

**ENGINE SECTION 1**

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(H4SO)**

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

**INTAKE (INDUCTION) IN(H4SO)**

**MECHANICAL ME(H4SO)**

**EXHAUST EX(H4SO)**

**COOLING CO(H4SO)**

**LUBRICATION LU(H4SO)**

**SPEED CONTROL SYSTEMS SP(H4SO)**

**IGNITION IG(H4SO)**

**STARTING/CHARGING SYSTEMS SC(H4SO)**

**ENGINE (DIAGNOSTICS) EN(H4SO)(diag)**

**FUEL INJECTION (FUEL SYSTEMS) FU(H4SOw/oOBD)**

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ENGINE SECTION 1

LUBRICATION

LU(H4SOw/oOBD)

SPEED CONTROL SYSTEMS

SP(H4SOw/oOBD)

IGNITION

IG(H4SOw/oOBD)

STARTING/CHARGING SYSTEMS

SC(H4SOw/oOBD)

ENGINE (DIAGNOSTICS)

EN(H4SOw/oOBD)  
(diag)

# ENGINE (DIAGNOSTICS)

## *EN(H4SOw/oOBD)(diag)*

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# Basic Diagnostic Procedure

ENGINE (DIAGNOSTICS)

## 1. Basic Diagnostic Procedure

### A: PROCEDURE

#### 1. WITH SUBARU SELECT MONITOR

Step	Check	Yes	No
<b>1 CHECK ENGINE START FAILURE.</b> 1)Ask the customer when and how trouble occurred using the interview check list. <Ref. to EN(H4SOw/oOBD)(diag)-4, CHECK, Check List for Interview.> 2)Start the engine.	Does the engine start?	Go to step 2.	Inspection using "Diagnostics for Engine Starting Failure". <Ref. to EN(H4SOw/oOBD)(diag)-38, Diagnostics for Engine Starting Failure.>
<b>2 CHECK ILLUMINATION OF MALFUNCTION INDICATOR LIGHT.</b> <Ref. to EN(H4SOw/oOBD)(diag)-30, ACTIVATION OF MALFUNCTION INDICATOR LIGHT, Malfunction Indicator Light.>	Does the malfunction indicator light illuminate?	Go to step 3.	Inspection using "General Diagnostic Table". <Ref. to EN(H4SOw/oOBD)(diag)-97, INSPECTION, General Diagnostic Table.>
<b>3 CHECK INDICATION OF DTC ON DISPLAY.</b> 1)Turn the ignition switch to OFF. 2)Connect the SUBARU Select Monitor to data link connector. 3)Turn the ignition switch to ON and the SUBARU Select Monitor switch to ON. 4)Read any DTC on SUBARU Select Monitor. <Ref. to EN(H4SOw/oOBD)(diag)-24, WITH SUBARU SELECT MONITOR, OPERATION, Read Diagnostic Trouble Code (DTC).>	Does the SUBARU Select Monitor indicate DTC? <Ref. to EN(H4SOw/oOBD)(diag)-55, LIST, List of Diagnostic Trouble Code (DTC).>	Record the DTC. Repair the trouble cause. <Ref. to EN(H4SOw/oOBD)(diag)-57, Diagnostic Procedure with 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 circuit or combination meter. <Ref. to EN(H4SOw/oOBD)(diag)-30, Malfunction Indicator Light.>
<b>4 PERFORM THE DIAGNOSIS.</b> 1)Perform the Clear Memory Mode. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> 2)Perform the inspection mode. <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>	Does the SUBARU Select Monitor indicate DTC? <Ref. to EN(H4SOw/oOBD)(diag)-55, LIST, List of Diagnostic Trouble Code (DTC).>	Record the DTC. Repair the trouble cause. <Ref. to EN(H4SOw/oOBD)(diag)-57, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Complete the diagnosis.

## 2. WITHOUT SUBARU SELECT MONITOR

**CAUTION:**

- Check the connector while it is connected unless specified otherwise.
- Be sure to check again from the beginning in order to prevent secondary trouble caused by repair work.

Step	Check	Yes	No
<b>1 CHECK ENGINE START FAILURE.</b> 1)Ask the customer when and how trouble occurred using interview check list. <Ref. to EN(H4SOw/oOBD)(diag)-4, CHECK, Check List for Interview.> 2)Start the engine.	Does the engine start?	Go to step 2.	Inspection using "Diagnostics for Engine Starting Failure". <Ref. to EN(H4SOw/oOBD)(diag)-38, Diagnostics for Engine Starting Failure.>
<b>2 CHECK ILLUMINATION OF MALFUNCTION INDICATOR LIGHT.</b> <Ref. to EN(H4SOw/oOBD)(diag)-30, ACTIVATION OF MALFUNCTION INDICATOR LIGHT, Malfunction Indicator Light.>	Does the malfunction indicator light illuminate?	Go to step 3.	Inspection using "General Diagnostic Table". <Ref. to EN(H4SOw/oOBD)(diag)-97, INSPECTION, General Diagnostic Table.>
<b>3 CHECK INDICATION OF DTC ON MALFUNCTION INDICATOR LIGHT.</b> 1)Perform the read DTC (read memory mode). <Ref. to EN(H4SOw/oOBD)(diag)-24, WITHOUT SUBARU SELECT MONITOR, OPERATION, Read Diagnostic Trouble Code (DTC).> 2)Read any DTC on malfunction indicator light.	Does the malfunction indicator light indicate DTC? <Ref. to EN(H4SOw/oOBD)(diag)-55, LIST, List of Diagnostic Trouble Code (DTC).>	Repair the trouble cause. Go to step 4.	Repair the related parts.  NOTE: If the DTC is not shown on malfunction indicator light although malfunction indicator light illuminates, perform diagnostics of circuit or combination meter. <Ref. to EN(H4SOw/oOBD)(diag)-30, Malfunction Indicator Light.>
<b>4 PERFORM THE DIAGNOSIS.</b> 1)Perform the Clear Memory Mode. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> 2)Perform the inspection mode. <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>	Does the malfunction indicator light indicate DTC? <Ref. to EN(H4SOw/oOBD)(diag)-55, LIST, List of Diagnostic Trouble Code (DTC).>	Repair the trouble cause. <Ref. to EN(H4SOw/oOBD)(diag)-57, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Complete the diagnosis.

## 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	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
Radiator 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 the 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"><li>• Lack of gasoline: <input type="checkbox"/> Yes / <input type="checkbox"/> No</li><li>• Indicator position of fuel gauge:</li></ul>
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"><li>• What:</li></ul>
d) Intentional connecting or disconnecting of hoses: <input type="checkbox"/> Yes / <input type="checkbox"/> No
<ul style="list-style-type: none"><li>• What:</li></ul>
e) Installing of parts other than genuine parts: <input type="checkbox"/> Yes / <input type="checkbox"/> No
<ul style="list-style-type: none"><li>• What:</li><li>• Where:</li></ul>
f) Occurrence of noise: <input type="checkbox"/> Yes / <input type="checkbox"/> No
<ul style="list-style-type: none"><li>• From where:</li><li>• What kind:</li></ul>
g) Occurrence of smell: <input type="checkbox"/> Yes / <input type="checkbox"/> No
<ul style="list-style-type: none"><li>• From where:</li><li>• What kind:</li></ul>
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 engine control module (ECM), main relay and fuel pump relay.

#### CAUTION:

- All airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuit.
- Be careful not to damage the airbag system wiring harness when servicing the engine control module (ECM), transmission control module (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.

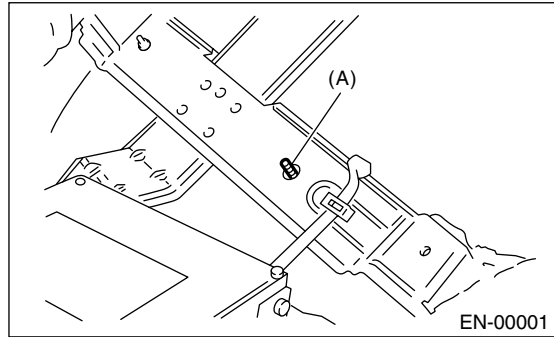
- Otherwise, the ECM may be damaged.

#### CAUTION:

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

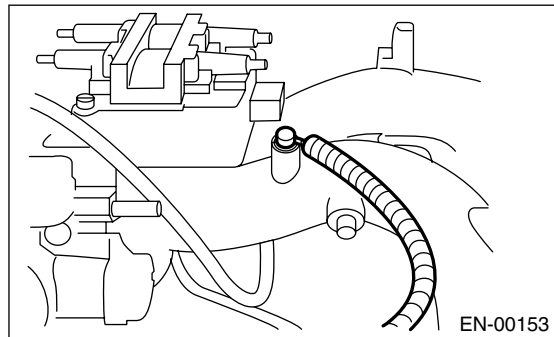
7) The connectors to each sensor in the engine compartment and the harness connectors on the engine side and body side are all designed to be waterproof. However, it is still necessary to take care not to allow water to get into the connectors when washing the vehicle, or when servicing the vehicle on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

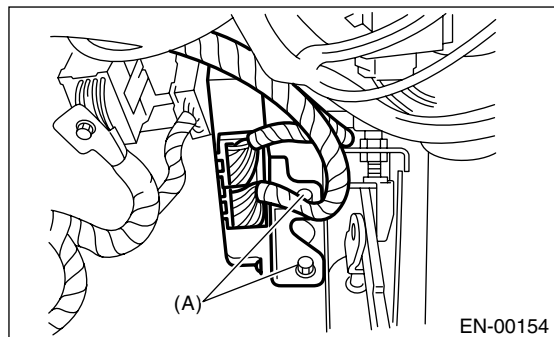


(A) Stud bolt

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 body head 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 apart as possible from the ECM and MFI harness.
- Carefully adjust the antenna for correct matching.
- When mounting a large power type radio, pay special attention to the three items above mentioned.
- Incorrect installation of the radio may affect the operation of the 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 customer's complaint, and distinguish between the three causes.

16) In AT model, do not continue the stall for more than 5 seconds at a time (from closed throttle, fully open throttle to stall engine speed).

17) On ABS model, 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 the 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.

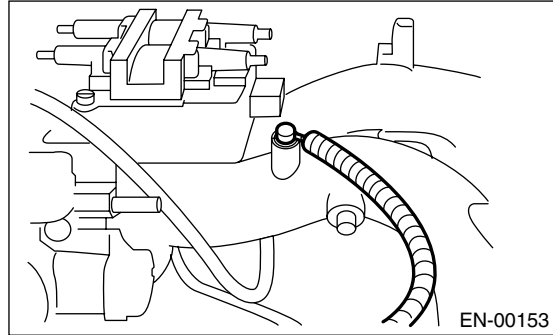
**Standard voltage: 12 V**

**Specific gravity: Above 1.260**

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

## 2. ENGINE GROUNDING

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



## C: NOTE

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

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

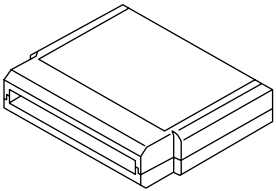

The MFI system also has the following features:

- Reduced emission of harmful exhaust gases.
- 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.

# General Description

ENGINE (DIAGNOSTICS)

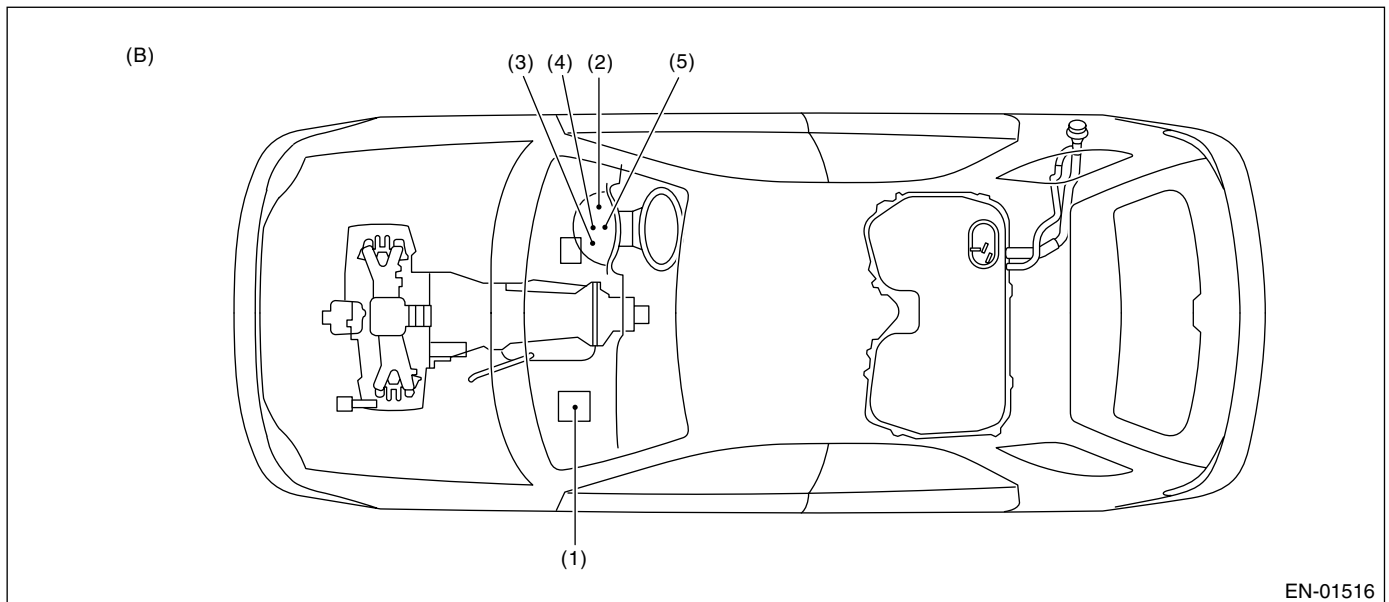
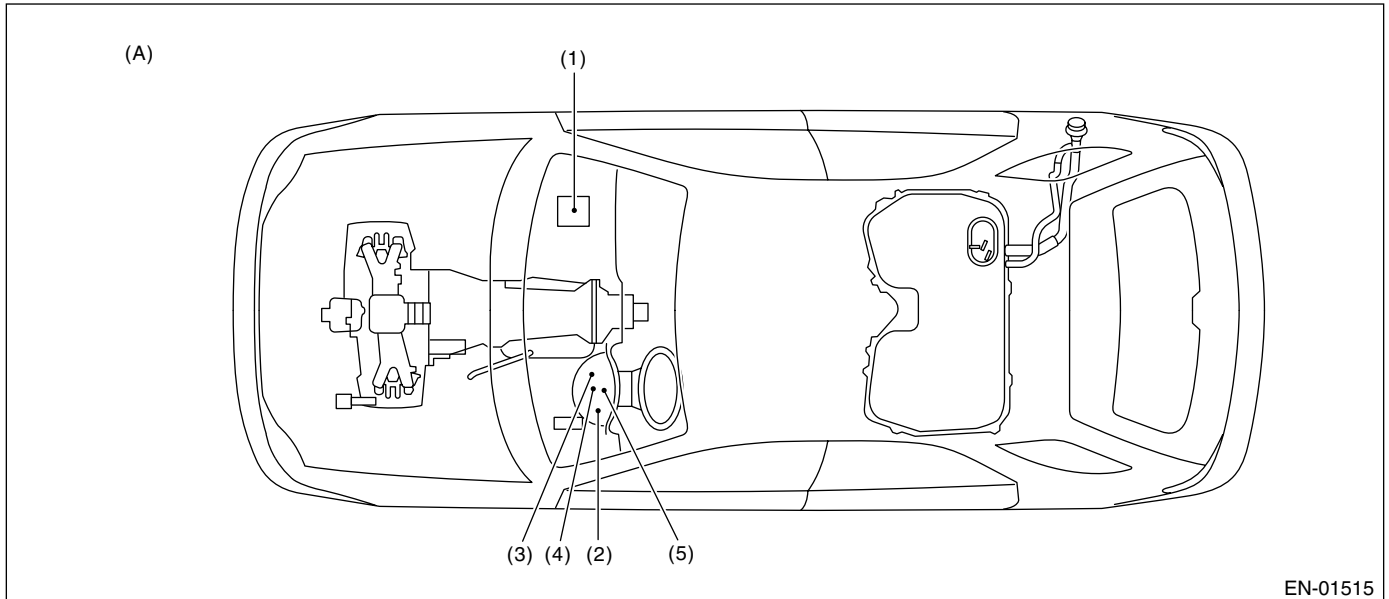
## D: PREPARATION TOOL

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

## 4. Electrical Components Location

### A: LOCATION

#### 1. MODULE



(A) LHD

(B) RHD

(1) Engine control module (ECM)

(3) Read memory connector

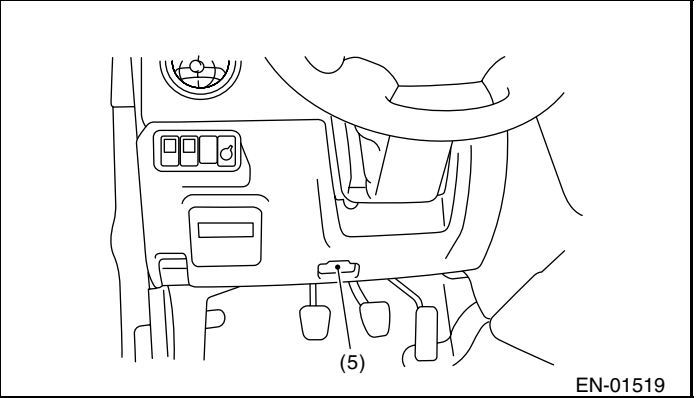
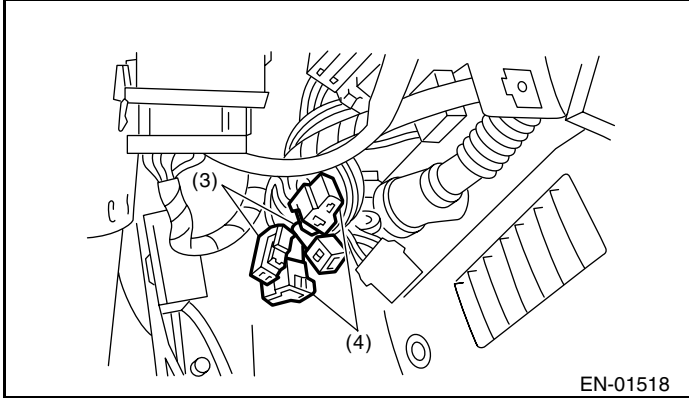
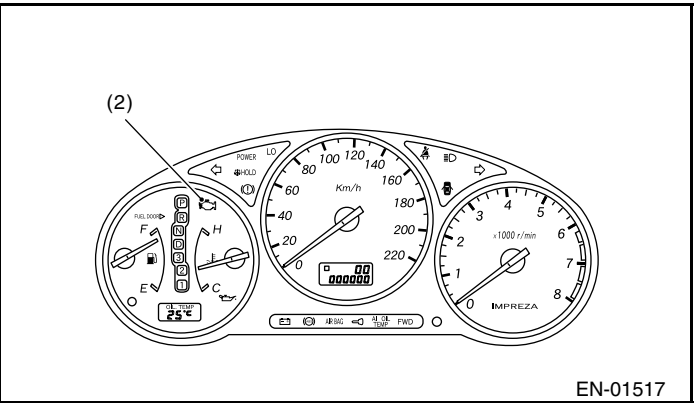
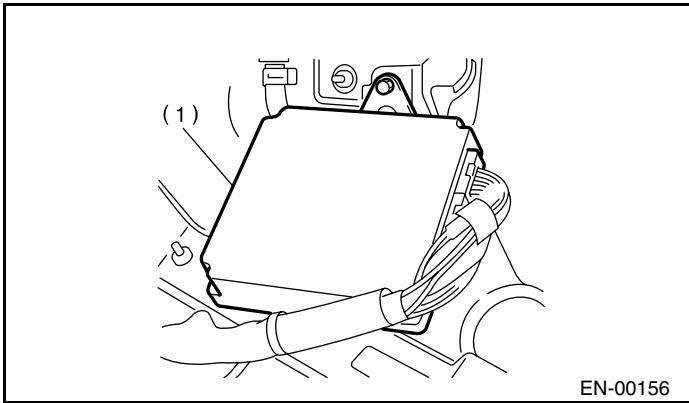
(5) Data link connector

(2) Malfunction indicator light

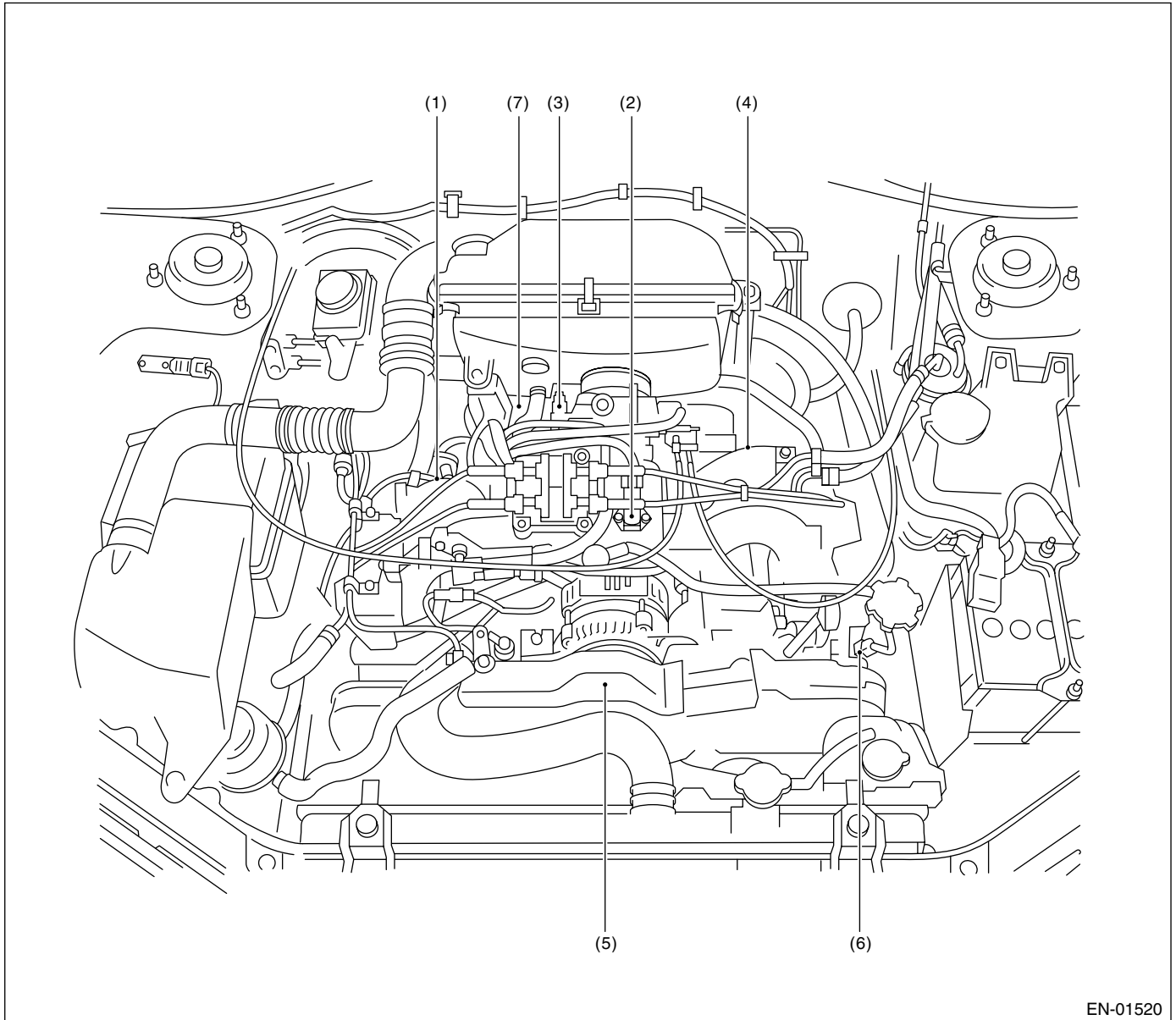
(4) Test mode connector

# Electrical Components Location

## ENGINE (DIAGNOSTICS)



## 2. SENSOR

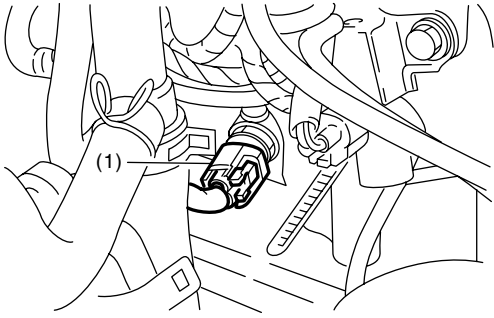


EN-01520

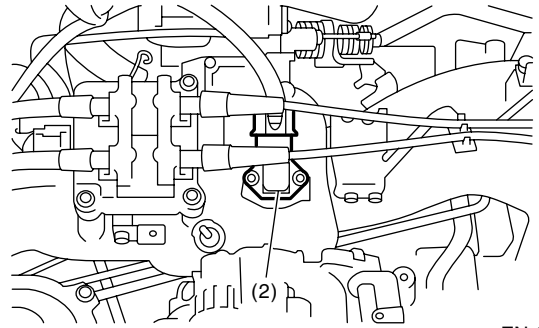
- |  |                                |                          |
|--|--------------------------------|--------------------------|
| (1) Engine coolant temperature sensor                            | (3) Throttle position sensor   | (7) Vehicle speed sensor |
| (2) Intake air temperature and Manifold absolute pressure sensor | (4) Knock sensor               |                          |
|  | (5) Crankshaft position sensor |                          |
|  | (6) Camshaft position sensor   |                          |

# Electrical Components Location

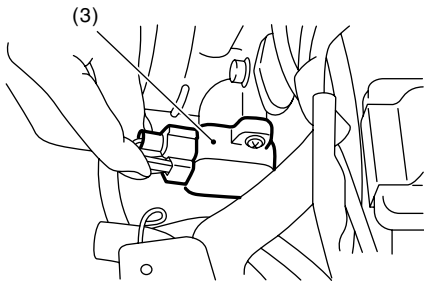
## ENGINE (DIAGNOSTICS)



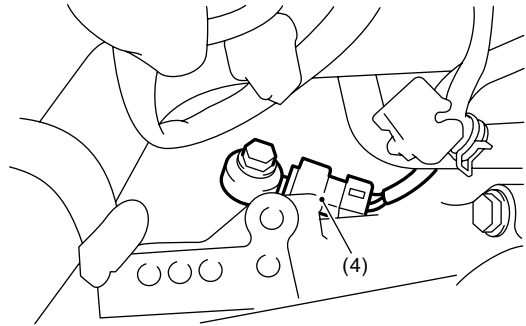
EN-01521



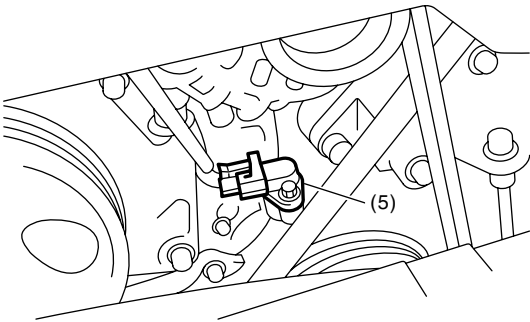
EN-01522



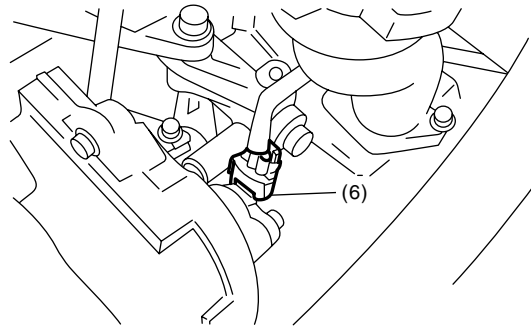
EN-01523



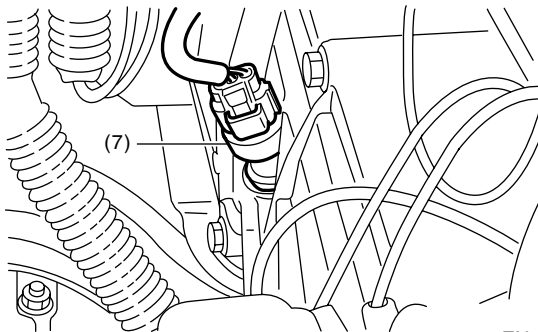
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EN-01525

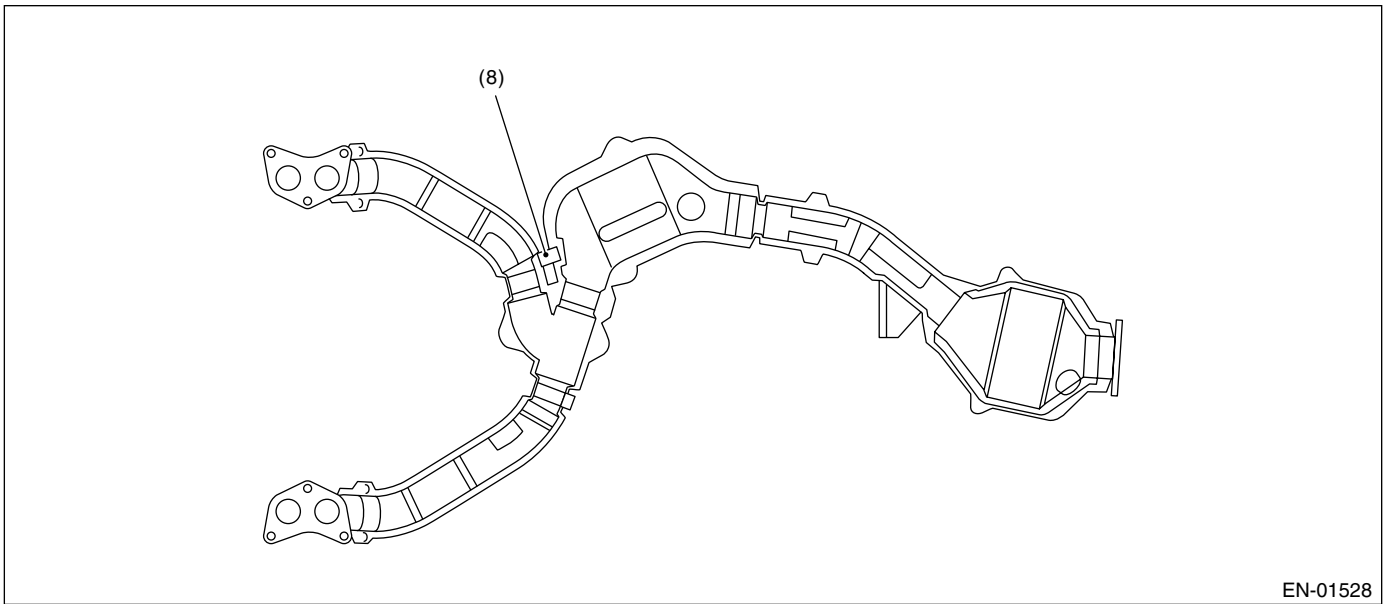


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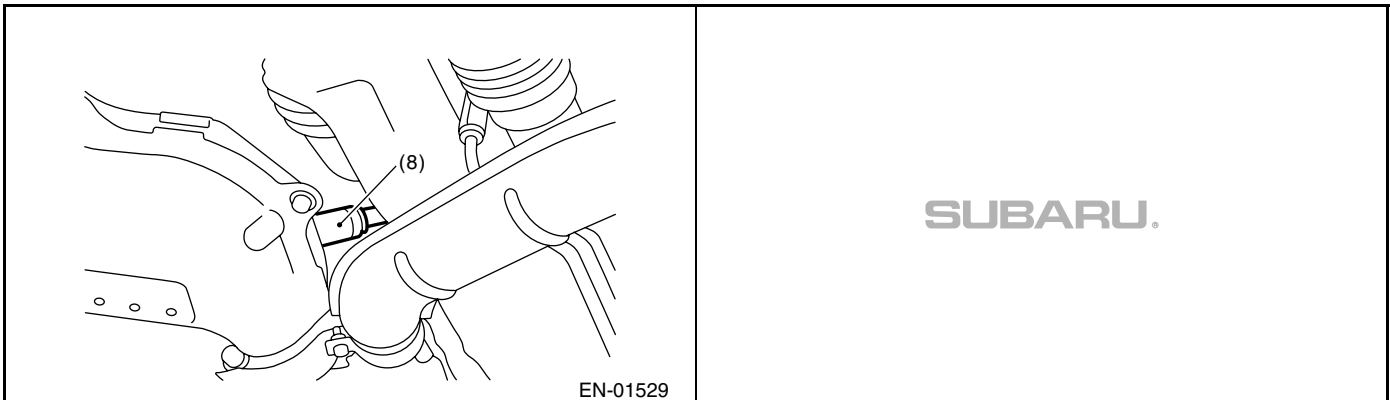
EN-01527

**SUBARU.**



EN-01528

- (8) Oxygen sensor (With catalyst converter model)



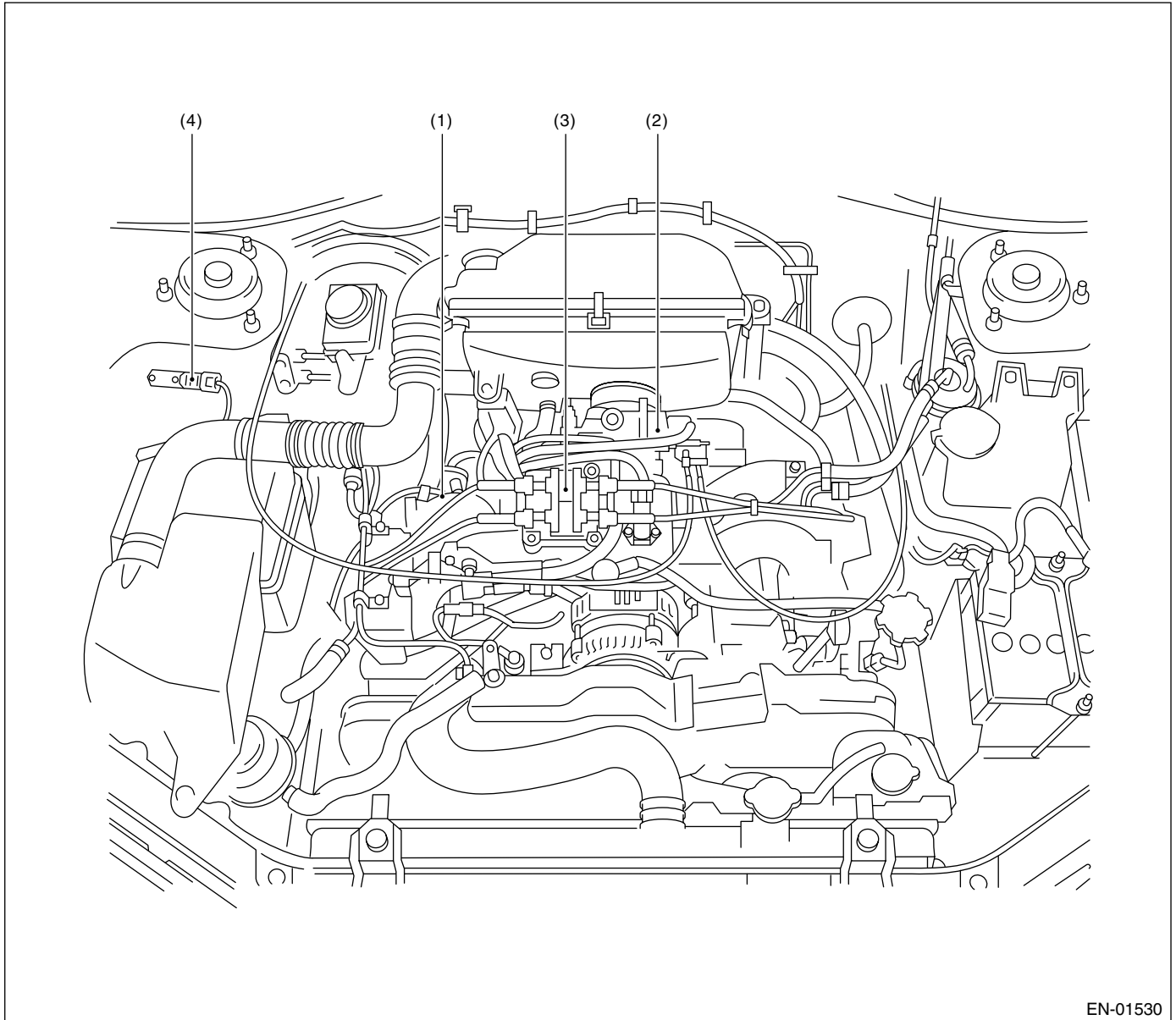
EN-01529

**SUBARU.**

# Electrical Components Location

ENGINE (DIAGNOSTICS)

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



EN-01530

- (1) Purge control solenoid valve
- (2) Idle air control solenoid valve

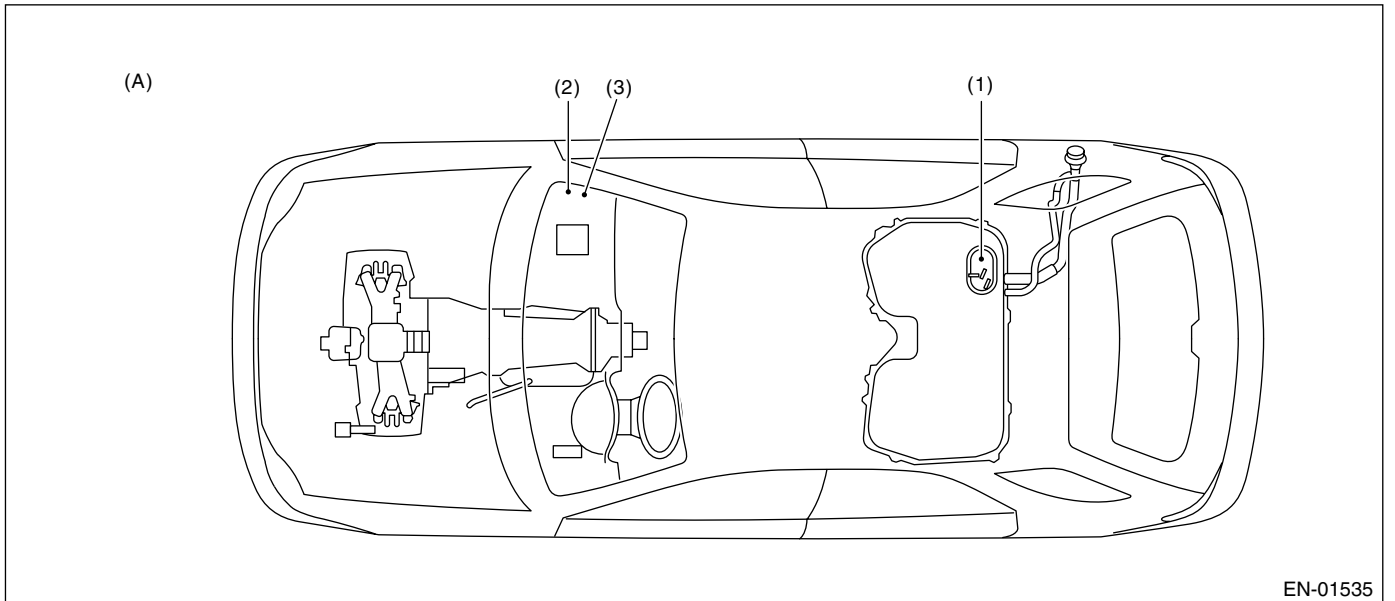
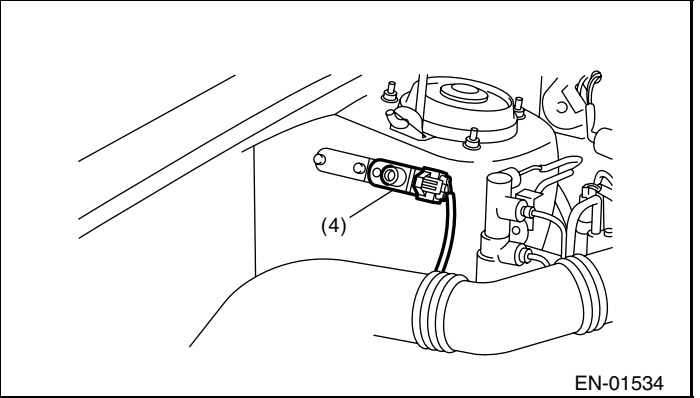
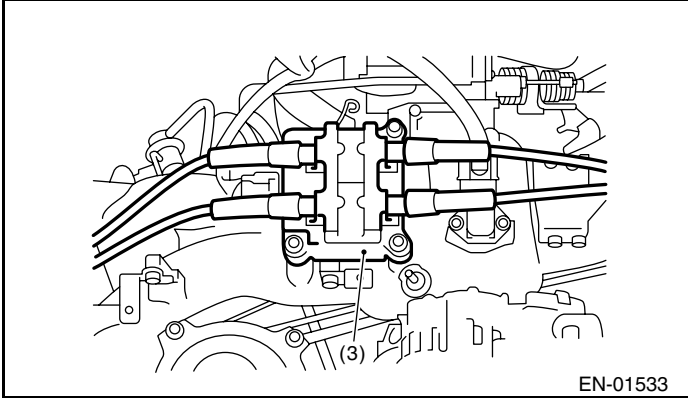
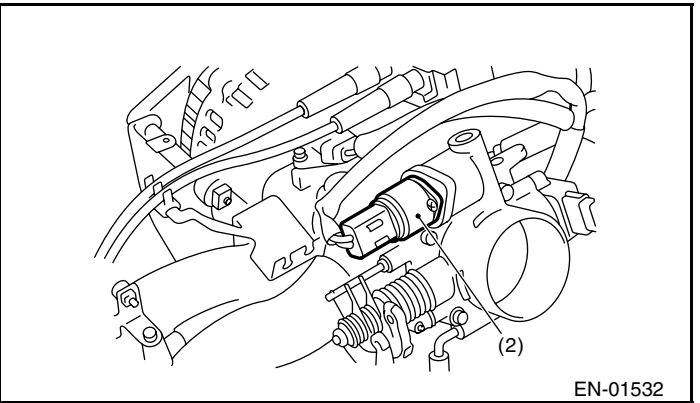
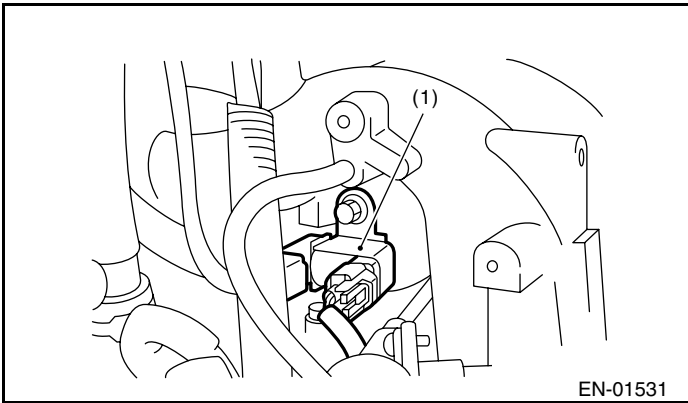
- (3) Ignition coil and ignitor ASSY

- (4) CO resistor (Without catalyst converter model)



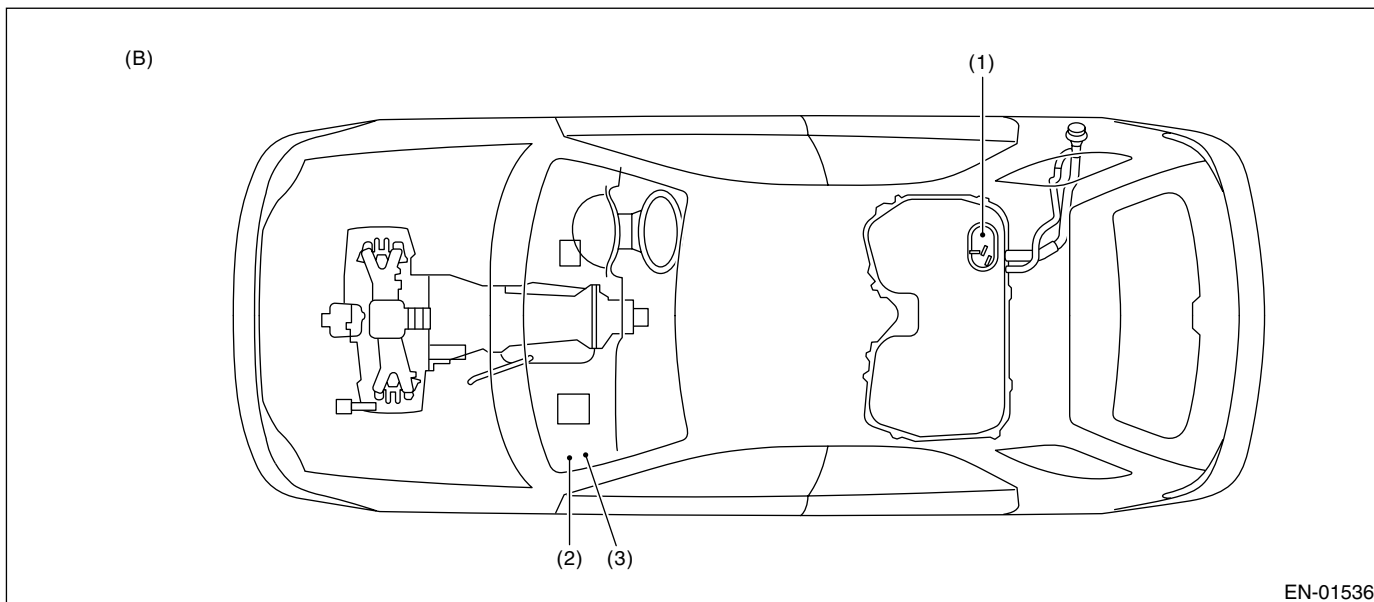
# Electrical Components Location

ENGINE (DIAGNOSTICS)



# Electrical Components Location

ENGINE (DIAGNOSTICS)



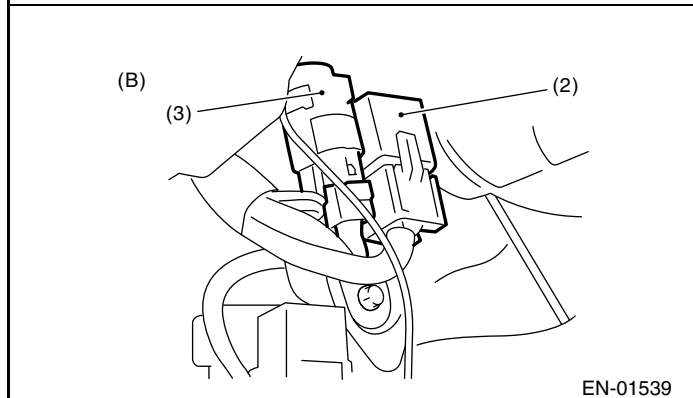
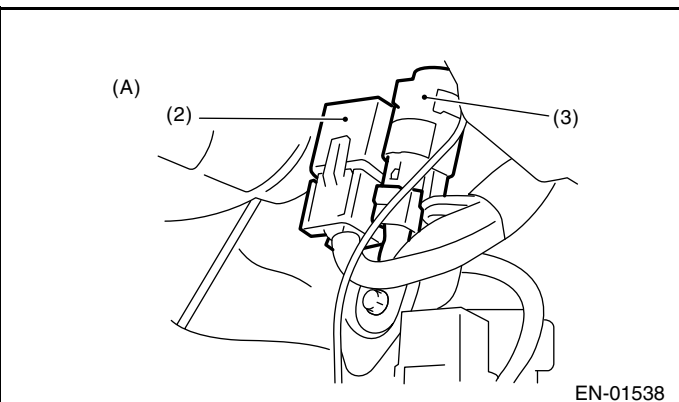
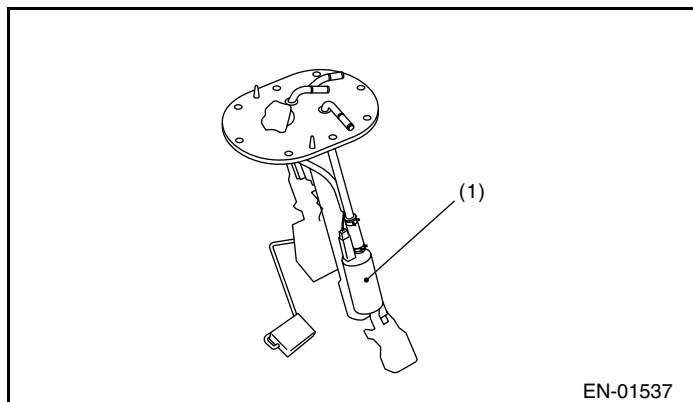
(A) LHD

(B) RHD

(1) Fuel pump

(2) Main relay

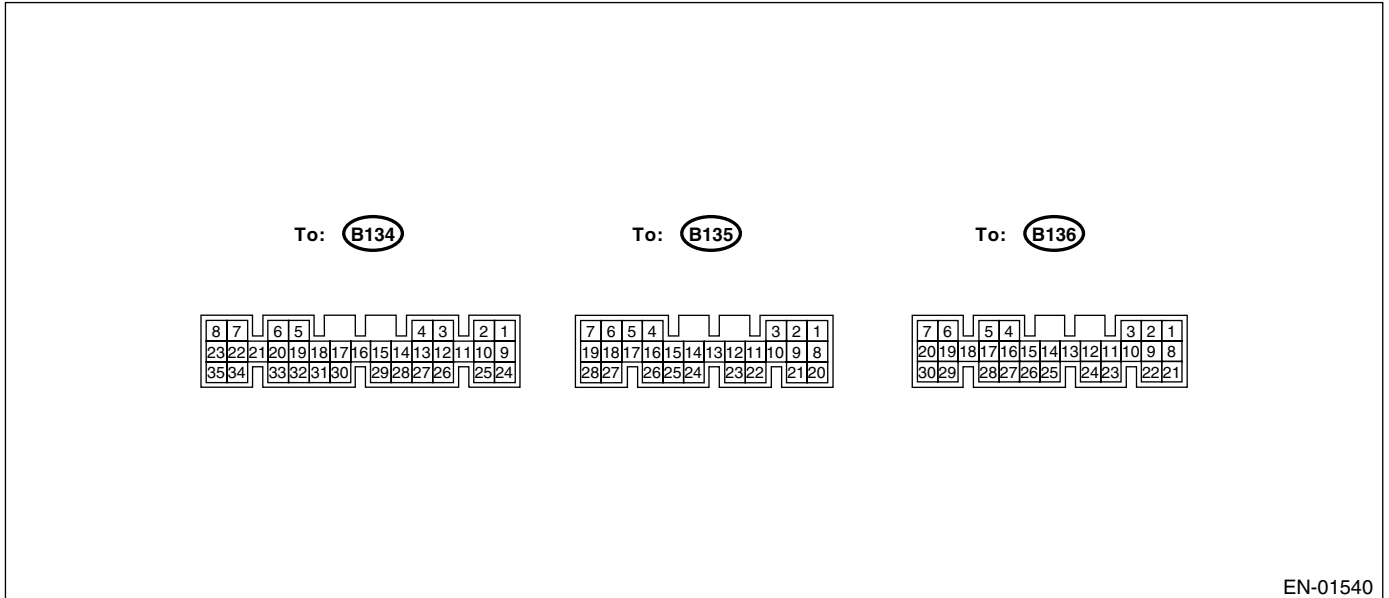
(3) Fuel pump relay



**SUBARU.**

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

### A: ELECTRICAL SPECIFICATION



EN-01540

# Engine Control Module (ECM) I/O Signal

## ENGINE (DIAGNOSTICS)

Content		Connector No.	Terminal No.		Signal (V)		Note
					Ignition SW	Engine ON (Idling)	
					ON (Engine OFF)		
Crankshaft position sensor	Signal (+)	B135	*2	1	0	±6	Sensor output waveform
	Signal (-)	B135	8		0	0	—
	Shield	B135	10		0	0	—
Camshaft position sensor	Signal (+)	B135	*1	2	0	±6	Sensor output waveform
	Signal (-)	B135	8		0	0	—
	Shield	B135	10		0	0	—
Intake air temperature sensor	Signal	B136	13		2.3 — 2.5	1.4 — 1.6	Ambient temperature: 25°C (77°F)
Throttle position sensor	Signal	B136	17		Fully closed: 0.5±0.3 Fully opened: 4.3±0.3		—
	Power supply	B136	15		5	5	—
	GND	B136	16		0	0	—
Oxygen sensor	Signal	B136	7		0		Rich mixture: 0.7 Lean mixture: 0
	Shield	B136	23		0	0	—
Engine coolant temperature sensor	Signal	B136	14		0.6 — 1.0	0.6 — 1.0	After warm-up
	GND	B136	16		0	0	—
Vehicle speed sensor		B135	24		0 or 5	0 or 5	"5" and "0" are repeatedly displayed when vehicle is driven.
Starter switch		B135	28		0	0	Cranking: 10 to 14
A/C switch		B135	27		ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
Ignition switch		B135	7		10 — 13	13 — 14	—
Neutral position switch (MT)		B135	26		ON: 5 OFF: 0		Switch is ON when gear is in neutral position.
Park/Neutral position switch (AT)		B135	26		ON: 0 OFF: 5		Switch is ON when shift lever is in "P" or "N" position.
Test mode connector		B135	14		5	5	When connected: 0
Read memory connector		B135	15		5	5	When connected: 0
Back-up power supply		B136	9		10 — 13	13 — 14	—
Control unit power supply		B136	1		10 — 13	13 — 14	—
			2				
Ignition control	# 1, # 2	B134	25		0	3.4, max.	—
	# 3, # 4	B134	26		0	3.4, max.	—
Fuel injector	# 1	B134	4		10 — 13	13 — 14	Waveform
	# 2	B134	13		10 — 13	13 — 14	Waveform
	# 3	B134	14		10 — 13	13 — 14	Waveform
	# 4	B134	15		10 — 13	13 — 14	Waveform

\*: With immobilizer

# Engine Control Module (ECM) I/O Signal

ENGINE (DIAGNOSTICS)

Content		Connector No.	Terminal No.		Signal (V)		Note
					Ignition SW	Engine ON (Idling)	
					ON (Engine OFF)		
Idle air control solenoid valve	Signal 1	B134	5	—	1 — 13	Waveform	
	Signal 2	B134	6	—	1 — 13	Waveform	
	Signal 3	B134	19	—	1 — 13	Waveform	
	Signal 4	B134	20	—	1 — 13	Waveform	
Torque control signal 1		B135	16	5	5	—	
Torque control signal 2		B135	17	5	5	—	
Fuel pump relay control		B134	29*	16	ON: 0 OFF: 10 — 13	0	—
A/C relay control		B134	17		ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Radiator fan relay 1 control		B134	3		ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Radiator fan relay 2 control		B134	12		ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Self-shutoff control		B135	19		10 — 13	13 — 14	—
Malfunction indicator light		B134	11		—	—	Light "ON": 1, max. Light "OFF": 10 — 14
Engine speed output		B134	30		—	0 — 13, min.	Waveform
Knock sensor	Signal	B136	4		2.8	2.8	—
	Shield	B136	25		0	0	—
Manifold absolute pressure sensor	Signal	B136	5		3.4 — 3.6	1.2 — 1.8	—
	Power supply		15		5	5	—
	GND		16		0	0	—
Purge control solenoid valve		B134	2		ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
GND (sensors)		B136	16		0	0	—
GND (injectors)		B134	7		0	0	—
GND (ignition system)		B134	27		0	0	—
GND (power supply)		B134	8		0	0	—
GND (control systems)		B136	21		0	0	—
		B136	22		0	0	—
Select monitor signal		B135	11		—	—	—
			12		—	—	—
Power steering switch		B135	13		ON: 0 OFF: 10 — 13	ON: 0 OFF: 10 — 13	—
Torque control cut signal		B134	31		8	8	—
AT load signal		B136	11		0 — 0.3	0.8 — 1.2	—
MT/AT identification		B135	25		MT: 0 AT: 5	MT: 0 AT: 5	—

\*: With immobilizer

# Subaru Select Monitor

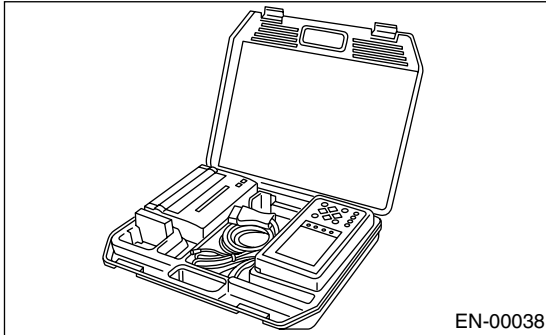
ENGINE (DIAGNOSTICS)

## 6. Subaru Select Monitor

### A: OPERATION

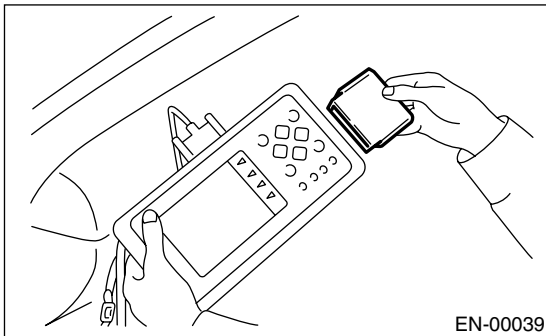
#### 1. HOW TO USE SUBARU SELECT MONITOR

1) Prepare the SUBARU Select Monitor kit.



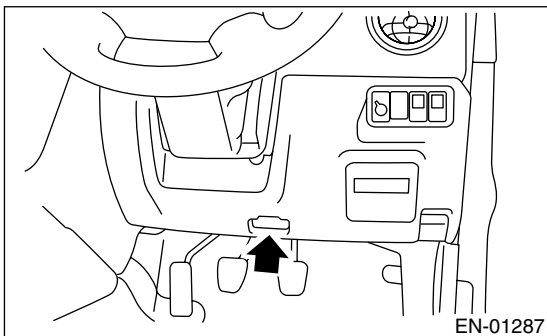
2) Connect the diagnosis cable to SUBARU Select Monitor.

3) Insert the cartridge into SUBARU Select Monitor.



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

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

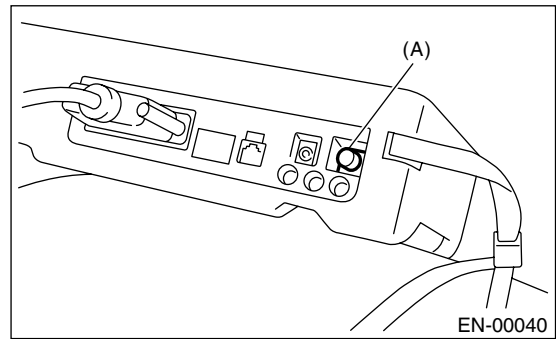


(2) Connect the diagnosis cable to data link connector.

#### CAUTION:

Do not connect the scan tools except for SUBARU Select Monitor.

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 any DTCs and various data, then record them.

#### 2. READ DIAGNOSTIC TROUBLE CODE (DTC) FOR ENGINE.

Refer to Read DTC for information about how to indicate the DTC. <Ref. to EN(H4SOw/oOBD)(diag)-24, Read Diagnostic Trouble Code (DTC).>

### 3. READ CURRENT DATA SHOWN ON DISPLAY.

- 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 {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.

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	%	0±10%
A/F learning 1	A/F Learning #1	%	0±5%
Intake manifold absolute pressure	Mani. Absolute Pressure	mmHg	200 — 300 mmHg
Engine speed signal	Engine Speed	rpm	500 — 900 rpm (Agree with the tachometer indication)
Vehicle speed signal	Vehicle Speed	km/h	0 km/h (at parking)
Ignition timing signal	Ignition Timing	deg	10 — 20 deg
Intake air temperature signal	Intake Air Temp.	°C	(Ambient air temperature)
Battery voltage	Battery Voltage	V	13 — 14 V
Injection 1 pulse width	Fuel Injection #1 Pulse	ms	2 — 5 ms
Knock sensor correction	Knocking Correction	deg	0.0 deg
Idle air control signal	ISC Valve Step	STEP	10 — 40
Throttle sensor voltage	Throttle Sensor Voltage	V	0.2 — 1.0 V
Oxygen sensor output signal *1	Oxygen Sensor Output Signal	V	0 — 0.9 V
CO resistor *2	CO Resistor	V	0 — 5 V
AT/MT identification terminal	AT Vehicle ID Signal	—	ON or 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 <sub>2</sub> monitor	Rear O <sub>2</sub> 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
Fuel pump relay signal	Fuel Pump Relay	—	ON
Engine torque control signal #1	Torque Control Signal #1	—	OFF
Engine torque control signal #2	Torque Control Signal #2	—	OFF

# Subaru Select Monitor

## ENGINE (DIAGNOSTICS)

Remarks	Display	Unit of measure	Note (at idling)
Engine torque control permission signal	Torque Permission Signal	—	ON or OFF
TCS AET signal	TCS AET Signal	—	ON or OFF
Canister purge control solenoid valve	Canister Purge Control Solenoid Valve	—	ON or OFF

\*1: With catalyst model only

\*2: Without catalyst model only

### NOTE:

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



## 4. LED OPERATION MODE FOR ENGINE

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	D check
Read memory signal	Read Memory Terminal	ON or OFF	Clear memory connector is connected.
Neutral position switch signal *1	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 ON.
Power steering switch signal	P/S Switch	ON or OFF	When power steering switch is entered.
Air conditioning switch signal	A/C Switch	ON or OFF	When air conditioning switch is input.
Starter switch signal	Starter Switch	ON or OFF	When starter switch is input.
Oxygen sensor rich signal *2	O2 Rich Signal	ON or OFF	When 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 entered.
Rear defogger switch signal	Rear Defogger Switch	ON or OFF	When rear defogger switch is turned ON.
Blower fan switch signal	Blower Fan Switch	ON or OFF	When blower fan switch is turned ON.
Small light switch signal	Light Switch	ON or OFF	When small light switch is turned ON.
Air conditioning relay signal	A/C Compressor Signal	ON or OFF	When air conditioning relay is in function.
Radiator fan relay 1 signal	Radiator Fan Relay #1	ON or OFF	When radiator fan relay 1 is in function.
Radiator fan relay 2 signal	Radiator Fan Relay #2	ON or OFF	When radiator fan relay 2 is in function.
Fuel pump relay signal	Fuel Pump Relay	ON or OFF	ON output
Engine torque control signal #1	Torque Control Signal #1	ON or OFF	When engine torque control signal 1 is entered.
Engine torque control signal #2	Torque Control Signal #2	ON or OFF	When engine torque control signal 2 is entered.
Engine torque control permission signal	Torque Control Permit	ON or OFF	When engine torque control permission signal is entered.
TCS AET signal	TCS AET Signal	ON or OFF	When TCS AET signal is entered.
Canister purge control solenoid valve	Canister Purge Control Solenoid Valve	ON or OFF	When canister purge control solenoid valve is in function.

\*1: On MT model, switch is turned ON when gear position is in neutral position.

On AT model, switch is turned ON when shift position is in "P" or "N" position.

\*2: With catalyst model only

**NOTE:**

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

# Read Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

## 7. Read Diagnostic Trouble Code (DTC)

### A: OPERATION

#### 1. WITH SUBARU SELECT MONITOR

- 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 DTCs, refer to the List of DTC. <Ref. to EN(H4SOw/oOBD)(diag)-55, LIST, List of Diagnostic Trouble Code (DTC).>

#### 2. WITHOUT SUBARU SELECT MONITOR

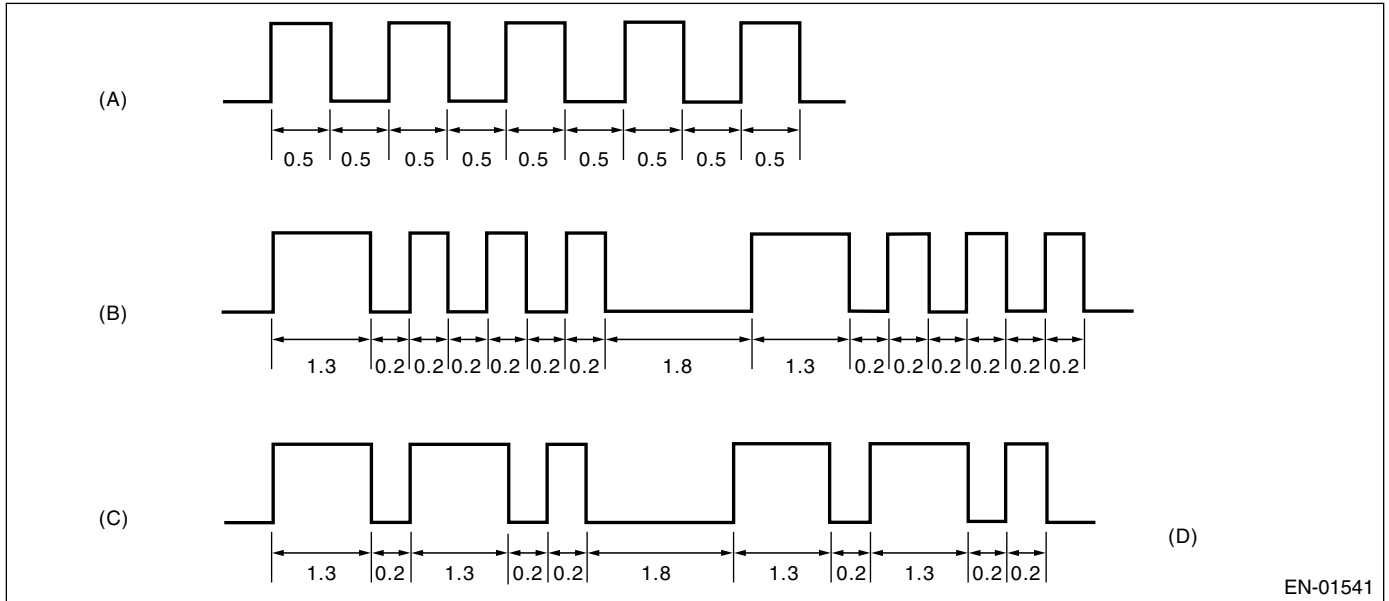
Step	Check	Yes	No
<b>1</b> <b>CHECK STATUS OF CHECK MALFUNCTION INDICATOR LIGHT.</b> 1) Turn the ignition switch to OFF. 2) Connect the read memory connector. <Ref. to EN(H4SOw/oOBD)(diag)-9, LOCATION, Electrical Components Location.> 3) Turn the ignition switch to ON.	Does the malfunction indicator light come on?	Go to step 2.	Check the following and repair if necessary. <b>NOTE:</b> <ul style="list-style-type: none"><li>• Open or short circuit in engine control module power supply or ground line</li><li>• Open or short circuit in malfunction indicator light</li></ul>
<b>2</b> <b>CHECK DTC.</b>	Does the malfunction indicator light indicate DTC?	Record the DTC. Then turn the ignition switch to OFF, disconnect read memory connector.	Complete the read DTC. Turn the ignition switch to OFF and disconnect read memory connector.

# Read Diagnostic Trouble Code (DTC)

The malfunction indicator light flashes code corresponding to faulty parts. The long segment (1.3 seconds ON) indicates a “ten”, and the short segment (0.2 seconds ON) signifies “one”. And middle segment (0.5 seconds ON) means OK code.

**NOTE:**

- For detailed concerning DTCs, refer to the List of DTC. <Ref. to EN(H4SOW/oOBD)(diag)-55, LIST, List of Diagnostic Trouble Code (DTC).>



- (A) OK code
- (B) DTC 13

(C) DTC 21

(D) Unit: second

## 8. Inspection Mode

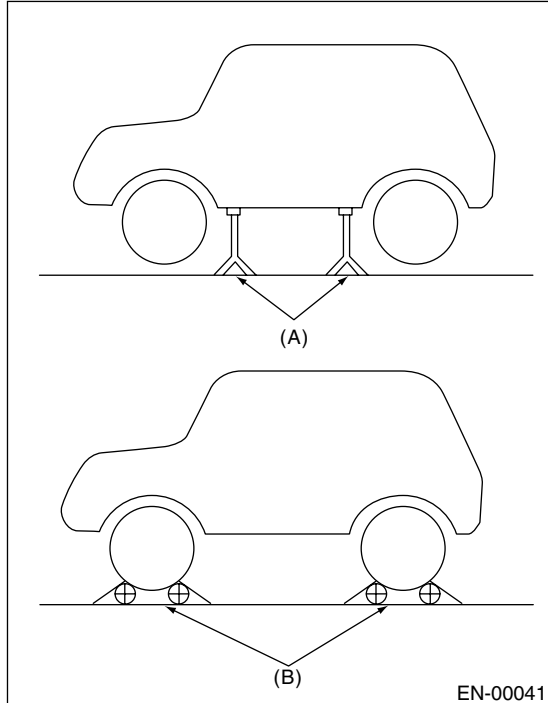
### A: OPERATION

#### 1. PREPARATIONS FOR THE INSPECTION MODE

Raise the vehicle using a garage jack and place on rigid racks or drive the vehicle onto free rollers.

**WARNING:**

- Before raising the vehicle, ensure parking brake is applied.
- Do not use a pantograph jack in place of a rigid rack.
- Secure a rope or wire to the front and rear towing or tie-down hooks to prevent the lateral runoff 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 rigid racks 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.

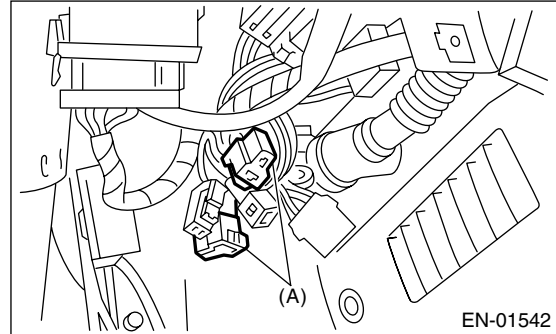


(A) Rigid rack  
(B) Free rollers

#### 2. WITH SUBARU SELECT MONITOR

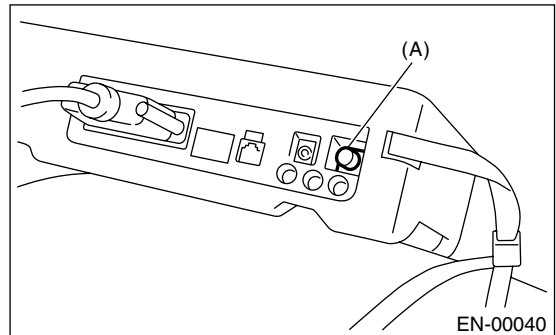
After performing diagnostics and clearing memory, check for any remaining unresolved trouble data.

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



(A) Test mode connector

- 2) Connect the SUBARU Select Monitor to data link connector. <Ref. to EN(H4SOw/oOBD)(diag)-9, LOCATION, Electrical Components Location.>
- 3) Turn the ignition switch to ON (engine OFF) and SUBARU Select Monitor switch to ON.



(A) Power switch

- 4) On the «Main Menu» display screen, select the {2. Each System Check} and press the [YES] key.
- 5) On the «System Selection Menu» display screen, select the {Engine Control System} and press the [YES] key.
- 6) Press the [YES] key after displayed the information of engine type.
- 7) On the «Engine Diagnosis» display screen, select the {6. Dealer Check Mode Procedure} and press the [YES] key.
- 8) When the "Perform Inspection (Dealer Check) Mode?" is shown on the display screen, press the [YES] key.

9) 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 DTCs, refer to the DTC LIST. <Ref. to EN(H4SOw/oOBD)(diag)-55, LIST, List of Diagnostic Trouble Code (DTC).>
- On AWD vehicles, 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.

### 3. WITHOUT SUBARU SELECT MONITOR

Step	Check	Yes	No
<b>1</b> <b>CHECK STATUS OF MALFUNCTION INDICATOR LIGHT.</b> 1)Start and warm-up the engine. 2)Turn the ignition switch to OFF. 3)Set the shift lever to neutral position (MT model), or set selector lever to "P" position (AT model). 4)Connect the test mode connector (green) at lower portion of instrument panel (on driver's side). 5)Turn the ignition switch to ON.	Does the malfunction indicator light come on?	Go to step 2.	Check the following and repair if necessary.  NOTE: • Open or short circuit in engine control module power supply or ground line • Open or short circuit in malfunction indicator light
<b>2</b> <b>CHECK DTC.</b> 1)Set the selector lever to "N" position, and then set selector lever to "P" position again (AT model only). 2)Start the engine.	Does the malfunction indicator light indicate DTC?	Record the DTC and inspect using DTC. <Ref. to EN(H4SOw/oOBD)(diag)-57, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Go to step 3.
<b>3</b> <b>CHECK DTC.</b> 1)Drive the vehicle at speed greater than 11 km/h (7 MPH) for at least 1 minute. 2)Warm-up the engine above 2,000 rpm.	Does the malfunction indicator light indicate DTC?	Record the DTC and inspect using DTC. <Ref. to EN(H4SOw/oOBD)(diag)-57, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Turn the ignition switch to OFF. Disconnect the test mode connector. Complete the inspection mode.  NOTE: When the on-board diagnosis system indicates no trouble, trouble is in a different symptom.

# Clear Memory Mode

ENGINE (DIAGNOSTICS)

## 9. Clear Memory Mode

### A: OPERATION

#### 1. WITH SUBARU SELECT MONITOR

- 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 {Clear Memory} and press the [YES] key.
- 5) When the “Done” and “Turn Ignition Switch OFF” are shown on the display screen, turn the SUBARU Select Monitor and ignition switch to OFF.

#### NOTE:

- After the memory has been cleared, the ISC must be initialized. To do this, turn the ignition switch to the ON position. Wait 3 seconds before starting the engine.
- For detailed operation procedure, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.

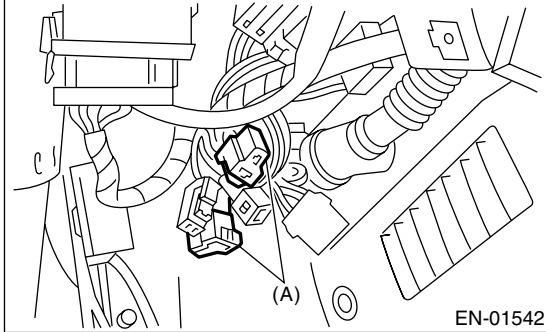
#### 2. WITHOUT SUBARU SELECT MONITOR

	Step	Check	Yes	No
1	<b>CHECK STATUS OF MALFUNCTION INDICATOR LIGHT.</b> 1) Turn the ignition switch to OFF. 2) Set the shift lever to neutral position (MT model), or set selector lever to “P” position (AT model). 3) Connect the test mode connector and read memory connector at lower portion of instrument panel (on driver’s side). 4) Turn the ignition switch to ON.	Does the malfunction indicator light come on?	Go to step 2.	Check the following and repair if necessary. <b>NOTE:</b> <ul style="list-style-type: none"><li>• Open or short circuit in engine control module power supply or ground line</li><li>• Open or short circuit in malfunction indicator light</li></ul>
2	<b>CHECK DTC.</b> 1) Set the selector lever to “N” position, and then set selector lever to “P” position again (AT model only). 2) Start the engine. 3) Drive the vehicle at speed greater than 11 km/h (7 MPH) for at least 1 minute. 4) Warm-up engine above 2,000 rpm.	Does the malfunction indicator light indicate DTC? <Ref. to EN(H4SOW/oOBD)(diag)-55, LIST, List of Diagnostic Trouble Code (DTC).>	Record the DTC. Repair the trouble cause. <Ref. to EN(H4SOW/oOBD)(diag)-57, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Turn the ignition switch to OFF. Disconnect the read memory connector and test mode connector. Complete the Clear Memory Mode.

## 10. Compulsory Valve Operation Check Mode

### A: OPERATION

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



(A) Test mode connector

2) Each valve functions when the ignition switch is turned to ON (engine OFF).

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

Contents
Compulsory fuel pump relay operation check
Compulsory purge control solenoid valve operation check
Compulsory radiator fan relay operation check
Compulsory air conditioning relay operation check

# Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

## 11. Malfunction Indicator Light

### A: PROCEDURE

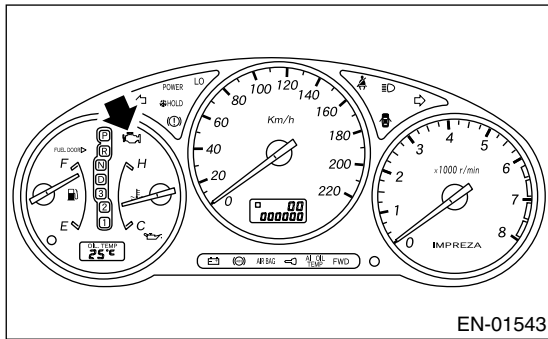
1. Activation of malfunction indicator light. <Ref. to EN(H4SOW/oOBD)(diag)-30, ACTIVATION OF MALFUNCTION INDICATOR LIGHT, Malfunction Indicator Light.>
↓
2. Malfunction indicator light does not come on. <Ref. to EN(H4SOW/oOBD)(diag)-32, MALFUNCTION INDICATOR LIGHT DOES NOT COME ON., Malfunction Indicator Light.>
↓
3. Malfunction indicator light does not go off. <Ref. to EN(H4SOW/oOBD)(diag)-34, MALFUNCTION INDICATOR LIGHT DOES NOT GO OFF., Malfunction Indicator Light.>
↓
4. Malfunction indicator light does not blink at a cycle of 3 Hz. <Ref. to EN(H4SOW/oOBD)(diag)-35, MALFUNCTION INDICATOR LIGHT DOES NOT BLINK AT A CYCLE OF 3 HZ., Malfunction Indicator Light.>
↓
5. Malfunction indicator light remains blinking at a cycle of 3 Hz. <Ref. to EN(H4SOW/oOBD)(diag)-37, MALFUNCTION INDICATOR LIGHT REMAINS BLINKING AT A CYCLE OF 3 HZ., Malfunction Indicator Light.>

### B: ACTIVATION OF MALFUNCTION INDICATOR LIGHT

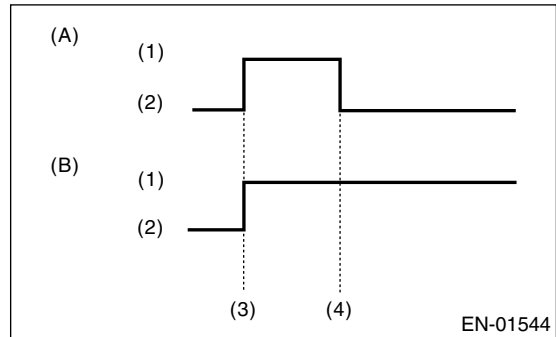
1) When the ignition switch is turned to ON (engine off), the malfunction indicator light in the combination meter illuminates.

#### NOTE:

If the malfunction indicator light does not illuminate, perform diagnostics of the malfunction indicator light circuit or the combination meter circuit. <Ref. to IDI-11, Combination Meter Assembly.>



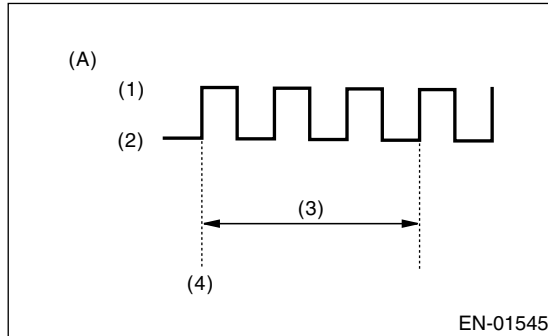
2) After starting the engine, the malfunction indicator light goes out. If it does not, either the engine or the emission control system is malfunctioning. <Ref. to EN(H4SOW/oOBD)(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>



- (A) Malfunction indicator light when no trouble
- (B) Malfunction indicator light when trouble occurs
- (1) ON
- (2) OFF
- (3) Ignition switch ON
- (4) Engine start



3) 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.



- (A) Malfunction indicator light when no trouble
- (1) ON
- (2) OFF
- (3) 1 sec.
- (4) Ignition switch ON

# Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

## C: MALFUNCTION INDICATOR LIGHT DOES NOT COME ON.

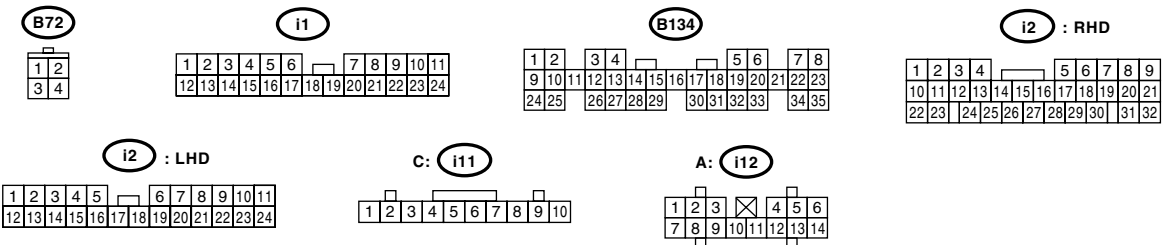
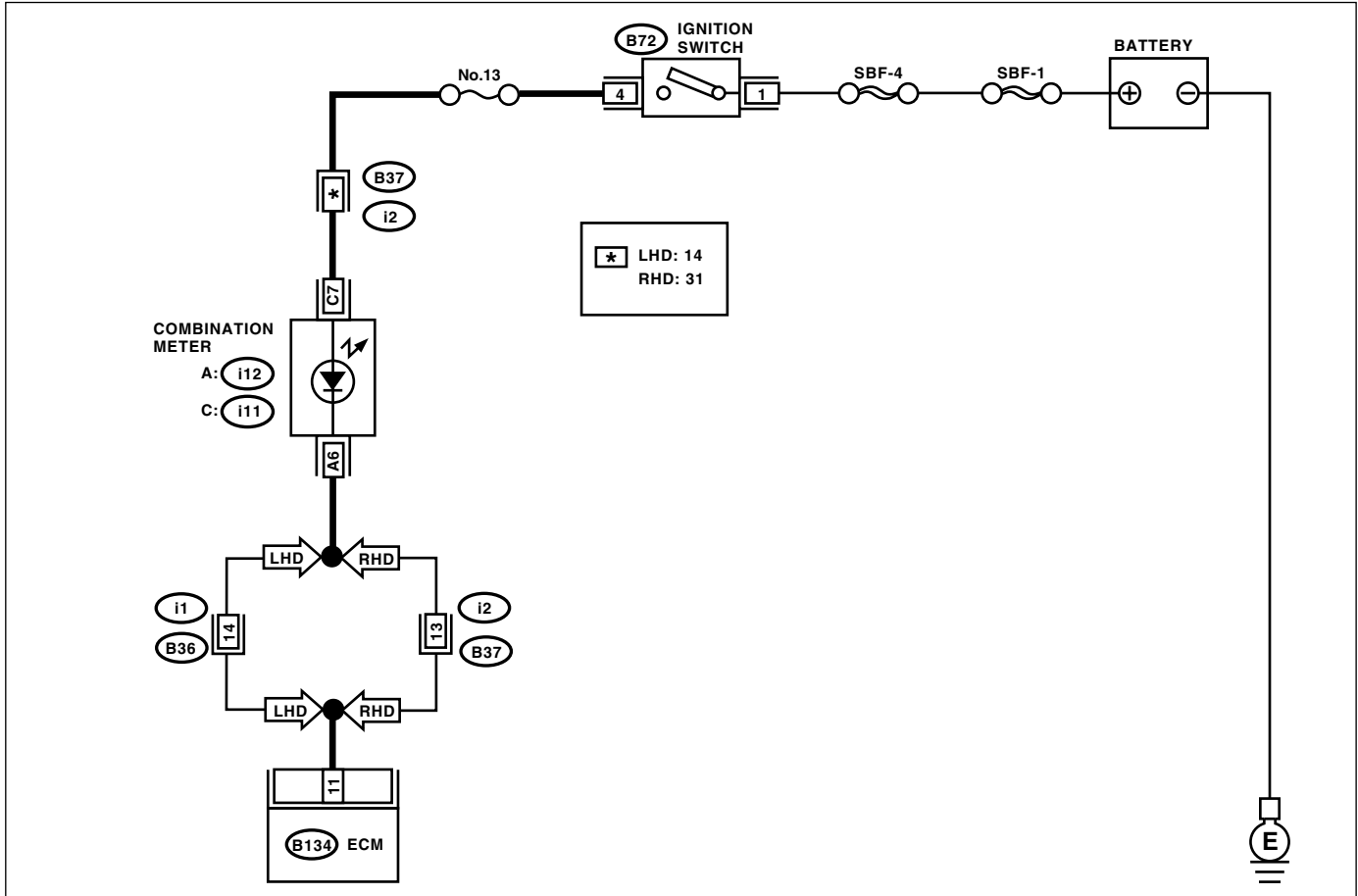
### • DIAGNOSIS:

- The malfunction indicator light circuit is open or shorted.

### • TROUBLE SYMPTOM:

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

### • WIRING DIAGRAM:



EN-02613

Step	Check	Yes	No	
1	<b>CHECK OUTPUT SIGNAL FROM ECM.</b> 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. <b>Connector &amp; terminal (B134) No. 11 (+) — Chassis ground (-):</b>	Is the voltage less than 1 V?	Go to step 4.	Go to step 2.
2	<b>CHECK POOR CONTACT.</b> Does the malfunction indicator light come on when shaking or pulling ECM connector and harness?	Repair poor contact in the ECM connector.	Go to step 3.	

# Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>3</b> <b>CHECK ECM CONNECTOR.</b>	Is the ECM connector correctly connected?	Replace the ECM.	Repair the connection of ECM connector.
<b>4</b> <b>CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR.</b> 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. <b>Connector &amp; terminal</b> <b>(B134) No. 11 — (i12) No. 6:</b>	Is the resistance less than 1 $\Omega$ ?	Go to step 5.	Repair the harness and connector. NOTE: In this case, repair the following: <ul style="list-style-type: none"> <li>• Open circuit in harness between ECM and combination meter connector</li> <li>• Poor contact in coupling connector</li> </ul>
<b>5</b> <b>CHECK POOR CONTACT.</b> Check poor contact in combination meter connector. <Ref. to IDI-11, Combination Meter Assembly.>	Is there poor contact in combination meter connector?	Repair the poor contact in combination meter connector.	Go to step 6.
<b>6</b> <b>CHECK HARNESS BETWEEN COMBINATION METER AND IGNITION SWITCH CONNECTOR.</b> 1) Turn the ignition switch to ON. 2) Measure the voltage between combination meter connector and chassis ground. <b>Connector &amp; terminal</b> <b>(i11) No. 7 (+) — Chassis ground (-):</b>	Is the voltage more than 10 V?	Replace the printed circuit board of combination meter. <Ref. to IDI-11, Combination Meter Assembly.>	Check the following and repair if necessary. NOTE: <ul style="list-style-type: none"> <li>• Blown out fuse (No. 13)</li> <li>• Open or short circuit in harness between fuse (No. 13) and battery terminal</li> <li>• Poor contact in ignition switch connector</li> </ul>

# Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

## D: MALFUNCTION INDICATOR LIGHT DOES NOT GO OFF.

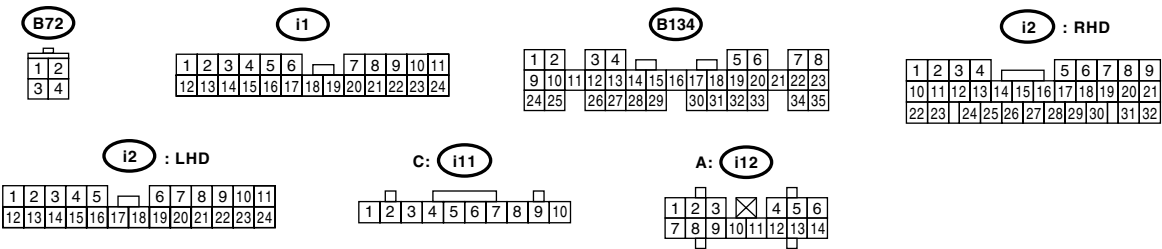
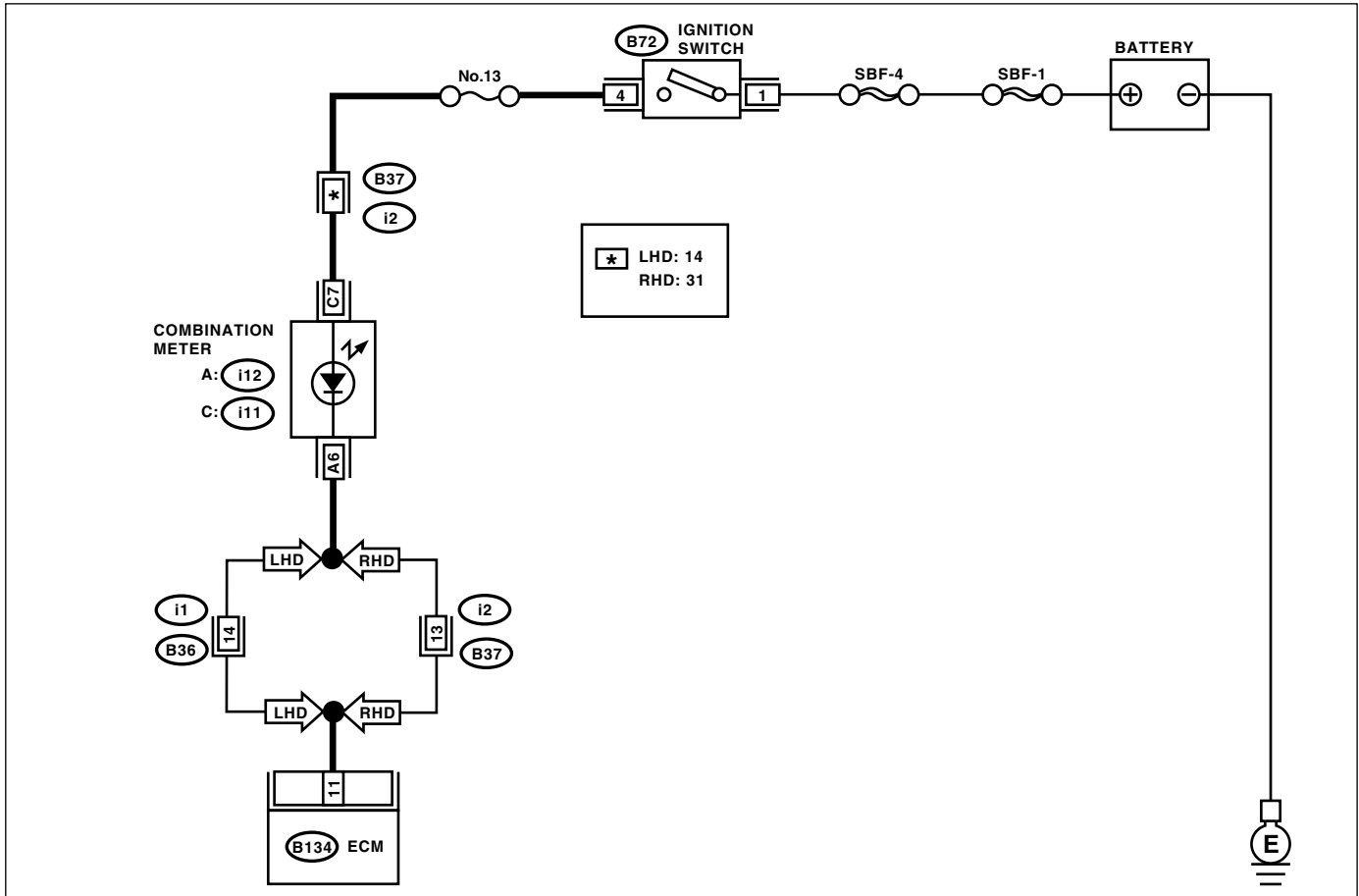
• **DIAGNOSIS:**

- The malfunction indicator light circuit is shorted.

• **TROUBLE SYMPTOM:**

- Although the 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:**



EN-02613

Step	Check	Yes	No
<b>1</b> <b>CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR.</b> 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(H4SOw/oOBD)-43, Engine Control Module (ECM).>

# Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

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

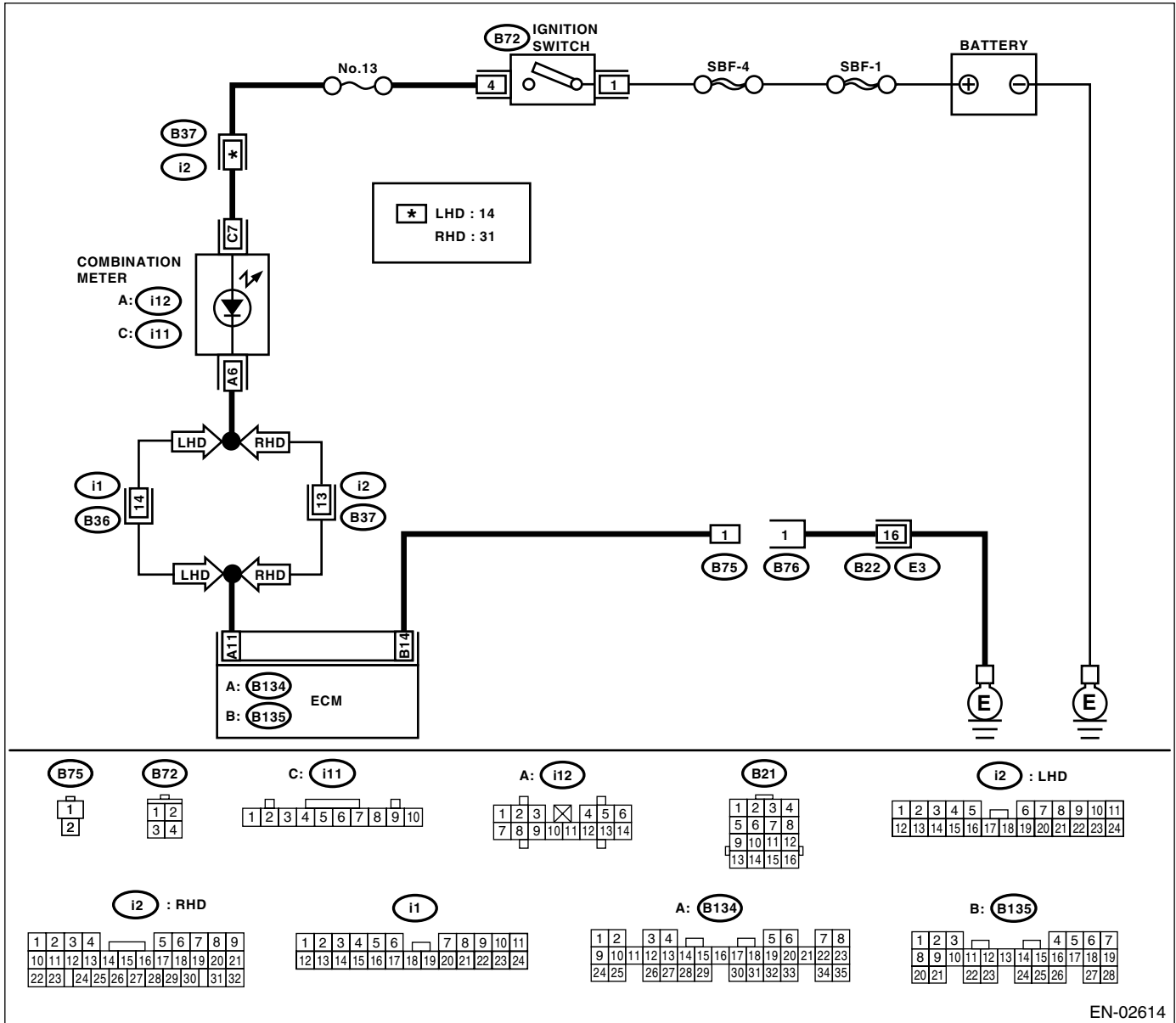
### • DIAGNOSIS:

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

### • TROUBLE SYMPTOM:

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

### • WIRING DIAGRAM:



EN-02614

## Malfunction Indicator Light

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>1</b> <b>CHECK STATUS OF MALFUNCTION INDICATOR LIGHT.</b> 1)Turn the ignition switch to OFF. 2)Disconnect the test mode connector at lower portion of instrument panel (on driver's side). 3)Turn the ignition switch to ON.	Does the malfunction indicator light come on?	Go to step 2.	Repair the malfunction indicator light circuit. <Ref. to EN(H4SOW/oOBD)(diag)-32, MALFUNCTION INDICATOR LIGHT DOES NOT COME ON., Malfunction Indicator Light.>
<b>2</b> <b>CHECK OUTPUT SIGNAL FROM ECM.</b> Measure the voltage between test mode connector and chassis ground. <i>Connector &amp; terminal</i> <i>(B75) No. 1 (+) — Chassis ground (-):</i>	Is the voltage less than 1 V?	Go to step 3.	Go to step 5.
<b>3</b> <b>CHECK HARNESS BETWEEN ECM AND TEST MODE CONNECTOR.</b> 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ECM. 3)Measure the resistance of harness between ECM and test mode connector. <i>Connector &amp; terminal</i> <i>(B135) No. 14 — (B75) No. 1:</i>	Is the resistance less than 1 Ω?	Go to step 4.	Repair the harness and connector. NOTE: In this case, repair the following: • Open circuit in harness between ECM and test mode connector
<b>4</b> <b>CHECK POOR CONTACT.</b> 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(H4SOW/oOBD)-43, Engine Control Module (ECM).>
<b>5</b> <b>CHECK HARNESS BETWEEN TEST MODE CONNECTOR AND CHASSIS GROUND.</b> 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 &amp; terminal</i> <i>(B76) No. 1 — Chassis ground:</i>	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 test mode connector and chassis ground
<b>6</b> <b>CHECK POOR CONTACT.</b> 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(H4SOW/oOBD)-43, Engine Control Module (ECM).>

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

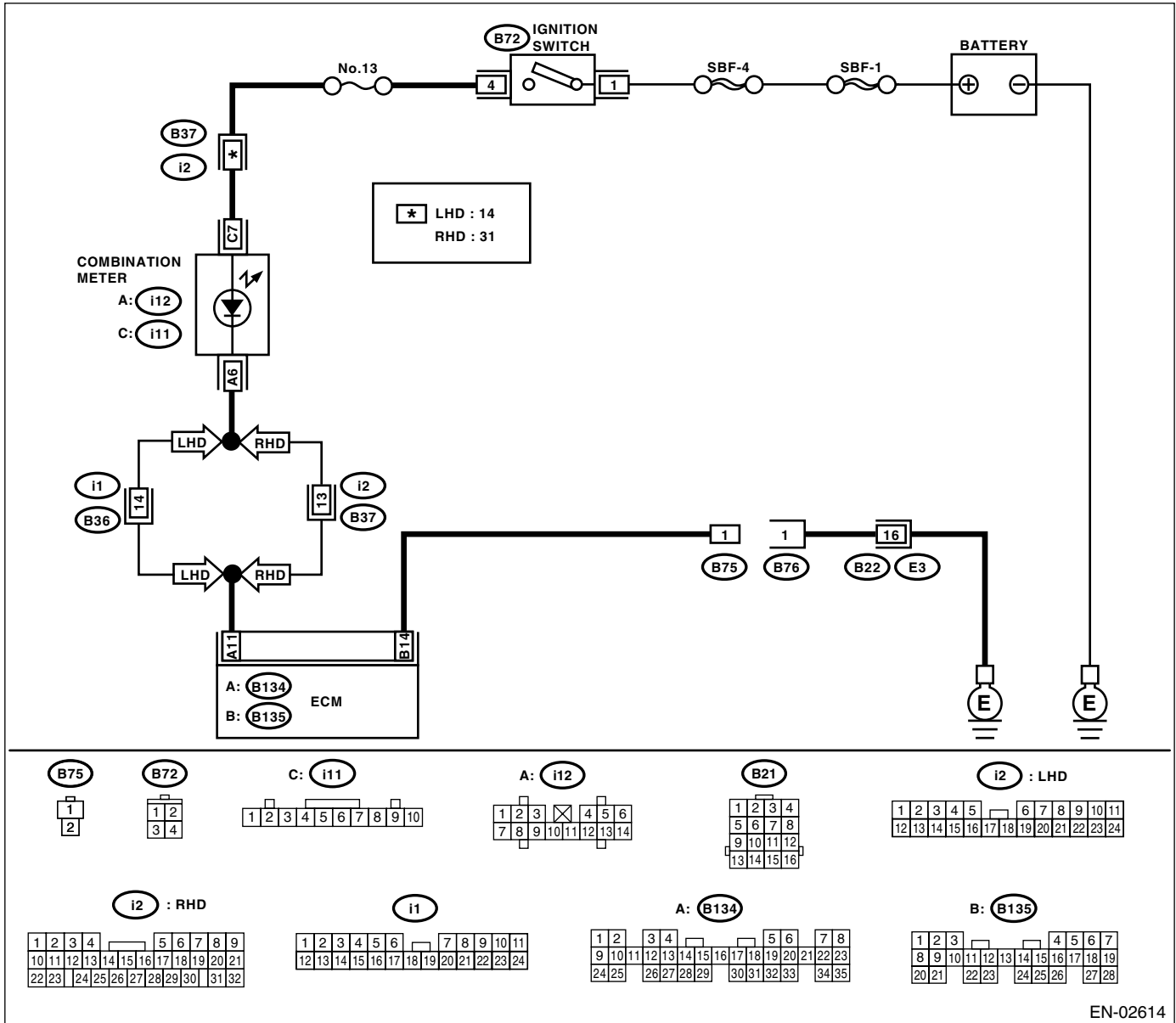
• **DIAGNOSIS:**

- Test mode connector circuit is shorted.

• **TROUBLE SYMPTOM:**

- Even though test mode connector is disconnected, the malfunction indicator light blinks at a cycle of 3 Hz when ignition switch is turned to ON.

• **WIRING DIAGRAM:**



EN-02614

Step	Check	Yes	No
<p><b>1</b></p> <p><b>CHECK HARNESS BETWEEN ECM CONNECTOR AND ENGINE GROUNDING TERMINAL.</b></p> <p>1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Measure the resistance of harness between ECM connector and engine ground.</p> <p><b>Connector &amp; terminal</b> <b>(B135) No. 14 — Engine ground:</b></p>	<p>Is the resistance less than 5 Ω?</p>	<p>Repair the short circuit in harness between ECM and test mode connector.</p>	<p>Replace the ECM. &lt;Ref. to FU(H4SOW/oOBD)-43, Engine Control Module (ECM).&gt;</p>

# Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

## 12. Diagnostics for Engine Starting Failure

### A: PROCEDURE

1. Inspection of starter motor circuit. <Ref. to EN(H4SOw/oOBD)(diag)-39, STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
2. Inspection of ECM power supply and ground line. <Ref. to EN(H4SOw/oOBD)(diag)-42, ENGINE CONTROL MODULE (ECM) POWER SUPPLY AND GROUND LINE, Diagnostics for Engine Starting Failure.>
↓
3. Inspection of ignition control system. <Ref. to EN(H4SOw/oOBD)(diag)-45, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>
↓
4. Inspection of fuel pump circuit. <Ref. to EN(H4SOw/oOBD)(diag)-49, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
5. Inspection of fuel injector circuit. <Ref. to EN(H4SOw/oOBD)(diag)-52, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

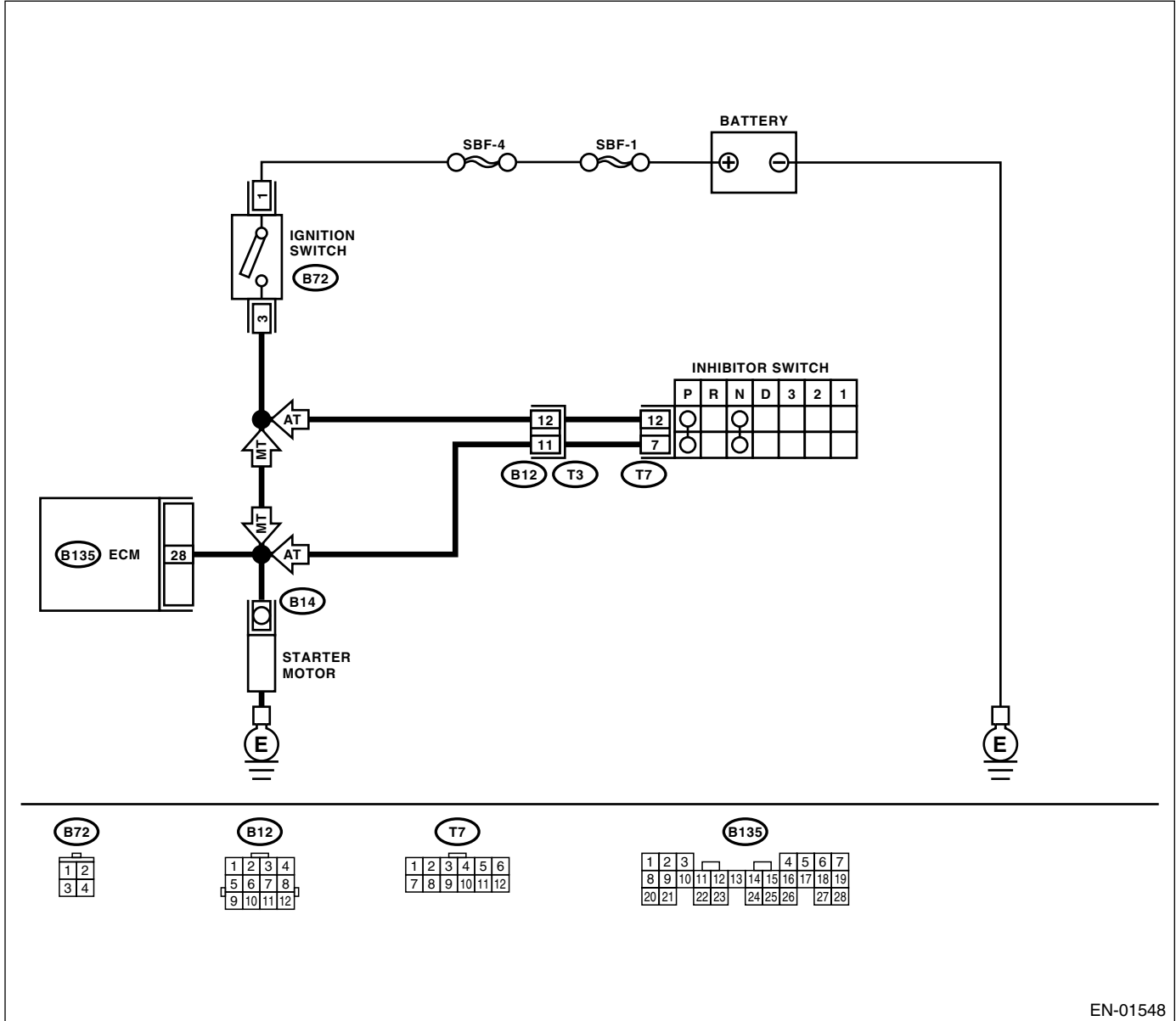


## B: STARTER MOTOR CIRCUIT

**CAUTION:**

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>

• **WIRING DIAGRAM:**



Step	Check	Yes	No
1	<b>CHECK OPERATION OF STARTER MOTOR.</b> Does the starter motor operate when the switch starts?	Go to step 2.	Go to step 3.
2	<b>CHECK DTC.</b> <Ref. to EN(H4SOw/oOBD)(diag)-24, OPERATION, Read Diagnostic Trouble Code (DTC).>	Record the DTC. Repair the trouble cause. <Ref. to EN(H4SOw/oOBD)(diag)-57, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Go to step 3.

## Diagnostics for Engine Starting Failure

### ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>3 CHECK INPUT SIGNAL FOR STARTER MOTOR.</b> 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. <i><b>Connector &amp; terminal</b></i> <i><b>(B14) No. 1 (+) — Engine ground (-):</b></i> NOTE: On AT model, place the selector lever in the "P" or "N" position.	Is the voltage more than 10 V?	Go to step 4.	Go to step 5.
<b>4 CHECK GROUND CIRCUIT OF STARTER MOTOR.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the terminal from starter motor. 3) Measure the resistance of ground cable between ground cable terminal and engine ground.	Is the resistance less than 5 $\Omega$ ?	Check the starter motor. <Ref. to SC(H4SO)-9, INSPECTION, Starter.>	Repair the open circuit of ground cable.
<b>5 CHECK HARNESS BETWEEN ECM AND STARTER MOTOR CIRCUIT.</b> 1) Turn the ignition switch to OFF. 2) Measure the resistance between starter motor and ECM. <i><b>Connector &amp; terminal</b></i> <i><b>(B14) No. 1 — Engine ground:</b></i>	Is the resistance less than 1 $\Omega$ ?	Repair the ground short circuit.	Go to step 6.
<b>6 CHECK HARNESS BETWEEN ECM AND STARTER MOTOR CIRCUIT.</b> 1) Turn the ignition switch to START. 2) Measure the resistance of fuse. <i><b>Connector &amp; terminal</b></i> <i><b>(B14) No. 1 — Engine ground:</b></i>	Is the resistance less than 1 $\Omega$ ?	Go to step 7.	Repair the ground short circuit.
<b>7 CHECK HARNESS BETWEEN BATTERY AND IGNITION SWITCH CONNECTOR.</b> 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. <i><b>Connector &amp; terminal</b></i> <i><b>(B72) No. 1 (+) — Chassis ground (-):</b></i>	Is the voltage more than 10 V?	Go to step 8.	Repair the open circuit in harness between ignition switch and battery.
<b>8 CHECK HARNESS BETWEEN BATTERY AND IGNITION SWITCH CONNECTOR.</b> 1) Connect the connector to ignition switch. 2) Turn the ignition switch to START. 3) Measure the voltage between ignition switch and chassis ground. <i><b>Connector &amp; terminal</b></i> <i><b>(B72) No. 3 (+) — Chassis ground (-):</b></i>	Is the voltage more than 10 V?	Go to step 9.	Replace the ignition switch.
<b>9 CHECK TRANSMISSION TYPE.</b>	Is the vehicle AT?	Go to step 10.	Repair the open circuit between ignition switch and starter motor circuit.

# Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>10 CHECK INHIBITOR SWITCH CIRCUIT.</b> 1) Turn the ignition switch to OFF. 2) Place the selector lever in the "P" or "N" position. 3) Separate the transmission harness connector. 4) Measure the resistance between transmission harness connector receptacle's terminals. <i><b>Connector &amp; terminal</b></i> <i><b>(T3) No. 11 — No. 12:</b></i>	Is the resistance less than 1 $\Omega$ ?	Repair the open circuit in harness between starter motor and ignition switch connector.	Go to step 11.
<b>11 CHECK TRANSMISSION HARNESS.</b> 1) Disconnect the connector from inhibitor switch. 2) Measure the resistance of harness between transmission harness and inhibitor switch connector. <i><b>Connector &amp; terminal</b></i> <i><b>(T3) No. 11 — (T7) No. 7:</b></i> <i><b>(T3) No. 12 — (T7) No. 12:</b></i>	Is the resistance less than 1 $\Omega$ ?	Go to step 12.	Repair the open circuit in harness between transmission harness and inhibitor switch connector.
<b>12 CHECK POOR CONTACT.</b> Check poor contact in inhibitor switch connector.	Is there poor contact in inhibitor switch connector?	Repair the poor contact in inhibitor switch connector.	Replace the inhibitor switch.

# Diagnostics for Engine Starting Failure

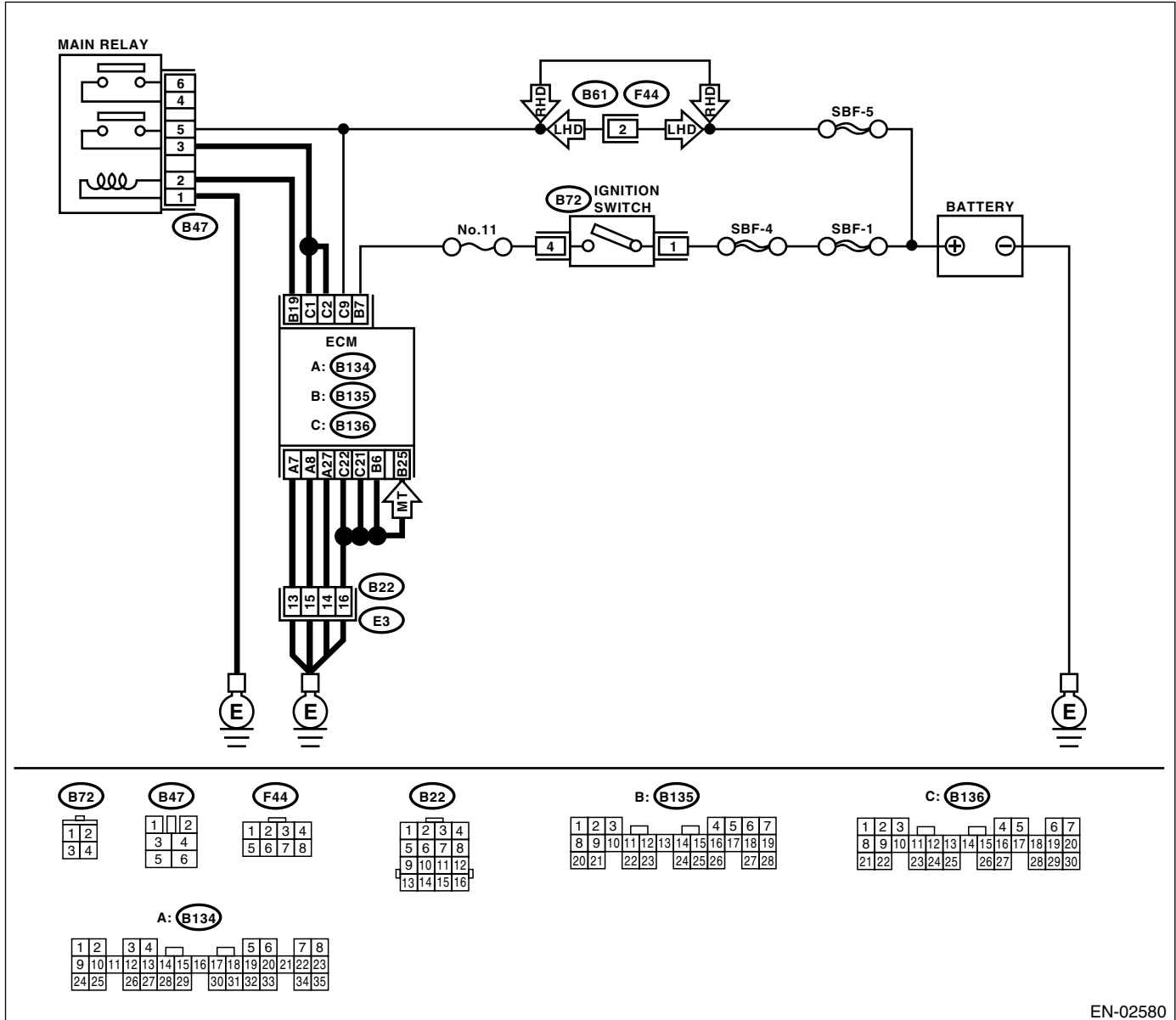
ENGINE (DIAGNOSTICS)

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

### CAUTION:

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>

### • WIRING DIAGRAM:



# Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>1 CHECK MAIN RELAY.</b> 1) Turn the ignition switch to OFF. 2) Remove the main relay. 3) Connect the battery to main relay terminals No. 1 and No. 2. 4) Measure the resistance between main relay terminals. <i>Terminals</i> <i>No. 3 — No. 5:</i> <i>No. 4 — No. 6:</i>	Is the resistance less than 10 $\Omega$ ?	Go to step 2.	Replace the main relay.
<b>2 CHECK GROUND CIRCUIT OF ECM.</b> 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM and chassis ground. <i>Connector &amp; terminal</i> <i>(B136) No. 21 — Chassis ground:</i> <i>(B136) No. 22 — Chassis ground:</i> <i>(B134) No. 27 — Chassis ground:</i> <i>(B134) No. 8 — Chassis ground:</i> <i>(B134) No. 7 — Chassis ground:</i> <i>(B135) No. 25 — Chassis ground: (MT model)</i> <i>(B135) No. 6 — Chassis ground:</i>	Is the resistance less than 5 $\Omega$ ?	Go to step 3.	Repair the open circuit in harness between ECM connector and engine grounding terminal.
<b>3 CHECK INPUT VOLTAGE OF ECM.</b> Measure the voltage between ECM connector and chassis ground. <i>Connector &amp; terminal</i> <i>(B136) No. 9 (+) — 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.
<b>4 CHECK INPUT VOLTAGE OF ECM.</b> 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. <i>Connector &amp; terminal</i> <i>(B135) No. 7 (+) — Chassis ground (-):</i>	Is the voltage more than 10 V?	Go to step 5.	Repair the open or ground short circuit of power supply circuit.
<b>5 CHECK HARNESS BETWEEN ECM AND MAIN RELAY CONNECTOR.</b> 1) Turn the ignition switch to OFF. 2) Measure the resistance between ECM and chassis ground. <i>Connector &amp; terminal</i> <i>(B135) No. 19 — Chassis ground:</i>	Is the resistance more than 1 M $\Omega$ ?	Go to step 6.	Repair the ground short circuit in harness between ECM connector and main relay connector, and then replace the ECM.
<b>6 CHECK OUTPUT VOLTAGE FROM ECM.</b> 1) Connect the connector to ECM. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. <i>Connector &amp; terminal</i> <i>(B135) No. 19 (+) — Chassis ground (-):</i>	Is the voltage more than 10 V?	Go to step 7.	Replace the ECM.
<b>7 CHECK INPUT VOLTAGE OF MAIN RELAY.</b> Check the voltage between main relay connector and chassis ground. <i>Connector &amp; terminal</i> <i>(B47) No. 2 (+) — Chassis ground (-):</i>	Is the voltage more than 10 V?	Go to step 8.	Repair the open circuit in harness between ECM connector and main relay connector.

## Diagnostics for Engine Starting Failure

### ENGINE (DIAGNOSTICS)

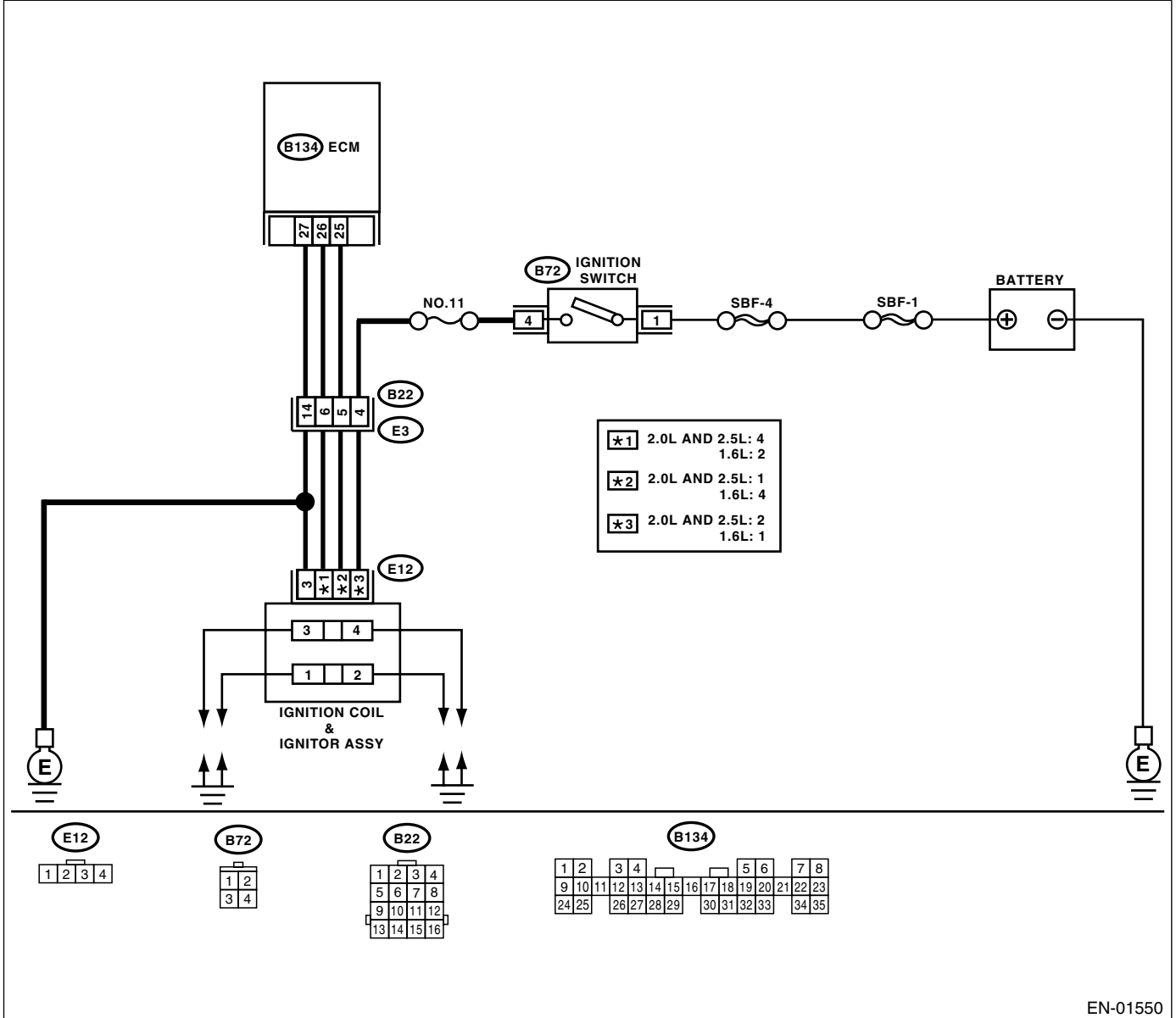
Step	Check	Yes	No
<b>8</b> <b>CHECK GROUND CIRCUIT OF MAIN RELAY.</b> 1) Turn the ignition switch to OFF. 2) Measure the resistance between main relay connector and chassis ground. <i><b>Connector &amp; terminal</b></i> <i><b>(B47) No. 1 — Chassis ground:</b></i>	Is the resistance less than 5 $\Omega$ ?	Go to step <b>9</b> .	Repair the open circuit between main relay and chassis ground.
<b>9</b> <b>CHECK INPUT VOLTAGE OF MAIN RELAY.</b> Measure the voltage between main relay connector and chassis ground. <i><b>Connector &amp; terminal</b></i> <i><b>(B47) No. 5 (+) — Chassis ground (-):</b></i> <i><b>(B47) No. 6 (+) — Chassis ground (-):</b></i>	Is the voltage more than 10 V?	Go to step <b>10</b> .	Repair the open or ground short circuit in harness of power supply circuit.
<b>10</b> <b>CHECK INPUT VOLTAGE OF ECM.</b> 1) Connect the main relay connector. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector and chassis ground. <i><b>Connector &amp; terminal</b></i> <i><b>(B136) No. 1 (+) — Chassis ground (-):</b></i> <i><b>(B136) No. 2 (+) — Chassis ground (-):</b></i>	Is the voltage more than 10 V?	Check the ignition control system. <Ref. to EN(H4SOw/oOBD)(diag)-45, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Repair the open or ground short circuit in harness between ECM connector and main relay connector.

## D: IGNITION CONTROL SYSTEM

**CAUTION:**

After repair or replacement of the faulty parts, conduct the Clear Memory and inspection modes.  
 <Ref. to EN(H4SOW/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOW/oOBD)(diag)-26, OPERATION, Inspection Mode.>

• **WIRING DIAGRAM:**



EN-01550

## Diagnostics for Engine Starting Failure

### ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<p><b>1</b></p> <p><b>CHECK IGNITION SYSTEM FOR SPARKS.</b>                      1)Remove the plug cord cap from each spark plug.                      2)Install new spark plug on the plug cord cap.  <b>CAUTION:</b>  <b>Do not remove the spark plug from engine.</b>                      3&gt;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.</p>	Does spark occur at each cylinder?	Check the fuel pump system. <Ref. to EN(H4SOW/oOBD)(diag)-49, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step 2.
<p><b>2</b></p> <p><b>CHECK POWER SUPPLY CIRCUIT FOR IGNITION COIL &amp; IGNITOR ASSY.</b>                      1)Turn the ignition switch to OFF.                      2)Disconnect the connector from ignition coil &amp; ignitor ASSY.                      3)Turn the ignition switch to ON.                      4)Measure the power supply voltage between ignition coil &amp; ignitor ASSY connector and engine ground.  <b>Connector &amp; terminal</b>  <b>1.6 L</b>  <b>(E12) No. 1 (+) — Engine ground (-):</b>  <b>2.0 L and 2.5 L</b>  <b>(E12) No. 2 (+) — Engine ground (-):</b></p>	Is the voltage more than 10 V?	Go to step 3.	Repair the harness and connector.  NOTE: In this case, repair the following: <ul style="list-style-type: none"> <li>• Open circuit or ground short in harness between ignition coil &amp; ignitor ASSY, and ignition switch connector</li> <li>• Poor contact in coupling connector (B22)</li> </ul>
<p><b>3</b></p> <p><b>CHECK HARNESS OF IGNITION COIL &amp; IGNITOR ASSY GROUND CIRCUIT.</b>                      1)Turn the ignition switch to OFF.                      2)Measure the resistance between ignition coil &amp; ignitor ASSY connector and engine ground.  <b>Connector &amp; terminal</b>  <b>(E12) No. 3 — Engine ground:</b></p>	Is the resistance less than 5 Ω?	Go to step 4.	Repair the harness and connector.  NOTE: In this case, repair the following: <ul style="list-style-type: none"> <li>• Open circuit in harness between ignition coil &amp; ignitor ASSY connector and engine grounding terminal</li> </ul>
<p><b>4</b></p> <p><b>CHECK IGNITION COIL &amp; IGNITOR ASSY.</b>                      1)Remove the spark plug cords.                      2)Measure the resistance between spark plug cord contact portions to check secondary coil.  <b>Terminals</b>  <b>1.6 L</b>  <b>No. 4 — No. 1:</b>  <b>2.0 L and 2.5 L</b>  <b>No. 1 — No. 2:</b></p>	Is the resistance 10 — 15 Ω?	Go to step 5.	Replace the ignition coil & ignitor ASSY.
<p><b>5</b></p> <p><b>CHECK IGNITION COIL &amp; IGNITOR ASSY.</b>                      Measure the resistance between spark plug cord contact portions to check secondary coil.  <b>Terminals</b>  <b>1.6 L</b>  <b>No. 3 — No. 2:</b>  <b>2.0 L and 2.5 L</b>  <b>No. 3 — No. 4:</b></p>	Is the resistance 10 — 15 Ω?	Go to step 6.	Replace the ignition coil & ignitor ASSY.



# Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<p><b>6</b></p> <p><b>CHECK INPUT SIGNAL FOR IGNITION COIL &amp; IGNITOR ASSY.</b> Check if the voltage varies synchronously with engine speed when cranking, while monitoring voltage between ignition coil &amp; ignitor ASSY connector and engine ground.</p> <p><b>Connector &amp; terminal</b> <b>1.6 L</b> <b>(E12) No. 4 (+) — Engine ground (-):</b> <b>2.0 L and 2.5 L</b> <b>(E12) No. 1 (+) — Engine ground (-):</b></p>	Is the voltage more than 10 V?	Go to step 7.	Replace the ignition coil & ignitor ASSY.
<p><b>7</b></p> <p><b>CHECK INPUT SIGNAL FOR IGNITION COIL &amp; IGNITOR ASSY.</b> Check if the voltage varies synchronously with engine speed when cranking, while monitoring voltage between ignition coil &amp; ignitor ASSY connector and engine ground.</p> <p><b>Connector &amp; terminal</b> <b>1.6 L</b> <b>(E12) No. 2 (+) — Engine ground (-):</b> <b>2.0 L and 2.5 L</b> <b>(E12) No. 4 (+) — Engine ground (-):</b></p>	Is the voltage more than 10 V?	Go to step 8.	Replace the ignition coil & ignitor ASSY.
<p><b>8</b></p> <p><b>CHECK HARNESS BETWEEN ECM AND IGNITION COIL &amp; IGNITOR ASSY CONNECTOR.</b> 1)Disconnect the connector from ECM. 2)Measure the resistance of harness between ECM and ignition coil &amp; ignitor ASSY connector.</p> <p><b>Connector &amp; terminal</b> <b>1.6 L</b> <b>(B134) No. 26 — (E12) No. 2:</b> <b>2.0 L and 2.5 L</b> <b>(B134) No. 26 — (E12) No. 4:</b></p>	Is the resistance less than 1 $\Omega$ ?	Go to step 9.	Repair the harness and connector. <b>NOTE:</b> In this case, repair the following: • Open circuit in harness between ECM and ignition coil & ignitor ASSY connector • Poor contact in a coupling connector (B22)
<p><b>9</b></p> <p><b>CHECK HARNESS BETWEEN ECM AND IGNITION COIL &amp; IGNITOR ASSY CONNECTOR.</b> Measure the resistance of harness between ECM and ignition coil &amp; ignitor ASSY connector.</p> <p><b>Connector &amp; terminal</b> <b>1.6 L</b> <b>(B134) No. 25 — (E12) No. 4:</b> <b>2.0 L and 2.5 L</b> <b>(B134) No. 25 — (E12) No. 1:</b></p>	Is the resistance less than 1 $\Omega$ ?	Go to step 10.	Repair the harness and connector. <b>NOTE:</b> In this case, repair the following: • Open circuit in harness between ECM and ignition coil & ignitor ASSY connector • Poor contact in a coupling connector (B22)

## Diagnostics for Engine Starting Failure

### ENGINE (DIAGNOSTICS)

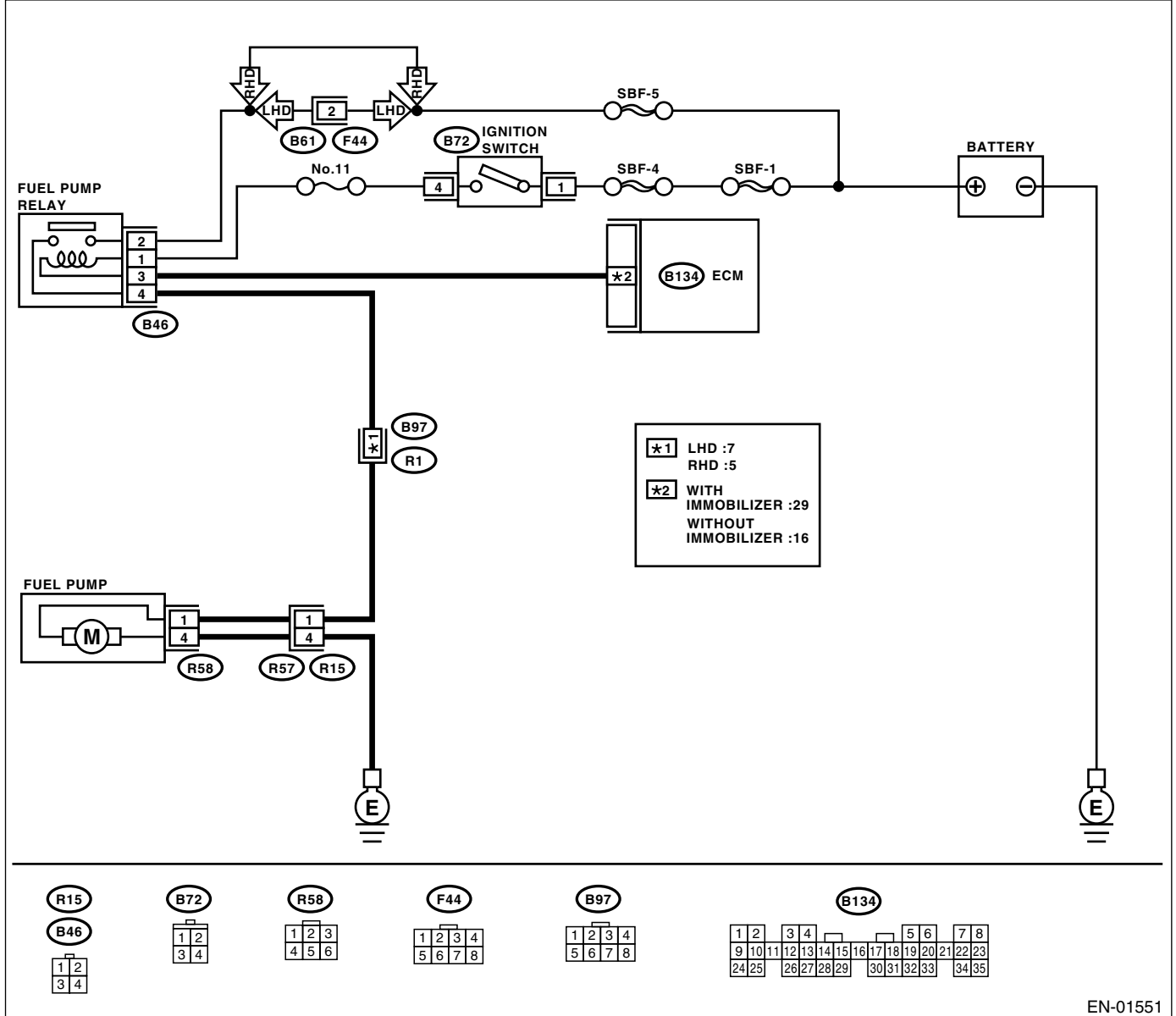
Step	Check	Yes	No
<b>10 CHECK HARNESS BETWEEN ECM AND IGNITION COIL &amp; IGNITOR ASSY CONNECTOR.</b> Measure the resistance of harness between ECM and ignition coil & ignitor ASSY connector. <i><b>Connector &amp; terminal:</b></i> <i><b>(B134) No. 27 — (E12) No. 3:</b></i>	Is the resistance less than 1 $\Omega$ ?	Go to step 11.	Repair the harness and connector. NOTE: In this case, repair the following: <ul style="list-style-type: none"> <li>• Open circuit in harness between ECM and ignition coil &amp; ignitor ASSY connector</li> <li>• Poor contact in a coupling connector (B22)</li> </ul>
<b>11 CHECK HARNESS BETWEEN ECM AND IGNITION COIL &amp; IGNITOR ASSY CONNECTOR.</b> Measure the resistance of harness between ECM and chassis ground. <i><b>Connector &amp; terminal:</b></i> <i><b>(B134) No. 26 — Chassis ground:</b></i>	Is the resistance more than 1 $M\Omega$ ?	Go to step 12.	Repair the ground short circuit in harness between ECM and ignition coil & ignitor ASSY connector.
<b>12 CHECK HARNESS BETWEEN ECM AND IGNITION COIL &amp; IGNITOR ASSY CONNECTOR.</b> Measure the resistance of harness between ECM and chassis ground. <i><b>Connector &amp; terminal</b></i> <i><b>(B134) No. 25 — Chassis ground:</b></i>	Is the resistance more than 1 $M\Omega$ ?	Go to step 13.	Repair the ground short circuit in harness between ECM and ignition coil & ignitor ASSY connector.
<b>13 CHECK POOR CONTACT.</b> Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact in ECM connector.	Check the spark plug and spark plug cord. <Ref. to IG(H4SO)-6, INSPECTION, Spark Plug.> <Ref. to IG(H4SO)-10, INSPECTION, Spark Plug Cord.>

## E: FUEL PUMP CIRCUIT

**CAUTION:**

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>

• WIRING DIAGRAM:



EN-01551

## Diagnostics for Engine Starting Failure

### ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<p><b>1 CHECK OPERATING SOUND OF FUEL PUMP.</b> Make sure that the fuel pump is in operation for 2 seconds when turning ignition switch to ON. NOTE: Fuel pump operation check can also be executed using "COMPULSORY VALVE OPERATION CHECK MODE". For the procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". &lt;Ref. to EN(H4SOw/oOBD)(diag)-29, OPERATION, Compulsory Valve Operation Check Mode.&gt;</p>	Does the fuel pump produce operating sound?	Check the fuel injector circuit. <Ref. to EN(H4SOw/oOBD)(diag)-52, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step 2.
<p><b>2 CHECK GROUND CIRCUIT OF FUEL PUMP.</b> 1) Turn the ignition switch to OFF. 2) Raise the rear seat, and turn the floor mat up. 3) Remove the service hole cover. 4) Disconnect the connector from fuel pump. 5) Measure the resistance of harness connector between fuel pump and chassis ground. <b>Connector &amp; terminal</b> <b>(R58) No. 4 — Chassis ground:</b></p>	Is the resistance less than 5 $\Omega$ ?	Go to step 3.	<p>Repair the harness and connector. NOTE: In this case, repair the following:</p> <ul style="list-style-type: none"> <li>• Open circuit in harness between fuel pump connector and chassis grounding terminal</li> <li>• Poor contact in coupling connector (R15) and (B97)</li> </ul>
<p><b>3 CHECK POWER SUPPLY TO FUEL PUMP.</b> 1) Turn the ignition switch to ON. 2) Measure the voltage of power supply circuit between fuel pump connector and chassis ground. <b>Connector &amp; terminal</b> <b>(R58) No. 1 (+) — Chassis ground (-):</b></p>	Is the voltage more than 10 V?	Replace the fuel pump.	Go to step 4.
<p><b>4 CHECK HARNESS BETWEEN FUEL PUMP AND FUEL PUMP RELAY CONNECTOR.</b> 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between fuel pump and fuel pump relay connector. <b>Connector &amp; terminal</b> <b>(R58) No. 1 — (B46) No. 4:</b></p>	Is the resistance less than 1 $\Omega$ ?	Go to step 5.	<p>Repair the harness and connector. NOTE: In this case, repair the following:</p> <ul style="list-style-type: none"> <li>• Open circuit in harness between fuel pump and fuel pump relay connector</li> <li>• Poor contact in coupling connectors (R15) and (B97)</li> </ul>
<p><b>5 CHECK HARNESS BETWEEN FUEL PUMP AND FUEL PUMP RELAY CONNECTOR.</b> Measure the resistance of harness between fuel pump and fuel pump relay connector. <b>Connector &amp; terminal</b> <b>(R58) No. 1 — Chassis ground:</b></p>	Is the resistance more than 1 M $\Omega$ ?	Go to step 6.	Repair the ground short circuit in harness between fuel pump and fuel pump relay connector.

# Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>6 CHECK FUEL PUMP RELAY.</b> 1)Disconnect the connector from fuel pump relay. 2)Remove the fuel pump relay from bracket. 3)Connect the battery to fuel pump relay connector terminals No. 1 and No. 3. 4)Measure the resistance between connector terminals of fuel pump relay. <i>Terminals</i> <i>No. 2 — No. 4:</i>	Is the resistance less than 10 Ω?	Go to step 7.	Replace the fuel pump relay.
<b>7 CHECK HARNESS BETWEEN ECM AND FUEL PUMP RELAY CONNECTOR.</b> 1)Disconnect the connectors from ECM. 2)Measure the resistance of harness between ECM and fuel pump relay connector. <i>Connector &amp; terminal</i> <i>With Immobilizer</i> <i>(B134) No. 29 — (B46) No. 3:</i> <i>Without Immobilizer</i> <i>(B134) No. 16 — (B46) No. 3:</i>	Is the resistance less than 1 Ω?	Go to step 8.	Repair the open circuit in harness between ECM and fuel pump relay connector.
<b>8 CHECK POOR CONTACT.</b> Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact in ECM connector.	Check the fuel injector circuit. <Ref. to EN(H4SOw/oOBD)(diag)-52, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

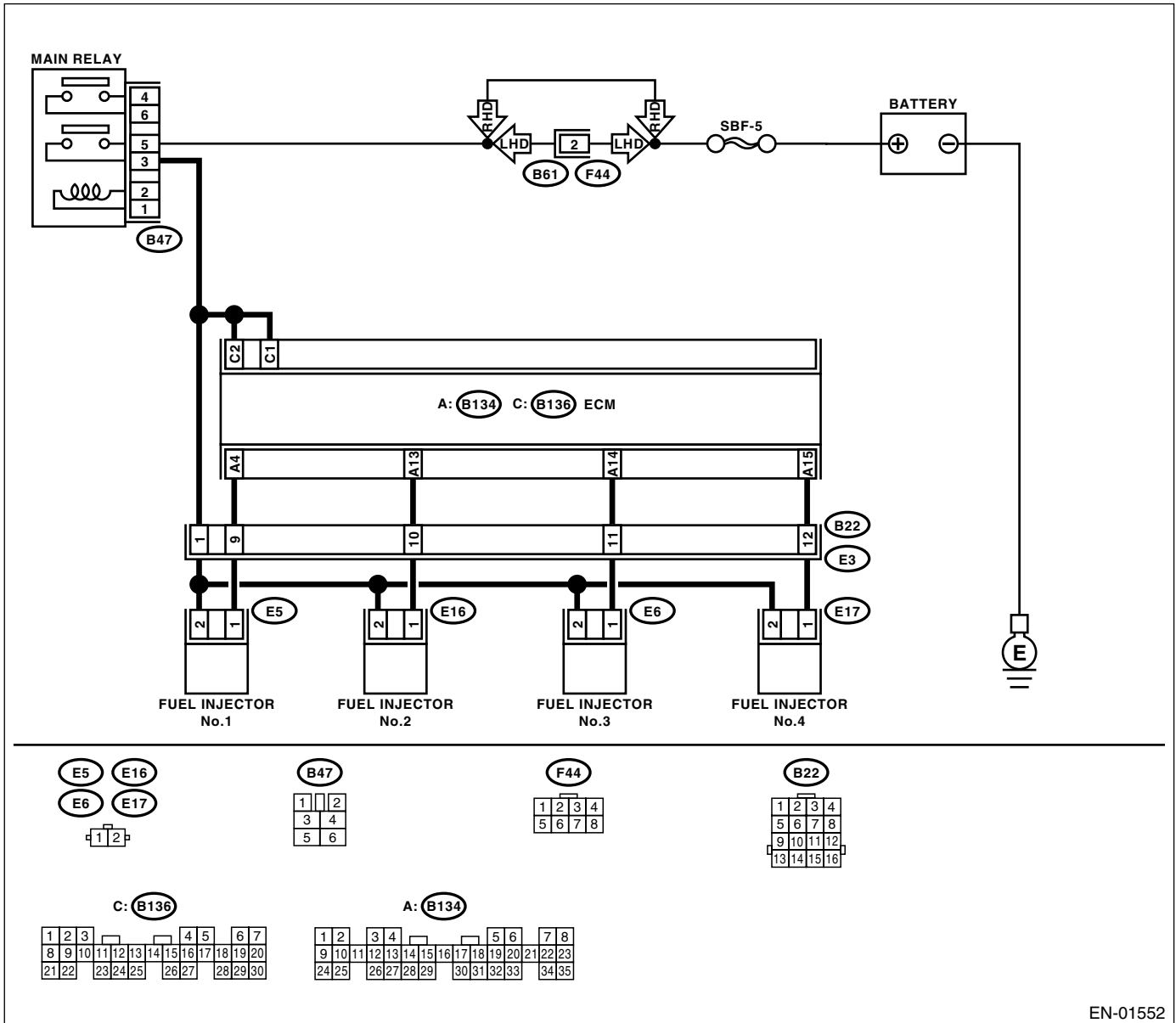
# Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

## F: FUEL INJECTOR CIRCUIT

### CAUTION:

- Check or repair only the faulty parts.
- After repair or replacement of the faulty parts, conduct the Clear Memory and inspection modes. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>
- **WIRING DIAGRAM:**



EN-01552

Step	Check	Yes	No	
1	<p><b>CHECK OPERATION OF EACH FUEL INJECTOR.</b></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>	<p>Does the fuel injector emit “operating” sound?</p>	<p>Check the fuel pressure. &lt;Ref. to ME(H4SO)-31, INSPECTION, Fuel Pressure.&gt;</p>	<p>Go to step 2.</p>

# Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<p><b>2</b></p> <p><b>CHECK POWER SUPPLY TO EACH FUEL INJECTOR.</b>                      1) Turn the ignition switch to OFF.                      2) Disconnect the connector from each cylinder 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><b>Connector &amp; terminal</b>  <b>#1 (E5) No. 2 (+) — Engine ground (-):</b>  <b>#2 (E16) No. 2 (+) — Engine ground (-):</b>  <b>#3 (E6) No. 2 (+) — Engine ground (-):</b>  <b>#4 (E17) No. 2 (+) — Engine ground (-):</b></p>	Is the voltage more than 10 V?	Go to step 3.	Repair the harness and connector. NOTE: In this case, repair the following: <ul style="list-style-type: none"> <li>• Open circuit in harness between main relay and fuel injector connector</li> <li>• Poor contact in main relay connector</li> <li>• Poor contact in coupling connector (B22)</li> <li>• Poor contact in fuel injector connector</li> </ul>
<p><b>3</b></p> <p><b>CHECK EACH FUEL INJECTOR.</b>                      1) Turn the ignition switch to OFF.                      2) Measure the resistance between each fuel injector terminals.</p> <p><b>Terminals</b>  <b>No. 1 — No. 2:</b></p>	Is the resistance 5 — 20 Ω?	Go to step 4.	Replace the faulty fuel injector.
<p><b>4</b></p> <p><b>CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.</b>                      1) Disconnect the connector from ECM.                      2) Connect the connector to #1 fuel injector.                      3) Measure the resistance of harness between ECM and fuel injector connector.</p> <p><b>Connector &amp; terminal</b>  <b>(B134) No. 4 — (B136) No. 2:</b></p>	Is the resistance 5 — 20 Ω?	Go to step 5.	Repair the harness and connector. NOTE: In this case, repair the following: <ul style="list-style-type: none"> <li>• Open circuit in harness between ECM and fuel injector connector</li> <li>• Poor contact in coupling connector (B22)</li> </ul>
<p><b>5</b></p> <p><b>CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.</b>                      Measure the resistance of harness between ECM and fuel injector connector.</p> <p><b>Connector &amp; terminal</b>  <b>(B134) No. 4 — Chassis ground:</b></p>	Is the resistance less than 1 Ω?	Repair the ground short circuit in harness between ECM and fuel injector connector.	Go to step 6.
<p><b>6</b></p> <p><b>CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.</b>                      1) Connect the connector to #2 fuel injector.                      2) Measure the resistance of harness between ECM and fuel injector connector.</p> <p><b>Connector &amp; terminal</b>  <b>(B134) No. 13 — (B136) No. 2:</b></p>	Is the resistance 5 — 20 Ω?	Go to step 7.	Repair the harness and connector. NOTE: In this case, repair the following: <ul style="list-style-type: none"> <li>• Open circuit in harness between ECM and fuel injector connector</li> <li>• Poor contact in coupling connector (B22)</li> </ul>

## Diagnostics for Engine Starting Failure

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>7</b> <b>CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.</b> Measure the resistance of harness between ECM and fuel injector connector. <i><b>Connector &amp; terminal</b></i> <i><b>(B134) No. 13 — Chassis ground:</b></i>	Is the resistance less than 1 $\Omega$ ?	Repair the ground short circuit in harness between ECM and fuel injector connector.	Go to step <b>8</b> .
<b>8</b> <b>CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.</b> 1)Connect the connector to #3 fuel injector. 2)Measure the resistance of harness between ECM and fuel injector connector. <i><b>Connector &amp; terminal</b></i> <i><b>(B134) No. 14 — (B136) No. 2:</b></i>	Is the resistance 5 — 20 $\Omega$ ?	Go to step <b>9</b> .	Repair the harness and connector. NOTE: In this case, repair the following: <ul style="list-style-type: none"> <li>• Open circuit in harness between ECM and fuel injector connector</li> <li>• Poor contact in coupling connector (B22)</li> </ul>
<b>9</b> <b>CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.</b> Measure the resistance of harness between ECM and fuel injector connector. <i><b>Connector &amp; terminal</b></i> <i><b>(B134) No. 14 — Chassis ground:</b></i>	Is the resistance less than 1 $\Omega$ ?	Repair the ground short circuit in harness between ECM and fuel injector connector.	Go to step <b>10</b> .
<b>10</b> <b>CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.</b> 1)Connect the connector to #4 fuel injector. 2)Measure the resistance of harness between ECM and fuel injector connector. <i><b>Connector &amp; terminal</b></i> <i><b>(B134) No. 15 — (B136) No. 2:</b></i>	Is the resistance 5 — 20 $\Omega$ ?	Go to step <b>11</b> .	Repair the harness and connector. NOTE: In this case, repair the following: <ul style="list-style-type: none"> <li>• Open circuit in harness between ECM and fuel injector connector</li> <li>• Poor contact in coupling connector (B22)</li> </ul>
<b>11</b> <b>CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.</b> Measure the resistance of harness between ECM and fuel injector connector. <i><b>Connector &amp; terminal</b></i> <i><b>(B134) No. 15 — Chassis ground:</b></i>	Is the resistance less than 1 $\Omega$ ?	Repair the ground short circuit in harness between ECM and fuel injector connector.	Go to step <b>12</b> .
<b>12</b> <b>CHECK POOR CONTACT.</b> Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact in ECM connector.	Inspection using "General Diagnostic Table". <Ref. to EN(H4SO)(diag)-260, INSPECTION, General Diagnostic Table.>



# List of Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

## 13. List of Diagnostic Trouble Code (DTC)

### A: LIST

DTC	Item	Contents of diagnosis	Index
11	Crankshaft position sensor	<ul style="list-style-type: none"> <li>No signal entered from crankshaft position sensor when starter switch is ON.</li> <li>Harness connector between ECM and crankshaft position sensor is in short or open.</li> </ul>	<Ref. to EN(H4SOW/oOBD)(diag)-57, DTC 11 CRANKSHAFT POSITION SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
12	Starter switch	<ul style="list-style-type: none"> <li>Starter switch signal is abnormal.</li> <li>Harness connector between ECM and starter switch is in short or open.</li> </ul>	<Ref. to EN(H4SOW/oOBD)(diag)-60, DTC 12 STARTER SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
13	Camshaft position sensor	<ul style="list-style-type: none"> <li>No signal entered from camshaft position sensor, but signal entered from crankshaft position sensor.</li> <li>Harness connector between ECM and camshaft position sensor is in short or open.</li> </ul>	<Ref. to EN(H4SOW/oOBD)(diag)-62, DTC 13 CAMSHAFT POSITION SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
21	Engine coolant temperature sensor	<ul style="list-style-type: none"> <li>Engine coolant temperature sensor signal is abnormal.</li> <li>Harness connector between ECM and engine coolant temperature sensor is in short or open.</li> </ul>	<Ref. to EN(H4SOW/oOBD)(diag)-64, DTC 21 ENGINE COOLANT TEMPERATURE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
22	Knock sensor	<ul style="list-style-type: none"> <li>Knock sensor signal is abnormal.</li> <li>Harness connector between ECM and knock sensor is in short or open.</li> </ul>	<Ref. to EN(H4SOW/oOBD)(diag)-67, DTC 22 KNOCK SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
24	Idle air control solenoid valve	<ul style="list-style-type: none"> <li>Idle air control solenoid valve is not in function.</li> <li>Harness connector between ECM and idle air control solenoid valve is in short or open.</li> </ul>	<Ref. to EN(H4SOW/oOBD)(diag)-69, DTC 24 IDLE AIR CONTROL SOLENOID VALVE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
26	Intake air temperature sensor	<ul style="list-style-type: none"> <li>Intake air temperature sensor signal is abnormal.</li> <li>Harness connector between ECM and intake air temperature sensor is in short or open.</li> </ul>	<Ref. to EN(H4SOW/oOBD)(diag)-72, DTC 26 INTAKE AIR TEMPERATURE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
31	Throttle position sensor	<ul style="list-style-type: none"> <li>Throttle position sensor signal is abnormal.</li> <li>Throttle position sensor is installed abnormally.</li> <li>Harness connector between ECM and throttle position sensor is in short or open.</li> </ul>	<Ref. to EN(H4SOW/oOBD)(diag)-75, DTC 31 THROTTLE POSITION SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
32	Oxygen sensor	<ul style="list-style-type: none"> <li>Oxygen sensor is not in function.</li> <li>Harness connector between ECM and oxygen sensor is in short or open.</li> </ul>	<Ref. to EN(H4SOW/oOBD)(diag)-77, DTC 32 OXYGEN SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
33	Vehicle speed signal	<ul style="list-style-type: none"> <li>Vehicle speed signal is abnormal.</li> <li>Harness connector between ECM and vehicle speed sensor is in short or open.</li> </ul>	<Ref. to EN(H4SOW/oOBD)(diag)-80, DTC 33 VEHICLE SPEED SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
35	Purge control solenoid valve	<ul style="list-style-type: none"> <li>Purge control solenoid valve is not in function.</li> <li>Harness connector between ECM and purge control solenoid valve is in short or open.</li> </ul>	<Ref. to EN(H4SOW/oOBD)(diag)-82, DTC 35 PURGE CONTROL SOLENOID VALVE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

## List of Diagnostic Trouble Code (DTC)

### ENGINE (DIAGNOSTICS)

DTC	Item	Contents of diagnosis	Index
38	Torque control signal (AT)	<ul style="list-style-type: none"> <li>• Abnormal signal is entered from TCM.</li> <li>• Harness connector between ECM and TCM is in short or open.</li> </ul>	<Ref. to EN(H4SOW/oOBD)(diag)-85, DTC 38 TORQUE CONTROL SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
45	Manifold absolute pressure sensor	<ul style="list-style-type: none"> <li>• Manifold absolute pressure sensor signal is abnormal.</li> <li>• Harness connector between ECM and Manifold absolute pressure sensor is in short or open.</li> </ul>	<Ref. to EN(H4SOW/oOBD)(diag)-87, DTC 45 PRESSURE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
46	CO resistor (General spec. vehicles)	<ul style="list-style-type: none"> <li>• CO resistor signal is abnormal.</li> <li>• Harness connector between ECM and CO resistor is in short or open.</li> <li>• CO valve is not adjusted to specification.</li> </ul>	<Ref. to EN(H4SOW/oOBD)(diag)-89, DTC 46 CO RESISTOR (GENERAL SPEC. VEHICLES), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
51	Neutral position switch (MT)	<ul style="list-style-type: none"> <li>• Neutral position switch signal is abnormal.</li> <li>• Harness connector between ECM and neutral position switch is in short or open.</li> </ul>	<Ref. to EN(H4SOW/oOBD)(diag)-91, DTC 51 NEUTRAL POSITION SWITCH (MT MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
	Park/Neutral position switch (AT)	<ul style="list-style-type: none"> <li>• Park/neutral position switch signal is abnormal.</li> <li>• Shift cable is connected abnormally.</li> <li>• Harness connector between ECM and inhibitor switch is in short or open.</li> </ul>	<Ref. to EN(H4SOW/oOBD)(diag)-93, DTC 51 PARK/NEUTRAL POSITION SWITCH (AT MODEL), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
53*	Immobilizer system	Faulty immobilizer system.	<Ref. to IM(diag)-2, Basic Diagnostic Procedure.>
85	Charge system	Charge system is abnormal.	<Ref. to EN(H4SOW/oOBD)(diag)-95, DTC 85 CHARGE SYSTEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

\*: Immobilizer system equipped model only

## 14. Diagnostic Procedure with Diagnostic Trouble Code (DTC)

### A: DTC 11 CRANKSHAFT POSITION SENSOR

• **DIAGNOSIS:**

- No signal entered from crankshaft position sensor when ignition switch is ON.
- The harness connector between ECM and crankshaft position sensor is open or shorted.

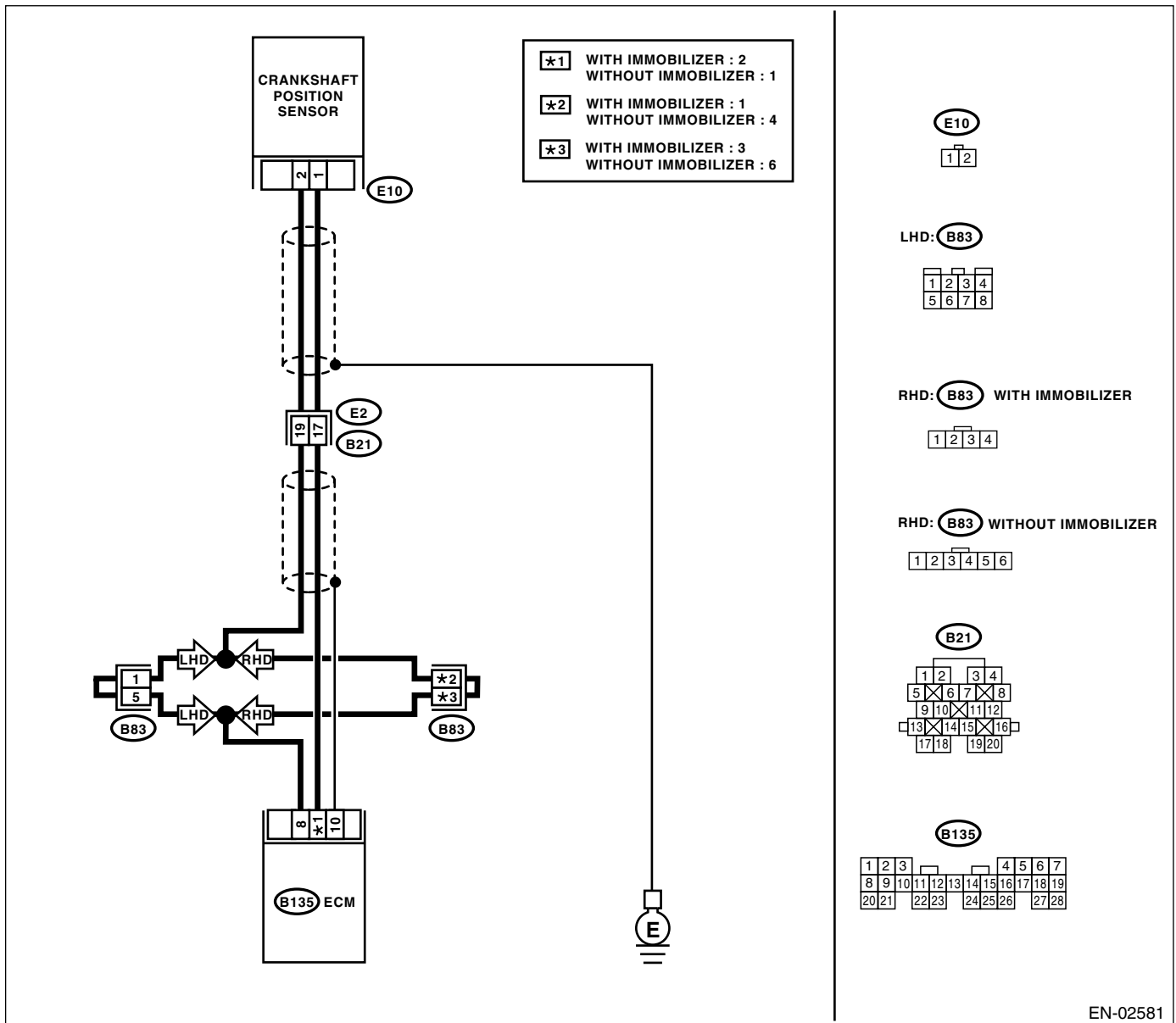
• **TROUBLE SYMPTOM:**

- Engine stalls.
- Restarting impossible

**CAUTION:**

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>

• **WIRING DIAGRAM:**



EN-02581

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

## ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>1</b>	<b>CHECK CONDITION OF CRANKSHAFT POSITION SENSOR INSTALLATION.</b>	Go to step 2.	Tighten the crankshaft position sensor installing bolts securely.
<b>2</b>	<b>CHECK CRANKSHAFT POSITION SENSOR.</b> 1)Remove the crankshaft position sensor. 2)Measure the resistance between connector terminals of crankshaft position sensor. <b>Terminals</b> <b>No. 1 — No. 2:</b>	Go to step 3.	Replace the crankshaft position sensor.
<b>3</b>	<b>CHECK HARNESS BETWEEN ECM AND CRANKSHAFT POSITION SENSOR CONNECTOR.</b> 1)Connect the connector to crankshaft position sensor. 2)Disconnect the connector from ECM. 3)Measure the resistance of harness between crankshaft position sensor connector and ECM. <b>Connector &amp; terminal</b> <b>With Immobilizer</b> <b>(B135) No. 8 — (B135) No. 2</b> <b>Without Immobilizer</b> <b>(B135) No. 8 — (B135) No. 1</b>	Go to step 4.	Repair the harness and connector. <b>NOTE:</b> In this case, repair the following: • Open circuit in harness between crankshaft position sensor and ECM connector • Poor contact in coupling connector (B21)
<b>4</b>	<b>CHECK HARNESS BETWEEN ECM AND CRANKSHAFT POSITION SENSOR CONNECTOR.</b> Measure the resistance of harness between ECM connector and chassis ground. <b>Connector &amp; terminal</b> <b>(B135) No. 8 — Chassis ground:</b>	Is the resistance less than 10 Ω?	Repair the ground short circuit in harness between crankshaft position sensor and ECM connector. Go to step 5.
<b>5</b>	<b>CHECK INPUT SIGNAL FOR ECM.</b> 1)Turn the ignition switch to OFF. 2)Set the oscilloscope probe at ECM connector terminal positive (+) and its ground lead at negative (-). 3)Measure the voltage indicated on oscilloscope while cranking engine. <b>Connector &amp; terminal</b> <b>With Immobilizer</b> <b>(B135) No. 2 (+) — (B135) No. 8 (-)</b> <b>Without Immobilizer</b> <b>(B135) No. 1 (+) — (B135) No. 8 (-)</b>	Is the voltage more than 400 mV?	Go to step 6. Replace the crankshaft position sensor.
<b>6</b>	<b>CHECK POOR CONTACT.</b> Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact in ECM connector. Go to step 7.
<b>7</b>	<b>CHECK ECM.</b> 1)Connect all connectors. 2)Erase the memory. <Ref. to EN(H4SOW/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> 3)Perform the inspection mode. <Ref. to EN(H4SOW/oOBD)(diag)-26, OPERATION, Inspection Mode.> 4)Read any DTC on the display. <Ref. to EN(H4SOW/oOBD)(diag)-24, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is the same DTC as in current diagnosis still being output?	Replace the generator. Go to step 8.

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>8</b> CHECK ANY OTHER DTCs APPEARANCE.	Is any other DTC displayed?	Proceed with the diagnosis corresponding to the DTC.	A temporary poor contact.

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

## B: DTC 12 STARTER SWITCH

### • DIAGNOSIS:

- The starter switch signal is abnormal.
- The harness connector between ECM and starter switch is open or shorted.

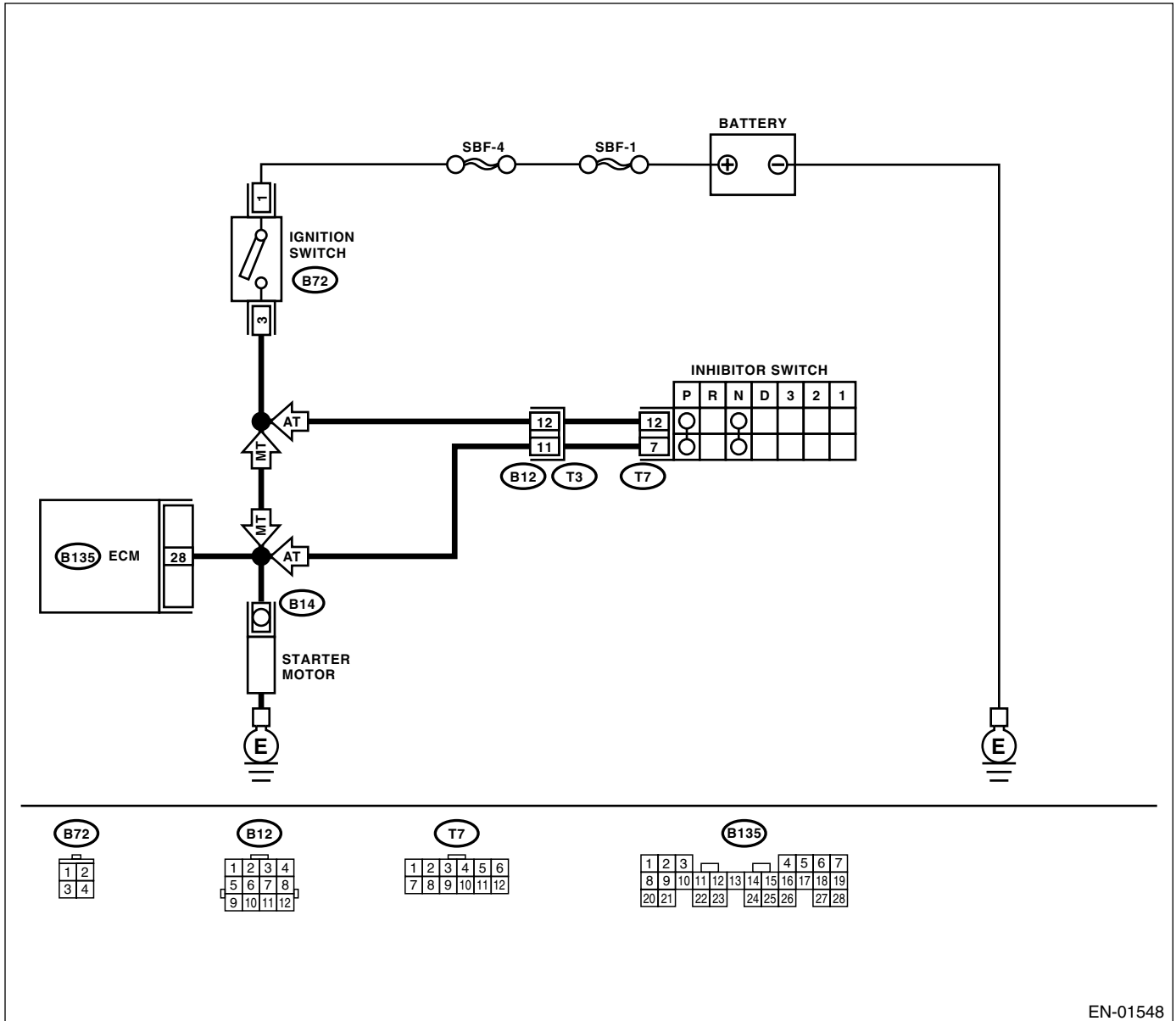
### • TROUBLE SYMPTOM:

- Failure of engine to start

### CAUTION:

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>

### • WIRING DIAGRAM:



EN-01548

Step	Check	Yes	No
1	<b>CHECK OPERATION OF STARTER MOTOR.</b> Does the starter motor operate when ignition switch is turned to START?	Go to step 2.	Check the starter motor circuit.

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>2</b> <b>CHECK HARNESS BETWEEN ECM AND IGNITION SWITCH CONNECTOR.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM. 3) Set the selector lever to "P" or "N" position (AT model). 4) Turn the ignition switch to START. 5) Measure the power supply voltage between ECM connector and chassis ground. <b>Connector &amp; terminal</b> <b>(B135) No. 28 (+) — Chassis ground (-):</b>	Is the voltage more than 10 V?	Repair the poor contact in ECM connector.	Repair the open or ground short circuit in harness between ECM and ignition switch connector.

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

## C: DTC 13 CAMSHAFT POSITION SENSOR

### • DIAGNOSIS:

- No signal entered from camshaft position sensor, but signal entered from crankshaft position sensor.
- The harness connector between ECM and camshaft position sensor is open or shorted.

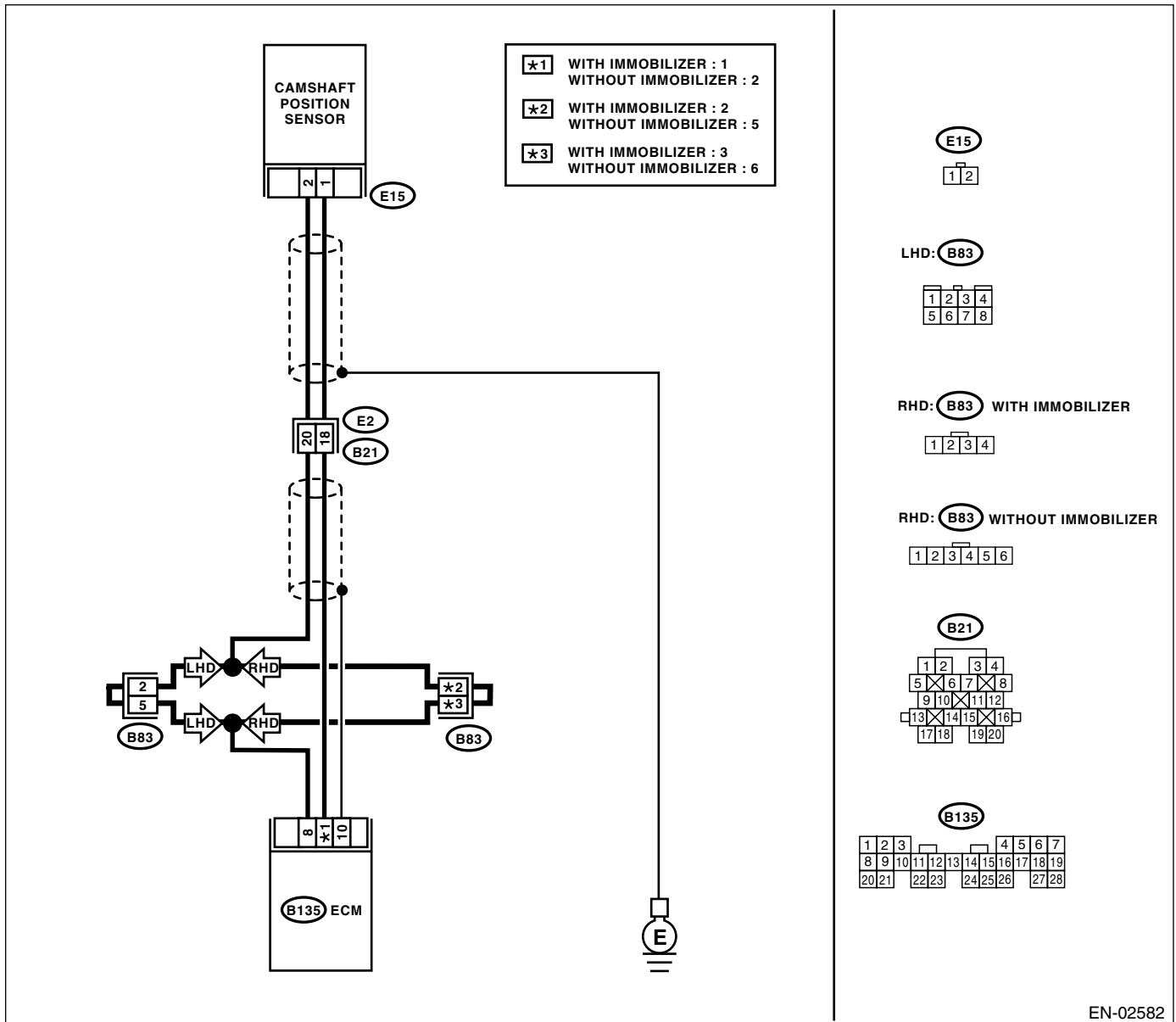
### • TROUBLE SYMPTOM:

- Engine stalls.
- Failure of engine to start

### CAUTION:

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOW/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOW/oOBD)(diag)-26, OPERATION, Inspection Mode.>

### • WIRING DIAGRAM:



Step	Check	Yes	No
1	<b>CHECK CONDITION OF CAMSHAFT POSITION SENSOR INSTALLATION.</b> Are the camshaft position sensor installing bolts tightened securely?	Go to step 2.	Tighten the camshaft position sensor installing bolts securely.



# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>2 CHECK CAMSHAFT POSITION SENSOR.</b> 1)Remove the camshaft position sensor. 2)Measure the resistance between connector terminals of camshaft position sensor. <i>Terminals</i> <i>No. 1 — No. 2:</i>	Is the resistance 1 — 4 kΩ?	Go to step 3.	Replace the camshaft position sensor.
<b>3 CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.</b> 1)Connect the connector to camshaft position sensor. 2)Disconnect the connector from ECM. 3)Measure the resistance of harness between camshaft position sensor connector and ECM. <i>Connector &amp; terminal</i> <i>With Immobilizer</i> <i>(B135) No. 8 — (B135) No. 1:</i> <i>Without Immobilizer</i> <i>(B135) No. 8 — (B135) No. 2:</i>	Is the resistance 1 — 5 kΩ?	Go to step 4.	Repair the harness and connector. NOTE: In this case, repair the following: • Open circuit in harness between camshaft position sensor and ECM connector • Poor contact in coupling connector (B21)
<b>4 CHECK HARNESS BETWEEN ECM AND CAMSHAFT POSITION SENSOR CONNECTOR.</b> Measure the resistance of harness between ECM connector and chassis ground. <i>Connector &amp; terminal</i> <i>(B135) No. 8 — Chassis ground:</i>	Is the resistance less than 5 Ω?	Repair the ground short circuit in harness between camshaft position sensor and ECM connector.	Go to step 5.
<b>5 CHECK INPUT SIGNAL FOR ECM.</b> 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ECM. 3)Set the oscilloscope probe at ECM connector terminal positive (+) and its ground lead at negative (-). 4)Measure the voltage indicated on oscilloscope while cranking engine. <i>Connector &amp; terminal</i> <i>With Immobilizer</i> <i>(B135) No. 1 (+) — (B135) No. 8 (-):</i> <i>Without Immobilizer</i> <i>(B135) No. 2 (+) — (B135) No. 8 (-):</i>	Is the voltage more than 400 mV?	Go to step 6.	Replace the camshaft position sensor.
<b>6 CHECK POOR CONTACT.</b> Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact in ECM connector.	Go to step 7.
<b>7 CHECK ECM.</b> 1)Connect all connectors. 2)Erase the memory. <Ref. to EN(H4SOW/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> 3)Perform the inspection mode. <Ref. to EN(H4SOW/oOBD)(diag)-26, OPERATION, Inspection Mode.> 4)Read any DTC on the display. <Ref. to EN(H4SOW/oOBD)(diag)-24, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is the same DTC as in the current diagnosis still being output?	Replace the generator.	Go to step 8.
<b>8 CHECK ANY OTHER DTCs APPEARANCE.</b>	Is any other DTC displayed?	Proceed with the diagnosis corresponding to the DTC.	A temporary poor contact.

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

## D: DTC 21 ENGINE COOLANT TEMPERATURE SENSOR

### • DIAGNOSIS:

- The engine coolant temperature sensor signal is abnormal.
- The harness connector between ECM and engine coolant temperature sensor is open or shorted.

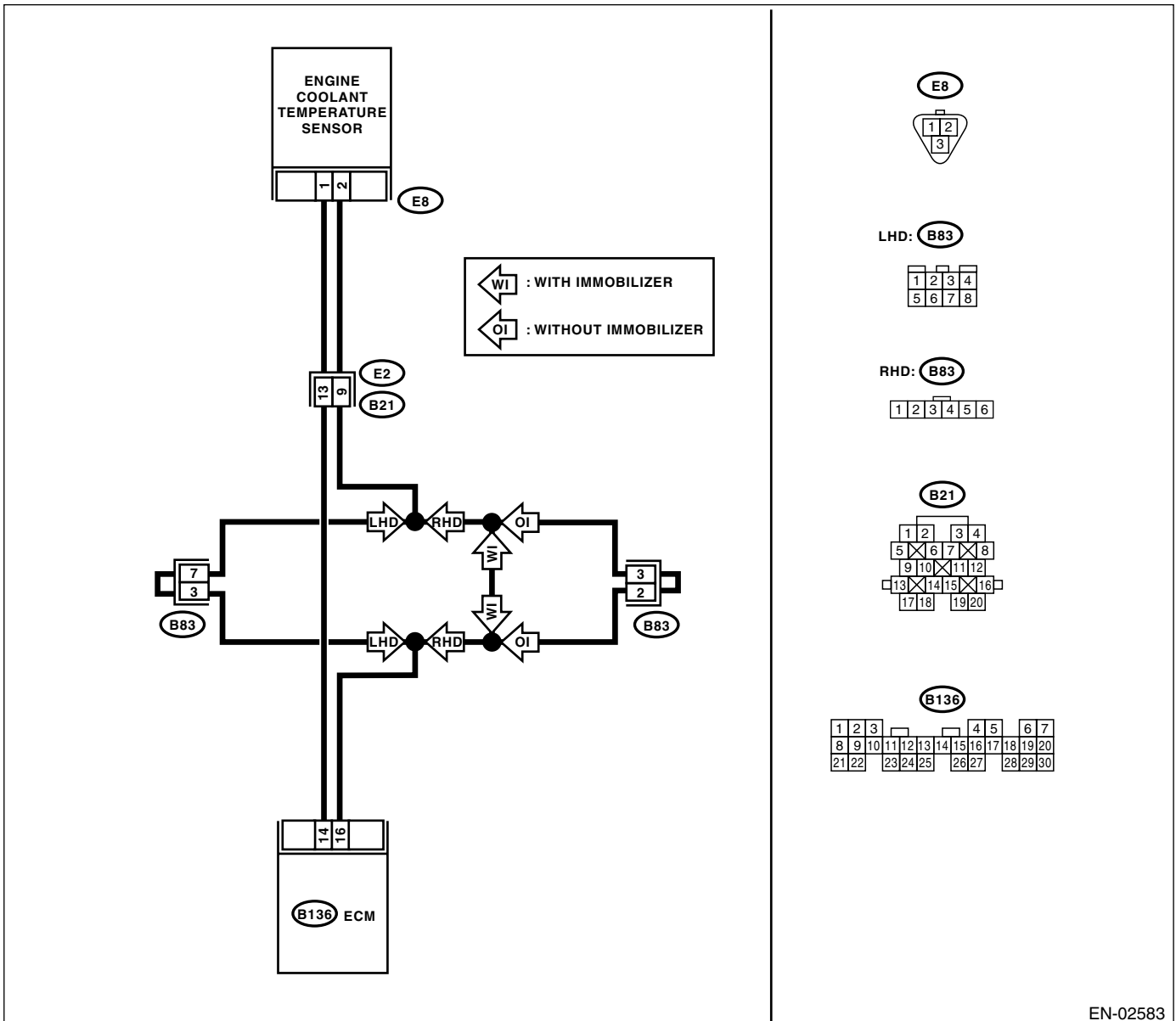
### • TROUBLE SYMPTOM:

- Hard to start
- Erroneous idling
- Poor driving performance

### CAUTION:

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>

### • WIRING DIAGRAM:



EN-02583

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<p><b>1</b></p> <p><b>CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR.</b></p> <p>1) Turn the ignition switch to OFF.                      2) Remove the generator.                      3) Disconnect the connector from engine coolant temperature sensor.                      4) Measure the voltage between engine coolant temperature sensor connector and engine ground.</p> <p><b>Connector &amp; terminal</b>  <b>(E8) No. 1 (+) — Engine ground (-):</b></p>	Is the voltage more than 10 V?	Repair the battery short circuit in harness between ECM and engine coolant temperature sensor connector.	Go to step 2.
<p><b>2</b></p> <p><b>CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR.</b></p> <p>1) Turn the ignition switch to ON.                      2) Measure the voltage between engine coolant temperature sensor connector and engine ground.</p> <p><b>Connector &amp; terminal</b>  <b>(E8) No. 1 (+) — Engine ground (-):</b></p>	Is the voltage more than 10 V?	Repair the battery short circuit in harness between ECM and engine coolant temperature sensor connector.	Go to step 3.
<p><b>3</b></p> <p><b>CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR.</b></p> <p>Measure the voltage between engine coolant temperature sensor connector and engine ground.</p> <p><b>Connector &amp; terminal</b>  <b>(E8) No. 1 (+) — Engine ground (-):</b></p>	Is the voltage more than 4 V?	Go to step 4.	Repair the harness and connector.  NOTE: In this case, repair the following: <ul style="list-style-type: none"> <li>• Open circuit in harness between ECM and engine coolant temperature sensor connector</li> <li>• Poor contact in engine coolant temperature sensor connector</li> <li>• Poor contact in ECM connector</li> <li>• Poor contact in coupling connector (B21)</li> </ul>

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

## ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<p><b>4</b></p> <p><b>CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR.</b></p> <p>1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between engine coolant temperature sensor connector and engine ground.</p> <p><b>Connector &amp; terminal</b> <b>(E8) No. 2 — Engine ground:</b></p>	<p>Is the resistance less than 5 <math>\Omega</math>?</p>	<p>Go to step 5.</p>	<p>Repair the harness and connector.</p> <p><b>NOTE:</b> In this case, repair the following:</p> <ul style="list-style-type: none"> <li>• Open circuit in harness between ECM and engine coolant temperature sensor connector</li> <li>• Poor contact in engine coolant temperature sensor connector</li> <li>• Poor contact in ECM connector</li> <li>• Poor contact in coupling connector (B21)</li> <li>• Poor contact in sensor ground joint connector (B83)</li> </ul>
<p><b>5</b></p> <p><b>CHECK ENGINE COOLANT TEMPERATURE SENSOR.</b></p> <p>Measure the resistance between engine coolant temperature sensor terminals.</p> <p><b>Terminals</b> <b>No. 1 — No. 2:</b></p>	<p>Is the resistance 2 — 3 k<math>\Omega</math> at 20°C (68°F)?</p>	<p>Go to step 6.</p>	<p>Replace the engine coolant temperature sensor.</p>
<p><b>6</b></p> <p><b>CHECK ENGINE COOLANT TEMPERATURE SENSOR.</b></p> <p>Measure the resistance between engine coolant temperature sensor terminals.</p> <p><b>Terminals</b> <b>No. 1 — No. 2:</b></p>	<p>Is the resistance 0.35 — 0.4 k<math>\Omega</math> at 80°C (176°F)?</p>	<p>Go to step 7.</p>	<p>Replace the engine coolant temperature sensor.</p>
<p><b>7</b></p> <p><b>CHECK ENGINE COOLANT TEMPERATURE SENSOR.</b></p> <p>Measure the resistance between engine coolant temperature sensor terminals.</p> <p><b>Terminals</b> <b>No. 1 — No. 2:</b></p>	<p>Is the resistance 0.2 — 0.3 k<math>\Omega</math> at 90°C (194°F)?</p>	<p>Replace the ECM.</p>	<p>Replace the engine coolant temperature sensor.</p>

## E: DTC 22 KNOCK SENSOR

**• DIAGNOSIS:**

- The knock sensor signal is abnormal.
- The harness connector between ECM and knock sensor is open or shorted.

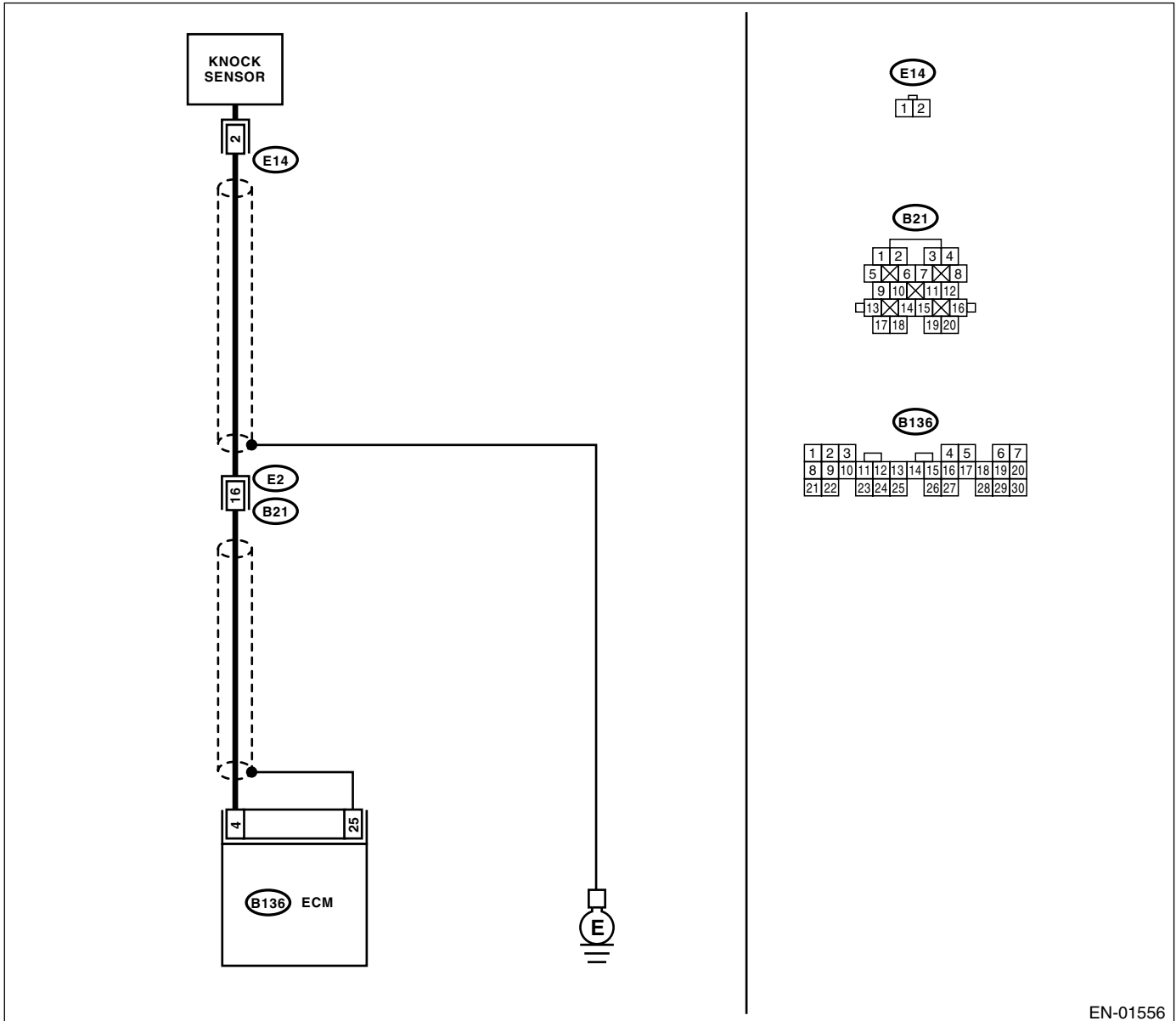
**• TROUBLE SYMPTOM:**

- Poor driving performance

**CAUTION:**

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>

**• WIRING DIAGRAM:**



EN-01556

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

## ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>1 CHECK INPUT SIGNAL FOR ECM.</b> 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. <b>Connector &amp; terminal</b> <b>(B136) No. 4 (+) — Chassis ground (-):</b>	Is the voltage more than 3 V?	Go to step 2.	Go to step 3.
<b>2 CHECK POOR CONTACT.</b> 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(H4SOw/oOBD)-43, Engine Control Module (ECM).>
<b>3 CHECK KNOCK SENSOR.</b> 1) Disconnect the connector from knock sensor. 2) Measure the resistance between knock sensor connector terminal and engine ground. <b>Terminals</b> <b>No. 2 — Engine ground:</b>	Is the resistance 530 k $\Omega$ — 590 k $\Omega$ ?	Go to step 4.	Repair the harness and connector.  NOTE: In this case, repair the following: <ul style="list-style-type: none"> <li>• Open circuit in harness between knock sensor and ECM connector</li> <li>• Poor contact in knock sensor connector</li> <li>• Poor contact in coupling connector (B21)</li> </ul>
<b>4 CHECK HARNESS CONNECTOR BETWEEN ECM AND KNOCK SENSOR.</b> Measure the resistance of harness connector between ECM and knock sensor. <b>Connector &amp; terminal</b> <b>(E14) No. 2 — Chassis ground:</b>	Is the resistance less than 1 $\Omega$ ?	Go to step 5.	Replace the knock sensor. <Ref. to FU(H4SOw/oOBD)-31, Knock Sensor.>
<b>5 CHECK HARNESS CONNECTOR BETWEEN ECM AND KNOCK SENSOR.</b> Measure the resistance of harness of harness connector between ECM connector and knock sensor. <b>Connector &amp; terminal</b> <b>(B136) No. 4 — Chassis ground:</b>	Is the resistance more than 1 M $\Omega$ ?	Go to step 6.	Repair the ground short circuit between ECM and knock sensor.
<b>6 CHECK POOR CONTACT.</b> 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(H4SOw/oOBD)-43, Engine Control Module (ECM).>

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

## F: DTC 24 IDLE AIR CONTROL SOLENOID VALVE

### • DIAGNOSIS:

- The idle air control solenoid valve is not in function.
- The harness connector between ECM and idle air control solenoid valve is open or shorted.

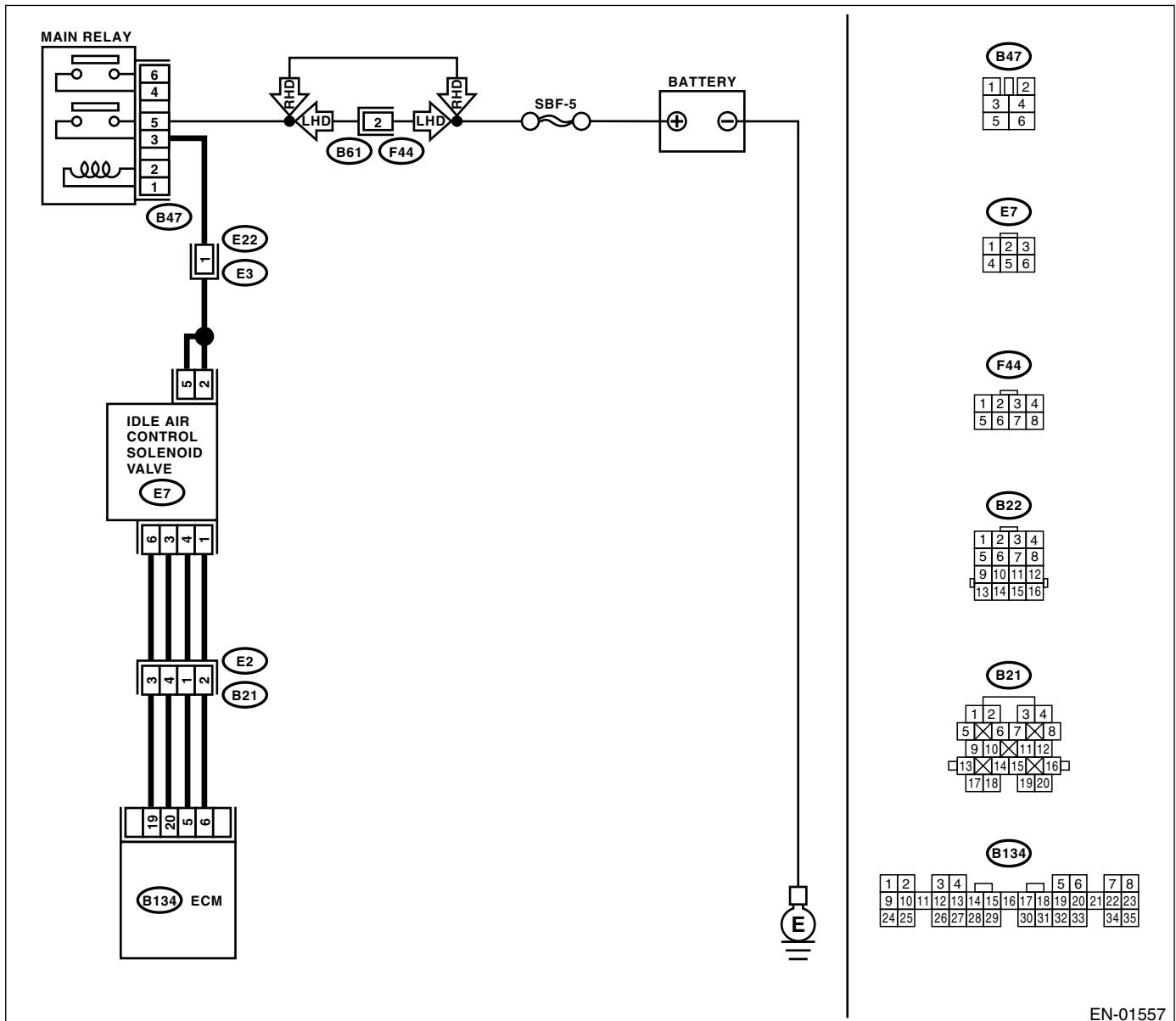
### • TROUBLE SYMPTOM:

- Erroneous idling
- Hard to start
- Poor driving performance

### CAUTION:

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4S0w/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4S0w/oOBD)(diag)-26, OPERATION, Inspection Mode.>

### • WIRING DIAGRAM:



EN-01557

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

## ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>1 CHECK POWER SUPPLY TO IDLE AIR CONTROL SOLENOID VALVE.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connector from idle air control solenoid valve. 3) Turn the ignition switch to ON. 4) Measure the voltage between idle air control solenoid valve connector and engine ground. <b>Connector &amp; terminal</b> (E7) No. 2 (+) — Engine ground (-): (E7) No. 5 (+) — Engine ground (-):	Is the voltage more than 10 V?	Go to step 2.	Repair the harness and connector.  NOTE: In this case, repair the following: <ul style="list-style-type: none"> <li>• Open circuit in harness between idle air control solenoid valve and main relay connector</li> <li>• Poor contact in coupling connector (B22)</li> </ul>
<b>2 CHECK HARNESS BETWEEN ECM AND IDLE AIR CONTROL SOLENOID VALVE CONNECTOR.</b> 1) Turn the ignition switch to OFF. 2) Measure the resistance between ECM and idle air control solenoid valve connector. <b>Connector &amp; terminal</b> #1 (B134) No. 20 — (E7) No. 3: #2 (B134) No. 6 — (E7) No. 1: #3 (B134) No. 19 — (E7) No. 6: #4 (B134) No. 5 — (E7) No. 4:	Is the resistance less than 1 Ω?	Go to step 3.	Repair the harness and connector.  NOTE: In this case, repair the following: <ul style="list-style-type: none"> <li>• Open circuit in harness between ECM and idle air control solenoid valve connector</li> <li>• Poor contact in coupling connector (B21)</li> </ul>
<b>3 CHECK HARNESS BETWEEN ECM AND IDLE AIR CONTROL SOLENOID VALVE CONNECTOR.</b> 1) Disconnect the connector from ECM. 2) Measure the resistance between ECM connector and chassis ground. <b>Connector &amp; terminal</b> #1 (B134) No. 20 — Chassis ground: #2 (B134) No. 6 — Chassis ground: #3 (B134) No. 19 — Chassis ground: #4 (B134) No. 5 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 4.	Repair the ground short circuit in harness between ECM and idle air control solenoid valve connector.
<b>4 CHECK POOR CONTACT.</b> Check poor contact in ECM connector and idle air control solenoid valve connector.	Is there poor contact in ECM connector or idle air control solenoid valve connector?	Repair the poor contact in ECM connector or idle air control solenoid valve connector.	Go to step 5.
<b>5 CHECK IDLE SPEED.</b>	Is the idling speed higher than standard?	Go to step 6.	Go to step 8.
<b>6 CHECK AIR INTAKE SYSTEM.</b> 1) Turn the ignition switch to ON. 2) Start the engine, and idle it. 3) Check the following items. <ul style="list-style-type: none"> <li>• Loose installation of intake manifold, idle air control solenoid valve and throttle body</li> <li>• Cracks of intake manifold gasket, idle air control solenoid valve gasket and throttle body gasket</li> <li>• Disconnections of vacuum hoses</li> </ul>	Is there a fault in the air intake system?	Repair the air suction and leaks.	Go to step 7.



# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>7</b> <b>CHECK AIR BY-PASS LINE.</b> 1) Turn the ignition switch to OFF. 2) Remove the idle air control solenoid valve from throttle body. <Ref. to FU(H4SOW/oOBD)-35, Idle Air Control Solenoid Valve.> 3) Confirm that there are no foreign particles in the by-pass air line.	Are foreign particles in the by-pass air line?	Remove the foreign particles from by-pass air line.	Replace the idle air control solenoid valve. <Ref. to FU(H4SOW/oOBD)-35, Idle Air Control Solenoid Valve.>
<b>8</b> <b>CHECK AIR BY-PASS LINE.</b> 1) Turn the ignition switch to OFF. 2) Remove the idle air control solenoid valve from throttle body. <Ref. to FU(H4SOW/oOBD)-35, Idle Air Control Solenoid Valve.> 3) Remove the throttle body from intake manifold. <Ref. to FU(H4SOW/oOBD)-15, Throttle Body.> 4) Confirm that there are no foreign particles in the throttle body. 5) Using an air gun, force air into the idle air control solenoid valve installation area. Confirm that forced air subsequently escapes from the throttle body interior.	Does air flow out?	Replace the idle air control solenoid valve. <Ref. to FU(H4SOW/oOBD)-35, Idle Air Control Solenoid Valve.>	Replace the throttle body. <Ref. to FU(H4SOW/oOBD)-15, Throttle Body.>

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

## G: DTC 26 INTAKE AIR TEMPERATURE SENSOR

### • DIAGNOSIS:

- The intake air temperature sensor signal is abnormal.
- The harness connector between ECM and intake air temperature sensor is open or shorted.

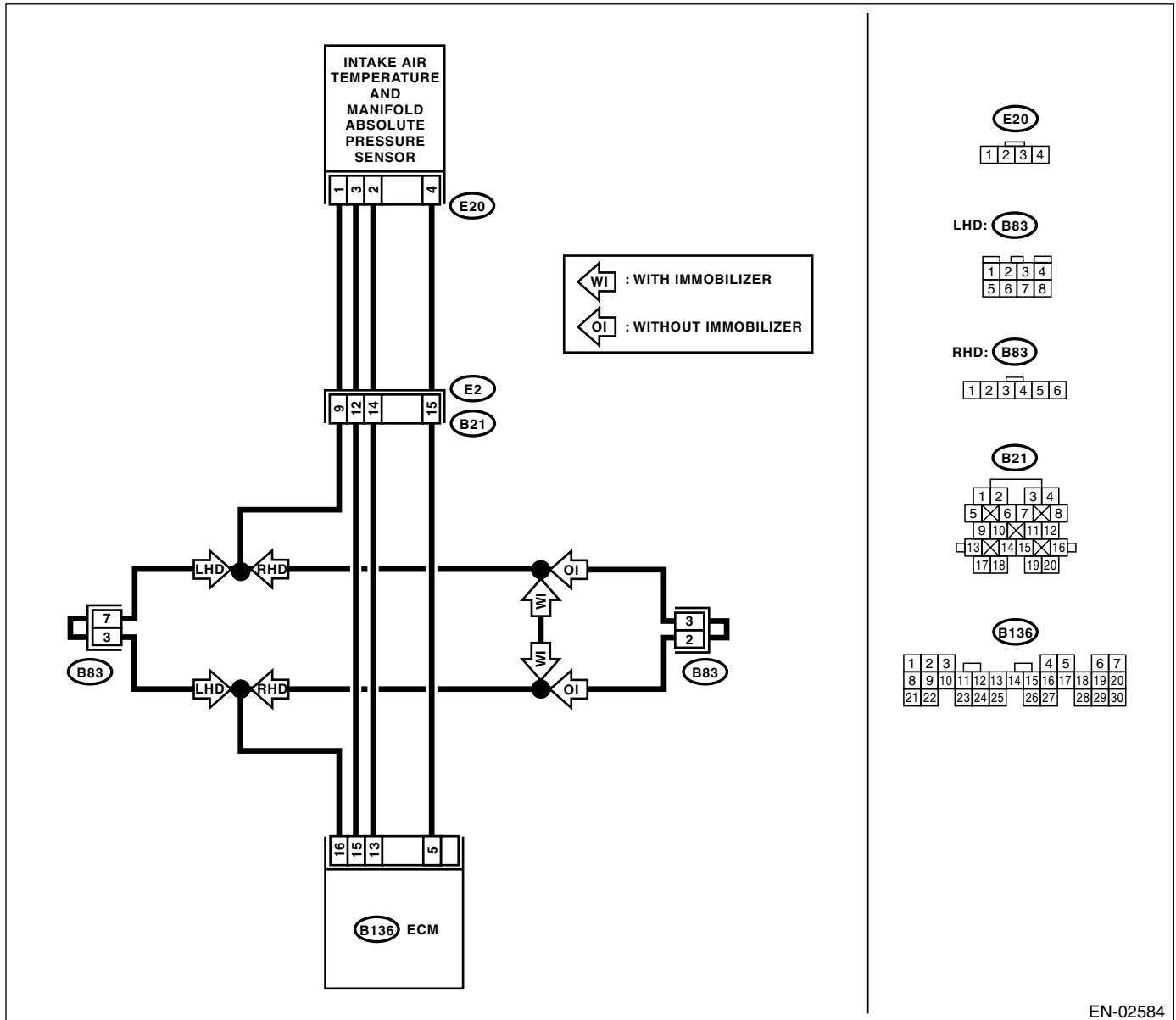
### • TROUBLE SYMPTOM:

- Hard to start
- Erroneous idling
- Poor driving performance

### CAUTION:

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOW/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOW/oOBD)(diag)-26, OPERATION, Inspection Mode.>

### • WIRING DIAGRAM:



EN-02584

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<p><b>1</b></p> <p><b>CHECK INTAKE AIR TEMPERATURE SENSOR.</b>                      1) Turn the ignition switch to OFF.                      2) Disconnect the connector from intake air temperature sensor.                      3) Measure the resistance between intake air temperature sensor terminals.</p> <p><b>Terminals</b>  <b>No. 2 — No. 3:</b></p>	<p>Is the resistance 2 — 3 k<math>\Omega</math> at 20°C (68°F)?</p>	Go to step 2.	Replace the intake air temperature sensor. <Ref. to FU(H4SOW/oOBD)-34, Intake Air Temperature and Manifold Absolute Pressure Sensor.>
<p><b>2</b></p> <p><b>CHECK INTAKE AIR TEMPERATURE SENSOR.</b>                      Measure the resistance between intake air temperature sensor terminals.</p> <p><b>Terminals</b>  <b>No. 2 — No. 3:</b></p>	<p>Is the resistance 0.66 — 1 k<math>\Omega</math> at 50°C (122°F)?</p>	Go to step 3.	Replace the intake air temperature sensor. <Ref. to FU(H4SOW/oOBD)-34, Intake Air Temperature and Manifold Absolute Pressure Sensor.>
<p><b>3</b></p> <p><b>CHECK HARNESS BETWEEN ECM AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.</b>                      1) Disconnect the connector from ECM.                      2) Measure the resistance of harness connector between ECM and intake air temperature sensor connector.</p> <p><b>Connector &amp; terminal</b>  <b>(B136) No. 15 — (E20) No. 3:</b></p>	<p>Is the resistance less than 1 <math>\Omega</math>?</p>	Go to step 4.	<p>Repair the harness and connector.</p> <p><b>NOTE:</b>                      In this case, repair the following:</p> <ul style="list-style-type: none"> <li>• Open circuit in harness between ECM and intake air temperature and manifold absolute pressure sensor connector</li> <li>• Poor contact in coupling connector (B21)</li> </ul>
<p><b>4</b></p> <p><b>CHECK HARNESS BETWEEN ECM AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.</b>                      Measure the resistance of harness connector between ECM and intake air temperature sensor connector.</p> <p><b>Connector &amp; terminal</b>  <b>(B136) No. 13 — (E20) No. 2:</b></p>	<p>Is the resistance less than 1 <math>\Omega</math>?</p>	Go to step 5.	Repair the harness and connector.
<p><b>5</b></p> <p><b>CHECK HARNESS BETWEEN ECM AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.</b>                      Measure the resistance of harness between ECM connector and chassis ground.</p> <p><b>Connector &amp; terminal</b>  <b>(B136) No. 15 — Chassis ground:</b></p>	<p>Is the resistance more than 1 M<math>\Omega</math>?</p>	Go to step 6.	Repair the ground short circuit in harness between ECM and idle air control solenoid valve connector.
<p><b>6</b></p> <p><b>CHECK HARNESS BETWEEN ECM AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.</b>                      Measure the resistance of harness between ECM connector and chassis ground.</p> <p><b>Connector &amp; terminal</b>  <b>(B136) No. 13 — Chassis ground:</b></p>	<p>Is the resistance more than 1 M<math>\Omega</math>?</p>	Go to step 7.	Repair the ground short circuit in harness between ECM and idle air control solenoid valve connector.

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
7 <b>CHECK POOR CONTACT.</b> Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact in ECM connector.	Contact with your SUBARU distributor service. <b>NOTE:</b> Inspection by your SUBARU distributor service is required, because probable cause is deterioration of multiple parts.

## H: DTC 31 THROTTLE POSITION SENSOR

**• DIAGNOSIS:**

- The throttle position sensor signal is abnormal.
- The throttle position sensor is installed abnormally.
- The harness connector between ECM and throttle position sensor is open or shorted.

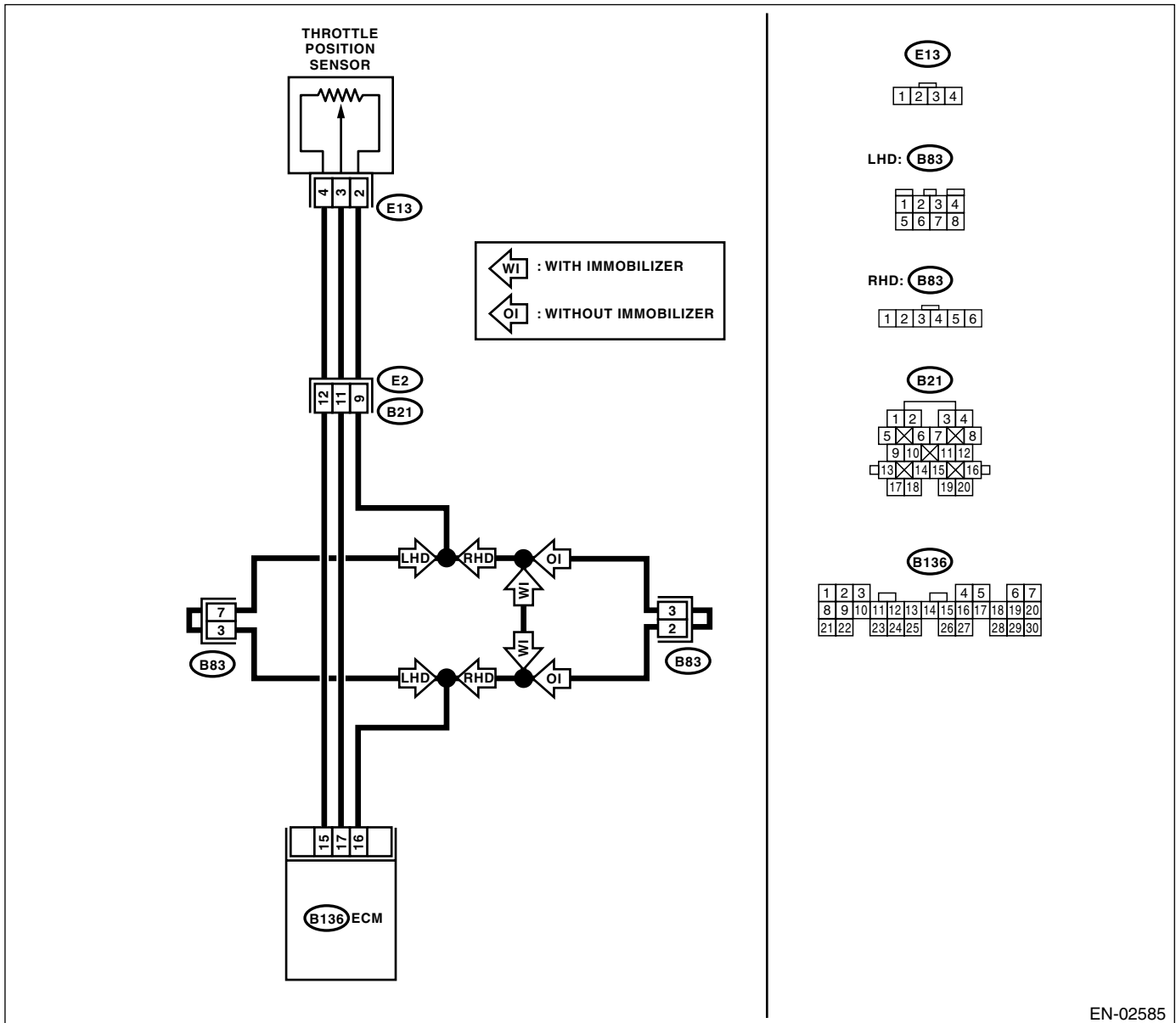
**• TROUBLE SYMPTOM:**

- Erroneous idling
- Engine stalls
- Poor driving performance

**CAUTION:**

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>

**• WIRING DIAGRAM:**



## Diagnostic Procedure with Diagnostic Trouble Code (DTC)

### ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>1 CHECK HARNESS BETWEEN ECM AND THROTTLE POSITION SENSOR.</b> 1) Disconnect the connector from ECM and throttle position sensor. 2) Measure the resistance between ECM and throttle position sensor. <i>Connector &amp; terminal</i> <i>(B136) No. 16 — (E13) No. 2:</i> <i>(B136) No. 17 — (E13) No. 3:</i> <i>(B136) No. 15 — (E13) No. 4:</i>	Is the resistance less than 1 $\Omega$ ?	Go to step 2.	Repair the open circuit between ECM and throttle position sensor.
<b>2 CHECK HARNESS BETWEEN ECM AND THROTTLE POSITION SENSOR CONNECTOR.</b> 1) Disconnect the connector from TCM. (AT model) 2) Measure the resistance between ECM and chassis ground. <i>Connector &amp; terminal</i> <i>(B136) No. 16 — Chassis ground:</i> <i>(B136) No. 17 — Chassis ground:</i> <i>(B136) No. 15 — Chassis ground:</i>	Is the resistance more than 1 M $\Omega$ ?	Go to step 3.	Repair the ground short circuit between ECM and chassis ground.
<b>3 CHECK INPUT SIGNAL FOR ECM.</b> 1) Connect the connector to ECM and throttle position sensor. 2) Ignition the switch to ON. 3) Measure the voltage between ECM terminals while throttle valve is fully closed. <i>Connector &amp; terminal</i> <i>(B136) No. 15 (+) — No. 17 (-):</i>	Is the voltage less than 0.1 V?	Go to step 5.	Go to step 4.
<b>4 CHECK INPUT SIGNAL FOR ECM.</b> Measure the voltage between ECM terminals while throttle valve is fully opened. <i>Connector &amp; terminal</i> <i>(B136) No. 15 (+) — No. 17 (-):</i>	Is the voltage more than 4.5 V?	Go to step 5.	Go to step 6.
<b>5 CHECK POOR CONTACT.</b> Check poor contact in throttle position sensor connector.	Is there poor contact in throttle position sensor connector?	Repair the poor contact in throttle position sensor connector.	Replace the throttle position sensor.
<b>6 CHECK CONDITION OF THROTTLE POSITION SENSOR INSTALLATION.</b>	Are the throttle position sensor installing screw tightened securely?	Replace the throttle position sensor.	Adjust the throttle position sensor and tighten throttle position sensor installing screws securely.

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

## I: DTC 32 OXYGEN SENSOR

### • DIAGNOSIS:

- The oxygen sensor is not in function.
- The harness connector between ECM and oxygen sensor is open or shorted.

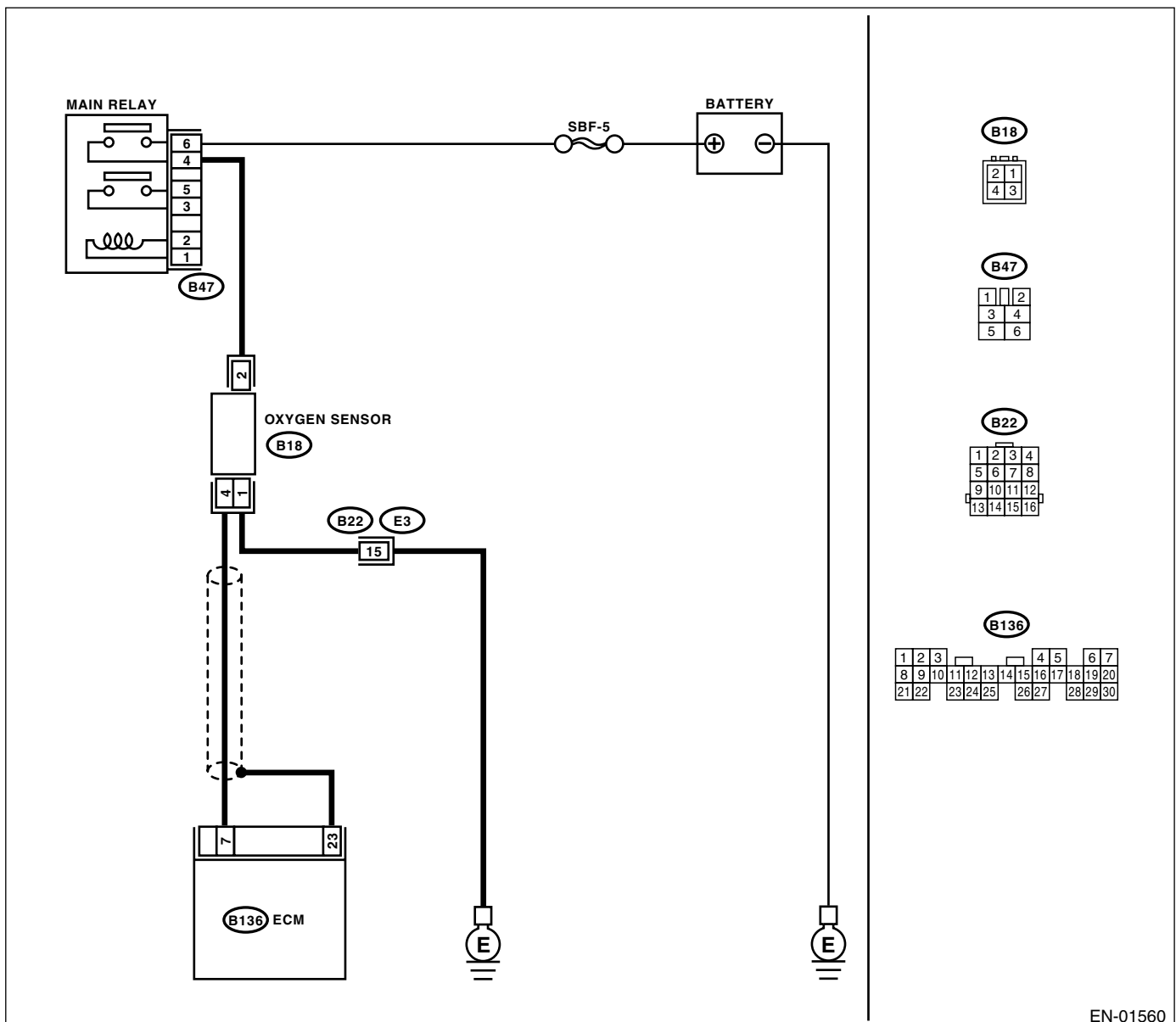
### • TROUBLE SYMPTOM:

- Failure of engine to start
- Erroneous idling
- Poor driving performance
- Engine stalls.
- Idle mixture is out of specifications.

### CAUTION:

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>

### • WIRING DIAGRAM:



EN-01560

## Diagnostic Procedure with Diagnostic Trouble Code (DTC)

### ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>1 CHECK FOR OTHER CAUSES AFFECTING EXHAUST GAS.</b> NOTE: •Check for use of improper fuel. •Check if engine oil or coolant level is extremely low.	Is CO % more than 2% after the engine warm up?	Check the fuel system.	Go to step 2.
<b>2 CHECK EXHAUST SYSTEM.</b>	Is there a fault in the exhaust system?	Repair the exhaust system. NOTE: • Loose installation of front portion of exhaust pipe onto cylinder heads • Loose connection between front exhaust pipe and front catalytic converter • Damage of exhaust pipe resulting in hole	Go to step 3.
<b>3 CHECK INPUT VOLTAGE FOR OXYGEN SENSOR.</b> 1)Disconnect the connector from oxygen sensor connector. 2)Measure the voltage between main relay and oxygen sensor. <i>Connector &amp; terminal</i> <i>(B18) No. 2 (+) — Chassis ground (-):</i>	Is the voltage more than 10 V?	Go to step 4.	Repair the open circuit between main relay and oxygen sensor.
<b>4 CHECK HARNESS CONNECTOR BETWEEN OXYGEN SENSOR AND ENGINE GROUND CABLE.</b> Measure the resistance between oxygen sensor and chassis ground. <i>Connector &amp; terminal</i> <i>(B18) No. 1 — Chassis ground:</i>	Is the resistance less than 1 $\Omega$ ?	Go to step 5.	Repair the open circuit between oxygen sensor and chassis ground.
<b>5 CHECK OXYGEN SENSOR.</b> Measure the resistance between oxygen sensor terminals. <i>Connector &amp; terminal</i> <i>No. 1 — No. 2:</i>	Is the resistance less than 30 $\Omega$ ?	Repair poor contact.	Go to step 6.
<b>6 CHECK HARNESS BETWEEN ECM AND OXYGEN SENSOR.</b> 1)Disconnect the connector from ECM. 2)Measure the resistance between ECM and chassis ground. <i>Connector &amp; terminal</i> <i>(B136) No. 7 — Chassis ground:</i>	Is the resistance more than 1 M $\Omega$ ?	Go to step 7.	Repair the ground short circuit between ECM and chassis ground.
<b>7 CHECK HARNESS BETWEEN ECM AND OXYGEN SENSOR.</b> 1)Turn the ignition switch to ON. 2)Measure the voltage between ECM and chassis ground. <i>Connector &amp; terminal</i> <i>(B136) No. 7 (+) — Chassis ground (-):</i>	Is the voltage more than 0.2 V?	Repair the battery short circuit between ECM and oxygen sensor.	Go to step 8.



# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>8</b> <b>CHECK INPUT VOLTAGE FOR ECM.</b> 1) Turn the ignition switch to OFF. 2) Connect the connector to ECM and oxygen sensor. 3) Set the oscilloscope probe at ECM connector terminal positive (+) and its ground lead at negative (-). 4) Start the engine.	Do 0.1 and 1 V waveform patterns alternately appear on the oscilloscope screen?	Go to step <b>9</b> .	Replace the oxygen sensor.
<b>9</b> <b>CHECK POOR CONTACT.</b> Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Replace the oxygen sensor connector.	Replace the ECM. <Ref. to FU(H4SOW/oOBD)-43, Engine Control Module (ECM).>

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

## J: DTC 33 VEHICLE SPEED SIGNAL

### • DIAGNOSIS:

- The vehicle speed signal is abnormal.
- The harness connector between ECM and vehicle speed sensor is open or shorted.

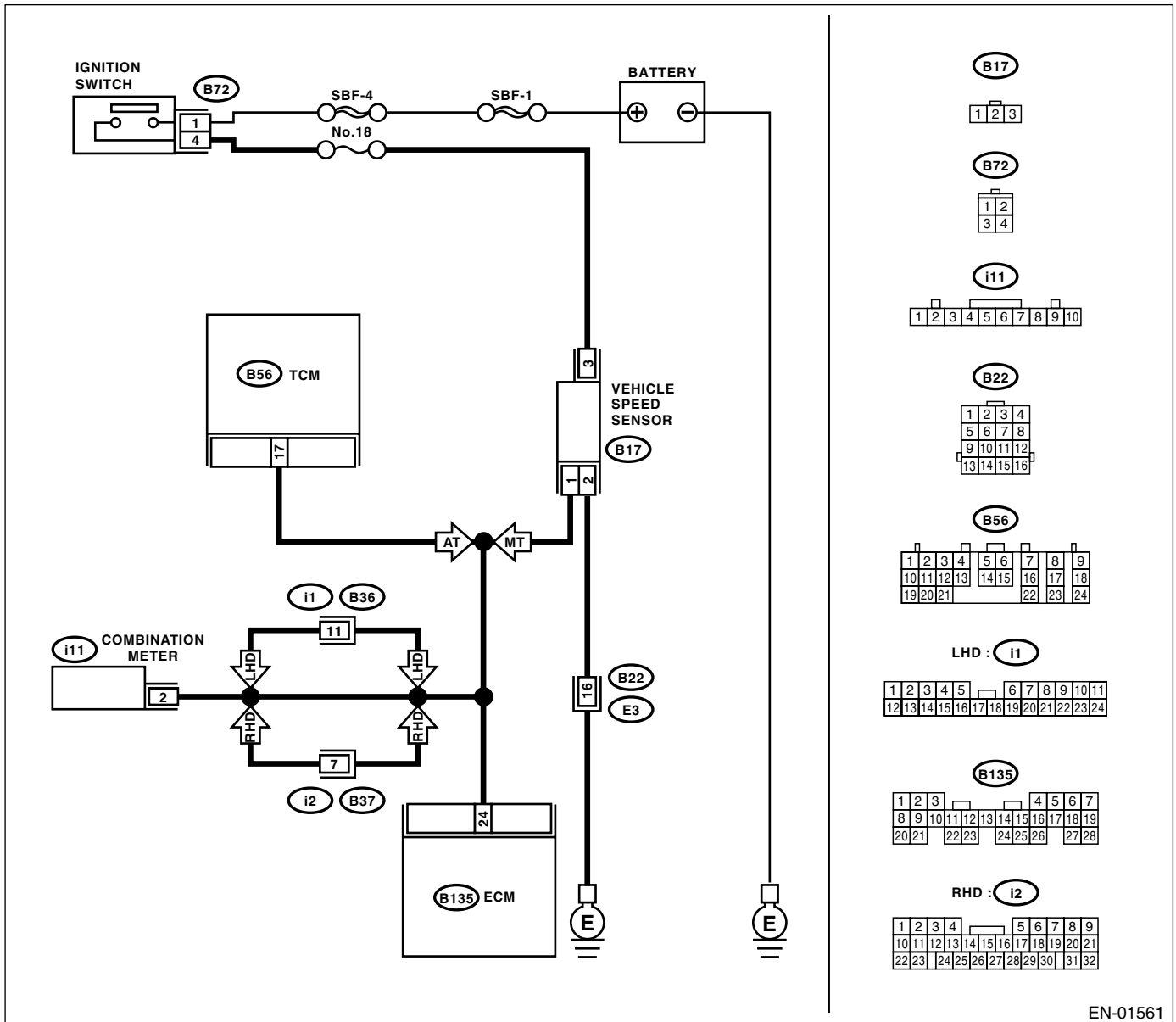
### • TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

### CAUTION:

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOW/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOW/oOBD)(diag)-26, OPERATION, Inspection Mode.>

### • WIRING DIAGRAM:



EN-01561

Step	Check	Yes	No	
1	<b>CHECK SPEEDOMETER OPERATION IN COMBINATION METER.</b>	Does the speedometer operate normally?	Go to step 2.	Check the speedometer and vehicle speed sensor.

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>2</b> <b>CHECK INPUT SIGNAL FOR ECM.</b> 1)Lift-up the vehicle. 2)Set the oscilloscope probe at ECM connector terminal positive (+) and its ground lead at negative (-). <i>Connector &amp; terminal</i> <i>(B135) No. 24 (+) — Chassis ground (-):</i> 3)Start the engine. 4)Shift on the gear position, and put the vehicle at constant speed. 5)Measure the signal voltage indicated on oscilloscope.	Is the voltage more than 3 V?	Go to step 3.	Go to step 4.
<b>3</b> <b>CHECK POOR CONTACT.</b> Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact in ECM.	Replace the ECM. <Ref. to FU(H4SOw/oOBD)-43, Engine Control Module (ECM).>
<b>4</b> <b>CHECK HARNESS BETWEEN ECM AND COMBINATION METER CONNECTOR.</b> Measure the voltage between ECM and chassis ground. <i>Connector &amp; terminal</i> <i>(B135) No. 24 (+) — Chassis ground (-):</i>	Is the voltage more than 2 V?	Repair the harness and connector.  NOTE: In this case, repair the following: Battery short circuit in harness between ECM and combination meter connector	Go to step 5.
<b>5</b> <b>CHECK HARNESS BETWEEN ECM AND COMBINATION METER CONNECTOR.</b> 1)Turn the ignition switch to OFF. 2)Measure the resistance of harness between ECM connector and chassis ground. <i>Connector &amp; terminal</i> <i>(B135) No. 24 — Chassis ground:</i>	Is the resistance less than 10 $\Omega$ ?	Repair the ground short circuit in harness between ECM and combination meter connector.	Go to step 6.
<b>6</b> <b>CHECK POOR CONTACT.</b> Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact in ECM.	Replace the ECM. <Ref. to FU(H4SOw/oOBD)-43, Engine Control Module (ECM).>

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

## K: DTC 35 PURGE CONTROL SOLENOID VALVE

**DIAGNOSIS:**

- The purge control solenoid valve is not in function.
- The harness connector between ECM and purge control solenoid valve is open or shorted.

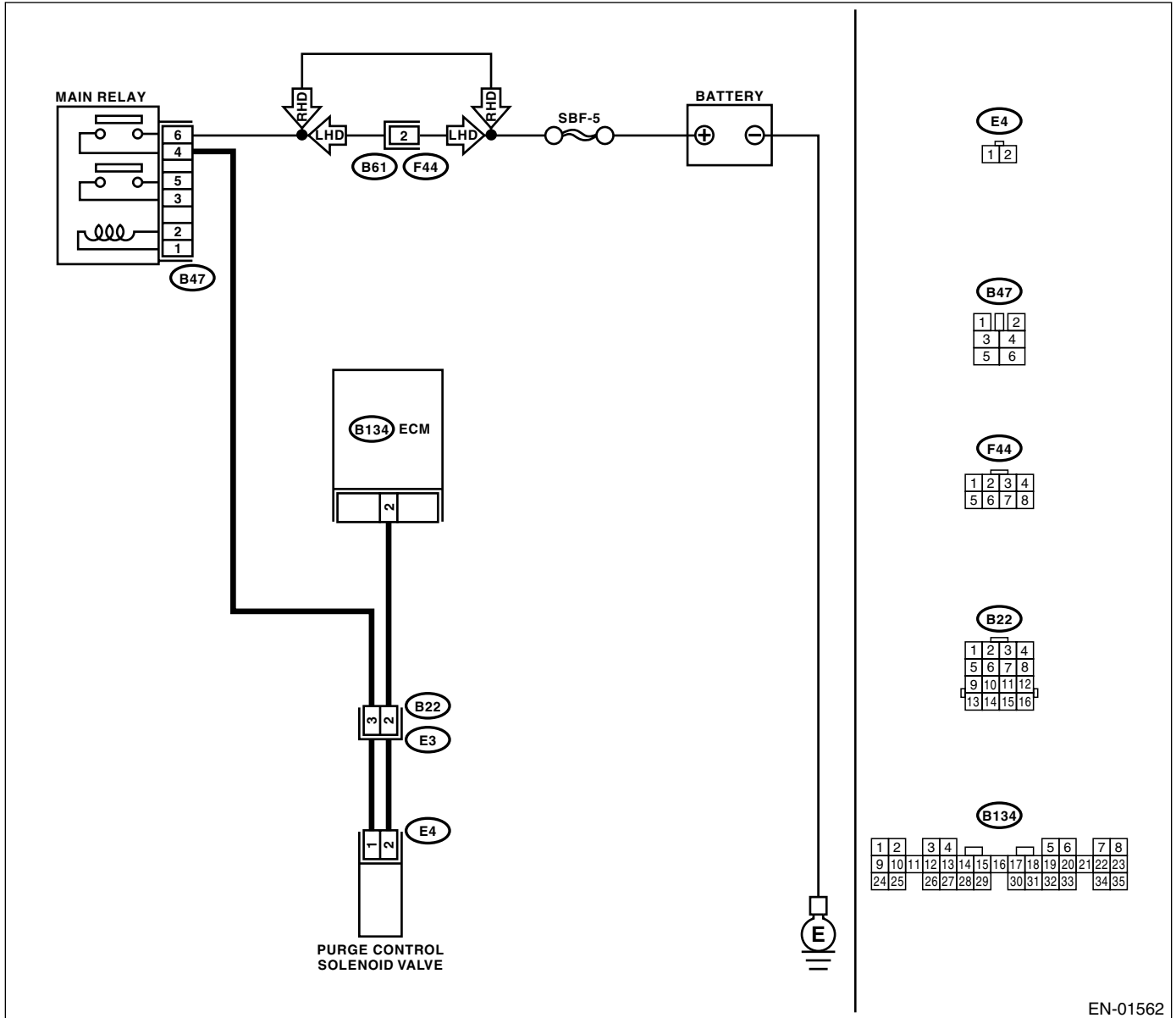
**TROUBLE SYMPTOM:**

- Erroneous idling

**CAUTION:**

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>

**WIRING DIAGRAM:**



EN-01562

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>1 CHECK OPERATION SOUND OF PURGE CONTROL SOLENOID VALVE.</b> 1)Turn the ignition switch to OFF. 2)Connect the test mode connector at lower portion of instrument panel (on driver's side). 3)Turn the ignition switch to ON. 4)Make sure that the ON/OFF operating sound of purge control solenoid valve occurs at about 10 Hz.	Does the purge control solenoid valve produce operating sound?	Go to step 2.	Go to step 3.
<b>2 CHECK POOR CONTACT.</b> Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact in ECM.	Replace the ECM. <Ref. to FU(H4SOw/oOBD)-43, Engine Control Module (ECM).>
<b>3 CHECK HARNESS BETWEEN PURGE CONTROL SOLENOID VALVE AND ECM CONNECTOR.</b> 1)Turn the ignition switch to OFF. 2)Disconnect the test mode connector. 3)Disconnect the connector from purge control solenoid valve. 4)Turn the ignition switch to ON. 5)Measure the voltage between ECM and chassis ground. <i>Connector &amp; terminal</i> <i>(B134) No. 2 (+) — Chassis ground (-):</i>	Is the voltage more than 10 V?	Repair the battery short circuit in harness between ECM and purge control solenoid valve connector. After repair, replace the ECM.	Go to step 4.
<b>4 CHECK HARNESS BETWEEN PURGE CONTROL SOLENOID VALVE AND ECM CONNECTOR.</b> 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ECM. 3)Measure the resistance of harness between ECM and purge control solenoid valve of harness connector. <i>Connector &amp; terminal</i> <i>(B134) No. 2 — (E4) No. 2:</i>	Is the resistance less than 1 $\Omega$ ?	Go to step 5.	Repair the open circuit in harness between ECM and purge control solenoid valve connector.
<b>5 CHECK PURGE CONTROL SOLENOID VALVE.</b> 1)Remove the purge control solenoid valve. 2)Measure the resistance between purge control solenoid valve terminals. <i>Terminals</i> <i>No. 1 — No. 2:</i>	Is the resistance 23 — 27 $\Omega$ ?	Go to step 6.	Replace the purge control solenoid valve. <Ref. to EC(H4SOw/oOBD)-6, Purge Control Solenoid Valve.>

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

## ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<p><b>6</b></p> <p><b>CHECK POWER SUPPLY TO PURGE CONTROL SOLENOID VALVE.</b></p> <p>1)Connect the connector to engine control module (ECM).                      2)Turn the ignition switch to ON.                      3)Measure the voltage between purge control solenoid valve and engine ground.</p> <p><b>Connector &amp; terminal</b>  <b>(E4) No. 1 (+) — Engine ground (-):</b></p>	<p>Is the voltage more than 10 V?</p>	<p>Go to step 7.</p>	<p>Repair the harness and connector.</p> <p><b>NOTE:</b>                      In this case, repair the following:</p> <ul style="list-style-type: none"> <li>• Open circuit in harness between main relay and purge control solenoid valve connector</li> <li>• Poor contact in main relay connector</li> <li>• Poor contact in coupling connector (B22)</li> </ul>
<p><b>7</b></p> <p><b>CHECK POOR CONTACT.</b></p> <p>Check poor contact in purge control solenoid valve connector.</p>	<p>Is there poor contact in purge control solenoid valve connector?</p>	<p>Repair the poor contact in purge control solenoid valve connector.</p>	<p>Contact with your SUBARU distributor service.</p> <p><b>NOTE:</b>                      Inspection by your SUBARU distributor service is required, because probable cause is deterioration of multiple parts.</p>

## L: DTC 38 TORQUE CONTROL SIGNAL

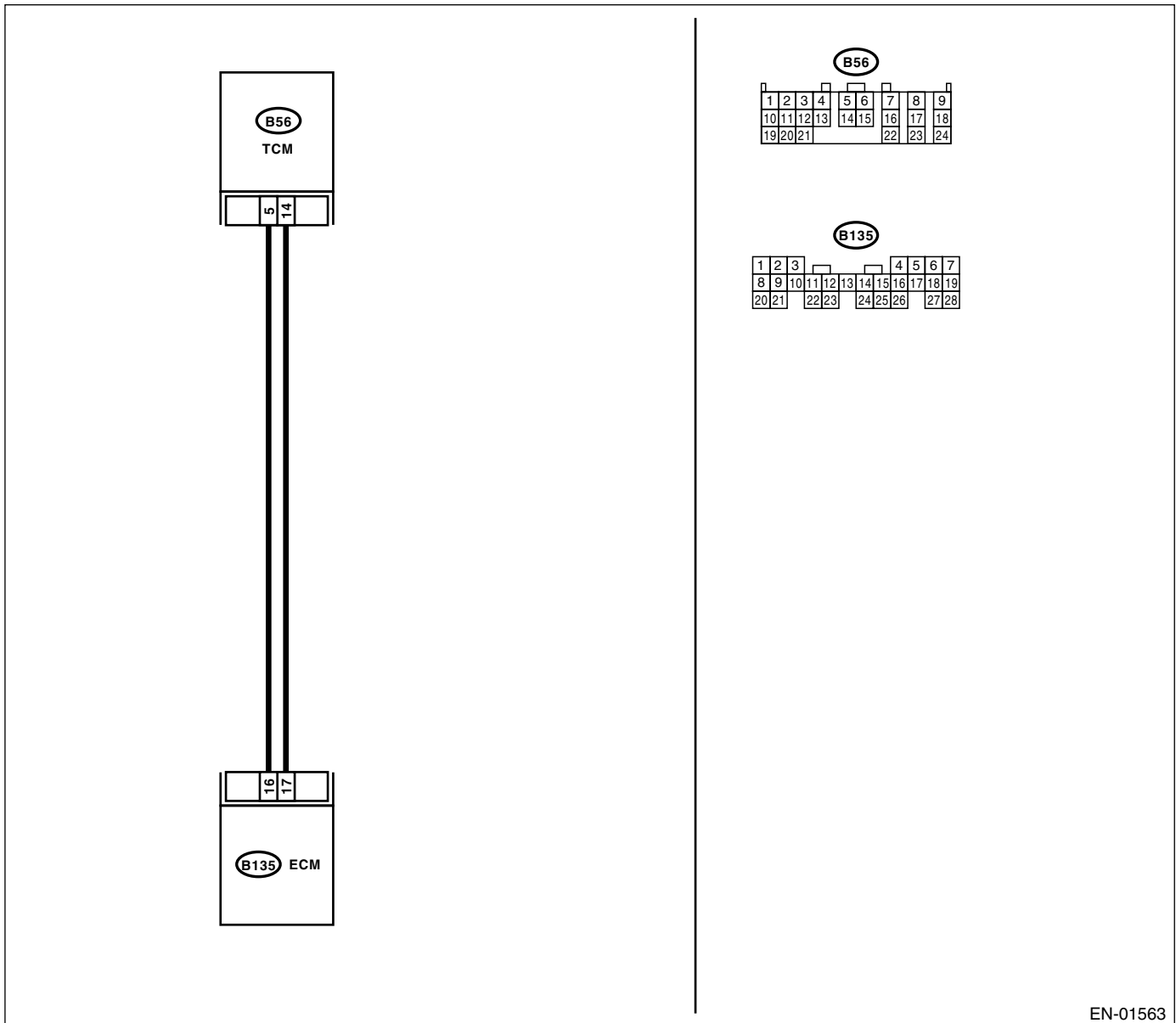
**• DIAGNOSIS:**

- Abnormal signal entered from TCM
- The harness connector between ECM and TCM is shorted.

**CAUTION:**

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>

**• WIRING DIAGRAM:**



EN-01563

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

Step	Check	Yes	No	
<b>1</b>	<b>CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.</b> 1)Disconnect the connectors from ECM and TCM. 2)Measure the resistance of harness between ECM and chassis ground. <b>Connector &amp; terminal</b> <b>(B135) No. 17 — Chassis ground:</b>	Is the resistance less than 10 $\Omega$ ?	Repair the ground short circuit in harness between ECM and TCM connector.	Go to step 2.
<b>2</b>	<b>CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.</b> Measure the resistance of harness between ECM and chassis ground. <b>Connector &amp; terminal</b> <b>(B135) No. 16 — Chassis ground:</b>	Is the resistance less than 10 $\Omega$ ?	Repair the ground short circuit in harness between ECM and TCM connector.	Replace the TCM. <Ref. to 4AT-74, Transmission Control Module (TCM).>



## M: DTC 45 PRESSURE SENSOR

**• DIAGNOSIS:**

- The manifold absolute pressure sensor signal is abnormal.
- The harness connector between ECM and manifold absolute pressure sensor is open or shorted.

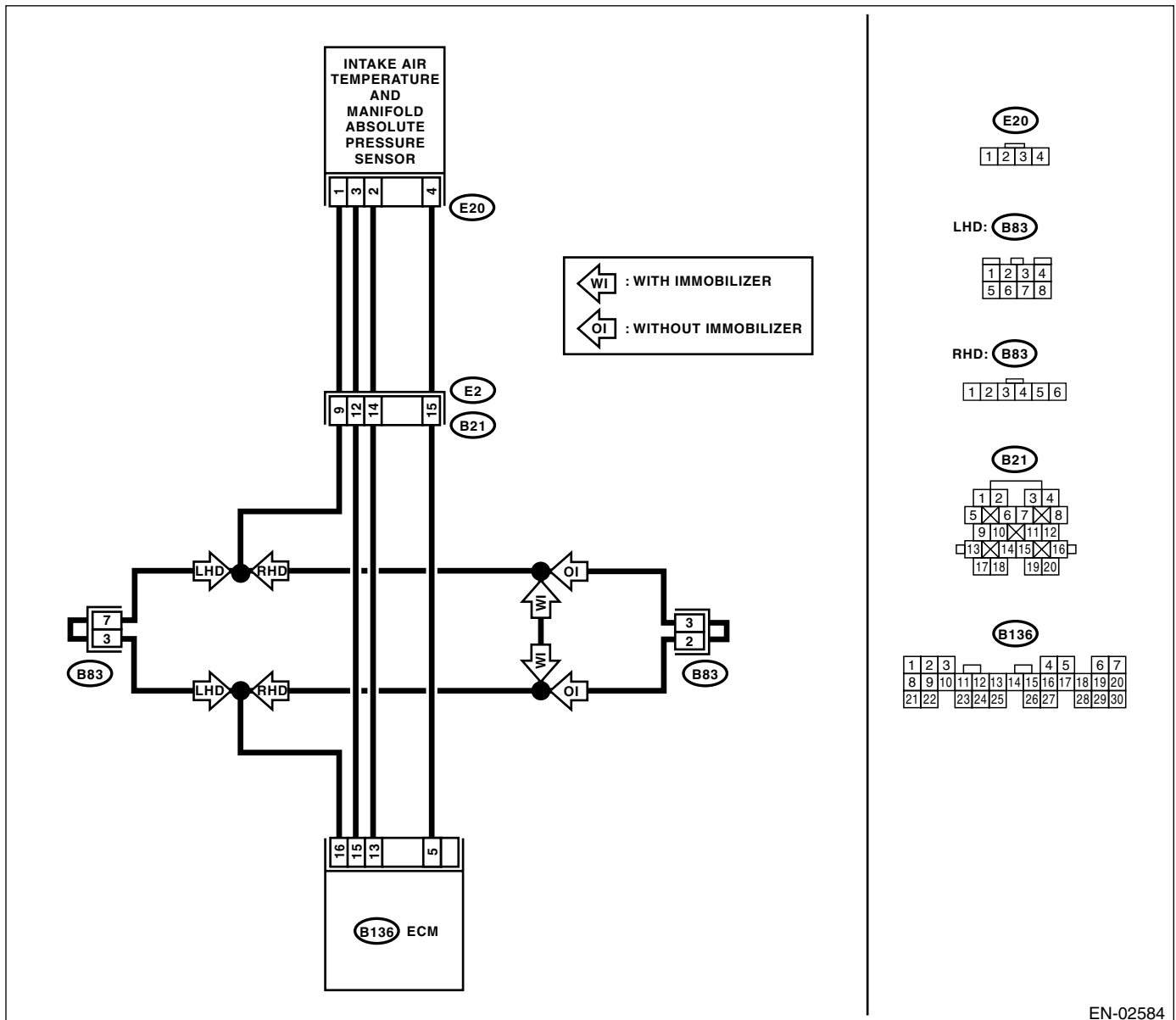
**• TROUBLE SYMPTOM:**

- Erroneous idling
- Engine stalls.
- Poor driving performance

**CAUTION:**

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOW/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOW/oOBD)(diag)-26, OPERATION, Inspection Mode.>

**• WIRING DIAGRAM:**



EN-02584

## Diagnostic Procedure with Diagnostic Trouble Code (DTC)

### ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>1 CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR.</b> 1)Disconnect the connector from manifold absolute pressure sensor. 2)Turn the ignition switch to ON. 3)Measure the voltage between manifold absolute pressure sensor connector and engine ground. <i>Connector &amp; terminal</i> <i>(E20) No. 3 (+) — Engine ground (-):</i>	Is the voltage 4.5 — 5.5 V?	Go to step 2.	Repair the open or ground short circuit in harness between ECM and manifold absolute pressure sensor.
<b>2 CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR.</b> 1)Disconnect the connector from ECM. 2)Measure the resistance of harness between ECM and manifold absolute pressure sensor connector. <i>Connector &amp; terminal</i> <i>(B136) No. 16 — (E20) No. 1:</i> <i>(B136) No. 5 — (E20) No. 4:</i>	Is the resistance less than 1 $\Omega$ ?	Go to step 3.	Repair the open circuit in harness between ECM and manifold absolute pressure sensor connector.
<b>3 CHECK HARNESS BETWEEN ECM AND MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR.</b> Measure the resistance of harness between ECM connector and chassis ground. <i>Connector &amp; terminal</i> <i>(B136) No. 5 — Chassis ground:</i> <i>(B136) No. 16 — Chassis ground:</i>	Is the resistance more than 1 M $\Omega$ ?	Go to step 4.	Repair the ground short circuit in harness between ECM and manifold absolute pressure sensor connector.
<b>4 CHECK INPUT SIGNAL FOR ECM.</b> 1)Turn the ignition switch to OFF. 2)Connect the connector to ECM and manifold absolute pressure sensor. 3)Turn the ignition switch to ON. 4)Measure the voltage between ECM and chassis ground. <i>Connector &amp; terminal</i> <i>(B136) No. 5 (+) — Chassis ground (-):</i>	Is the voltage 2.3 — 2.5 V?	Go to step 5.	Replace the manifold absolute pressure sensor. <Ref. to FU(H4SOw/oOBD)-34, Intake Air Temperature and Manifold Absolute Pressure Sensor.>
<b>5 CHECK INPUT SIGNAL FOR ECM.</b> 1)Start the engine, and idle it. 2)Measure the voltage between ECM and chassis ground. <i>Connector &amp; terminal</i> <i>(B136) No. 5 (+) — Chassis ground (-):</i>	Is the voltage 1.2 — 1.8 V?	Go to step 6.	Replace the manifold absolute pressure sensor. <Ref. to FU(H4SOw/oOBD)-34, Intake Air Temperature and Manifold Absolute Pressure Sensor.>
<b>6 CHECK POOR CONTACT.</b> Check poor contact in manifold absolute pressure sensor connector.	Is there poor contact in manifold absolute pressure sensor connector?	Repair the poor contact in manifold absolute pressure sensor connector.	Replace the manifold absolute pressure sensor. <Ref. to FU(H4SOw/oOBD)-34, Intake Air Temperature and Manifold Absolute Pressure Sensor.>

## N: DTC 46 CO RESISTOR (GENERAL SPEC. VEHICLES)

**• DIAGNOSIS:**

- The CO resistor signal is abnormal.
- The harness connector between ECM and CO resistor is open or shorted.
- The CO value is not adjusted to specifications.

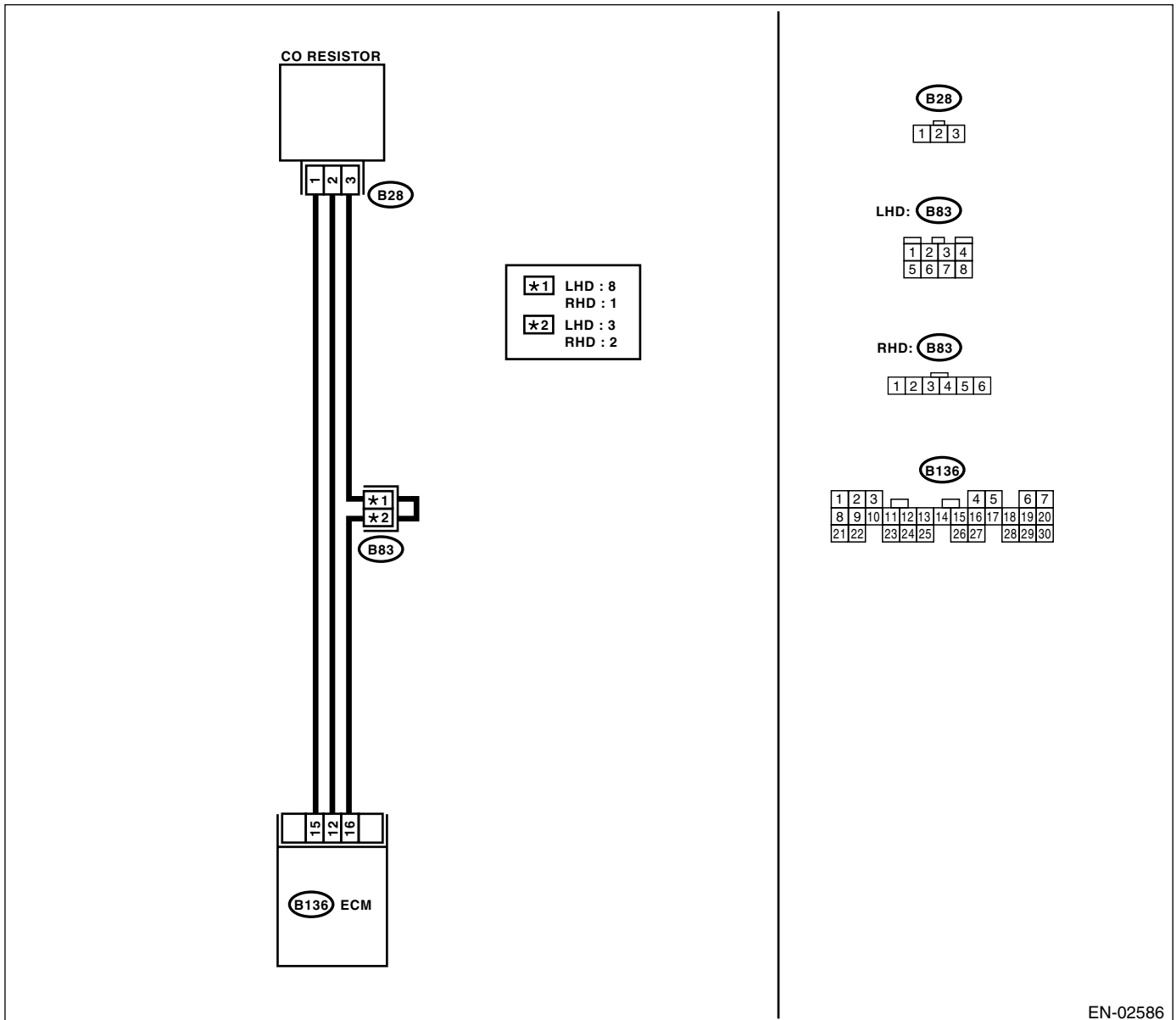
**• TROUBLE SYMPTOM:**

- Erroneous idling
- Mixture ratio is too rich or too lean.

**CAUTION:**

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>

**• WIRING DIAGRAM:**



EN-02586

## Diagnostic Procedure with Diagnostic Trouble Code (DTC)

### ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>1 CHECK INPUT SIGNAL FOR ECM.</b> 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground. <i><b>Connector &amp; terminal</b></i> <i><b>(B136) No. 12 (+) — Chassis ground (-):</b></i>	Is the voltage 0.5 — 4.5 V?	Go to step 3.	Go to step 2.
<b>2 CHECK POOR CONTACT.</b>	Is there poor contact in ECM connector?	Repair the poor contact in ECM connector.	Replace the ECM. <Ref. to FU(H4SOw/oOBD)-43, Engine Control Module (ECM).>
<b>3 CHECK HARNESS BETWEEN CO RESISTOR AND ECM CONNECTOR.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ECM and CO resistor. 3) Measure the resistance of harness between ECM and CO resistor connector. <i><b>Connector &amp; terminal</b></i> <i><b>(B136) No. 15 — (B28) No. 1:</b></i> <i><b>(B136) No. 12 — (B28) No. 2:</b></i> <i><b>(B136) No. 16 — (B28) No. 3:</b></i>	Is the resistance less than 1 $\Omega$ ?	Go to step 4.	Repair the open circuit in harness between ECM and CO resistor connector.
<b>4 CHECK HARNESS BETWEEN CO RESISTOR AND ECM CONNECTOR.</b> Measure the resistance of harness between ECM connector and chassis ground. <i><b>Connector &amp; terminal</b></i> <i><b>(B136) No. 15 — Chassis ground:</b></i> <i><b>(B136) No. 12 — Chassis ground:</b></i> <i><b>(B136) No. 16 — Chassis ground:</b></i>	Is the resistance more than 1 M $\Omega$ ?	Go to step 5.	Repair the short circuit in harness between ECM and CO resistor connector.
<b>5 CHECK CO RESISTOR.</b> Measure the resistance between CO resistor terminals. <i><b>Terminals</b></i> <i><b>No. 1 — No. 3:</b></i>	Is the resistance 4 — 6 k $\Omega$ ?	Go to step 6.	Replace the CO resistor.
<b>6 CHECK CO RESISTOR.</b> Measure the variable resistance between CO resistor terminals while rotating the screw of CO resistor. <i><b>Terminals</b></i> <i><b>No. 1 — No. 2:</b></i>	Is the resistance 0 — 6 k $\Omega$ ?	Replace the ECM.	Replace the CO resistor.  NOTE: Ensure resistance varies in response to screw rotation.

## O: DTC 51 NEUTRAL POSITION SWITCH (MT MODEL)

• **DIAGNOSIS:**

- The neutral position switch signal is abnormal.
- The harness connector between ECM and neutral position switch is open or shorted.

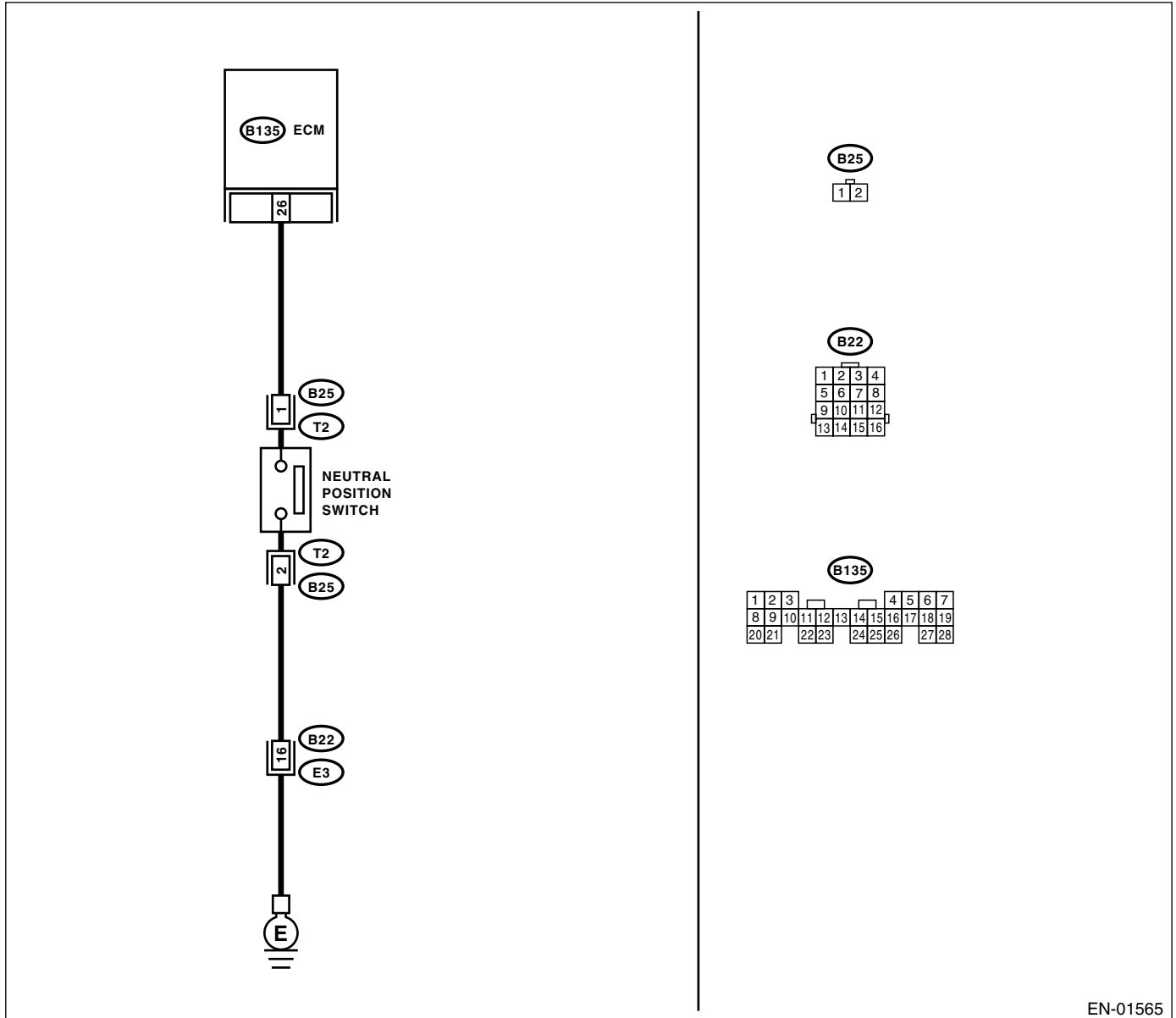
• **TROUBLE SYMPTOM:**

- Erroneous idling

**CAUTION:**

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>

• **WIRING DIAGRAM:**



EN-01565

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

## ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>1 CHECK INPUT SIGNAL FOR ECM.</b> 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground. <i><b>Connector &amp; terminal</b></i> <i><b>(B135) No. 26 (+) — Chassis ground (-):</b></i>	Is the voltage 4.5 — 5.5 V in neutral position?	Go to step 3.	Go to step 2.
<b>2 CHECK INPUT SIGNAL FOR ECM.</b> Measure the voltage between ECM and chassis ground. <i><b>Connector &amp; terminal</b></i> <i><b>(B135) No. 26 (+) — Chassis ground (-):</b></i>	Is the voltage less than 1 V in other positions?	Go to step 3.	Go to step 4.
<b>3 CHECK POOR CONTACT.</b> 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(H4SOw/oOBD)-43, Engine Control Module (ECM).>
<b>4 CHECK NEUTRAL POSITION SWITCH.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connector from transmission harness. 3) Measure the resistance between transmission harness and connector terminals. <i><b>Connector &amp; terminal</b></i> <i><b>(T2) No. 1 — No. 2:</b></i>	Is the resistance more than 1 MΩ in neutral position?	Go to step 5.	Repair the short circuit in transmission harness or replace neutral position switch.
<b>5 CHECK NEUTRAL POSITION SWITCH.</b> Measure the resistance between transmission harness connector terminals. <i><b>Connector &amp; terminal</b></i> <i><b>(T2) No. 1 — No. 2:</b></i>	Is the resistance less than 10 Ω in other positions?	Go to step 6.	Repair the open circuit in transmission harness or replace neutral position switch.
<b>6 CHECK HARNESS BETWEEN ECM AND NEUTRAL POSITION SWITCH CONNECTOR.</b> 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM and transmission harness connector. <i><b>Connector &amp; terminal</b></i> <i><b>(B135) No. 26 — (B25) No. 1:</b></i>	Is the resistance less than 1 Ω?	Go to step 7.	Repair the open circuit in harness between ECM and transmission harness connector.
<b>7 CHECK HARNESS BETWEEN ECM AND NEUTRAL POSITION SWITCH CONNECTOR.</b> Measure the resistance between ECM and chassis ground. <i><b>Connector &amp; terminal</b></i> <i><b>(B135) No. 26 — Chassis ground:</b></i>	Is the resistance less than 10 Ω?	Repair the ground short circuit in harness between ECM and transmission harness connector.	Go to step 8.
<b>8 CHECK POOR CONTACT.</b> Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace the ECM. <Ref. to FU(H4SOw/oOBD)-43, Engine Control Module (ECM).>

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

ENGINE (DIAGNOSTICS)

## P: DTC 51 PARK/NEUTRAL POSITION SWITCH (AT MODEL)

### • DIAGNOSIS:

- The park/neutral position switch signal is abnormal.
- The shift cable is connected abnormally.
- The harness connector between ECM/TCM and inhibitor switch is open or shorted.

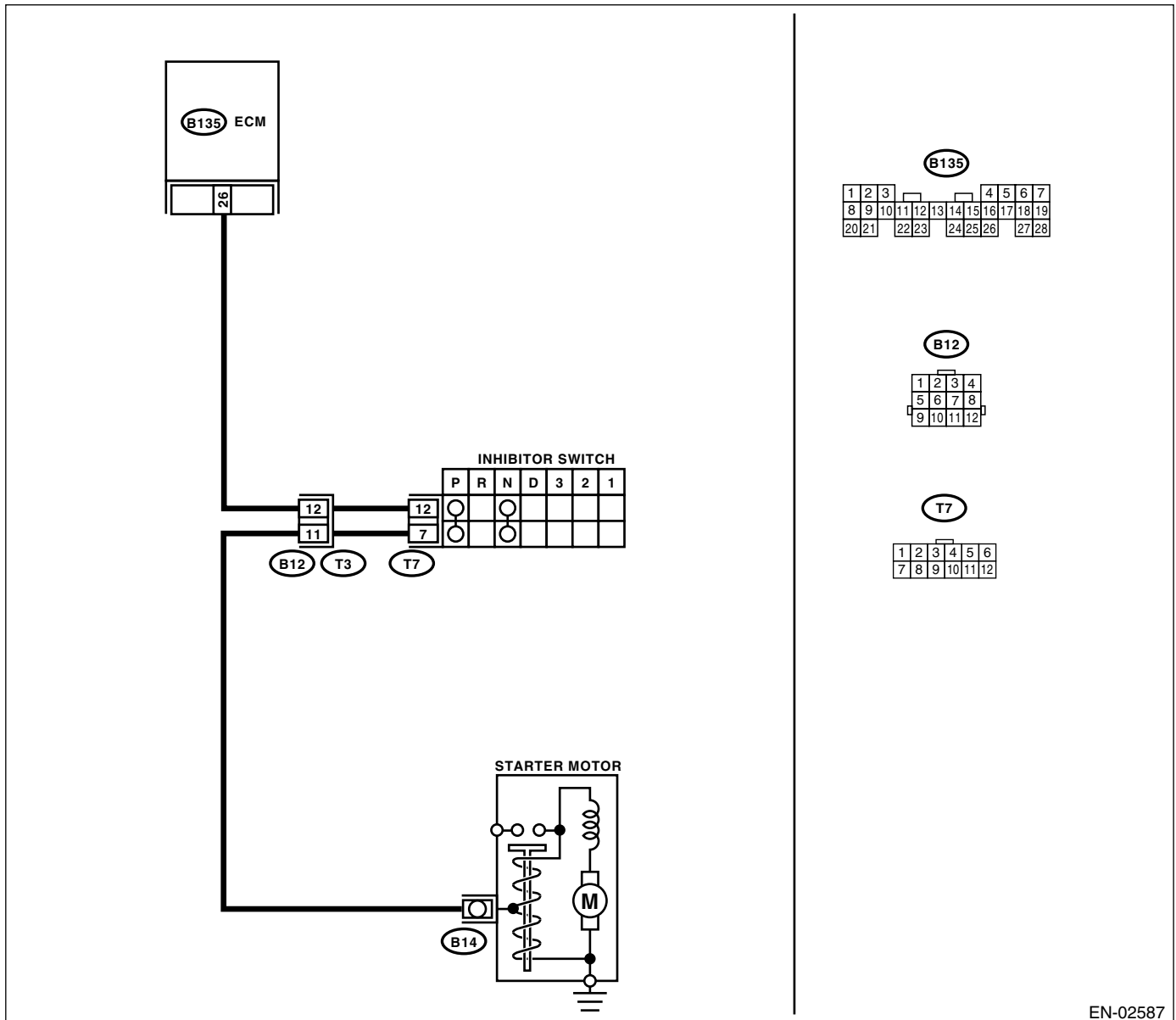
### • TROUBLE SYMPTOM:

- Erroneous idling

### CAUTION:

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.>

### • WIRING DIAGRAM:



EN-02587

# Diagnostic Procedure with Diagnostic Trouble Code (DTC)

## ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>1 CHECK INPUT SIGNAL FOR ECM.</b> 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM and chassis ground in selector lever "N" and "P" positions. <i><b>Connector &amp; terminal</b></i> <i><b>(B135) No. 26 (+) — Chassis ground (-):</b></i>	Is the voltage less than 1 V?	Go to step 2.	Go to step 3.
<b>2 CHECK POOR CONTACT.</b> Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact in ECM connector.	Go to step 3.
<b>3 CHECK HARNESS BETWEEN ECM AND INHIBITOR SWITCH CONNECTOR.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ECM and inhibitor switch. 3) Measure the resistance of harness between ECM and inhibitor switch connector. <i><b>Connector &amp; terminal</b></i> <i><b>(B135) No. 26 — (T7) No. 12:</b></i>	Is the resistance less than 1 $\Omega$ ?	Go to step 4.	Repair the harness and connector. NOTE: In this case, repair the following: <ul style="list-style-type: none"> <li>• Open circuit in harness between ECM and inhibitor switch connector</li> <li>• Poor contact in coupling connector (B12)</li> <li>• Poor contact in inhibitor switch connector</li> <li>• Poor contact in ECM connector</li> </ul>
<b>4 CHECK INHIBITOR SWITCH GROUND LINE.</b> Measure the resistance of harness between inhibitor switch connector and engine ground. <i><b>Connector &amp; terminal</b></i> <i><b>(T7) No. 12 — Engine ground:</b></i>	Is the resistance less than 5 $\Omega$ ?	Go to step 5.	Repair the open circuit in inhibitor switch ground line.
<b>5 CHECK HARNESS BETWEEN ECM AND TRANSMISSION HARNESS CONNECTOR.</b> Measure the resistance of harness between ECM connector and chassis ground. <i><b>Connector &amp; terminal</b></i> <i><b>(B135) No. 26 — Chassis ground:</b></i>	Is the resistance less than 10 $\Omega$ ?	Repair the ground short circuit in harness between ECM and transmission harness connector.	Go to step 6.
<b>6 CHECK POOR CONTACT.</b> 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(H4SOw/oOBD)-43, Engine Control Module (ECM).>



## Q: DTC 85 CHARGE SYSTEM

• **DIAGNOSIS:**

- Power source voltage of the ECM is low or high.

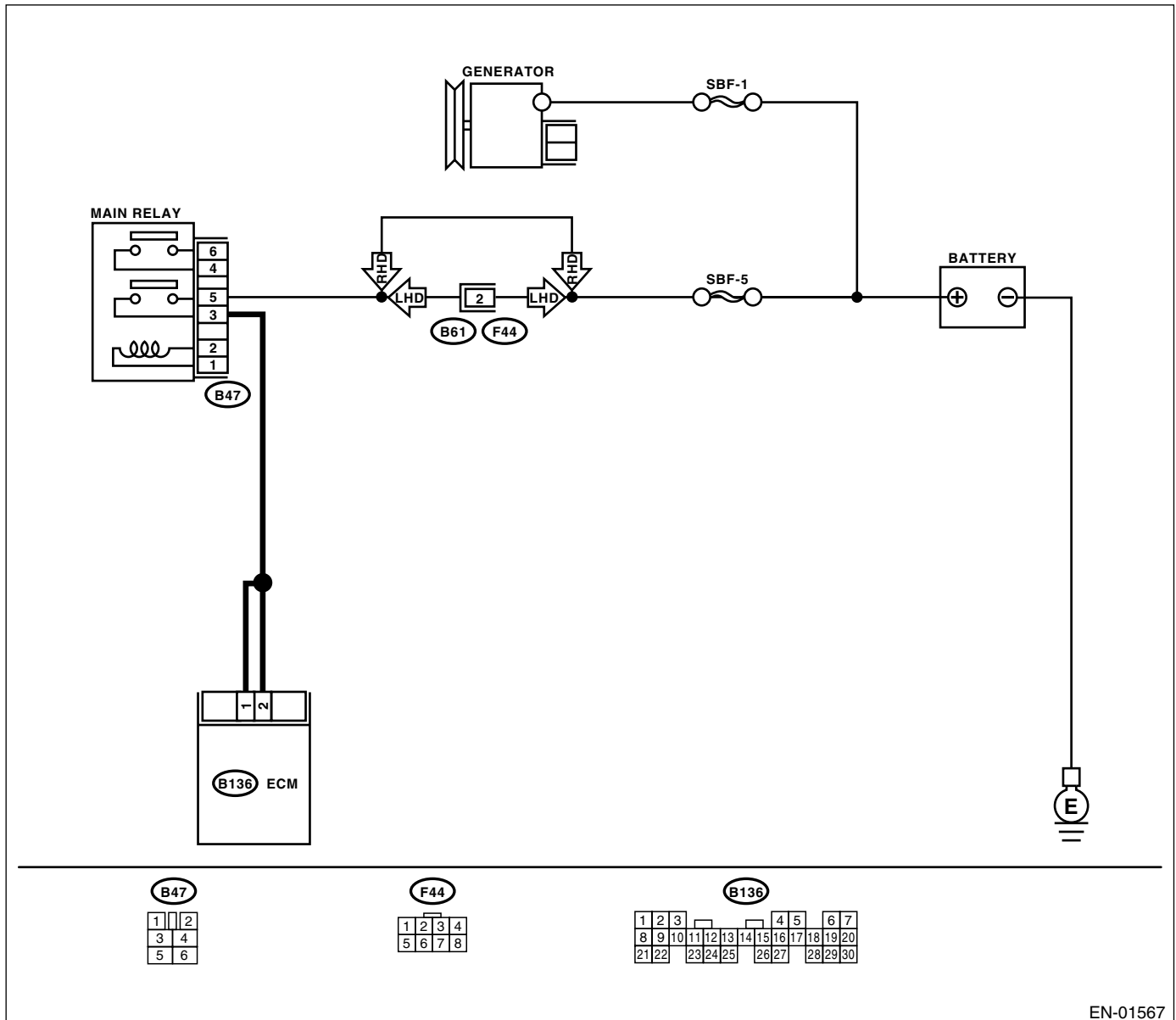
• **TROUBLE SYMPTOM:**

- Charge warning light comes on.

**CAUTION:**

After repair or replacement of faulty parts, conduct Clear Memory and inspection modes. <Ref. to EN(H4S0w/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> and <Ref. to EN(H4S0w/oOBD)(diag)-26, OPERATION, Inspection Mode.>

• **WIRING DIAGRAM:**



EN-01567

## Diagnostic Procedure with Diagnostic Trouble Code (DTC)

### ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
<b>1 CHECK GENERATOR.</b> 1)Start the engine. 2)Idle after warm-up. 3)Measure the voltage between generator B terminal and chassis ground. <i>Terminal</i> <i>Generator B terminal (+) — Chassis ground (-):</i>	Is the voltage 10.8 V — 16.2 V?	Go to step 2.	Repair the generator. <Ref. to SC(H4SO)-13, Generator.>
<b>2 CHECK GENERATOR.</b> 1)Run the engine at 5,000 rpm. 2)Measure the voltage between generator B terminal and chassis ground. <i>Terminal</i> <i>Generator B terminal (+) — Chassis ground (-):</i>	Is the voltage 10.8 V — 16.2 V?	Go to step 3.	Repair the generator. <Ref. to SC(H4SO)-13, Generator.>
<b>3 CHECK BATTERY TERMINAL.</b> Turn the ignition switch to OFF.	Are the positive and ground battery terminals tightly clamped?	Go to step 4.	Tighten the clamp of terminal.
<b>4 CHECK INPUT VOLTAGE OF ECM.</b> 1)Run the engine at idle. 2)Measure the voltage between ECM connector and chassis ground. <i>Connector &amp; terminal</i> <i>(B136) No. 1 (+) — Chassis ground (-):</i> <i>(B136) No. 2 (+) — Chassis ground (-):</i>	Is the voltage 10.8 V — 16.2 V?	Go to step 5.	Repair the harness connector between battery, main relay and ECM.
<b>5 CHECK POOR CONTACT IN CONNECTORS.</b>	Is there poor contact in the connectors between generator, battery and ECM?	Repair the connector.	Go to step 6.
<b>6 CHECK ECM.</b> 1)Connect all connectors. 2)Erase the memory. <Ref. to EN(H4SOw/oOBD)(diag)-28, OPERATION, Clear Memory Mode.> 3)Perform the inspection mode. <Ref. to EN(H4SOw/oOBD)(diag)-26, OPERATION, Inspection Mode.> 4)Read any DTC on the display. <Ref. to EN(H4SOw/oOBD)(diag)-24, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is the same DTC as in the current diagnosis still being output?	Replace the generator.	Go to step 7.
<b>7 CHECK ANY OTHER DTCs APPEARANCE.</b>	Is any other DTC displayed?	Proceed with the diagnosis corresponding to the DTC.	A temporary poor contact.

## 15. General Diagnostic Table

### A: INSPECTION

**NOTE:**

- Malfunction of parts other than those listed is also possible.
- The right-hand priority column indicates inspection priority of probable causes of the symptom. Carry out the check starting from A.

Symptom	Problem parts	Priority
1. Engine does not start. (Internal combustion does not occur.)	1) ECM power supply	A
	2) Engine ground cable	A
	3) Crankshaft position sensor	B
	4) Camshaft position sensor	B
	5) Fuel pump	B
	6) Pressure regulator	B
	7) Ignition coil & ignitor ASSY	C
	8) Spark plug	C
	9) Fuel injector	C
2. Engine does not start. (Internal combustion occurs.)	1) ECM power supply	A
	2) Spark plug	A
	3) Engine coolant temperature sensor	B
	4) Pressure regulator	B
	5) Manifold absolute pressure sensor	C
	6) Fuel pump	C
	7) Fuel injector	C
	8) Camshaft position sensor	C
	9) Crankshaft position sensor	C
	10) Idle air control solenoid valve	C
3. Engine does not start. (Engine stalls after internal combustion.)	1) ECM power supply	A
	2) Manifold absolute pressure sensor	A
	3) Engine coolant temperature sensor	B
	4) Spark plug	B
	5) Ignition coil	C
	6) Fuel pump	C
	7) Pressure regulator	C
	8) Fuel injector	C
	9) Idle air control solenoid valve	C
4. Engine stalls.	1) Idle air control solenoid valve	A
	2) Manifold absolute pressure sensor	B
	3) Spark plug	B
	4) Accelerator cable is out of adjustment	B
	5) ECM power supply	C
	6) Throttle position sensor	C
	7) Crankshaft position sensor	C
	8) Vehicle speed sensor	C
	9) Ignition coil	C
	10) Fuel pump	C

## General Diagnostic Table

### ENGINE (DIAGNOSTICS)

Symptom	Problem parts	Priority
5. Rough idling	1) Spark plug	A
	2) Manifold absolute pressure sensor	B
	3) Engine coolant temperature sensor	B
	4) Pressure regulator	B
	5) Idle air control solenoid valve	B
	6) Air leak in air intake system	B
	7) ECM power supply	C
	8) Throttle position sensor	C
	9) Camshaft position sensor	C
	10) Crankshaft position sensor	C
	11) Oxygen sensor	C
	12) Fuel pump	C
	13) Fuel injector	C
	14) Test mode or read memory connectors are connected	C
	15) Intake air temperature sensor	C
6. Hard to drive at constant speed	1) Pressure regulator	A
	2) Fuel injector	B
	3) Manifold absolute pressure sensor	C
	4) Engine coolant temperature sensor	C
	5) Throttle position sensor	C
	6) Fuel pump	C
7. Poor acceleration/deceleration	1) Spark plug	A
	2) Throttle position sensor	B
	3) Ignition coil	B
	4) Fuel pump	B
	5) Pressure regulator	B
	6) Fuel injector	B
	7) Manifold absolute pressure sensor	C
	8) Engine coolant temperature sensor	C
	9) Idle air control solenoid valve	C
	10) Knock sensor	C
8. Poor return to idling	1) Accelerator cable is out of adjustment	A
	2) Throttle position sensor	B
	3) Idle air control solenoid valve	B
	4) Manifold absolute pressure sensor	C
	5) Engine coolant temperature sensor	C
9. Back fire	1) Spark plug	A
	2) Fuel injector	B
	3) Ignition coil and ignitor	C
	4) Fuel pump	C
	5) Pressure regulator	C
10. Knocking	1) Manifold absolute pressure sensor	A
	2) Fuel pump	B
	3) Knock sensor	B
	4) Pressure regulator	B
	5) Engine coolant temperature sensor	C
11. Excessive fuel consumption	1) Manifold absolute pressure sensor	A
	2) Pressure regulator	B
12. Shocks while driving	1) Pressure regulator	A
	2) ECM power supply	B
	3) Throttle position sensor	B

# General Diagnostic Table

ENGINE (DIAGNOSTICS)

Symptom	Problem parts	Priority
13. Poor engine revving	1) Pressure regulator	A
	2) Manifold absolute pressure sensor	B
	3) Engine coolant temperature sensor	B
	4) Throttle sensor	B
	5) Fuel pump	B
14. Remarks	1) ECM power supply	A*
	2) Manifold absolute pressure sensor	B*
	3) Pressure regulator	B*
	4) Idle air control solenoid valve	B*
	5) Air leak in air intake system	B*

A\*: Including ECM ground circuit

B\*: Check hoses.

# General Diagnostic Table

ENGINE (DIAGNOSTICS)

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