

ENGINE SECTION 2

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.

This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.

Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUEL INJECTION (FUEL SYSTEMS) FU(H4DOTC)

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES) EC(H4DOTC)

INTAKE (INDUCTION) IN(H4DOTC)

MECHANICAL ME(H4DOTC)

EXHAUST EX(H4DOTC)

COOLING CO(H4DOTC)

LUBRICATION LU(H4DOTC)

SPEED CONTROL SYSTEMS SP(H4DOTC)

IGNITION IG(H4DOTC)

STARTING/CHARGING SYSTEMS SC(H4DOTC)

ENGINE (DIAGNOSTICS) EN(H4DOTC)(diag)

ENGINE (DIAGNOSTICS)

EN(H4DOTC)(diag)

	Page
1. Basic Diagnostic Procedure	2
2. Check List for Interview	4
3. General Description	6
4. Electrical Components Location.....	9
5. Engine Control Module (ECM) I/O Signal	23
6. Engine Condition Data	27
7. Transmission Control Module (TCM) I/O Signal	28
8. Data Link Connector	29
9. OBD-II General Scan Tool	30
10. Subaru Select Monitor.....	32
11. Read Diagnostic Trouble Code (DTC)	38
12. Inspection Mode	39
13. Drive Cycle	45
14. Clear Memory Mode.....	47
15. Compulsory Valve Operation Check Mode	48
16. Malfunction Indicator Light	50
17. Diagnostics for Engine Starting Failure.....	59
18. List of Diagnostic Trouble Code (DTC)	74
19. Diagnostic Procedure with Diagnostic Trouble Code (DTC)	81
20. General Diagnostic Table.....	308

Basic Diagnostic Procedure

ENGINE (DIAGNOSTICS)

1. Basic Diagnostic Procedure

A: PROCEDURE

1. ENGINE

Step	Check	Yes	No
1 CHECK ENGINE START FAILURE. 1)Ask the customer when and how trouble occurred using the interview check list. <Ref. to EN(H4DOTC)(diag)-4, CHECK, Check List for Interview.> 2)Start the engine.	Does the engine start?	Go to step 2.	Inspection using “Diagnostics for Engine Start Failure”. <Ref. to EN(H4DOTC)(diag)-59, 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 Diagnostics Table”. <Ref. to EN(H4DOTC)(diag)-308, General Diagnostic Table.>
3 CHECK INDICATION OF DTC ON DISPLAY. 1)Turn the ignition switch to OFF. 2)Connect the Subaru Select Monitor or OBD-II general scan tool to data link connector. 3)Turn the ignition switch to ON and the Subaru Select Monitor or OBD-II general scan tool switch to ON. 4)Read the DTC on Subaru Select Monitor or OBD-II general scan tool.	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC?	Record the DTC code. Repair the trouble cause. <Ref. to EN(H4DOTC)(diag)-74, List of Diagnostic Trouble Code (DTC).> Go to step 4.	Repair the related parts. NOTE: If a DTC is not shown on display although malfunction indicator light illuminates, perform diagnostics of malfunction indicator light circuit or combination meter. <Ref. to EN(H4DOTC)(diag)-50, Malfunction Indicator Light.>
4 PERFORM THE DIAGNOSIS. 1)Perform the clear memory mode. <Ref. to EN(H4DOTC)(diag)-47, Clear Memory Mode.> 2)Perform the inspection mode. <Ref. to EN(H4DOTC)(diag)-39, Inspection Mode.>	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC?	Inspect using “Diagnostics Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to EN(H4DOTC)(diag)-81, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Complete the diagnosis.

2. AUTOMATIC TRANSMISSION

When DTC about automatic transmission is shown on display, carry out the following basic check. After that, carry out the replacement or repair work.

- 1) ATF level check <Ref. to 4AT-31, Automatic Transmission Fluid.>
- 2) Differential gear oil level check <Ref. to 4AT-33, Differential Gear Oil.>
- 3) ATF leak check <Ref. to 4AT-31, Automatic Transmission Fluid.>
- 4) Differential gear oil leak check <Ref. to 4AT-33, Differential Gear Oil.>
- 5) Stall test <Ref. to 4AT-35, Stall Test.>
- 6) Line pressure test <Ref. to 4AT-38, Line Pressure Test.>
- 7) Transfer clutch pressure test <Ref. to 4AT-39, Transfer Clutch Pressure Test.>
- 8) Time lag test <Ref. to 4AT-37, Time Lag Test.>
- 9) Road test <Ref. to 4AT-34, Road Test.>
- 10) Shift characteristics <Ref. to 4AT-39, Transfer Clutch Pressure Test.>

Check List for Interview

ENGINE (DIAGNOSTICS)

2. Check List for Interview

A: CHECK

1. CHECK LIST No. 1

Check the following items when problem has occurred.

NOTE:

Use copies of this page for interviewing customers.

Customer's name		Engine No.	
Date of sale		Fuel brand	
Date of repair		Odometer reading	km
VIN			miles
Weather	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others:		
Outdoor temperature	°C (°F)		
	<input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold		
Place	<input type="checkbox"/> Highway <input type="checkbox"/> Suburbs <input type="checkbox"/> Inner city <input type="checkbox"/> Uphill <input type="checkbox"/> Downhill <input type="checkbox"/> Rough road <input type="checkbox"/> Others:		
Engine temperature	<input type="checkbox"/> Cold <input type="checkbox"/> Warming-up <input type="checkbox"/> After warming-up <input type="checkbox"/> Any temperature <input type="checkbox"/> Others:		
Engine speed	rpm		
Vehicle speed	km/h (MPH)		
Driving conditions	<input type="checkbox"/> Not affected <input type="checkbox"/> At starting <input type="checkbox"/> While idling <input type="checkbox"/> At racing <input type="checkbox"/> While accelerating <input type="checkbox"/> While cruising <input type="checkbox"/> While decelerating <input type="checkbox"/> While turning (RH/LH)		
Headlight	<input type="checkbox"/> ON / <input type="checkbox"/> OFF	Rear defogger	<input type="checkbox"/> ON / <input type="checkbox"/> OFF
Blower	<input type="checkbox"/> ON / <input type="checkbox"/> OFF	Radio	<input type="checkbox"/> ON / <input type="checkbox"/> OFF
A/C compressor	<input type="checkbox"/> ON / <input type="checkbox"/> OFF	CD/Cassette	<input type="checkbox"/> ON / <input type="checkbox"/> OFF
Cooling fan	<input type="checkbox"/> ON / <input type="checkbox"/> OFF	Car phone	<input type="checkbox"/> ON / <input type="checkbox"/> OFF
Front wiper	<input type="checkbox"/> ON / <input type="checkbox"/> OFF	CB	<input type="checkbox"/> ON / <input type="checkbox"/> OFF
Rear wiper	<input type="checkbox"/> ON / <input type="checkbox"/> OFF		

Check List for Interview

ENGINE (DIAGNOSTICS)

2. CHECK LIST No. 2

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

NOTE:

Use copies of this page for interviewing customers.

a) Other warning lights or indicators turn on. <input type="checkbox"/> Yes / <input type="checkbox"/> No
<input type="checkbox"/> Low fuel warning light <input type="checkbox"/> Charge indicator light <input type="checkbox"/> AT diagnostics indicator light <input type="checkbox"/> ABS warning light <input type="checkbox"/> Engine oil pressure warning light
b) Fuel level
<ul style="list-style-type: none">• Lack of gasoline: <input type="checkbox"/> Yes / <input type="checkbox"/> No• Indicator position of fuel gauge:• Experienced running out of fuel: <input type="checkbox"/> Yes / <input type="checkbox"/> No
c) Intentional connecting or disconnecting of harness connectors or spark plug cords: <input type="checkbox"/> Yes / <input type="checkbox"/> No
<ul style="list-style-type: none">• What:
d) Intentional connecting or disconnecting of hoses: <input type="checkbox"/> Yes / <input type="checkbox"/> No
<ul style="list-style-type: none">• What:
e) Installing of parts other than genuine parts: <input type="checkbox"/> Yes / <input type="checkbox"/> No
<ul style="list-style-type: none">• What:• Where:
f) Occurrence of noise: <input type="checkbox"/> Yes / <input type="checkbox"/> No
<ul style="list-style-type: none">• From where:• What kind:
g) Occurrence of smell: <input type="checkbox"/> Yes / <input type="checkbox"/> No
<ul style="list-style-type: none">• From where:• What kind:
h) Intrusion of water into engine compartment or passenger compartment: <input type="checkbox"/> Yes / <input type="checkbox"/> No
i) Troubles occurred
<input type="checkbox"/> Engine does not start. <input type="checkbox"/> Engine stalls during idling. <input type="checkbox"/> Engine stalls while driving. <input type="checkbox"/> Engine speed decreases. <input type="checkbox"/> Engine speed does not decrease. <input type="checkbox"/> Rough idling <input type="checkbox"/> Poor acceleration <input type="checkbox"/> Back fire <input type="checkbox"/> After fire <input type="checkbox"/> No shift <input type="checkbox"/> 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:

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

2) Never connect the battery in reverse polarity.

- The ECM will be destroyed instantly.
- The fuel injector and other part will be damaged in just a few minutes more.

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

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

4) Before disconnecting the connectors of each sensor and the ECM, be sure to turn the ignition switch to OFF.

5) Poor contact has been identified as a primary cause of this problem. To measure the voltage and/or resistance of individual sensors or all electrical control modules at the harness side connector, use a tapered pin with a diameter of less than 0.64 mm (0.025 in). Do not insert the pin more than 5 mm (0.20 in) into the part.

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

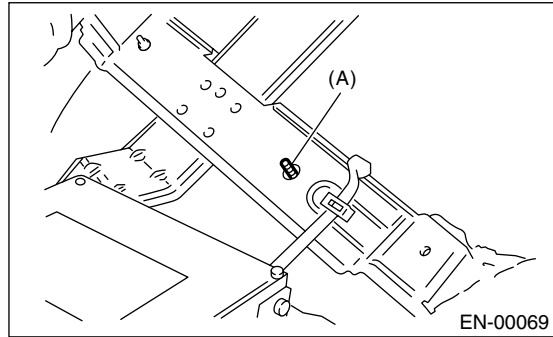
- Otherwise, the ECM may be damaged.

CAUTION:

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

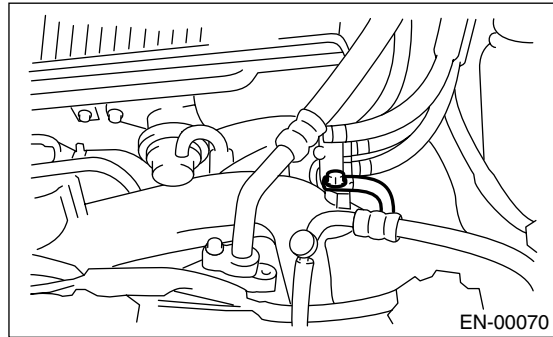
7) The connectors to each sensor in the engine compartment and the harness connectors on the engine side and body side are all designed to be waterproof. However, it is still necessary to take care not to allow water to get into the connectors when washing the vehicle, or when servicing the vehicle on a rainy day.

8) Use the ECM mounting stud bolt at the body head grounding points when measuring voltage and resistance inside the passenger compartment.

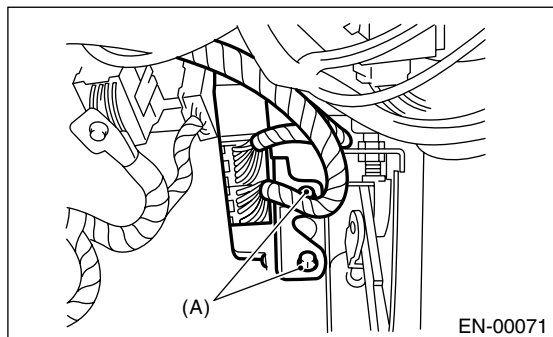


(A) Stud bolt

9) Use the engine grounding terminal or engine proper as the grounding point to the body, when measuring voltage and resistance in the engine compartment.



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



(A) Stud bolt

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

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

CAUTION:

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

13) Before disconnecting the fuel hose, disconnect the fuel pump connector and crank the engine for more than 5 seconds to release pressure in the fuel system. If the engine starts during this operation, run it until it stops.

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

15) Diagnostics should be conducted by rotating with simple, easy operations and proceeding to complicated, difficult operations. The most important thing in diagnostics is to understand the customer's complaint, and distinguish between the three causes.

16) On model with ABS, when performing driving test in jacked-up or lifted-up position, sometimes the warning light may be lit, but this is not a malfunction of the system. The reason for this is the speed difference between front and rear wheels. After diagnosis of engine control system, perform the ABS memory clearance procedure of self-diagnosis system.

B: INSPECTION

Before performing diagnostics, check the following items which might affect engine problems:

1. BATTERY

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

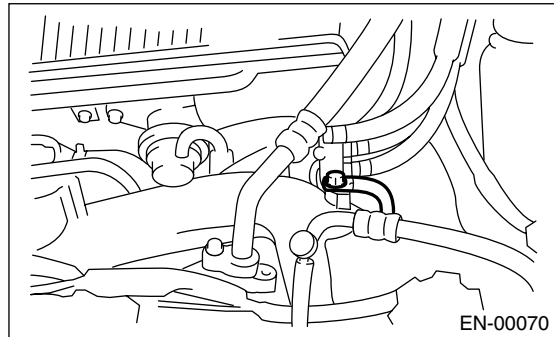
Standard voltage: 12 V

Specific gravity: Above 1.260

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

2. ENGINE GROUNDING

Make sure the engine grounding terminal is properly connected to engine.



C: NOTE

1. DESCRIPTION

- The on-board diagnostics (OBD) system detects and indicates a fault in various inputs and outputs of complex electronic control. Malfunction indicator light in combination meter indicates occurrence of a fault or trouble.
- Further, against such a failure or sensors as may disable the drive, the fail-safe function is provided to ensure the minimal driveability.
- The OBD system incorporated with the vehicles within this engine family complies with Section 1968.1, California Code of Regulations (OBD-II regulation). 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 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 first.
- If the OBD system detects the various malfunctions including the fault of fuel trim or misfire, the OBD system first stores freeze frame engine conditions about the fuel trim or misfire.
- When the malfunction does not occur again for three consecutive driving cycles, malfunction indicator light is turned off, but DTC remains at on-board computer.
- The OBD-II system is capable of communication with a general scan tool (OBD-II general scan tool) formed by ISO 9141 CARB.

General Description

ENGINE (DIAGNOSTICS)

- The OBD-II diagnostics procedure is different from usual diagnostics procedure. When troubleshooting model with OBD-II, connect the Subaru Select Monitor or the OBD-II general scan tool to the vehicle.

2. ENGINE AND EMISSION CONTROL SYSTEM

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

With this system fuel, which is pressurized at a constant pressure, is injected into the intake air passage of the cylinder head. The injection quantity of fuel is controlled by an intermittent injection system where the electro-magnetic injection valve (fuel injector) opens only for a short period of time, de-

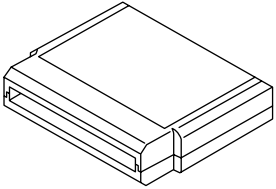

pending on the quantity of air required for one cycle of operation. In actual operation, the injection quantity is determined by the duration of an electric pulse applied to the fuel injector and this permits simple, yet highly precise metering of the fuel.

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

The MFI system also has the following features:

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

D: PREPARATION TOOL

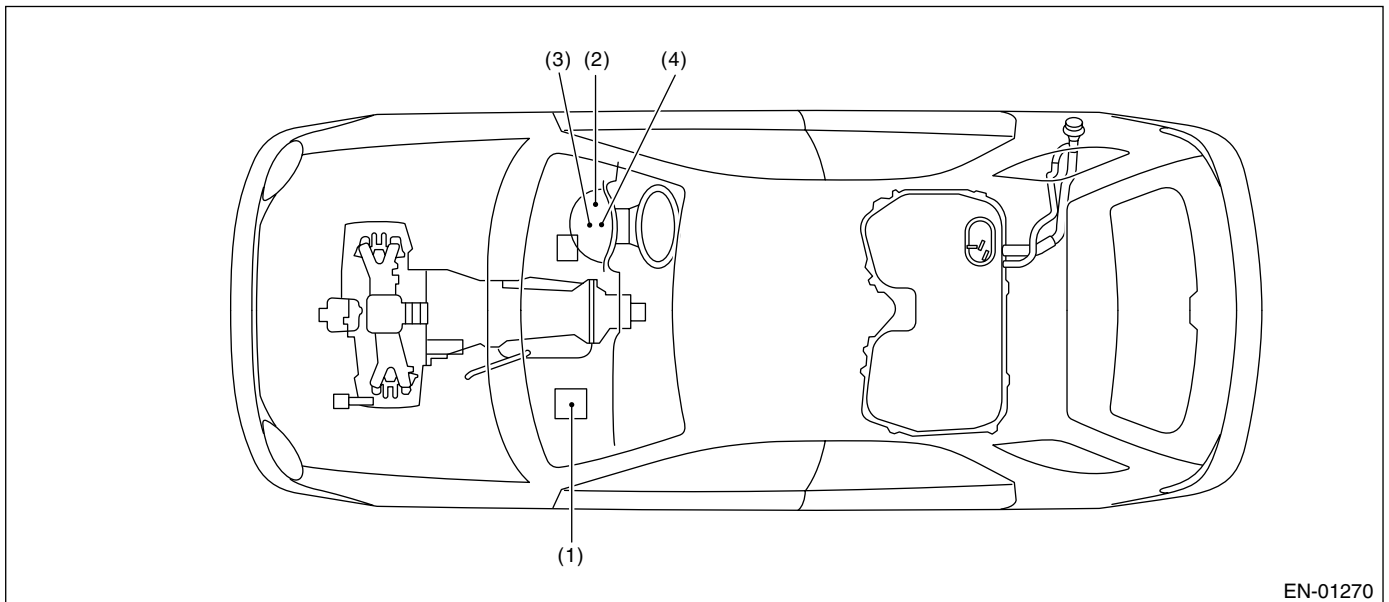
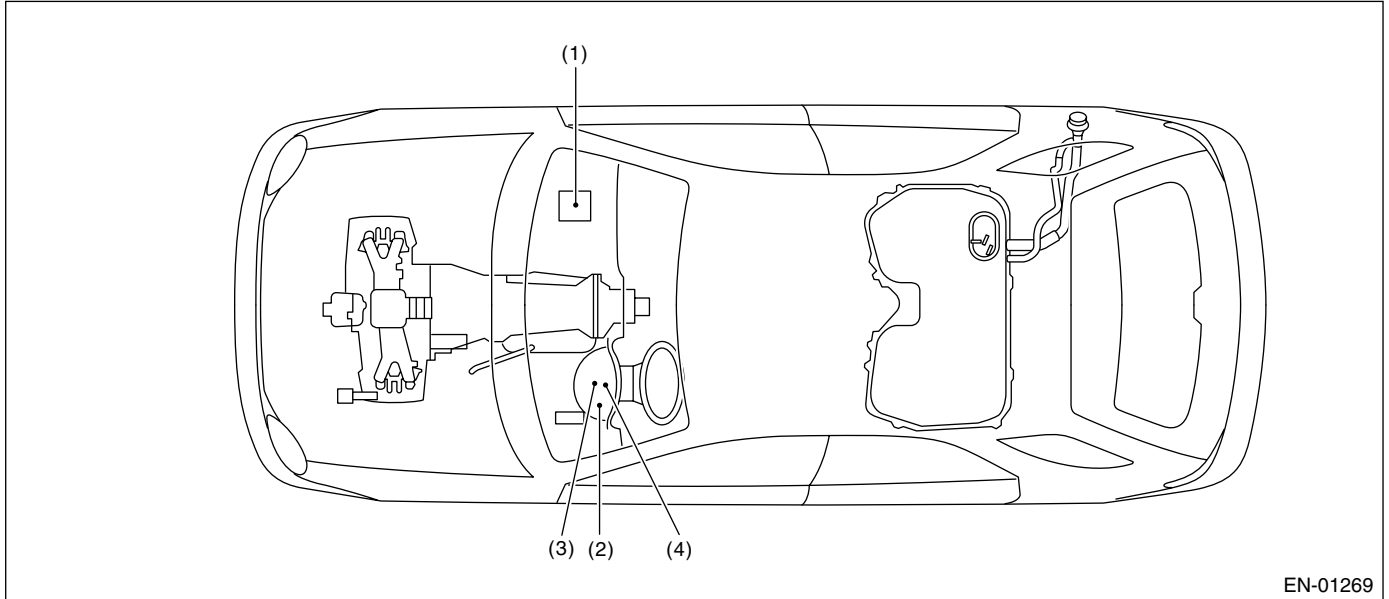
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST24082AA230</p>	24082AA230	CARTRIDGE	Troubleshooting for electrical systems.
 <p>ST22771AA030</p>	22771AA030	SUBARU SELECT MONITOR KIT	Troubleshooting for electrical systems. <ul style="list-style-type: none"> English: 22771AA030 (Without printer) German: 22771AA070 (Without printer) French: 22771AA080 (Without printer) Spanish: 22771AA090 (Without printer)

4. Electrical Components Location

A: LOCATION

1. ENGINE

• Module



(1) Engine control module (ECM)

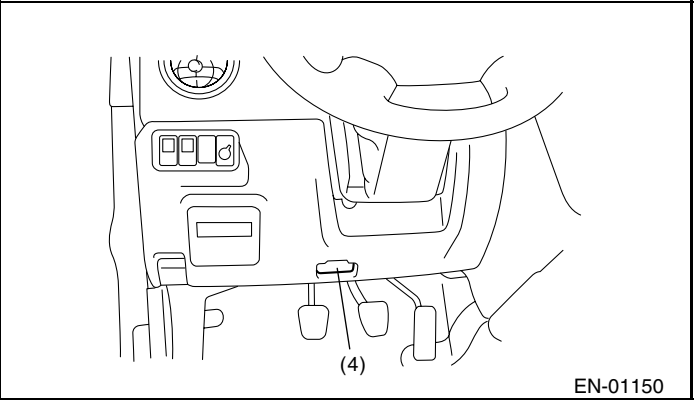
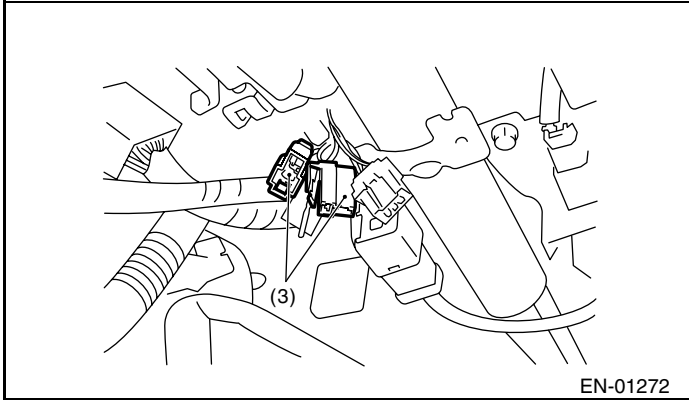
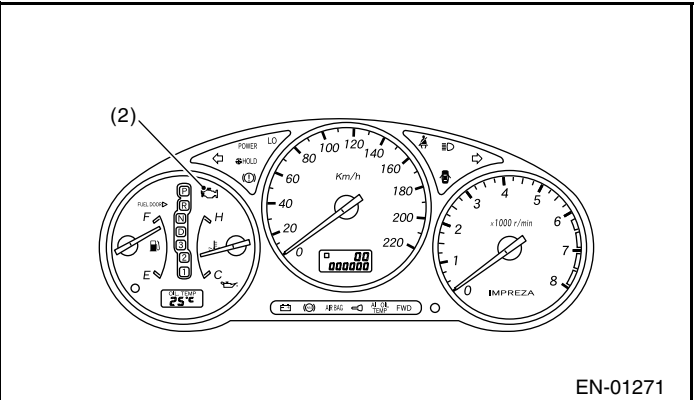
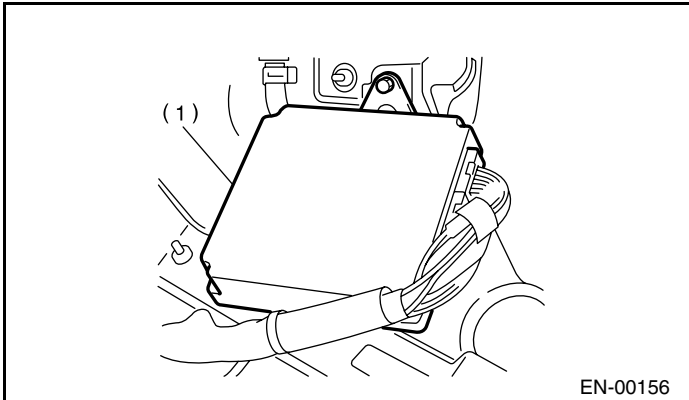
(3) Test mode connector

(4) Data link connector

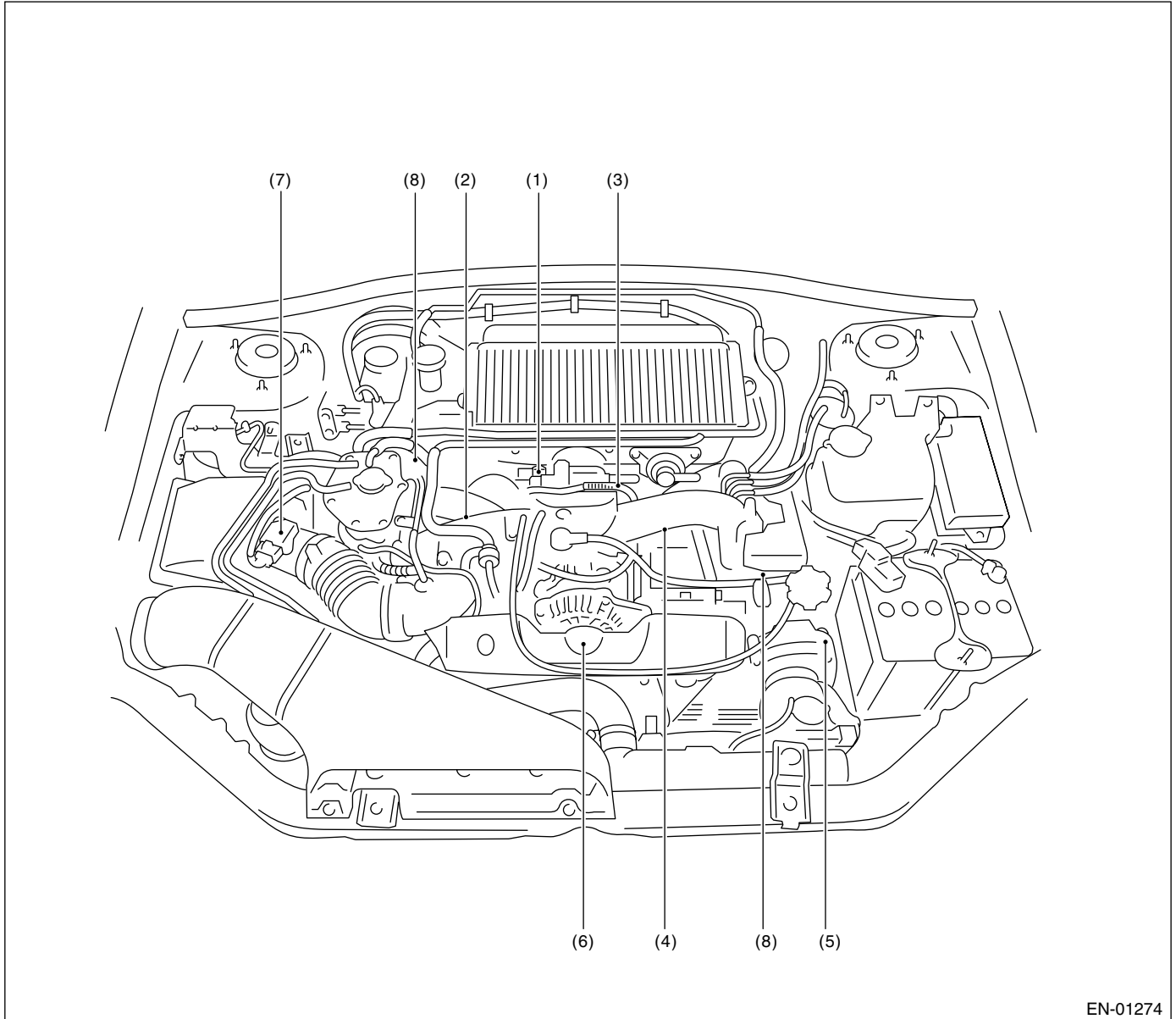
(2) Malfunction indicator light

Electrical Components Location

ENGINE (DIAGNOSTICS)



• Sensor

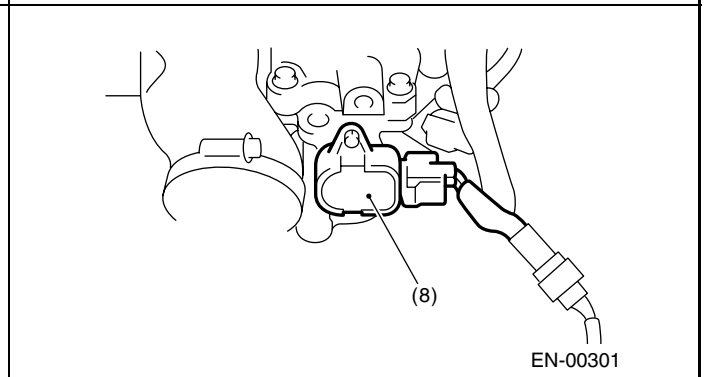
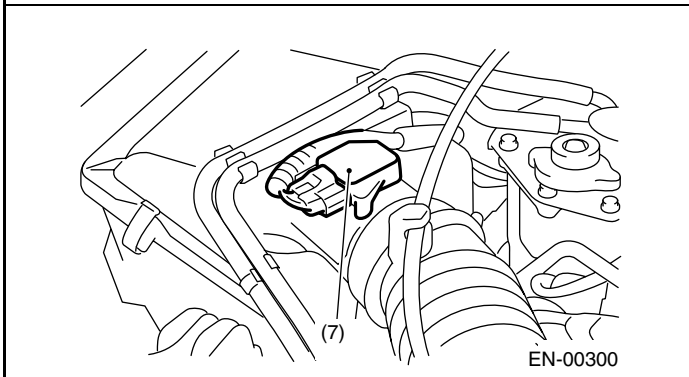
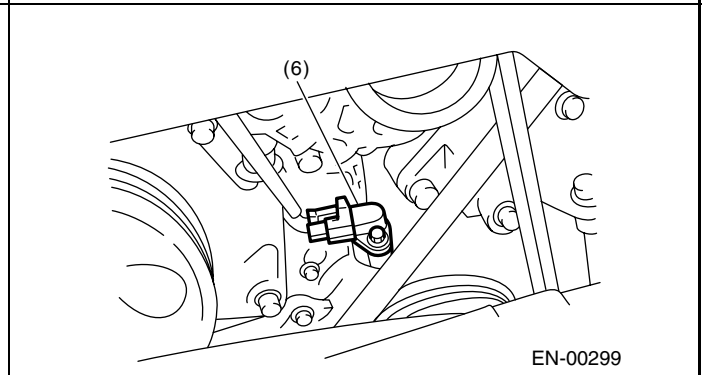
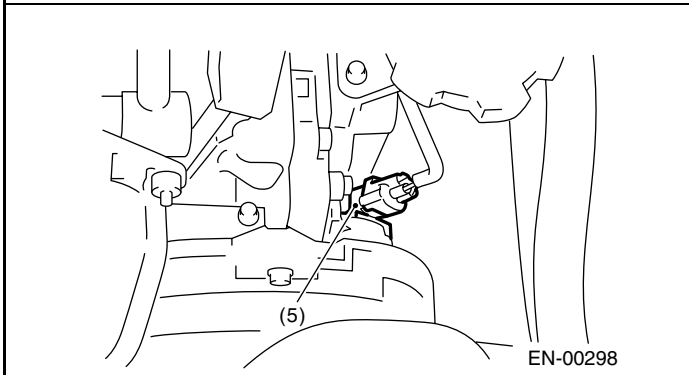
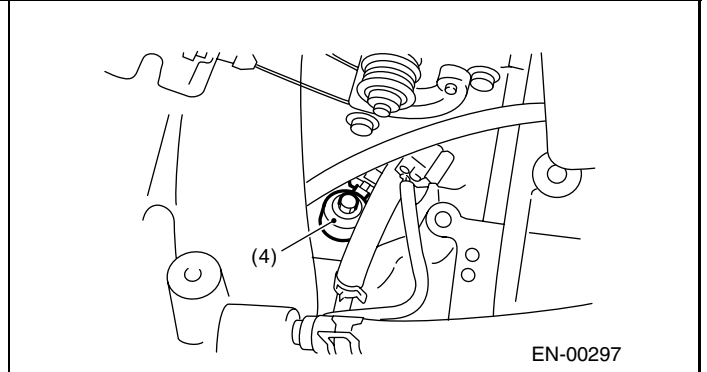
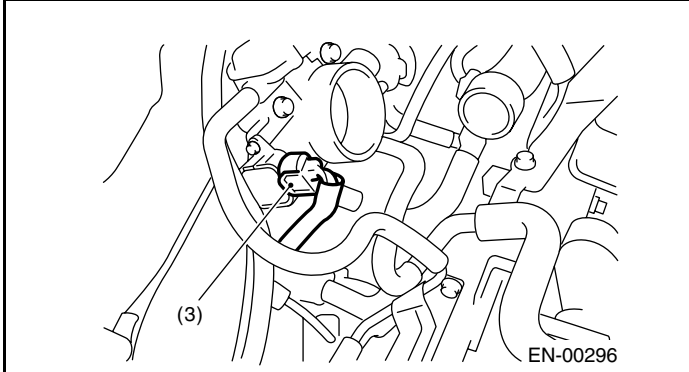
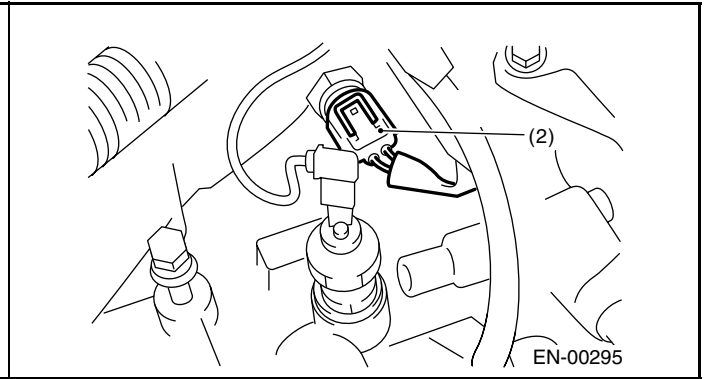
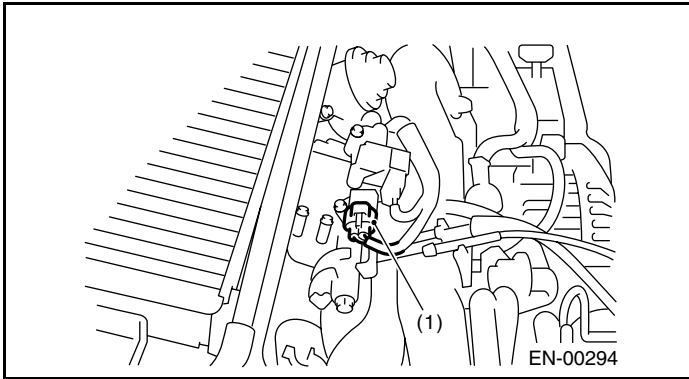


EN-01274

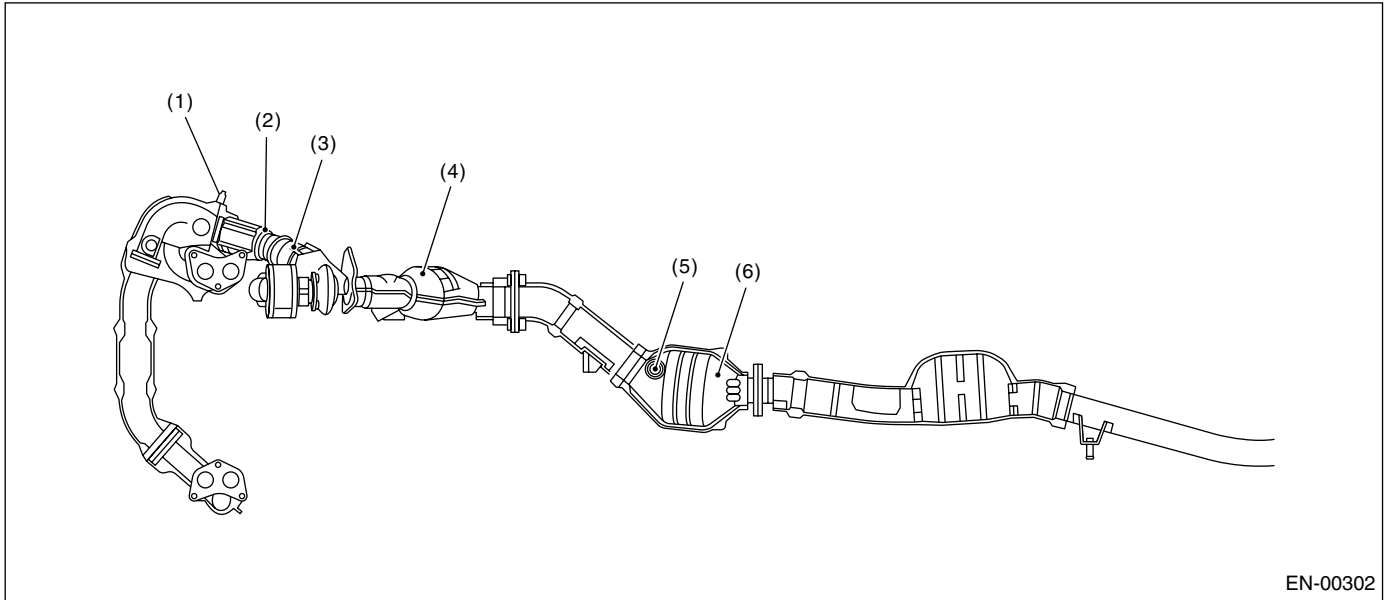
- | | | |
|---------------------------------------|--------------------------------|---|
| (1) Manifold absolute pressure sensor | (4) Knock sensor | (7) Mass air flow and intake air temperature sensor |
| (2) Engine coolant temperature sensor | (5) Camshaft position sensor | (8) Tumble generator valve position sensor |
| (3) Throttle position sensor | (6) Crankshaft position sensor | |

Electrical Components Location

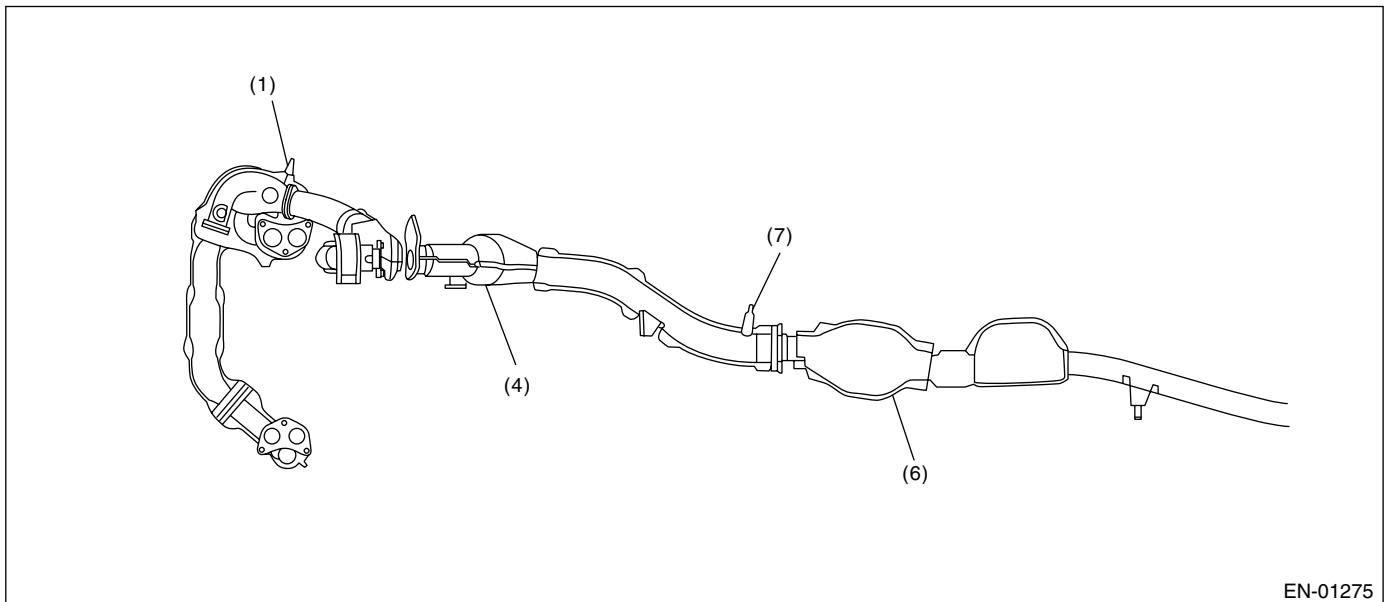
ENGINE (DIAGNOSTICS)



• Except for Australia model



• For Australia model except for STi



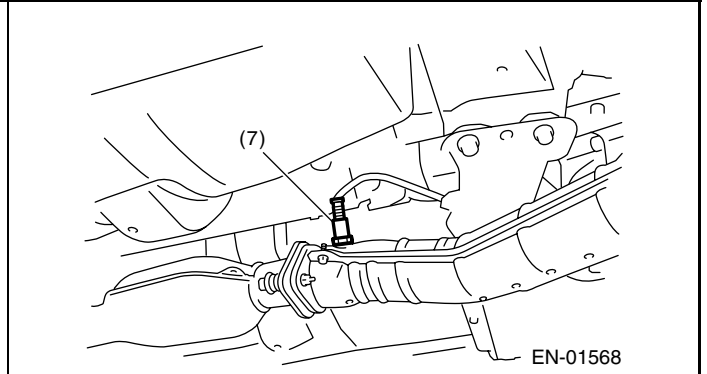
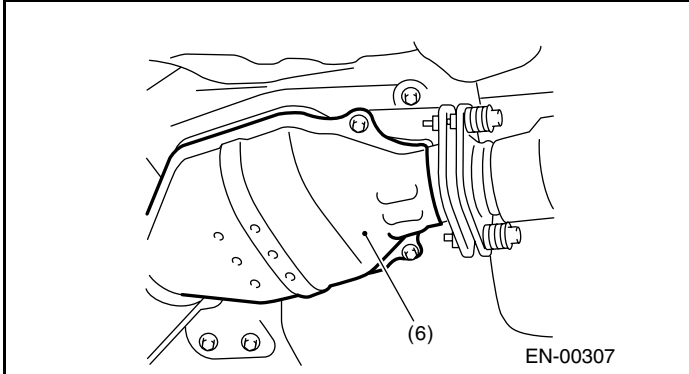
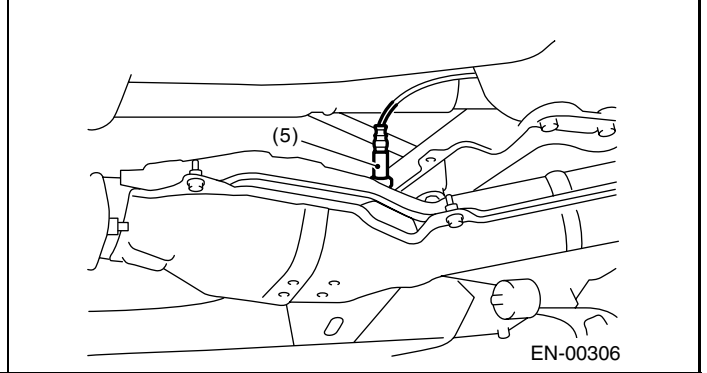
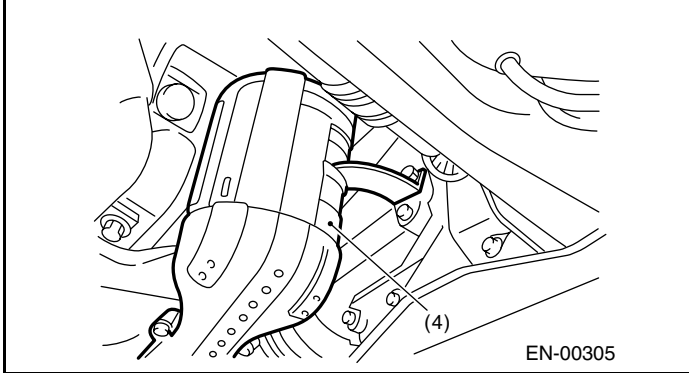
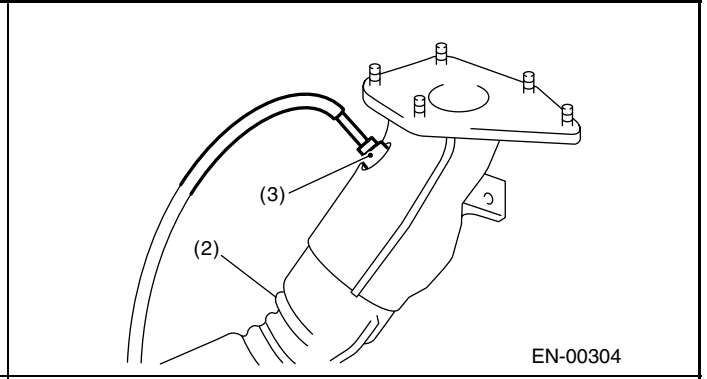
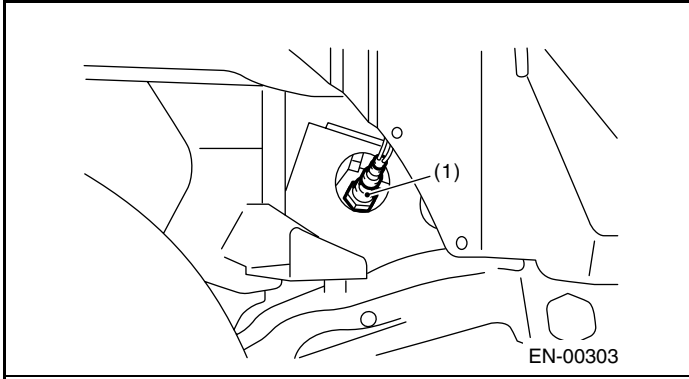
- (1) Front oxygen (A/F) sensor
- (2) Precatalytic converter (Except for Australia model and STi model)
- (3) Exhaust temperature sensor (Except for Australia model and STi model)

- (4) Front catalytic converter
- (5) Rear oxygen sensor (Except for Australia model)

- (6) Rear catalytic converter
- (7) Rear oxygen sensor (Australia model except for STi)

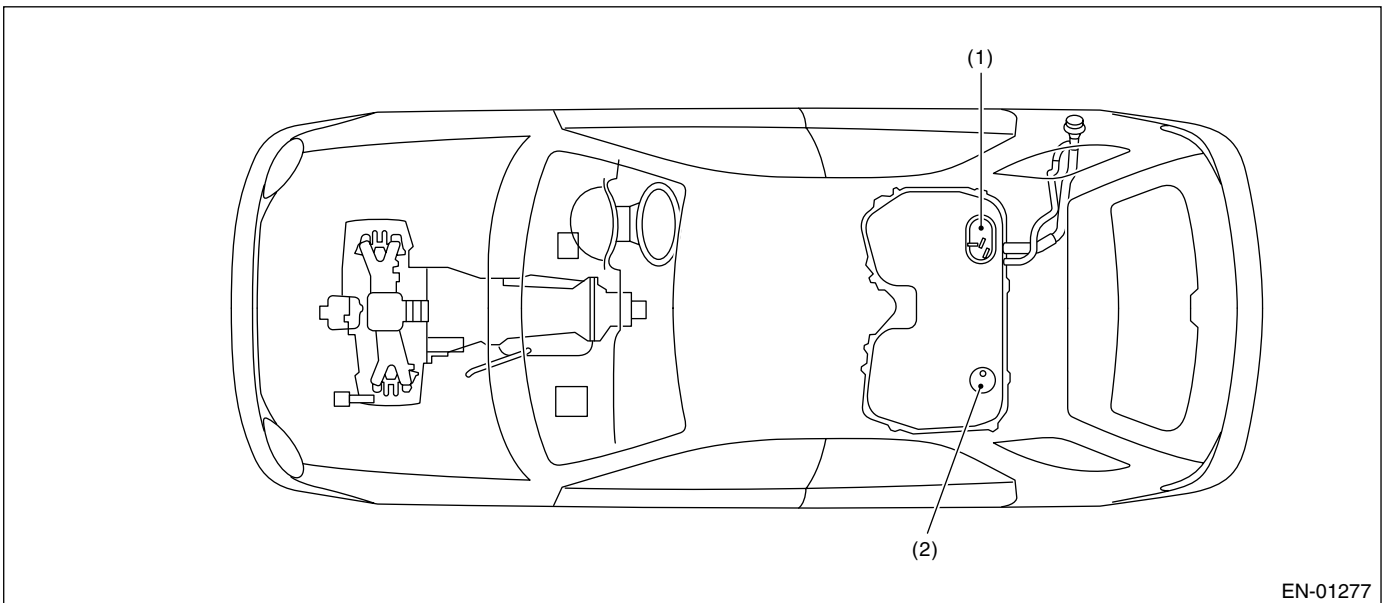
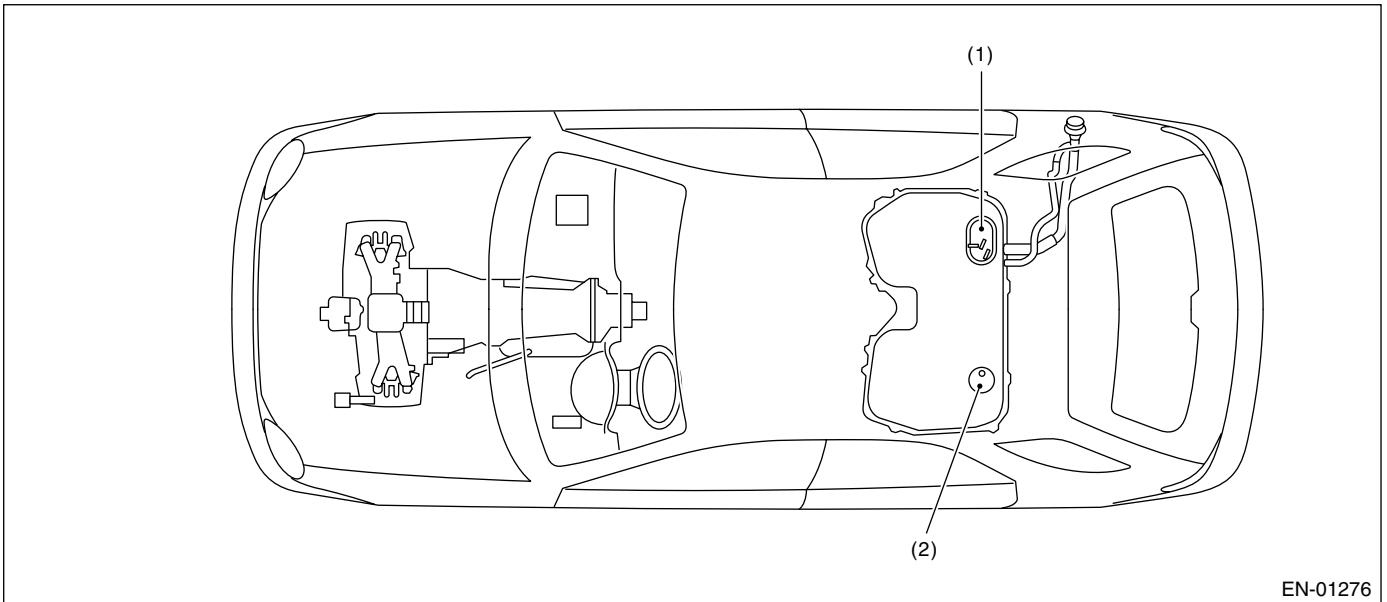
Electrical Components Location

ENGINE (DIAGNOSTICS)



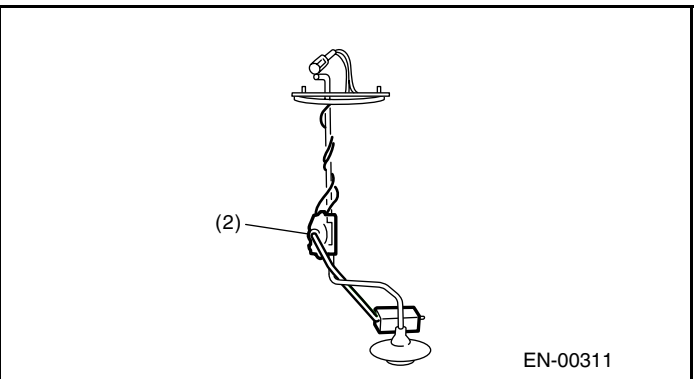
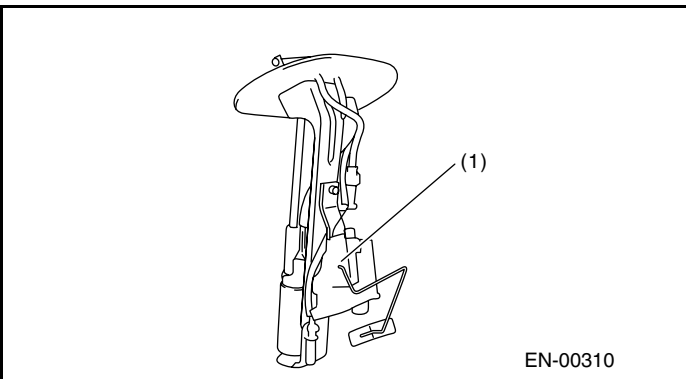
Electrical Components Location

ENGINE (DIAGNOSTICS)



(1) Fuel level sensor

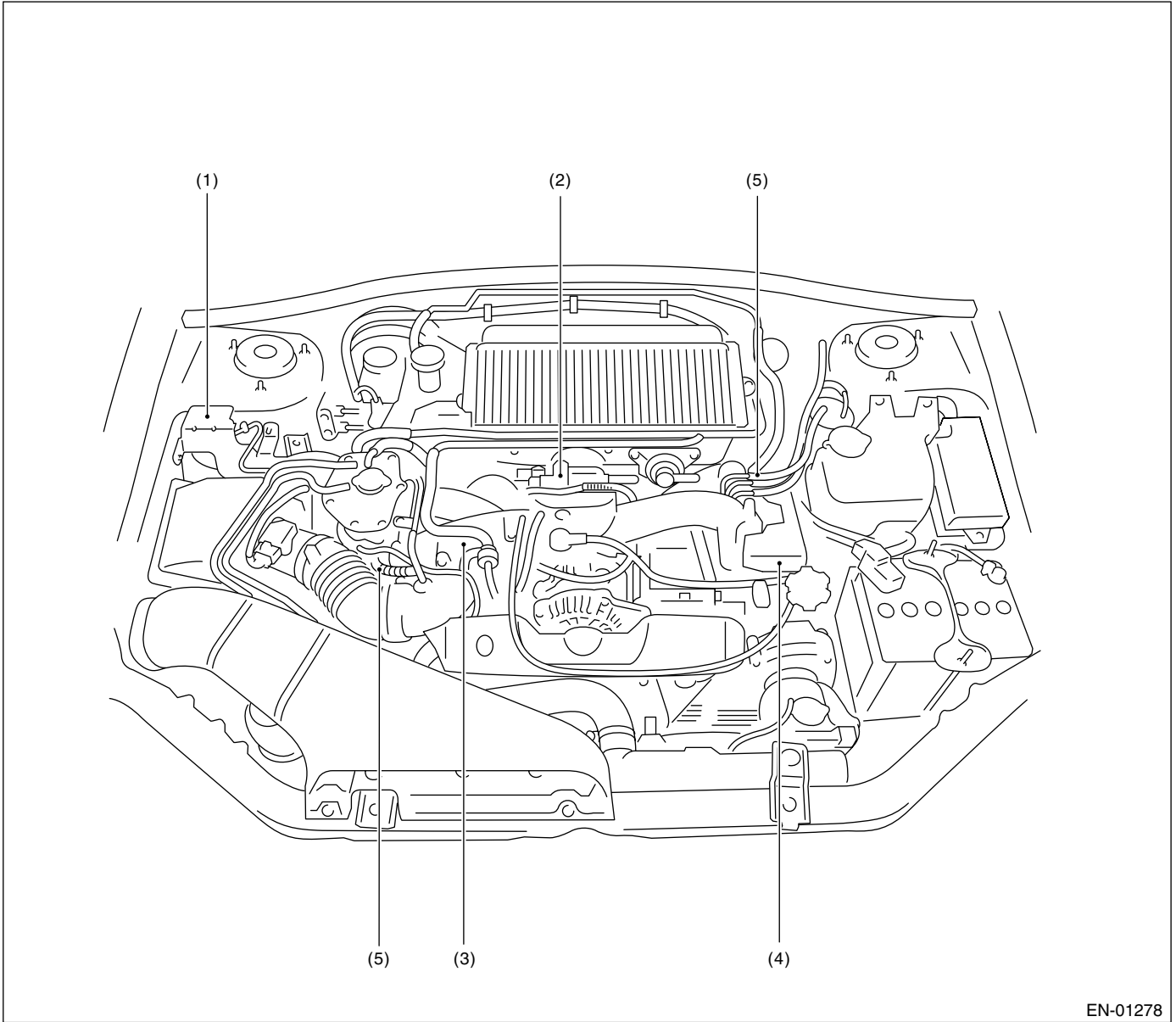
(2) Fuel sub level sensor



Electrical Components Location

ENGINE (DIAGNOSTICS)

• Solenoid Valve, Actuator, Emission Control System Parts and Ignition System Parts



EN-01278

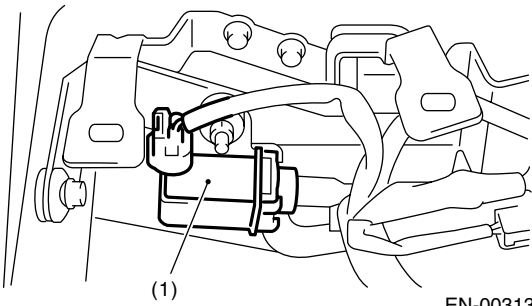
(1) Wastegate control solenoid valve
(2) Idle air control solenoid valve

(3) Purge control solenoid valve
(4) Ignition coil

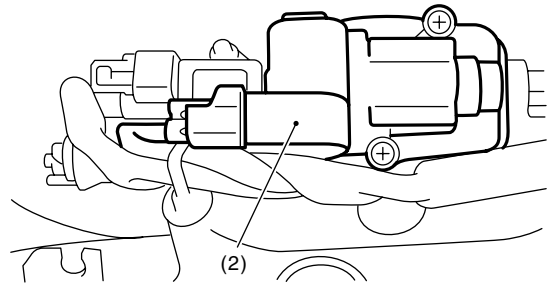
(5) Tumble generator valve actuator

Electrical Components Location

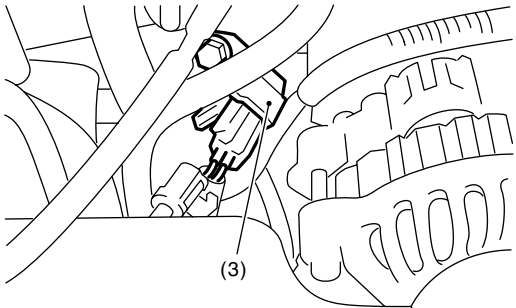
ENGINE (DIAGNOSTICS)



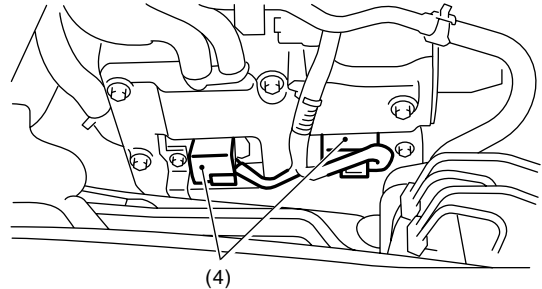
EN-00313



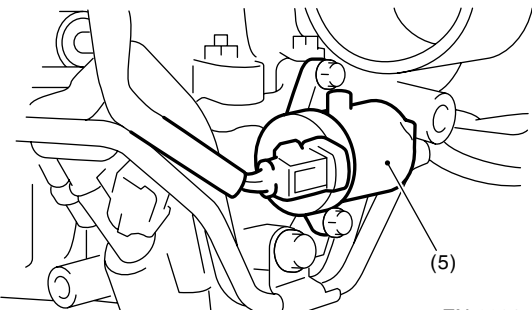
EN-00314



EN-00315



EN-00316

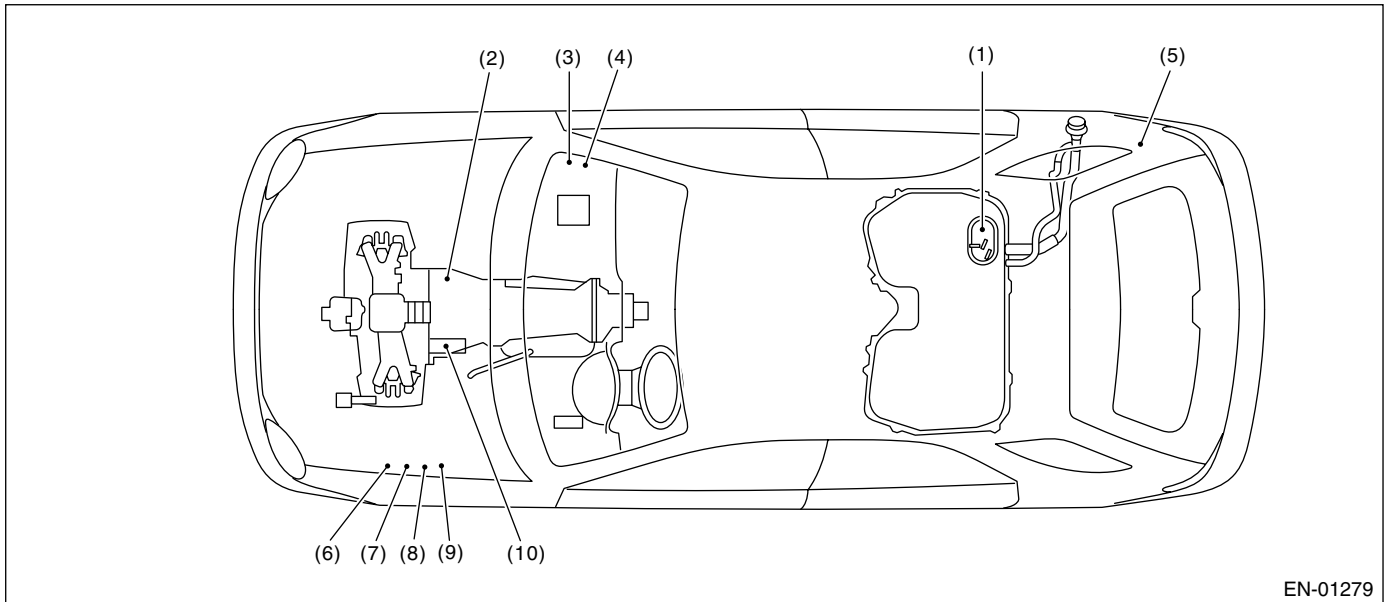


EN-00317

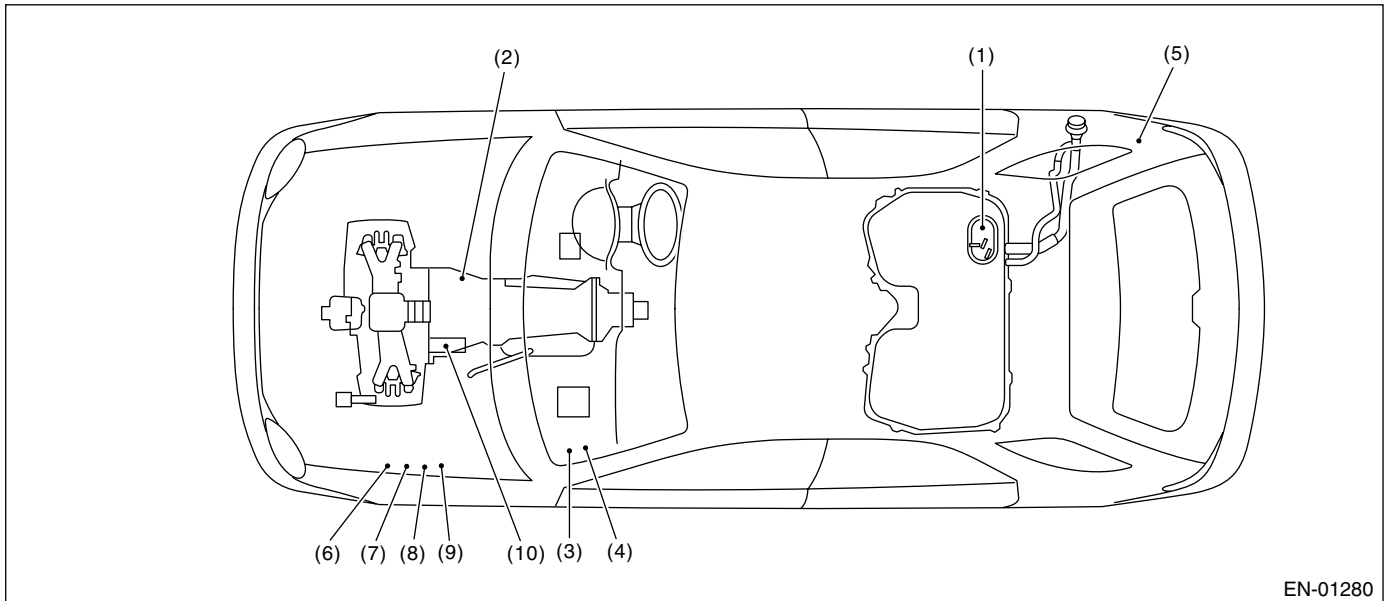
SUBARU.

Electrical Components Location

ENGINE (DIAGNOSTICS)



EN-01279

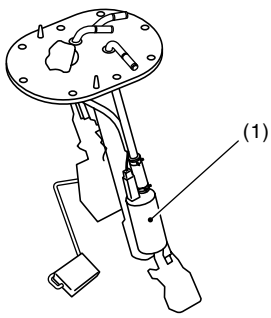
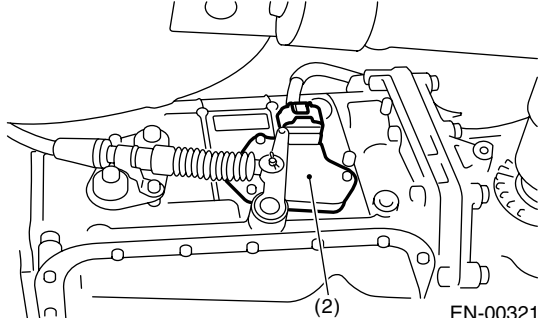
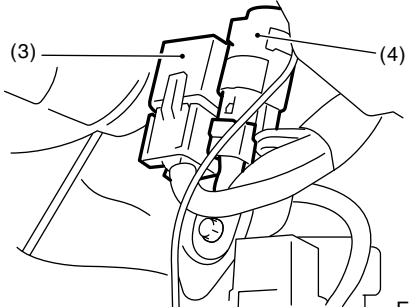
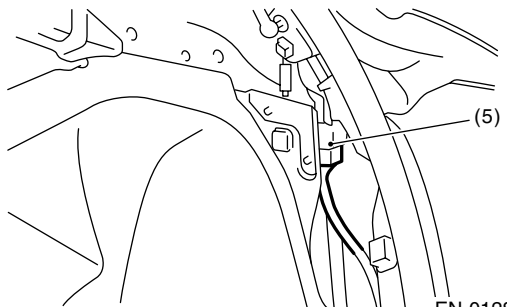
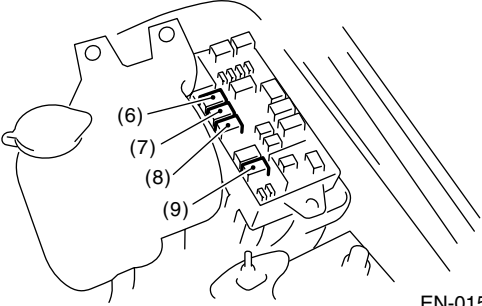
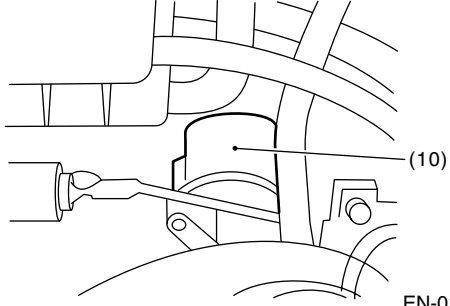


EN-01280

- | | | |
|----------------------|-------------------------------|------------------------------|
| (1) Fuel pump | (5) Fuel pump control unit | (9) Radiator sub fan relay 2 |
| (2) Inhibitor switch | (6) Radiator main fan relay 1 | (10) Starter |
| (3) Main relay | (7) Radiator main fan relay 2 | |
| (4) Fuel pump relay | (8) Radiator sub fan relay 1 | |

Electrical Components Location

ENGINE (DIAGNOSTICS)

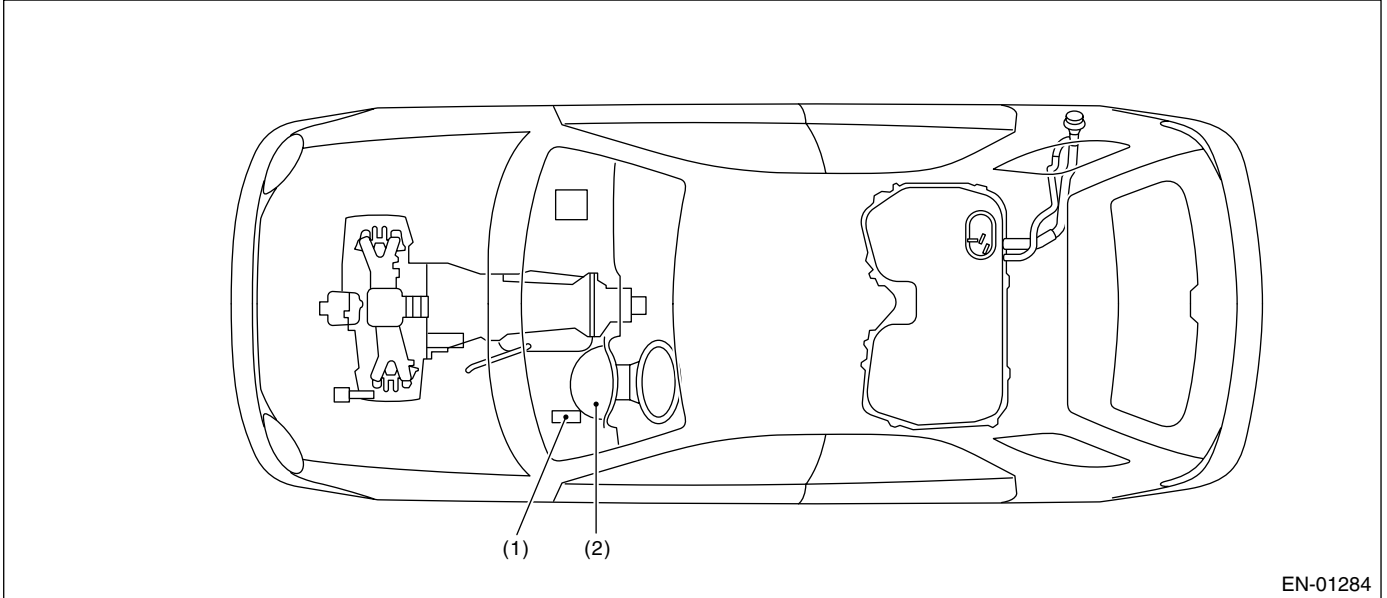
 <p>EN-00320</p>	 <p>EN-00321</p>
 <p>EN-01281</p>	 <p>EN-01282</p>
 <p>EN-01596</p>	 <p>EN-01328</p>

Electrical Components Location

ENGINE (DIAGNOSTICS)

2. TRANSMISSION

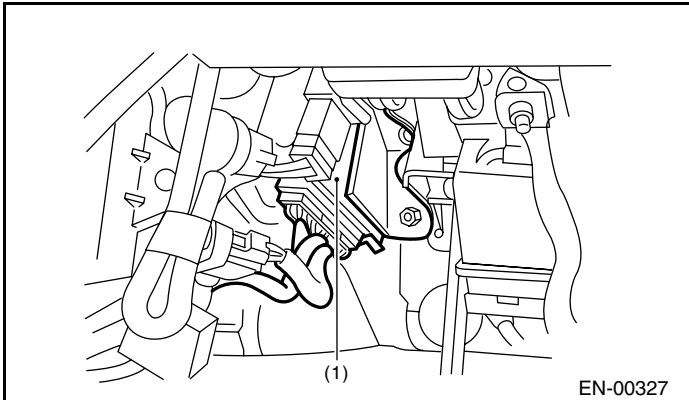
• Module



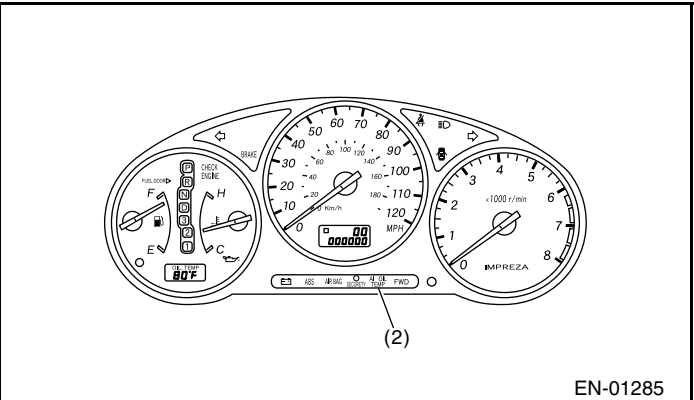
EN-01284

(1) Transmission control module (TCM) (for AT model)

(2) AT diagnostic indicator light (for AT model)

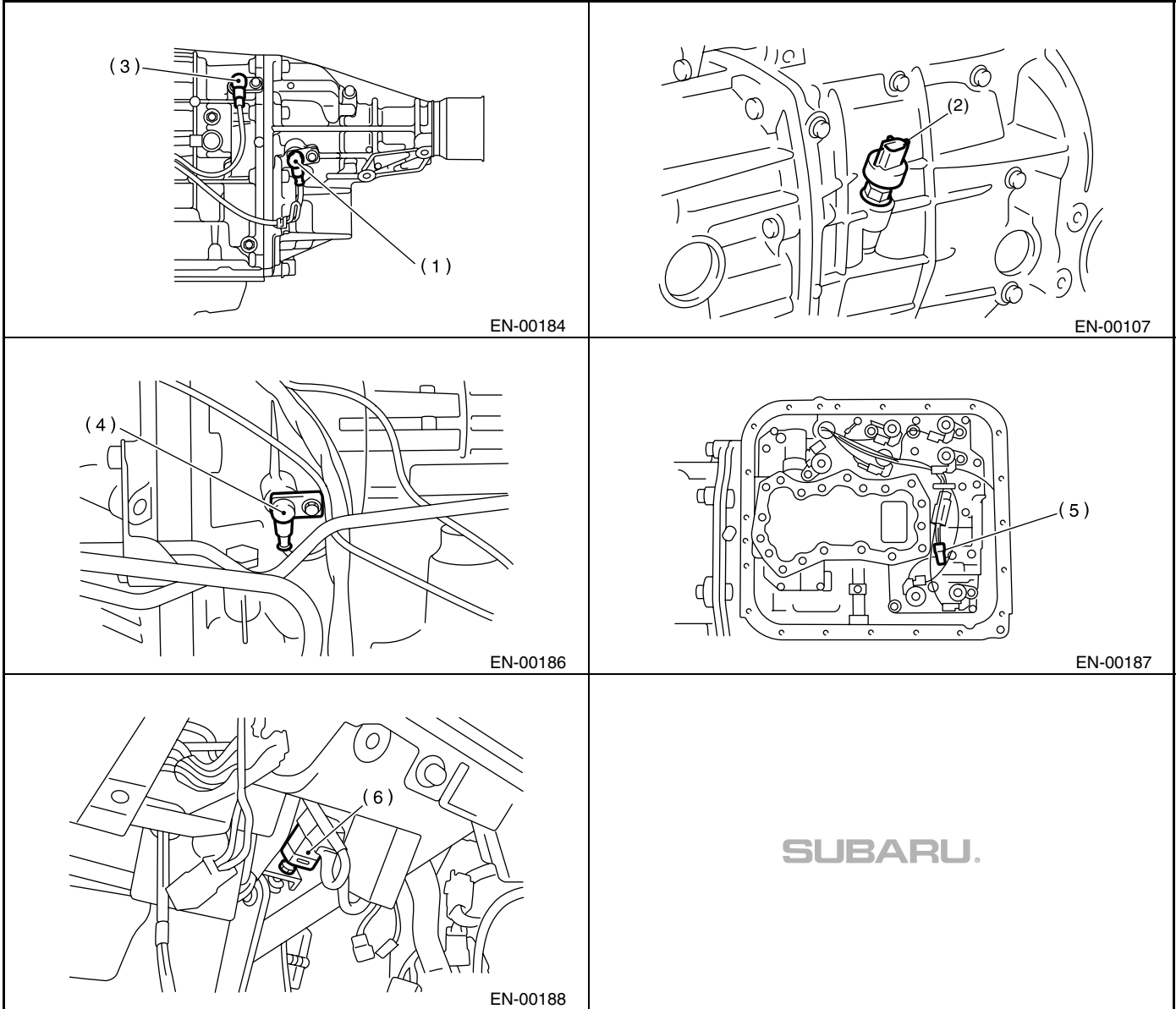


EN-00327



EN-01285

• Sensor

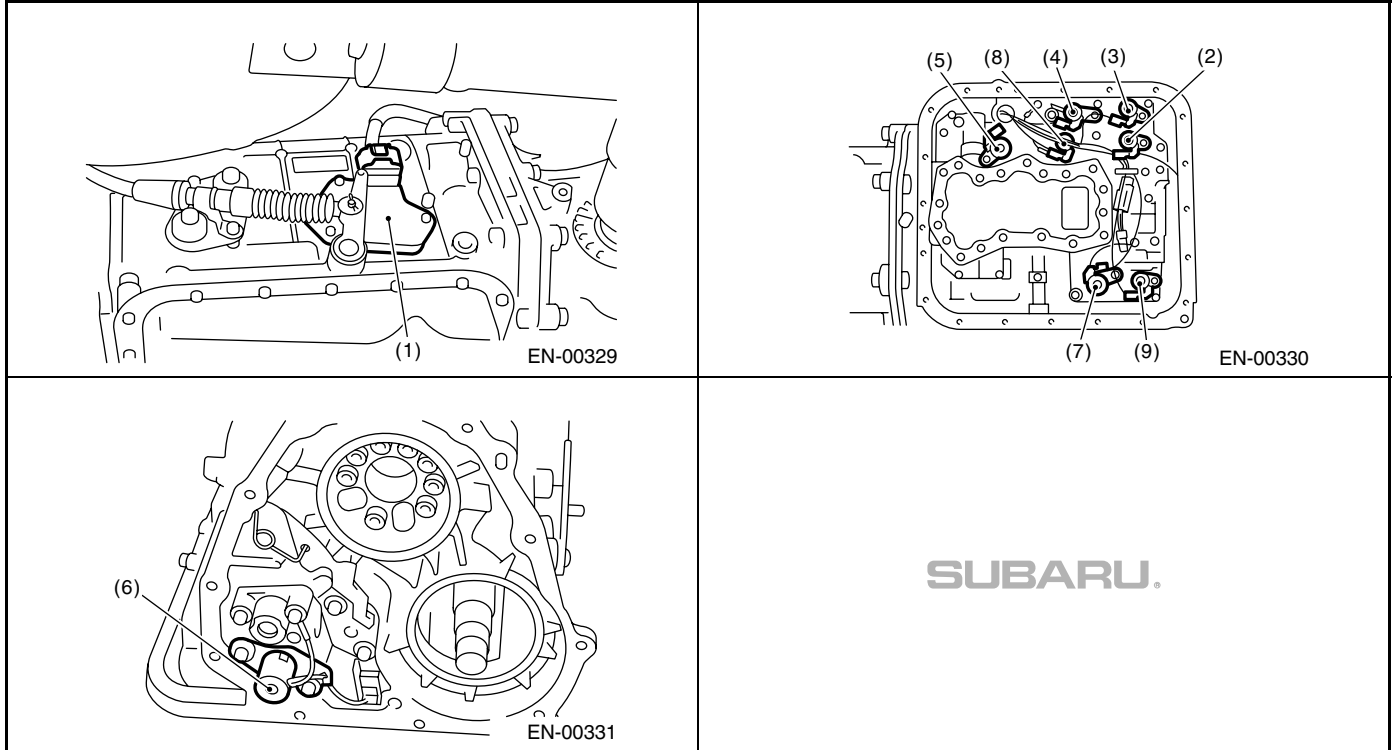


- | | | |
|---|--|---|
| (1) Rear vehicle speed sensor (for AT model) | (3) Front vehicle speed sensor (for AT model) | (5) ATF temperature sensor (for AT model) |
| (2) Front vehicle speed sensor (for MT model) | (4) Torque converter turbine speed sensor (for AT model) | (6) Brake light switch |

Electrical Components Location

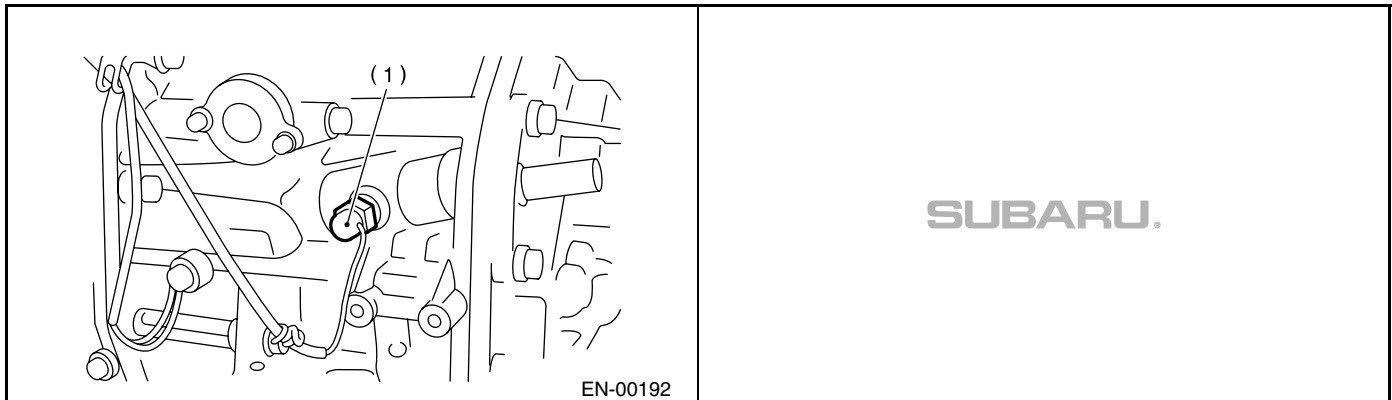
ENGINE (DIAGNOSTICS)

• Solenoid Valve and Switch (AT model)



- | | | |
|----------------------------|---------------------------------|--------------------------------------|
| (1) Inhibitor switch | (4) Line pressure duty solenoid | (7) 2-4 brake duty solenoid |
| (2) Shift solenoid valve 1 | (5) Lock-up duty solenoid | (8) Low clutch timing solenoid valve |
| (3) Shift solenoid valve 2 | (6) Transfer duty solenoid | (9) 2-4 brake timing solenoid valve |

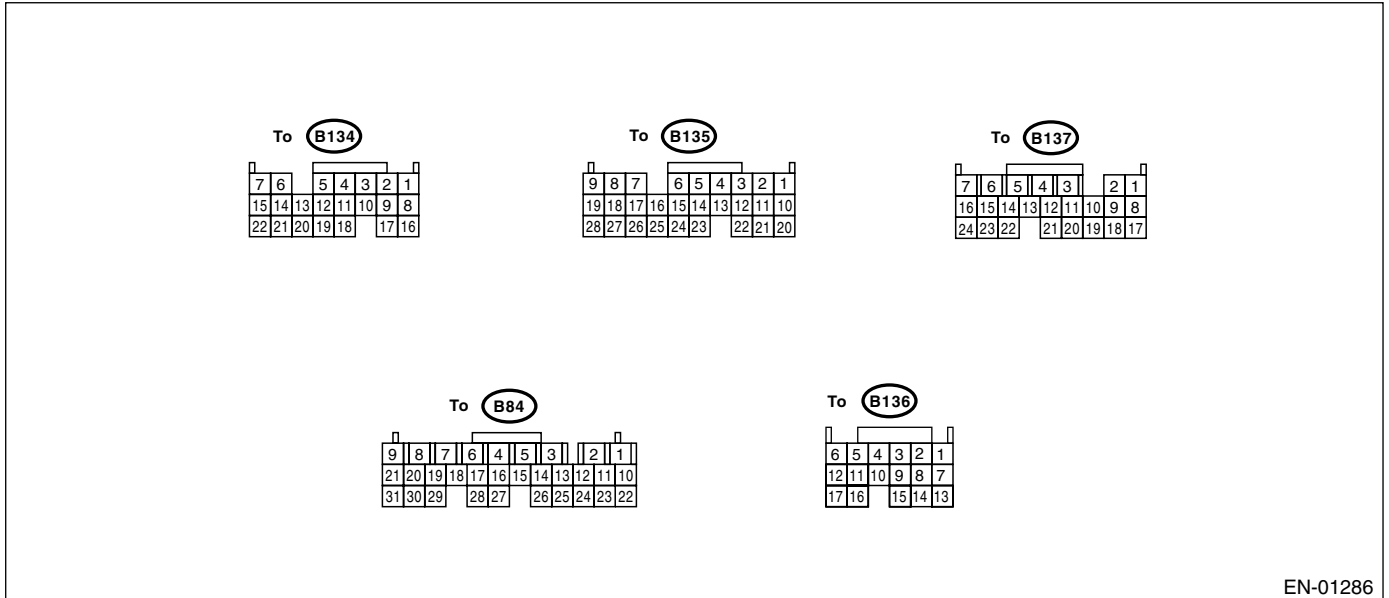
• Solenoid Valve and Switch (MT model)



- (1) Neutral position switch

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

A: ELECTRICAL SPECIFICATION



EN-01286

Content		Con- nector No.	Termi- nal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Crank- shaft po- sition sensor	Signal (+)	B135	2	0	-7 — +7	Sensor output waveform
	Signal (-)	B135	11	0	0	—
	Shield	B135	21	0	0	—
Camshaft position sensor	Signal (+)	B135	1	0	-7 — +7	Sensor output waveform
	Signal (-)	B135	10	0	0	—
	Shield	B135	21	0	0	—
Throttle position sensor	Signal	B135	7	Fully closed: 0.2 — 1.0 Fully opened: 4.2 — 4.7		—
	Power supply	B135	9	5	5	—
	GND (sensor)	B135	19	0	0	—
Rear oxy- gen sen- sor	Signal	B135	17	0	0 — 0.9	—
	Shield	B135	26	0	0	—
	GND (sensor)	B135	19	0	0	—
Front oxy- gen (A/F) sensor heater	Signal 1	B84	5	0 — 1.0	0 — 1.0	—
	Signal 2	B84	4	0 — 1.0	0 — 1.0	—
Rear oxygen sensor heater signal		B137	13	0 — 1.0	0 — 1.0	—
Engine coolant tempera- ture sen- sor	Signal	B135	18	1.0 — 1.4	1.0 — 1.4	After warm-up the engine.
	GND (sensor)	B135	19	0	0	After warm-up the engine.
Vehicle speed signal		B134	1	0 or 5	0 or 5	"5" and "0" are repeatedly dis- played when vehicle is driven.

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Content		Con- nector No.	Termi- nal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Generator signal		B84	11	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 10 — 13	Waveform
Mass air flow sen- sor	Signal	B136	13	—	0.3 — 4.5	—
	Shield	B136	8	0	0	—
	GND	B136	7	0	0	—
Intake air temperature sensor signal		B135	27	—	—	—
Exhaust gas tem- perature sensor	Signal	B135	16	—	—	—
	GND (sensor)	B135	19	0	0	—
Tumble generator valve posi- tion sensor RH	Signal	B135	23	Fully closed: 0.2 — 1.0 Fully opened: 4.2 — 4.7		—
	Power supply	B135	9	5	5	—
	GND (sensor)	B135	19	0	0	—
Tumble generator valve posi- tion sensor LH	Signal	B135	13	Fully closed: 0.2 — 1.0 Fully opened: 4.2 — 4.7		—
	Power supply	B135	9	5	5	—
	GND (sensor)	B135	19	0	0	—
Tumble generator valve RH (open)		B136	4	0 or 5	0 or 5	—
Tumble generator valve RH (close)		B136	5	0 or 5	0 or 5	—
Tumble generator valve LH (open)		B136	10	0 or 5	0 or 5	—
Tumble generator valve LH (close)		B136	11	0 or 5	0 or 5	—
Wastegate control sole- noid valve		B84	24	10 — 13	13 — 14	—
Starter switch		B134	16	0	0	Cranking: 8 — 14
A/C switch		B134	6	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
Ignition switch		B134	14	10 — 13	13 — 14	—
Neutral position switch		B134	8	ON: 12±0.5 OFF: 0		Switch is ON when gear is in neutral position.
Test mode connector		B134	5	5	5	When connected: 0
Knock sensor	Signal	B135	4	2.8	2.8	—
	Shield	B135	22	0	0	—
Back-up power supply		B84	10	10 — 13	13 — 14	Ignition switch "OFF": 10 — 13
Control unit power sup- ply	B84	2	10 — 13	13 — 14	—	
	B84	3	10 — 13	13 — 14	—	
Sensor power supply		B135	9	5	5	—
Line end check 1		B134	10	0	0	—
Ignition control	#1	B137	24	0	13 — 14	Waveform
	#2	B137	23	0	13 — 14	Waveform
	#3	B137	22	0	13 — 14	Waveform
	#4	B137	21	0	13 — 14	Waveform

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Content		Con- nector No.	Termi- nal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Oil flow control solenoid valve (LH)	Signal (+)	B136	17	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
	Signal (-)	B136	16	0	0	—
Oil flow control solenoid valve (RH)	Signal (+)	B136	6	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
	Signal (-)	B136	12	0	0	—
Fuel injec- tor	#1	B84	1	10 — 13	1 — 14	Waveform
	#2	B137	6	10 — 13	1 — 14	Waveform
	#3	B137	5	10 — 13	1 — 14	Waveform
	#4	B137	4	10 — 13	1 — 14	Waveform
Idle air control solenoid valve	Signal	B137	10	0 or 13 — 14	0 or 13 — 14	Waveform
Fuel pump control unit	Signal 1	B134	13	—	—	—
	Signal 2	B137	16	—	—	—
A/C relay control		B84	27	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—
Radiator fan relay 1 control		B84	17	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—
Radiator fan relay 2 control		B84	28	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	Model with A/C only
Malfunction indicator lamp		B84	15	—	—	Light "ON": 1, or less Light "OFF": 10 — 14
Engine speed output		B137	9	—	0 — 13, or more	Waveform
Purge control solenoid valve		B84	16	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—
Manifold absolute pressure sensor	Signal	B135	8	1.7 — 2.4	1.1 — 1.6	—
	Power supply	B135	9	5	5	
	GND (sensor)	B135	19	0	0	
Fuel level sensor		B135	25	0.12 — 4.75	0.12 — 4.75	—
Small light switch		B134	17	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Blower fan switch		B134	9	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Rear defogger switch		B134	3	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Power steering oil pres- sure switch		B135	24	10 — 13	ON: 0 OFF: 13 — 14	—
Wiper switch		B135	12	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
Front oxygen (A/F) sen- sor signal (+)		B84	29	2.8 — 3.2	2.8 — 3.2	—
Front oxygen (A/F) sen- sor signal (-)		B84	19	2.4 — 2.7	2.4 — 2.7	—
Front oxygen (A/F) sen- sor shield		B84	18	0	0	—
SSM/GST communica- tion line		B134	21	Less than 1 ←→ More than 4	Less than 1 ←→ More than 4	—

Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Content	Con- nector No.	Termi- nal No.	Signal (V)		Note
			Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Torque control 1 signal	B134	19	More than 4	More than 4	—
Torque control 2 signal	B134	18	More than 4	More than 4	—
Torque control cut sig- nal	B137	14	8	8	—
AT diagnosis input sig- nal	B135	20	Less than 1 ←→ More than 4	Less than 1 ←→ More than 4	Waveform
AT load signal	B135	28	4.3 — 4.4	0.9 — 1.4	—
GND (sensors)	B135	19	0	0	—
GND (injectors)	B137	8	0	0	—
GND (ignition system)	B137	18	0	0	—
GND (power supply)	B137	17	0	0	—
	B134	22	0	0	—
GND (control systems)	B134	7	0	0	—
	B134	15	0	0	—
GND (oxygen sensor heater 1)	B84	9	0	0	—
GND (oxygen sensor heater 2)	B84	8	0	0	—

6. Engine Condition Data

A: ELECTRICAL SPECIFICATION

Content	Specified data
Engine load	1.6 — 2.9 (%): Idling
	6.4 — 12.8 (%): 2,500 rpm racing

Measuring condition:

- After warm-up the engine.
- Gear position is in neutral position.
- A/C is turned to OFF.
- All accessory switches are turned to OFF.

Transmission Control Module (TCM) I/O Signal

ENGINE (DIAGNOSTICS)

7. Transmission Control Module (TCM) I/O Signal

A: ELECTRICAL SPECIFICATION

<Ref. to 4AT(diag)-13, Transmission Control Module (TCM) I/O Signal.>

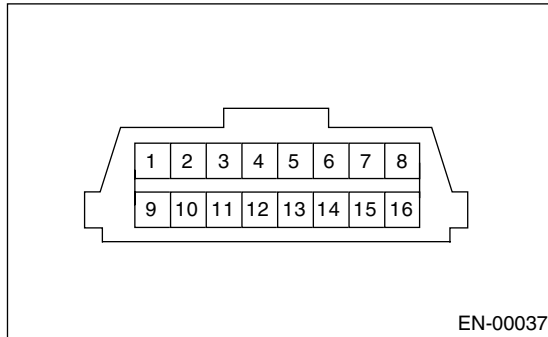
8. Data Link Connector

A: NOTE

This connector is used both for the OBD-II general scan tools and Subaru Select Monitor.

CAUTION:

Do not connect any scan tools other than the OBD-II general scan tools and Subaru Select Monitor, because the circuit for Subaru Select Monitor may be damaged.



Terminal No.	Contents	Terminal No.	Contents
1	Power supply	9	Blank
2	Blank	10	Subaru Select Monitor signal
3	Blank	11	Blank
4	Blank	12	Ground
5	Blank	13	Ground
6	Line end check signal 1	14	Blank
7	Blank	15	Blank
8	Blank	16	Blank

OBD-II General Scan Tool

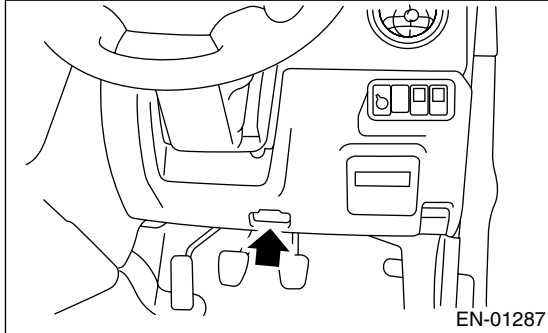
ENGINE (DIAGNOSTICS)

9. OBD-II General Scan Tool

A: OPERATION

1. HOW TO USE OBD-II GENERAL SCAN TOOL

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



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

OBD-II 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

Read out the data according to repair procedures. (For detailed operation procedures, refer to the OBD-II General Scan Tool Operation Manual.)

NOTE:

For details concerning DTC, refer to the List of Diagnostic Trouble Code (DTC). <Ref. to EN(H4DOTC)(diag)-74, List of Diagnostic Trouble Code (DTC).>

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

Refers to data denoting the current operating condition of analog input/output, digital input/output and/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 Support of diagnosis and status information	ON/OFF
03	Fuel system control status	—
04	Calculated engine load value	%
05	Engine coolant temperature	°C
06	Short term fuel trim	%
07	Long term fuel trim	%
0B	Intake manifold absolute pressure	kPa
0C	Engine revolution	rpm
0D	Vehicle speed	km/h
0E	Ignition timing advance	°
0F	Intake air temperature	°C
10	Intake air amount	g/sec
11	Throttle valve opening angle	%
13	Check whether oxygen sensor is installed.	—
15	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor — bank 2	V and %
21	Driving distance after the malfunction indicator light illuminates	km
24	A/F sensor 1 output voltage and short term fuel trim associated with A/F sensor 1	V and %
1C	On-board diagnosis system	—

NOTE:

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

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

Refers to data denoting the operating condition when trouble is sensed by the on-board diagnosis system. A list of the support data and PID (Parameter Identification) codes are shown in the following table.

PID	Data	Unit of measure
02	DTC that caused CARB required freeze frame data storage	—
03	Fuel system control status	—
04	Calculated engine load value	%
05	Engine coolant temperature	°C
06	Short term fuel trim	%
07	Long term fuel trim	%
0B	Intake manifold absolute pressure	kPa
0C	Engine revolution	rpm
0D	Vehicle speed	km/h
0E	Cylinder 1 ignition timing	°
0F	Intake air temperature	°C
10	Air flow amount	g/sec
11	Throttle opening angle	%

NOTE:

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

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

Refer to Read Diagnostic Trouble Code (DTC) for information about data denoting emission-related powertrain DTC. <Ref. to EN(H4DOTC)(diag)-38, Read Diagnostic Trouble Code (DTC).>

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

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

NOTE:

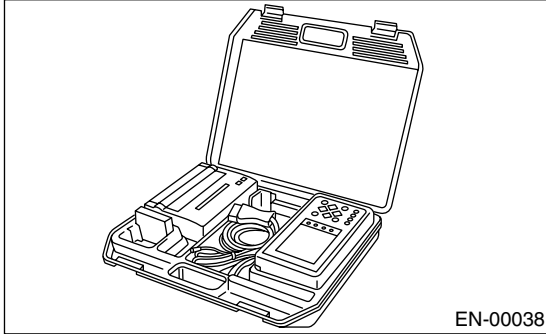
Refer to OBD-II general scan tool manufacturer's instruction manual to clear or reset emission-related diagnostic information (MODE \$04).

10. Subaru Select Monitor

A: OPERATION

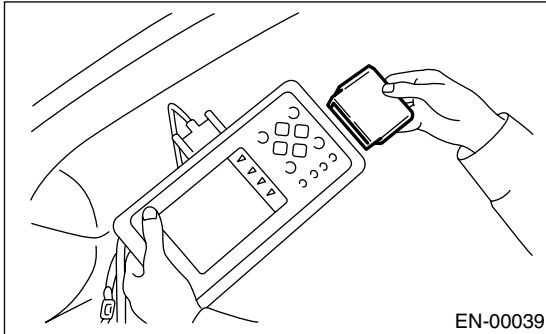
1. HOW TO USE SUBARU SELECT MONITOR

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



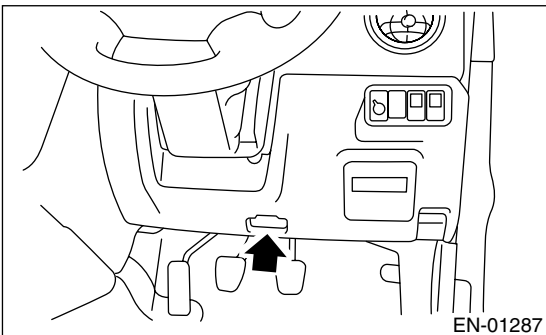
2) Connect the diagnosis cable to Subaru Select Monitor.

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



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

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

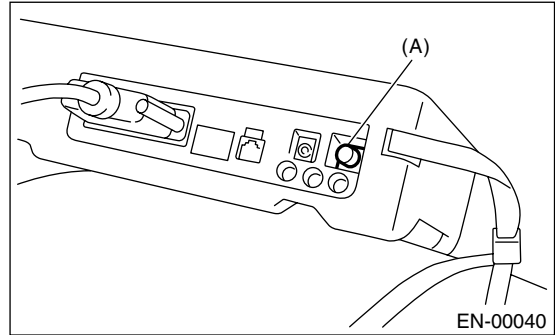


(2) Connect the diagnosis cable to data link connector.

CAUTION:

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

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



(A) Power switch

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

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

Refer to Read Diagnostic Trouble Code (DTC) for information about how to indicate DTC. <Ref. to EN(H4DOTC)(diag)-38, Read Diagnostic Trouble Code (DTC).>

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

Refer to Read Diagnostic Trouble Code (DTC) for information about how to indicate DTC. <Ref. to EN(H4DOTC)(diag)-38, Read Diagnostic Trouble Code (DTC).>

4. READ CURRENT DATA FOR ENGINE. (NORMAL MODE)

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

Remarks	Display	Unit of measure	Note (at idling)
Engine coolant temperature signal	Coolant Temp.	°C	80 — 100°C
A/F correction 1	A/F Correction #1	%	-10 — +10%
A/F learning 1	A/F Learning #1	%	-10 — +10%
Intake manifold absolute pressure	Mani. Absolute Pressure	mmHg	250 — 350 mmHg
Intake manifold relative pressure	Mani. Relative Pressure	mmHg	Intake manifold absolute pressure – atmospheric pressure
Engine speed signal	Engine Speed	rpm	630 — 770 rpm (Agree with the tachometer indication)
Vehicle speed signal	Vehicle Speed	km/h	0 km/h (at parking)
Ignition timing signal	Ignition Timing	deg	9 — 15 deg
Intake air temperature signal	Intake Air Temp.	°C	10 — 30°C higher than ambient temperature
Amount of intake air	Mass Air Flow	g/s	2 — 3 g/s
Throttle opening angle signal	Throttle Opening Angle	%	0% (80° = 100%)
Throttle voltage	Throttle voltage	V	0.35 — 0.65 V
Rear oxygen sensor voltage	Rear O2 Sensor	V	0 — 1.0 V
Rear oxygen sensor heater voltage	Rear O2 Heater Voltage	V	0 — 4 V
Battery voltage	Battery Voltage	V	12 — 15 V
Mass air flow voltage	Air Flow Sensor Voltage	V	1.0 — 1.3 V
Injection 1 pulse width	Fuel Injection #1 Pulse	ms	2 — 3.5 ms
Knock sensor correction	Knock Correction	deg	0.0 deg
Primary supercharged pressure control signal	Primary Control	%	0.0%
Purge control solenoid duty ratio	CPC Valve Duty Ratio	%	0 — 25%
Generator duty ratio	ALT Duty	%	0 — 100%
Fuel pump duty ratio	Fuel Pump Duty	%	28 — 38%
AVCS advance angle amount RH	VVT Adv. Ang. Amount R	deg	-2 — +2 deg
AVCS advance angle amount LH	VVT Adv. Ang. Amount L	deg	-2 — +2 deg
Oil flow control solenoid valve duty RH (AVCS)	OCV Duty R	%	10 — 20%
Oil flow control solenoid valve duty LH (AVCS)	OCV Duty L	%	10 — 20%
Oil flow control solenoid valve current RH	OCV Current R	mA	50 — 100 mA
Oil flow control solenoid valve current LH	OCV Current L	mA	50 — 100 mA
A/F sensor current value 1	A/F Sensor #1 Current	mA	-0.2 — +0.2 mA
A/F sensor resistance value 1	A/F Sensor #1 Resistance	ohm	27 — 32 Ω
A/F sensor output lambda 1	A/F Sensor #1	—	0.8 — 1.2
A/F correction 3	A/F Correction #3	%	0.00%
A/F sensor heater current valve 1	A/F Heater Current #1	A	1.0 — 2.0 A
Idle air control solenoid valve signal	ISC Duty	%	15 — 25%
Tumble generator valve signal	TGV Position Sensor R	V	4.0 — 4.5 V
Tumble generator valve signal	TGV Position Sensor L	V	4.0 — 4.5 V
Atmospheric pressure signal	Atmospheric Pressure	mmHg	700 — 800 mmHg

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

Remarks	Display	Unit of measure	Note (at idling)
AT/MT identification terminal	AT Vehicle ID Signal	—	ON/OFF
Test mode terminal	Test Mode Signal	—	OFF
Read memory terminal	Read Memory Terminal	—	OFF
Neutral position switch signal	Neutral Position Switch	—	ON
Soft idle switch signal	Idle Switch Signal	—	ON
Ignition switch signal	Ignition Switch	—	ON
Power steering switch input signal	P/S Switch	—	OFF (At OFF)
Air conditioning switch signal	A/C Switch	—	OFF (At OFF)
Starter switch signal	Starter Switch	—	OFF
Rear O ₂ monitor	Rear O2 Rich Signal	—	OFF
Knocking signal	Knocking Signal	—	OFF
Crankshaft position sensor signal	Crankshaft Position Sig.	—	OFF
Camshaft position sensor signal	Camshaft Position Sig.	—	OFF
Rear defogger switch signal	Rear Defogger SW	—	OFF (At OFF)
Blower fan switch signal	Blower Fan SW	—	OFF (At OFF)
Light switch signal	Light Switch	—	OFF (At OFF)
Air conditioner compressor relay output signal	A/C Compressor Signal	—	OFF
Radiator fan relay 1 signal	Radiator Fan Relay #1	—	OFF
Radiator fan relay 2 signal	Radiator Fan Relay #2	—	OFF
Tumble generator valve output signal	TGV Output	—	OFF
Tumble generated valve drive signal	TGV Drive	—	Open
AT cooperative control request signal 1	Torque Control Signal #1	—	OFF
AT cooperative control request signal 2	Torque Control Signal #2	—	OFF
AT coordinate permission demand	Torque Permission Signal	—	ON
Intercooler water spray auto switch signal	IC Washer Switch	—	OFF (At OFF)
Intercooler water spray relay signal	IC Washer Relay	—	OFF (At OFF)

NOTE:

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

5. READ CURRENT DATA FOR ENGINE (OBD MODE)

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

Description	Display	Unit of measure
Number of diagnosis code	Number of Diag. Code:	—
Condition of malfunction indicator light	MI (MIL)	ON or OFF
Monitoring test of misfire	Misfire monitoring	no support
Monitoring test of fuel system	Fuel system monitoring	complete or incomplete
Monitoring test of comprehensive component	Component monitoring	complete or incomplete
Test of catalyst	Catalyst Diagnosis	no support
Test of heating-type catalyst	Heated catalyst	no support
Test of evaporative emission purge control system	Evaporative purge system	no support
Test of secondary air system	Secondary air system	no support
Test of air conditioning system refrigerant	A/C system refrigerant	no support
Test of oxygen sensor	Oxygen sensor	complete or incomplete
Test of oxygen sensor heater	O2 Heater Diagnosis	complete or incomplete
Test of EGR system	EGR system	no support

NOTE:

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

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

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

Contents	Display	Unit of measure
DTC for freeze frame data	Freeze frame data	DTC
Air fuel ratio control system for bank 1	Fuel system for Bank1	ON or OFF
Engine load data	Engine Load	%
Engine coolant temperature signal	Coolant Temp.	°C or °F
Short term fuel trim by front oxygen (A/F) sensor	Short term fuel trim B1	%
Long term fuel trim by front oxygen (A/F) sensor	Long term fuel trim B1	%
Intake manifold absolute pressure signal	Mani. Absolute Pressure	mmHg, kPa, inHg or psi
Engine speed signal	Engine Speed	rpm
Vehicle speed signal	Vehicle Speed	km/h or MPH
Air fuel ratio control system for bank 1	Fuel System for Bank 1	—
Ignition timing advance for #1 cylinder	Ignition timing adv. #1	°
Intake air temperature signal	Intake Air Temp.	°C or °F
Intake air amount	Mass Air Flow	g/s
Throttle position signal	Throttle Opening Angle	%

NOTE:

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

Subaru Select Monitor

ENGINE (DIAGNOSTICS)

7. LED OPERATION MODE FOR ENGINE

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

Remarks	Display	Message	LED "ON" requirements
AT/MT identification signal	AT Vehicle ID Signal	ON or OFF	Illuminate (AT model)
Test mode signal	Test Mode Signal	ON or OFF	When test mode connector is connected.
Read memory signal	Read Memory Terminal	ON or OFF	When read memory connector is connected.
Neutral position switch signal	Neutral Position Switch	ON or OFF	When neutral position signal is entered.
Idle switch signal	Idle Switch Signal	ON or OFF	When idle switch signal is entered.
Ignition switch signal	Ignition Switch	ON or OFF	When ignition switch is turned to ON.
Power steering switch signal	P/S Switch	ON or OFF	When power steering switch is entered.
Starter switch signal	Starter Switch	ON or OFF	When starter switch is input.
Air conditioning switch signal	A/C Switch	ON or OFF	When air conditioning switch is input.
Rear oxygen sensor rich signal	Rear O2 Rich Signal	ON or OFF	When rear oxygen sensor mixture ratio is rich.
Knocking signal	Knocking Signal	ON or OFF	When knocking signal is input.
Crankshaft position sensor signal	Crankshaft Position Signal	ON or OFF	When crankshaft position sensor signal is input.
Camshaft position sensor signal	Camshaft Position Signal	ON or OFF	When camshaft position sensor signal is input.
Rear defogger switch signal	Rear Defogger Switch	ON or OFF	When rear defogger switch is turned to ON.
Blower fan switch signal	Blower Fan Switch	ON or OFF	When blower fan switch is turned to ON.
Small light switch signal	Light Switch	ON or OFF	When small light switch is turned to ON.
Air conditioning relay signal	A/C Compressor Signal	ON or OFF	When air conditioning relay is in function.
Radiator fan relay 1 signal	Radiator Fan Relay #1	ON or OFF	When radiator fan relay 1 is in function.
Radiator fan relay 2 signal	Radiator Fan Relay #2	ON or OFF	When radiator fan relay 2 is in function.
AT cooperative control request signal 1	Torque Control Signal #1	ON or OFF	When AT cooperative control request signal is input.
AT cooperative control request signal 2	Torque Control Signal #2	ON or OFF	When AT cooperative control request signal is input.
AT coordinate permission signal	Torque Control Permission	ON or OFF	When AT coordinate permission signal is input.
Intercooler water spray auto switch signal	IC Washer Switch	ON or OFF	When intercooler water spray auto switch signal is input.
Intercooler water spray relay signal	IC Washer Relay	ON or OFF	When intercooler water spray relay signal is input.

NOTE:

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

8. READ CURRENT DATA FOR AT

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

Contents	Display	Unit of measure
Battery voltage	Battery Voltage	V
Rear vehicle speed sensor signal	Rear Wheel Speed	km/h or MPH
Front vehicle speed sensor signal	Front Wheel Speed	km/h or MPH
Engine speed signal	Engine Speed	rpm
Automatic transmission fluid temperature signal	ATF Temp.	°C or °F
Mass air flow sensor signal	Air Flow Sensor Voltage	V
Throttle position signal	Throttle Sensor Voltage	V
Gear position	Gear Position	—
Line pressure control duty ratio	Line Pressure Duty Ratio	%
Lock up clutch control duty ratio	Lock Up Duty Ratio	%
Transfer clutch control duty ratio	Transfer Duty Ratio	%
Power supply for throttle position sensor	Throttle Sensor Power	V
Torque converter turbine speed signal	Turbine Revolution Speed	rpm
2-4 brake timing pressure control duty ratio	Brake Clutch Duty Ratio	%
Stop lamp switch signal	Stop Light Switch	ON or OFF
Anti lock brake system signal	ABS Signal	ON or OFF
Cruise control system signal	Cruise Control Signal	ON or OFF
Neutral/Parking range signal	N/P Range Signal	ON or OFF
Reverse range signal	R Range Signal	ON or OFF
Drive range signal	D Range Signal	ON or OFF
3rd range signal	3rd Range Signal	ON or OFF
2nd range signal	2nd Range Signal	ON or OFF
1st range signal	1st Range Signal	ON or OFF
Shift control solenoid A	Shift Solenoid #1	ON or OFF
Shift control solenoid B	Shift Solenoid #2	ON or OFF
Torque control output signal #1	Torque Control Signal #1	ON or OFF
Torque control output signal #2	Torque Control Signal #2	ON or OFF
Torque control cut signal	Torque Control Cut Sig.	ON or OFF
2-4 brake timing control solenoid valve	2-4 Brake Timing Sol.	ON or OFF
Low clutch timing control solenoid valve	Low Clutch Timing Sol.	ON or OFF
Automatic transmission diagnosis indicator lamp	Diagnosis Lamp	ON or OFF

NOTE:

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

Read Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

11. Read Diagnostic Trouble Code (DTC)

A: OPERATION

1. SUBARU SELECT MONITOR (NORMAL MODE)

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

NOTE:

- For detailed operation procedure, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.
- For detailed concerning DTC, refer to the List of Diagnostic Trouble Code (DTC). <Ref. to EN(H4DOTC)(diag)-74, List of Diagnostic Trouble Code (DTC).>

2. SUBARU SELECT MONITOR (OBD MODE)

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

NOTE:

- For detailed operation procedure, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.
- For detailed concerning DTC, refer to the List of Diagnostic Trouble Code (DTC). <Ref. to EN(H4DOTC)(diag)-74, List of Diagnostic Trouble Code (DTC).>

3. OBD-II GENERAL SCAN TOOL

Refers to data denoting emission-related powertrain DTC.

For details concerning DTC, refer to the List of Diagnostic Trouble Code (DTC). <Ref. to EN(H4DOTC)(diag)-74, List of Diagnostic Trouble Code (DTC).>

NOTE:

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

12. Inspection Mode

A: OPERATION

Carry out trouble diagnosis shown in the following DTC table.

When performing trouble diagnosis which is not shown in the DTC table, refer to the next item Drive cycle.

<Ref. to EN(H4DOTC)(diag)-45, Drive Cycle.>

DTC	Item	Condition
P0011	"A" Camshaft Position-Timing Over-Advanced or System Performance (Bank 1)	—
P0021	"A" Camshaft Position-Timing Over-Advanced or System Performance (Bank 2)	—
P0030	HO2S Heater Control Circuit (Bank 1 Sensor 1)	—
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)	—
P0068	Manifold Absolute Pressure/Barometric Pressure Circuit Range/Performance	—
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 Circuit Low Input	—
P0113	Intake Air Temperature Circuit High Input	—
P0117	Engine Coolant Temperature Circuit Low Input	—
P0118	Engine Coolant Temperature Circuit High Input	—
P0122	Throttle/Pedal Position Sensor/Switch "A" Circuit Low Input	—
P0123	Throttle/Pedal Position Sensor/Switch "A" Circuit High Input	—
P0129	Atmospheric Pressure Sensor Circuit Range/Performance	—
P0130	O2 Sensor Circuit (Bank 1 Sensor 1)	—
P0134	O2 Sensor Circuit No Activity Detected (Bank 1 Sensor 1)	—
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)	—
P0172	System too Rich (Bank 1)	—
P0230	Fuel Pump Primary Circuit	—
P0245	Turbo/Super Charger Wastegate Solenoid "A" Low	—
P0246	Turbo/Super Charger Wastegate Solenoid "A" High	—
P0327	Knock Sensor 1 Circuit Low Input (Bank 1 or Single Sensor)	—
P0328	Knock Sensor 1 Circuit High Input (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)	—
P0365	Camshaft Position Sensor "B" Circuit (Bank 1)	—
P0390	Camshaft Position Sensor "B" Circuit (Bank 2)	—
P0458	Evaporative Emission Control System Purge Control Valve Circuit Low	—
P0462	Fuel Level Sensor Circuit Low Input	—
P0463	Fuel Level Sensor Circuit High Input	—
P0502	Vehicle Speed Sensor Circuit Low Input	—
P0503	Vehicle Speed Sensor Intermittent/Erratic/High	—

Inspection Mode

ENGINE (DIAGNOSTICS)

DTC	Item	Condition
P0508	Idle Control System Circuit Low	—
P0509	Idle Control System Circuit High	—
P0512	Starter Request Circuit	—
P0513	Incorrect Immobilizer Key	—
P0519	Idle Control System Malfunction (Fail-Safe)	—
P0558	Generator Circuit Low Input	—
P0559	Generator Circuit High Input	—
P0565	Cruise Control On Signal	—
P0604	Internal Control Module Random Access Memory (RAM) Error	—
P0691	Cooling Fan 1 Control Circuit Low	—
P0692	Cooling Fan 1 Control Circuit High	—
P0703	Torque Converter/Brake Switch "B" Circuit	—
P0705	Transmission Range Sensor Circuit (PRNDL Input)	—
P0710	Transmission Fluid Temperature Sensor Circuit	—
P0716	Torque Converter Turbine Speed Sensor	—
P0720	Output Speed Sensor Circuit	—
P0726	Engine Speed Input Circuit Range/Performance	—
P0731	Gear 1 Incorrect Ratio	—
P0732	Gear 2 Incorrect Ratio	—
P0733	Gear 3 Incorrect Ratio	—
P0734	Gear 4 Incorrect Ratio	—
P0741	Torque Converter Clutch Circuit Performance or Stuck Off	—
P0743	Torque Converter Clutch Circuit Electrical	—
P0748	Pressure Control Solenoid "A" Electrical	—
P0753	Shift Solenoid "A" Electrical	—
P0758	Shift Solenoid "B" Electrical	—
P0771	Low Clutch Timing Solenoid	—
P0778	Pressure Control Solenoid "B" Electrical	—
P0785	Shift/Timing Solenoid	—
P0851	Neutral Switch Input Circuit Low	—
P0852	Neutral Switch Input Circuit High	—
P0864	TCM Communication Circuit Range/Performance	—
P0865	TCM Communication Circuit Low	—
P0866	TCM Communication Circuit High	—
P1086	Tumble Generated Valve Position Sensor 2 Circuit Low	—
P1087	Tumble Generated Valve Position Sensor 2 Circuit High	—
P1088	Tumble Generated Valve Position Sensor 1 Circuit Low	—
P1089	Tumble Generated Valve Position Sensor 1 Circuit High	—
P1090	Tumble Generated Valve System 1 (Valve Open)	Engine coolant temperature is -5 — 5°C (-41 — 41°F) at engine start.
P1091	Tumble Generated Valve System 1 (Valve Close)	—
P1092	Tumble Generated Valve System 2 (Valve Open)	Engine coolant temperature is -5 — 5°C (-41 — 41°F) at engine start.
P1093	Tumble Generated Valve System 2 (Valve Close)	—
P1094	Tumble Generated Valve Signal 1 Circuit Malfunction (Open)	—
P1095	Tumble Generated Valve Signal 1 Circuit Malfunction (Short)	—
P1096	Tumble Generated Valve Signal 2 Circuit Malfunction (Open)	—
P1097	Tumble Generated Valve Signal 2 Circuit Malfunction (Short)	—
P1110	Atmospheric Pressure sensor circuit malfunction (Low input)	—
P1111	Atmospheric Pressure sensor circuit malfunction (High input)	—
P1134	A/F Sensor Micro-Computer Problem (Bank1 Sensor1)	—
P1152	O2 Sensor Circuit Range/Performance (Low) (Bank1 Sensor1)	—

Inspection Mode

ENGINE (DIAGNOSTICS)

DTC	Item	Condition
P1153	O2 Sensor Circuit Range/Performance (High) (Bank1 Sensor1)	—
P1306	OCV Solenoid Valve Signal 1 Circuit Malfunction (Open)	—
P1307	OCV Solenoid Valve Signal 1 Circuit Malfunction (Short)	—
P1308	OCV Solenoid Valve Signal 2 Circuit Malfunction (Open)	—
P1309	OCV Solenoid Valve Signal 2 Circuit Malfunction (Short)	—
P1518	Starter Switch Circuit Low Input	—
P1560	Back-up Voltage Circuit Malfunction	—
P1570	Antenna	—
P1571	Reference Code Incompatibility	—
P1572	IMM Circuit Failure (Except Antenna Circuit)	—
P1574	Key Communication Failure	—
P1576	EGI Control Module EEPROM	—
P1577	IMM Control Module EEPROM	—
P1700	Throttle Position Sensor	—
P1711	Engine Torque Control Signal 1 Circuit Malfunction	—
P1712	Engine Torque Control Signal 2 Circuit Malfunction	—

Inspection Mode

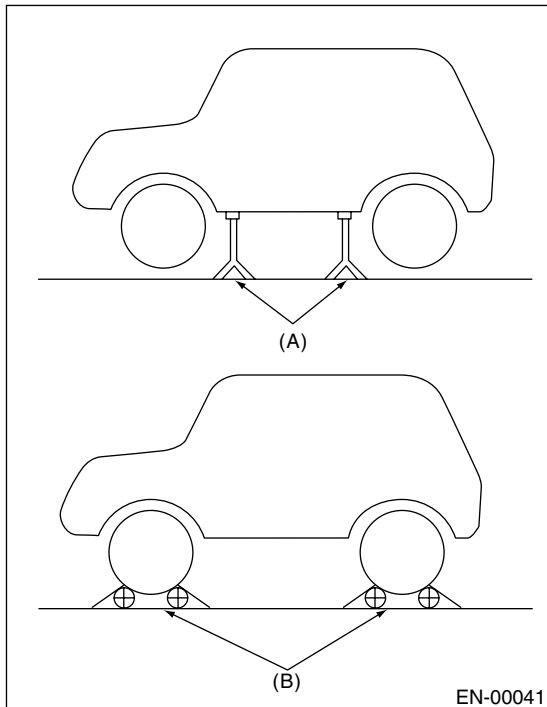
ENGINE (DIAGNOSTICS)

1. PREPARATION FOR THE INSPECTION MODE

- 1) Make sure that the fuel remains approx. half amount [20 — 40 ℓ (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)] and the battery voltage is 12 V or more.
- 2) Raise the vehicle using a garage jack and place on safety stands or drive the vehicle onto free rollers.

WARNING:

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



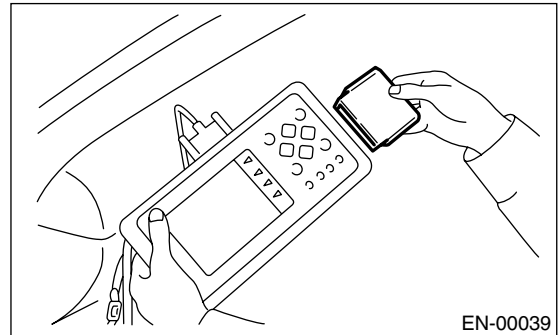
- (A) Safety stand
(B) Free rollers

2. SUBARU SELECT MONITOR

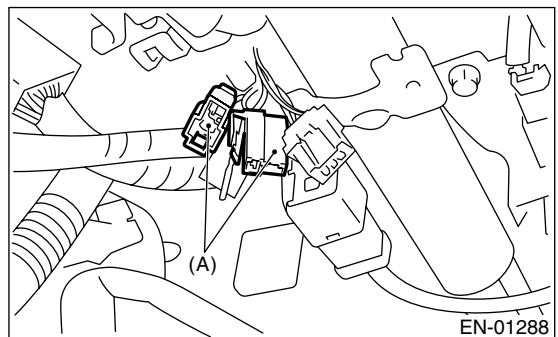
- 1) Clearing the memory, check for any remaining unresolved trouble data. <Ref. to EN(H4DOTC)(diag)-47, Clear Memory Mode.>
- 2) Warm up the engine.
- 3) Prepare the Subaru Select Monitor kit. <Ref. to EN(H4DOTC)(diag)-8, PREPARATION TOOL, General Description.>



- 4) Connect the diagnosis cable to Subaru Select Monitor.
- 5) Insert the cartridge into Subaru Select Monitor. <Ref. to EN(H4DOTC)(diag)-8, PREPARATION TOOL, General Description.>



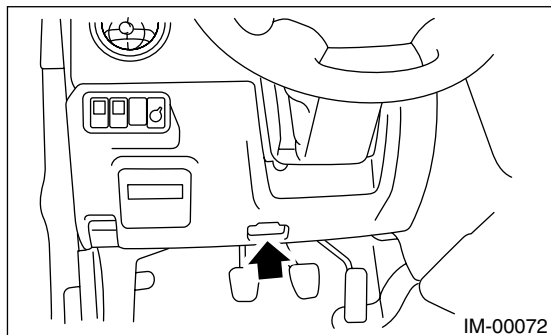
- 6) Connect the test mode connector (A) at the lower portion of instrument panel (on the driver's side).



- (A) Test mode connector

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

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

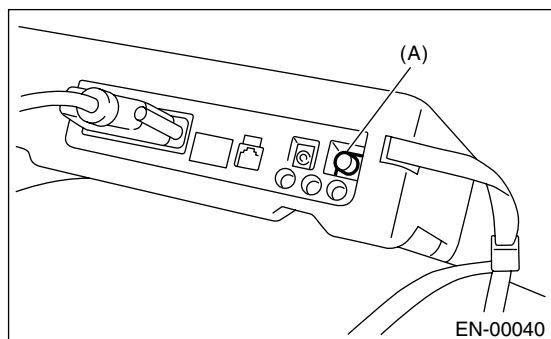


(2) Connect the diagnosis cable to data link connector.

CAUTION:

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

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



(A) Power switch

9) On the «Main Menu» display screen, select the {2. Each System Check} and press the [YES] key.

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

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

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

13) When the "Perform Inspection (Dealer Check Mode?)" is shown on the display screen, press the [YES] key.

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

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

NOTE:

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

- For detailed concerning the DTC, refer to the List of Diagnostic Trouble Code (DTC).

<Ref. to EN(H4DOTC)(diag)-74, List of Diagnostic Trouble Code (DTC).>

- Release the parking brake.

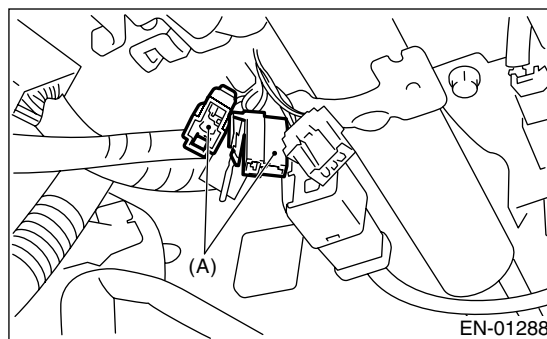
- The speed difference between front and rear wheels may light either the ABS warning light, but this indicates no malfunctions. When the engine control diagnosis is finished, perform the ABS memory clearance procedure of self-diagnosis system.

3. OBD-II GENERAL SCAN TOOL

1) After performing the diagnostics and clearing memory, check for any remaining unresolved trouble data: <Ref. to EN(H4DOTC)(diag)-47, Clear Memory Mode.>

2) Warm up the engine.

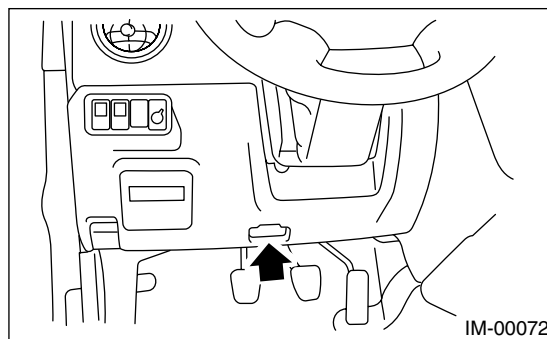
3) Connect the test mode connector (A) at the lower side of instrument panel (on the driver's side).



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

CAUTION:

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



Inspection Mode

ENGINE (DIAGNOSTICS)

5) Start the engine.

NOTE:

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

6) Using the select lever or shift lever, turn the “P” position switch and “N” position switch to ON.

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

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

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

NOTE:

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

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

NOTE:

- For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.
- For detailed concerning DTC, refer to the List of Diagnostic Trouble Code (DTC).

<Ref. to EN(H4DOTC)(diag)-74, List of Diagnostic Trouble Code (DTC).>

13. Drive Cycle

A: OPERATION

There are three drive patterns for the trouble diagnosis. Driving in the specified pattern allows to diagnose malfunctioning items listed below. After the malfunctioning items listed below are repaired, always check whether they correctly resume their functions by driving in the required drive pattern.

1. PREPARATION FOR THE DRIVE CYCLE

- 1) Make sure that the fuel remains approx. half amount [20 — 40 ℓ (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)], and battery voltage is 12 V or more.
- 2) After performing the diagnostics and cleaning memory, check for any remaining unresolved trouble data. <Ref. to EN(H4DOTC)(diag)-47, Clear Memory Mode.>
- 3) Separate the test mode connector.

NOTE:

- Except for the engine coolant temperature specified items at starting, the diagnosis is carried out after engine warm up.
- Carry out the diagnosis which is marked * on DTC twice, then, after finishing first diagnosis, stop the engine and do second time at the same condition.

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

DTC	Item	Condition
*P0125	Insufficient Coolant Temperature for Closed Loop Fuel Control	Engine coolant temperature is less than 20°C (68°F) at engine start.
*P0133	O2 Sensor Circuit Slow Response (Bank 1 Sensor 1)	—
*P0420	Catalyst System Efficiency Below Threshold (Bank 1)	—
P0459	Evaporative Emission Control System Purge Control Valve Circuit High	—
P0461	Fuel Level Sensor Circuit Range/Performance	—
P0545	Exhaust Gas Temperature Sensor Circuit Low-Bank1	—
P0546	Exhaust Gas Temperature Sensor Circuit High-Bank1	—
P1312	Exhaust Gas Temperature Sensor Malfunction	Engine coolant temperature is less than 30°C (86°F) at engine start.

Drive Cycle

ENGINE (DIAGNOSTICS)

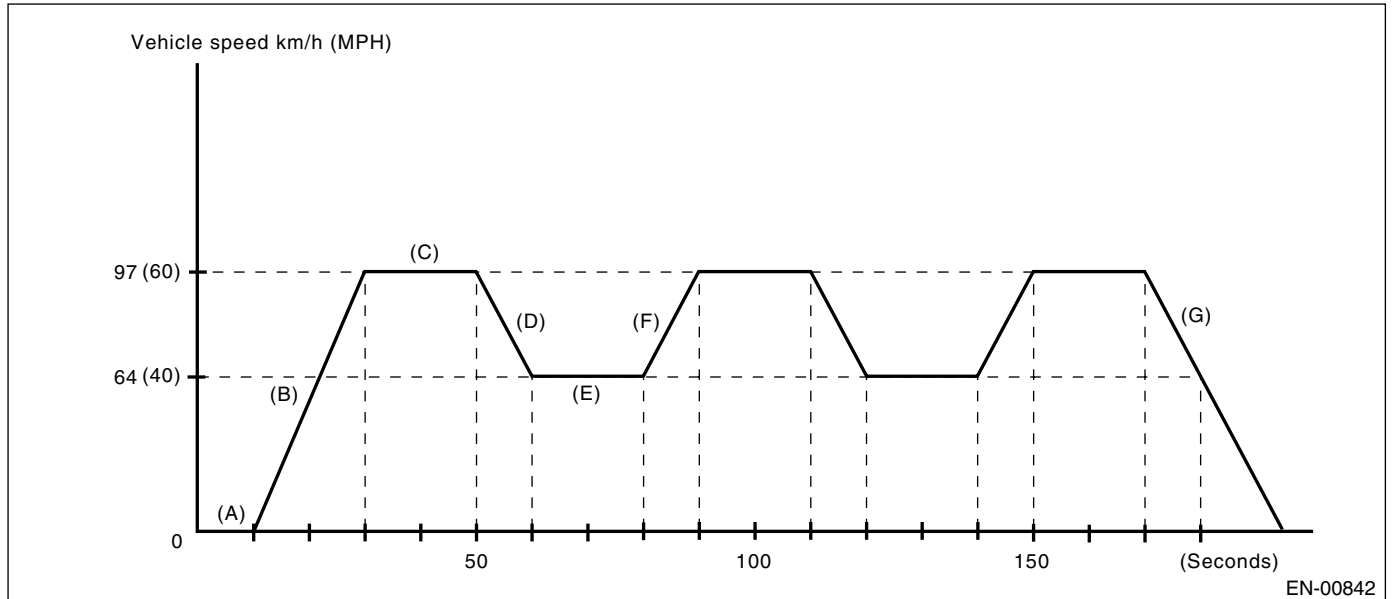
3. IDLE FOR 10 MINUTES

NOTE:

Before the diagnosis, drive the vehicle at 10 km/h (6 MPH) or more.

DTC	Item	Condition
*P0483	Cooling Fan Rationality Check	—
*P0506	Idle Control System RPM Lower Than Expected	—
*P0507	Idle Control System RPM Higher Than Expected	—

4. DRIVE ACCORDING TO THE FOLLOWING DRIVE PATTERN



- | | | |
|---|--|--|
| (A) Idle engine for 10 seconds or more. | (D) Decelerate with fully closed throttle to 64 km/h (40 MPH). | (G) Stop vehicle with throttle fully closed. |
| (B) Accelerate to 97 km/h (60 MPH) within 20 seconds. | (E) Drive vehicle at 64 km/h (40 MPH) for 20 seconds. | |
| (C) Drive vehicle at 97 km/h (60 MPH) for 20 seconds. | (F) Accelerate to 97 km/h (60 MPH) within 10 seconds. | |

DTC	Item	Condition
*P0121	Throttle/Pedal Position Sensor/Switch "A" Circuit Range/Performance	—
*P0139	O2 Sensor Circuit Slow Response (Bank 1 Sensor 2)	—
*P0301	Cylinder 1 Misfire Detected	In some cases, diagnosis may complete at once.
*P0302	Cylinder 2 Misfire Detected	In some cases, diagnosis may complete at once.
*P0303	Cylinder 3 Misfire Detected	In some cases, diagnosis may complete at once.
*P0304	Cylinder 4 Misfire Detected	In some cases, diagnosis may complete at once.
*P0101	Mass or Volume Air Flow Circuit Range/Performance	—
P0244	Turbo/Super Charger Wastegate Solenoid "A" Range/Performance	—
P1301	Misfire Detected (High Temperature Exhaust Gas)	—
P1544	Exhaust Gas Temperature Too High	—

14. Clear Memory Mode

A: OPERATION

1. SUBARU SELECT MONITOR (NORMAL MODE)

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

NOTE:

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

2. SUBARU SELECT MONITOR (OBD MODE)

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

NOTE:

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

3. OBD-II GENERAL SCAN TOOL

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

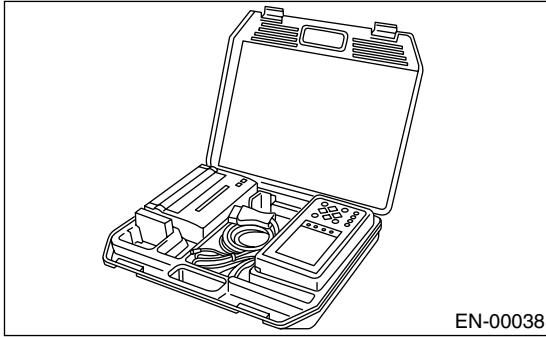
Compulsory Valve Operation Check Mode

ENGINE (DIAGNOSTICS)

15. Compulsory Valve Operation Check Mode

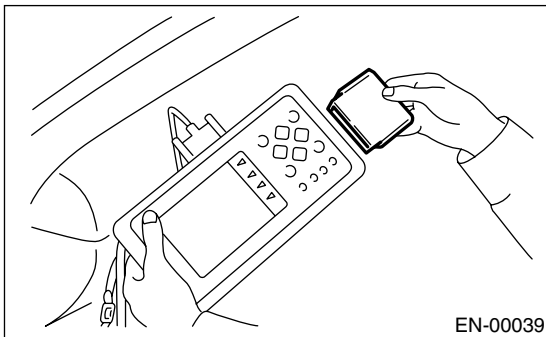
A: OPERATION

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

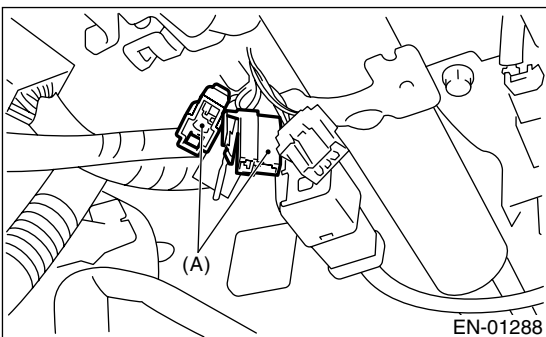


2) Connect the diagnosis cable to Subaru Select Monitor.

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

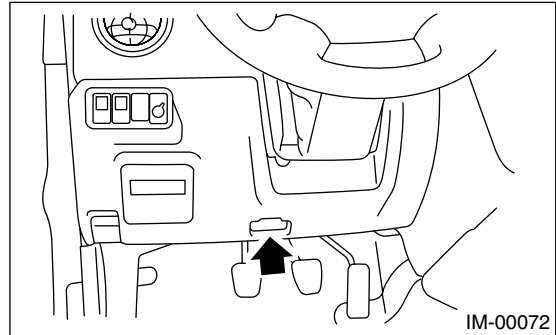


4) Connect the test mode connector (A) at the lower portion of instrument panel (on the driver's side).



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

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

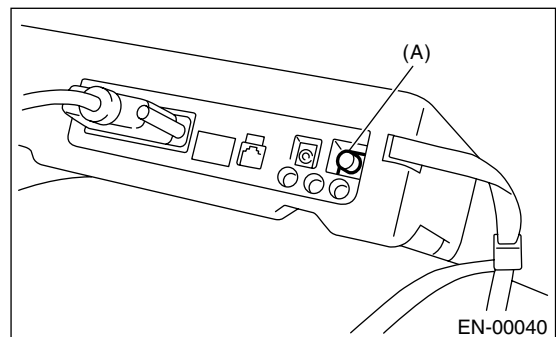


(2) Connect the diagnosis cable to data link connector.

CAUTION:

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

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



(A) Power switch

7) On the «Main Menu» display screen, select the {2. Each System Check} and press the [YES] key.

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

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

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

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

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

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

Compulsory Valve Operation Check Mode

ENGINE (DIAGNOSTICS)

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

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

NOTE:

- The following parts will be displayed but not functional because they are not installed on the vehicle.

Display
EGR Solenoid Valve
ASV Solenoid Valve
PCV Solenoid Valve
Vent Control Solenoid Valve
FICD Solenoid
Pressure Switching Sol. 1
Pressure Switching Sol. 2
AAI Solenoid Valve
Fuel Tank Sensor Control Valve

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

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

16. Malfunction Indicator Light

A: PROCEDURE

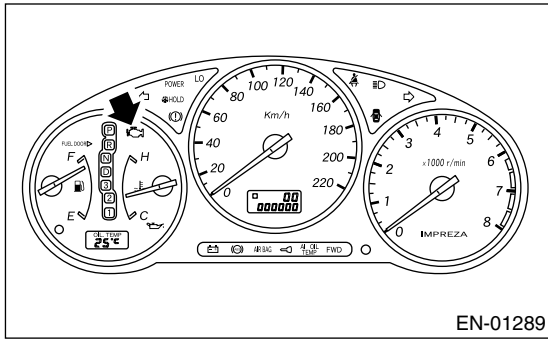
1. Activation of check malfunction indicator light. <Ref. to EN(H4DOTC)(diag)-51, ACTIVATION OF MALFUNCTION INDICATOR LIGHT, Malfunction Indicator Light.>
↓
2. Check that the malfunction indicator light does not come on. <Ref. to EN(H4DOTC)(diag)-52, MALFUNCTION INDICATOR LIGHT DOES NOT COME ON., Malfunction Indicator Light.>
↓
3. Check that the malfunction indicator light does not go off. <Ref. to EN(H4DOTC)(diag)-54, MALFUNCTION INDICATOR LIGHT DOES NOT GO OFF., Malfunction Indicator Light.>
↓
4. Check that the malfunction indicator light does not blink at a cycle of 3 Hz. <Ref. to EN(H4DOTC)(diag)-55, MALFUNCTION INDICATOR LIGHT DOES NOT BLINK AT A CYCLE OF 3 HZ., Malfunction Indicator Light.>
↓
5. Check that the malfunction indicator light remains blinking at a cycle of 3 Hz. <Ref. to EN(H4DOTC)(diag)-57, MALFUNCTION INDICATOR LIGHT REMAINS BLINKING AT A CYCLE OF 3 HZ., Malfunction Indicator Light.>

B: ACTIVATION OF MALFUNCTION INDICATOR LIGHT

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

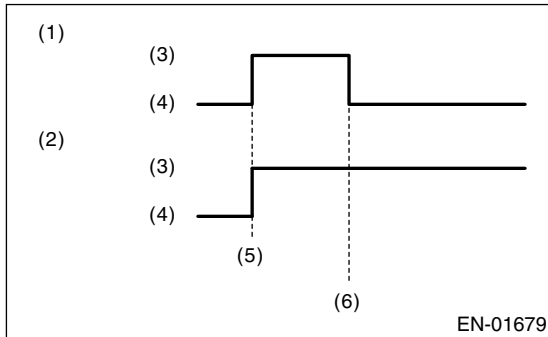
NOTE:

If the malfunction indicator light does not illuminate, perform diagnostics of the malfunction indicator light circuit or the combination meter circuit. <Ref. to EN(H4DOTC)(diag)-52, MALFUNCTION INDICATOR LIGHT DOES NOT COME ON., Malfunction Indicator Light.>



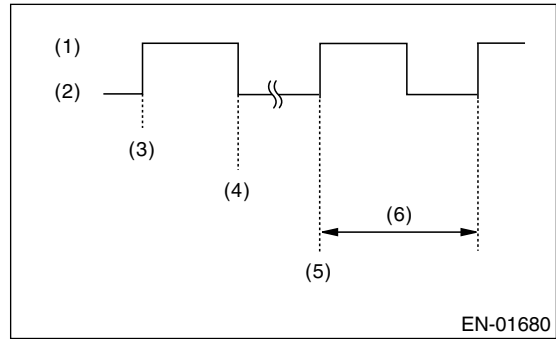
(A) Malfunction indicator light

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



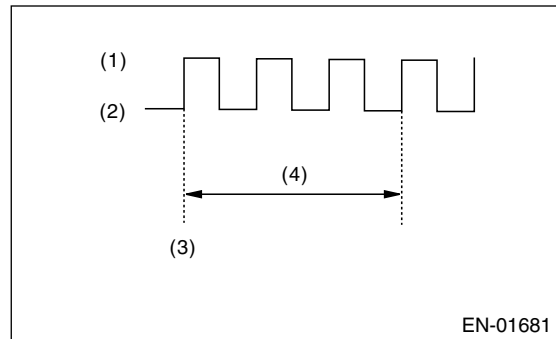
- (1) No trouble
- (2) Trouble occurs
- (3) ON
- (4) OFF
- (5) Ignition switch ON
- (6) Engine start

3) If the diagnosis system senses a misfire which could damage the catalyzer, 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

4) When the ignition switch is turned to ON (engine off) or to START with the test mode connector connected, the malfunction indicator light blinks at a cycle of 3 Hz.



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

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

C: MALFUNCTION INDICATOR LIGHT DOES NOT COME ON.

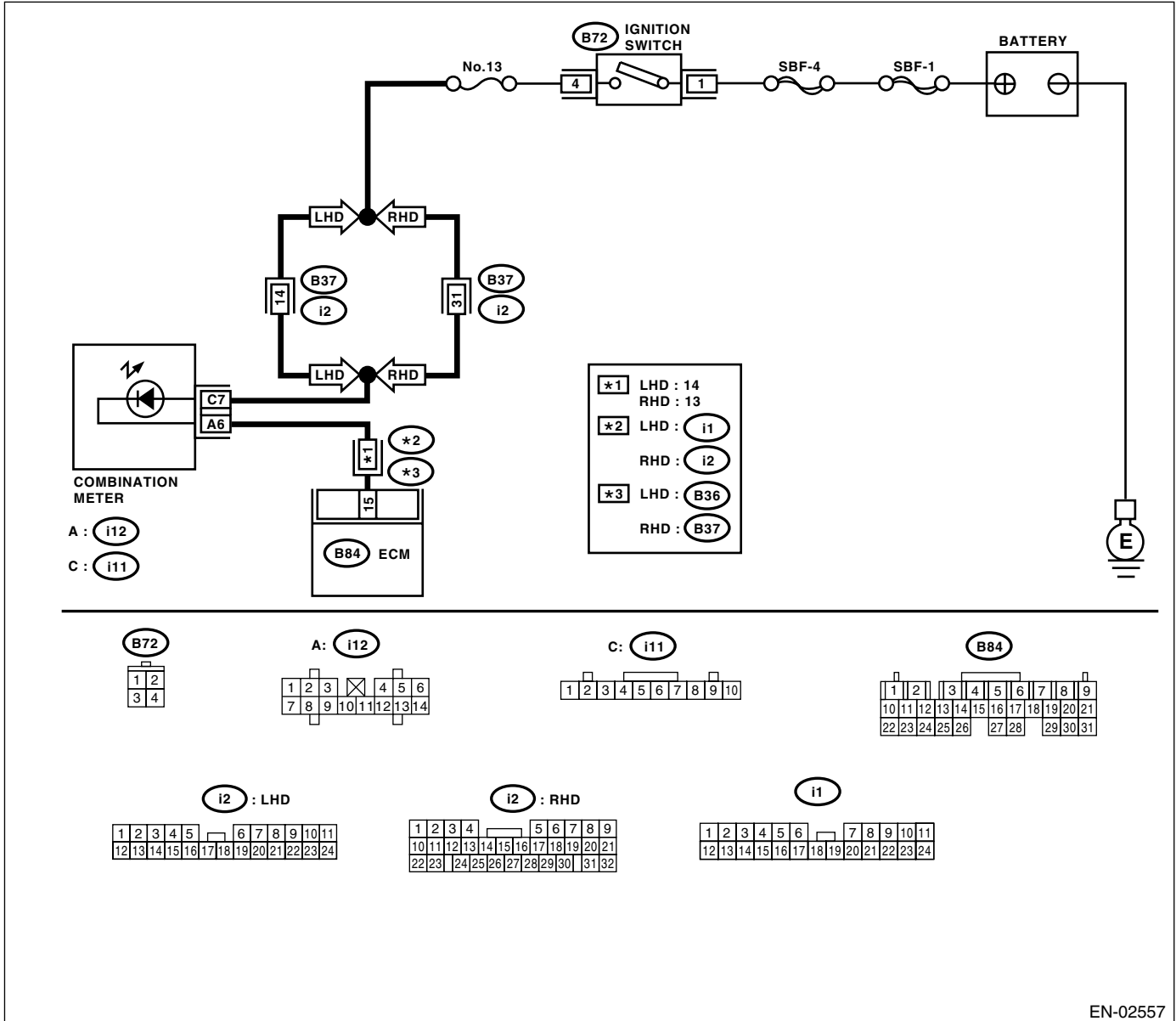
• DIAGNOSIS:

- The malfunction indicator light circuit is shorted.

• TROUBLE SYMPTOM:

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

• WIRING DIAGRAM:



Step	Check	Yes	No
1 CHECK OUTPUT SIGNAL FROM ECM. 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. Connector & terminal (B84) No. 15 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 4.	Go to step 2.
2 CHECK POOR CONTACT.	Does the malfunction indicator light come on when shaking or pulling ECM connector and harness?	Repair the poor contact in ECM connector.	Go to step 3.

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
3 CHECK ECM CONNECTOR.	Is the ECM connector correctly connected?	Replace the ECM. <Ref. to FU(H4DOTC)-49, Engine Control Module (ECM).>	Repair the connection of ECM connector.
4 CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Remove the combination meter. <Ref. to IDI-11, Combination Meter Assembly.> 3) Disconnect the connector from ECM and combination meter. 4) Measure the resistance of harness between ECM and combination meter connector. Connector & terminal (B84) No. 15 — (i12) No. 6:	Is the resistance less than 1 Ω?	Go to step 5.	Repair the harness and connector. NOTE: In this case, repair the following: • Open circuit in harness between ECM and combination meter connector • Poor contact in coupling connector
5 CHECK POOR CONTACT. Check poor contact in combination meter connector.	Is there poor contact in combination meter connector?	Repair the poor contact in combination meter connector.	Go to step 6.
6 CHECK HARNESS BETWEEN COMBINATION METER AND IGNITION SWITCH CONNECTOR. 1) Turn the ignition switch to ON. 2) Measure the voltage between combination meter connector and chassis ground. Connector & terminal (i11) No. 7 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Replace the combination meter circuit board. <Ref. to IDI-11, Combination Meter Assembly.>	Check the following and repair if necessary. NOTE: • Blown out fuse (No. 14) • Open or short circuit in harness between fuse (No. 14) and battery terminal • Poor contact in ignition switch connector

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

D: MALFUNCTION INDICATOR LIGHT DOES NOT GO OFF.

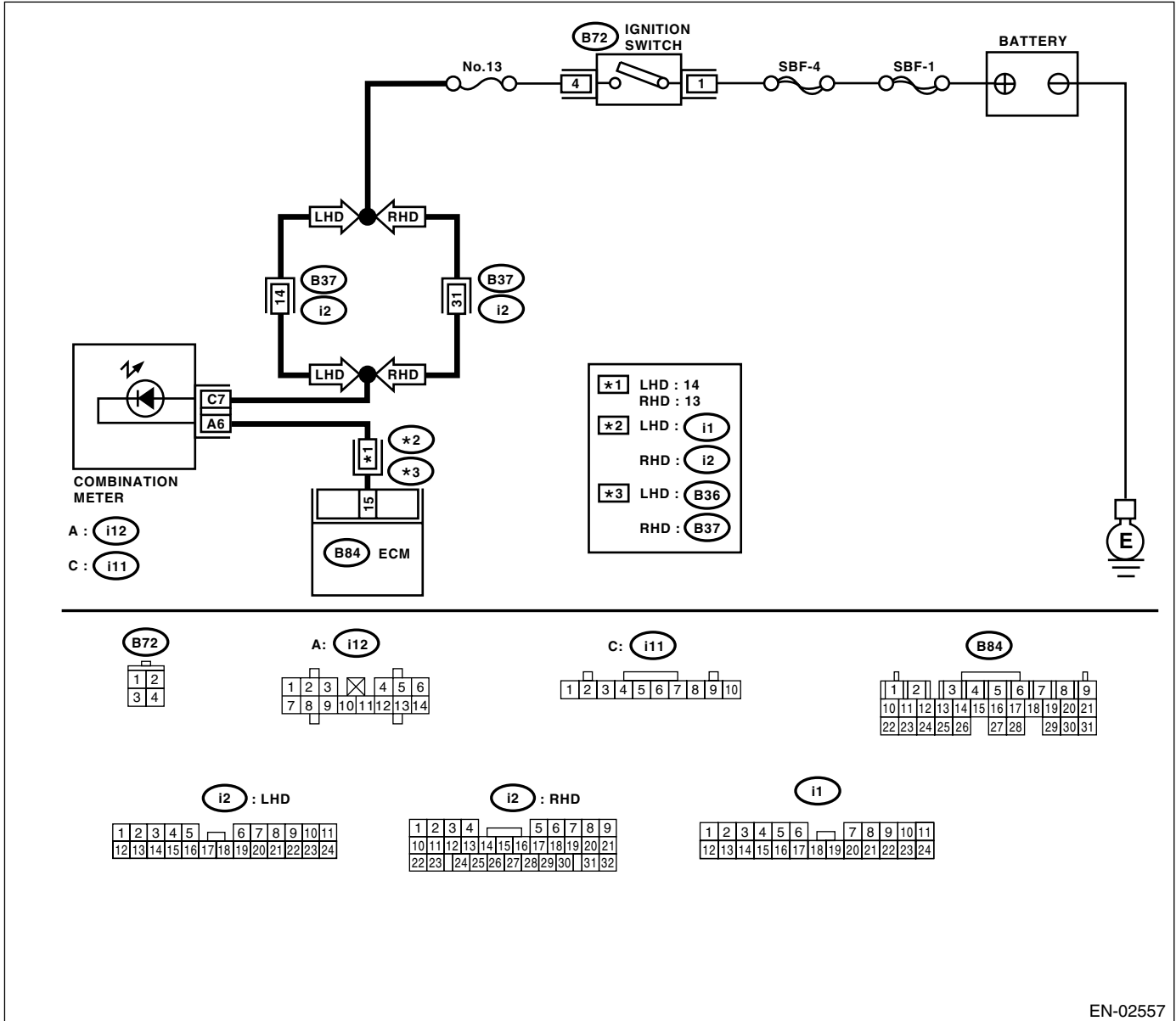
• DIAGNOSIS:

- The malfunction indicator light circuit is shorted.

• TROUBLE SYMPTOM:

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

• WIRING DIAGRAM:



Step	Check	Yes	No	
1	CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Turn the ignition switch to ON.	Does the malfunction indicator light come on?	Repair the short circuit in harness between combination meter and ECM connector.	Replace the ECM. <Ref. to FU(H4DOTC)-49, Engine Control Module (ECM).>

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

E: MALFUNCTION INDICATOR LIGHT DOES NOT BLINK AT A CYCLE OF 3 HZ.

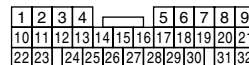
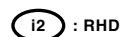
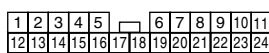
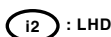
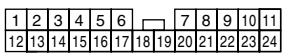
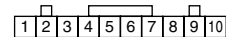
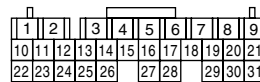
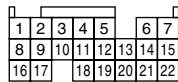
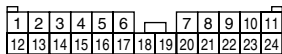
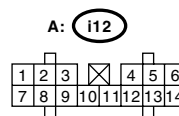
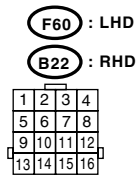
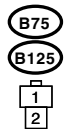
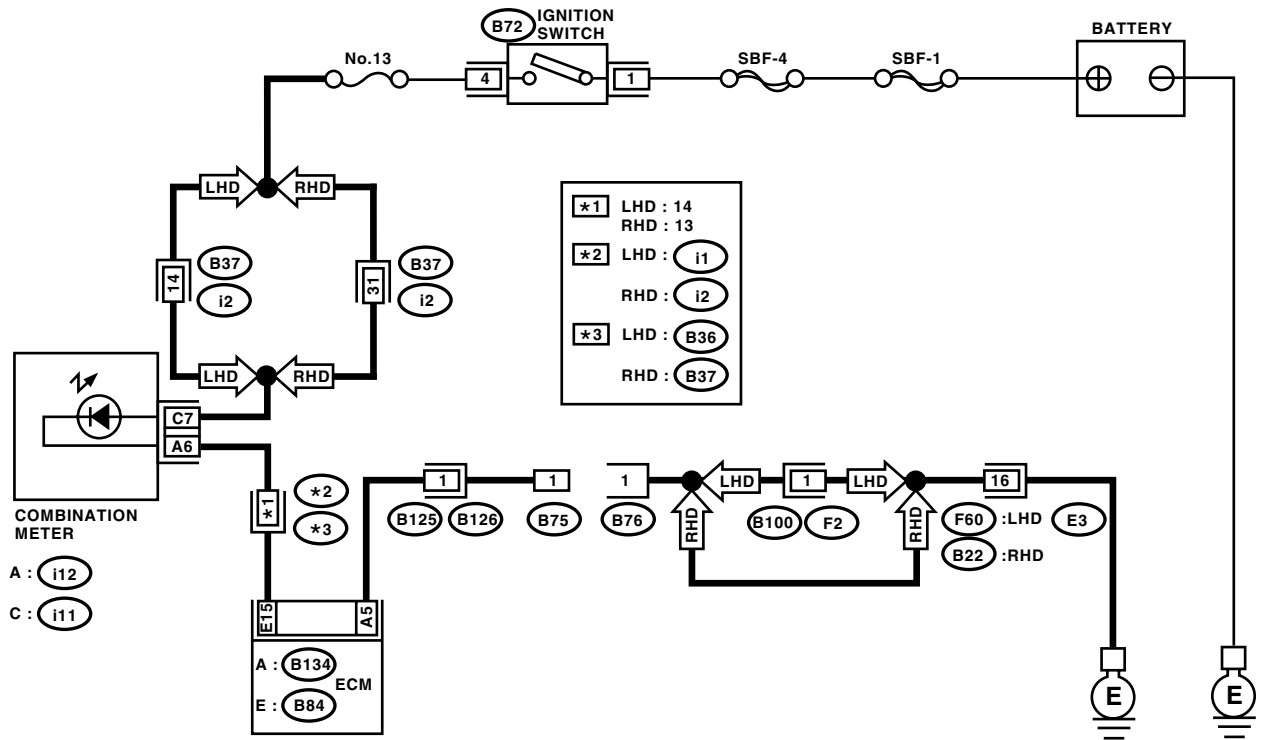
• DIAGNOSIS:

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

• TROUBLE SYMPTOM:

- During inspection mode, malfunction indicator light does not blink at a cycle of 3 Hz.

• WIRING DIAGRAM:



EN-02558

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

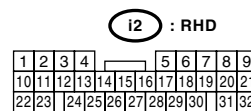
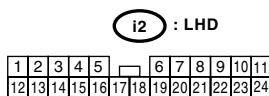
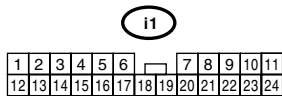
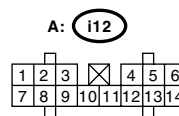
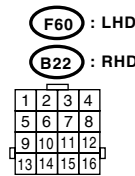
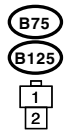
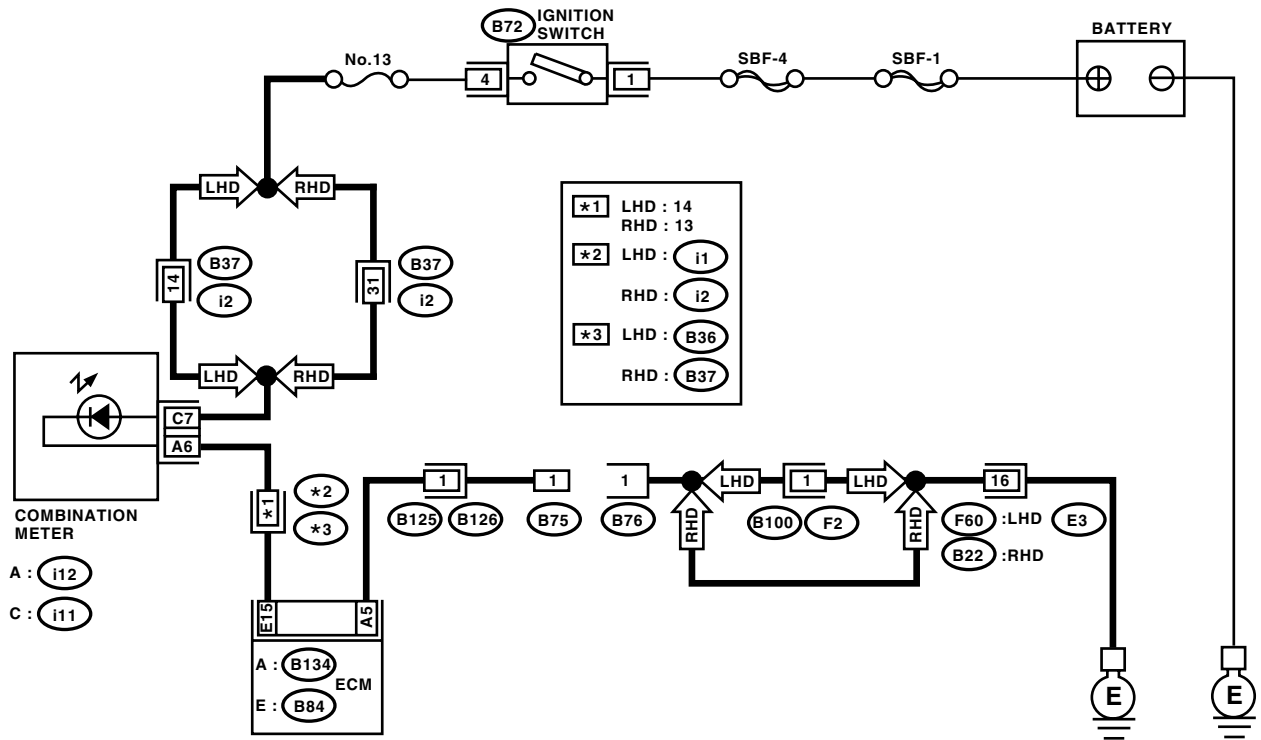
Step	Check	Yes	No
1 CHECK STATUS OF MALFUNCTION INDICATOR LIGHT. 1) Turn the ignition switch to OFF. 2) Disconnect the test mode connector. 3) Turn the ignition switch to ON. (engine OFF)	Does the malfunction indicator light come on?	Go to step 2.	Repair the malfunction indicator light circuit. <Ref. to EN(H4DOTC)(diag)-52, MALFUNCTION INDICATOR LIGHT DOES NOT COME ON., Malfunction Indicator Light.>
2 CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Turn the ignition switch to ON.	Does the malfunction indicator light come on?	Repair the ground short circuit in harness between combination meter and ECM connector.	Go to step 3.
3 CHECK HARNESS BETWEEN TEST MODE CONNECTOR AND CHASSIS GROUND. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between test mode connector and chassis ground. <i>Connector & terminal</i> <i>(B76) No. 1 — Chassis ground:</i>	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the harness and connector. NOTE: In this case, repair the following: <ul style="list-style-type: none"> • Open circuit in harness between test mode connector and chassis ground
4 CHECK POOR CONTACT. Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact in ECM connector.	Go to step 5.
5 CHECK HARNESS BETWEEN ECM AND TEST MODE CONNECTOR. 1) Connect the test mode connector. 2) Measure the resistance of harness between ECM and chassis ground. <i>Connector & terminal</i> <i>(B134) No. 5 — Chassis ground:</i>	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the open circuit in harness between ECM and test mode connector.
6 CHECK POOR CONTACT. Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact in ECM connector.	Replace the ECM. <Ref. to FU(H4DOTC)-49, Engine Control Module (ECM).>

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

F: MALFUNCTION INDICATOR LIGHT REMAINS BLINKING AT A CYCLE OF 3 HZ.

- **DIAGNOSIS:**
 - Test mode connector circuit is shorted.
- **TROUBLE SYMPTOM:**
 - Malfunction indicator light blinks at a cycle of 3 Hz when ignition switch is turned to ON.
- **WIRING DIAGRAM:**



EN-02558

Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK TEST MODE CONNECTOR. 1)Disconnect the test mode connector. 2)Turn the ignition switch to ON.	Does the malfunction indicator light blink?	Go to step 2.	System is in good order. NOTE: Malfunction indicator light blinks at a cycle of 3 Hz when test mode connector is connected.
2 CHECK HARNESS BETWEEN ECM CONNECTOR AND ENGINE GROUNDING TERMINAL. 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ECM. 3)Measure the resistance of harness between ECM connector and chassis ground. Connector & terminal (B134) No. 5 — Chassis ground:	Is the resistance less than 5 Ω ?	Repair the short circuit in harness between ECM and test mode connector.	Replace the ECM. <Ref. to FU(H4DOTC)-49, Engine Control Module (ECM).>

17. Diagnostics for Engine Starting Failure

A: PROCEDURE

1. Inspection of starter motor circuit. <Ref. to EN(H4DOTC)(diag)-60, STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
2. Inspection of ECM power supply and ground line. <Ref. to EN(H4DOTC)(diag)-62, CONTROL MODULE POWER SUPPLY AND GROUND LINE, Diagnostics for Engine Starting Failure.>
↓
3. Inspection of ignition control system. <Ref. to EN(H4DOTC)(diag)-66, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>
↓
4. Inspection of fuel pump circuit. <Ref. to EN(H4DOTC)(diag)-69, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
5. Inspection of fuel injector circuit. <Ref. to EN(H4DOTC)(diag)-71, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

Diagnostics for Engine Starting Failure

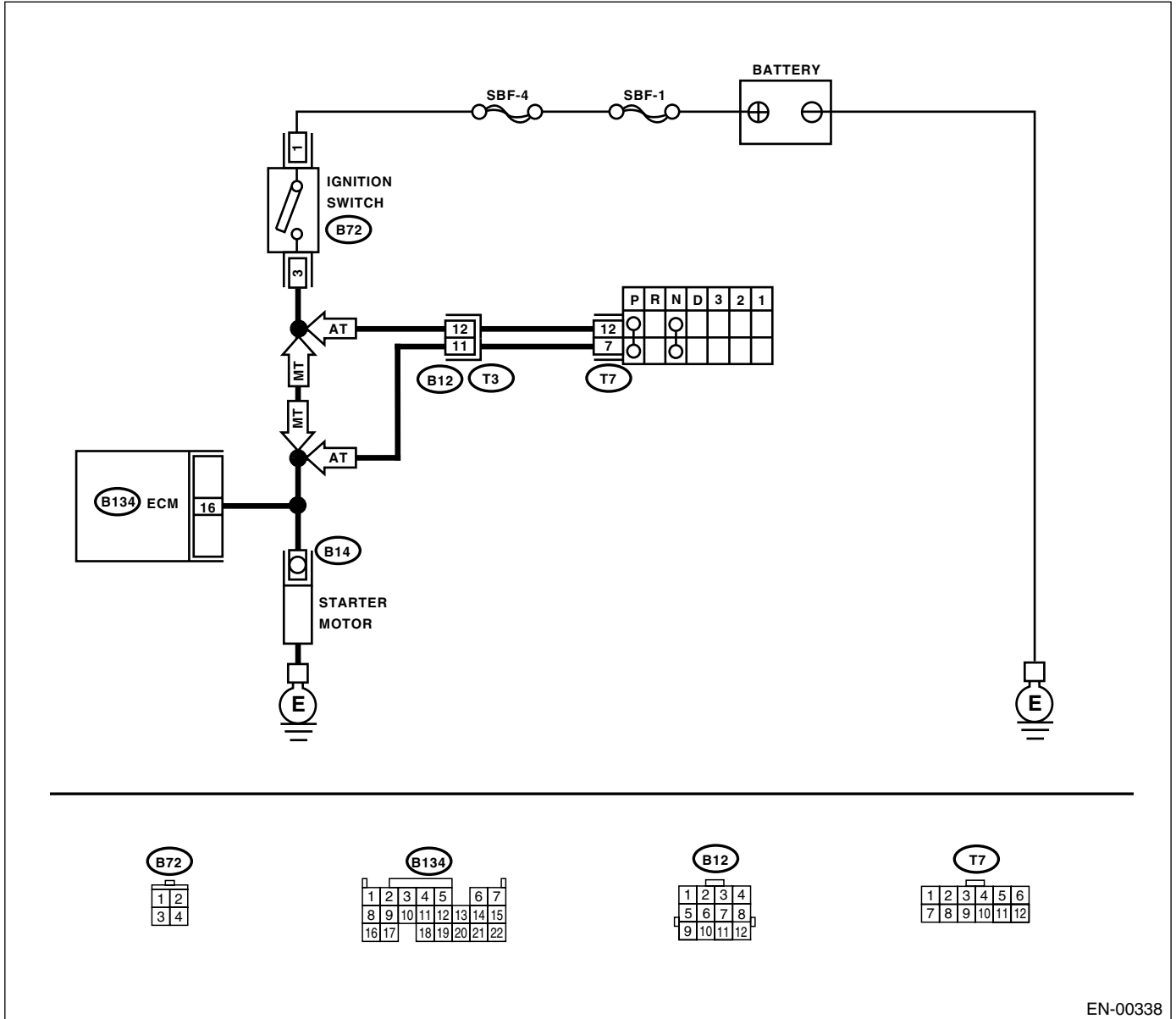
ENGINE (DIAGNOSTICS)

B: STARTER MOTOR CIRCUIT

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN(H4DOTC)(diag)-47, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN(H4DOTC)(diag)-39, Inspection Mode.>.

• WIRING DIAGRAM:



EN-00338

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No	
1	CHECK OPERATION OF STARTER MOTOR.	Does the starter motor operate?	Go to step 2.	Go to step 3.
2	CHECK DTC.	Is the DTC displayed? <Ref. to EN(H4DOTC)(diag)-38, OPERATION, Read Diagnostic Trouble Code (DTC).>	Using the List of Diagnostic Trouble Code (DTC), check the appropriate DTC. <Ref. to EN(H4DOTC)(diag)-74, List of Diagnostic Trouble Code (DTC).>	Go to step 3.
3	CHECK INPUT SIGNAL FOR STARTER MOTOR. 1)Turn the ignition switch to OFF. 2)Disconnect the connector from starter motor. 3)Turn the ignition switch to START. 4)Measure the power supply voltage between starter motor connector terminal and engine ground. Connector & terminal (B14) No. 1 (+) — Engine ground (-):	Is the voltage more than 10 V?	Go to step 4.	Go to step 5.
4	CHECK GROUND CIRCUIT OF STARTER MOTOR. 1)Turn the ignition switch to OFF. 2)Measure the resistance of ground cable between ground cable terminal and engine ground.	Is the resistance less than 5 Ω?	Check the starter motor. <Ref. to SC(H4SO)-7, Starter.>	Repair the open circuit of ground cable.
5	CHECK HARNESS BETWEEN BATTERY AND IGNITION SWITCH CONNECTOR. 1)Ignition the 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. 1 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Go to step 6.	Check the following, repair if necessary. <ul style="list-style-type: none"> • Fuse is blown out. • Open circuit in harness between ignition switch and battery.
6	CHECK HARNESS BETWEEN BATTERY AND IGNITION SWITCH CONNECTOR. 1)Connect the connector to ignition switch. 2)Turn the ignition switch to START. 3)Measure the voltage between ignition switch and chassis ground. Connector & terminal (B72) No. 3 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Repair the open circuit between ignition switch and starter motor circuit.	Go to step 7.
7	CHECK POOR CONTACT. Check poor contact in ignition switch connector.	Is there poor contact in ignition switch connector?	Repair the poor contact in ignition switch connector.	Replace the ignition switch.

Diagnostics for Engine Starting Failure

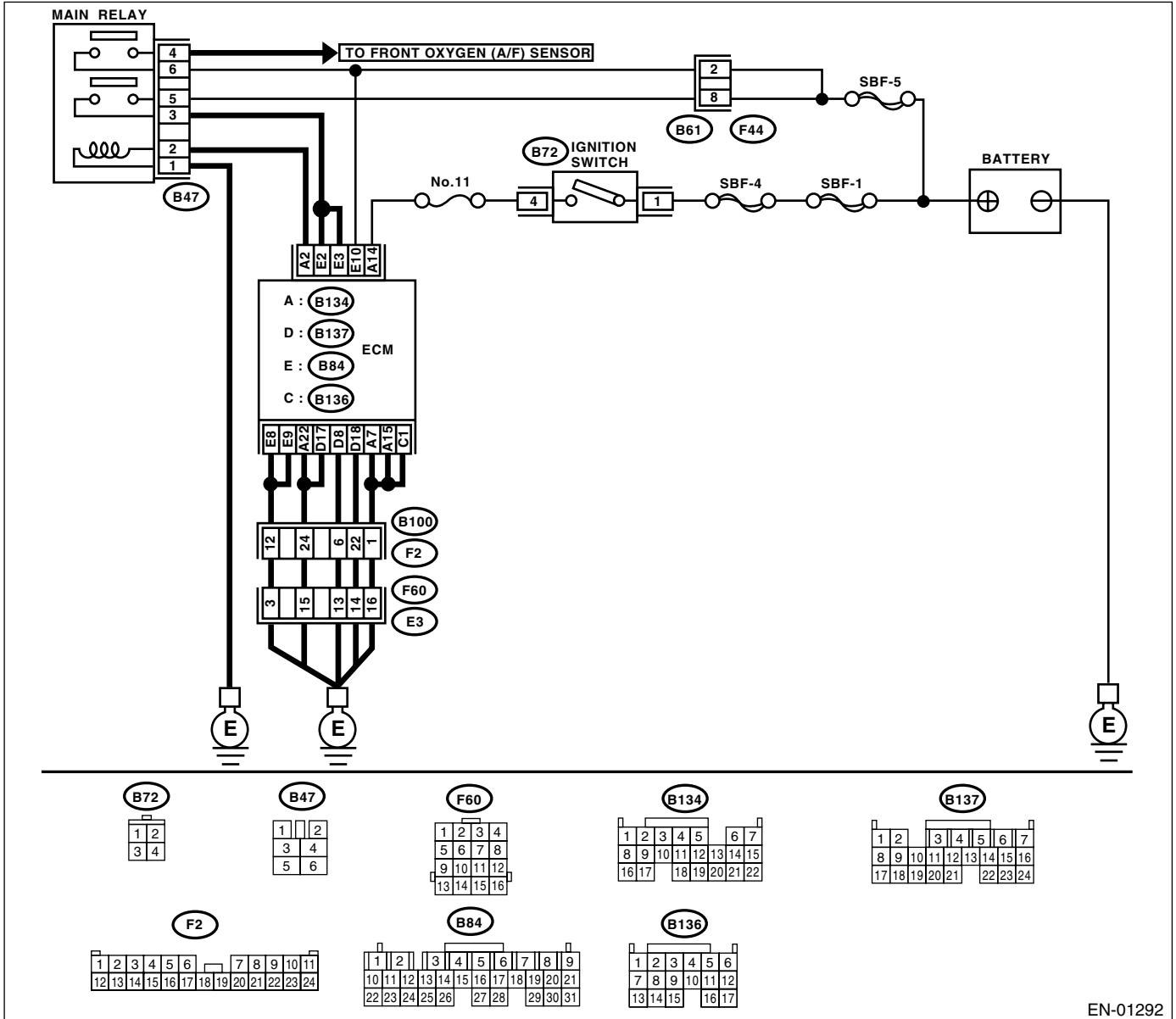
ENGINE (DIAGNOSTICS)

C: CONTROL MODULE POWER SUPPLY AND GROUND LINE

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN(H4DOTC)(diag)-47, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN(H4DOTC)(diag)-39, Inspection Mode.>.

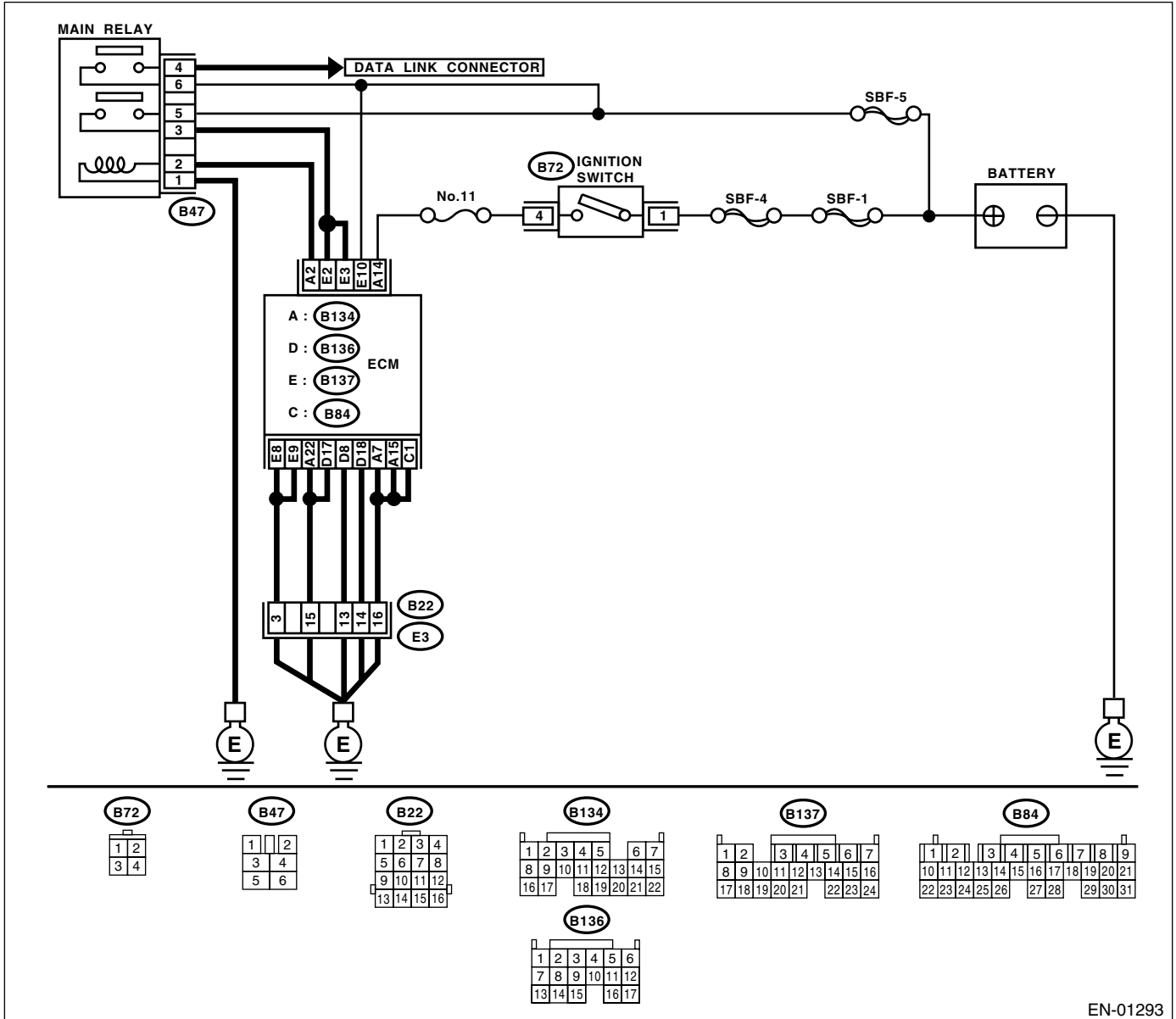
- WIRING DIAGRAM:
- LHD model



EN-01292

Diagnostics for Engine Starting Failure

• RHD model



EN-01293

Step	Check	Yes	No
<p>1</p> <p>CHECK MAIN RELAY.</p> <p>1) Turn the ignition switch to OFF.</p> <p>2) Remove the main relay.</p> <p>3) Connect the battery to main relay terminals No. 1 and No. 2.</p> <p>4) Measure the resistance between main relay terminals.</p> <p>Terminals</p> <p>No. 3 — No. 5:</p> <p>No. 4 — No. 6:</p>	<p>Is the resistance less than 10 Ω?</p>	<p>Go to step 2.</p>	<p>Replace the main relay.</p>

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK GROUND CIRCUIT OF ECM. 1)Disconnect the connector from ECM. 2)Measure the resistance of harness between ECM and chassis ground. Connector & terminal <i>(B134) No. 7 — Chassis ground:</i> <i>(B134) No. 15 — Chassis ground:</i> <i>(B134) No. 22 — Chassis ground:</i> <i>(B136) No. 1 — Chassis ground:</i> <i>(B137) No. 8 — Chassis ground:</i> <i>(B137) No. 17 — Chassis ground:</i> <i>(B137) No. 18 — Chassis ground:</i> <i>(B84) No. 8 — Chassis ground:</i> <i>(B84) No. 9 — Chassis ground:</i>	Is the resistance less than 5 Ω?	Go to step 3.	Repair the open circuit in harness between ECM connector and engine grounding terminal.
3 CHECK INPUT VOLTAGE OF ECM. Measure the voltage between ECM connector and chassis ground. Connector & terminal <i>(B84) No. 10 (+) — Chassis ground (-):</i> <i>(B134) No. 14 (+) — Chassis ground (-):</i>	Is the voltage more than 10 V?	Go to step 4.	Repair the open or ground short circuit of power supply circuit.
4 CHECK HARNESS BETWEEN ECM AND MAIN RELAY CONNECTOR. 1)Turn the ignition switch to OFF. 2)Measure the resistance between ECM and chassis ground. Connector & terminal <i>(B134) No. 2 — Chassis ground:</i>	Is the resistance more than 1 MΩ?	Go to step 5.	Repair the ground short circuit in harness between ECM connector and main relay connector, and then replace ECM.
5 CHECK OUTPUT VOLTAGE FROM ECM. 1)Connect the connector to ECM. 2)Turn the ignition switch to ON. 3)Measure the voltage between ECM connector and chassis ground. Connector & terminal <i>(B134) No. 2 (+) — Chassis ground (-):</i>	Is the voltage more than 10 V?	Go to step 6.	Replace the ECM. <Ref. to FU(H4DOTC)-49, Engine Control Module (ECM).>
6 CHECK INPUT VOLTAGE OF MAIN RELAY. Check the voltage between main relay connector and chassis ground. Connector & terminal <i>(B47) No. 2 (+) — Chassis ground (-):</i>	Is the voltage more than 10 V?	Go to step 7.	Repair the open circuit in harness between ECM connector and main relay connector.
7 CHECK GROUND CIRCUIT OF MAIN RELAY. 1)Turn the ignition switch to OFF. 2)Measure the resistance between main relay connector and chassis ground. Connector & terminal <i>(B47) No. 1 — Chassis ground:</i>	Is the resistance less than 5 Ω?	Go to step 8.	Repair the open circuit between main relay and chassis ground.
8 CHECK INPUT VOLTAGE OF MAIN RELAY. Measure the voltage between main relay connector and chassis ground. Connector & terminal <i>(B47) No. 5 (+) — Chassis ground (-):</i> <i>(B47) No. 6 (+) — Chassis ground (-):</i>	Is the voltage more than 10 V?	Go to step 9.	Repair the open or ground short circuit in harness of power supply circuit.

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
9 CHECK INPUT VOLTAGE OF ECM. 1)Connect the main relay connector. 2)Turn the ignition switch to ON. 3)Measure the voltage between ECM connector and chassis ground. Connector & terminal <i>(B84) No. 2 (+) — Chassis ground (-):</i> <i>(B84) No. 3 (+) — Chassis ground (-):</i>	Is the voltage more than 10 V?	Check the ignition control system. <Ref. to EN(H4DOTC)(diag)-66, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Repair the open or ground short circuit in harness between ECM connector and main relay connector.

Diagnostics for Engine Starting Failure

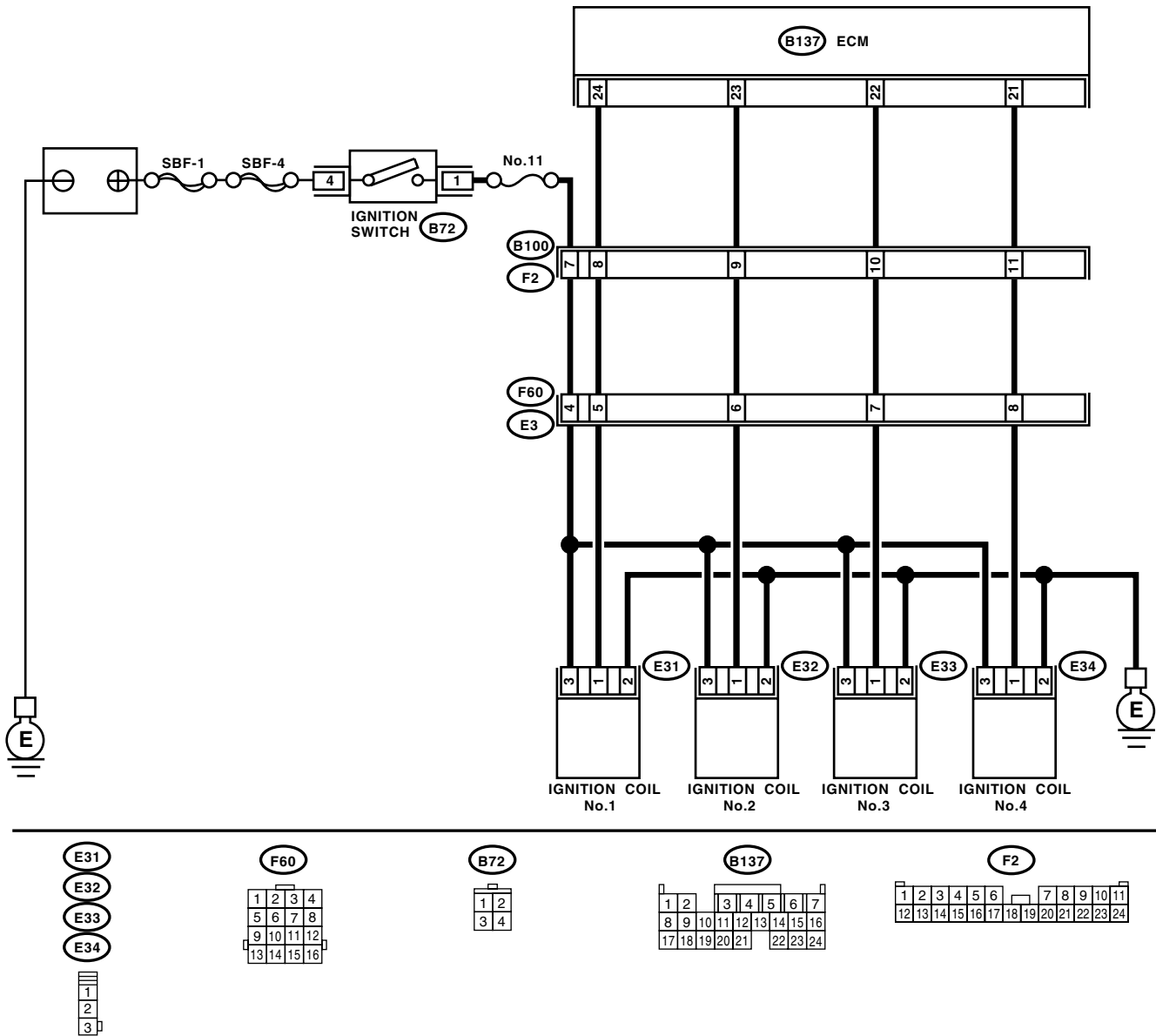
ENGINE (DIAGNOSTICS)

D: IGNITION CONTROL SYSTEM

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN(H4DOTC)(diag)-47, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN(H4DOTC)(diag)-39, Inspection Mode.>.

- WIRING DIAGRAM:
- LHD model

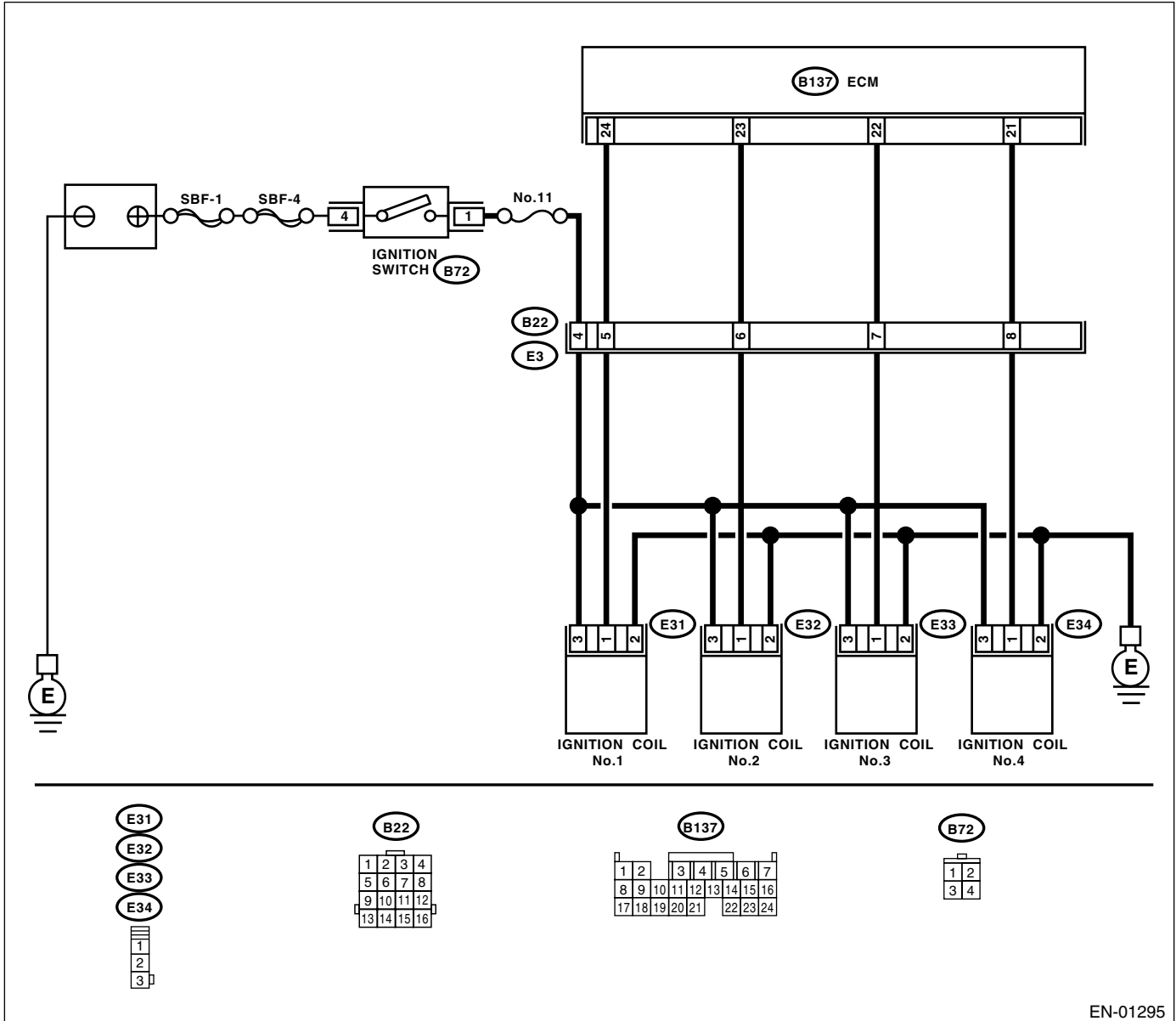


EN-01294

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

• RHD model



EN-01295

Step	Check	Yes	No
1 CHECK SPARK PLUG CONDITION. 1) Remove the spark plug. <Ref. to IG(H4DOTC)-5, INSTALLATION, Spark Plug.> 2) Check the spark plug condition. <Ref. to IG(H4DOTC)-5, INSPECTION, Spark Plug.>	Is the spark plug's status OK?	Go to step 2.	Replace the spark plug.
2 CHECK IGNITION SYSTEM FOR SPARKS. 1) Connect the spark plug to ignition coil. 2) Release the fuel pressure. <Ref. to FU(H4DOTC)-53, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.> 3) Contact the spark plug's thread portion on engine. 4) While opening the throttle valve fully, crank engine to check that spark occurs at each cylinder.	Does spark occur at each cylinder?	Check the fuel pump system. <Ref. to EN(H4DOTC)(diag)-69, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step 3.

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

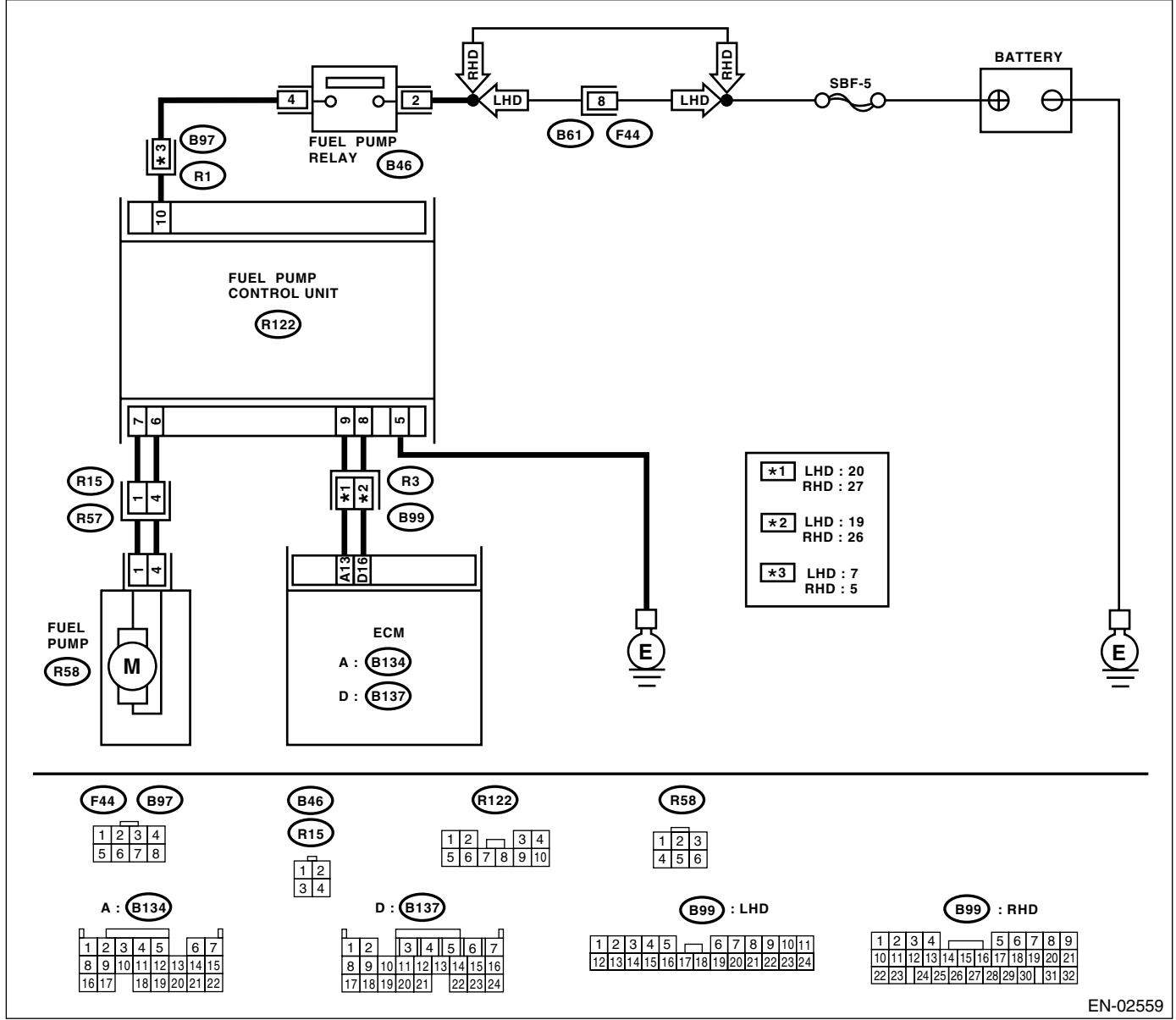
Step	Check	Yes	No
<p>3</p> <p>CHECK POWER SUPPLY CIRCUIT FOR IGNITION COIL & IGNITOR ASSEMBLY. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ignition coil & ignitor assembly. 3) Turn the ignition switch to ON. 4) Measure the power supply voltage between ignition coil & ignitor assembly connector and engine ground.</p> <p>Connector & terminal (E31) No. 3 (+) — Engine ground (-): (E32) No. 3 (+) — Engine ground (-): (E33) No. 3 (+) — Engine ground (-): (E34) No. 3 (+) — Engine ground (-):</p>	Is the voltage more than 10 V?	Go to step 4.	Repair the harness and connector. NOTE: In this case, repair the following: • Open circuit in harness between ignition coil & ignitor assembly, and ignition switch connector • Poor contact in coupling connectors
<p>4</p> <p>CHECK HARNESS OF IGNITION COIL & IGNITOR ASSEMBLY GROUND CIRCUIT. 1) Turn the ignition switch to OFF. 2) Measure the resistance between ignition coil & ignitor assembly connector and engine ground.</p> <p>Connector & terminal (E31) No. 2 — Engine ground: (E32) No. 2 — Engine ground: (E33) No. 2 — Engine ground: (E34) No. 2 — Engine ground:</p>	Is the resistance less than 5 Ω ?	Go to step 5.	Repair the harness and connector. NOTE: In this case, repair the following: • Open circuit in harness between ignition coil & ignitor assembly connector and engine grounding terminal
<p>5</p> <p>CHECK HARNESS BETWEEN ECM AND IGNITION COIL & IGNITOR ASSEMBLY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Disconnect the connector from ignition coil & ignitor assembly. 4) Measure the resistance of harness between ECM and ignition coil & ignitor assembly connector.</p> <p>Connector & terminal (B137) No. 21 — (E34) No. 1: (B137) No. 22 — (E33) No. 1: (B137) No. 23 — (E32) No. 1: (B137) No. 24 — (E31) No. 1:</p>	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the harness and connector. NOTE: In this case, repair the following: • Open circuit in harness between ECM and ignition coil & ignitor assembly connector • Poor contact in coupling connector
<p>6</p> <p>CHECK HARNESS BETWEEN ECM AND IGNITION COIL & IGNITOR ASSEMBLY CONNECTOR. Measure the resistance of harness between ECM and engine ground.</p> <p>Connector & terminal: (B137) No. 21 — Engine ground: (B137) No. 22 — Engine ground: (B137) No. 23 — Engine ground: (B137) No. 24 — Engine ground:</p>	Is the resistance more than 1 M Ω ?	Go to step 7.	Repair the ground short circuit in harness between ECM and ignition coil & ignitor assembly connector.
<p>7</p> <p>CHECK POOR CONTACT. Check poor contact in ECM connector.</p>	Is there poor contact in ECM connector?	Repair the poor contact in ECM connector.	Replace the ignition coil and ignitor assembly.

E: FUEL PUMP CIRCUIT

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN(H4DOTC)(diag)-47, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN(H4DOTC)(diag)-39, Inspection Mode.>.

• **WIRING DIAGRAM:**



EN-02559

Diagnostics for Engine Starting Failure

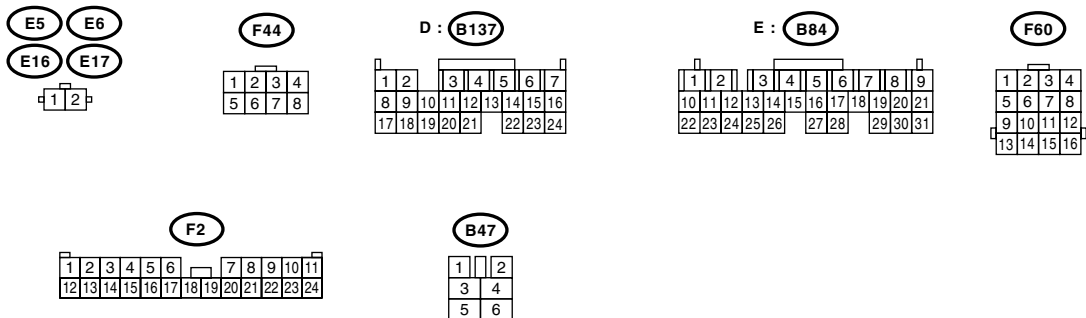
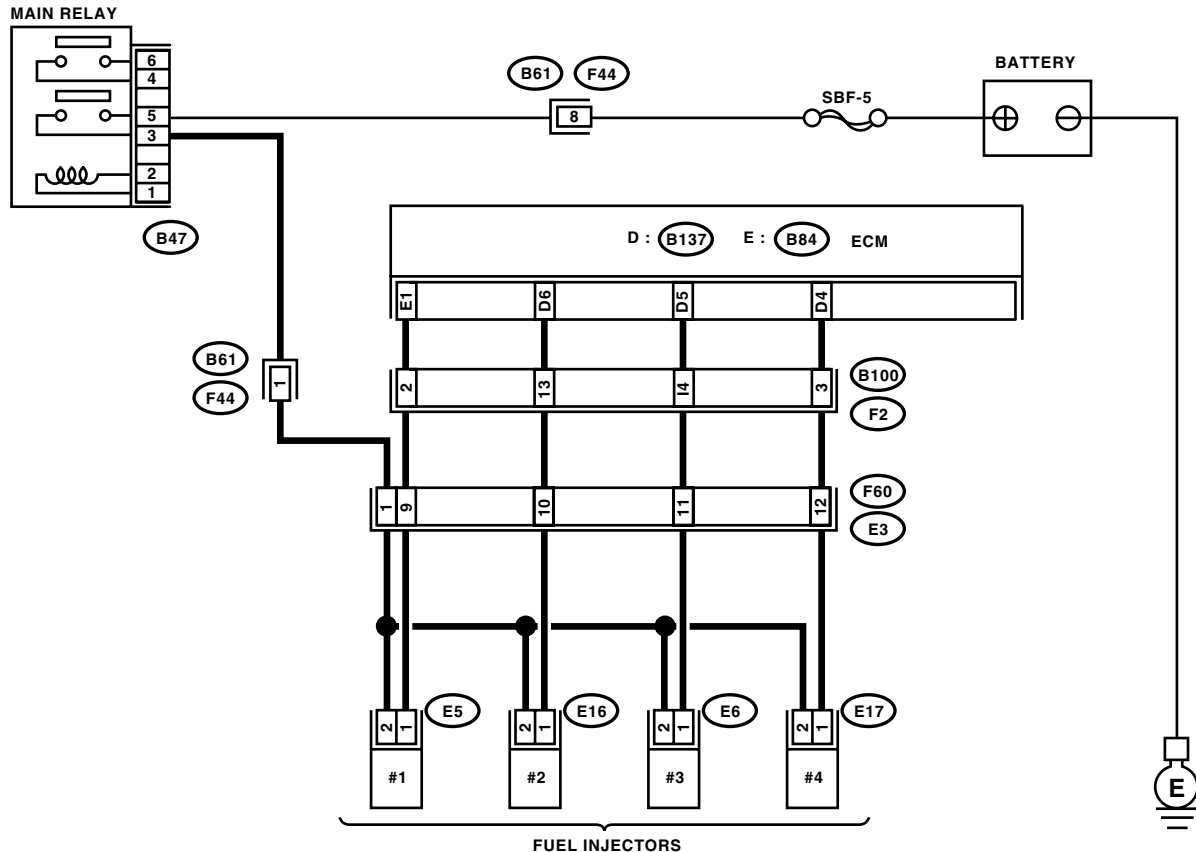
ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<p>1</p> <p>CHECK OPERATING SOUND OF FUEL PUMP.</p> <p>Make sure that the fuel pump is in operation for 2 seconds when turning ignition switch to ON.</p> <p>NOTE: Fuel pump operation check can also be executed using the Subaru Select Monitor. For the procedure, refer to "Compulsory Valve Operation Check Mode". <Ref. to EN(H4DOTC)(diag)-48, Compulsory Valve Operation Check Mode.></p>	<p>Does the fuel pump produce "operating" sound?</p>	<p>Check the fuel injector circuit. <Ref. to EN(H4DOTC)(diag)-71, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.></p>	<p>Display the DTC. <Ref. to EN(H4DOTC)(diag)-38, OPERATION, Read Diagnostic Trouble Code (DTC).></p>

F: FUEL INJECTOR CIRCUIT

CAUTION:

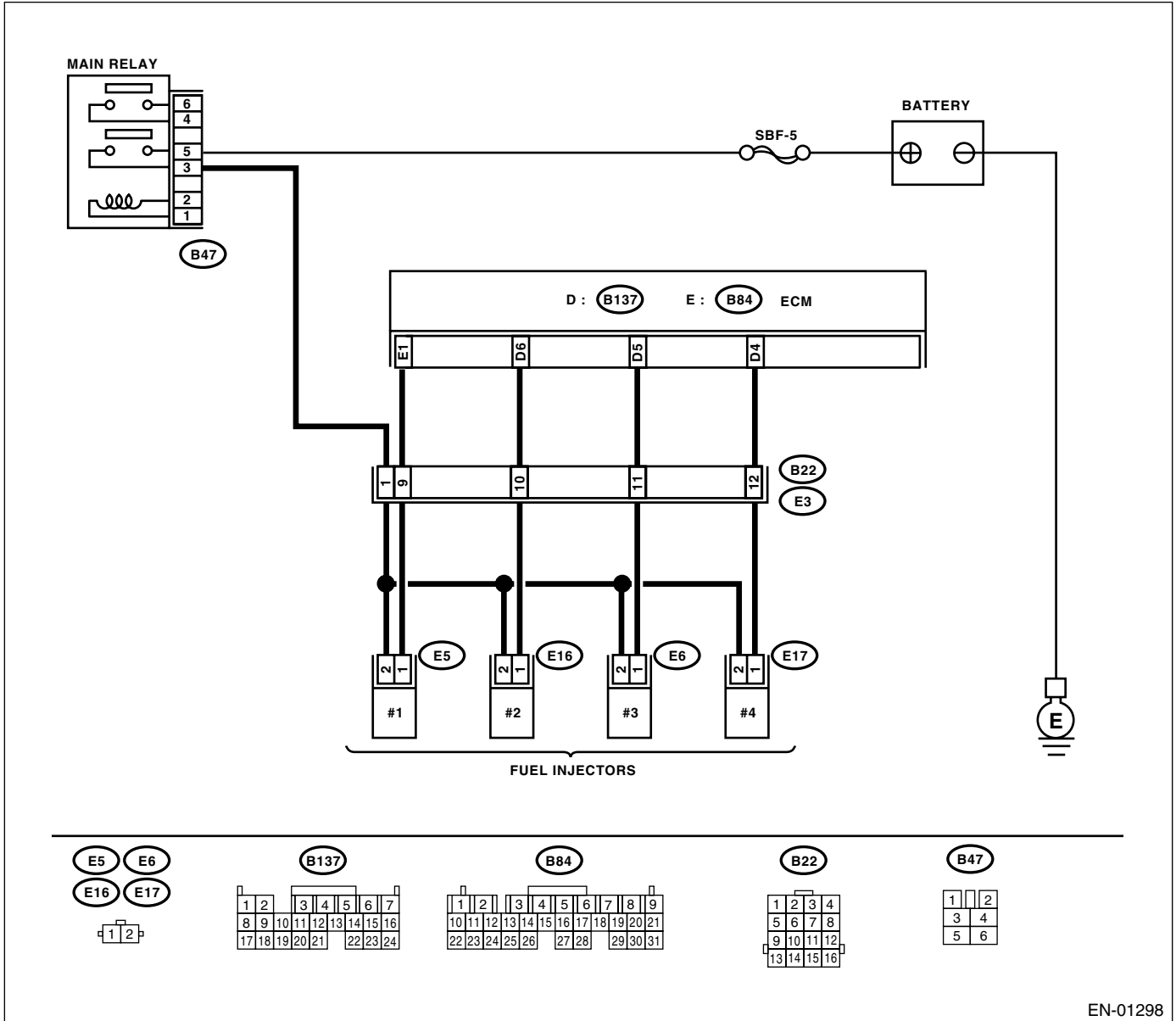
- Check or repair only faulty parts.
- After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN(H4DOTC)(diag)-47, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN(H4DOTC)(diag)-39, Inspection Mode.>.
- WIRING DIAGRAM:
- LHD model



Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

• RHD model



EN-01298

Step	Check	Yes	No	
1	<p>CHECK OPERATION OF EACH FUEL INJECTOR.</p> <p>While cranking the engine, check that each fuel injector emits "operating" sound. Use a sound scope or attach a screwdriver to injector for this check.</p>	Does the fuel injector emit "operating" sound?	Check the fuel pressure. <Ref. to ME(H4DOTC)-39, INSPECTION, Fuel Pressure.>	Go to step 2.

Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<p>2</p> <p>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 the fuel injector terminal and engine ground.</p> <p>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 (-):</p>	<p>Is the voltage more than 10 V?</p>	<p>Go to step 3.</p>	<p>Repair the harness and connector.</p> <p>NOTE: In this case, repair the following:</p> <ul style="list-style-type: none"> • Open circuit in harness between main relay and fuel injector connector • Poor contact in main relay connector • Poor contact in coupling connector • Poor contact in fuel injector connector
<p>3</p> <p>CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM and fuel injector connector.</p> <p>Connector & terminal (B84) No. 1 — (E5) No. 1: (B137) No. 6 — (E16) No. 1: (B137) No. 5 — (E6) No. 1: (B137) No. 4 — (E6) No. 1:</p>	<p>Is the resistance less than 1 Ω?</p>	<p>Go to step 4.</p>	<p>Repair the harness and connector.</p> <p>NOTE: In this case, repair the following:</p> <ul style="list-style-type: none"> • Open circuit in harness between ECM and fuel injector connector • Poor contact in coupling connector
<p>4</p> <p>CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. Measure the resistance of harness between ECM and fuel injector connector.</p> <p>Connector & terminal (B84) No. 1 — Chassis ground: (B137) No. 6 — Chassis ground: (B137) No. 5 — Chassis ground: (B137) No. 4 — Chassis ground:</p>	<p>Is the resistance less than 1 Ω?</p>	<p>Repair the ground short circuit in harness between ECM and fuel injector connector.</p>	<p>Go to step 5.</p>
<p>5</p> <p>CHECK EACH FUEL INJECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance between each fuel injector terminals.</p> <p>Terminals No. 1 — No. 2:</p>	<p>Is the resistance 5 — 20 Ω?</p>	<p>Go to step 6.</p>	<p>Replace the faulty fuel injector.</p>
<p>6</p> <p>CHECK POOR CONTACT. Check poor contact in ECM connector.</p>	<p>Is there poor contact in ECM connector?</p>	<p>Repair the poor contact in ECM connector.</p>	<p>Inspection using "General Diagnostic Table". <Ref. to EN(H4DOTC)(diag)-308, INSPECTION, General Diagnostic Table.></p>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

18. List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Index
P0011	"A" Camshaft Position - Timing Over-Advanced or System Performance (Bank 1)	<Ref. to EN(H4DOTC)(diag)-81, DTC P0011 "A" CAMSHAFT POSITION-TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0021	"A" Camshaft Position - Timing Over-Advanced or System Performance (Bank 2)	<Ref. to EN(H4DOTC)(diag)-82, DTC P0021 "A" 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(H4DOTC)(diag)-83, DTC P0030 HO2S HEATER CONTROL CIRCUIT (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0031	HO2S Heater Control Circuit Low (Bank 1 Sensor 1)	<Ref. to EN(H4DOTC)(diag)-85, DTC P0031 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0032	HO2S Heater Control Circuit High (Bank 1 Sensor 1)	<Ref. to EN(H4DOTC)(diag)-88, DTC P0032 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0037	HO2S Heater Control Circuit Low (Bank 1 Sensor 2)	<Ref. to EN(H4DOTC)(diag)-90, DTC P0037 HO2S HEATER CONTROL CIRCUIT LOW (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0038	HO2S Heater Control Circuit High (Bank 1 Sensor 2)	<Ref. to EN(H4DOTC)(diag)-93, DTC P0038 HO2S HEATER CONTROL CIRCUIT HIGH (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0068	Manifold Absolute Pressure/Barometric Pressure Circuit Range/Performance	<Ref. to EN(H4DOTC)(diag)-95, DTC P0068 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0101	Mass or Volume Air Flow Circuit Range/Performance	<Ref. to EN(H4DOTC)(diag)-98, DTC P0101 MASS OR VOLUME AIR FLOW CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0102	Mass or Volume Air Flow Circuit Low Input	<Ref. to EN(H4DOTC)(diag)-100, DTC P0102 MASS OR VOLUME AIR FLOW CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0103	Mass or Volume Air Flow Circuit High Input	<Ref. to EN(H4DOTC)(diag)-103, DTC P0103 MASS OR VOLUME AIR FLOW CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0107	Manifold Absolute Pressure/Barometric Pressure Circuit Low Input	<Ref. to EN(H4DOTC)(diag)-105, DTC P0107 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0108	Manifold Absolute Pressure/Barometric Pressure Circuit High Input	<Ref. to EN(H4DOTC)(diag)-108, DTC P0108 MANIFOLD ABSOLUTE PRESSURE/BAROMETRIC PRESSURE CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0112	Intake Air Temperature Circuit Low Input	<Ref. to EN(H4DOTC)(diag)-111, DTC P0112 INTAKE AIR TEMPERATURE CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0113	Intake Air Temperature Circuit High Input	<Ref. to EN(H4DOTC)(diag)-113, DTC P0113 INTAKE AIR TEMPERATURE CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0117	Engine Coolant Temperature Circuit Low Input	<Ref. to EN(H4DOTC)(diag)-116, DTC P0117 ENGINE COOLANT TEMPERATURE CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0118	Engine Coolant Temperature Circuit High Input	<Ref. to EN(H4DOTC)(diag)-118, DTC P0118 ENGINE COOLANT TEMPERATURE CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0121	Throttle/Pedal Position Sensor/Switch "A" Circuit Range/Performance	<Ref. to EN(H4DOTC)(diag)-121, DTC P0121 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Index
P0122	Throttle/Pedal Position Sensor/Switch "A" Circuit Low Input	<Ref. to EN(H4DOTC)(diag)-123, DTC P0122 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0123	Throttle/Pedal Position Sensor/Switch "A" Circuit High Input	<Ref. to EN(H4DOTC)(diag)-127, DTC P0123 THROTTLE/PEDAL POSITION SENSOR/SWITCH "A" CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0125	Insufficient Coolant Temperature for Closed Loop Fuel Control	<Ref. to EN(H4DOTC)(diag)-130, DTC P0125 INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0129	Atmospheric Pressure Sensor Circuit Range/Performance	<Ref. to EN(H4DOTC)(diag)-131, DTC P0129 ATMOSPHERIC PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0130	O2 Sensor Circuit (Bank 1 Sensor 1)	<Ref. to EN(H4DOTC)(diag)-132, DTC P0130 O2 SENSOR CIRCUIT (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0133	O2 Sensor Circuit Slow Response (Bank 1 Sensor 1)	<Ref. to EN(H4DOTC)(diag)-134, DTC P0133 O2 SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0134	O2 Sensor Circuit No Activity Detected (Bank 1 Sensor 1)	<Ref. to EN(H4DOTC)(diag)-135, DTC P0134 O2 SENSOR CIRCUIT NO ACTIVITY DETECTED (BANK 1 SENSOR 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0137	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 2)	<Ref. to EN(H4DOTC)(diag)-136, 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(H4DOTC)(diag)-139, DTC P0138 O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0139	O2 Sensor Circuit Slow Response (Bank 1 Sensor 2)	<Ref. to EN(H4DOTC)(diag)-142, DTC P0139 O2 SENSOR CIRCUIT SLOW RESPONSE (BANK 1 SENSOR 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0171	System too Lean (Bank 1)	<Ref. to EN(H4DOTC)(diag)-143, DTC P0171 SYSTEM TOO LEAN (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0172	System too Rich (Bank 1)	<Ref. to EN(H4DOTC)(diag)-144, DTC P0172 SYSTEM TOO RICH (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0230	Fuel Pump Primary Circuit	<Ref. to EN(H4DOTC)(diag)-147, DTC P0230 FUEL PUMP PRIMARY CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0244	Turbo/Super Charger Wastegate Solenoid "A" Range/Performance	<Ref. to EN(H4DOTC)(diag)-150, DTC P0244 TURBO/SUPER CHARGER WASTEGATE SOLENOID "A" RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0245	Turbo/Super Charger Wastegate Solenoid "A" Low	<Ref. to EN(H4DOTC)(diag)-152, DTC P0245 TURBO/SUPER CHARGER WASTEGATE SOLENOID "A" LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0246	Turbo/Super Charger Wastegate Solenoid "A" High	<Ref. to EN(H4DOTC)(diag)-154, DTC P0246 TURBO/SUPER CHARGER WASTEGATE SOLENOID "A" HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0301	Cylinder 1 misfire detected	<Ref. to EN(H4DOTC)(diag)-155, DTC P0301 CYLINDER 1 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0302	Cylinder 2 misfire detected	<Ref. to EN(H4DOTC)(diag)-155, DTC P0302 CYLINDER 2 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0303	Cylinder 3 misfire detected	<Ref. to EN(H4DOTC)(diag)-155, DTC P0303 CYLINDER 3 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0304	Cylinder 4 misfire detected	<Ref. to EN(H4DOTC)(diag)-156, DTC P0304 CYLINDER 4 MISFIRE DETECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0327	Knock Sensor 1 Circuit Low Input (Bank 1 or Single Sensor)	<Ref. to EN(H4DOTC)(diag)-163, DTC P0327 KNOCK SENSOR 1 CIRCUIT LOW INPUT (BANK 1 OR SINGLE SENSOR), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Index
P0328	Knock Sensor 1 Circuit High Input (Bank 1 or Single Sensor)	<Ref. to EN(H4DOTC)(diag)-165, DTC P0328 KNOCK SENSOR 1 CIRCUIT HIGH INPUT (BANK 1 OR SINGLE SENSOR), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0335	Crankshaft Position Sensor "A" Circuit	<Ref. to EN(H4DOTC)(diag)-167, DTC P0335 CRANKSHAFT POSITION SENSOR "A" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0336	Crankshaft Position Sensor "A" Circuit Range/Performance	<Ref. to EN(H4DOTC)(diag)-169, DTC P0336 CRANKSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0340	Camshaft Position Sensor "A" Circuit (Bank 1 or Single Sensor)	<Ref. to EN(H4DOTC)(diag)-171, DTC P0340 CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 1 OR SINGLE SENSOR), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0341	Camshaft Position Sensor "A" Circuit Range/Performance (Bank 1 or Single Sensor)	<Ref. to EN(H4DOTC)(diag)-173, DTC P0341 CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 1 OR SINGLE SENSOR), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0365	Camshaft Position Sensor "B" Circuit (Bank 1)	<Ref. to EN(H4DOTC)(diag)-176, DTC P0365 CAMSHAFT POSITION SENSOR "B" CIRCUIT (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0390	Camshaft Position Sensor "B" Circuit (Bank 2)	<Ref. to EN(H4DOTC)(diag)-178, DTC P0390 CAMSHAFT POSITION SENSOR "B" CIRCUIT (BANK 2), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0420	Catalyst System Efficiency Below Threshold (Bank 1)	<Ref. to EN(H4DOTC)(diag)-180, DTC P0420 CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD (BANK 1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0458	Evaporative Emission Control System Purge Control Valve Circuit Low	<Ref. to EN(H4DOTC)(diag)-182, DTC P0458 EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0459	Evaporative Emission Control System Purge Control Valve Circuit High	<Ref. to EN(H4DOTC)(diag)-184, DTC P0459 EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0461	Fuel Level Sensor Circuit Range/Performance	<Ref. to EN(H4DOTC)(diag)-186, DTC P0461 FUEL LEVEL SENSOR CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0462	Fuel Level Sensor Circuit Low Input	<Ref. to EN(H4DOTC)(diag)-189, DTC P0462 FUEL LEVEL SENSOR CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0463	Fuel Level Sensor Circuit High Input	<Ref. to EN(H4DOTC)(diag)-193, DTC P0463 FUEL LEVEL SENSOR CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0483	Cooling Fan Rationality Check	<Ref. to EN(H4DOTC)(diag)-197, DTC P0483 COOLING FAN RATIONALITY CHECK, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0502	Vehicle Speed Sensor Circuit Low Input	<Ref. to EN(H4DOTC)(diag)-200, DTC P0502 VEHICLE SPEED SENSOR CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0503	Vehicle Speed Sensor Intermittent/Erratic/High	<Ref. to EN(H4DOTC)(diag)-202, DTC P0503 VEHICLE SPEED SENSOR INTERMITTENT/ERRATIC/HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0506	Idle Control System RPM Lower Than Expected	<Ref. to EN(H4DOTC)(diag)-204, DTC P0506 IDLE CONTROL SYSTEM RPM LOWER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0507	Idle Control System RPM Higher Than Expected	<Ref. to EN(H4DOTC)(diag)-206, DTC P0507 IDLE CONTROL SYSTEM RPM HIGHER THAN EXPECTED, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0508	Idle Control System Circuit Low	<Ref. to EN(H4DOTC)(diag)-208, DTC P0508 IDLE CONTROL SYSTEM CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Index
P0509	Idle Control System Circuit High	<Ref. to EN(H4DOTC)(diag)-210, DTC P0509 IDLE CONTROL SYSTEM CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0512	Starter Request Circuit	<Ref. to EN(H4DOTC)(diag)-212, DTC P0512 STARTER REQUEST CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0513	Incorrect Immobilizer Key	<Ref. to IM(diag)-15, DTC P0513 INCORRECT IMMOBILIZER KEY, Diagnostics Chart with Diagnostic Trouble Code (DTC).>
P0519	Idle Control System Malfunction (Fail-Safe)	<Ref. to EN(H4DOTC)(diag)-214, DTC P0519 IDLE CONTROL SYSTEM MALFUNCTION (FAIL-SAFE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0545	Exhaust Gas Temperature Sensor Circuit Low-Bank 1	<Ref. to EN(H4DOTC)(diag)-216, DTC P0545 EXHAUST GAS TEMPERATURE SENSOR CIRCUIT LOW-BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0546	Exhaust Gas Temperature Sensor Circuit High-Bank 1	<Ref. to EN(H4DOTC)(diag)-218, DTC P0546 EXHAUST GAS TEMPERATURE SENSOR CIRCUIT HIGH-BANK 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0558	Generator Circuit Low Input	<Ref. to EN(H4DOTC)(diag)-220, DTC P0558 GENERATOR CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0559	Generator Circuit High Input	<Ref. to EN(H4DOTC)(diag)-221, DTC P0559 GENERATOR CIRCUIT HIGH INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0565	Cruise Control On Signal	<Ref. to EN(H4DOTC)(diag)-223, DTC P0565 CRUISE CONTROL ON SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0604	Internal Control Module Random Access Memory (RAM) Error	<Ref. to EN(H4DOTC)(diag)-225, DTC P0604 INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0691	Cooling Fan 1 Control Circuit Low	<Ref. to EN(H4DOTC)(diag)-227, DTC P0691 COOLING FAN 1 CONTROL CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0692	Cooling Fan 1 Control Circuit High	<Ref. to EN(H4DOTC)(diag)-231, DTC P0692 COOLING FAN 1 CONTROL CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0703	Torque Converter/Brake Switch "B" Circuit	<Ref. to EN(H4DOTC)(diag)-234, DTC P0703 TORQUE CONVERTER/BRAKE SWITCH "B" CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0705	Transmission Range Sensor Circuit (PRNDL Input)	<Ref. to 4AT(diag)-107, CHECK INHIBITOR SWITCH, Diagnostic Procedure without Diagnostic Trouble Code (DTC).>
P0710	Transmission Fluid Temperature Sensor Circuit	<Ref. to 4AT(diag)-44, DTC 27 ATF TEMPERATURE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0716	Torque Converter Turbine Speed Sensor	<Ref. to 4AT(diag)-56, DTC 36 TORQUE CONVERTER TURBINE SPEED SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0720	Output Speed Sensor Circuit	<Ref. to 4AT(diag)-52, DTC 33 FRONT VEHICLE SPEED SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0726	Engine Speed Input Circuit Range/Performance	<Ref. to 4AT(diag)-40, DTC 11 ENGINE SPEED SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0731	Gear 1 Incorrect Ratio	<Ref. to EN(H4DOTC)(diag)-235, DTC P0731 GEAR 1 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0732	Gear 2 Incorrect Ratio	<Ref. to EN(H4DOTC)(diag)-235, DTC P0732 GEAR 2 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0733	Gear 3 Incorrect Ratio	<Ref. to EN(H4DOTC)(diag)-235, DTC P0733 GEAR 3 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0734	Gear 4 Incorrect Ratio	<Ref. to EN(H4DOTC)(diag)-236, DTC P0734 GEAR 4 INCORRECT RATIO, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0741	Torque Converter Clutch Circuit Performance or Stuck Off	<Ref. to EN(H4DOTC)(diag)-237, DTC P0741 TORQUE CONVERTER CLUTCH CIRCUIT PERFORMANCE OR STUCK OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0743	Torque Converter Clutch Circuit Electrical	<Ref. to 4AT(diag)-81, DTC 77 LOCK-UP DUTY SOLENOID, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Index
P0748	Pressure Control Solenoid "A" Electrical	<Ref. to 4AT(diag)-75, DTC 75 LINE PRESSURE DUTY SOLENOID, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0753	Shift Solenoid "A" Electrical	<Ref. to 4AT(diag)-63, DTC 71 SHIFT SOLENOID 1, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0758	Shift Solenoid "B" Electrical	<Ref. to 4AT(diag)-66, DTC 72 SHIFT SOLENOID 2, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0771	Low Clutch Timing Solenoid	<Ref. to 4AT(diag)-69, DTC 73 LOW CLUTCH TIMING SOLENOID, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0778	Pressure Control Solenoid "B" Electrical	<Ref. to 4AT(diag)-78, DTC 76 2-4 BRAKE DUTY SOLENOID, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0785	Shift/Timing Solenoid	<Ref. to 4AT(diag)-72, DTC 74 2-4 BRAKE TIMING SOLENOID, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0851	Neutral Switch Input Circuit Low	<Ref. to EN(H4DOTC)(diag)-239, DTC P0851 NEUTRAL SWITCH INPUT CIRCUIT LOW (AT MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).> or <Ref. to EN(H4DOTC)(diag)-241, DTC P0851 NEUTRAL SWITCH INPUT CIRCUIT LOW (MT MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0852	Neutral Switch Input Circuit High	<Ref. to EN(H4DOTC)(diag)-244, DTC P0852 NEUTRAL SWITCH INPUT CIRCUIT HIGH (AT MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).> or <Ref. to EN(H4DOTC)(diag)-247, DTC P0852 NEUTRAL SWITCH INPUT CIRCUIT HIGH (MT MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0864	TCM Communication Circuit Range/Performance	<Ref. to EN(H4DOTC)(diag)-250, DTC P0864 TCM COMMUNICATION CIRCUIT RANGE/PERFORMANCE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0865	TCM Communication Circuit Low	<Ref. to EN(H4DOTC)(diag)-252, DTC P0865 TCM COMMUNICATION CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0866	TCM Communication Circuit High	<Ref. to EN(H4DOTC)(diag)-254, DTC P0866 TCM COMMUNICATION CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1086	Tumble Generated Valve Position Sensor 2 Circuit Low	<Ref. to EN(H4DOTC)(diag)-256, DTC P1086 TUMBLE GENERATED VALVE POSITION SENSOR 2 CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1087	Tumble Generated Valve Position Sensor 2 Circuit High	<Ref. to EN(H4DOTC)(diag)-260, DTC P1087 TUMBLE GENERATED VALVE POSITION SENSOR 2 CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1088	Tumble Generated Valve Position Sensor 1 Circuit Low	<Ref. to EN(H4DOTC)(diag)-263, DTC P1088 TUMBLE GENERATED VALVE POSITION SENSOR 1 CIRCUIT LOW, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1089	Tumble Generated Valve Position Sensor 1 Circuit High	<Ref. to EN(H4DOTC)(diag)-267, DTC P1089 TUMBLE GENERATED VALVE POSITION SENSOR 1 CIRCUIT HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1090	Tumble Generated Valve System 1 (Valve Open)	<Ref. to EN(H4DOTC)(diag)-270, DTC P1090 TUMBLE GENERATED VALVE SYSTEM 1 (VALVE OPEN), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1091	Tumble Generated Valve System 1 (Valve Close)	<Ref. to EN(H4DOTC)(diag)-270, DTC P1091 TUMBLE GENERATED VALVE SYSTEM 1 (VALVE CLOSE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1092	Tumble Generated Valve System 2 (Valve Open)	<Ref. to EN(H4DOTC)(diag)-271, DTC P1092 TUMBLE GENERATED VALVE SYSTEM 2 (VALVE OPEN), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1093	Tumble Generated Valve System 2 (Valve Close)	<Ref. to EN(H4DOTC)(diag)-271, DTC P1093 TUMBLE GENERATED VALVE SYSTEM 2 (VALVE CLOSE), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1094	Tumble Generated Valve Signal 1 Circuit Malfunction (Open)	<Ref. to EN(H4DOTC)(diag)-272, DTC P1094 TUMBLE GENERATED VALVE SIGNAL 1 CIRCUIT MALFUNCTION (OPEN), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Index
P1095	Tumble Generated Valve Signal 1 Circuit Malfunction (Short)	<Ref. to EN(H4DOTC)(diag)-274, DTC P1095 TUMBLE GENERATED VALVE SIGNAL 1 CIRCUIT MALFUNCTION (SHORT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1096	Tumble Generated Valve Signal 2 Circuit Malfunction (Open)	<Ref. to EN(H4DOTC)(diag)-276, DTC P1096 TUMBLE GENERATED VALVE SIGNAL 2 CIRCUIT MALFUNCTION (OPEN), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1097	Tumble Generated Valve Signal 2 Circuit Malfunction (Short)	<Ref. to EN(H4DOTC)(diag)-278, DTC P1097 TUMBLE GENERATED VALVE SIGNAL 2 CIRCUIT MALFUNCTION (SHORT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1110	Atmospheric Pressure Sensor Circuit Malfunction (Low Input)	<Ref. to EN(H4DOTC)(diag)-279, DTC P1110 ATMOSPHERIC PRESSURE SENSOR CIRCUIT MALFUNCTION (LOW INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1111	Atmospheric Pressure Sensor Circuit Malfunction (High Input)	<Ref. to EN(H4DOTC)(diag)-279, DTC P1111 ATMOSPHERIC PRESSURE SENSOR CIRCUIT MALFUNCTION (HIGH INPUT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1134	A/F Sensor Micro-Computer Problem (Bank1 Sensor1)	<Ref. to EN(H4DOTC)(diag)-280, DTC P1134 A/F SENSOR MICRO-COMPUTER PROBLEM (BANK1 SENSOR1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1152	O2 Sensor Circuit Range/Performance (Low) (Bank1 Sensor1)	<Ref. to EN(H4DOTC)(diag)-281, DTC P1152 O2 SENSOR CIRCUIT RANGE/PERFORMANCE (LOW) (BANK1 SENSOR1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1153	O2 Sensor Circuit Range/Performance (High) (Bank1 Sensor1)	<Ref. to EN(H4DOTC)(diag)-283, DTC P1153 O2 SENSOR CIRCUIT RANGE/PERFORMANCE (HIGH) (BANK1 SENSOR1), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1301	Misfire Detected (High Temperature Exhaust Gas)	<Ref. to EN(H4DOTC)(diag)-285, DTC P1301 MISFIRE DETECTED (HIGH TEMPERATURE EXHAUST GAS), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1306	OCV Solenoid Valve Signal 1 Circuit Malfunction (Open)	<Ref. to EN(H4DOTC)(diag)-287, DTC P1306 OCV SOLENOID VALVE SIGNAL 1 CIRCUIT MALFUNCTION (OPEN), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1307	OCV Solenoid Valve Signal 1 Circuit Malfunction (Short)	<Ref. to EN(H4DOTC)(diag)-289, DTC P1307 OCV SOLENOID VALVE SIGNAL 1 CIRCUIT MALFUNCTION (SHORT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1308	OCV Solenoid Valve Signal 2 Circuit Malfunction (Open)	<Ref. to EN(H4DOTC)(diag)-291, DTC P1308 OCV SOLENOID VALVE SIGNAL 2 CIRCUIT MALFUNCTION (OPEN), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1309	OCV Solenoid Valve Signal 2 Circuit Malfunction (Short)	<Ref. to EN(H4DOTC)(diag)-293, DTC P1309 OCV SOLENOID VALVE SIGNAL 2 CIRCUIT MALFUNCTION (SHORT), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1312	Exhaust Gas Temperature Sensor Malfunction	<Ref. to EN(H4DOTC)(diag)-295, DTC P1312 EXHAUST GAS TEMPERATURE SENSOR MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1518	Starter Switch Circuit Low Input	<Ref. to EN(H4DOTC)(diag)-297, DTC P1518 STARTER SWITCH CIRCUIT LOW INPUT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1544	Exhaust Gas Temperature Too High	<Ref. to EN(H4DOTC)(diag)-299, DTC P1544 EXHAUST GAS TEMPERATURE TOO HIGH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1560	Back-Up Voltage Circuit Malfunction	<Ref. to EN(H4DOTC)(diag)-301, DTC P1560 BACK-UP VOLTAGE CIRCUIT MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1570	Antenna	<Ref. to IM(diag)-16, DTC P1570 ANTENNA, Diagnostics Chart with Diagnostic Trouble Code (DTC).>
P1571	Reference Code Incompatibility	<Ref. to IM(diag)-18, DTC P1571 REFERENCE CODE INCOMPATIBILITY, Diagnostics Chart with Diagnostic Trouble Code (DTC).>
P1572	IMM Circuit Failure (Except Antenna Circuit)	<Ref. to IM(diag)-19, DTC P1572 IMM CIRCUIT FAILURE (EXCEPT ANTENNA CIRCUIT), Diagnostics Chart with Diagnostic Trouble Code (DTC).>

List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

DTC	Item	Index
P1574	Key Communication Failure	<Ref. to IM(diag)-23, DTC P1574 KEY COMMUNICATION FAILURE, Diagnostics Chart with Diagnostic Trouble Code (DTC).>
P1576	EGI Control Module EEPROM	<Ref. to IM(diag)-23, DTC P1576 EGI CONTROL MODULE EEPROM, Diagnostics Chart with Diagnostic Trouble Code (DTC).>
P1577	IMM Control Module EEPROM	<Ref. to IM(diag)-23, DTC P1577 IMM CONTROL MODULE EEPROM, Diagnostics Chart with Diagnostic Trouble Code (DTC).>
P1700	Throttle Position Sensor	<Ref. to 4AT(diag)-47, DTC 31 THROTTLE POSITION SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1711	Engine Torque Control Signal 1 Circuit Malfunction	<Ref. to EN(H4DOTC)(diag)-304, DTC P1711 ENGINE TORQUE CONTROL SIGNAL 1 CIRCUIT MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1712	Engine Torque Control Signal 2 Circuit Malfunction	<Ref. to EN(H4DOTC)(diag)-306, DTC P1712 ENGINE TORQUE CONTROL SIGNAL 2 CIRCUIT MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>