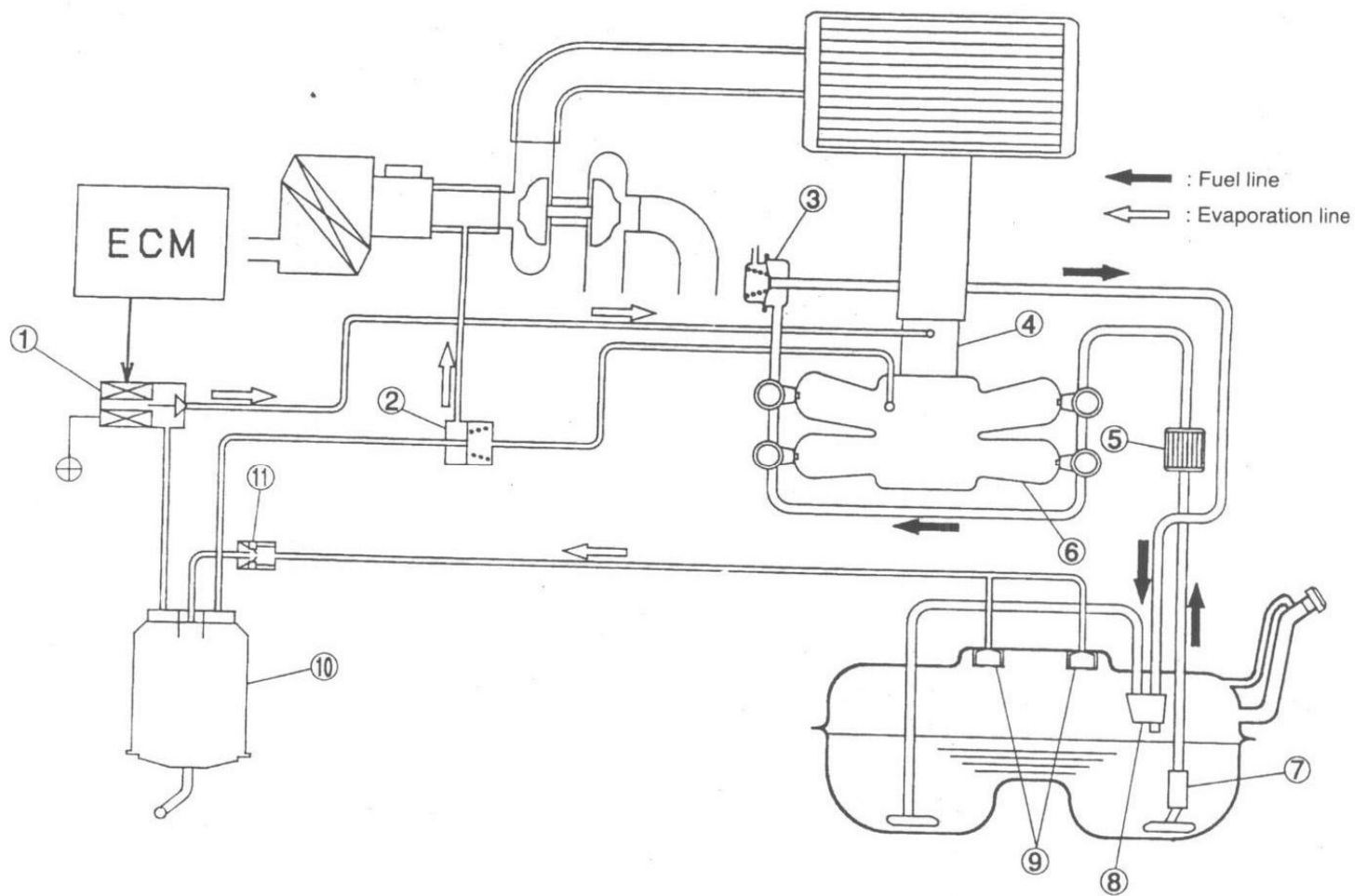


2. TURBO MODEL



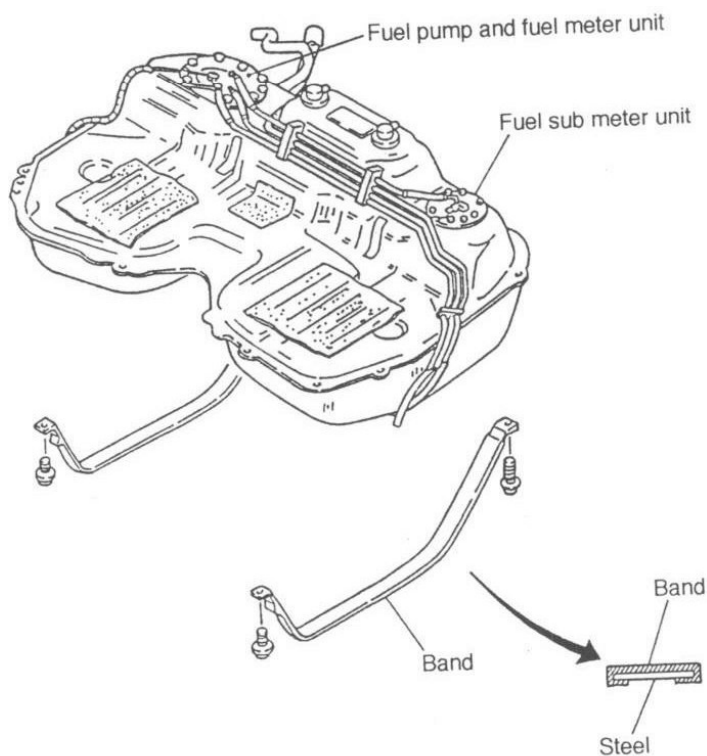
- ① Purge control solenoid valve
- ② Auxiliary purge control valve
- ③ Pressure regulator
- ④ Throttle body
- ⑤ Fuel filter
- ⑥ Intake manifold

- ⑦ Fuel pump
- ⑧ Jet pump
- ⑨ Fuel cut valve
- ⑩ Canister
- ⑪ Two-way valve

H2H1834A

B: TURBO MODEL

- The fuel tank is located under the rear seat and secured with hold down bands. The fuel tank utilizes a dented design to prevent interference with the rear differential.
- The fuel tank has two chambers, and is provided with a suction jet pump which transfers fuel from one chamber to another. Each fuel chamber has a built-in fuel sub meter unit.



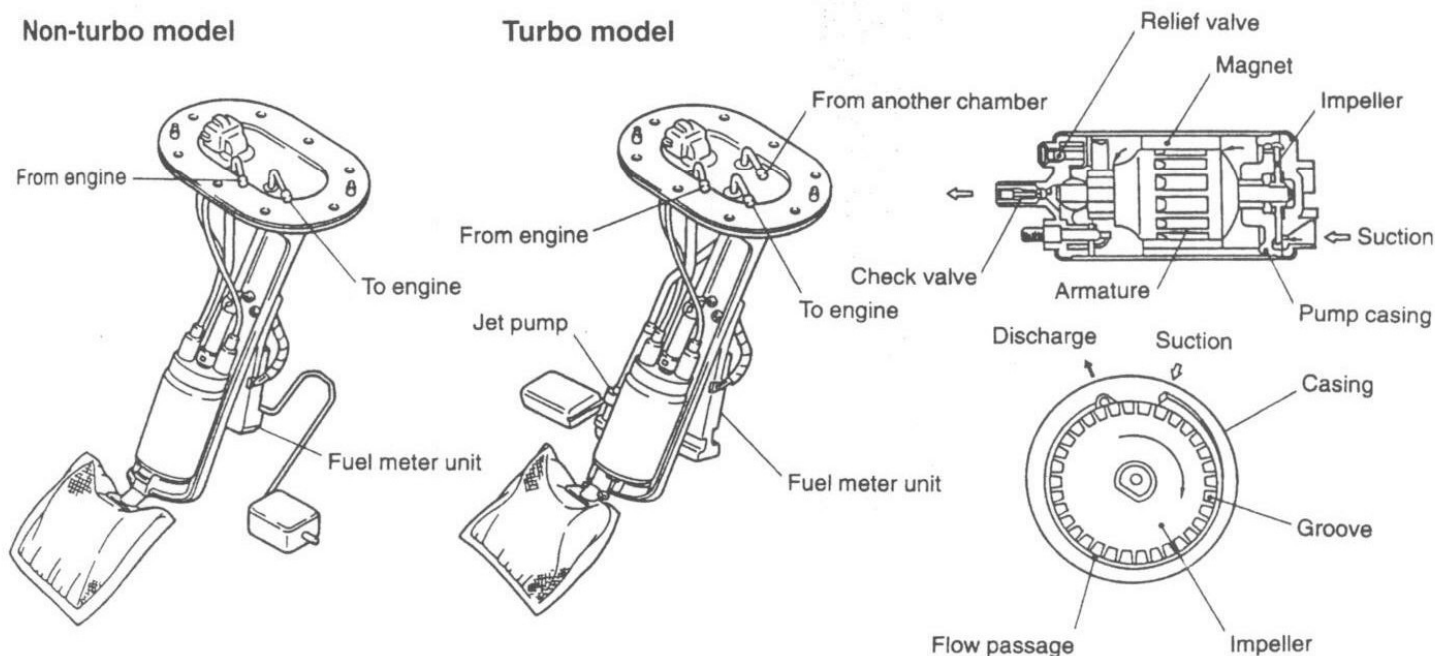
H2H1653A

3. Fuel Pump

The impeller type fuel pump consists of a motor, impeller, pump casing, pump cover, relief valve, check valve and pump filter. It is built into the fuel tank together with the fuel meter unit to provide quiet operation.

Non-turbo model

Turbo model

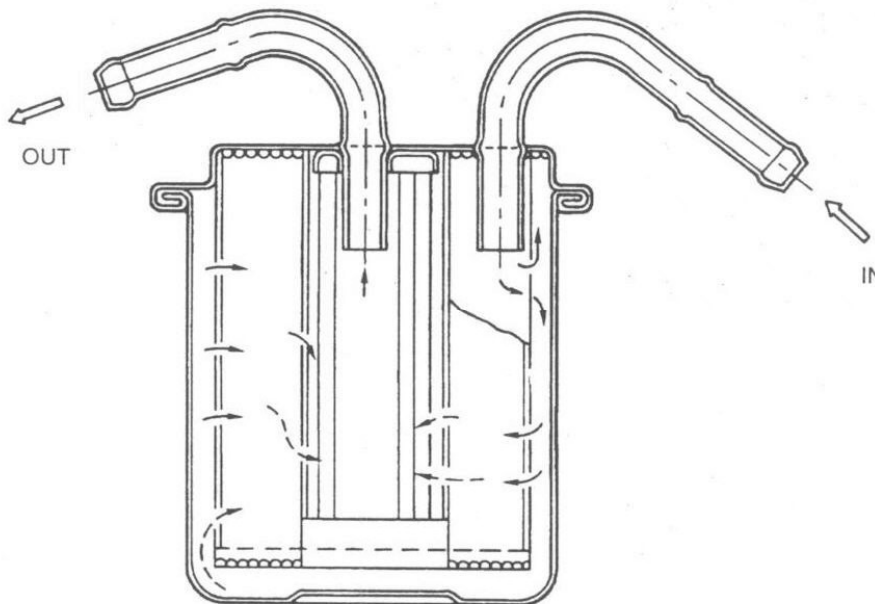


B2H0011B

- When the engine starts, fuel pump relay activates. This operates the motor to rotate the impeller.
- Fuel entering a vane groove of the impeller flows along the fuel passage and into the next vane groove by centrifugal force. During the time fuel flows from one groove to the next, a pressure differential is produced by friction of the flow.
- Thus, fuel pressure increases while the action is described in step 2) above is repeated, and fuel is discharged from the pump casing. Fuel under pressure then passes through the clearance between the armature and the magnet and is discharged from the fuel pump.
- As fuel discharge pressure reaches the specified value, the relief valve opens. This discharges fuel under pressure into the fuel tank. Fuel from the fuel tank then returns to the suction port and passes through the fuel pump. This action of fuel flow is repeated. In this manner, the relief valve prevents an abnormal increase in fuel pressure.
- When the engine and fuel pump stop, spring force acts on the check valve to close the discharge port so that fuel pressure remains in the fuel delivery line.

4. Fuel Filter

The fuel filter utilizes a pressure-withstanding, cartridge design. It has a filter element built into the metal case. With this design, fuel flows from the perimeter of the element to the interior of the filter.



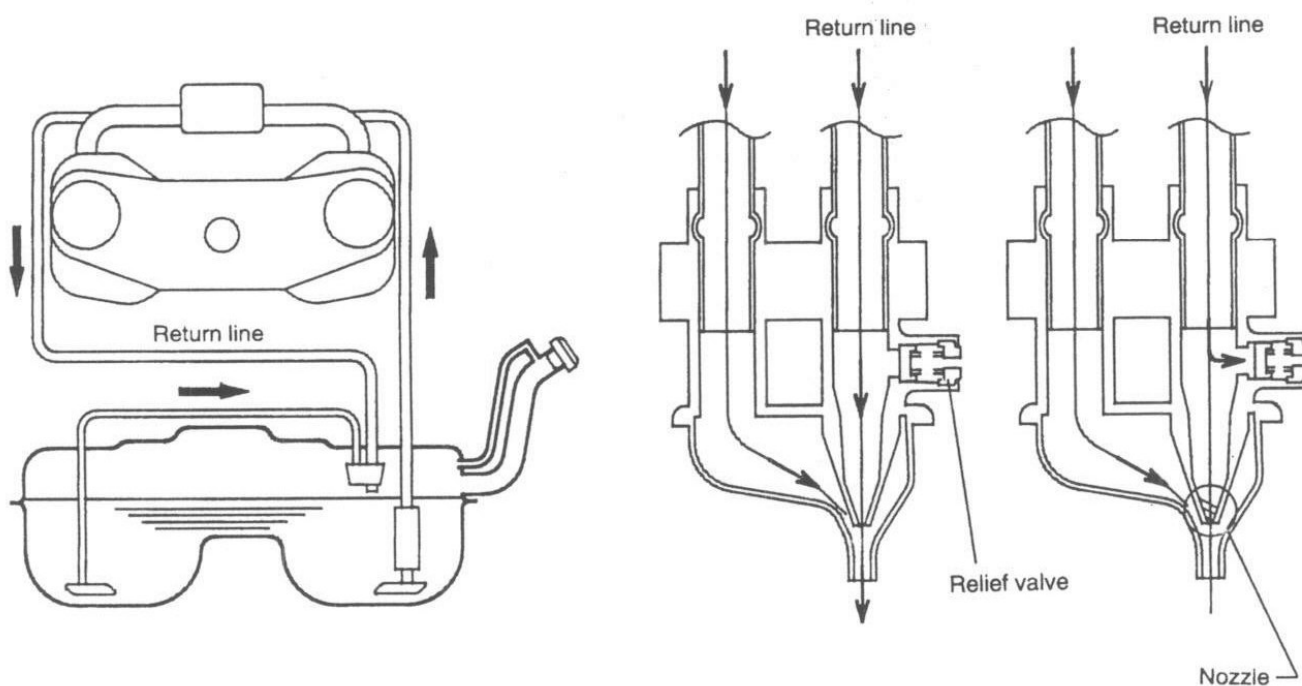
G2H0059

Jet Pump (Turbo model)

The jet pump utilizes the velocity of fuel returning from the engine to produce negative pressure at the jet pump.

This negative pressure allows fuel to be sucked up.

When the return line nozzle is clogged, the fuel sent back through the return line flows back into the fuel tank via the relief valve.



B2H0012A

FUEL INJECTION SYSTEM

[TURBO MODEL] 2-7c

	Page
T DIAGNOSTICS AIRBAG	2
1. Supplemental Restraint System "Airbag"	2
2. Pre-inspection	2
3. Electrical Unit Location	4
4. Schematic	10
5. Control Module I/O Signal	12
6. Diagnostics Chart for On-board Diagnosis System	14
7. Diagnostics Chart for Engine Starting Failure	21
8. Diagnostics Chart with Trouble Code	39
9. Diagnostics Chart with Select Monitor	90
10. General Diagnostics Table	104

1. Supplemental Restraint System "Airbag"

Airbag system wiring harness is routed near the 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 Airbag system wiring harness when servicing the engine control module (ECM), main relay and fuel pump relay.

2. Pre-inspection

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

1. POWER SUPPLY

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

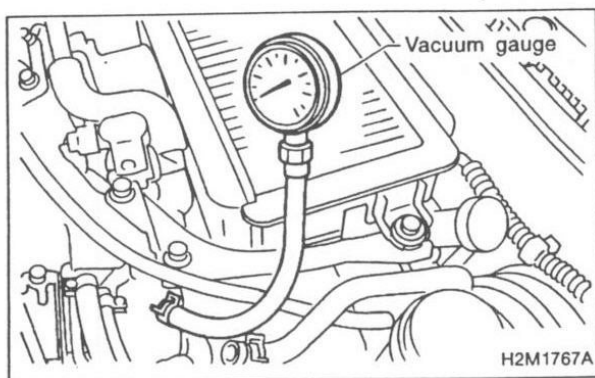
Standard voltage: 12 V

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. CAPS AND PLUGS

- 1) Check that the fuel cap is properly closed.
- 2) Check that the oil filler cap is properly closed.
- 3) Check that the oil level gauge is properly inserted.



3. INTAKE MANIFOLD VACUUM PRESSURE

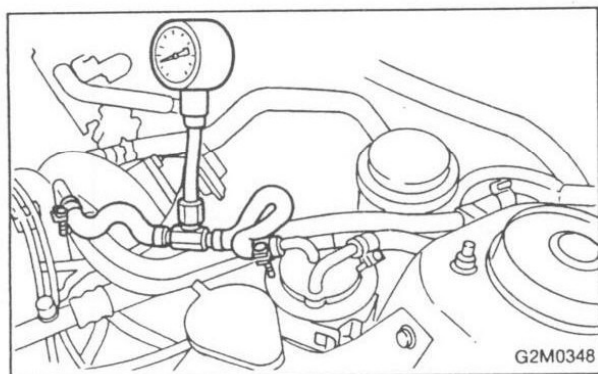
- 1) After warming-up the engine, measure intake manifold vacuum pressure while at idle.

Standard vacuum pressure:

More than -60.0 kPa (-450 mmHg, -17.72 inHg)

< Ref. to 2-2 [W5A0]. >

- 2) Unusual vacuum pressure occurs because of air leaks, fuel or engine problems. In such a case, engine idles roughly.



4. FUEL PRESSURE

- 1) Release fuel pressure.
< Ref. to 2-8 [W1A0]. >
- 2) Connect fuel pressure gauge between fuel filter and hose, and measure fuel pressure at idling.
< Ref. to 2-8 [W2A0]. >

Fuel pressure:

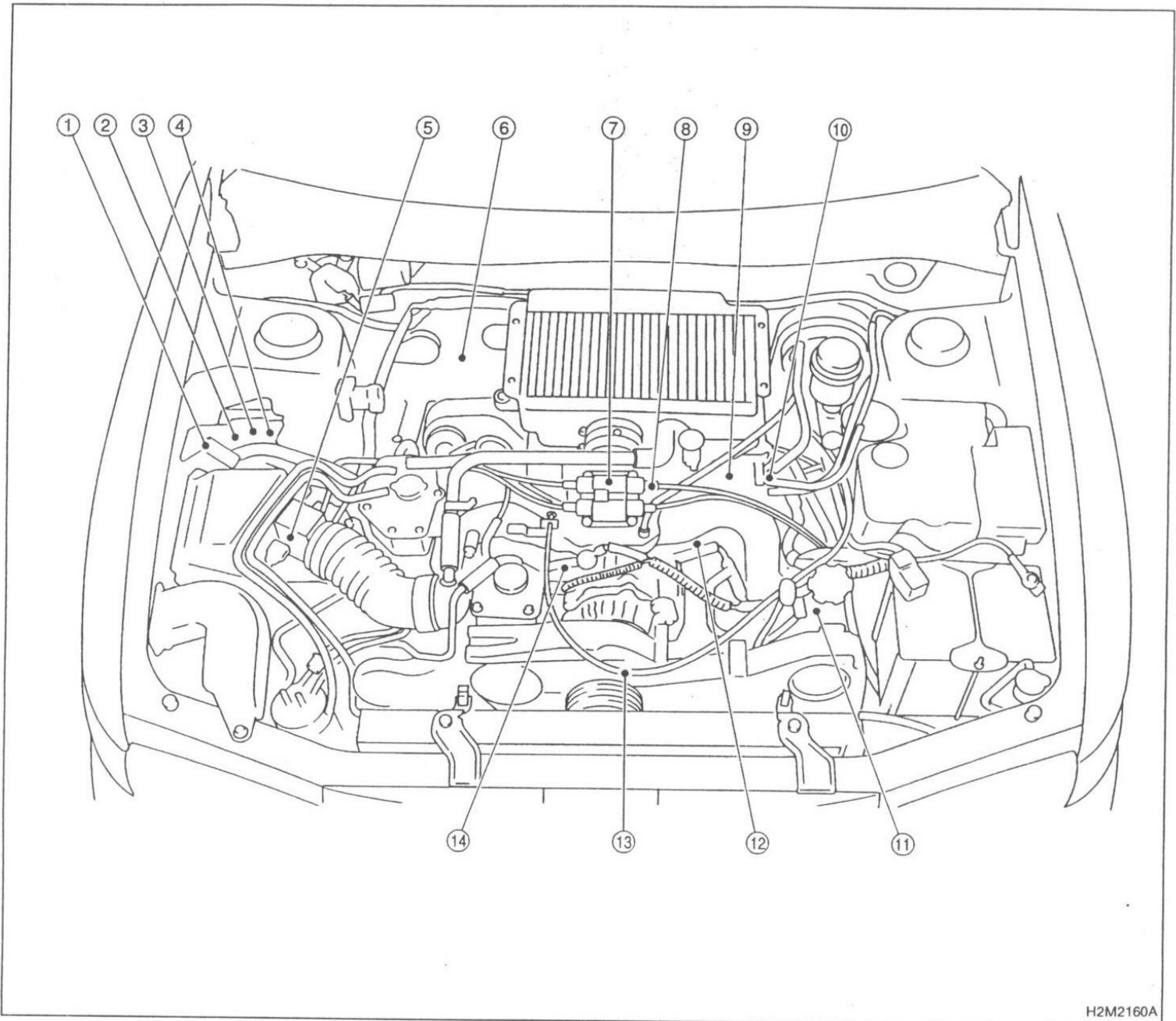
$284 - 314$ kPa ($2.9 - 3.2$ kg/cm², $41 - 46$ psi)

5. ENGINE GROUNDING

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

3. Electrical Unit Location

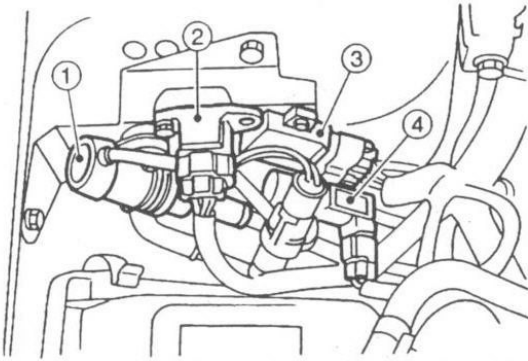
A: SENSOR AND SOLENOID VALVE



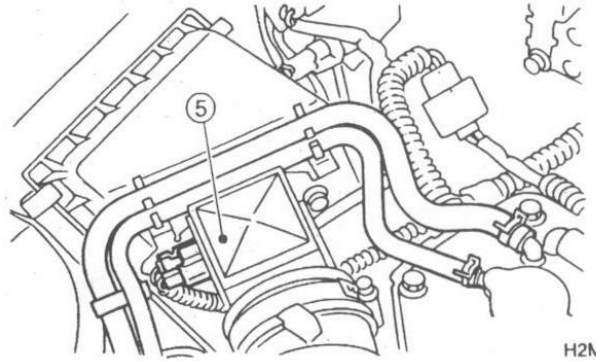
H2M2160A

- ① Wastegate control solenoid valve
- ② Pressure sensor
- ③ Ignitor
- ④ Pressure sources switching solenoid valve
- ⑤ Mass air flow sensor
- ⑥ Vehicle speed sensor 2
- ⑦ Ignition coil

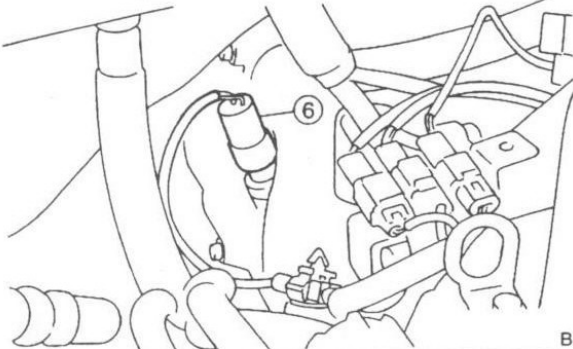
- ⑧ Throttle position sensor
- ⑨ Idle air control solenoid valve
- ⑩ Purge control solenoid valve
- ⑪ Camshaft position sensor
- ⑫ Knock sensor
- ⑬ Crankshaft position sensor
- ⑭ Engine coolant temperature sensor



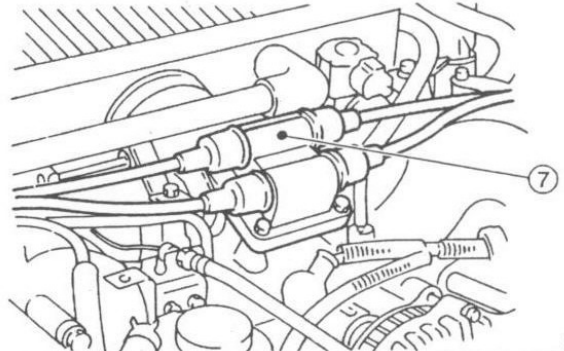
H2M2161A



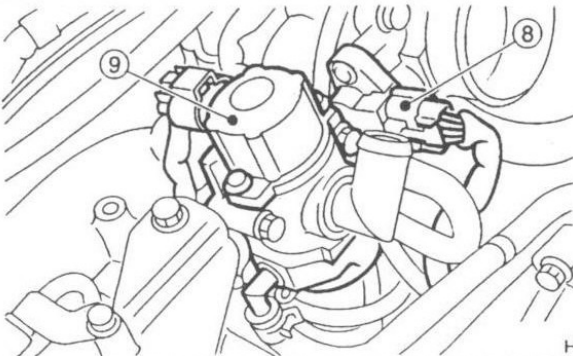
H2M1768C



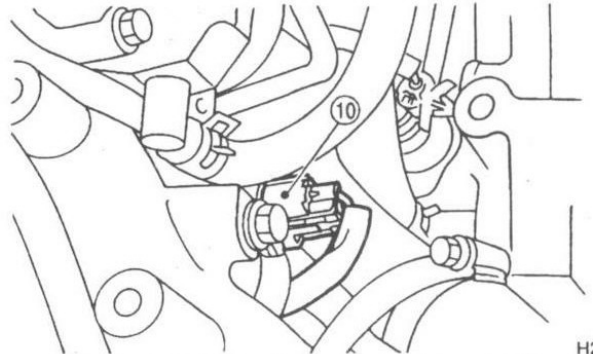
B2M0211D



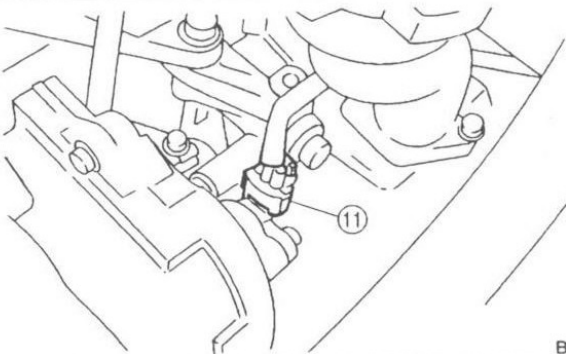
H6M0434D



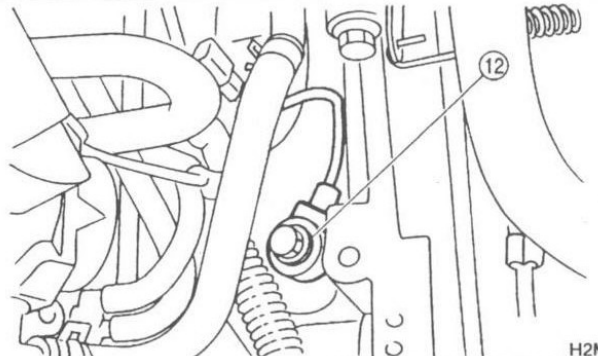
H2M2162A



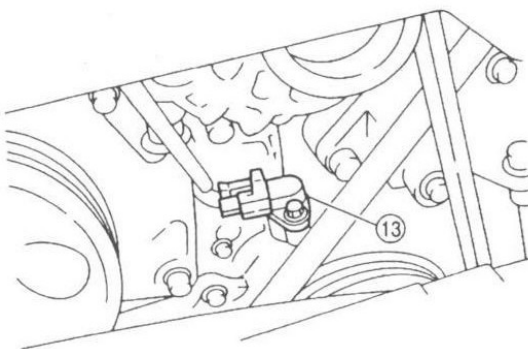
H2M2163A



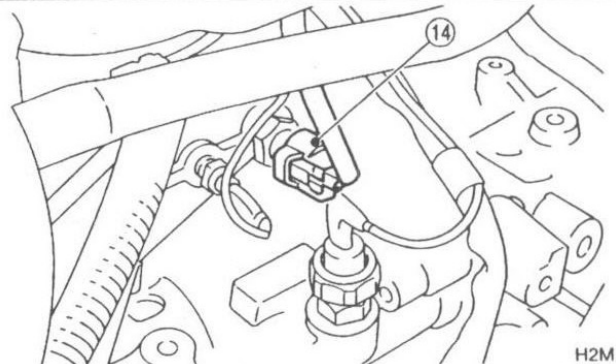
B2M0212C



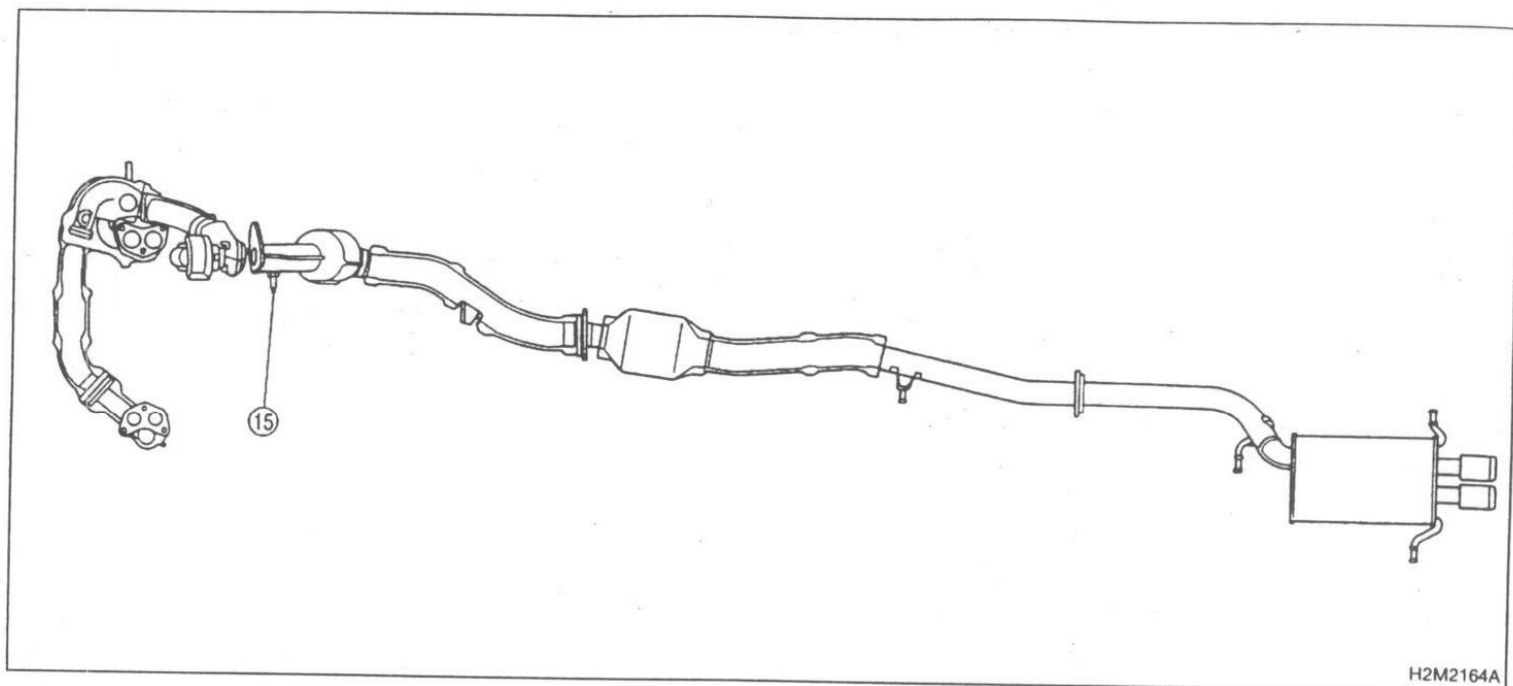
H2M9999A



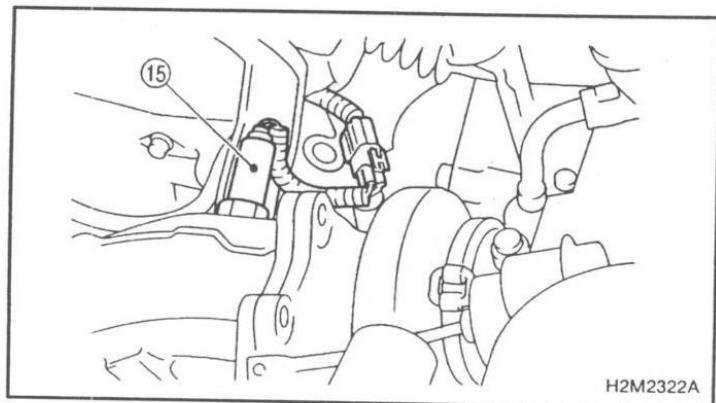
B2M0213G



H2M1906B

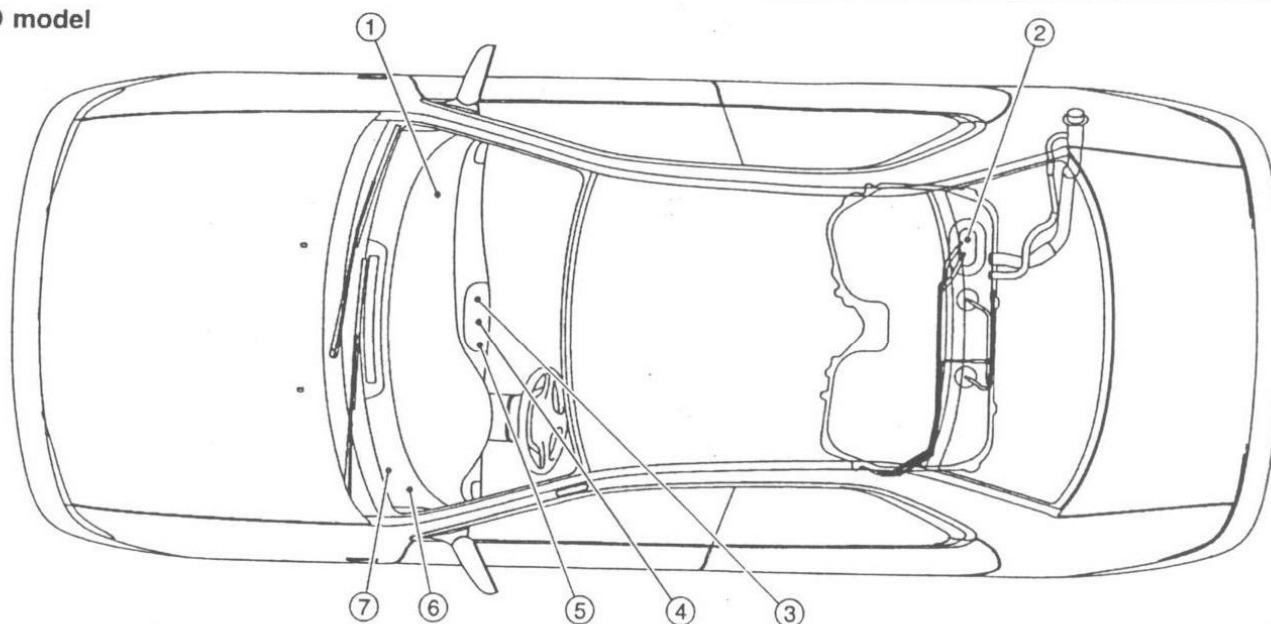


⑮ Oxygen sensor



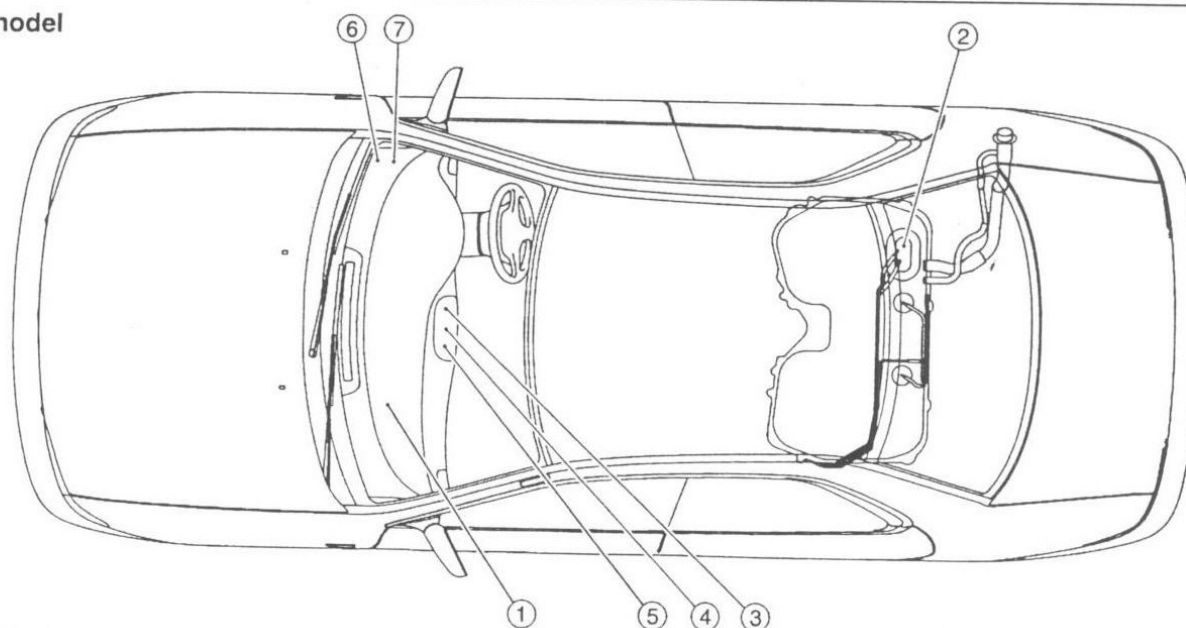
B: MODULE AND RELAY

LHD model



H2M1527B

RHD model

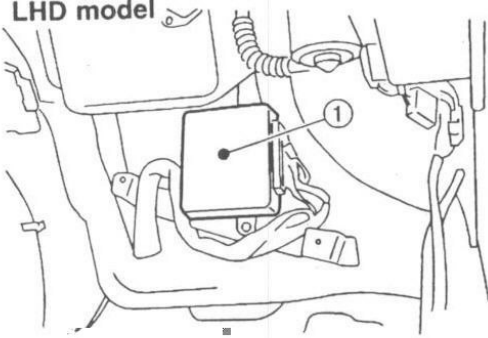


H2M1539B

- ① ECM
- ② Fuel pump
- ③ Read memory connector
- ④ Test mode connector

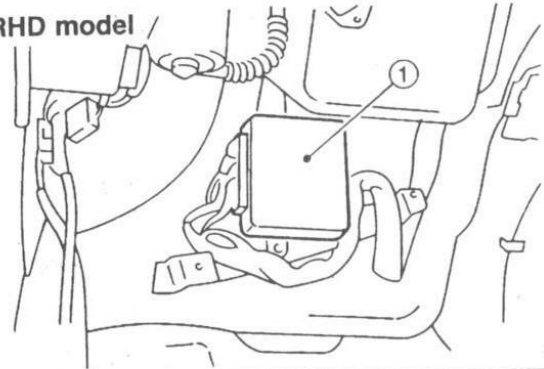
- ⑤ Data link connector
- ⑥ Main relay
- ⑦ Fuel pump relay

LHD model

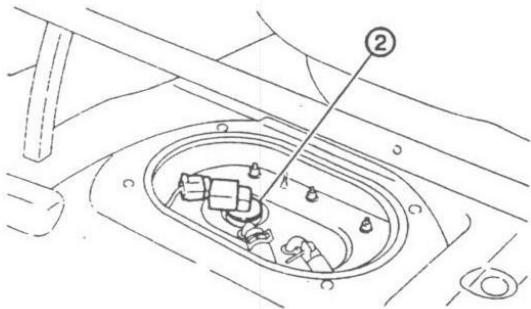


B2M0215B

RHD model

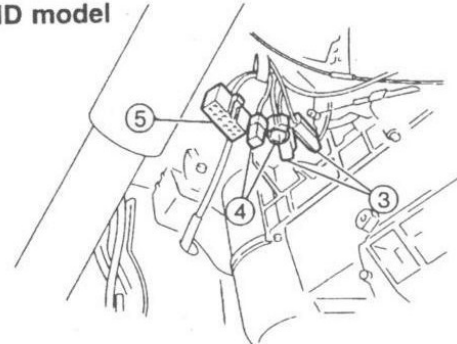


B2M1383A



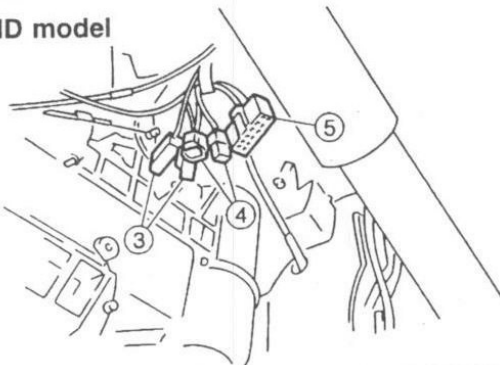
B2M0216A

LHD model



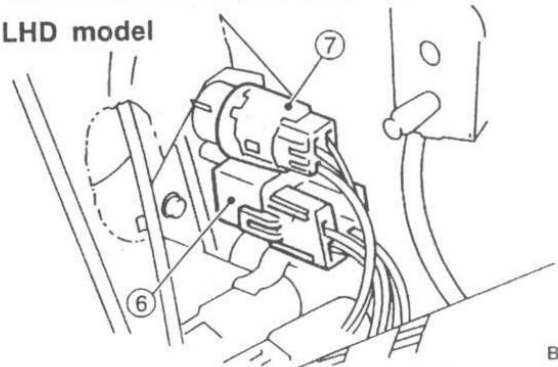
B2M0217B

RHD model



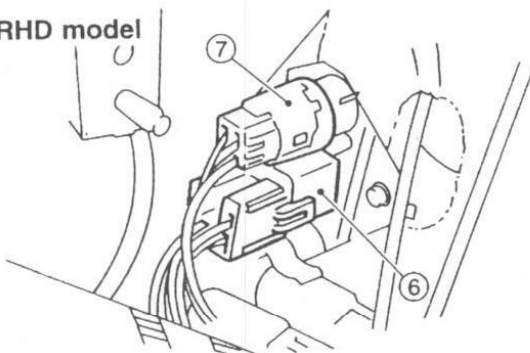
B2M1384A

LHD model



B2M0218D

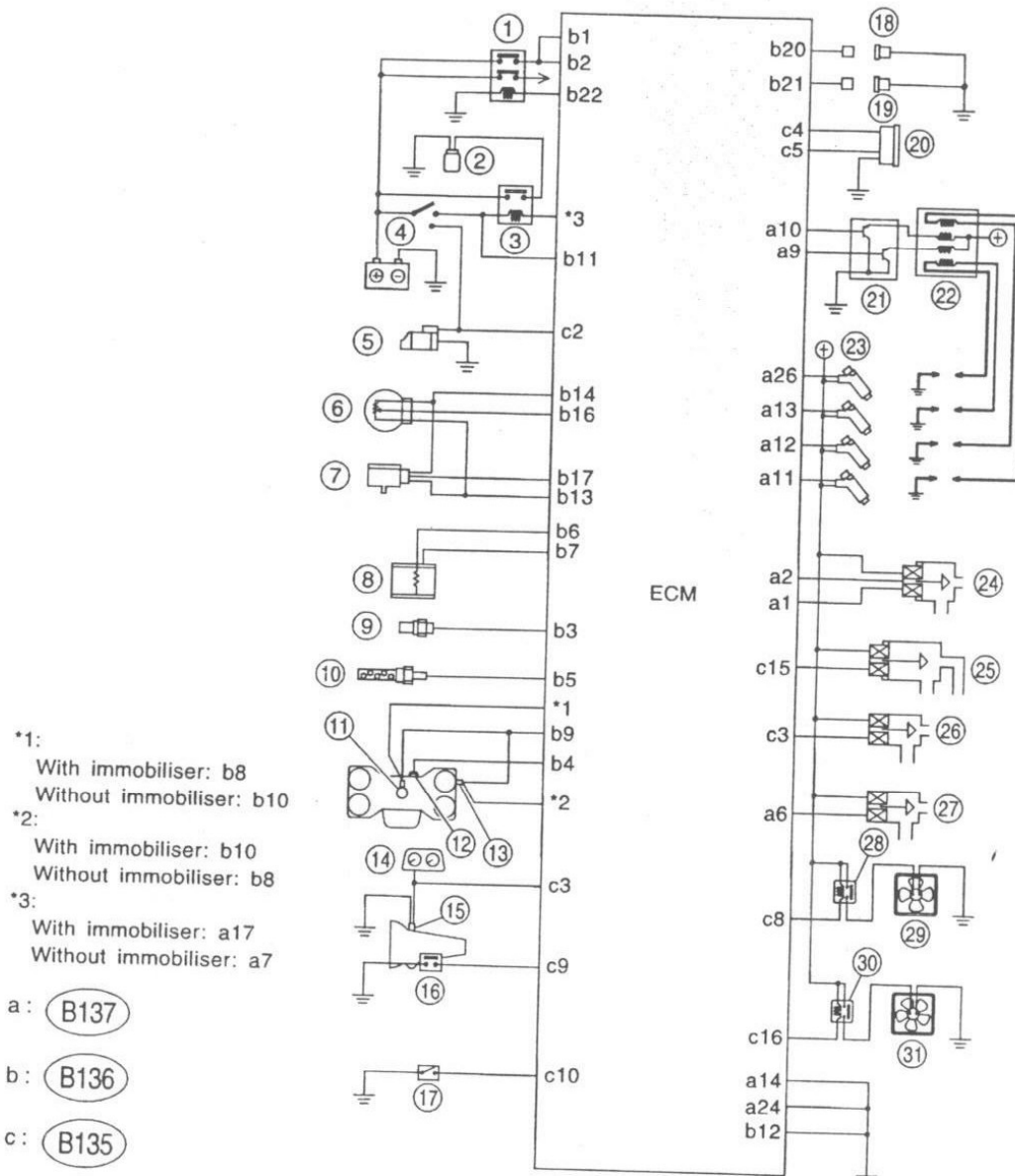
RHD model



B2M0434C

4. Schematic

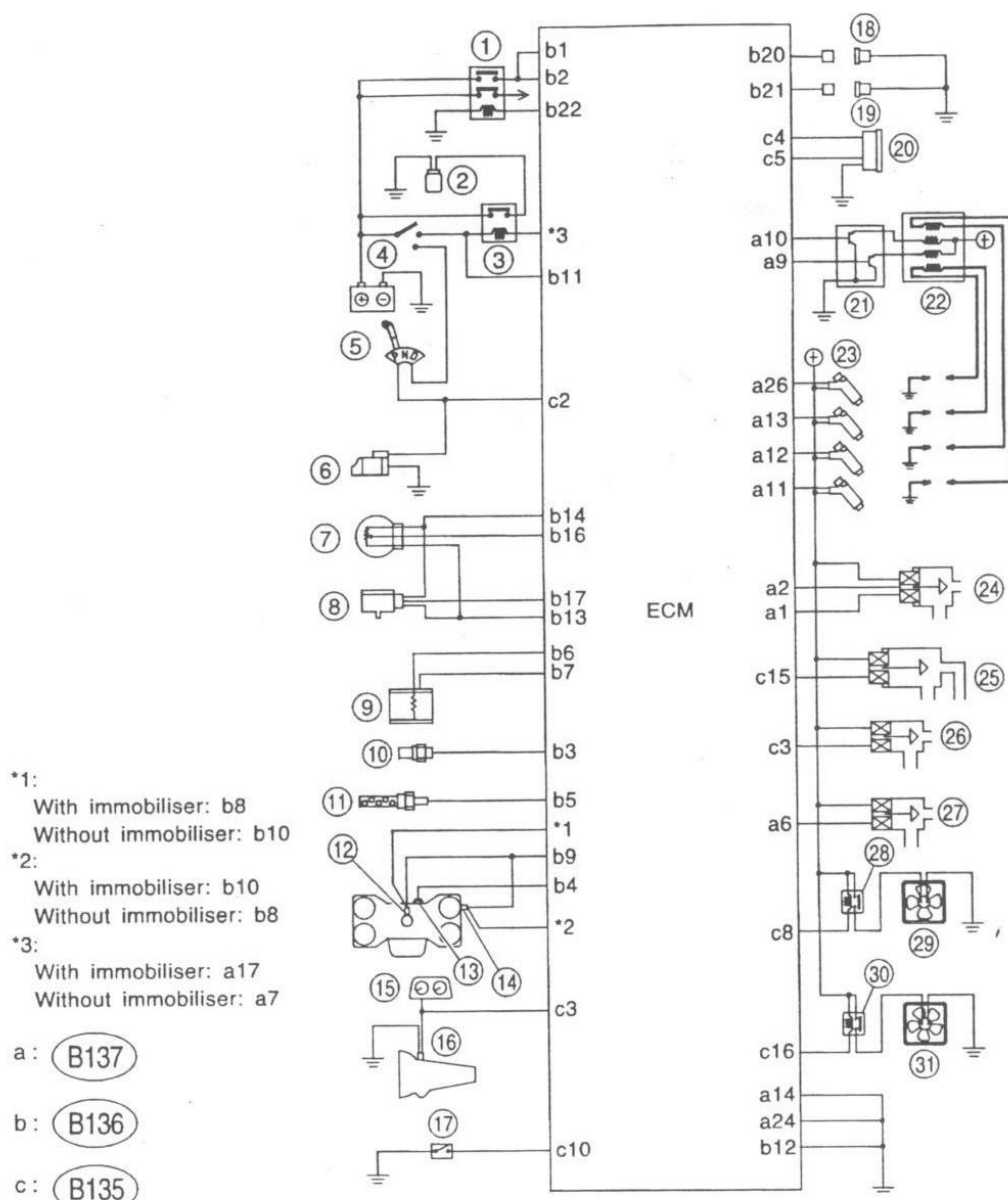
A: MT VEHICLES



H2M2165A

- | | | |
|-------------------------------------|------------------------------|---|
| ① Main relay | ⑪ Crankshaft position sensor | ⑳ Ignition coil |
| ② Fuel pump | ⑫ Knock sensor | ㉑ Fuel injector |
| ③ Fuel pump relay | ⑬ Camshaft position sensor | ㉒ Idle air control solenoid valve |
| ④ Ignition switch | ⑭ Combination meter | ㉓ Purge control solenoid valve |
| ⑤ Starter | ⑮ Vehicle speed sensor 2 | ㉔ Wastegate control solenoid valve |
| ⑥ Throttle position sensor | ⑯ Neutral position switch | ㉕ Pressure sources switching solenoid valve |
| ⑦ Pressure sensor | ⑰ A/C switch | ㉖ Radiator main fan relay |
| ⑧ Mass air flow sensor | ⑱ Read memory connector | ㉗ Radiator main fan |
| ⑨ Engine coolant temperature sensor | ㉒ Test mode connector | ㉘ Radiator sub fan relay |
| ⑩ Oxygen sensor | ㉓ Data link connector | ㉙ Radiator sub fan |
| | ㉔ Ignitor | |

B: AT VEHICLES



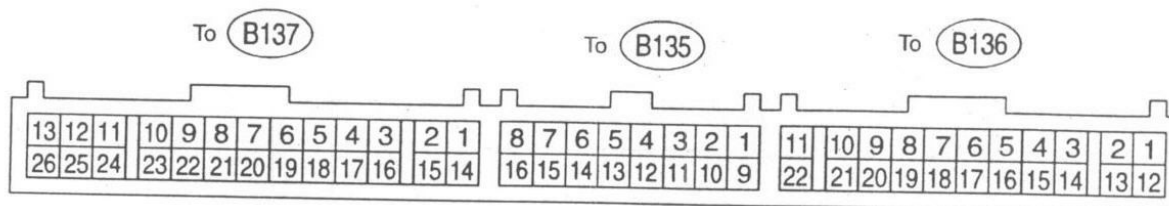
H2M2166A

- ① Main relay
- ② Fuel pump
- ③ Fuel pump relay
- ④ Ignition switch
- ⑤ Park/Neutral position (inhibitor) switch
- ⑥ Starter
- ⑦ Throttle position sensor
- ⑧ Pressure sensor
- ⑨ Mass air flow sensor
- ⑩ Engine coolant temperature sensor

- ⑪ Oxygen sensor
- ⑫ Crankshaft position sensor
- ⑬ Knock sensor
- ⑭ Camshaft position sensor
- ⑮ Combination meter
- ⑯ Vehicle speed sensor 2
- ⑰ A/C switch
- ⑱ Read memory connector
- ⑲ Test mode connector
- ⑳ Data link connector
- ㉑ Ignitor

- ㉒ Ignition coil
- ㉓ Fuel injector
- ㉔ Idle air control solenoid valve
- ㉕ Purge control solenoid valve
- ㉖ Wastegate control solenoid valve
- ㉗ Pressure sources switching solenoid valve
- ㉘ Radiator main fan relay
- ㉙ Radiator main fan
- ㉚ Radiator sub fan relay
- ㉛ Radiator sub fan

5. Control Module I/O Signal



B2M0219F

Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW	Engine ON (Idling)	
				ON (Engine OFF)		
Crankshaft position sensor	Signal (+)	B136	*1	0	±6	Sensor output waveform
	Signal (-)	B136	9	0	0	—
	Shield	B136	13	0	0	—
Camshaft position sensor	Signal (+)	B136	*2	0	±6	Sensor output waveform
	Signal (-)	B136	9	0	0	—
	Shield	B136	13	0	0	—
Mass air flow sensor	Signal	B136	6	0 — 0.3	0.8 — 1.2	—
	Shield	B136	13	0	0	—
	GND	B136	7	0	0	—
Throttle position sensor	Signal	B136	16	Fully closed: 0.5 ± 0.3 Fully opened: 4.3 ± 0.3		—
	Power supply	B136	14	5	5	—
	GND	B136	13	0	0	—
Oxygen sensor	Signal	B136	5	0	Rich mixture: 0.7 Lean mixture: 0	
	Shield	B136	13	0	0	—
Engine coolant temperature sensor	Signal	B136	3	0.6 — 1.0	0.6 — 1.0	After warm-up
	GND	B136	13	0	0	—
Vehicle speed sensor 2		B135	3	0 or 5	0 or 5	"5" and "0" are repeatedly displayed when vehicle is driven.
Starter switch		B135	2	0	0	Cranking: 10 to 14
A/C switch		B135	10	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
Ignition switch		B136	11	10 — 13	13 — 14	—
Neutral position switch (MT)		B135	9	ON: 5 OFF: 0		Switch is ON when gear is in neutral position.
Park/Neutral position switch (AT)		B135	9	ON: 0 OFF: 5		Switch is ON when shift lever is in "P" or "N" position.
Test mode connector		B136	21	5	5	When connected: 0

*1: With immobiliser: 8
Without immobiliser: 10

*2: With immobiliser: 10
Without immobiliser: 8

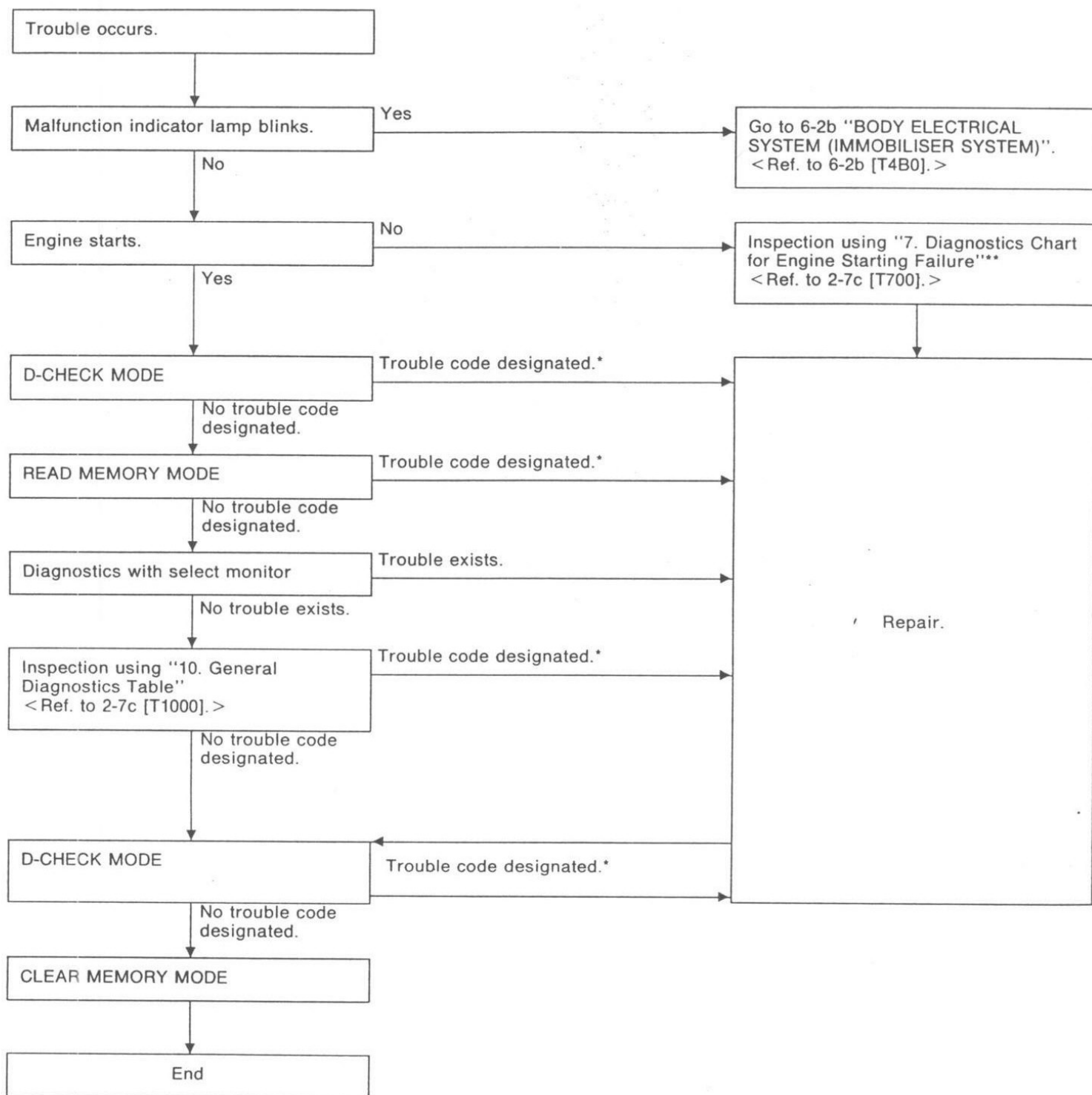
Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW	Engine ON (Idling)	
				ON (Engine OFF)		
Read memory connector		B136	20	5	5	When connected: 0
Back-up power supply		B137	15	10 — 13	13 — 14	—
Control unit power supply		B136	1	10 — 13	13 — 14	—
			2			
Ignition control	# 1, # 2	B137	10	0	3.4, max.	—
	# 3, # 4	B137	9	0	3.4, max.	—
Fuel injector	# 1	B137	26	10 — 13	13 — 14	Waveform
	# 2	B137	13	10 — 13	13 — 14	Waveform
	# 3	B137	12	10 — 13	13 — 14	Waveform
	# 4	B137	11	10 — 13	13 — 14	Waveform
Idle air control solenoid valve	OPEN end	B137	2	—	1, max. — 13, min.	Waveform
	CLOSE end	B137	1	—	13, min. — 1, max.	Waveform
Torque control signal*4		B135	11	0	5	—
Fuel pump relay control		B137	*3	ON: 0 OFF: 10 — 13	0	—
A/C relay control		B137	21	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Radiator fan relay 1 control		B135	8	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Radiator fan relay 2 control		B135	16	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Self-shutoff control		B136	22	10 — 13	13 — 14	—
Malfunction indicator lamp		B137	8	—	—	Light "ON": 1, max. Light "OFF": 10 — 14
Engine speed output		B135	14	—	0 — 13, min.	Waveform
Knock sensor	Signal	B136	4	2.8	2.8	—
	Shield	B136	13	0	0	—
Wastegate control		B137	3	10 — 13	13 — 14	—
Pressure sources switching solenoid valve		B137	6	10 — 13	13 — 14	—
Purge control solenoid valve		B135	15	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
GND (sensors)		B136	13	0	0	—
GND (injectors)		B137	25	0	0	—
GND (ignition system)		B137	24	0	0	—
GND (power supply)		B137	14	0	0	—
GND (control systems)		B136	12	0	0	—
Select monitor signal		B135	4	—	—	—
			5	—	—	—

*3: With immobiliser: 17
Without immobiliser: 7

*4: AT model only

6. Diagnostics Chart for On-board Diagnosis System

A: BASIC DIAGNOSTICS PROCEDURE



*: When more than one trouble code is out-putted, begin diagnostics with the smallest trouble code number and proceed to the next higher code. After correcting each problem, conduct the D-CHECK and ensure that the corresponding trouble code no longer appears.

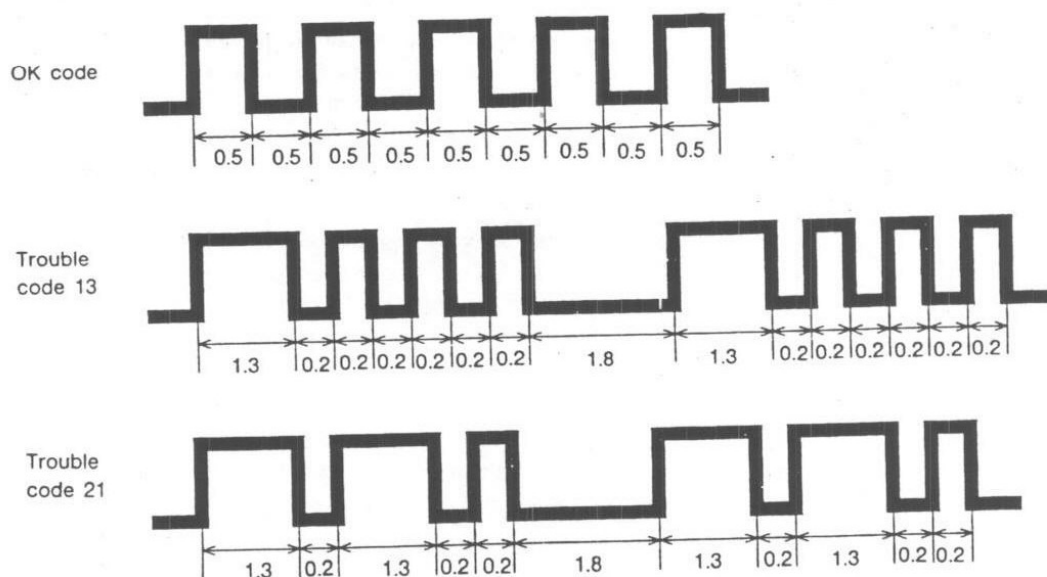
** : When a trouble code is displayed in the READ MEMORY MODE, conduct diagnostics measures which correspond with the code.

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.

B: TROUBLE CODE**1. HOW TO READ TROUBLE CODE**

The malfunction indicator lamp flashes the code corresponding to the 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.



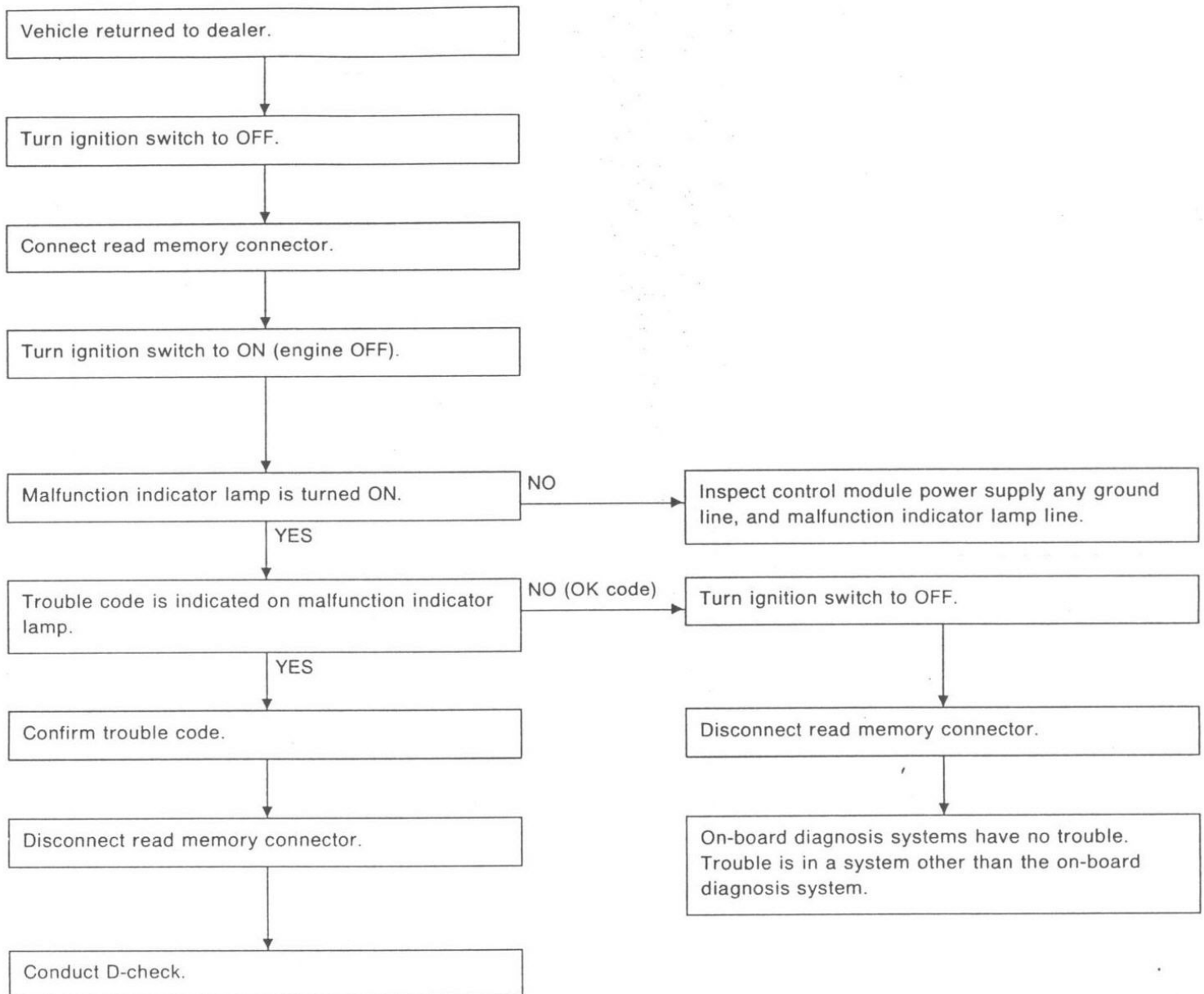
G2M0886

2. LIST OF TROUBLE CODE

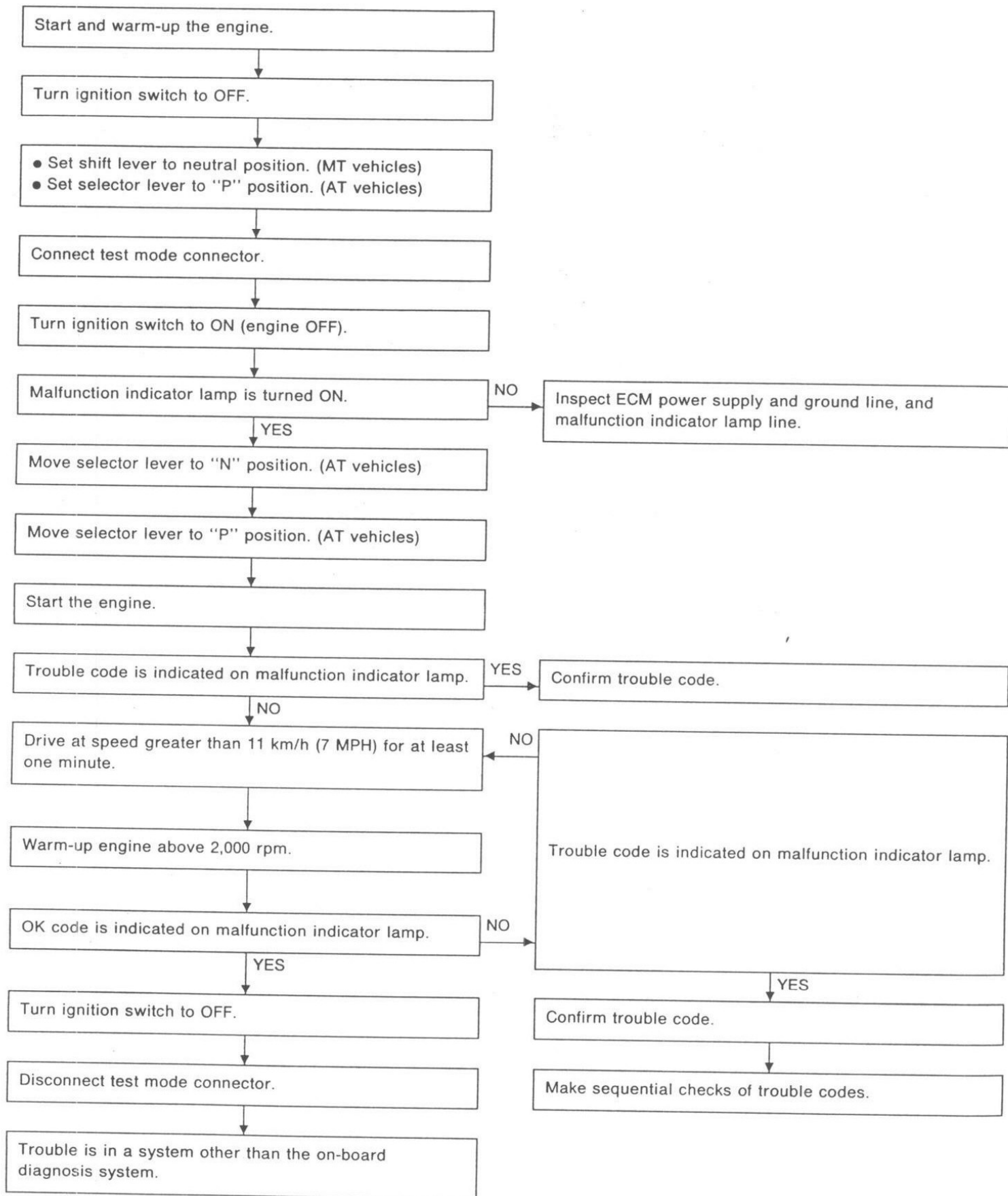
Trouble code	Item	Contents of diagnosis
11	Crankshaft position sensor	● No signal entered from crankshaft position sensor when starter switch is ON. ● The harness connector between ECM and crankshaft position sensor is in short or open.
12	Starter switch	● The starter switch signal is abnormal. ● The harness connector between ECM and starter switch is in short or open.
13	Camshaft position sensor	● No signal entered from camshaft position sensor, but signal entered from crankshaft position sensor. ● The harness connector between ECM and camshaft position sensor is in short or open.
21	Engine coolant temperature sensor	● The engine coolant temperature sensor signal is abnormal. ● The harness connector between ECM and engine coolant temperature sensor is in short or open.
22	Knock sensor	● The knock sensor signal is abnormal. ● The harness connector between ECM and knock sensor is in short or open.
23	Mass air flow sensor	● The mass air flow sensor signal is abnormal. ● The harness connector between ECM and mass air flow sensor is in short or open.
24	Idle air control solenoid valve	● The idle air control solenoid valve is not in function. ● The harness connector between ECM and idle air control solenoid valve is in short or open.
31	Throttle position sensor	● The throttle position sensor signal is abnormal. ● The throttle position sensor is installed abnormally. ● The harness connector between ECM and throttle position sensor is in short or open.
32	Oxygen sensor	● The oxygen sensor is not in function. ● The harness connector between ECM and oxygen sensor is in short or open.
33	Vehicle speed sensor 2	● The vehicle speed sensor 2 is not in function. ● The harness connector between ECM and vehicle speed sensor 2 is in short or open.
38	Torque control signal (AT)	● Abnormal signal is entered from TCM. ● The harness connector between ECM and TCM is in short or open.
44	Wastegate control solenoid valve	● The wastegate control solenoid valve is not in function. ● The harness connector between ECM and wastegate control solenoid valve is in short or open.
45	● Pressure sensor ● Pressure sources switching solenoid valve	● The pressure sensor signal is abnormal. ● The pressure sources switching solenoid valve is not in function. ● The intake manifold pressure is not transmitted to pressure sensor. ● The harness connector between ECM and pressure sensor, and pressure sources switching solenoid valve is in short or open.
51	Neutral position switch (MT)	● The neutral position switch signal is abnormal. ● The harness connector between ECM and neutral position switch is in short or open.
	Park/Neutral position switch (AT)	● The park/neutral position switch signal is abnormal. ● The shift cable is connected abnormally. ● The harness connector between ECM and inhibitor switch is in short or open.
53*	Immobiliser system	Faulty immobiliser system. < Refer to 6-2b [T100]. >

*: Immobiliser system equipped model only

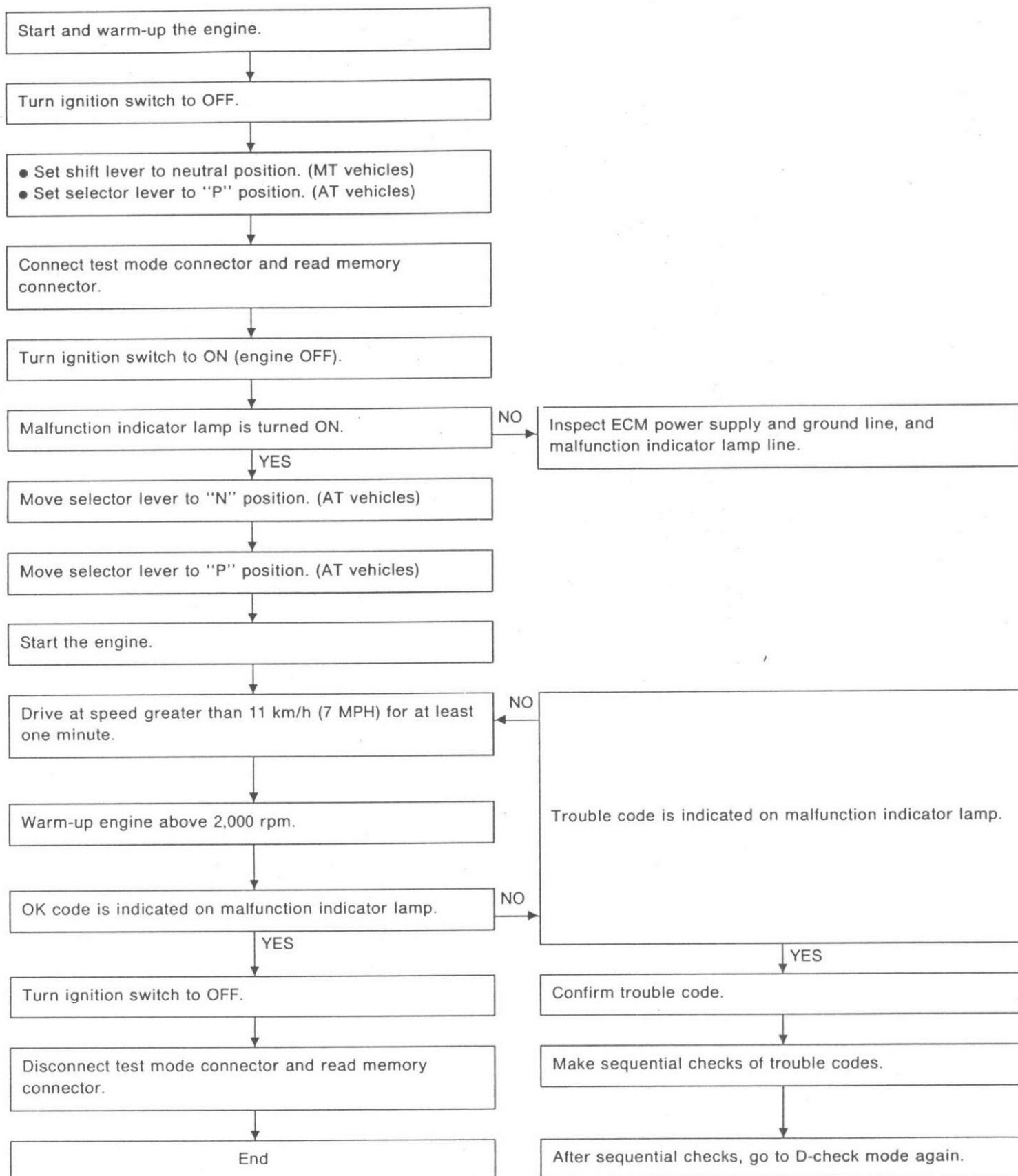
C: READ MEMORY MODE



D: D-CHECK MODE



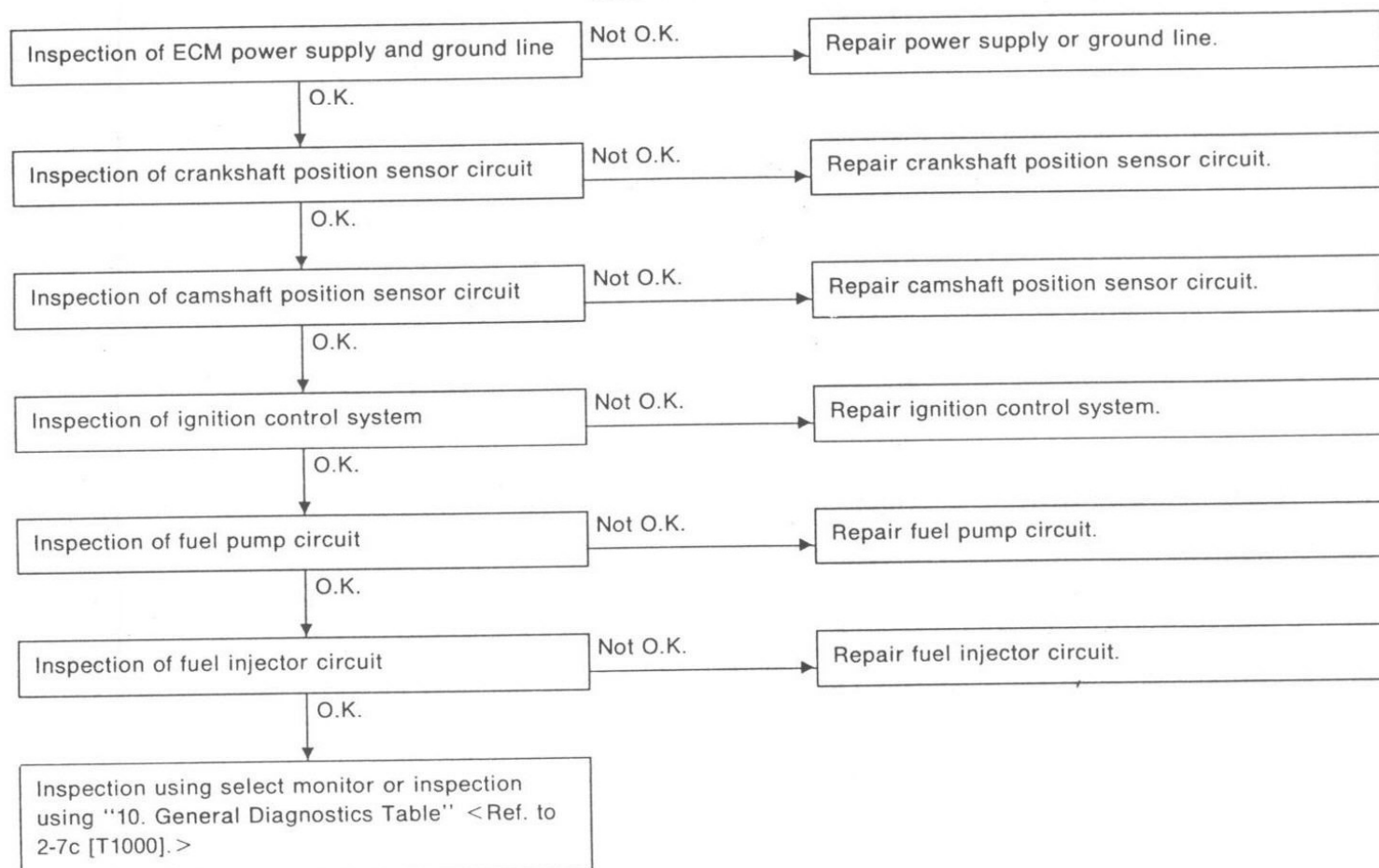
E: CLEAR MEMORY MODE

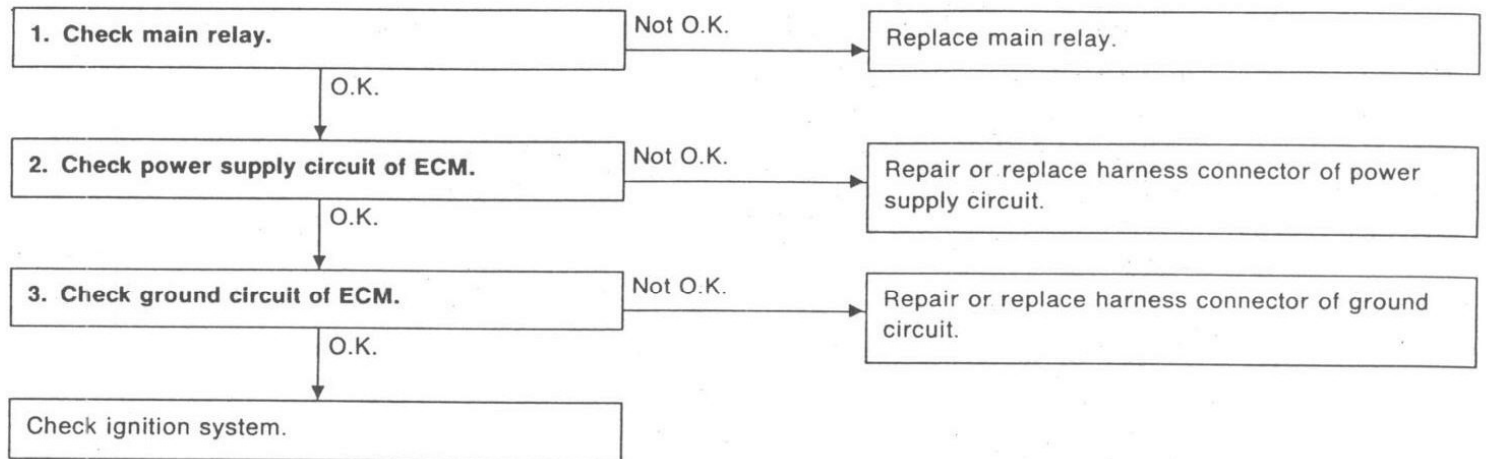
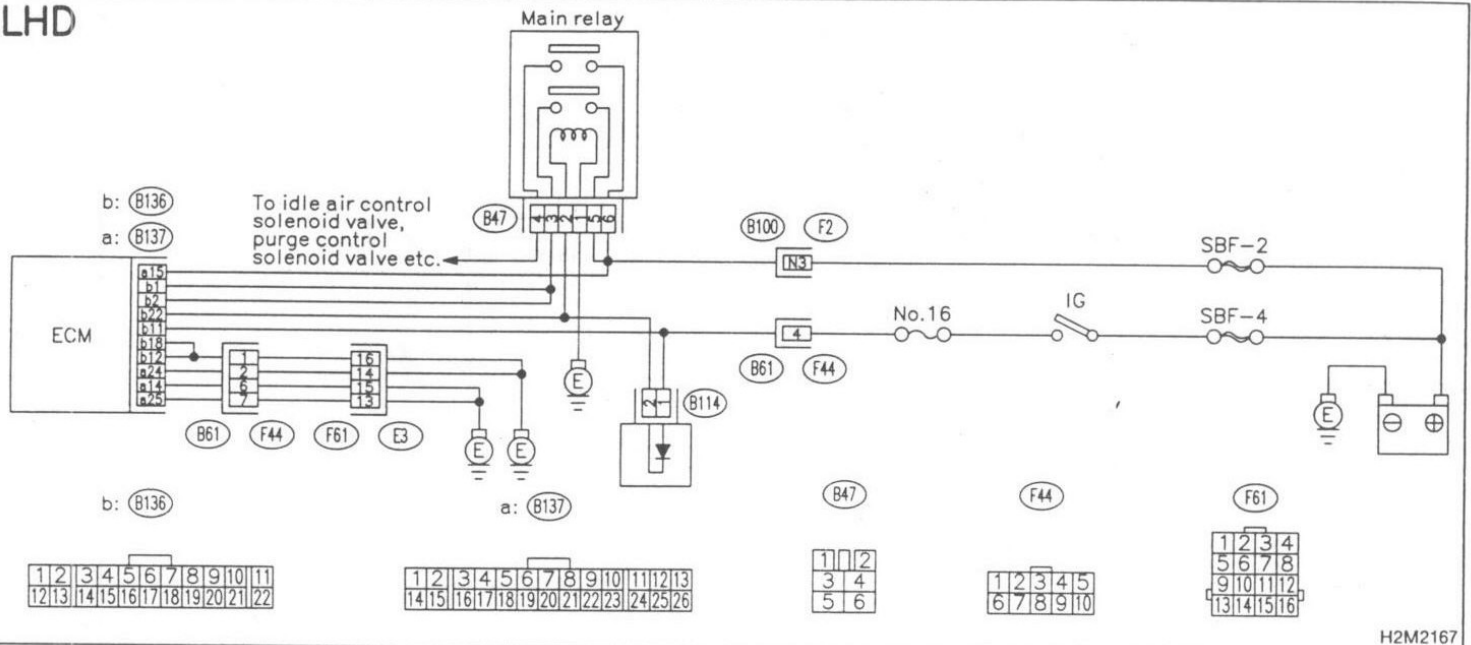


7. Diagnostics Chart for Engine Starting Failure

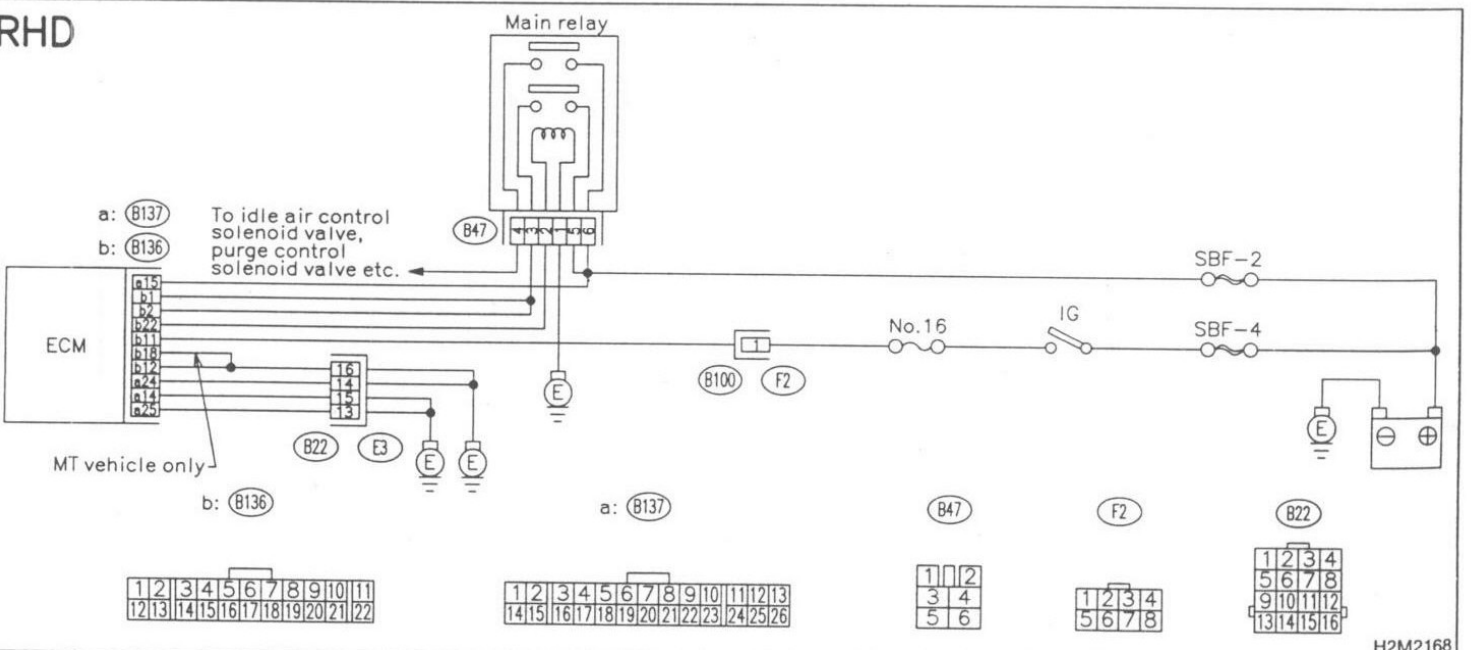
A: BASIC DIAGNOSTICS CHART

When engine cranks but does not start, perform diagnostics in accordance with the following chart.

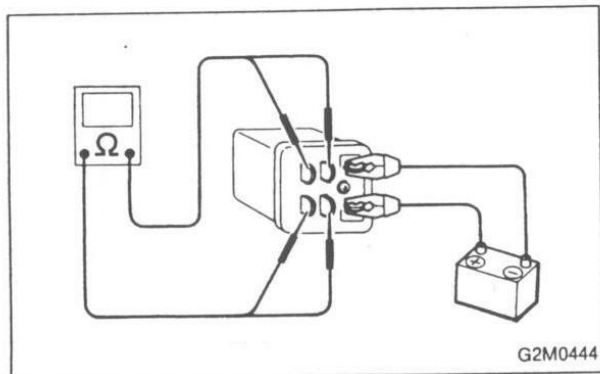


B: CONTROL UNIT POWER SUPPLY AND GROUND LINE**LHD**

H2M2167

RHD

H2M2168



G2M0444

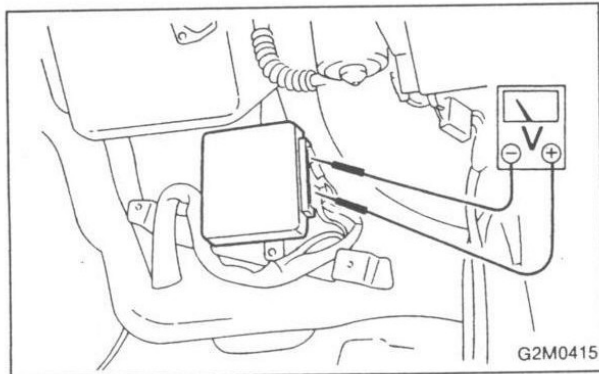
1. CHECK MAIN RELAY.

- 1) Turn the ignition switch to OFF.
- 2) Remove main relay.
- 3) Connect battery to main relay terminals No. 1 and No. 2.
- 4) Measure resistance between main relay terminals.

Terminals / Specified resistance:

No. 3 — No. 5 / Less than 10 Ω

No. 4 — No. 6 / Less than 10 Ω



G2M0415

2. CHECK POWER SUPPLY CIRCUIT OF ECM.

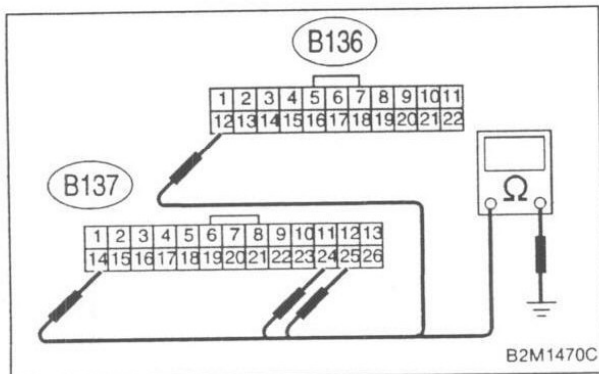
- 1) Install main relay.
- 2) Turn ignition switch to ON.
- 3) Measure power supply voltage between ECM connector terminals and body.

Connector & terminal / Specified voltage:

(B136) No. 1 — (B137) No. 14 / More than 10 V

(B136) No. 2 — (B137) No. 14 / More than 10 V

(B136) No. 11 — (B137) No. 14 / More than 10 V



B2M1470C

3. CHECK GROUND CIRCUIT OF ECM.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance of harness connector between ECM and body.

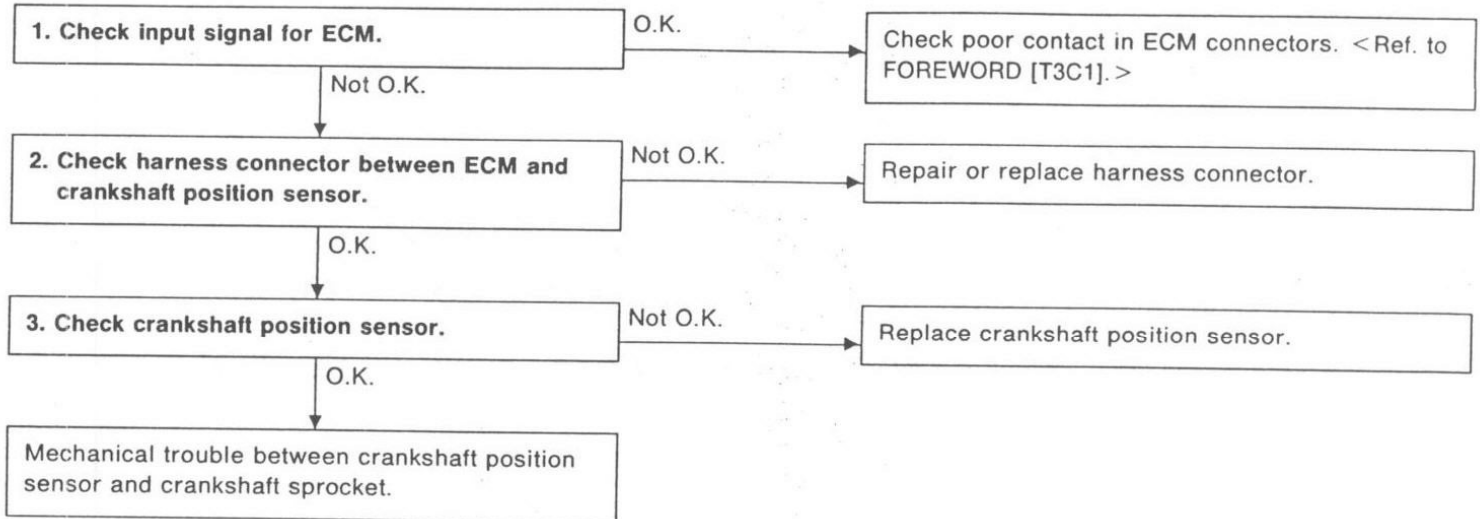
Connector & terminal / Specified resistance:

(B136) No. 12 — Body / Less than 5 Ω

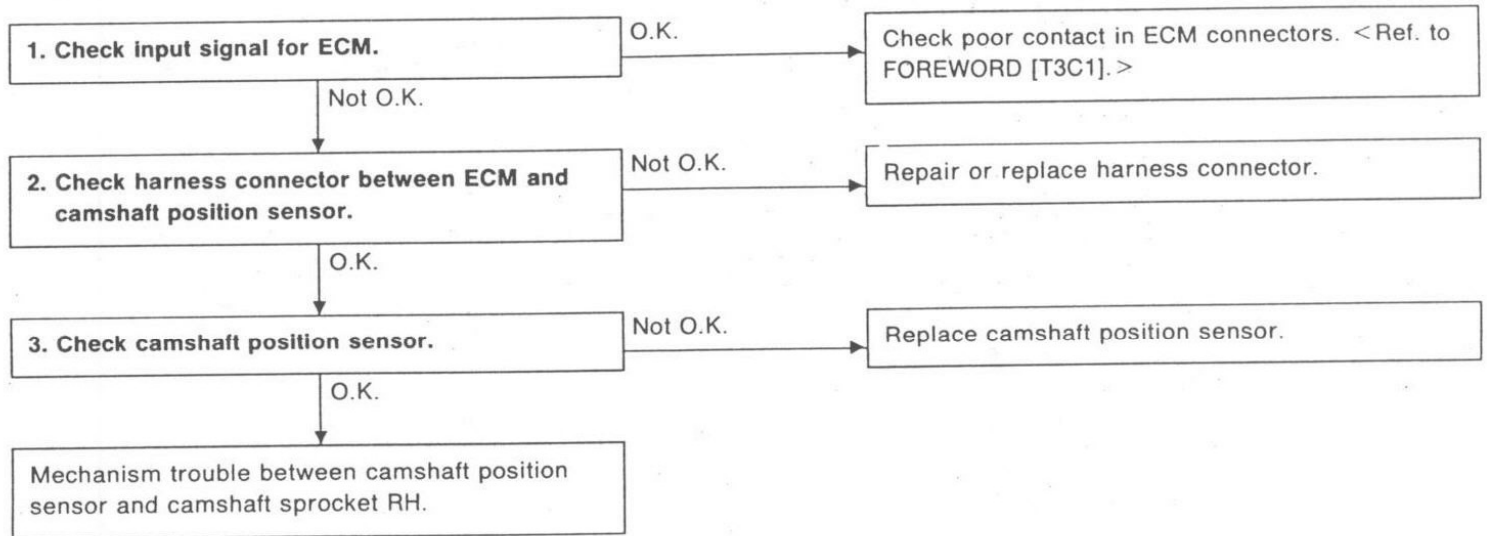
(B137) No. 14 — Body / Less than 5 Ω

(B137) No. 24 — Body / Less than 5 Ω

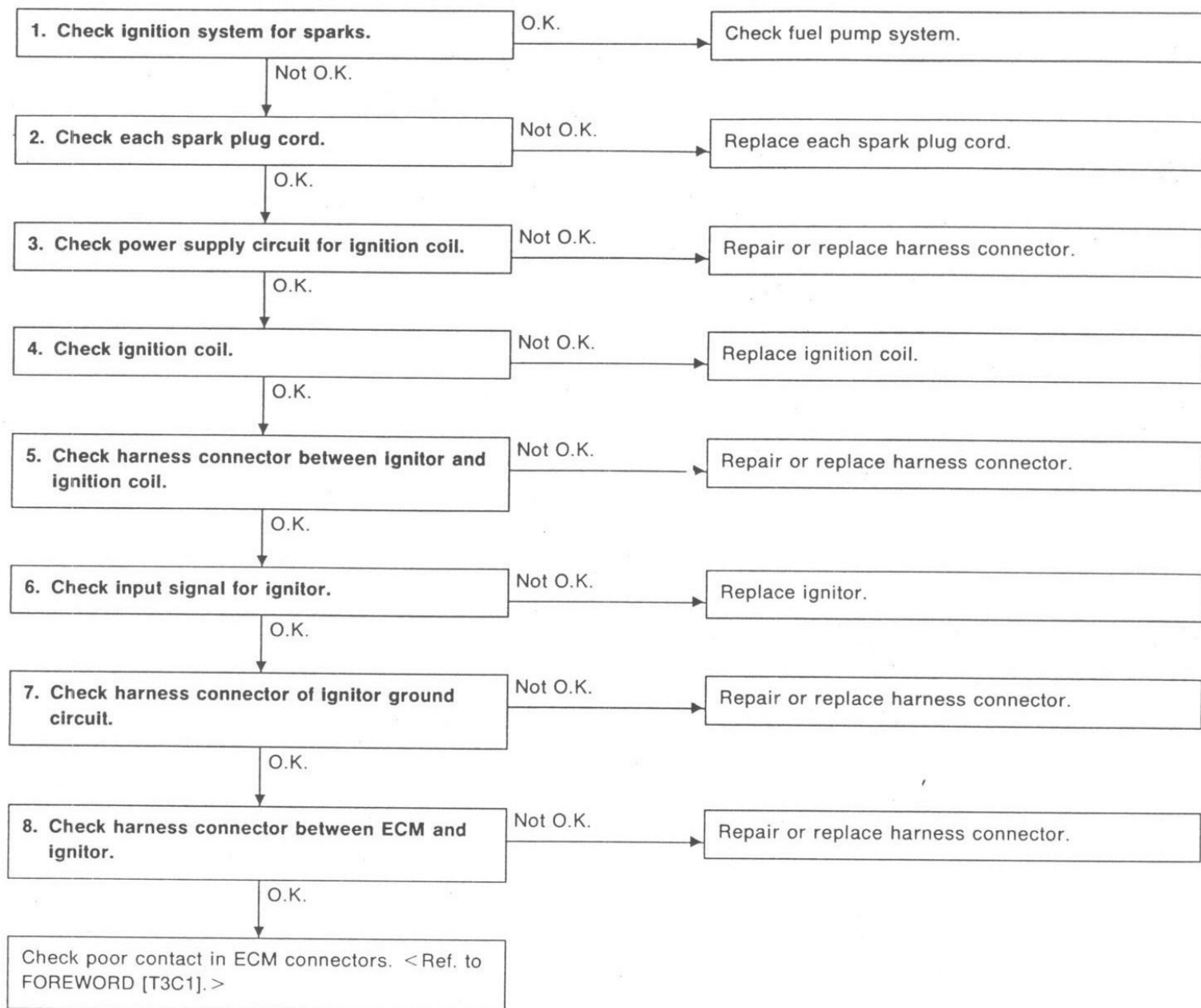
(B137) No. 25 — Body / Less than 5 Ω

C: CRANKSHAFT POSITION SENSOR CIRCUIT**NOTE:**

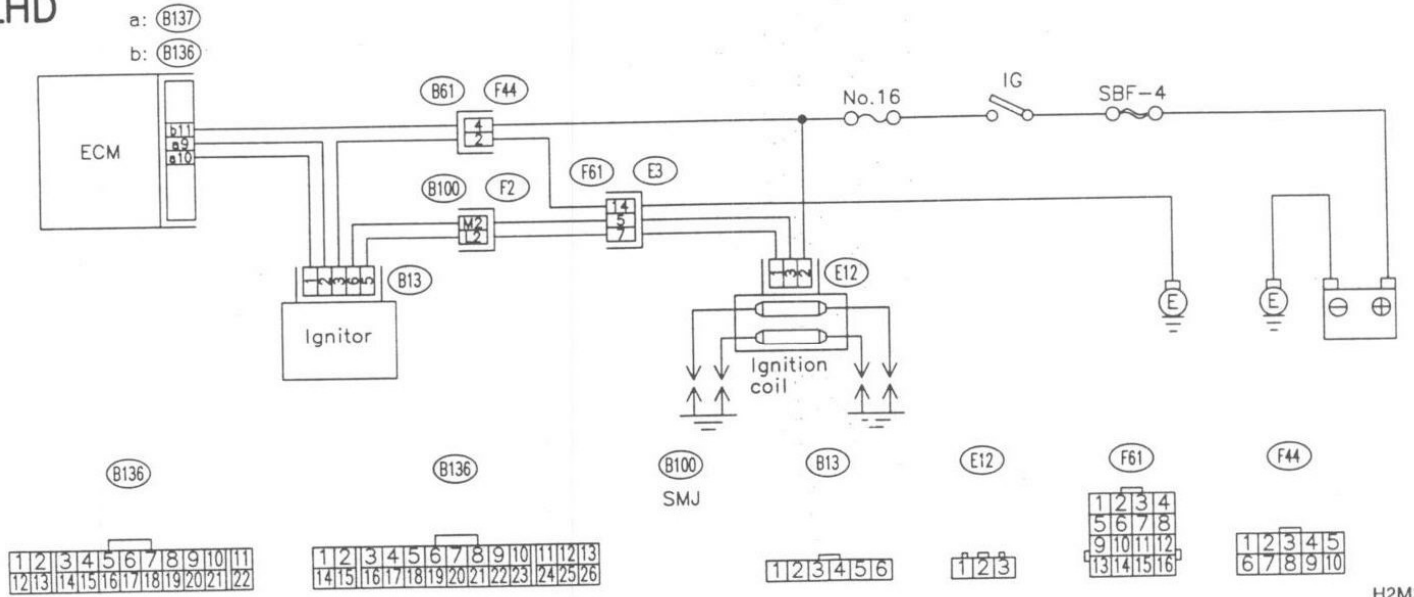
Check crankshaft position sensor circuit.
< Ref. to 2-7c [T8B0]. >

D: CAMSHAFT POSITION SENSOR CIRCUIT**NOTE:**

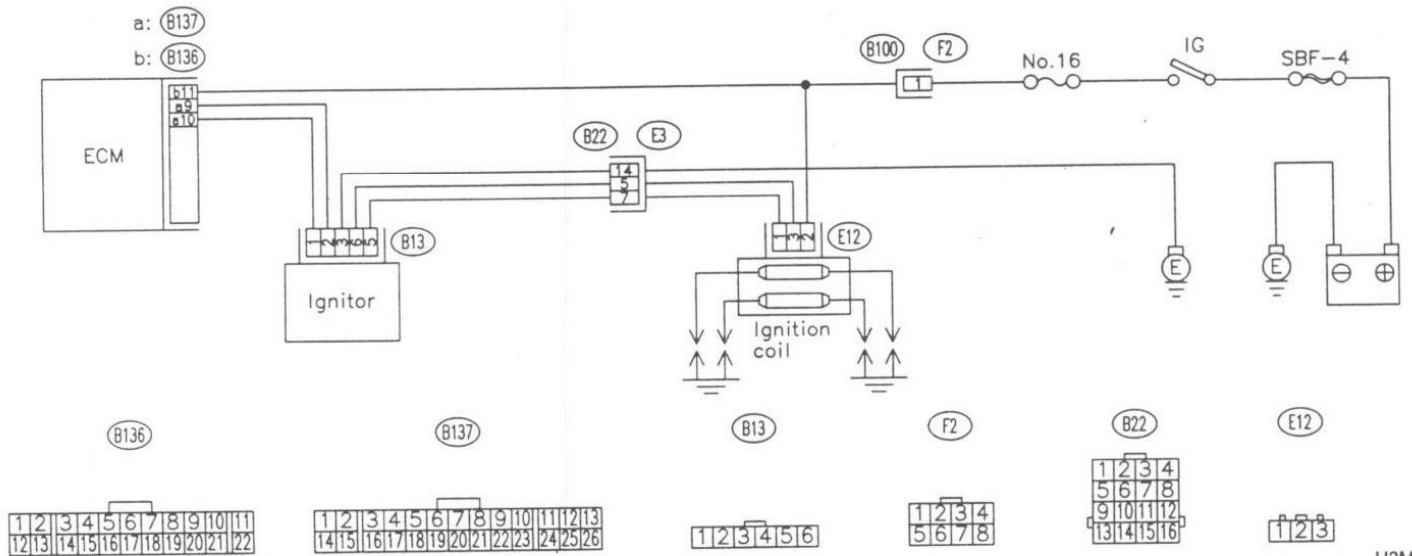
Check camshaft position sensor circuit.
<Ref. to 2-7c [T8D0].>

E: IGNITION CONTROL SYSTEM

LHD



RHD



1. CHECK IGNITION SYSTEM FOR SPARKS.

- 1) Remove plug cord cap from each spark plug.
- 2) Install new spark plug on plug cord cap.

CAUTION:

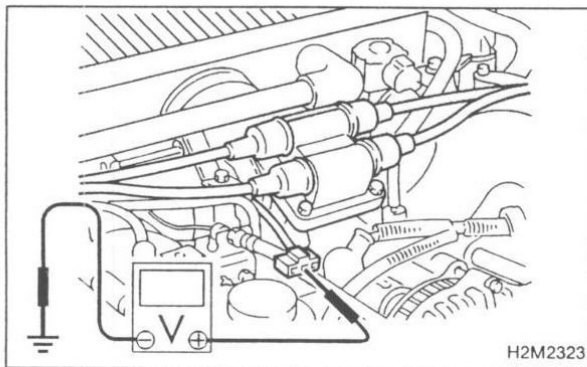
Do not remove spark plug from engine.

- 3) Contact spark plug's thread portion on engine.
- 4) While opening throttle valve fully, crank engine to check that spark occurs at each cylinder.

2. CHECK EACH SPARK PLUG CORD.

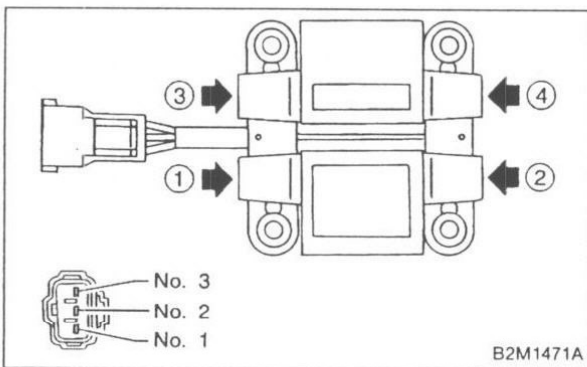
- 1) Remove each spark plug cord.
- 2) Measure resistance of each spark plug cord.

	Resistance value: kΩ
#1 cord	7.40 — 17.27
#2 cord	6.24 — 14.56
#3 cord	6.54 — 15.25
#4 cord	6.59 — 15.37

**3. CHECK POWER SUPPLY CIRCUIT FOR IGNITION COIL.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ignition coil.
- 3) Turn ignition switch to ON.
- 4) Measure power supply voltage between ignition coil connector terminal and body.

Connector & terminal / Specified voltage:
(E12) No. 2 — Body / More than 10 V

**4. CHECK IGNITION COIL.**

- 1) Measure resistance between ignition coil terminals to check primary coil.

Terminals / Specified resistance:

No. 2 — No. 1 / About 1 Ω

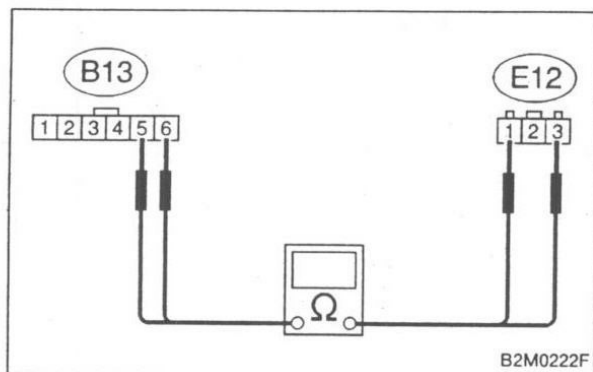
No. 2 — No. 3 / About 1 Ω

- 2) Measure resistance between spark plug cord contact portions to check secondary coil.

Connector & terminal / Specified resistance:

① — ② / 21 ± 3 kΩ

③ — ④ / 21 ± 3 kΩ



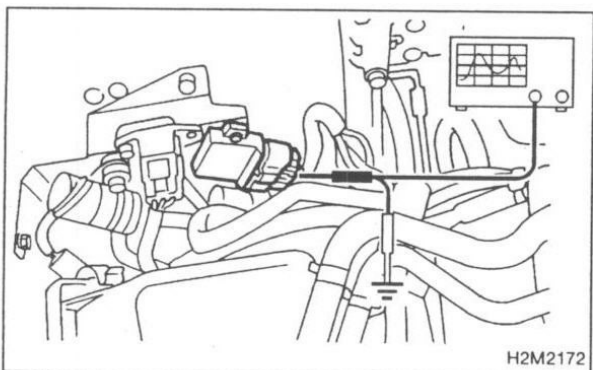
5. CHECK HARNESS CONNECTOR BETWEEN IGNITOR AND IGNITION COIL.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ignitor.
- 3) Measure resistance of harness connector between ignition coil and ignitor.

Connector & terminal / Specified resistance:

(B13) No. 5 — (E12) No. 1 / Less than 1 Ω

(B13) No. 6 — (E12) No. 3 / Less than 1 Ω



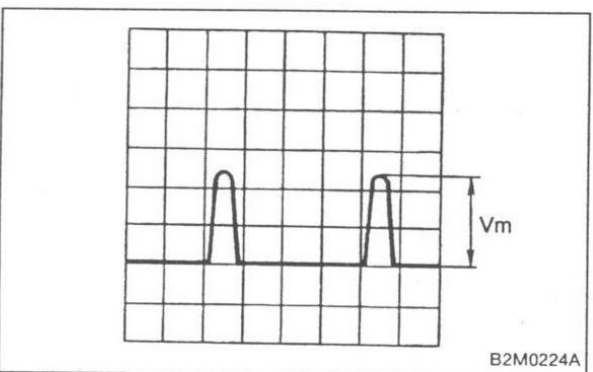
6. CHECK INPUT SIGNAL FOR IGNITOR.

Check if voltage varies synchronously with engine speed when cranking, while monitoring voltage between ignitor connector and body.

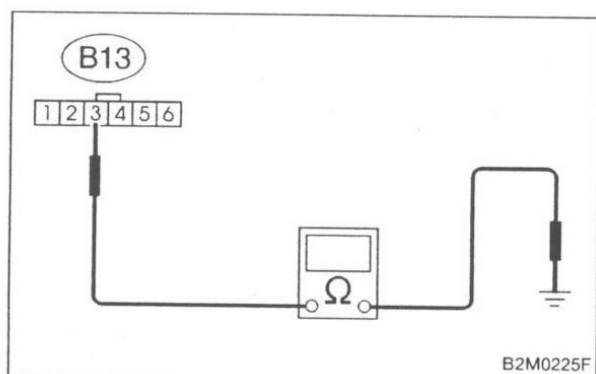
Connector & terminal

(B13) No. 1 — Body

(B13) No. 2 — Body



Specified voltage: More than 10 V

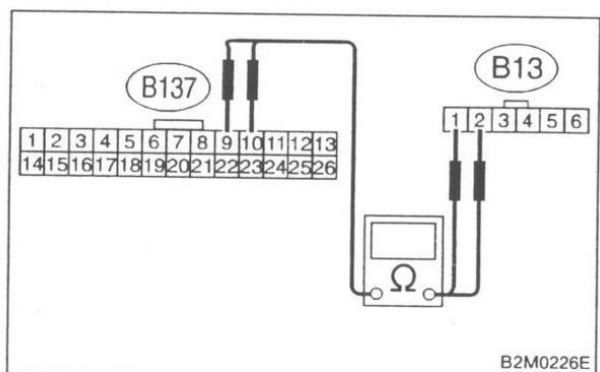


7. CHECK HARNESS CONNECTOR OF IGNITOR GROUND CIRCUIT.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between ignitor and body.

Connector & terminal / Specified resistance:

(B13) No. 3 — Body / Less than 1 Ω



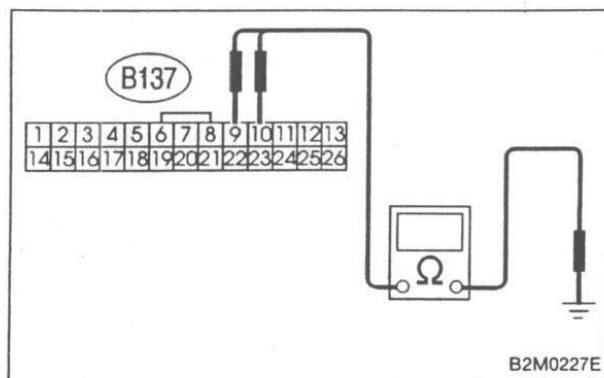
8. CHECK HARNESS CONNECTOR BETWEEN ECM AND IGNITOR.

- 1) Disconnect connector from ECM.
- 2) Measure resistance of harness connector between ECM and ignitor.

Connector & terminal / Specified resistance:

(B137) No. 10 — (B13) No. 1 / Less than 1 Ω

(B137) No. 9 — (B13) No. 2 / Less than 1 Ω



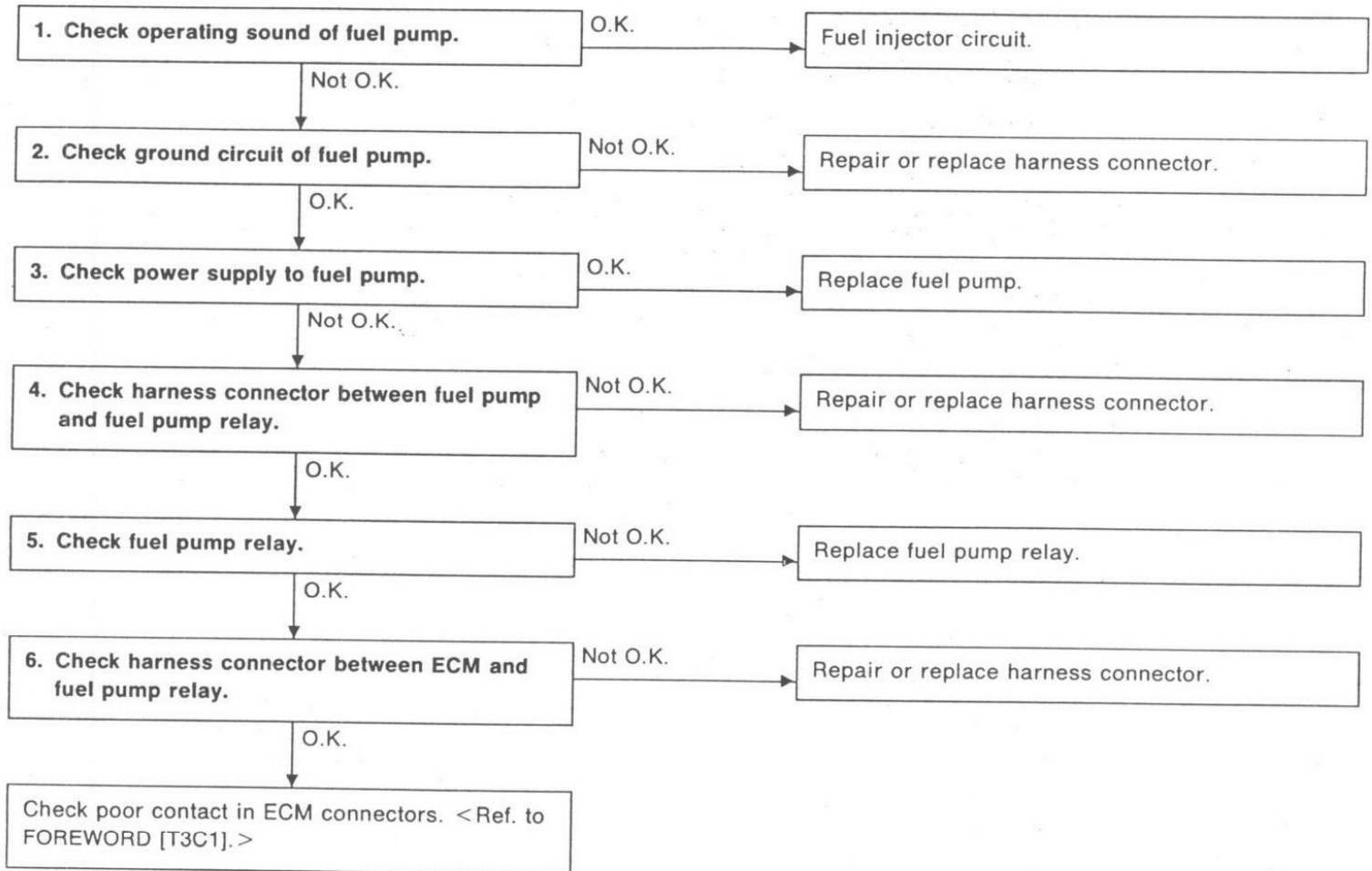
3) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

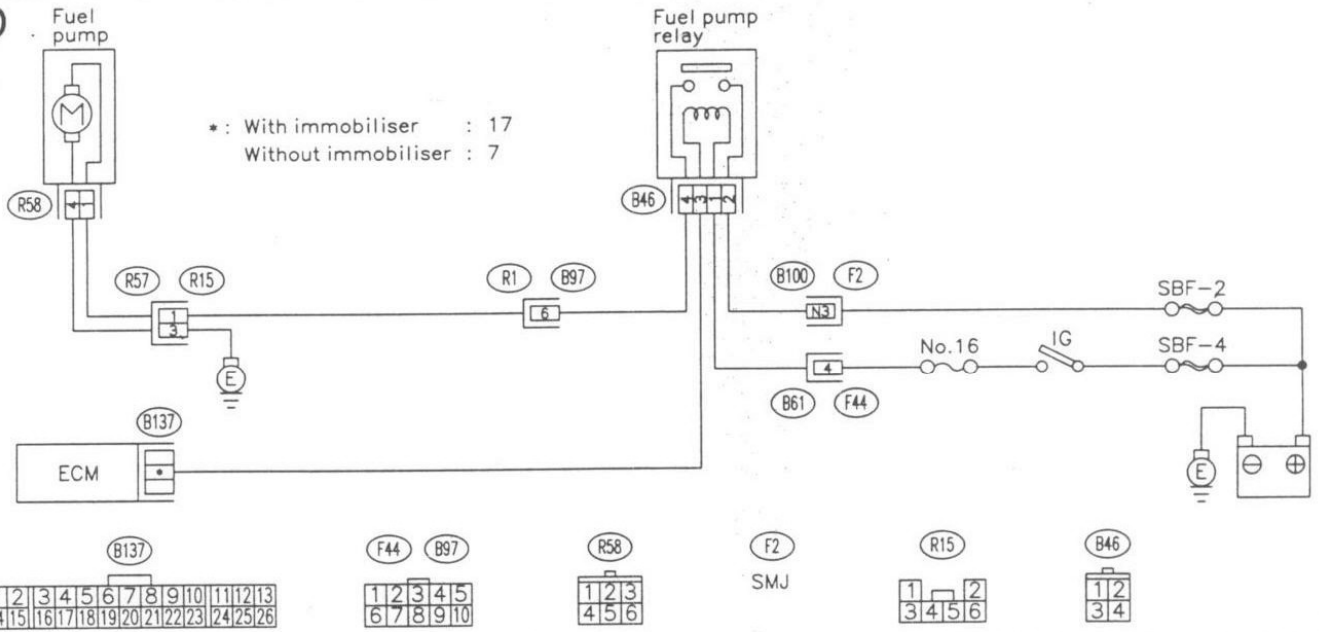
(B137) No. 10 — Body / More than 1 MΩ

(B137) No. 9 — Body / More than 1 MΩ

F: FUEL PUMP CIRCUIT

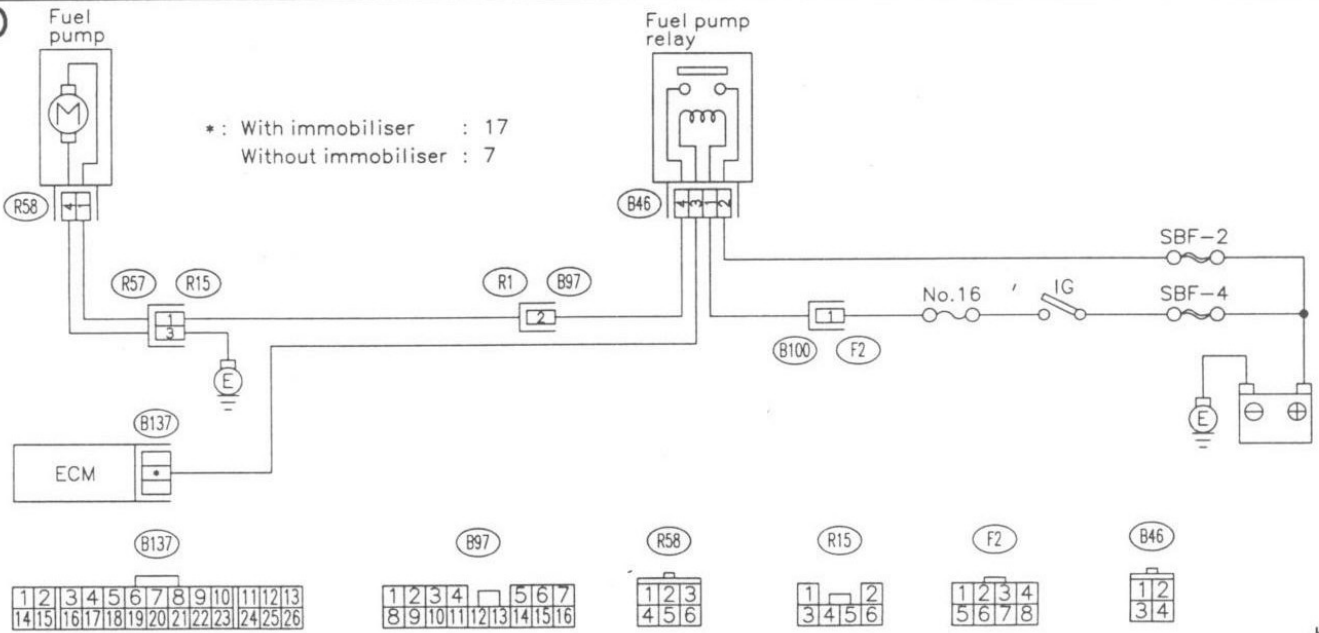


LHD



H2M2173

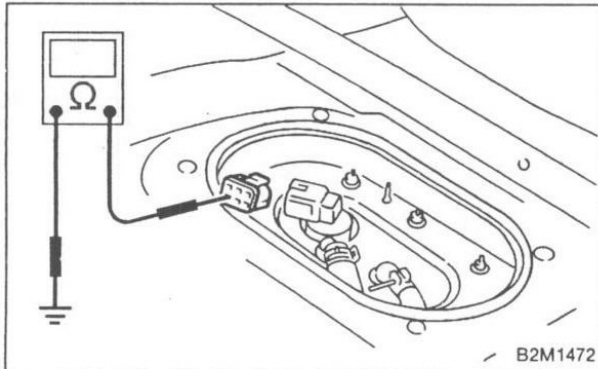
RHD



H2M2174

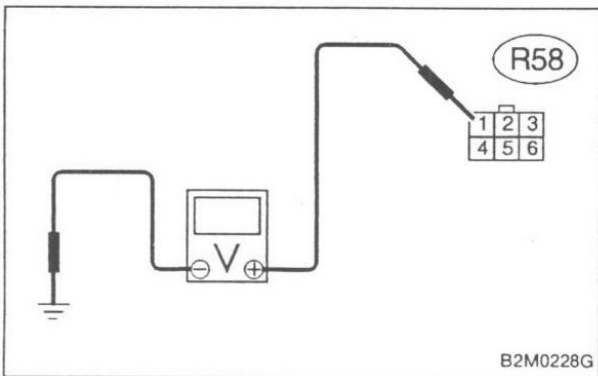
1. CHECK OPERATING SOUND OF FUEL PUMP.

Make sure that fuel pump is in operation for two seconds when turning ignition switch to ON.

**2. CHECK GROUND CIRCUIT OF FUEL PUMP.**

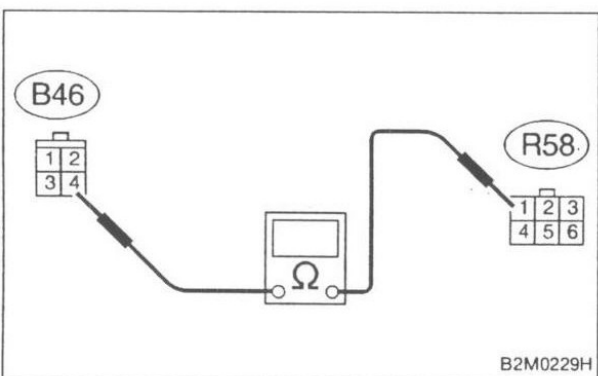
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from fuel pump.
- 3) Measure resistance of harness connector between fuel pump and body.

Connector & terminal / Specified resistance:
(R58) No. 4 — Body / Less than 5 Ω

**3. CHECK POWER SUPPLY TO FUEL PUMP.**

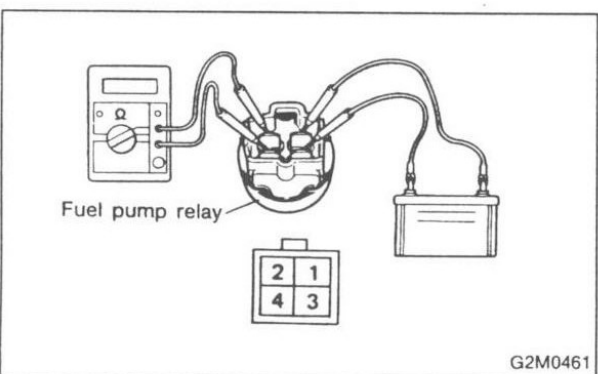
- 1) Turn ignition switch to ON.
- 2) Measure voltage of power supply circuit between fuel pump connector and body.

Connector & terminal / Specified voltage:
(R58) No. 1 — Body / More than 10 V

**4. CHECK HARNESS CONNECTOR BETWEEN FUEL PUMP AND FUEL PUMP RELAY.**

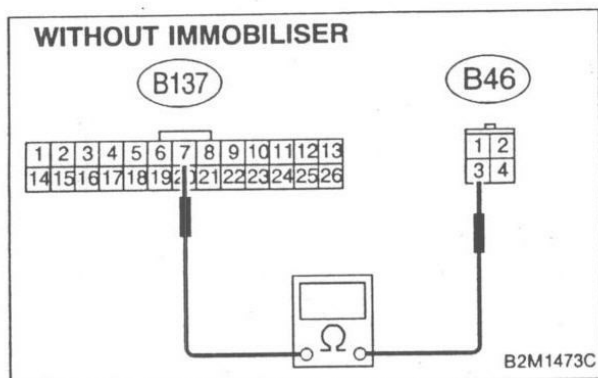
- 1) Turn ignition switch to OFF.
- 2) Measure resistance of harness connector between fuel pump and fuel pump relay.

Connector & terminal / Specified resistance:
(R58) No. 1 — (B46) No. 4 / Less than 1 Ω

**5. CHECK FUEL PUMP RELAY.**

- 1) Disconnect connectors from fuel pump relay and main relay.
- 2) Remove fuel pump relay and main relay with bracket.
- 3) Connect battery to fuel pump relay connector terminals No. 1 and No. 3.
- 4) Measure resistance between connector terminals of fuel pump relay.

Terminals / Specified resistance:
No. 2 — No. 4 / Less than 1 Ω



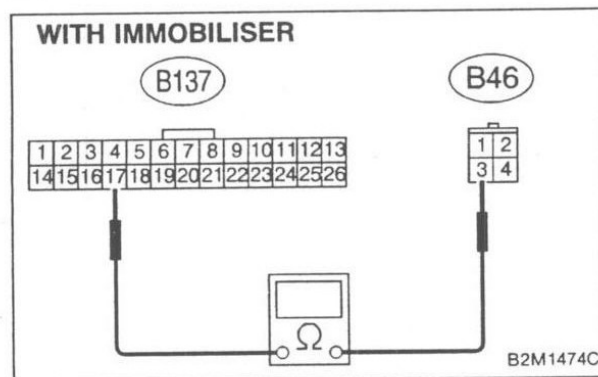
6. CHECK HARNESS CONNECTOR BETWEEN ECM AND FUEL PUMP RELAY.

- 1) Disconnect connectors from ECM.
- 2) Measure resistance of harness connector between ECM and fuel pump relay.

Connector & terminal / Specified resistance:

Without immobiliser:

(B137) No. 7 — (B46) No. 3 / Less than 1 Ω

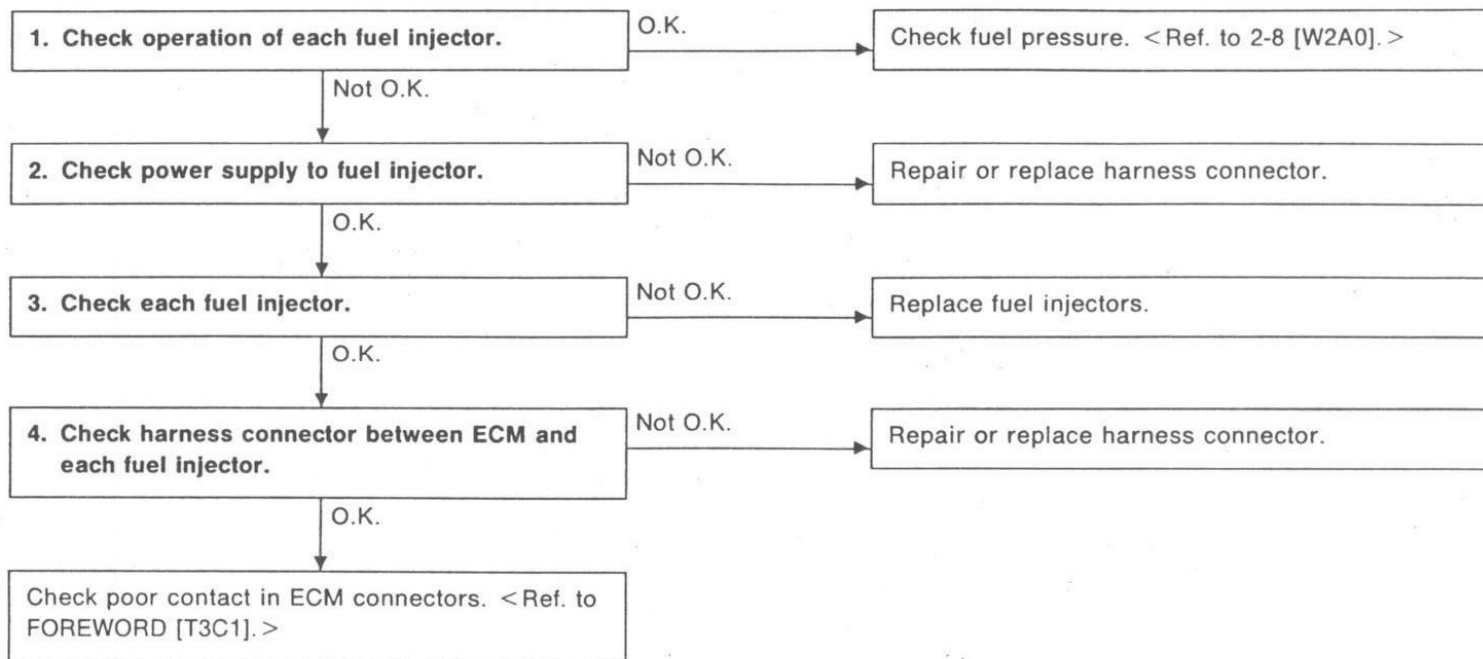


Connector & terminal / Specified resistance:

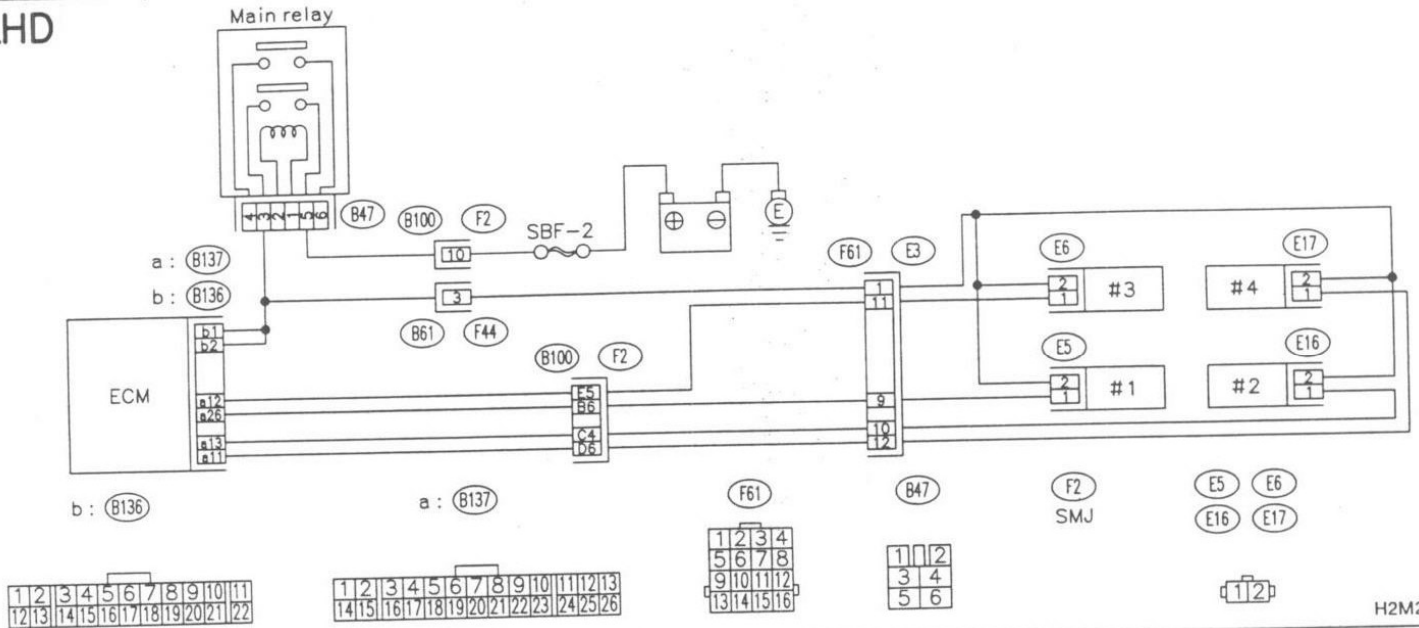
With immobiliser:

(B137) No. 17 — (B46) No. 3 / Less than 1 Ω

G: FUEL INJECTOR CIRCUIT

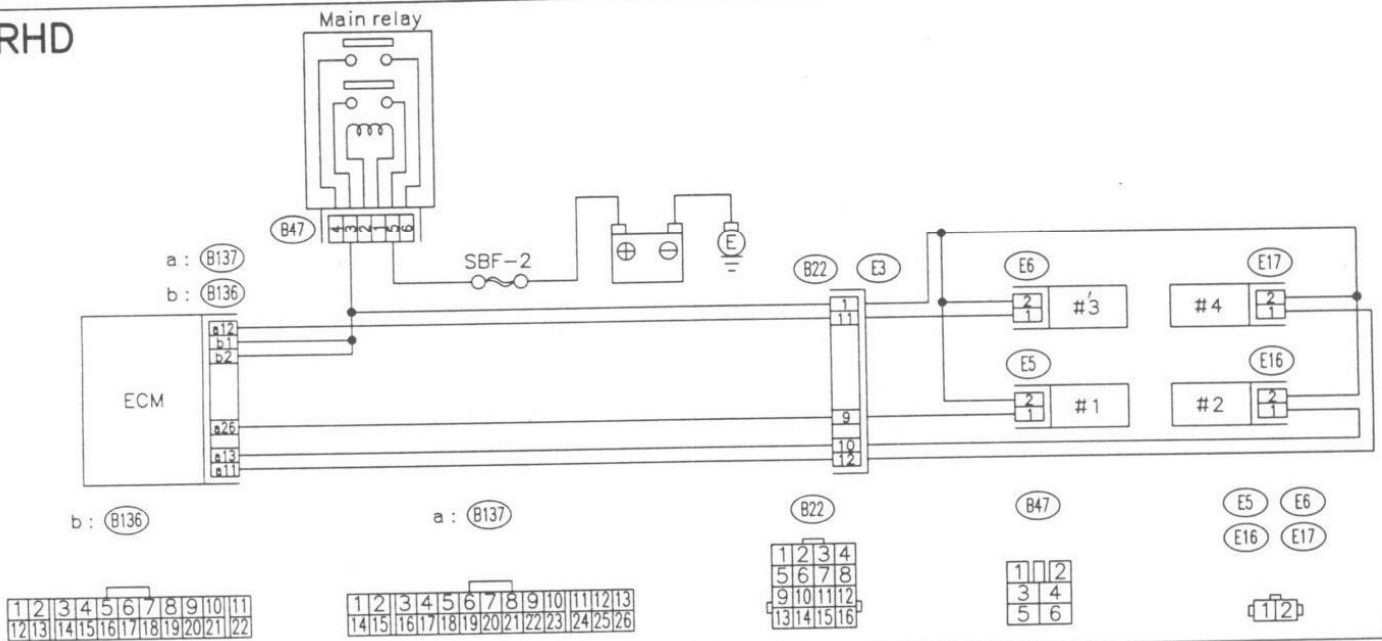


LHD



H2M2175

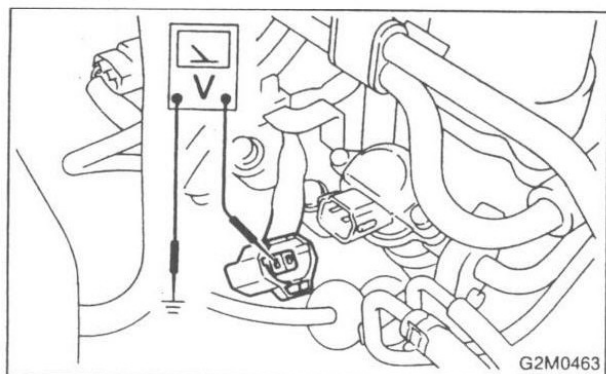
RHD



H2M2176

1. CHECK OPERATION OF EACH FUEL INJECTOR.

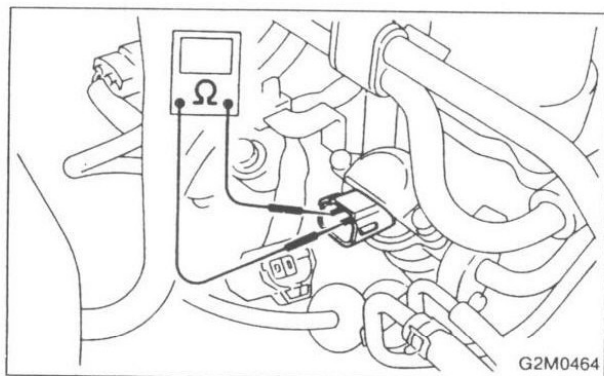
While cranking the engine, check that each fuel injector emits "operating" sound. Use a sound scope or attach a screwdriver to injector for this check.

**2. CHECK POWER SUPPLY TO FUEL INJECTOR.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from each injector.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between each fuel injector connector terminal and body.

Connector & terminal / Specified voltage:

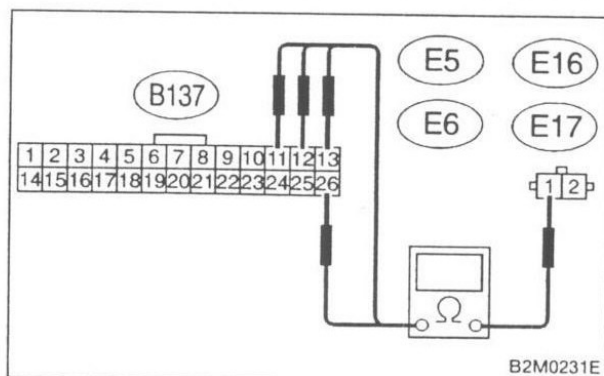
- #1 (E5) No. 2 — Body / More than 10 V
- #2 (E16) No. 2 — Body / More than 10 V
- #3 (E6) No. 2 — Body / More than 10 V
- #4 (E17) No. 2 — Body / More than 10 V

**3. CHECK EACH FUEL INJECTOR.**

Measure resistance between fuel injector terminals.

Terminals / Specified resistance:

- No. 1 — No. 2 / $11.5 \pm 0.5 \Omega$

**4. CHECK HARNESS CONNECTOR BETWEEN ECM AND EACH FUEL INJECTOR.**

- 1) Disconnect connector from ECM.
- 2) Measure resistance of harness connector between ECM and each fuel injector.

Connector & terminal / Specified resistance:

- (B137) No. 26 — (E5) No. 1 / Less than 1 Ω
- (B137) No. 13 — (E16) No. 1 / Less than 1 Ω
- (B137) No. 12 — (E6) No. 1 / Less than 1 Ω
- (B137) No. 11 — (E17) No. 1 / Less than 1 Ω

8. Diagnostics Chart with Trouble Code

A: TROUBLE CODE

Trouble code	Item	Contents of diagnosis	Page
11	Crankshaft position sensor	- No signal entered from crankshaft position sensor when starter switch is ON. - The harness connector between ECM and crankshaft position sensor is in short or open.	40
12	Starter switch	- The starter switch signal is abnormal. - The harness connector between ECM and starter switch is in short or open.	44
13	Camshaft position sensor	- No signal entered from camshaft position sensor, but signal entered from crankshaft position sensor. - The harness connector between ECM and camshaft position sensor is in short or open.	48
21	Engine coolant temperature sensor	- The engine coolant temperature sensor signal is abnormal. - The harness connector between ECM and engine coolant temperature sensor is in short or open.	52
22	Knock sensor	- The knock sensor signal is abnormal. - The harness connector between ECM and knock sensor is in short or open.	56
23	Mass air flow sensor	- The mass air flow sensor signal is abnormal. - The harness connector between ECM and mass air flow sensor is in short or open.	60
24	Idle air control solenoid valve	- The idle air control solenoid valve is not in function. - The harness connector between ECM and idle air control solenoid valve is in short or open.	64
31	Throttle position sensor	- The throttle position sensor signal is abnormal. - The throttle position sensor is installed abnormally. - The harness connector between ECM and throttle position sensor is in short or open.	66
32	Oxygen sensor	- The oxygen sensor is not in function. - The harness connector between ECM and oxygen sensor is in short or open.	70
33	Vehicle speed sensor 2	- The vehicle speed sensor 2 is not in function. - The harness connector between ECM and vehicle speed sensor 2 is in short or open.	74
38	Torque control signal (AT)	- Abnormal signal is entered from TCM. - The harness connector between ECM and TCM is in short or open.	78
44	Wastegate control solenoid valve	- The wastegate control solenoid valve is not in function. - The harness connector between ECM and wastegate control solenoid valve is in short or open.	80
45	- Pressure sensor - Pressure sources switching solenoid valve	- The pressure sensor signal is abnormal. - The pressure sources switching solenoid valve is not in function. - The intake manifold pressure is not transmitted to pressure sensor. - The harness connector between ECM and pressure sensor, and pressure sources switching solenoid valve is in short or open.	82
51	Neutral position switch (MT)	- The neutral position switch signal is abnormal. - The harness connector between ECM and neutral position switch is in short or open.	86
	Park/Neutral position switch (AT)	- The park/neutral position switch signal is abnormal. - The shift cable is connected abnormally. - The harness connector between ECM and inhibitor switch is in short or open.	88
53*	Immobiliser system	Faulty immobiliser system. < Ref. to 6-2b [T100]. >	—

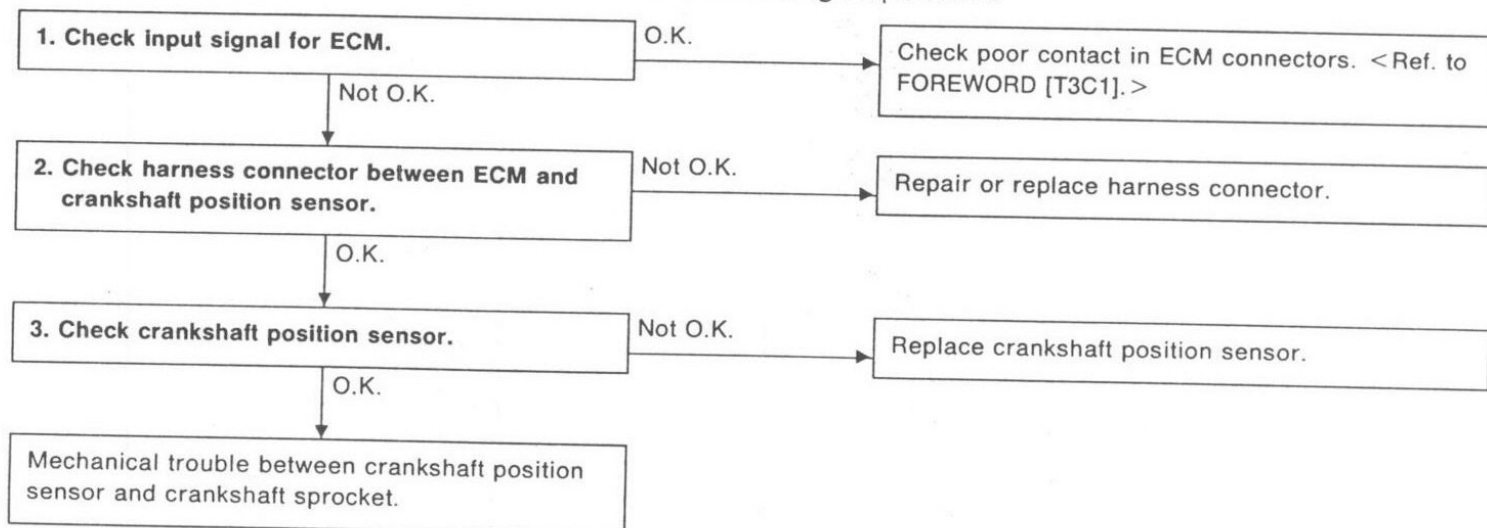
*: Immobiliser system equipped model only

B: TROUBLE CODE (11)**— CRANKSHAFT POSITION SENSOR —****DIAGNOSIS:**

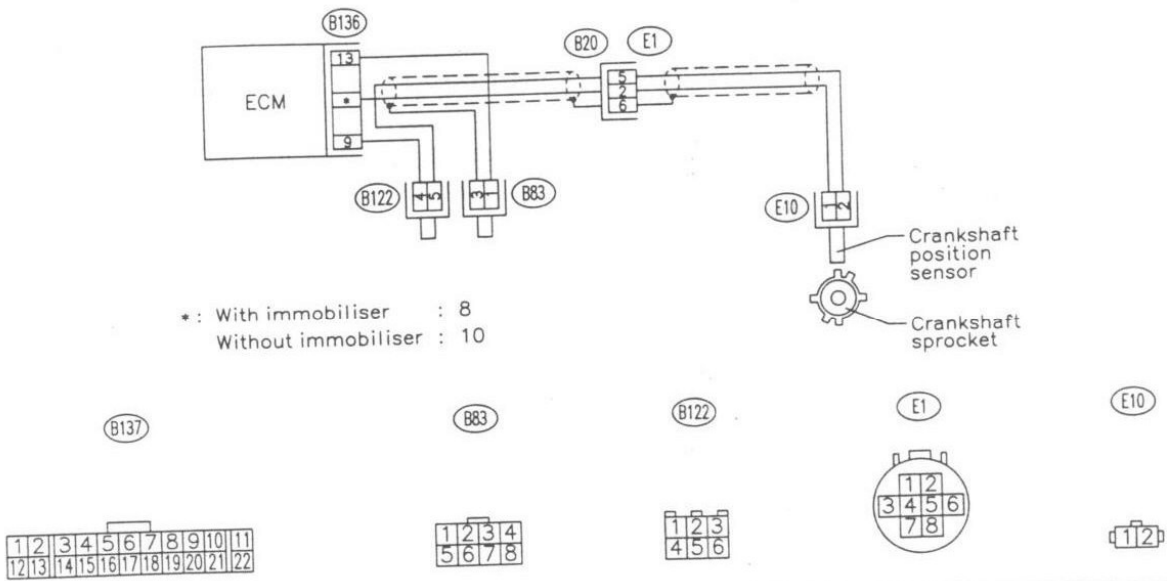
- No signal entered from crankshaft position sensor when starter switch is ON.
- The harness connector between ECM and crankshaft position sensor is in short or open.

TROUBLE SYMPTOM:

- Engine stalls.
- Restarting impossible

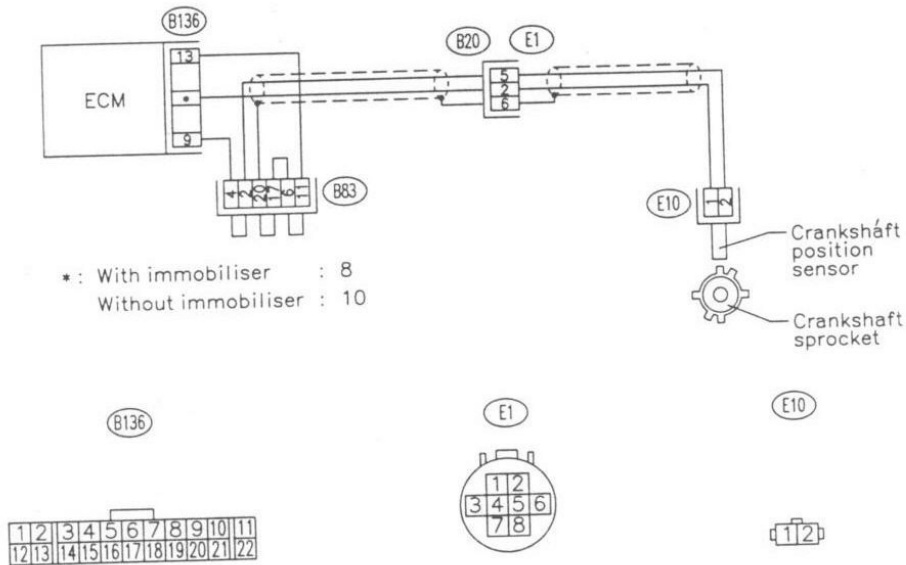


LHD

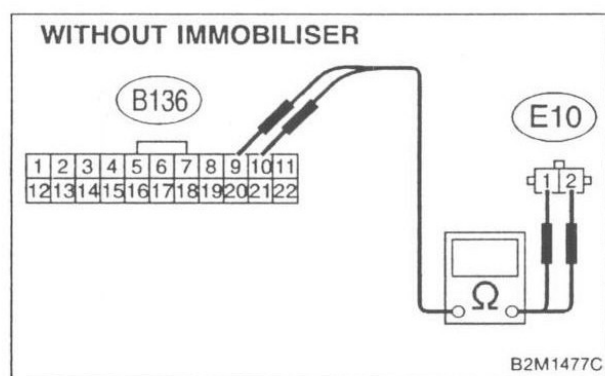
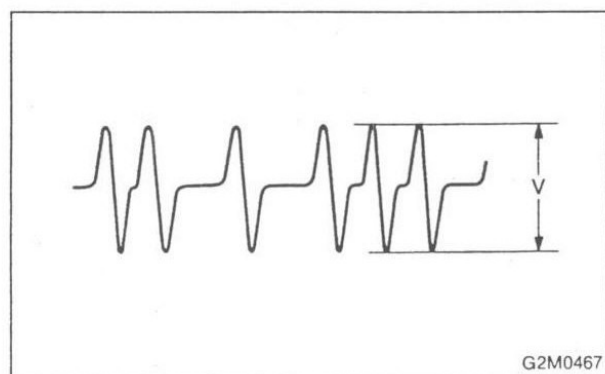
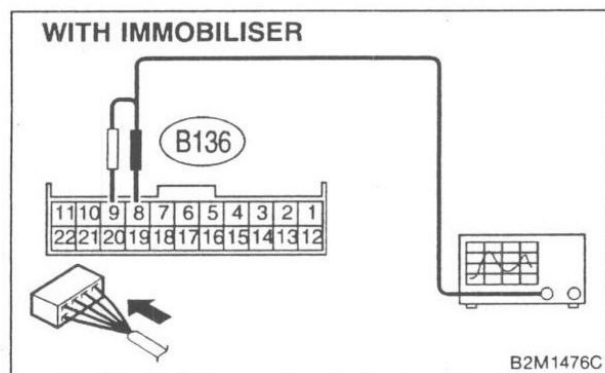
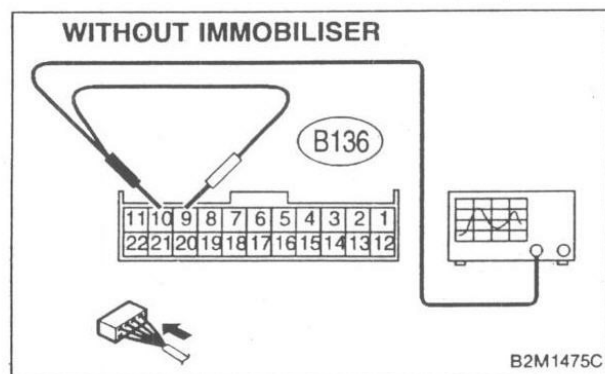


H2M2177

RHD



H2M2178



1. CHECK INPUT SIGNAL FOR ECM.

1) Set the positive (+) probe and earth lead of oscilloscope at ECM connector terminals.

Connector & terminal:

Without immobiliser:

Positive probe; (B136) No. 10

Earth lead; (B136) No. 9

Connector & terminal:

With immobiliser:

Positive probe; (B136) No. 8

Earth lead; (B136) No. 9

2) Measure signal voltage indicated on oscilloscope while cranking the engine.

Specified voltage: More than 400 mV

2. CHECK HARNESS CONNECTOR BETWEEN ECM AND CRANKSHAFT POSITION SENSOR.

1) Turn ignition switch to OFF.

2) Disconnect connectors from ECM and crankshaft position sensor.

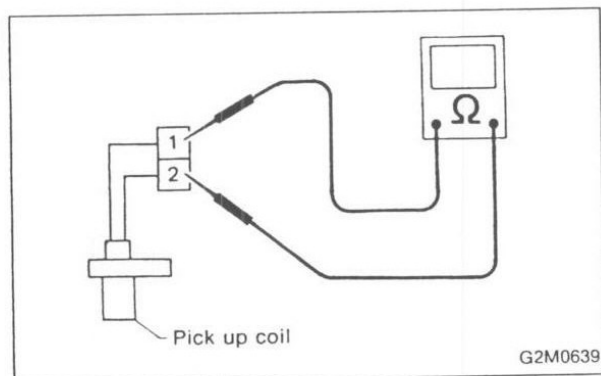
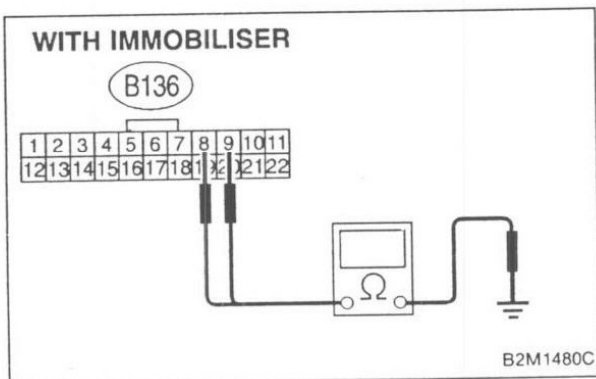
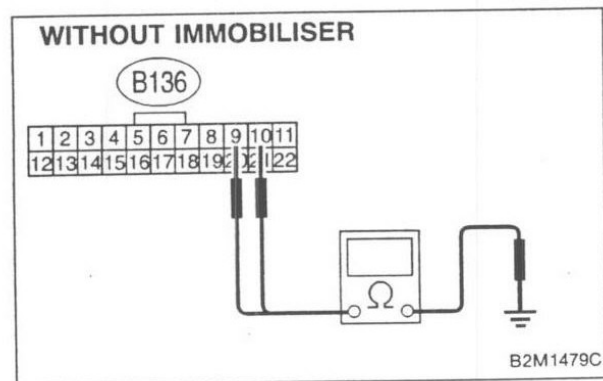
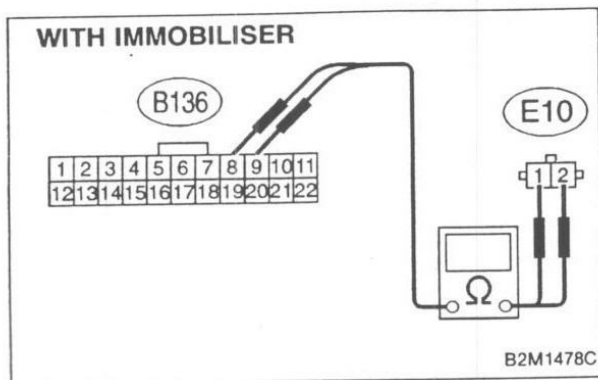
3) Measure resistance of harness connector between ECM and crankshaft position sensor.

Connector & terminal / Specified resistance:

Without immobiliser:

(B136) No. 10 — (E10) No. 1 / Less than 1 Ω

(B136) No. 9 — (E10) No. 2 / Less than 1 Ω



Connector & terminal / Specified resistance:

With immobiliser:

(B136) No. 8 — (E10) No. 1 / Less than 1 Ω

(B136) No. 9 — (E10) No. 2 / Less than 1 Ω

4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

Without immobiliser:

(B136) No. 10 — Body / More than 1 M Ω

(B136) No. 9 — Body / More than 1 M Ω

Connector & terminal / Specified resistance:

With immobiliser:

(B136) No. 8 — Body / More than 1 M Ω

(B136) No. 9 — Body / More than 1 M Ω

3. CHECK CRANKSHAFT POSITION SENSOR.

1) Remove crankshaft position sensor.

2) Measure resistance between connector terminals of crankshaft position sensor.

Terminals / Specified resistance:

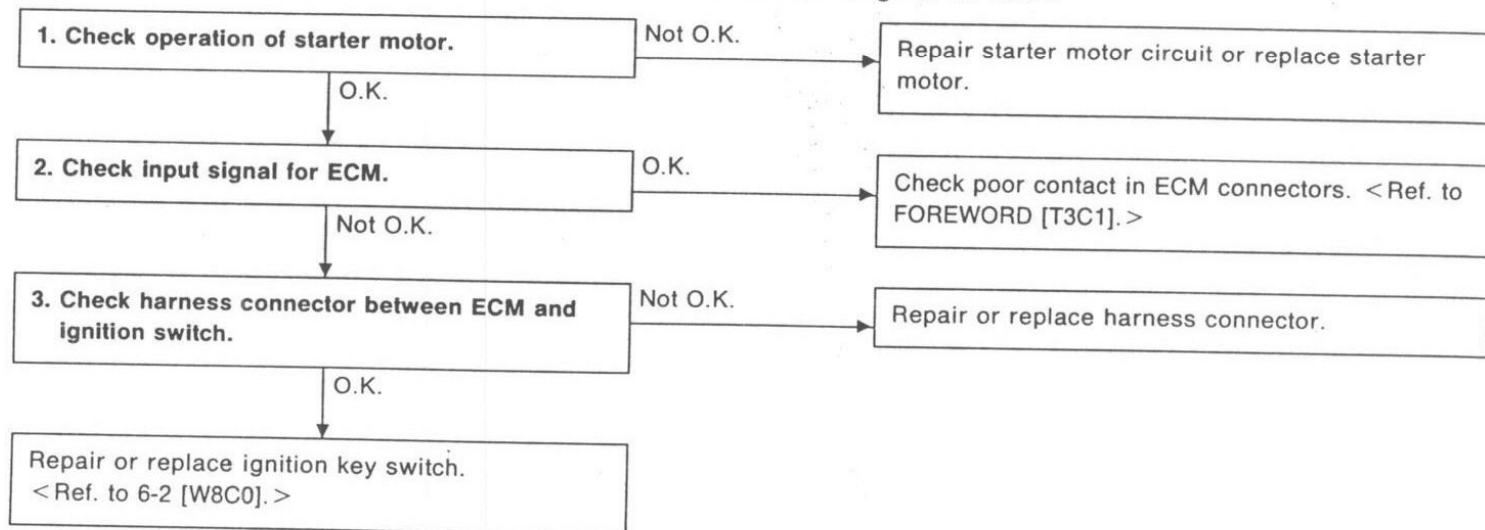
No. 1 — No. 2 / 2,040 $\pm$ 200 Ω

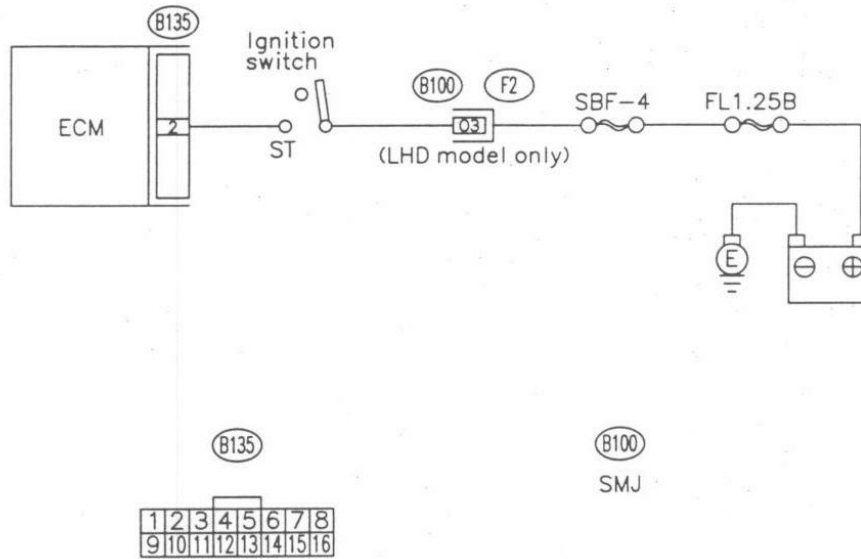
C: TROUBLE CODE (12)**— STARTER SWITCH —****DIAGNOSIS:**

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

TROUBLE SYMPTOM:

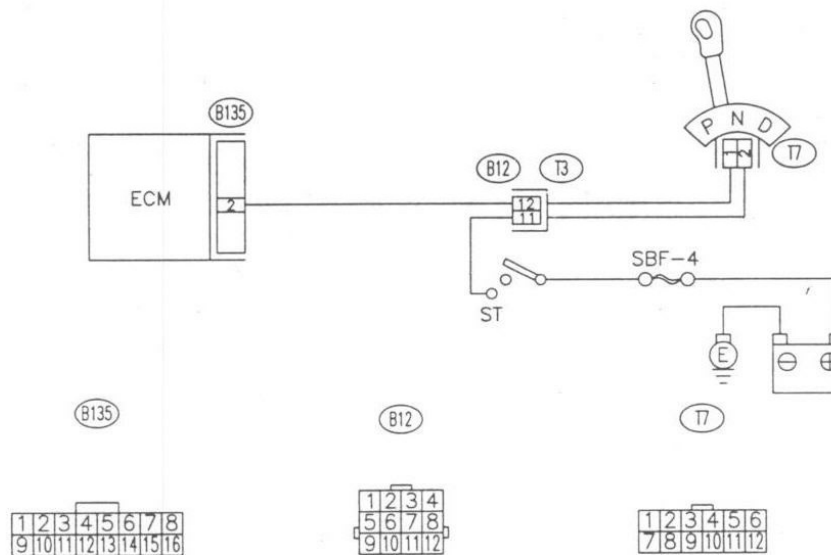
- Failure of engine to start.





H2M2179

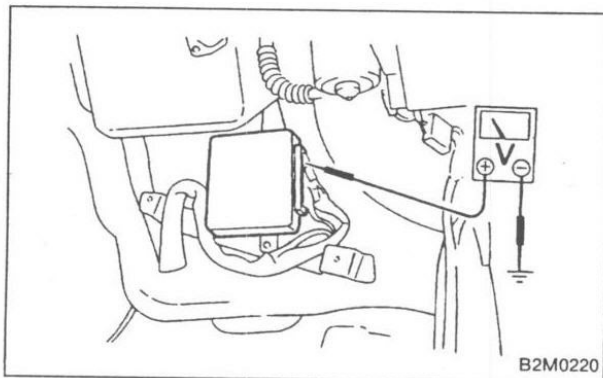
AT



H2M2184

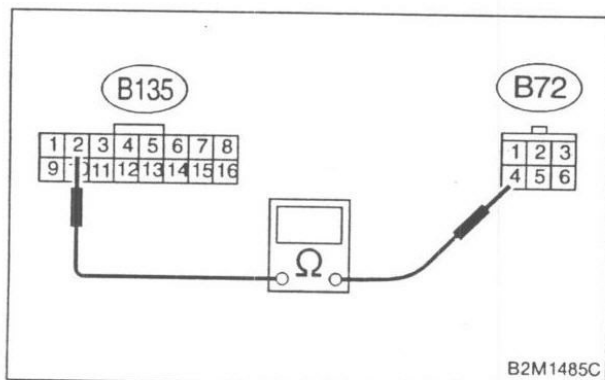
1. CHECK OPERATION OF STARTER MOTOR.

Turn ignition switch to "ST" to ensure that starter motor functions.

**2. CHECK INPUT SIGNAL FOR ECM.**

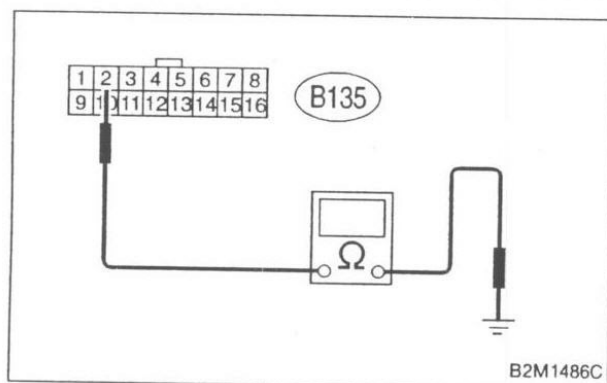
Measure voltage between ECM and body while cranking the engine.

Connector & terminal / Specified voltage:
(B135) No. 2 — Body / More than 9 V

**3. CHECK HARNESS CONNECTOR BETWEEN ECM AND IGNITION SWITCH.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from ECM and ignition switch.
- 3) Measure resistance of harness connector between ECM and ignition switch.

Connector & terminal / Specified resistance:
(B135) No. 2 — (B72) No. 4 / Less than 1 Ω



- 4) Measure resistance of harness connector between starter motor and body to make sure that circuit does not short.

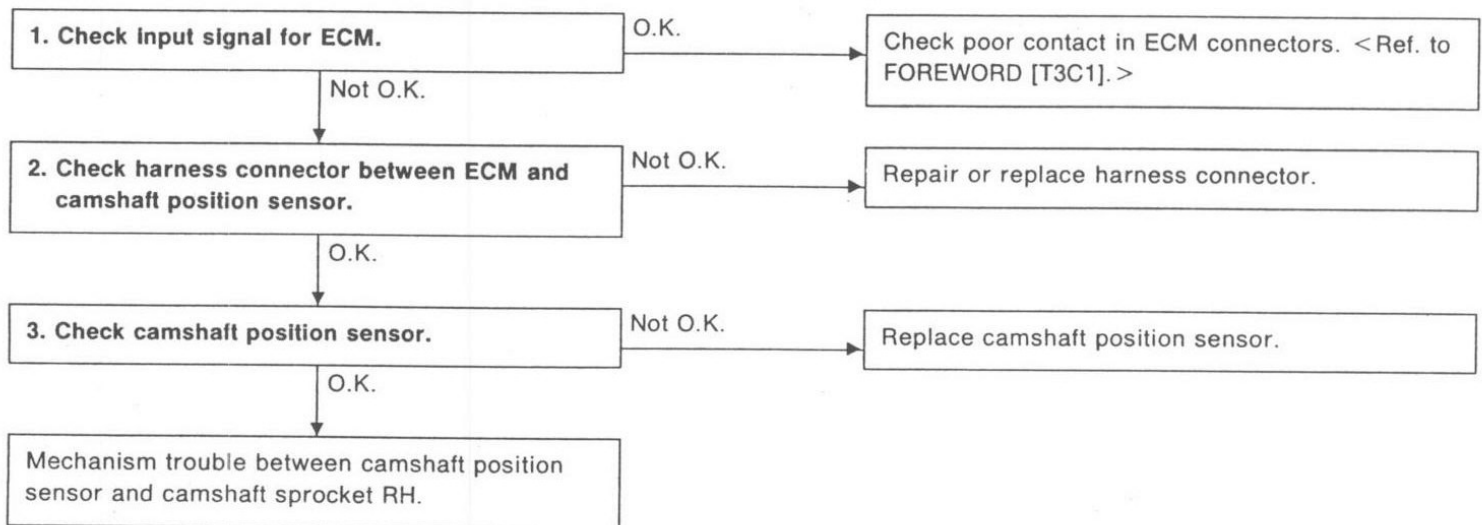
Connector & terminal / Specified resistance:
(B135) No. 2 — Body / More than 1 M Ω

D: TROUBLE CODE (13)**— CAMSHAFT POSITION SENSOR —****DIAGNOSIS:**

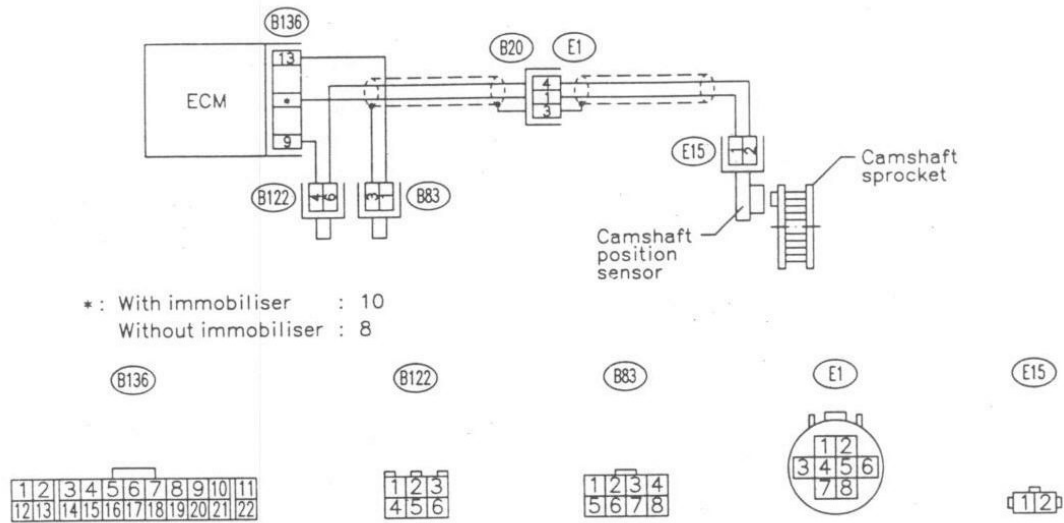
- No signal entered from camshaft position sensor, but signal entered from crankshaft position sensor.
- The harness connector between ECM and camshaft position sensor is in short or open.

TROUBLE SYMPTOM:

- Engine stalls.
- Failure of engine to start.

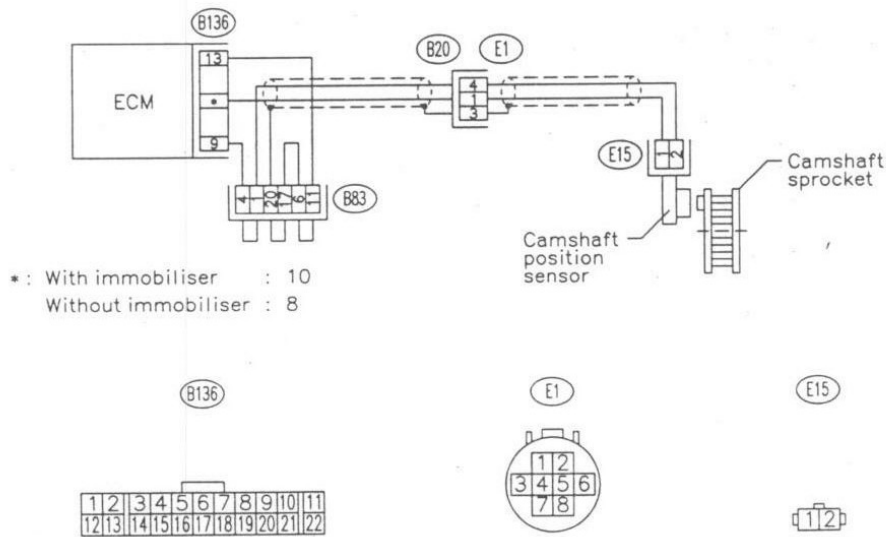


LHD

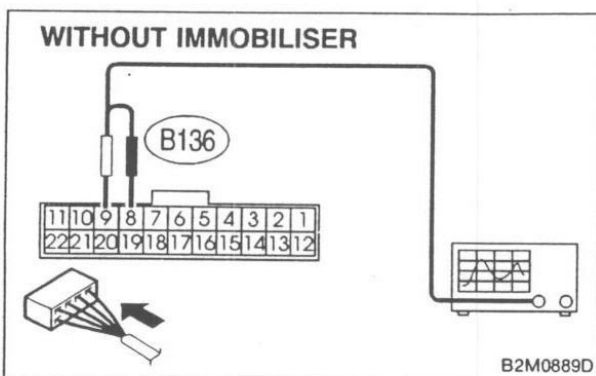


H2M2180

RHD



H2M2181

**1. CHECK INPUT SIGNAL FOR ECM.**

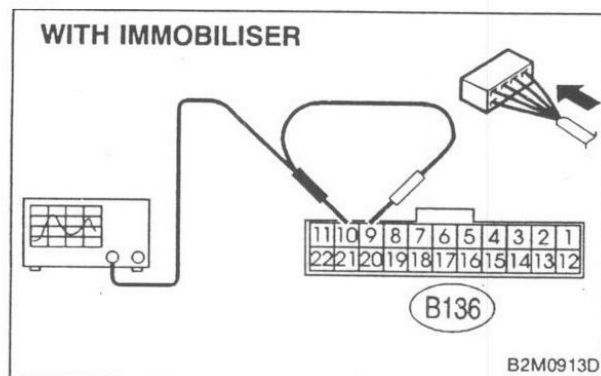
1) Set the positive (+) probe and earth lead of oscilloscope at ECM connector terminals.

Connector & terminal:

Without immobiliser:

Positive probe; (B136) No. 8

Earth lead; (B136) No. 9

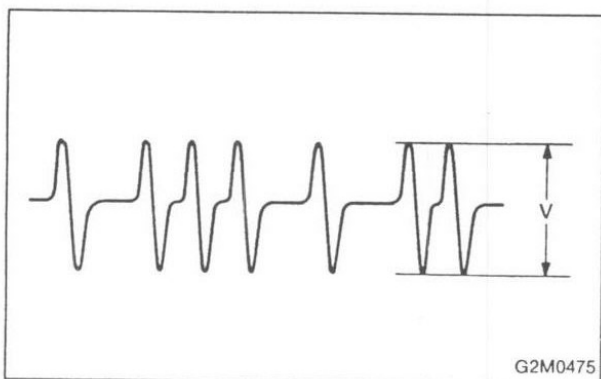


Connector & terminal:

With immobiliser:

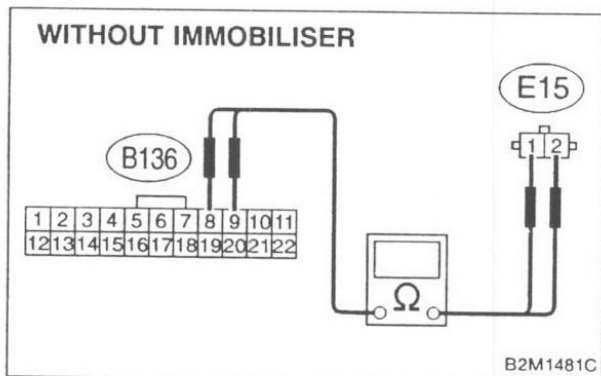
Positive probe; (B136) No. 10

Earth lead; (B136) No. 9



2) Measure signal voltage indicated on oscilloscope, while cranking the engine.

Specified voltage: More than 400 mV

**2. CHECK HARNESS CONNECTOR BETWEEN ECM AND CAMSHAFT POSITION SENSOR.**

1) Turn ignition switch to OFF.

2) Disconnect connectors from ECM and camshaft position sensor.

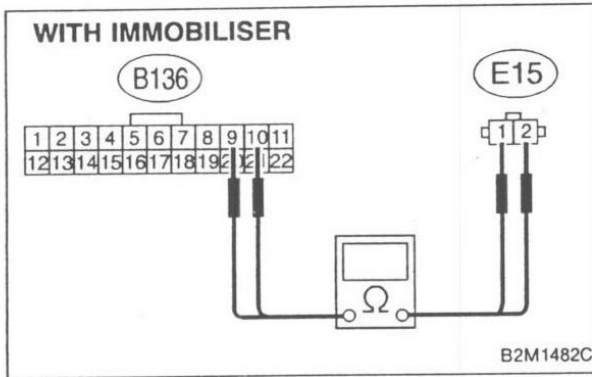
3) Measure resistance of harness connector between ECM and camshaft position sensor.

Connector & terminal / Specified resistance:

Without immobiliser:

(B136) No. 8 — (E15) No. 1 / Less than 1 Ω

(B136) No. 9 — (E15) No. 2 / Less than 1 Ω

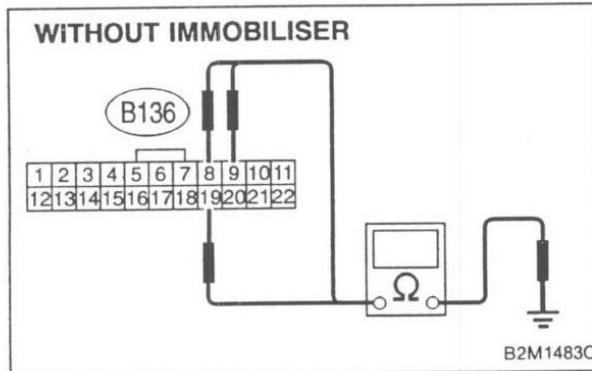


Connector & terminal / Specified resistance:

With immobiliser:

(B136) No. 10 — (E15) No. 1 / Less than 1 Ω

(B136) No. 9 — (E15) No. 2 / Less than 1 Ω



4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

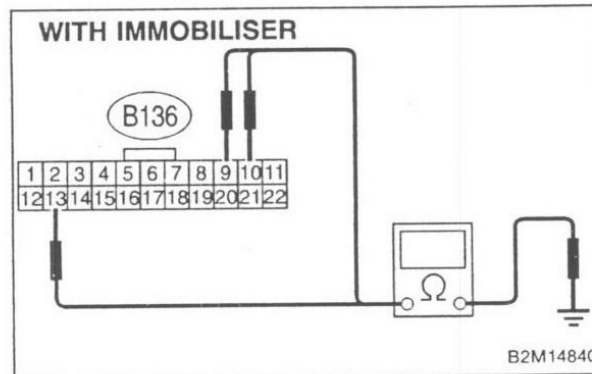
Connector & terminal / Specified resistance:

Without immobiliser:

(B136) No. 8 — Body / More than 1 M Ω

(B136) No. 9 — Body / More than 1 M Ω

(B136) No. 13 — Body / More than 1 M Ω



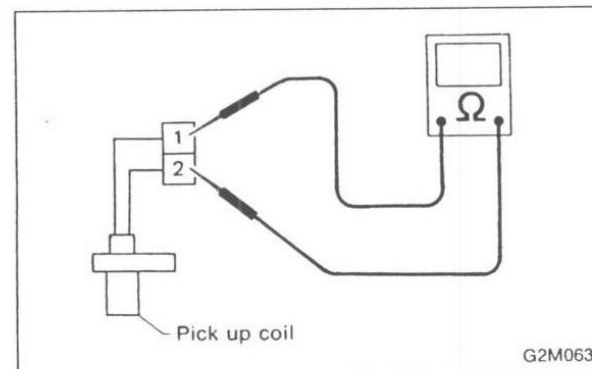
Connector & terminal / Specified resistance:

With immobiliser:

(B136) No. 9 — Body / More than 1 M Ω

(B136) No. 10 — Body / More than 1 M Ω

(B136) No. 13 — Body / More than 1 M Ω



3. CHECK CAMSHAFT POSITION SENSOR.

1) Remove camshaft position sensor.

2) Measure resistance between connector terminals of camshaft position sensor.

Terminals / Specified resistance:

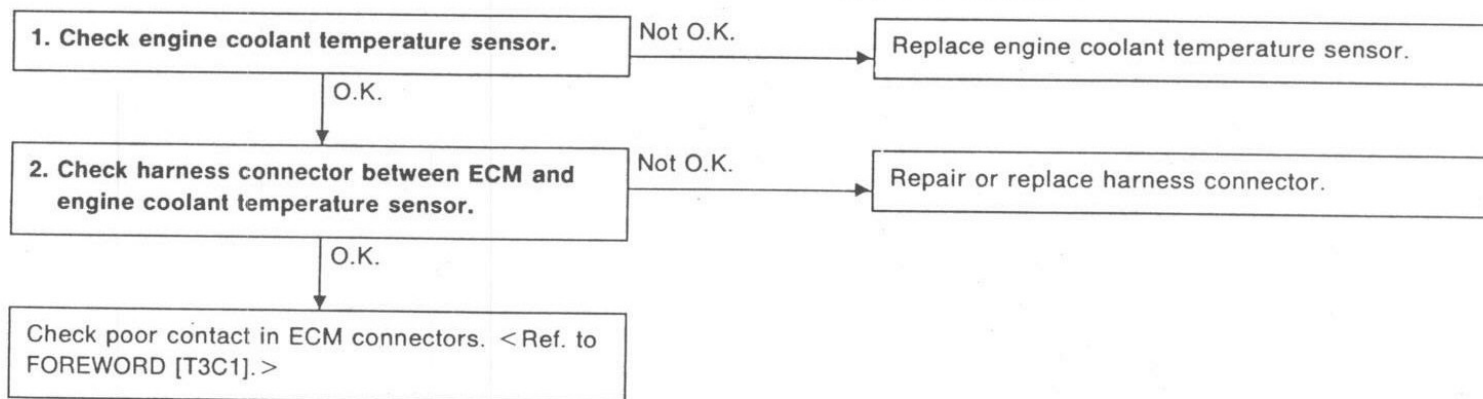
No. 1 — No. 2 / 2,040 $\pm$ 200 Ω

**E: TROUBLE CODE (21)
— ENGINE COOLANT TEMPERATURE
SENSOR —****DIAGNOSIS:**

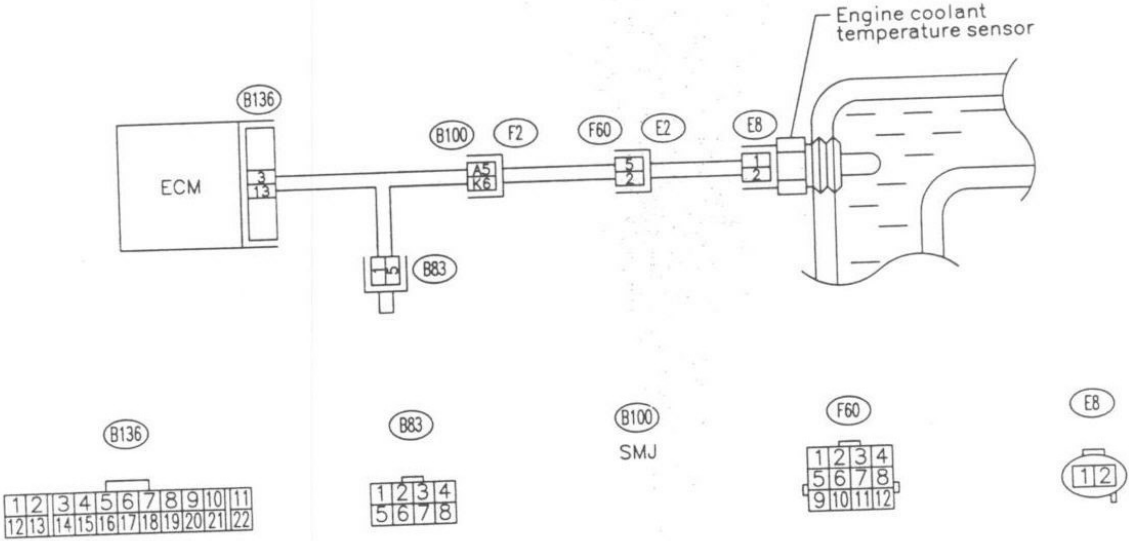
- The engine coolant temperature sensor signal is abnormal.
- The harness connector between ECM and engine coolant temperature sensor is in short or open.

TROUBLE SYMPTOM:

- Hard to start
- Erroneous idling
- Poor driving performance

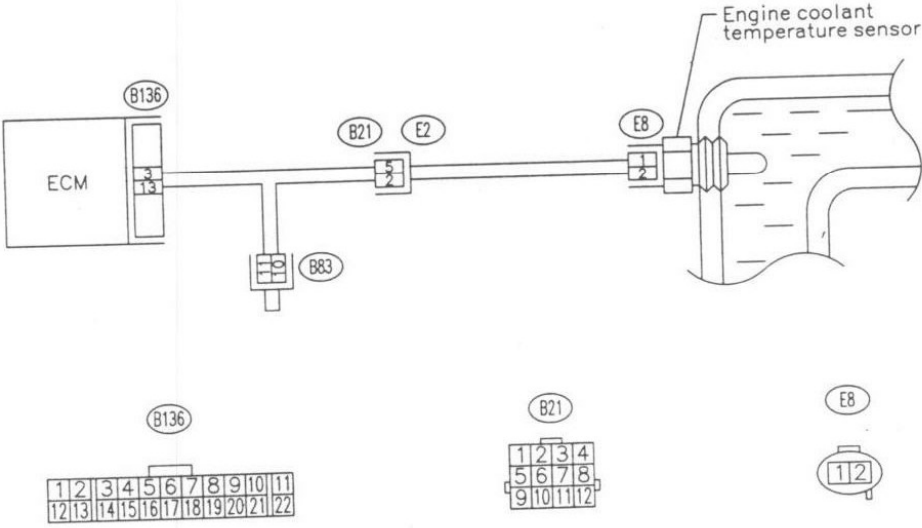


LHD

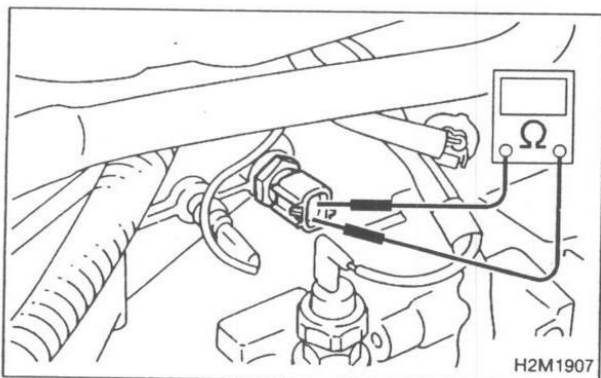


H2M2182

RHD



H2M2183



1. CHECK ENGINE COOLANT TEMPERATURE SENSOR.

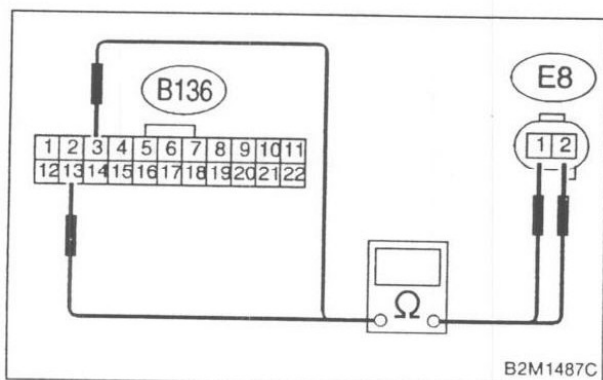
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from engine coolant temperature sensor.
- 3) Measure resistance between engine coolant temperature sensor terminals.

Terminals / Specified resistance:

No. 1 — No. 2 / $2.5 \pm 0.4 \text{ k}\Omega$ at 20°C (68°F)

No. 1 — No. 2 / $0.37 \pm 0.002 \text{ k}\Omega$ at 80°C (176°F)

No. 1 — No. 2 / $0.25 \pm 0.02 \text{ k}\Omega$ at 90°C (194°F)



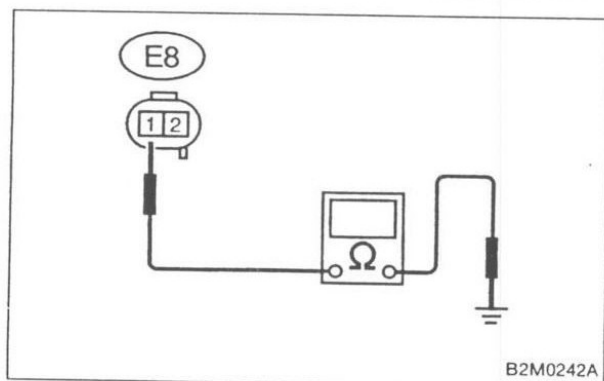
2. CHECK HARNESS CONNECTOR BETWEEN ECM AND ENGINE COOLANT TEMPERATURE SENSOR.

- 1) Disconnect connector from ECM.
- 2) Measure resistance of harness connector between ECM and engine coolant temperature connector.

Connector & terminal / Specified resistance:

(B136) No. 3 — (E8) No. 1 / Less than 1Ω

(B136) No. 13 — (E8) No. 2 / Less than 1Ω



- 3) Measure resistance of harness connector between engine coolant temperature sensor and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

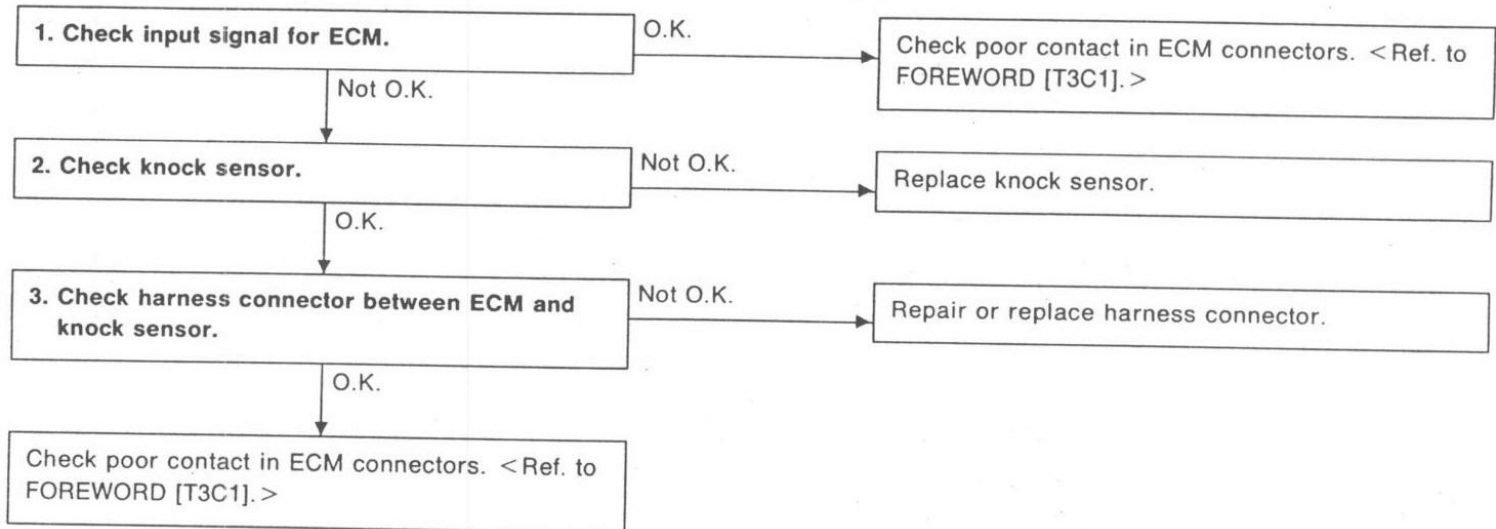
(E8) No. 1 — Body / More than $1 \text{ M}\Omega$

F: TROUBLE CODE (22)**— KNOCK SENSOR —****DIAGNOSIS:**

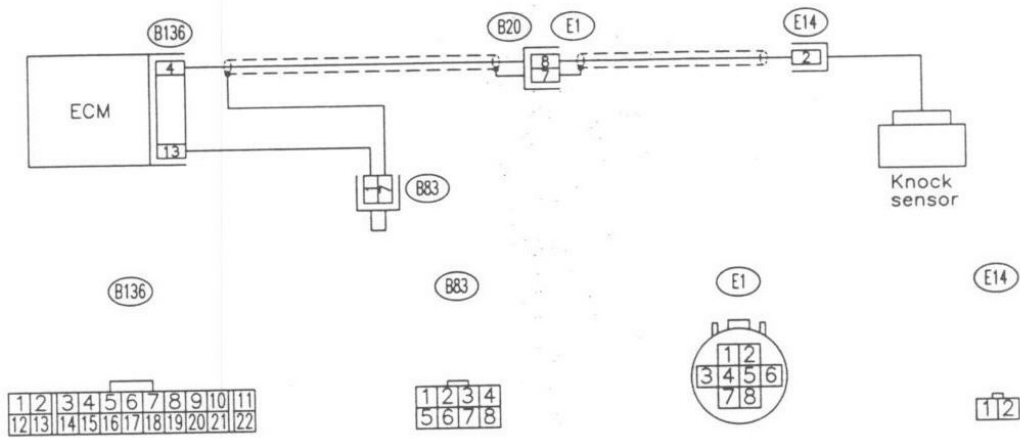
- The knock sensor signal is abnormal.
- The harness connector between ECM and knock sensor is in short or open.

TROUBLE SYMPTOM:

- Poor driving performance

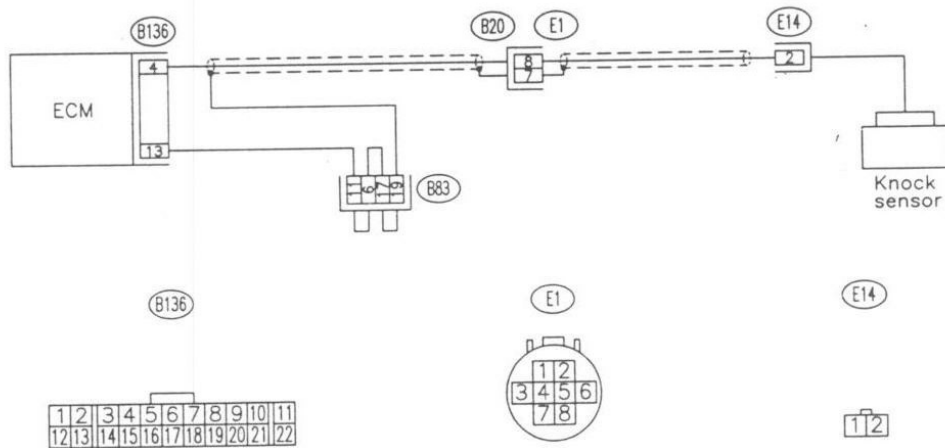


LHD

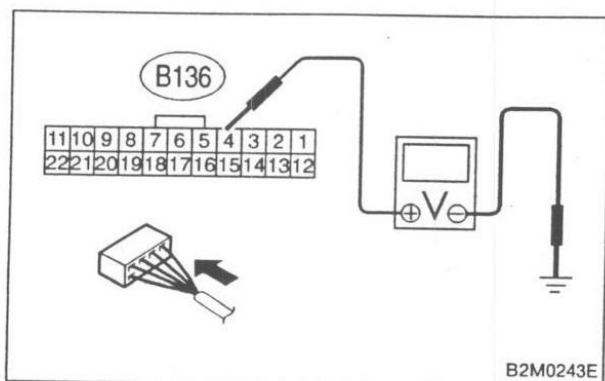


H2M2185

RHD

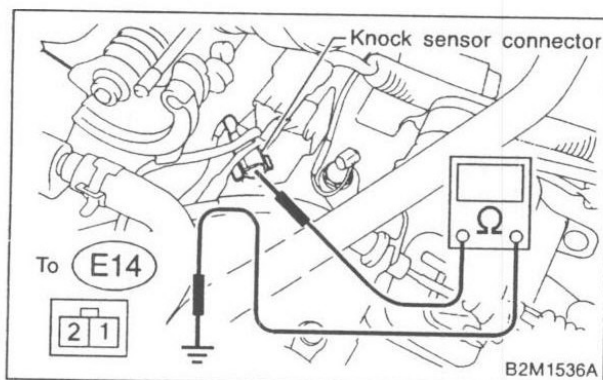


H2M2186

**1. INPUT SIGNAL FOR ECM.**

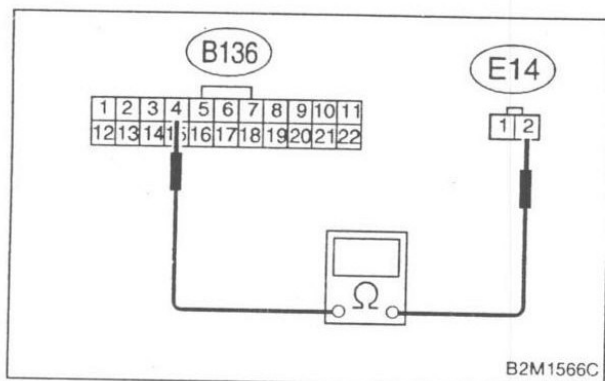
- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM connector terminal and body.

Connector & terminal / Specified voltage:
(B136) No. 4 — Body / About 2.8 V

**2. CHECK KNOCK SENSOR.**

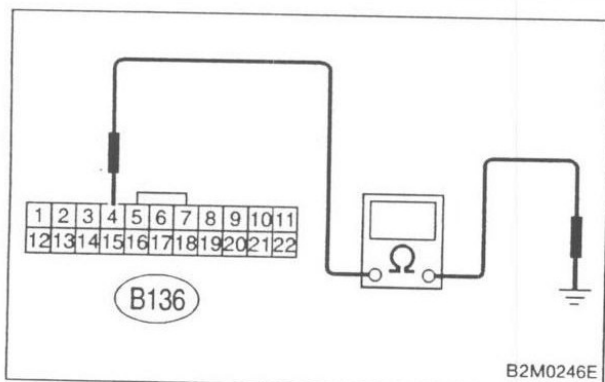
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from knock sensor.
- 3) Measure resistance between knock sensor terminal and body.

Connector & terminal / Specified resistance:
No. 2 — Body / Approx. 560 k Ω

**3. CHECK HARNESS CONNECTOR BETWEEN ECM AND KNOCK SENSOR.**

- 1) Disconnect connectors from ECM.
- 2) Measure resistance of harness connector between ECM and knock sensor.

Connector & terminal / Specified resistance:
(B136) No. 4 — (E14) No. 2 / Less than 1 Ω



- 3) Measure resistance of harness connector between ECM connector and body to make sure that circuit does not short.

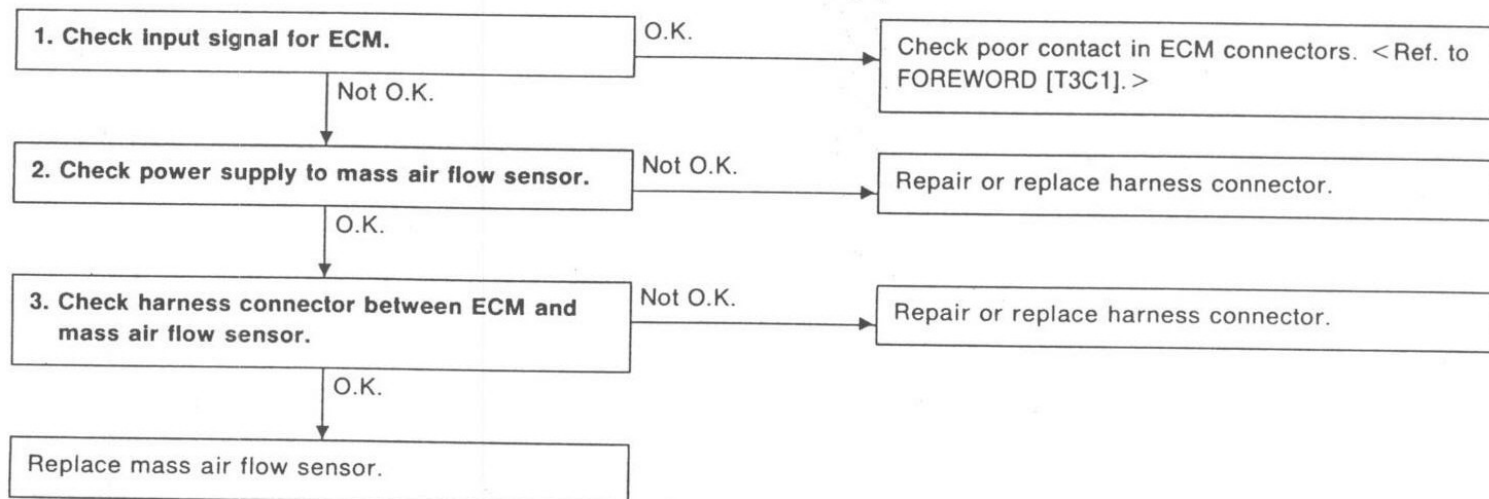
Connector & terminal / Specified resistance:
(B136) No. 4 — Body / More than 1 M Ω

G: TROUBLE CODE (23)**— MASS AIR FLOW SENSOR —****DIAGNOSIS:**

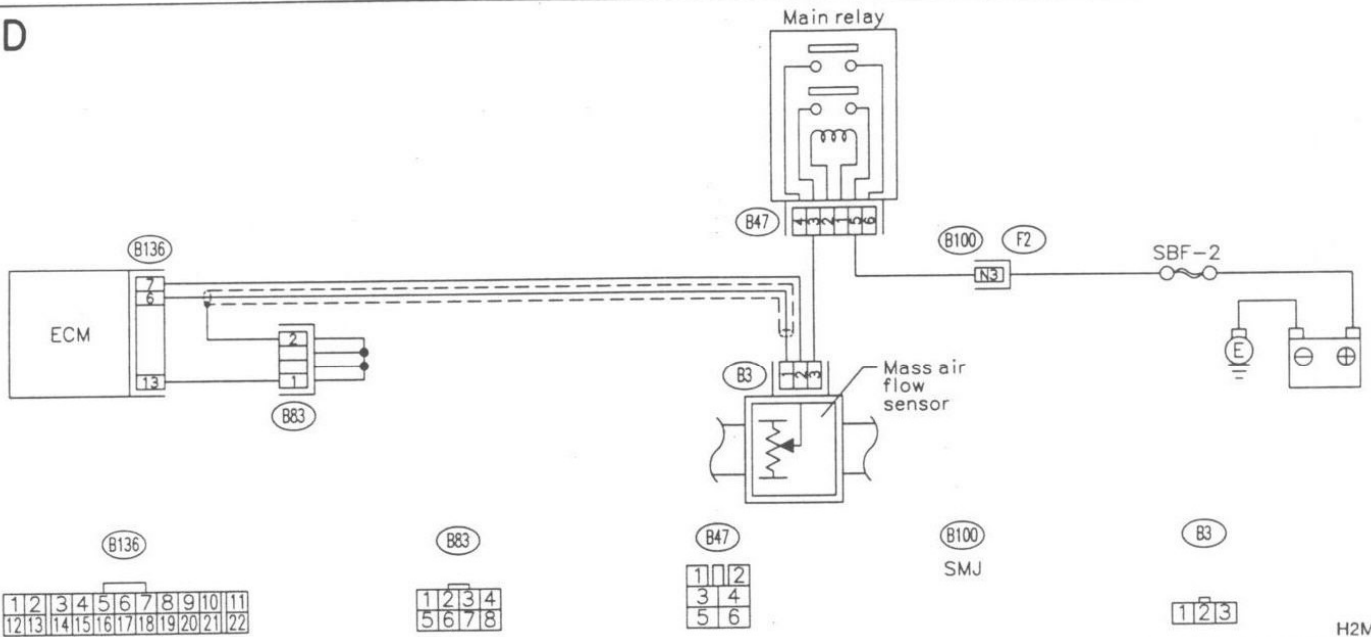
- The mass air flow sensor signal is abnormal.
- The harness connector between ECM and mass air flow sensor is in short or open.

TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

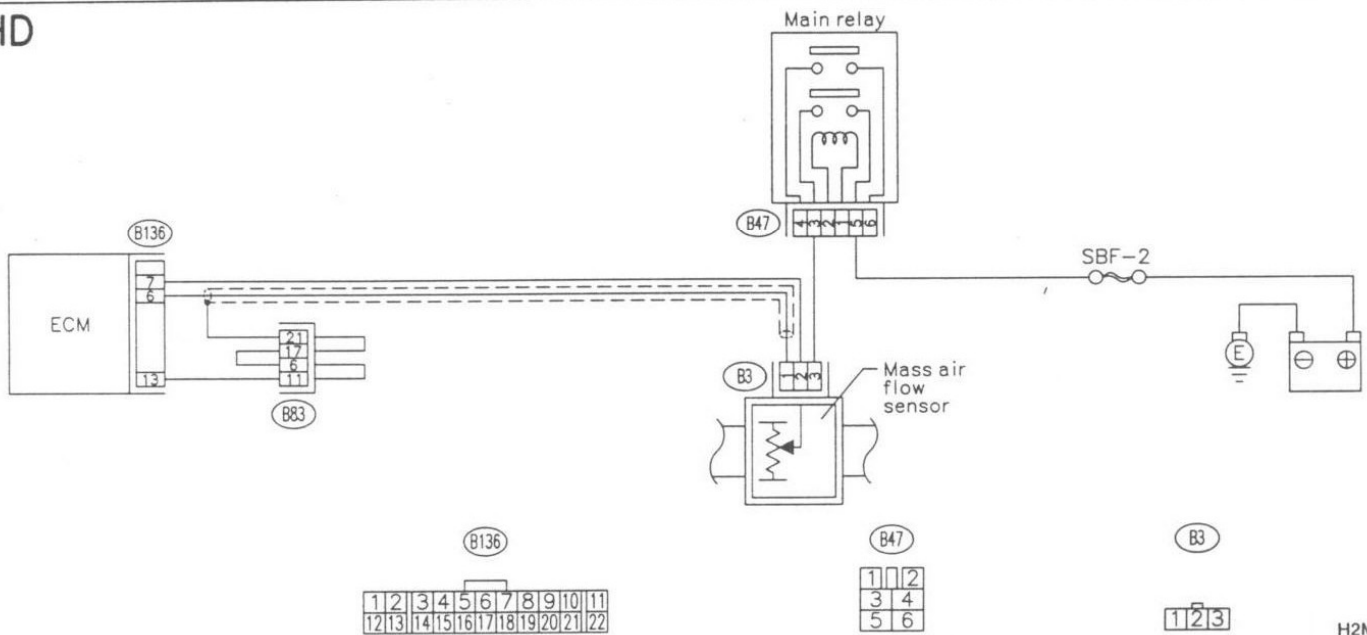


LHD

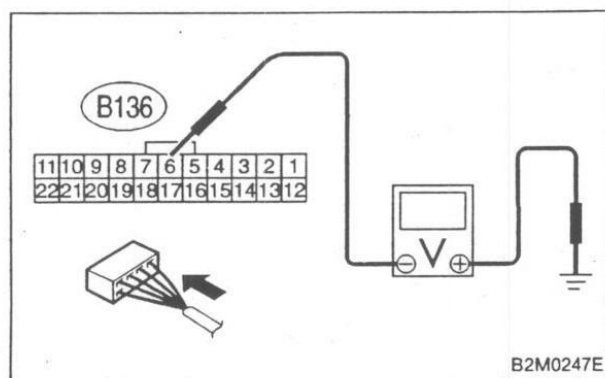


H2M2187

RHD



H2M2188

**1. CHECK INPUT SIGNAL FOR ECM.**

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM and body.

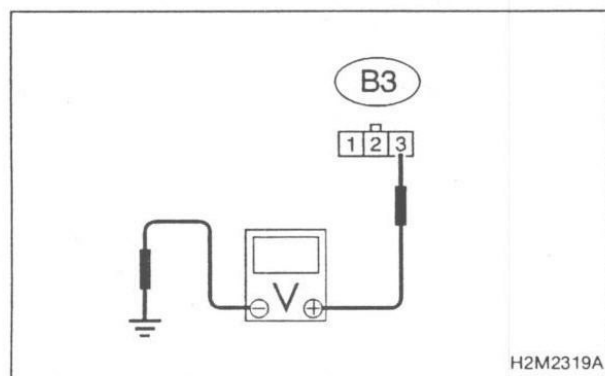
Connector & terminal / Specified voltage:

(B136) No. 6 — Body / 0.26 V

- 3) Start engine, and idle it.
- 4) Measure voltage between ECM and body while engine is idling.

Connector & terminal / Specified voltage:

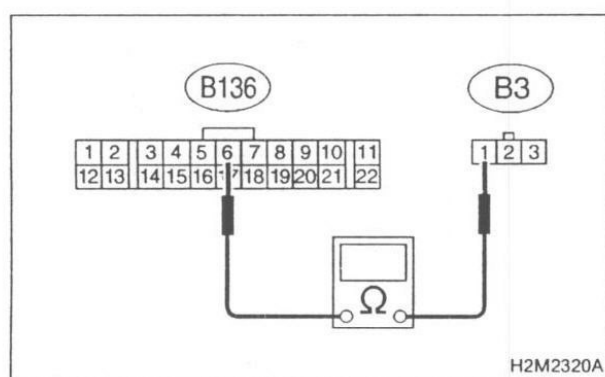
(B136) No. 6 — Body / 1.1 ± 0.3 V

**2. CHECK POWER SUPPLY TO MASS AIR FLOW SENSOR.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from mass air flow sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between mass air flow sensor connector and body.

Connector & terminal / Specified voltage:

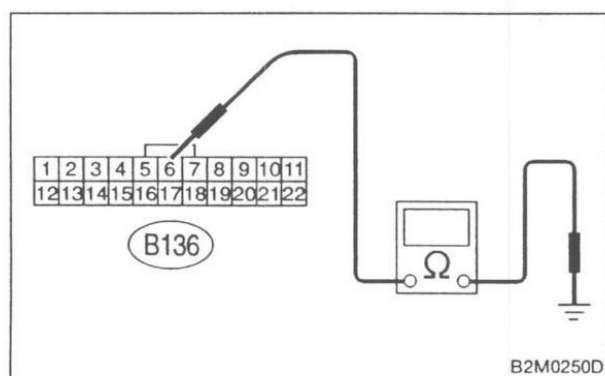
(B3) No. 3 — Body / More than 10 V

**3. CHECK HARNESS CONNECTOR BETWEEN ECM AND MASS AIR FLOW SENSOR.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from ECM.
- 3) Measure resistance of harness connector between ECM and mass air flow sensor.

Connector & terminal / Specified resistance:

(B136) No. 6 — (B3) No. 1 / Less than 1 Ω



- 4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

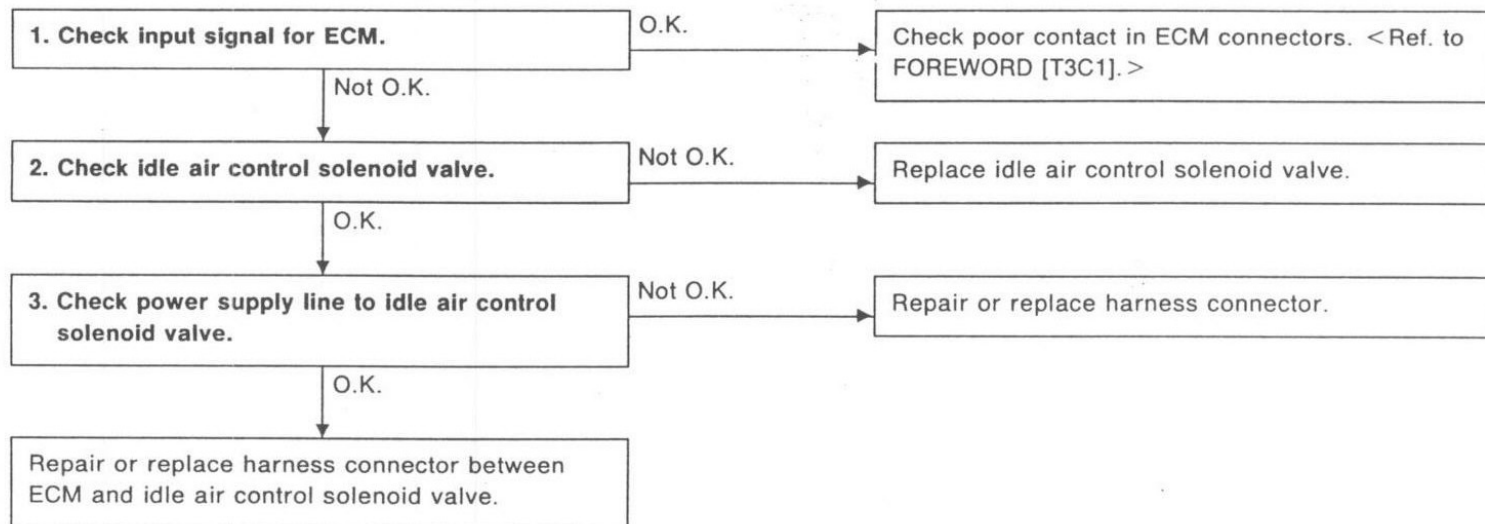
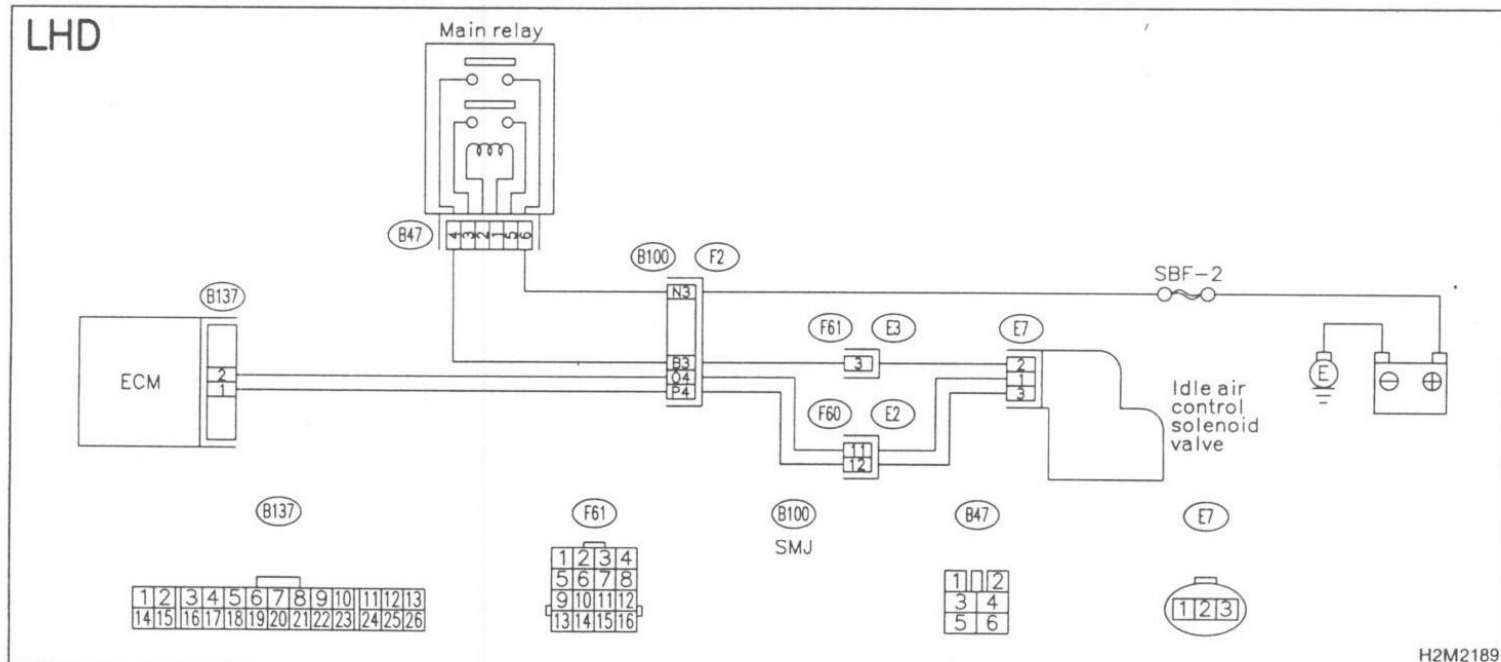
(B136) No. 6 — Body / More than 1 M Ω

H: TROUBLE CODE (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 in short or open.

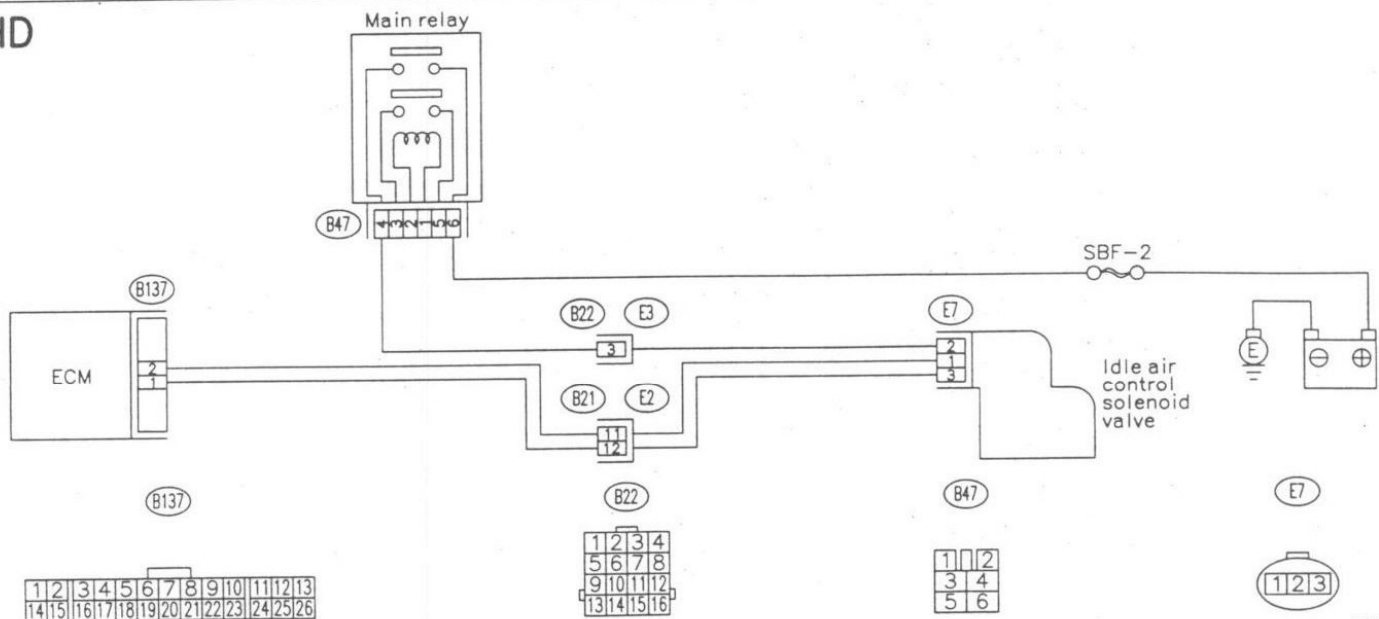
TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Engine breathing

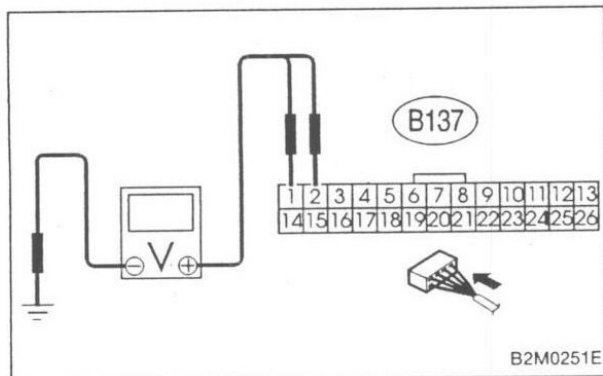
**LHD**

H2M2189

RHD



H2M2190

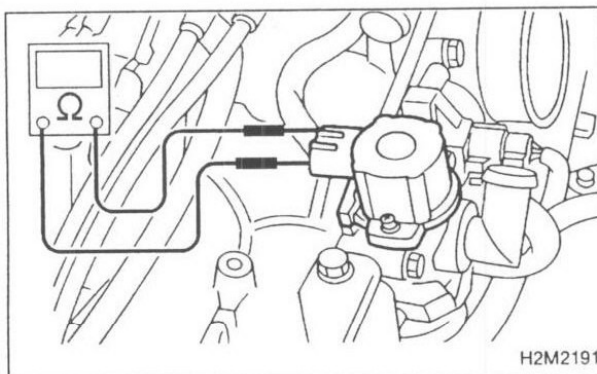


B2M0251E

1. CHECK INPUT SIGNAL FOR ECM.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM and body.

Connector & terminal / Specified voltage:
(B137) No. 1 — Body / More than 10 V
(B137) No. 2 — Body / More than 10 V

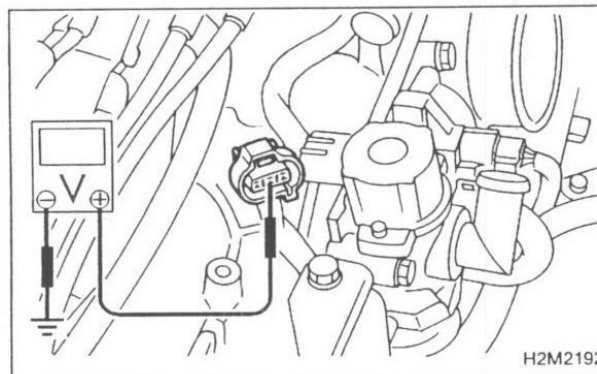


H2M2191

2. CHECK IDLE AIR CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from idle air control solenoid valve.
- 3) Measure resistance between solenoid valve terminals.

Terminals / Specified resistance:
No. 1 — No. 2 / $9.5 \pm 1.5 \Omega$
No. 3 — No. 2 / $9.5 \pm 1.5 \Omega$



H2M2192

3. CHECK POWER SUPPLY LINE TO IDLE AIR CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to ON.
- 2) Measure power supply voltage idle air control solenoid valve.

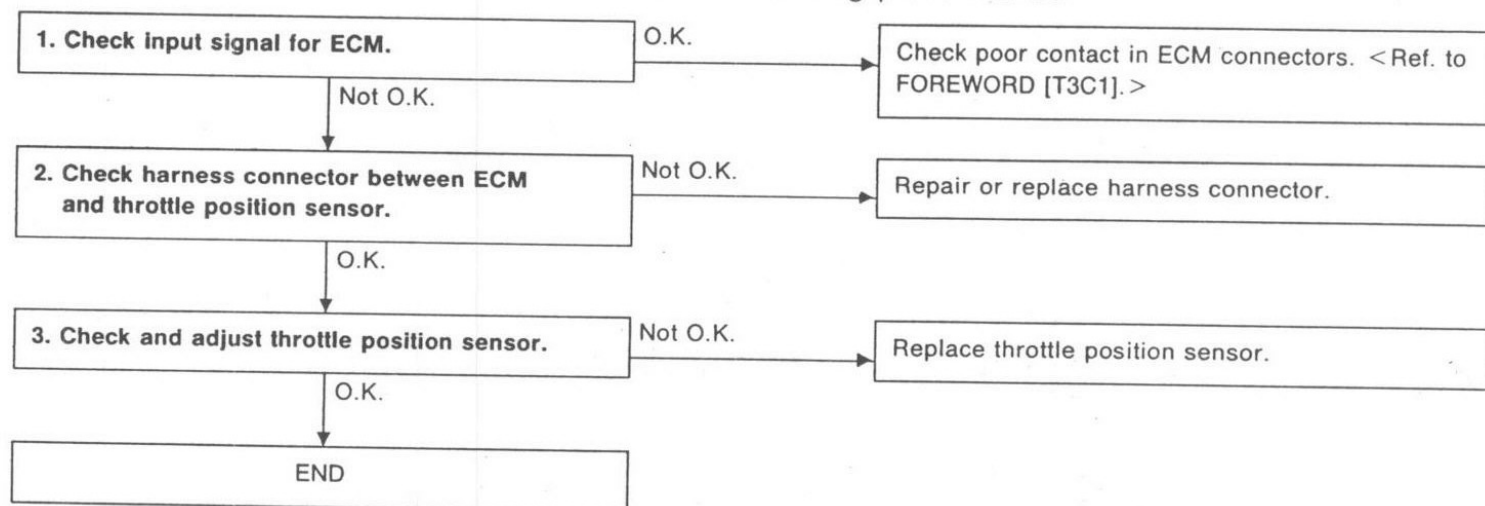
Connector & terminal / Specified voltage:
(E7) No. 2 — Body / More than 10 V

I: TROUBLE CODE (31)
— THROTTLE POSITION SENSOR —**DIAGNOSIS:**

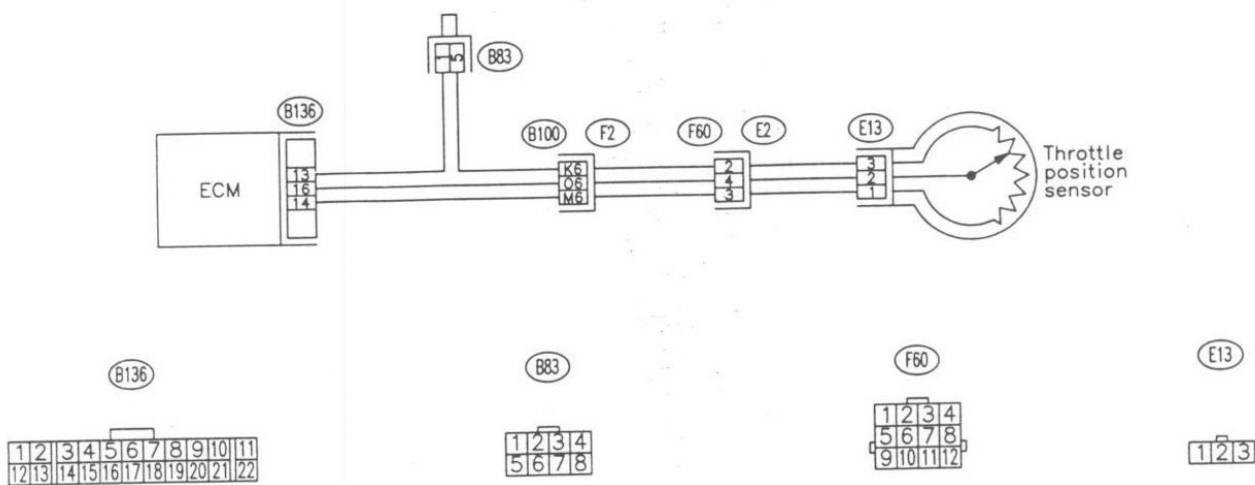
- The throttle position sensor signal is abnormal.
- The throttle position sensor is installed abnormally.
- The harness connector between ECM and throttle position sensor is in short or open.

TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

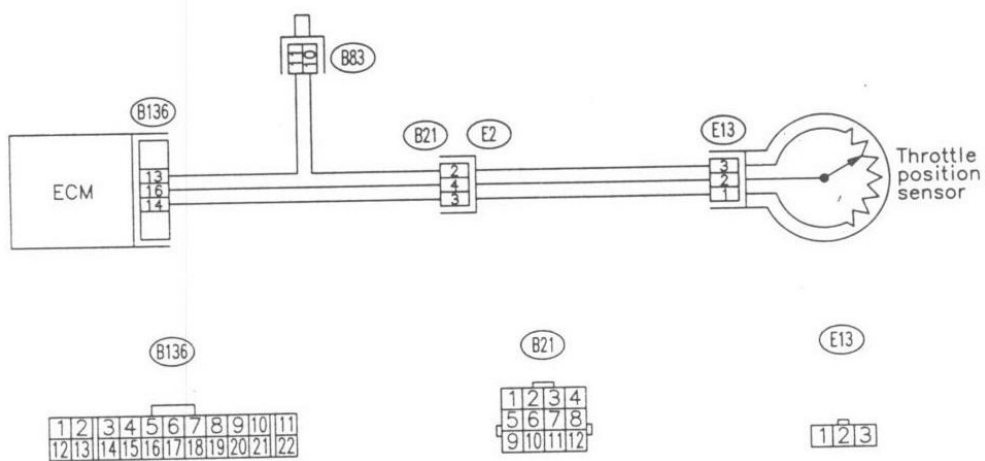


LHD

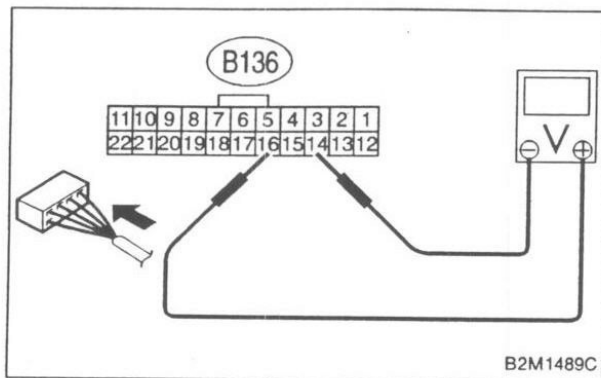


H2M2195

RHD



H2M2196

**1. CHECK INPUT SIGNAL FOR ECM.**

- 1) Turn ignition switch to ON.
- 2) Measure signal voltage between ECM terminals while throttle valve is fully closed.

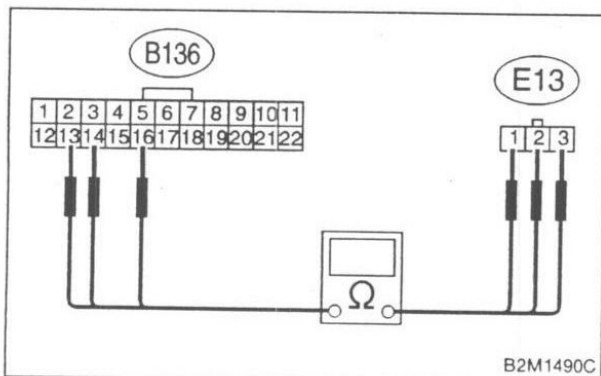
Connector & terminal / Specified voltage:

(B136) No. 16 — (B136) No. 14 / 0.5 ± 0.3 V

- 3) Measure signal voltage between ECM terminals while throttle valve is fully opened.

Connector & terminal / Specified voltage:

(B136) No. 16 — (B136) No. 14 / 4.3 ± 0.3 V

**2. CHECK HARNESS CONNECTOR BETWEEN ECM AND THROTTLE POSITION SENSOR.**

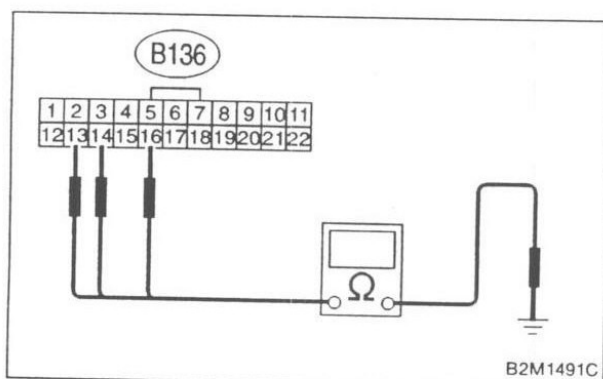
- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from ECM and throttle position sensor.
- 3) Measure resistance of harness connector between ECM and throttle position sensor.

Connector & terminal / Specified resistance:

(B136) No. 16 — (E13) No. 2 / Less than 1 Ω

(B136) No. 13 — (E13) No. 3 / Less than 1 Ω

(B136) No. 14 — (E13) No. 1 / Less than 1 Ω



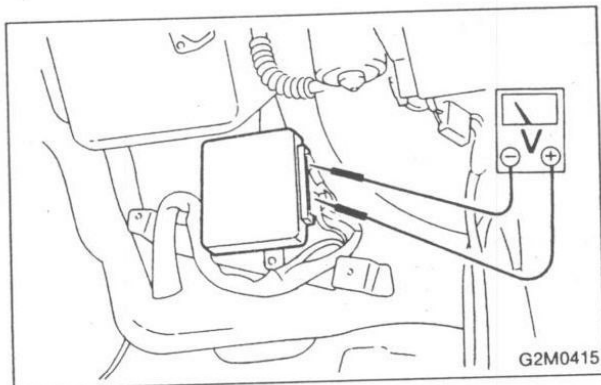
- 4) Disconnect connectors from TCM. (AT vehicle only)
- 5) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B136) No. 16 — Body / More than 1 M Ω

(B136) No. 13 — Body / More than 1 M Ω

(B136) No. 14 — Body / More than 1 M Ω



3. CHECK AND ADJUST THROTTLE POSITION SENSOR.

- 1) Connect all connectors.
- 2) Loosen throttle position sensor installing screws.
- 3) Adjust throttle position sensor while throttle valve is fully opened.

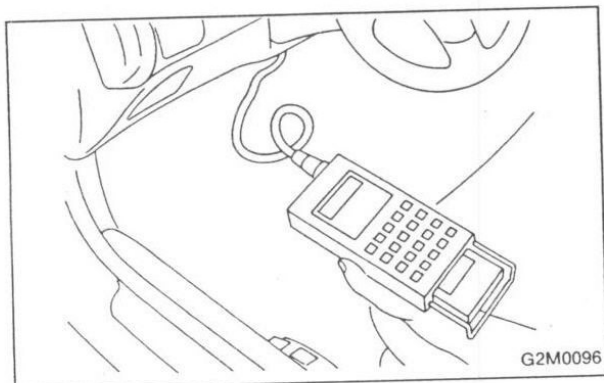
● Using voltage meter:

- (1) Turn ignition switch to ON.
- (2) Adjust throttle position sensor to specified voltage between ECM connector terminals.

Connector & terminal / Specified voltage:

(B136) No. 16 — (B136) No. 14 / 4.3 ± 0.3 V

- (3) Tighten throttle position sensor installing screws.



● Using select monitor:

- (1) Attach select monitor.
- (2) Turn ignition switch to ON.
- (3) Select mode "F07".
- (4) Adjust throttle position sensor to specified data.

Conditions / Specified data:

Throttle valve fully opened / 4.3 ± 0.3 V

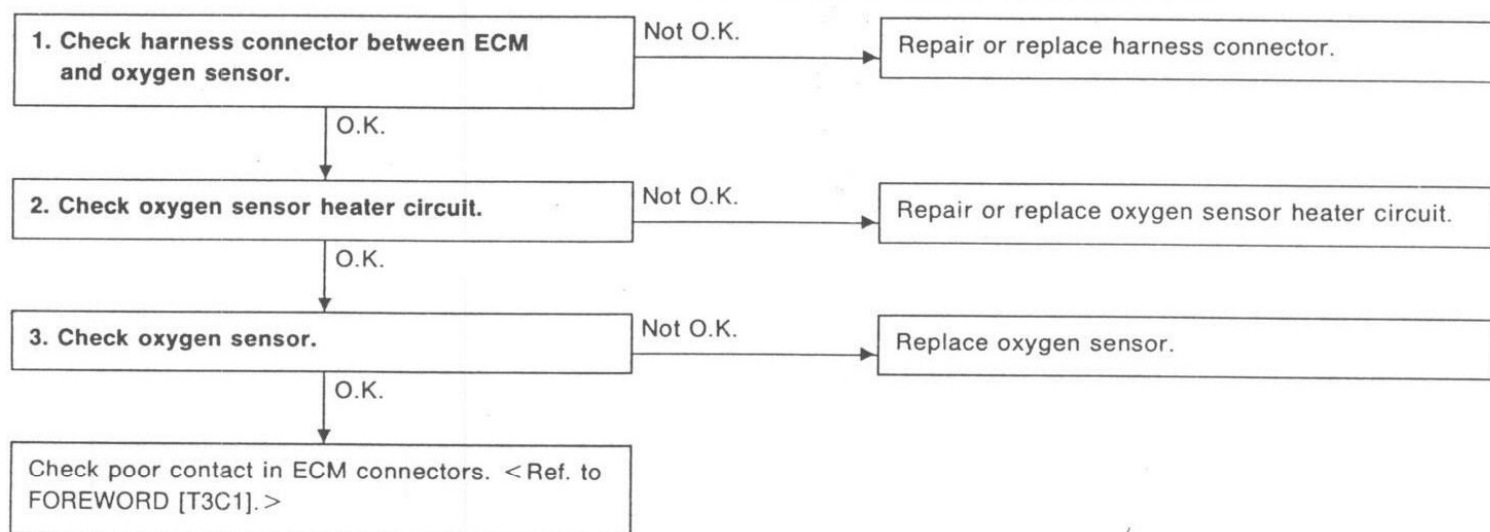
- (5) Tighten throttle position sensor installing screws.

J: TROUBLE CODE (32)
— OXYGEN SENSOR —**DIAGNOSIS:**

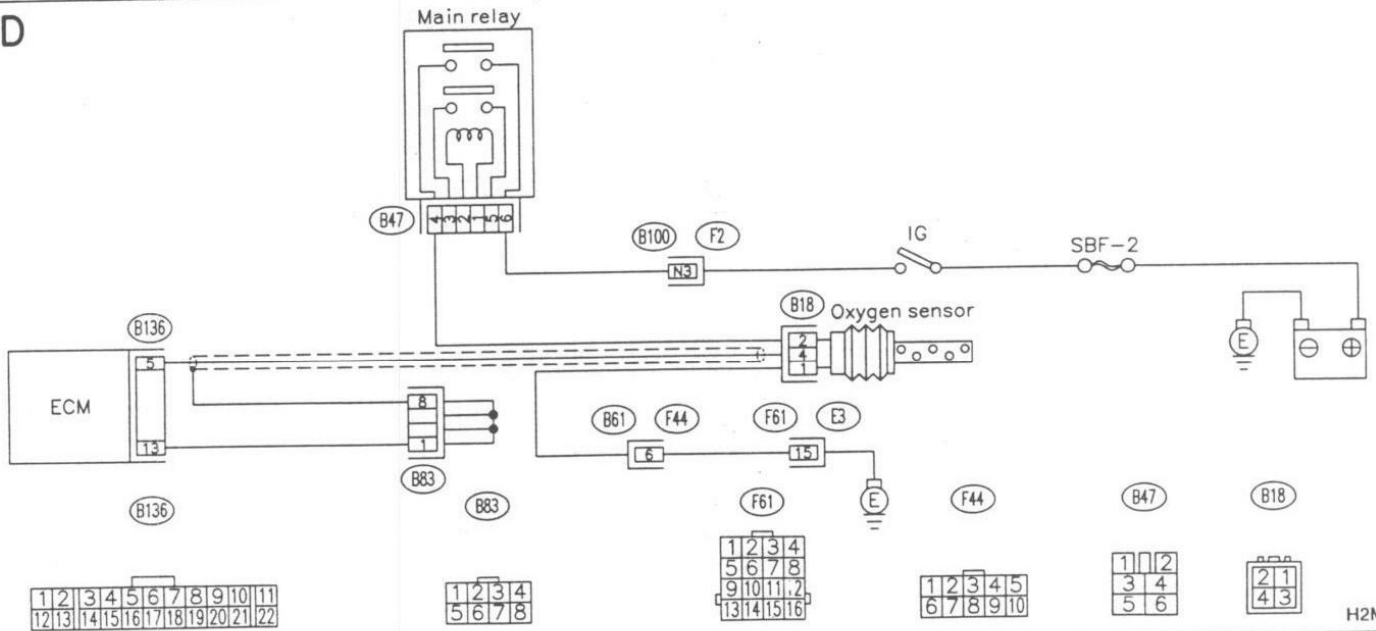
- The oxygen sensor is not in function.
- The harness connector between ECM and oxygen sensor is in short or open.

TROUBLE SYMPTOM:

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

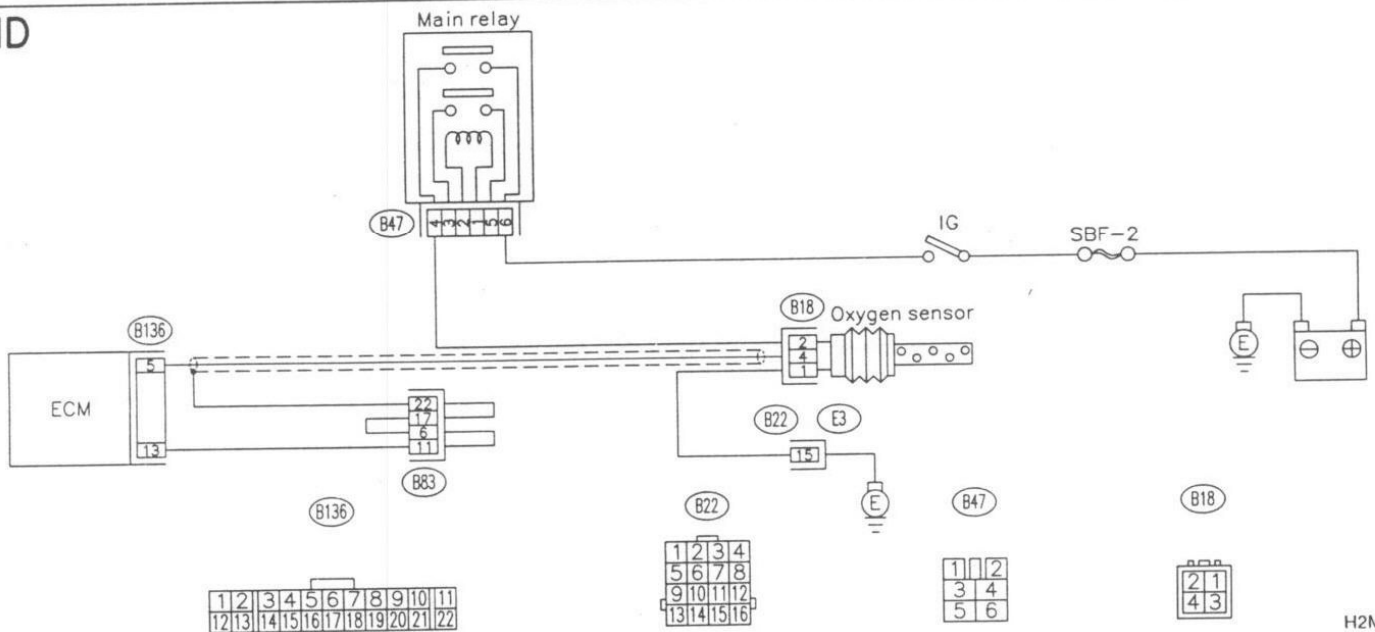


LHD

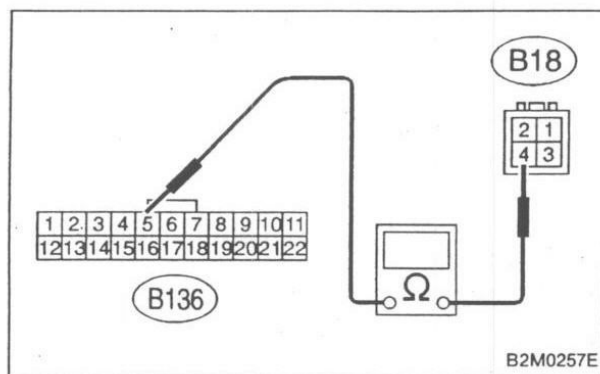


H2M2197

RHD



H2M2198

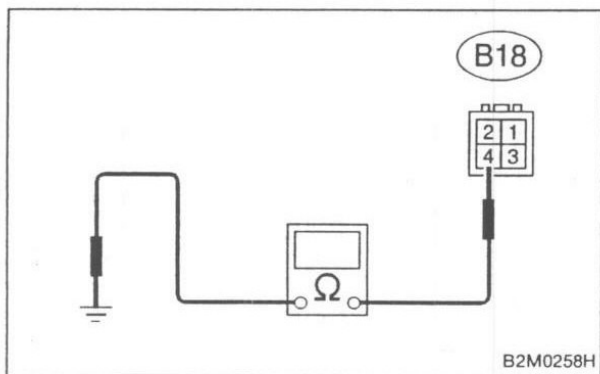


1. CHECK HARNESS CONNECTOR BETWEEN ECM AND OXYGEN SENSOR.

- 1) Disconnect connectors from ECM and oxygen sensor.
- 2) Measure resistance of harness connector between ECM and oxygen sensor.

Connector & terminal / Specified resistance:

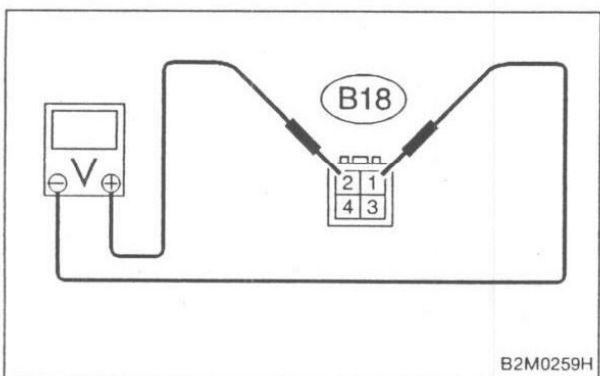
(B136) No. 5 — (B18) No. 4 / Less than 1 Ω



- 3) Measure resistance of harness connector between oxygen sensor and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B18) No. 4 — Body / More than 1 M Ω

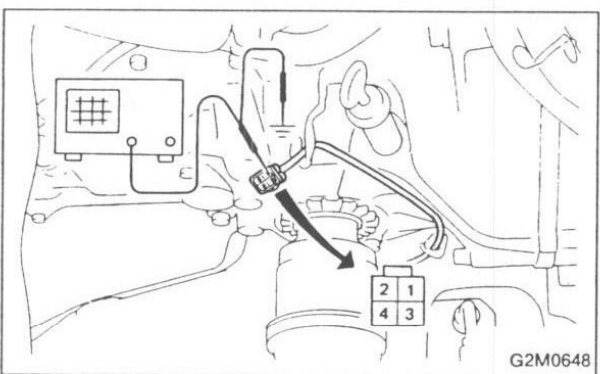


2. CHECK OXYGEN SENSOR HEATER CIRCUIT.

- 1) Connect ECM connectors.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between connector terminals of oxygen sensor.

Connector & terminal / Specified voltage:

(B18) No. 1 — (B18) No. 2 / More than 10 V



3. CHECK OXYGEN SENSOR.

- 1) Connect oxygen sensor.
- 2) Idle engine.
- 3) Disconnect oxygen sensor connector.
- 4) Measure voltage between oxygen sensor terminal and body by using oscilloscope.

Connector & terminal / Specified voltage:

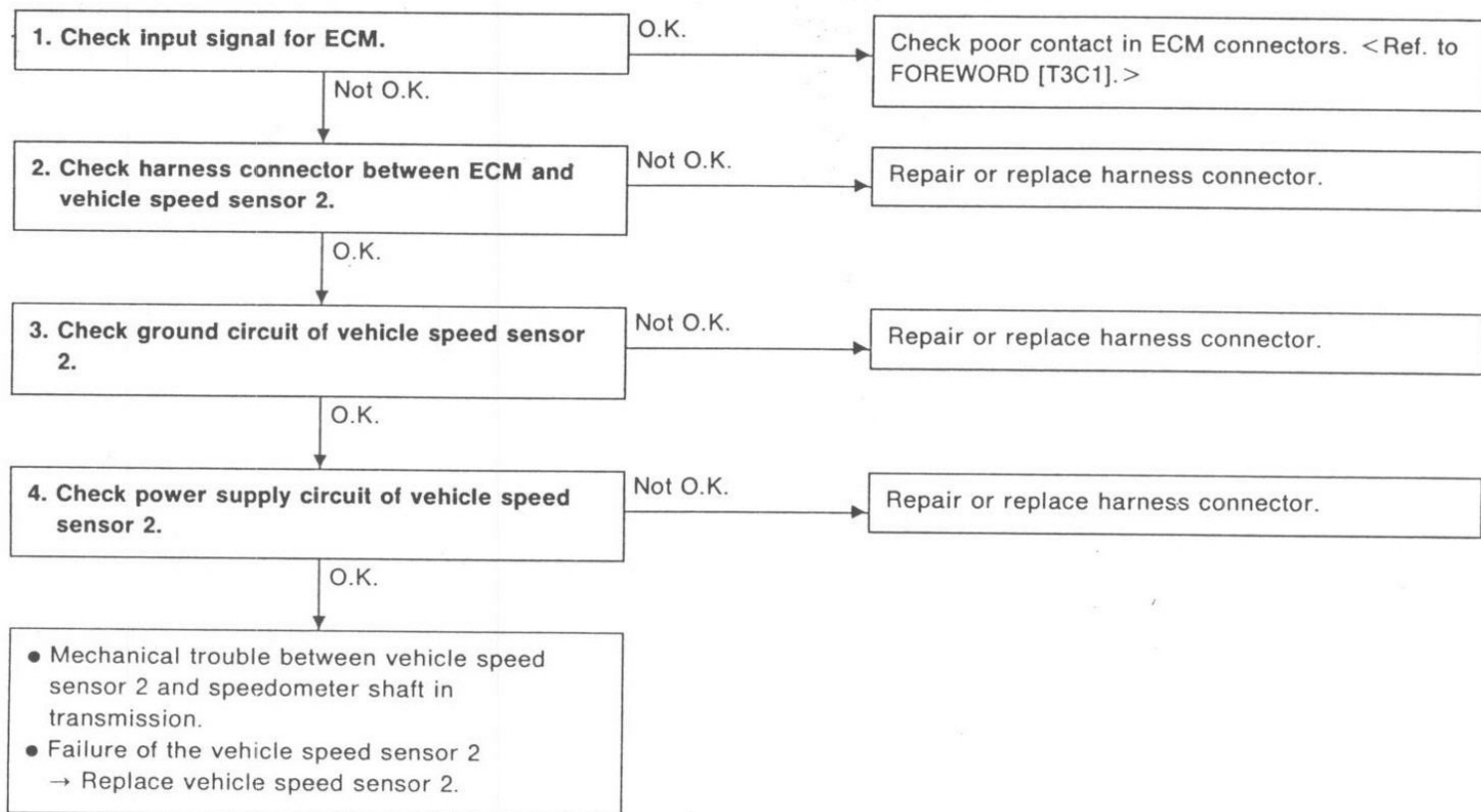
No. 4 — Body / 0.1 — 1.0 V

K: TROUBLE CODE (33)**— VEHICLE SPEED SENSOR 2 —****DIAGNOSIS:**

- The vehicle speed sensor 2 is not in function.
- The harness connector between ECM and vehicle speed sensor 2 is in short or open.

TROUBLE SYMPTOM:

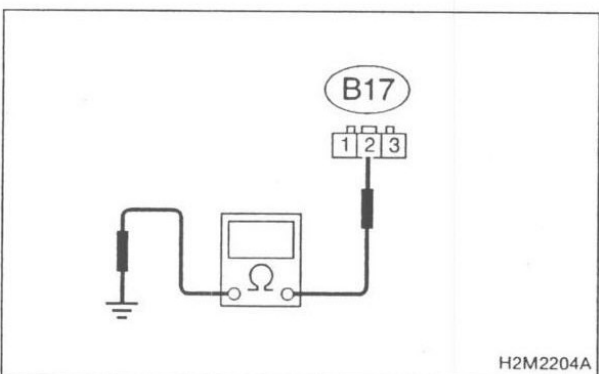
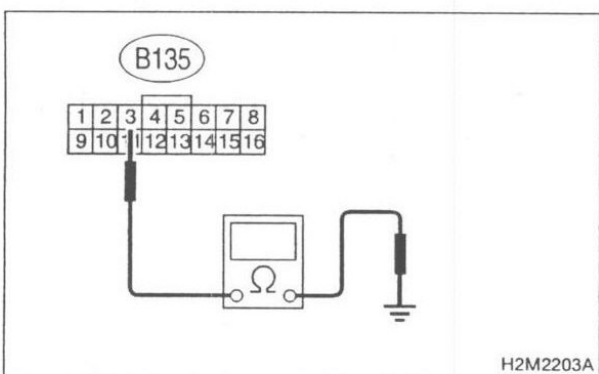
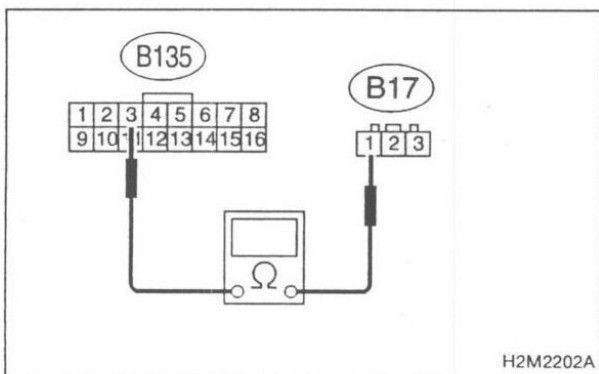
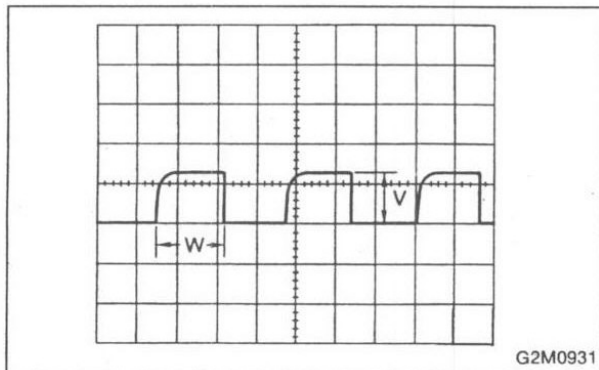
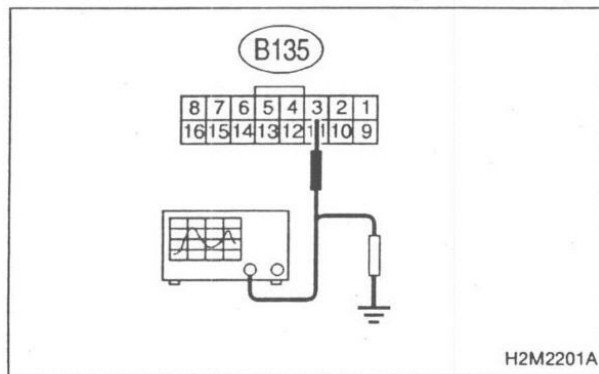
- Erroneous idling
- Engine stalls.
- Poor driving performance



MODEL] [T8K0] **2-7c**
8. Diagnostics Chart with Trouble Code

8. Diagnostics Chart with Trouble Code



**1. CHECK INPUT SIGNAL FOR ECM.**

- 1) Lift-up the vehicle, or set the vehicle on free roller.
- 2) Set the positive (+) terminal and earth lead of oscilloscope at ECM connector terminals.

Connector & terminal / (B135) No. 3 — Body

- 3) Start the engine.
- 4) Shift on the gear position, and be constant the vehicle speed.
- 5) Measure signal voltage indicated on oscilloscope.

Specified voltage / More than 3 V

NOTE:

If vehicle speed increases, the width of amplitude (W) decreases.

2. CHECK HARNESS CONNECTOR BETWEEN ECM AND VEHICLE SPEED SENSOR 2.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from ECM and vehicle speed sensor 2.
- 3) Measure resistance of harness connector between ECM and vehicle speed sensor 2.

Connector & terminal / Specified resistance:

(B135) No. 3 — (B17) No. 1 / Less than 1 Ω

- 4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

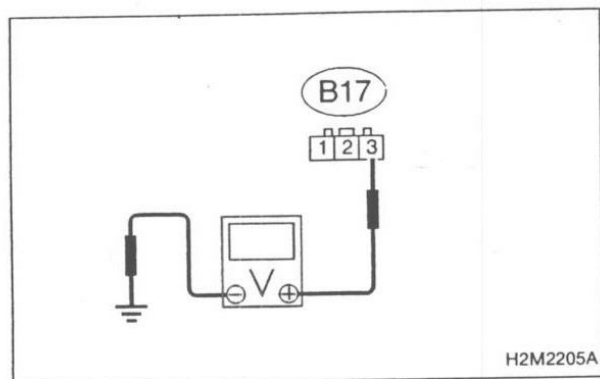
(B135) No. 3 — Body / More than 1 M Ω

3. CHECK GROUND CIRCUIT OF VEHICLE SPEED SENSOR 2.

Measure resistance of harness connector between vehicle speed sensor 2 and body.

Connector & terminal / Specified resistance:

(B17) No. 2 — Body / Less than 5 Ω

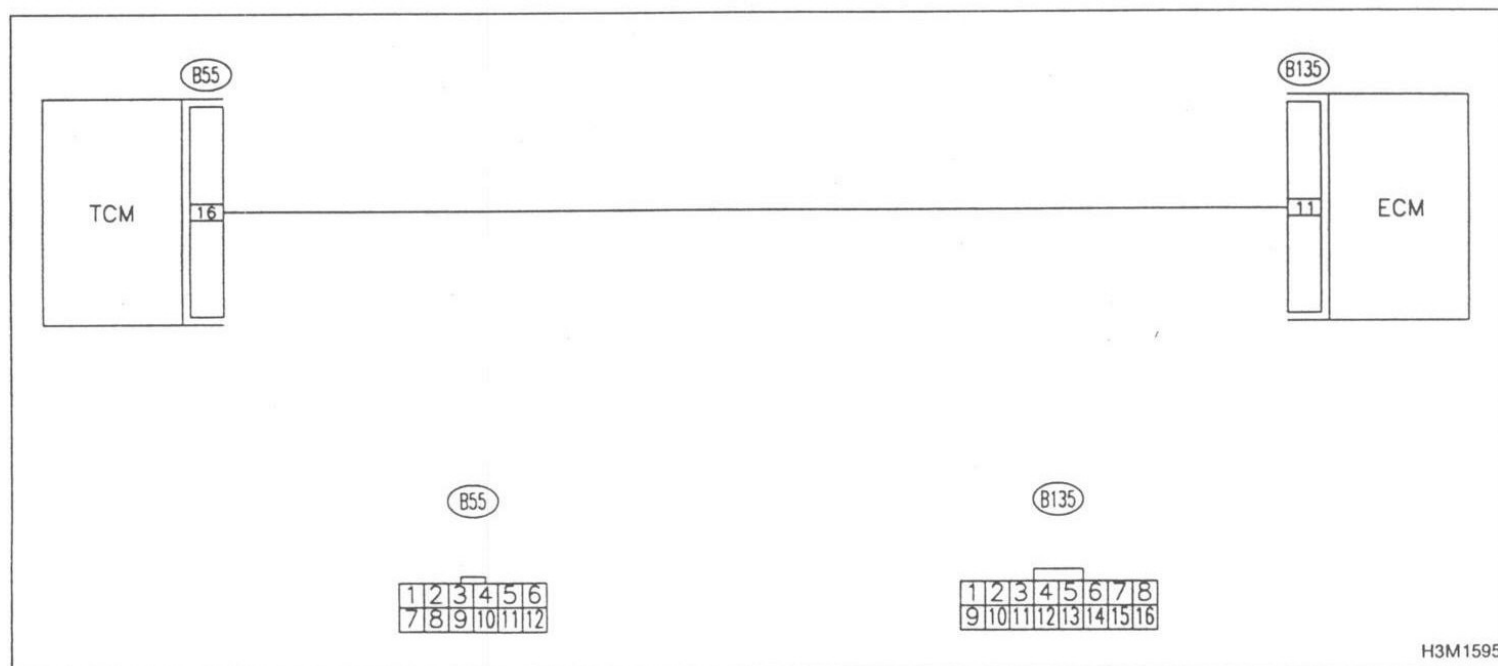
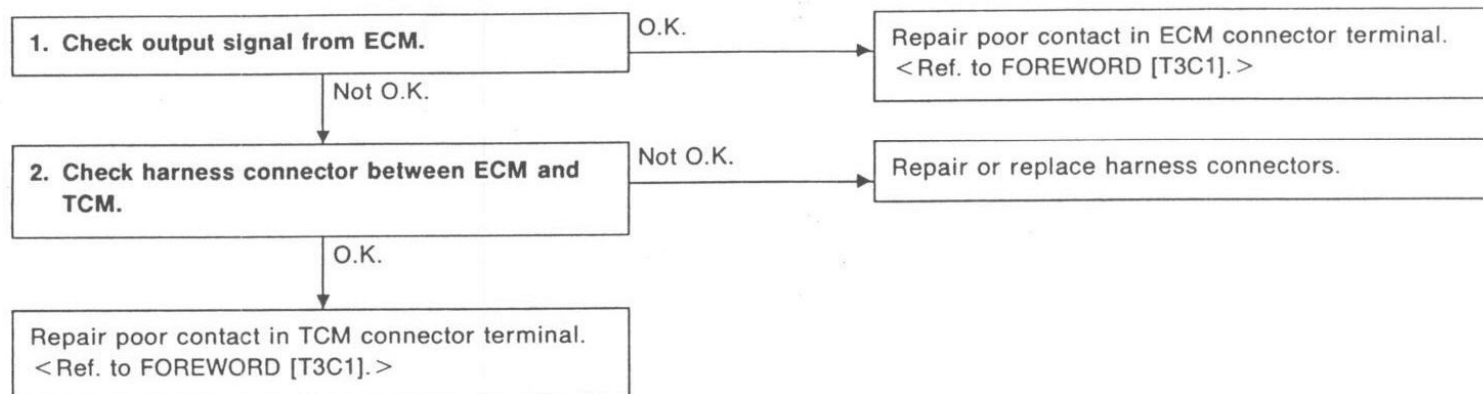
**4. CHECK POWER SUPPLY CIRCUIT OF VEHICLE SPEED SENSOR 2.**

- 1) Turn ignition switch to ON.
- 2) Measure power supply voltage to vehicle speed sensor 2.

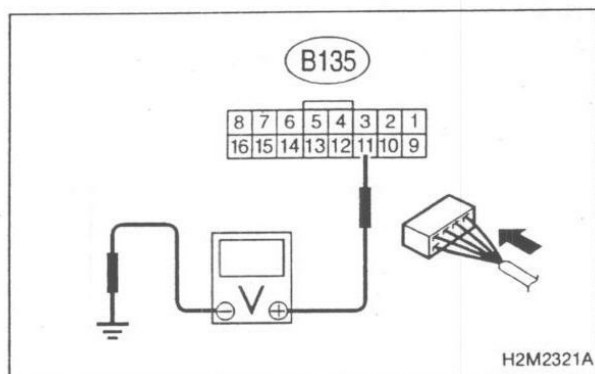
Connector & terminal / Specified voltage:
(B17) No. 3 — Body / $\geq$ More than 0 V

L: TROUBLE CODE (38)**— TORQUE CONTROL SIGNAL —****DIAGNOSIS:**

- Abnormal signal is entered from TCM.
- The harness connector between ECM and TCM is in short or open.



H3M1595

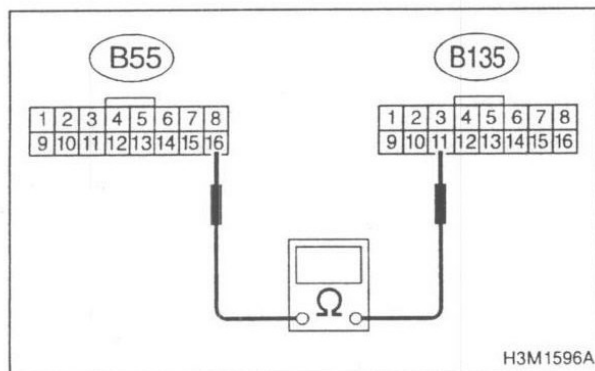


1. CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to ON.
- 2) Measure signal voltage between ECM and body.

Connector & terminal / Specified voltage:

(B135) No. 11 — Body / 5 ± 1 V

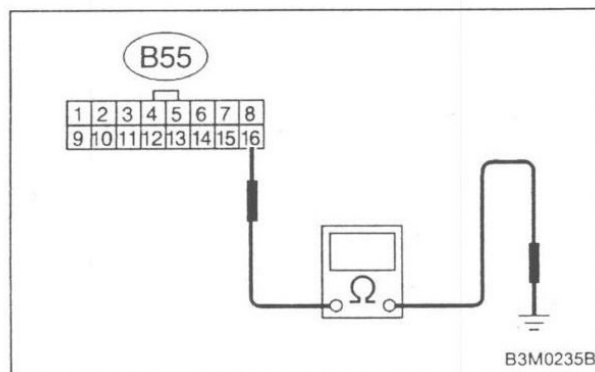


2. CHECK HARNESS CONNECTOR BETWEEN ECM AND TCM.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from TCM and ECM.
- 3) Measure resistance of harness connector between ECM and TCM.

Connector & terminal / Specified resistance:

(B135) No. 11 — (B55) No. 16 / Less than 1Ω



- 4) Measure resistance of harness connector between TCM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B55) No. 16 — Body / More than $1 M\Omega$

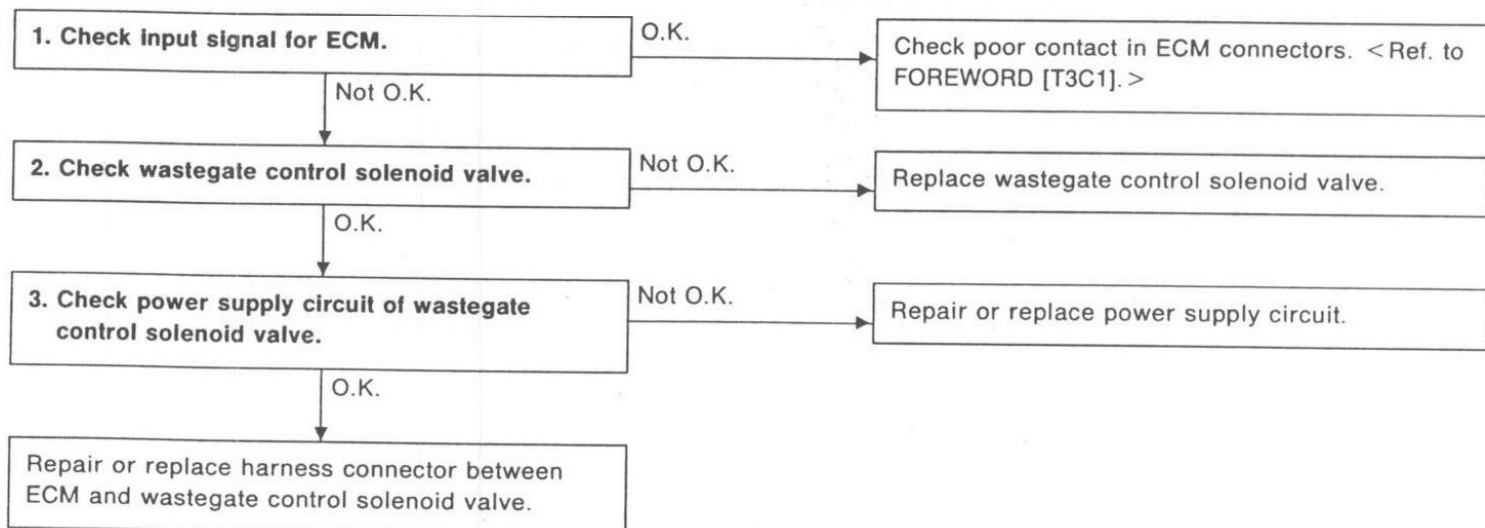
M: TROUBLE CODE (44) — WASTEGATE CONTROL SOLENOID VALVE —

DIAGNOSIS:

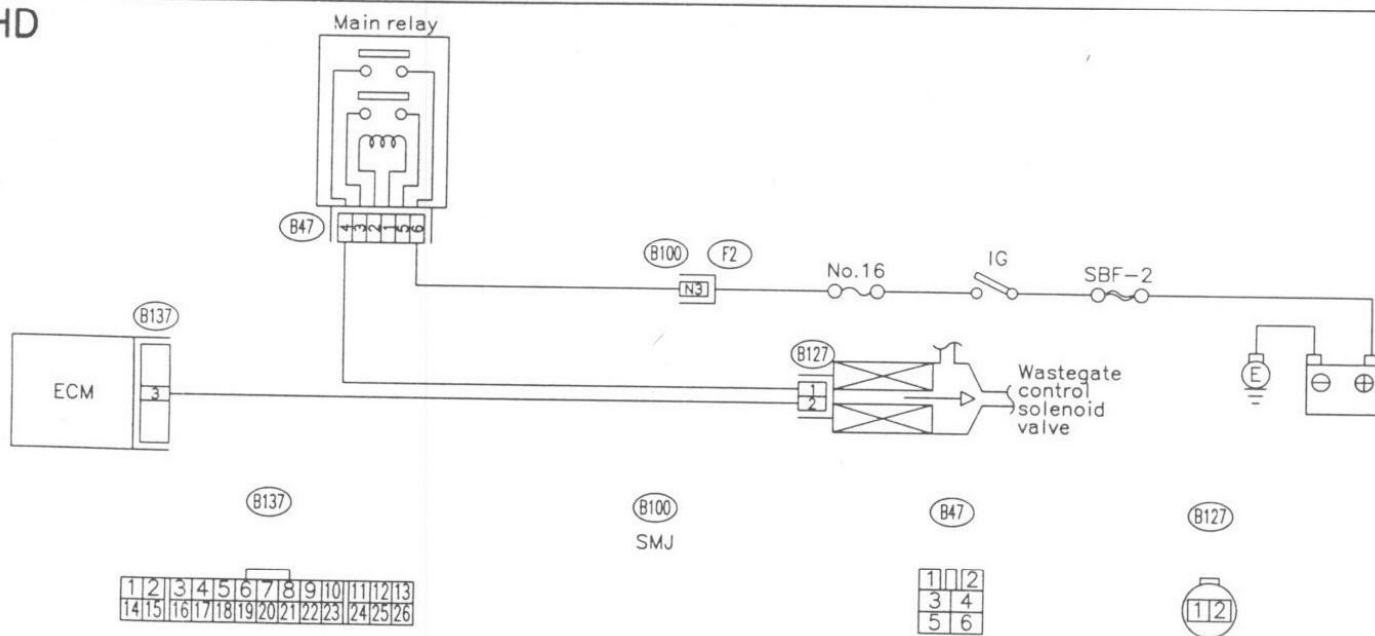
- The wastegate control solenoid valve is not in function.
- The harness connector between ECM and wastegate control solenoid valve is in short or open.

TROUBLE SYMPTOM:

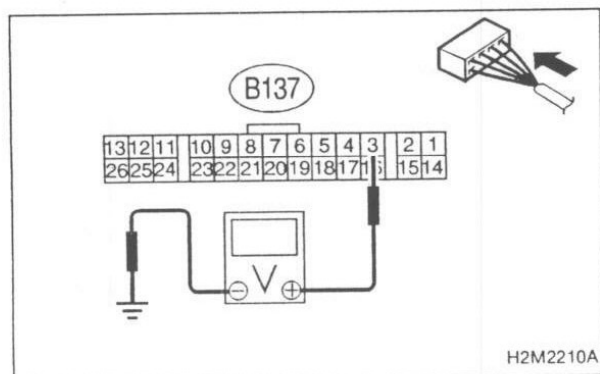
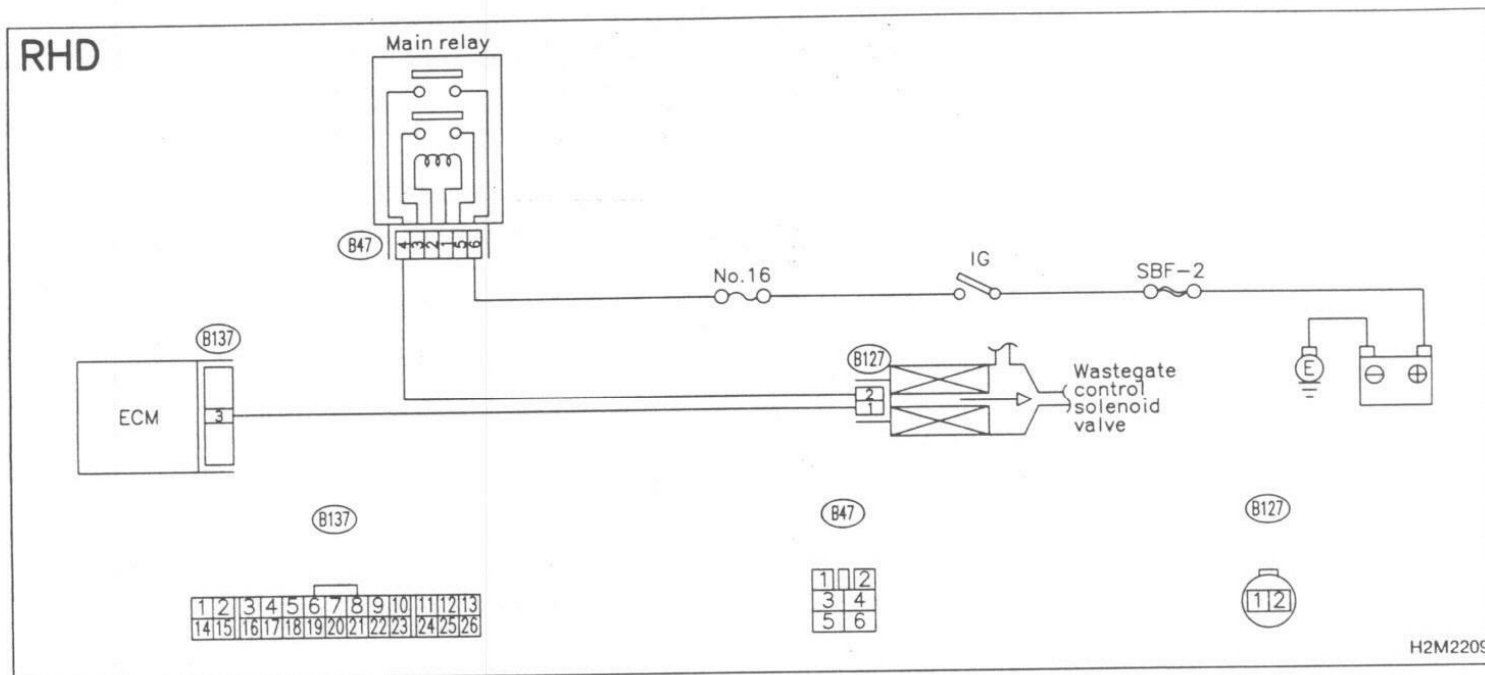
- Poor driving performance



LHD



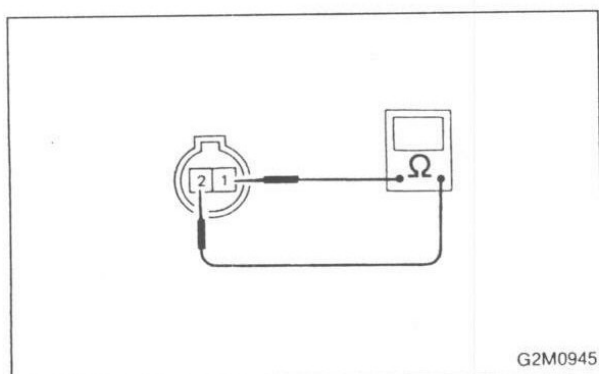
H2M2208



1. CHECK INPUT SIGNAL FOR ECM.

- 1) Turn ignition switch to ON.
- 2) Measure signal voltage between ECM and body.

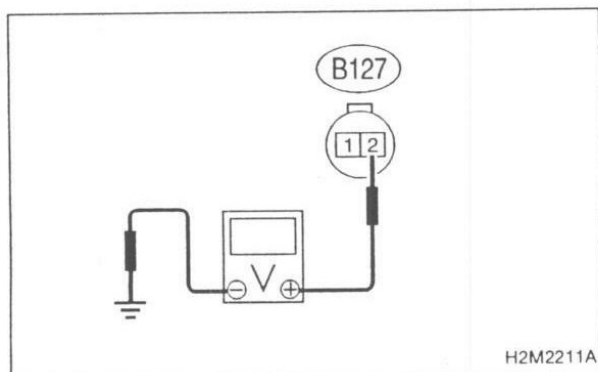
Connector & terminal / Specified voltage:
(B137) No. 3 — Body / More than 10 V



2. CHECK WASTEGATE CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from wastegate control solenoid valve.
- 3) Measure resistance between connector terminals of wastegate control solenoid valve.

Terminals / Specified resistance:
No. 1 — No. 2 / 20 Ω



3. CHECK POWER SUPPLY CIRCUIT OF WASTEGATE CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between wastegate control solenoid valve connector and body.

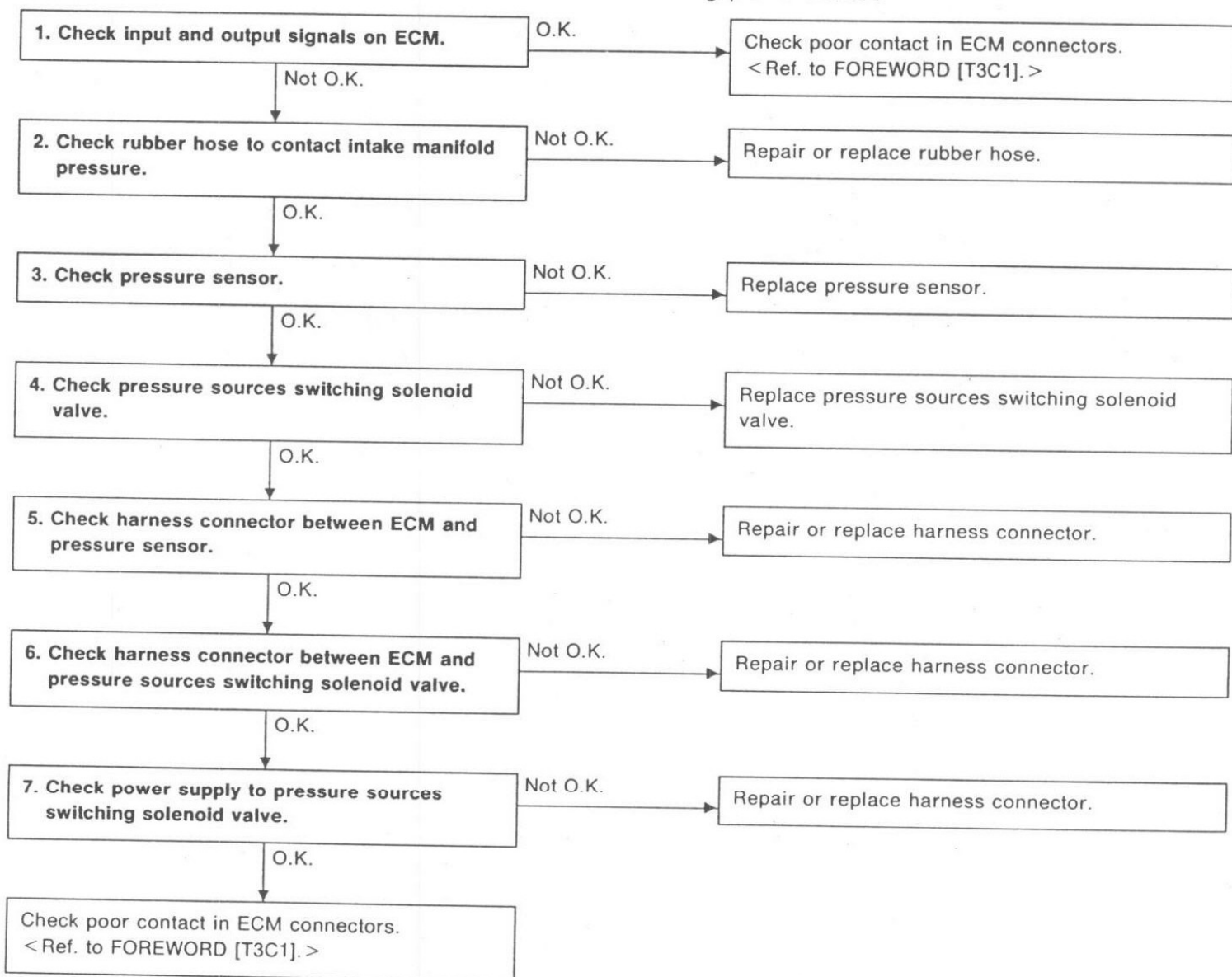
Connector & terminal / Specified voltage:
(B127) No. 2 — Body / More than 10 V

N: TROUBLE CODE (45)**— PRESSURE SENSOR, PRESSURE SOURCES SWITCHING SOLENOID VALVE —****DIAGNOSIS:**

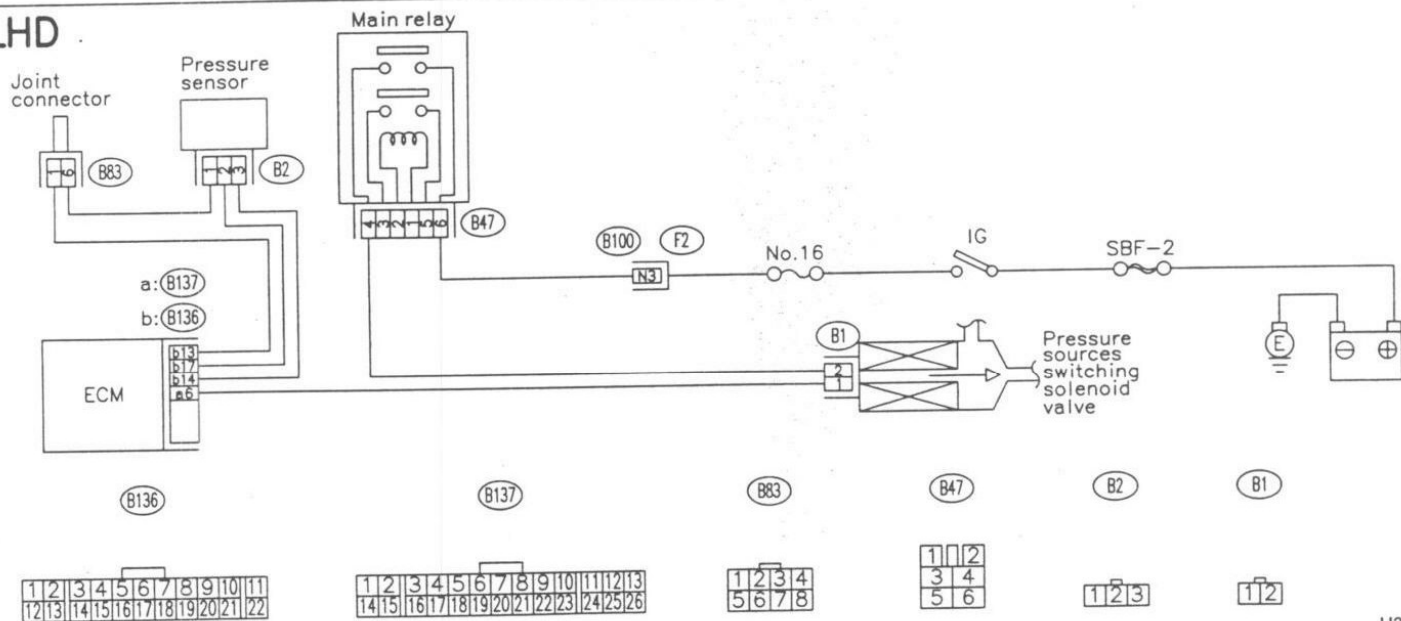
- The pressure sensor signal is abnormal.
- The pressure sources switching solenoid valve is not in function.
- The intake manifold pressure is not transmitted to pressure sensor.
- The harness connector between ECM and pressure sensor, and pressure sources switching solenoid valve is in short or open.

TROUBLE SYMPTOM:

- Poor driving performance

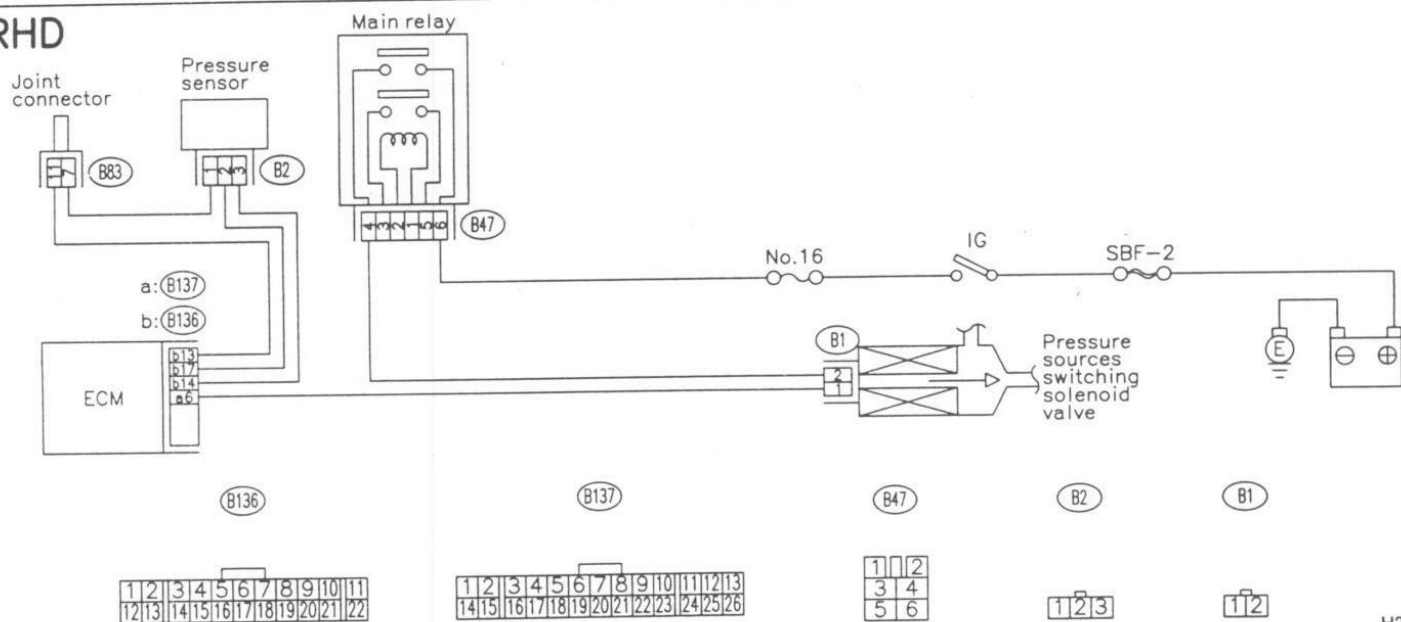


LHD

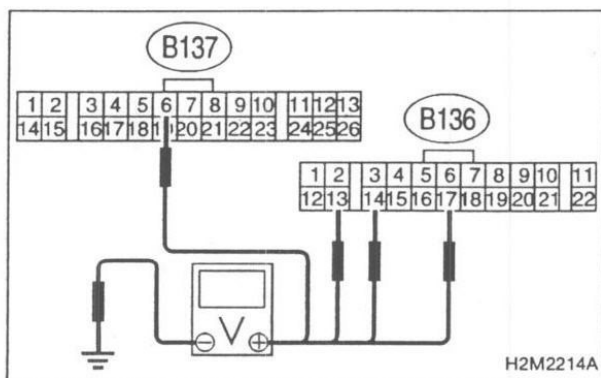


H2M2212

RHD



H2M2213

**1. CHECK INPUT AND OUTPUT SIGNALS ON ECM.**

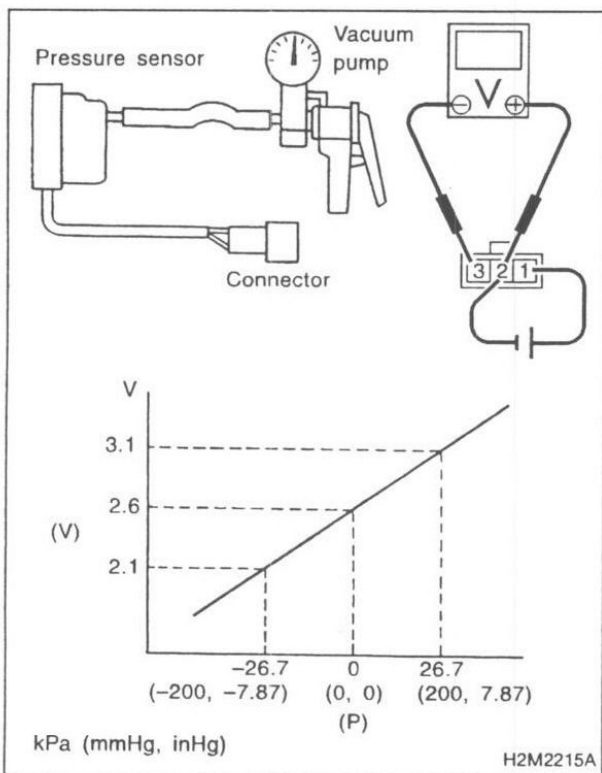
- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM connector terminal and body.

Connector & terminal / Specified voltage:

- (B136) No. 13 — Body / 5 V
 (B136) No. 14 — Body / 2.4 — 2.7 V
 (B136) No. 17 — Body / 0 V
 (B137) No. 6 — Body / 0 V or 10 — 13 V

2. CHECK RUBBER HOSE TO CONTACT INTAKE MANIFOLD PRESSURE.

- 1) Visually check the connection between pressure sensor and rubber hose, between pressure sources switching solenoid valve and rubber hose, and between intake manifold and rubber hose.
- 2) Check rubber hose for cracks and damage.

**3. CHECK PRESSURE SENSOR.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from pressure sensor.
- 3) Apply 5 volt voltage across terminals No. 1 and No. 2, then connect terminal No. 1 to positive side and terminal No. 2 to negative side.
- 4) Install vacuum pump to hose fitting on pressure sensor.
- 5) Measure voltage across terminals when pressure is applied to pressure sensor.

Terminals / Specified voltage:

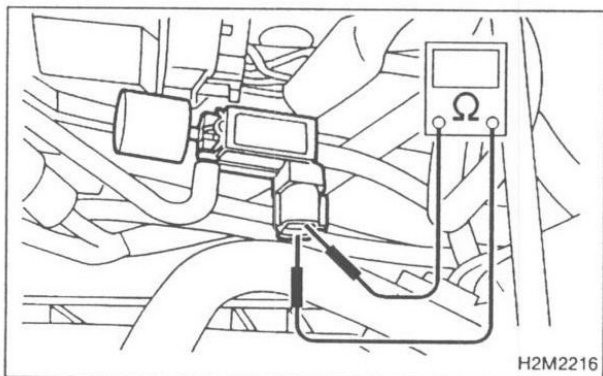
- No. 2 — No. 3 / 3.1 V at 26.7 kPa
 (200 mmHg, 7.87 inHg)
 2.6 V at 0 kPa
 (0 mmHg, 0 inHg)
 2.1 V at -26.7 kPa
 (-200 mmHg, -7.87 inHg)

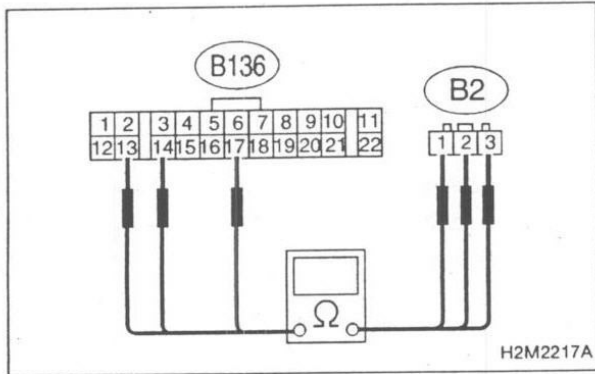
4. CHECK PRESSURE SOURCES SWITCHING SOLENOID VALVE.

- 1) Disconnect connector from pressure sources switching solenoid valve.
- 2) Measure resistance across terminals.

Terminals / Specified resistance:

- No. 1 — No. 2 / 37 — 48 Ω





5. CHECK HARNESS CONNECTOR BETWEEN ECM AND PRESSURE SENSOR.

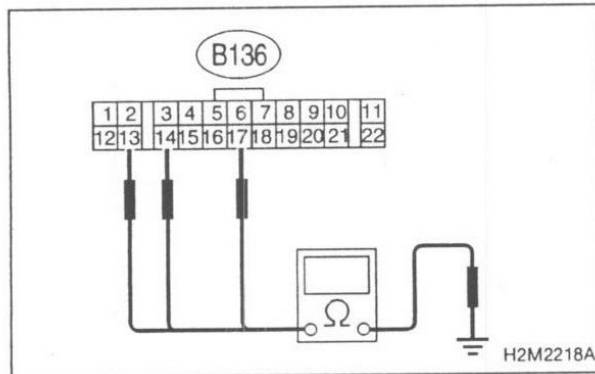
- 1) Disconnect connectors from ECM.
- 2) Measure resistance of harness connector between ECM and pressure sensor connector.

Connector & terminal / Specified resistance:

(B136) No. 13 — (B2) No. 1 / Less than 1 Ω

(B136) No. 14 — (B2) No. 3 / Less than 1 Ω

(B136) No. 17 — (B2) No. 2 / Less than 1 Ω



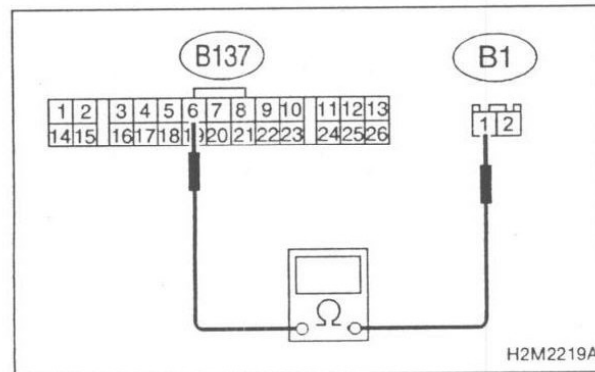
- 3) Measure resistance between ECM connector terminal and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B136) No. 13 — Body / More than 1 M Ω

(B136) No. 14 — Body / More than 1 M Ω

(B136) No. 17 — Body / More than 1 M Ω

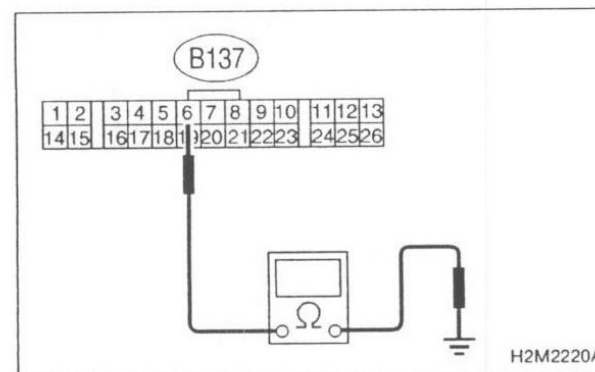


6. CHECK HARNESS CONNECTOR BETWEEN ECM AND PRESSURE SOURCES SWITCHING SOLENOID VALVE.

- 1) Measure resistance of harness connector between ECM and pressure sources switching solenoid valve connector.

Connector & terminal / Specified resistance:

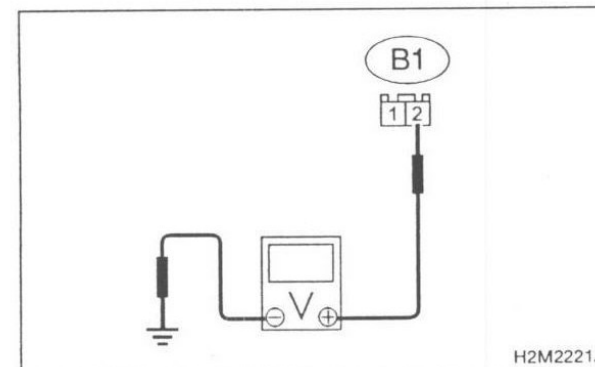
(B137) No. 6 — (B1) No. 1 / Less than 1 Ω



- 2) Measure resistance of harness connector between ECM terminal and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B137) No. 6 — Body / More than 1 M Ω



7. CHECK POWER SUPPLY TO PRESSURE SOURCES SWITCHING SOLENOID VALVE.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between connector terminal of pressure sources switching solenoid valve and body.

Connector & terminal / Specified voltage:

(B1) No. 2 — body / More than 10 V

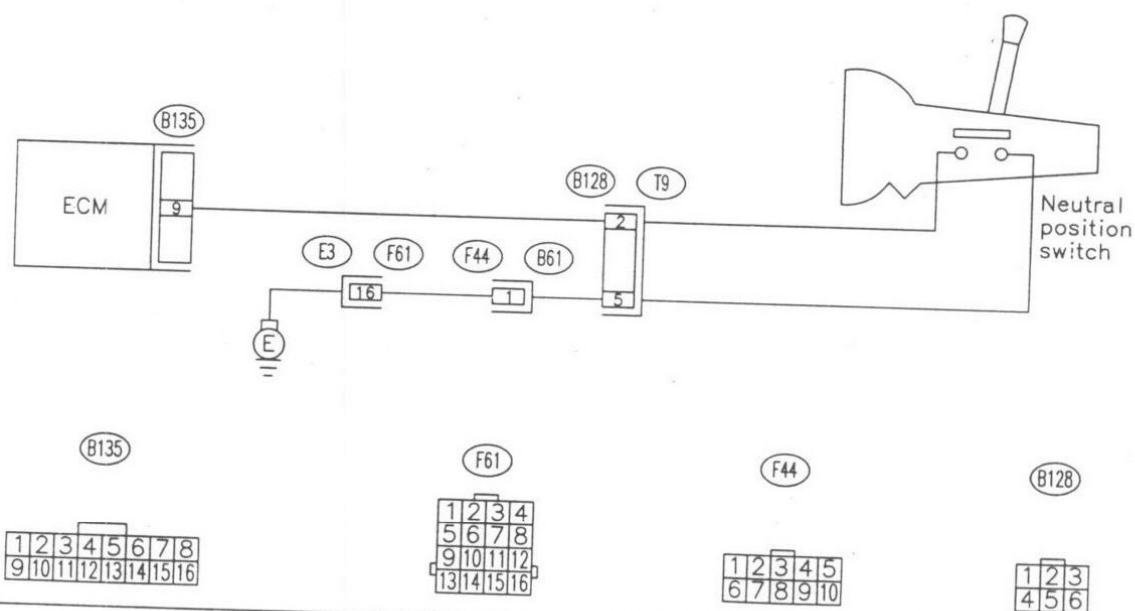
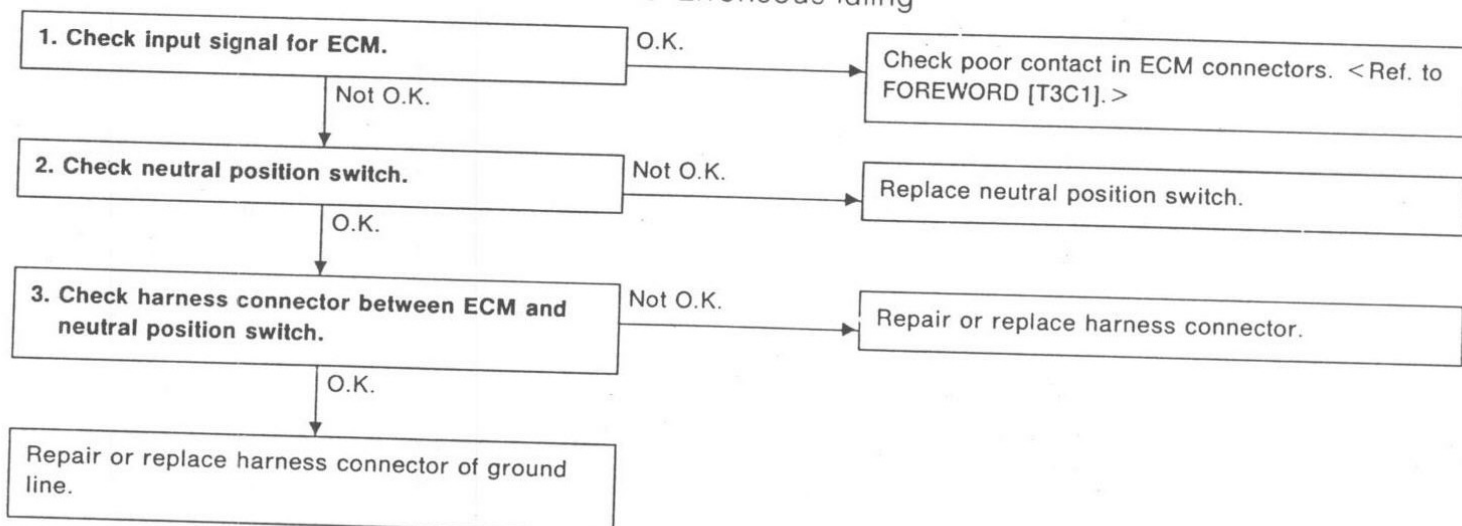
O: TROUBLE CODE (51) — NEUTRAL POSITION SWITCH (MT VEHICLE) —

DIAGNOSIS:

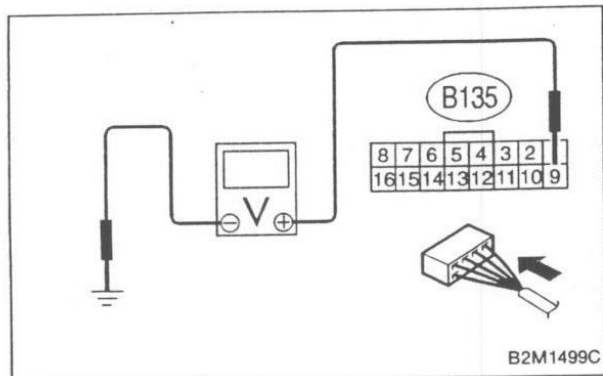
- The neutral position switch signal is abnormal.
- The harness connector between ECM and neutral position switch is in short or open.

TROUBLE SYMPTOM:

- Erroneous idling



H2M2222

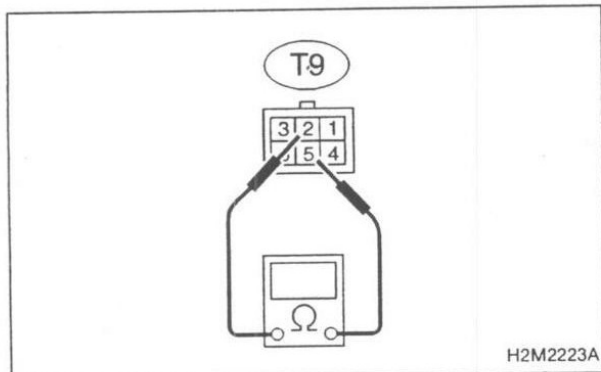


1. CHECK INPUT SIGNAL FOR ECM.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM and body.

Connector & terminal / Specified voltage:

(B135) No. 9 — Body / 5 V
(Neutral position)
/ 0 V
(Other positions)

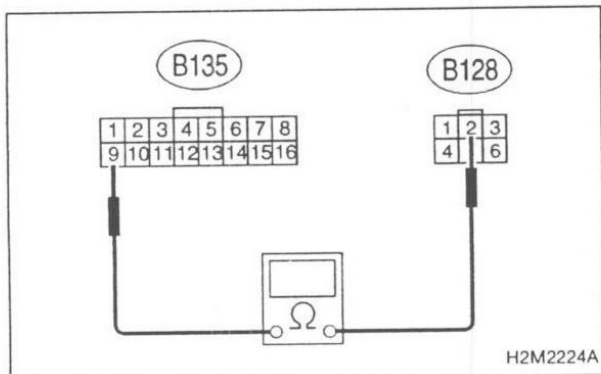


2. CHECK NEUTRAL POSITION SWITCH.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from transmission harness.
- 3) Measure resistance between connector terminals of transmission harness.

Connector & terminal / Specified resistance:

(T9) No. 2 — (T9) No. 5 / More than 1 MΩ
(Neutral position)
/ Less than 10 Ω
(Other positions)

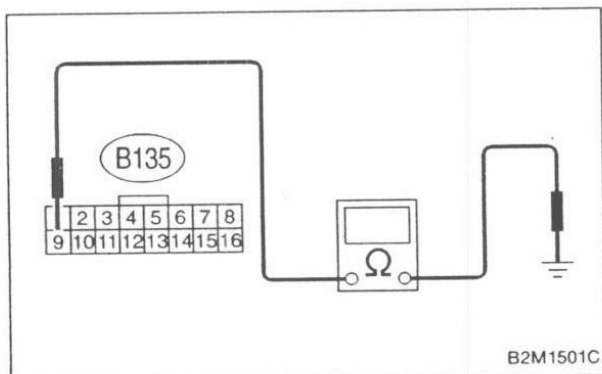


3. CHECK HARNESS CONNECTOR BETWEEN ECM AND NEUTRAL POSITION SWITCH.

- 1) Disconnect connectors from ECM.
- 2) Measure resistance of harness connector between ECM and neutral position switch.

Connector & terminal / Specified resistance:

(B135) No. 9 — (B128) No. 2 / Less than 1 Ω



- 3) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

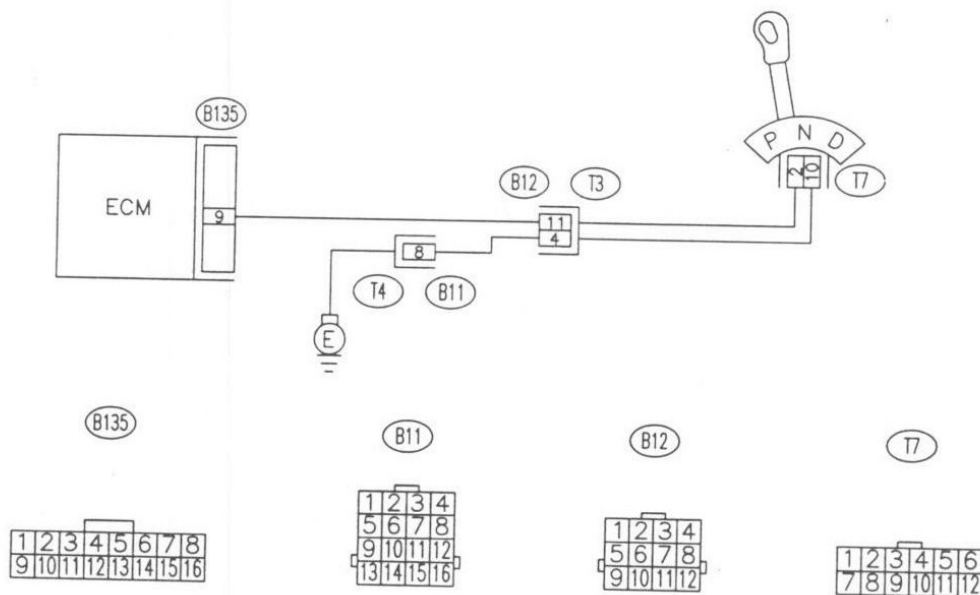
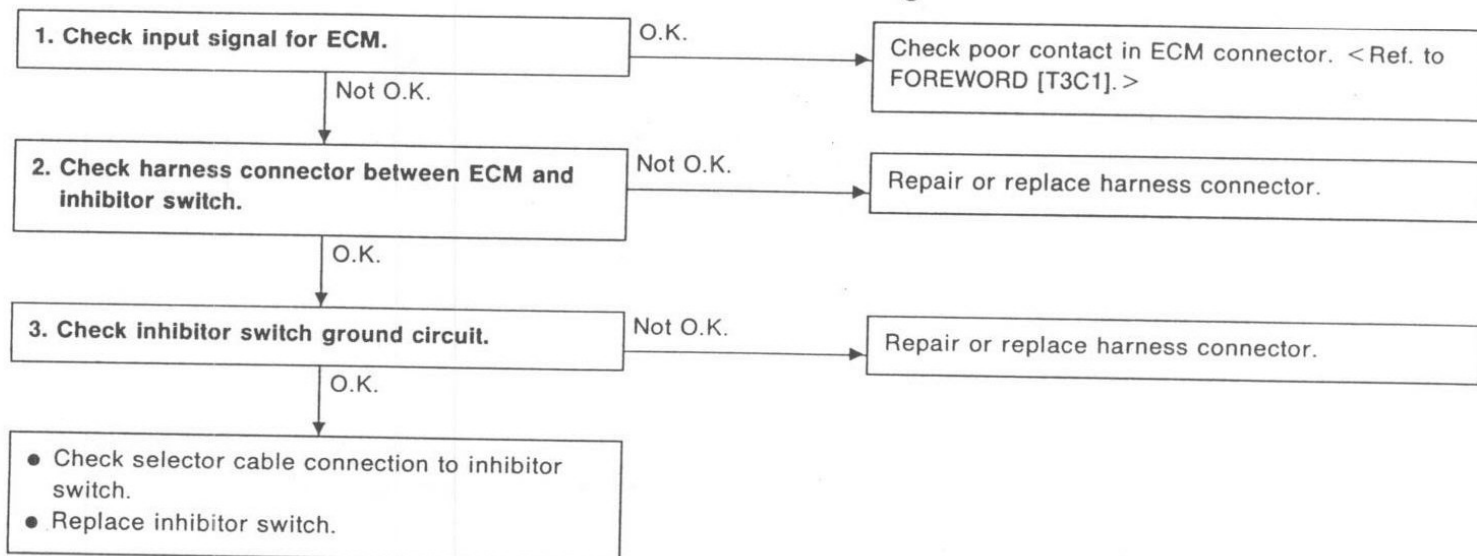
(B135) No. 9 — Body / More than 1 MΩ

P: TROUBLE CODE (51)**— PARK/NEUTRAL POSITION SWITCH (AT) —****DIAGNOSIS:**

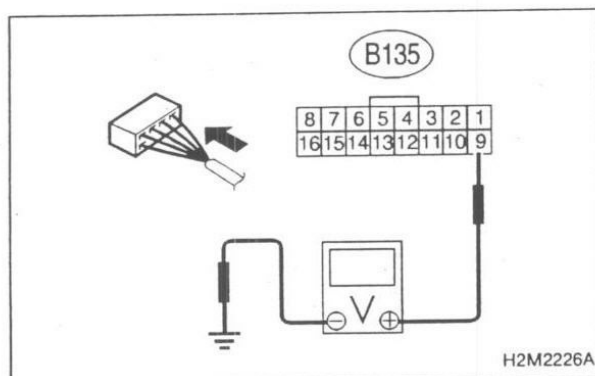
- The park/neutral position switch signal is abnormal.
- The shift cable is connected abnormally.
- The harness connector between ECM/TCM and inhibitor switch is in short or open.

TROUBLE SYMPTOM:

- Erroneous idling



H2M2225

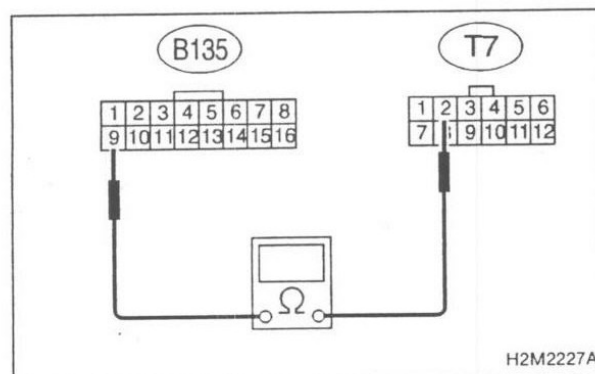


1. CHECK INPUT SIGNAL FOR ECM.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM and body.

Connector & terminal / Specified voltage:

(B135) No. 9 — Body / 0 V ("P" or "N" position)

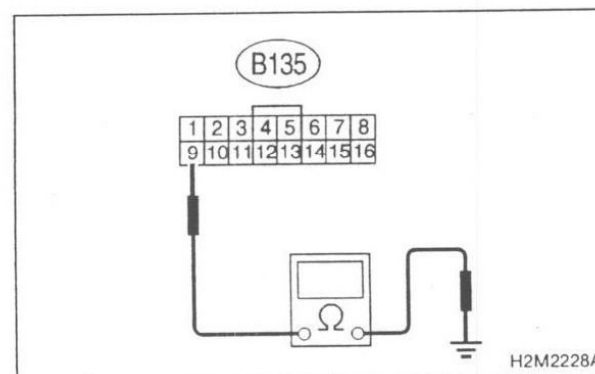


2. CHECK HARNESS CONNECTOR BETWEEN ECM AND INHIBITOR SWITCH.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ECM and transmission harness or inhibitor switch.
- 3) Measure resistance of harness connector between ECM and transmission harness or inhibitor switch.

Connector & terminal / Specified resistance:

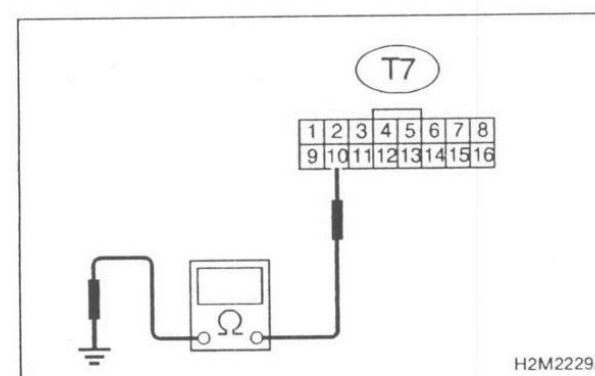
(B135) No. 9 — (T7) No. 2 / Less than 1 Ω



- 4) Measure resistance harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:

(B135) No. 9 — Body / More than 1 M Ω



3. CHECK INHIBITOR SWITCH GROUND CIRCUIT.

Measure resistance of harness between transmission harness or inhibitor switch connector and body.

Connector & terminal / Specified resistance:

(T7) No. 10 — Body / Less than 5 Ω