CYCLE I, PROCEDURE, Drive Cycle.>	Is DTC P2404 displayed on the display?	Replace the leak check valve assembly. <Ref. to EC(H4DO)-35, 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.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

ER:DTC P2419 EVAPORATIVE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT LOW

DTC DETECTING CONDITION:

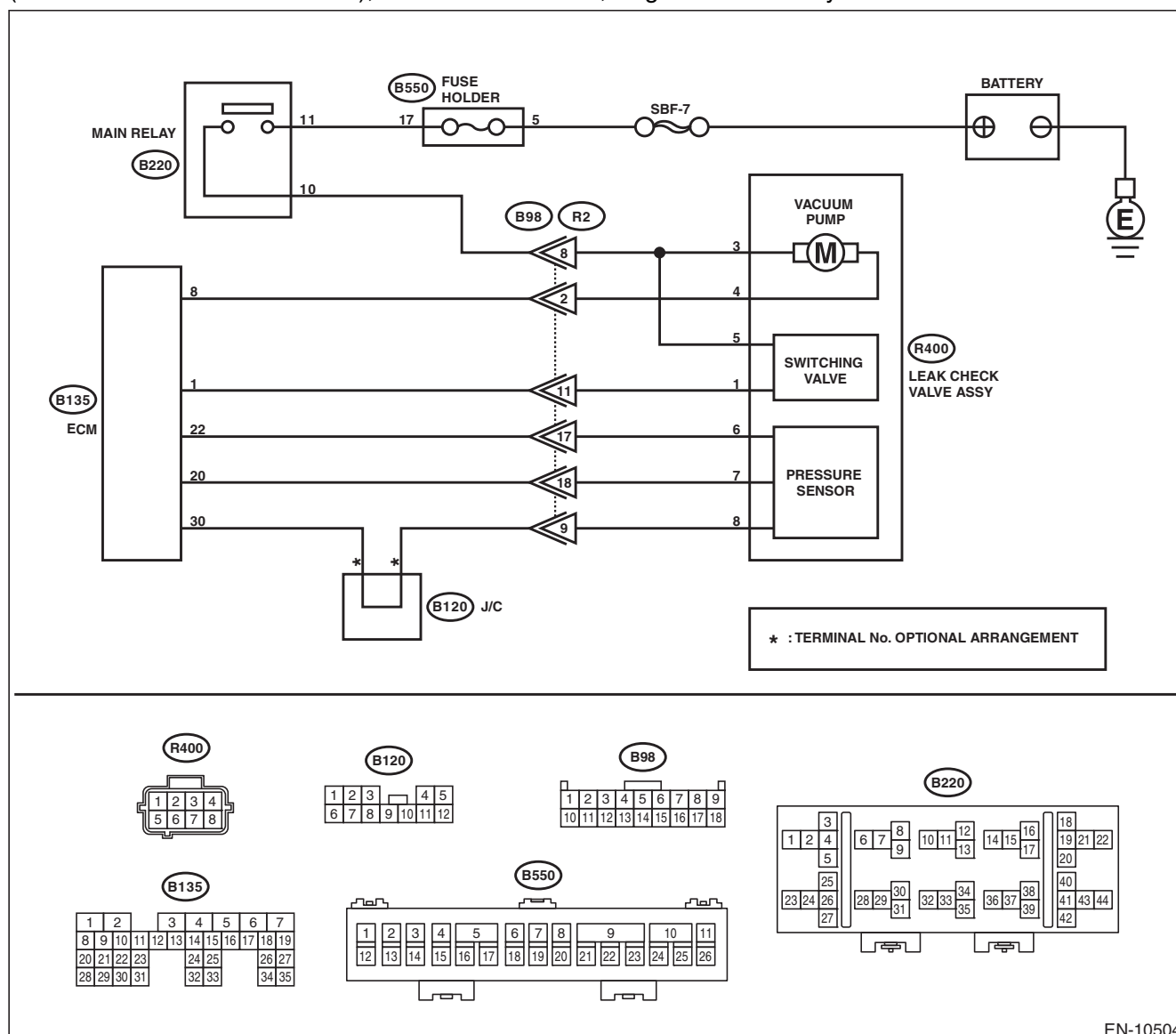
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-253, DTC P2419 EVAPORATIVE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT LOW, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10504

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 and chassis ground. <i>Connector & terminal</i> <i>(B135) No. 1 (+) — Chassis ground (-):</i>	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. <i>Connector & terminal</i> <i>(R400) No. 5 (+) — Engine ground (-):</i>	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. <i>Connector & terminal</i> <i>(R400) No. 1 — Chassis ground:</i>	Is the resistance 1 MΩ or more?	Go to step 5.	Repair the short circuit to ground in harness between ECM and leak check valve assembly connector.
5 CHECK HARNESS BETWEEN ECM AND LEAK CHECK VALVE ASSEMBLY CONNECTOR. Measure the resistance of harness between ECM and the leak check valve assembly connector. <i>Connector & terminal</i> <i>(B135) No. 1 — (R400) 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 in harness between ECM and the leak check valve assembly connector • Poor contact of coupling connector
6 CHECK LEAK CHECK VALVE ASSEMBLY. Check the switching valve of the leak check valve assembly. <Ref. to EC(H4DO)-51, 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(H4DO)-35, Leak Check Valve Assembly.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

ES:DTC P2420 EVAPORATIVE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH

DTC DETECTING CONDITION:

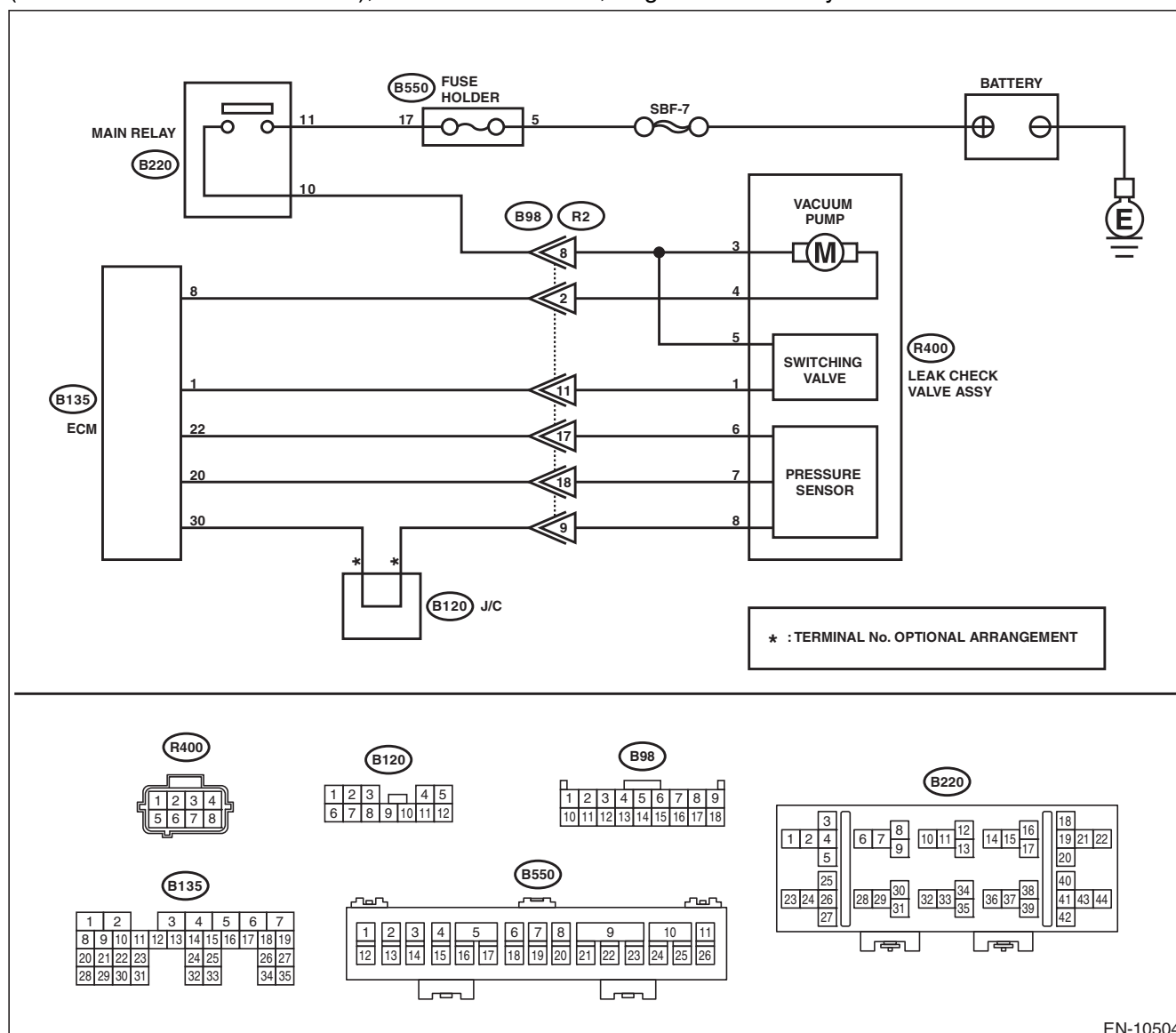
- Immediately at fault recognition
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-255, DTC P2420 EVAPORATIVE EMISSION SYSTEM SWITCHING VALVE CONTROL CIRCUIT HIGH, Diagnostic Trouble Code (DTC) Detecting Criteria.>

CAUTION:

After servicing or replacing faulty parts, perform Clear Memory Mode <Ref. to EN(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, PROCEDURE, Inspection Mode.>.

WIRING DIAGRAM:

- Engine electrical system non-turbo model (without push button start) <Ref. to WI-166, NON-TURBO MODEL (WITHOUT PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>
- Engine electrical system non-turbo model (with push button start) <Ref. to WI-184, NON-TURBO MODEL (WITH PUSH BUTTON START), WIRING DIAGRAM, Engine Electrical System.>



EN-10504

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 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(H4DO)-51, 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(H4DO)-35, Leak Check Valve Assembly.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

ET:DTC P2610 ECM/PCM INTERNAL ENGINE OFF TIMER PERFORMANCE

DTC DETECTING CONDITION:

- Detected when 2 consecutive driving cycles with fault occur.
- GENERAL DESCRIPTION <Ref. to GD(H4DO)-257, 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(H4DO)(diag)-58, OPERATION, Clear Memory Mode.>, and Inspection Mode <Ref. to EN(H4DO)(diag)-44, 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(H4DO)(diag)-83, List of Diagnostic Trouble Code (DTC).>	Replace the ECM. <Ref. to FU(H4DO)-94, Engine Control Module (ECM).> NOTE: The soak timer IC is built into the ECM.

EU:DTC U0073 CONTROL MODULE COMMUNICATION BUS "A" OFF

NOTE:

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

EV:DTC U0101 LOST COMMUNICATION WITH TCM

NOTE:

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

EW:DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE

NOTE:

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

EX:DTC U0155 LOST COMMUNICATION WITH INSTRUMENT PANEL CLUSTER (IPC) CONTROL MODULE

NOTE:

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

EY:DTC U0402 INVALID DATA RECEIVED FROM TCM

NOTE:

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

EZ:DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE

NOTE:

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

FA:DTC U0423 INVALID DATA RECEIVED FROM INSTRUMENT PANEL CLUSTER CONTROL MODULE

NOTE:

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

General Diagnostic Table

ENGINE (DIAGNOSTICS)

19. General Diagnostic Table

A: INSPECTION

1. ENGINE

NOTE:

Malfunction of parts other than those listed is also possible. <Ref. to ME(H4DO)-358, Engine Trouble in General.>

Symptoms	Faulty parts
1. Engine stalls during idling.	1) Manifold absolute pressure sensor 2) Mass air flow and intake air temperature sensor 3) Ignition parts (*1) 4) Engine coolant temperature sensor (*2) 5) Crankshaft position sensor (*3) 6) Camshaft position sensor (*3) 7) Fuel injection parts (*4) 8) Electronic throttle control
2. Rough idling	1) Manifold absolute pressure sensor 2) Mass air flow and intake air temperature sensor 3) Engine coolant temperature sensor (*2) 4) Ignition parts (*1) 5) Air intake system (*5) 6) Fuel injection parts (*4) 7) Electronic throttle control 8) Crankshaft position sensor (*3) 9) Camshaft position sensor (*3) 10) Oxygen sensor 11) Fuel pump and fuel pump relay 12) EGR control valve
3. Engine does not return to idle.	1) Engine coolant temperature sensor 2) Electronic throttle control 3) Manifold absolute pressure sensor 4) Mass air flow and intake air temperature sensor 5) EGR control valve 6) Accelerator pedal position sensor 7) Engine oil temperature 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) Engine torque control signal circuit 10) Ignition parts (*1) 11) EGR control valve 12) Accelerator pedal position sensor 13) Engine oil temperature 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) Electronic throttle control 9) Fuel pump and fuel pump relay 10) EGR control valve



General Diagnostic Table

ENGINE (DIAGNOSTICS)

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

*1: Check ignition coil and spark plug.

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

*3: Ensure the secure installation.

*4: Check fuel injector and fuel filter.

*5: Inspect air leak in air intake system.



General Diagnostic Table

ENGINE (DIAGNOSTICS)

