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

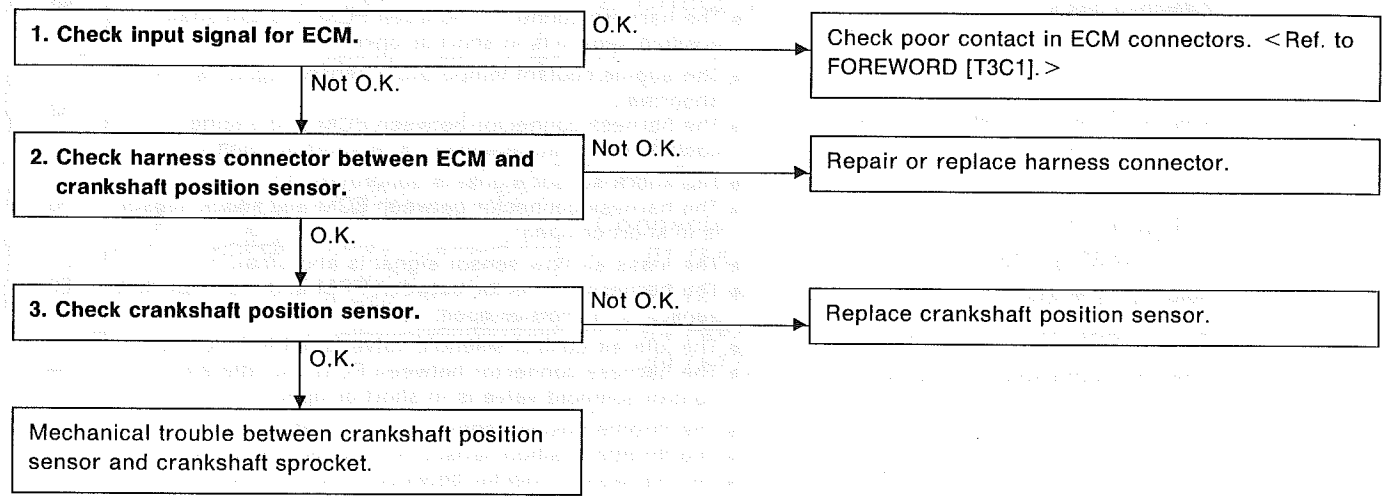
B: TROUBLE CODE (11)
— CRANKSHAFT POSITION SENSOR —

DIAGNOSIS:

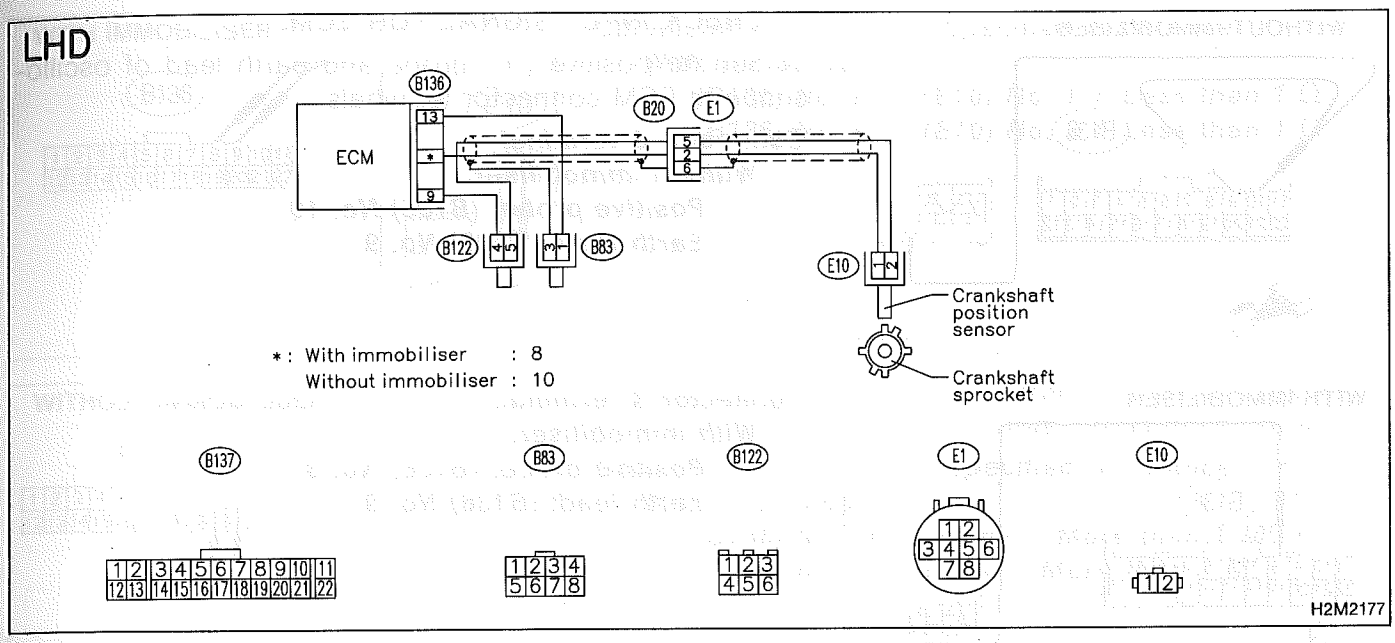
- No signal entered from crankshaft position sensor when starter switch is ON.
- The harness connector between ECM and crankshaft position sensor is in short or open.

TROUBLE SYMPTOM:

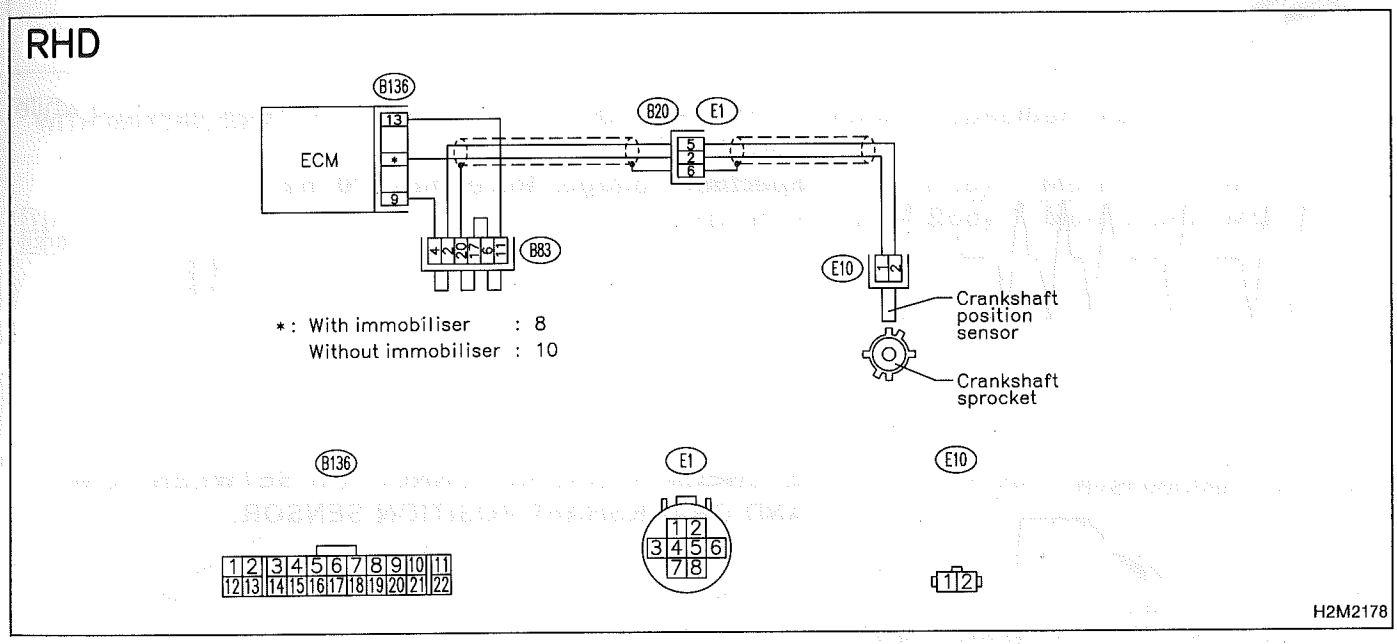
- Engine stalls.
- Restarting impossible

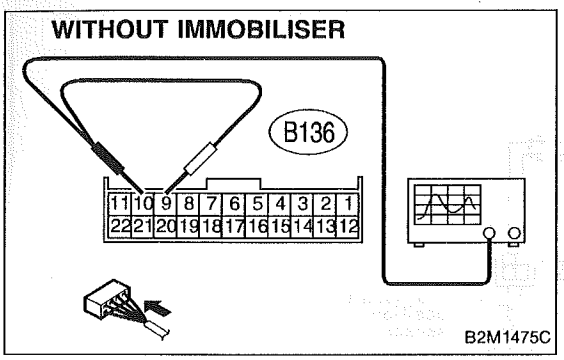


LHD


B136
ECM
13
*
9
B20
E1
B122
B83
E10
Crankshaft position sensor
Crankshaft sprocket
*: With immobiliser : 8
Without immobiliser : 10
B137
B83
B122
E1
E10
H2M2177

RHD

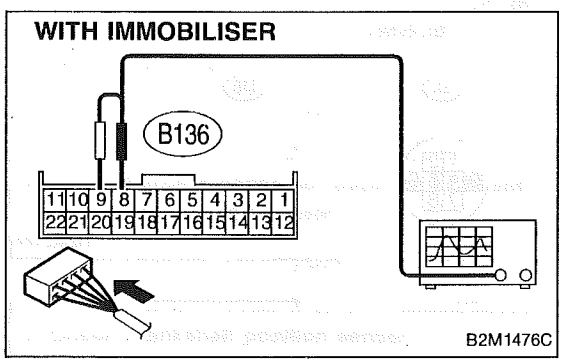

B136
ECM
13
*
9
B20
E1
B83
E10
Crankshaft position sensor
Crankshaft sprocket
*: With immobiliser : 8
Without immobiliser : 10
B136
E1
E10
H2M2178



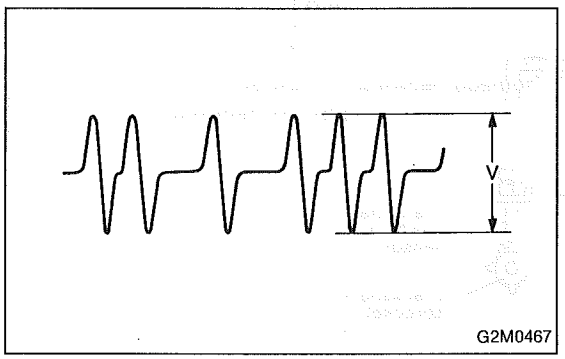
1. CHECK INPUT SIGNAL FOR ECM.

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

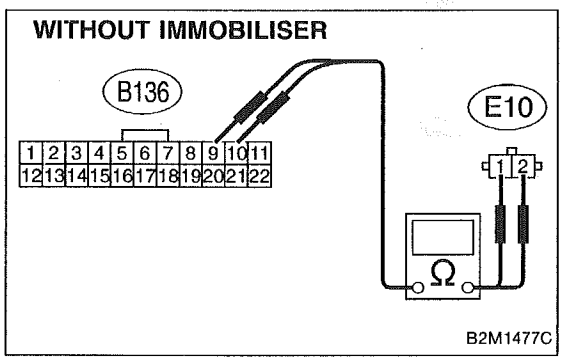


Connector & terminal:
With immobiliser:
Positive probe; (B136) No. 8
Earth lead; (B136) No. 9



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

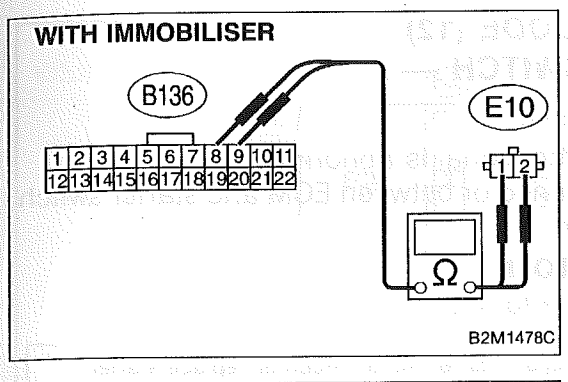
Specified voltage: More than 400 mV



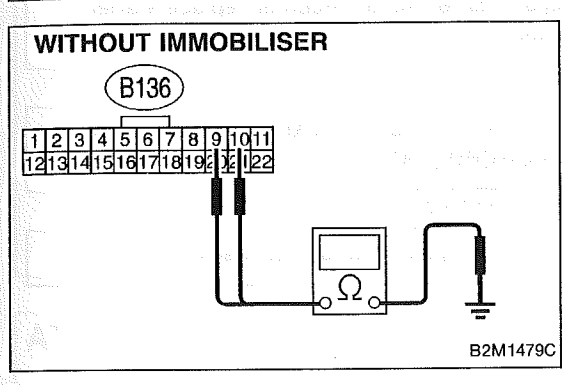
2. CHECK HARNESS CONNECTOR BETWEEN ECM AND CRANKSHAFT POSITION SENSOR.

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

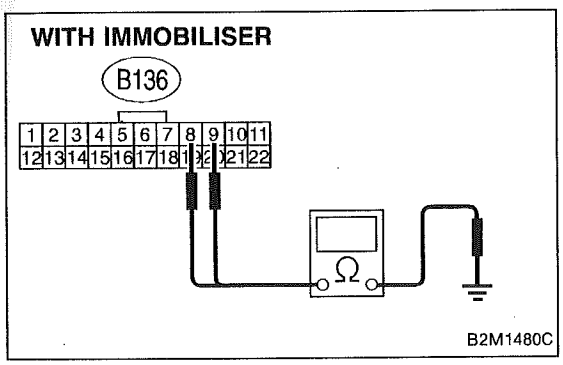


Connector & terminal / Specified resistance:
With immobiliser:
(B136) No. 8 — (E10) No. 1 / Less than 1 Ω
(B136) No. 9 — (E10) No. 2 / Less than 1 Ω

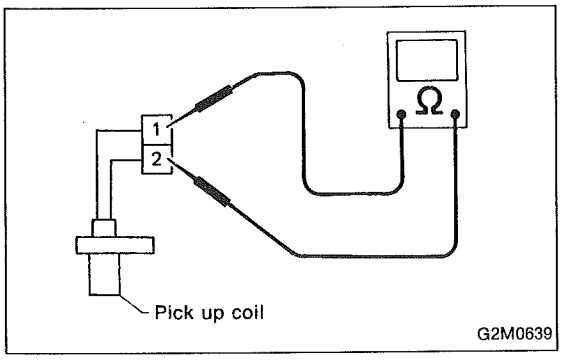


4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:
Without immobiliser:
(B136) No. 10 — Body / More than 1 MΩ
(B136) No. 9 — Body / More than 1 MΩ



Connector & terminal / Specified resistance:
With immobiliser:
(B136) No. 8 — Body / More than 1 MΩ
(B136) No. 9 — Body / More than 1 MΩ



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 ± 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:

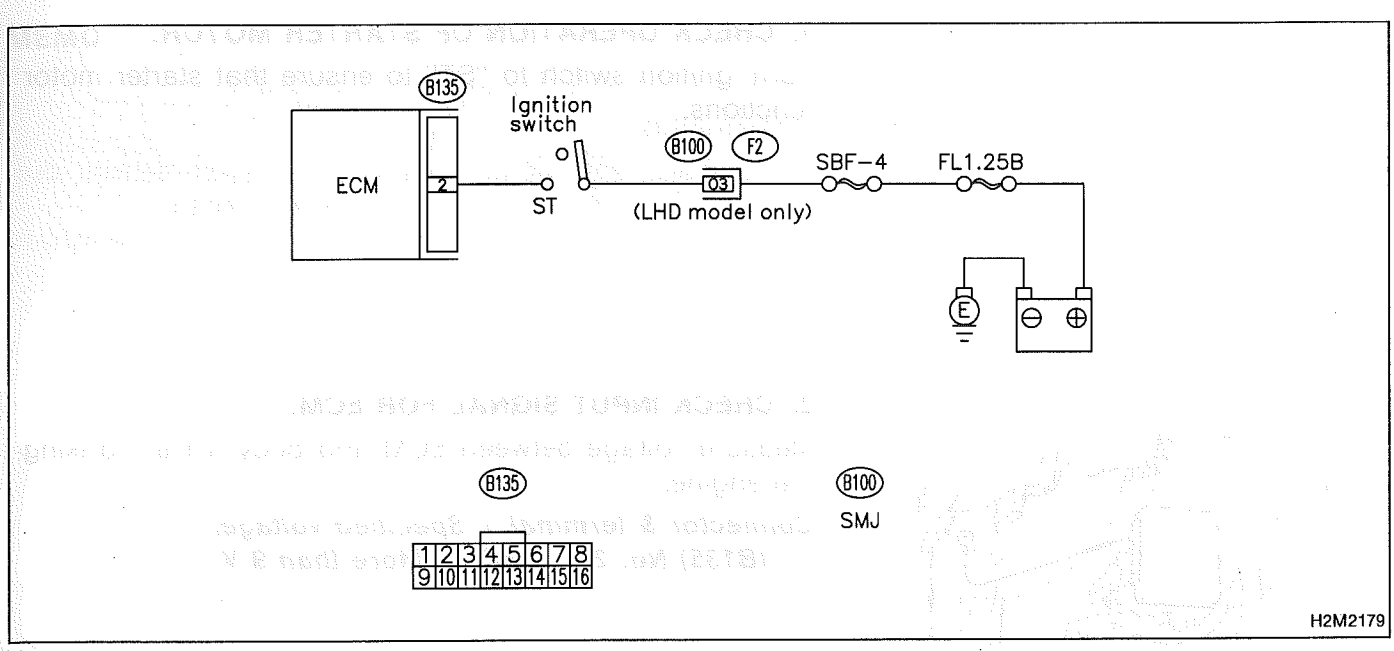
- Failure of engine to start.

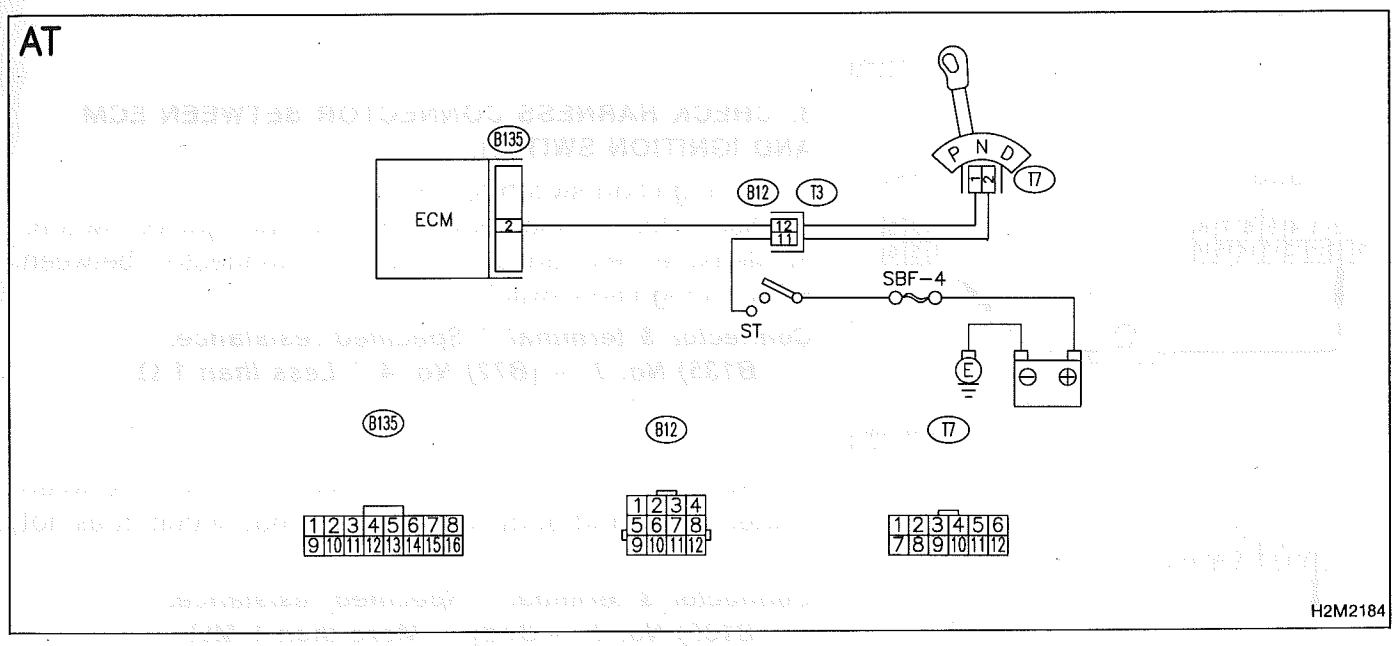
1. Check operation of starter motor.
- Not O.K. → Repair starter motor circuit or replace starter motor.
- O.K. ↓

2. Check input signal for ECM.
- O.K. → Check poor contact in ECM connectors. <Ref. to FOREWORD [T3C1].>
- Not O.K. ↓

3. Check harness connector between ECM and ignition switch.
- Not O.K. → Repair or replace harness connector.
- O.K. ↓

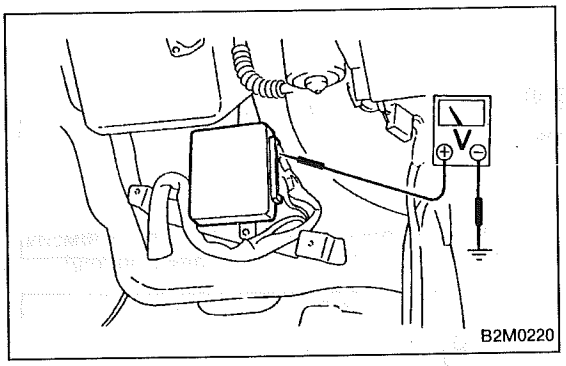
Repair or replace ignition key switch.
<Ref. to 6-2 [W8C0].>


B135
Ignition switch
ECM
2
ST
B100
F2
Q3
(LHD model only)
SBF−4
FL1.25B
E
B135
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
B100
SMJ
H2M2179


AT
B135
ECM
2
B12
T3
12
11
P N D
T7
SBF−4
ST
E
B135
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
B12
1 2 3 4
5 6 7 8
9 10 11 12
T7
1 2 3 4 5 6
7 8 9 10 11 12
H2M2184

1. CHECK OPERATION OF STARTER MOTOR.

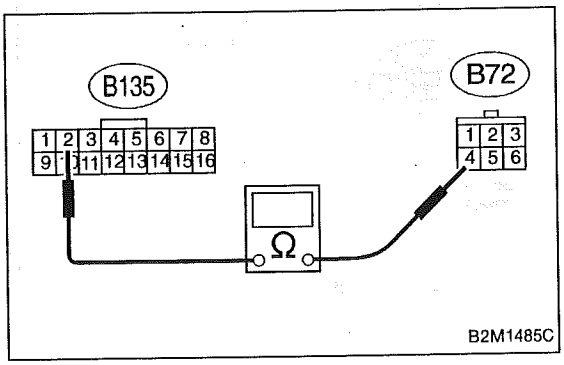
Turn ignition switch to "ST" to ensure that starter motor functions.



2. CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM and body while cranking the engine.

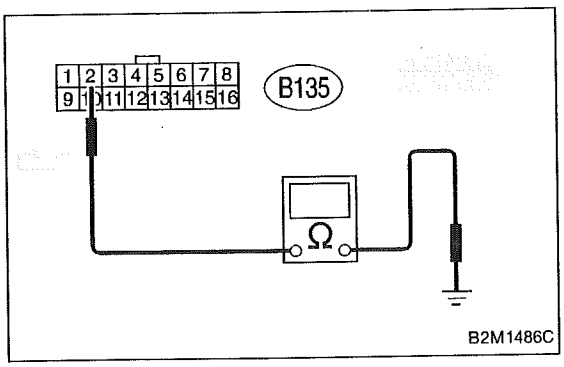
Connector & terminal / Specified voltage:
(B135) No. 2 — Body / More than 9 V



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 MΩ

MEMO:

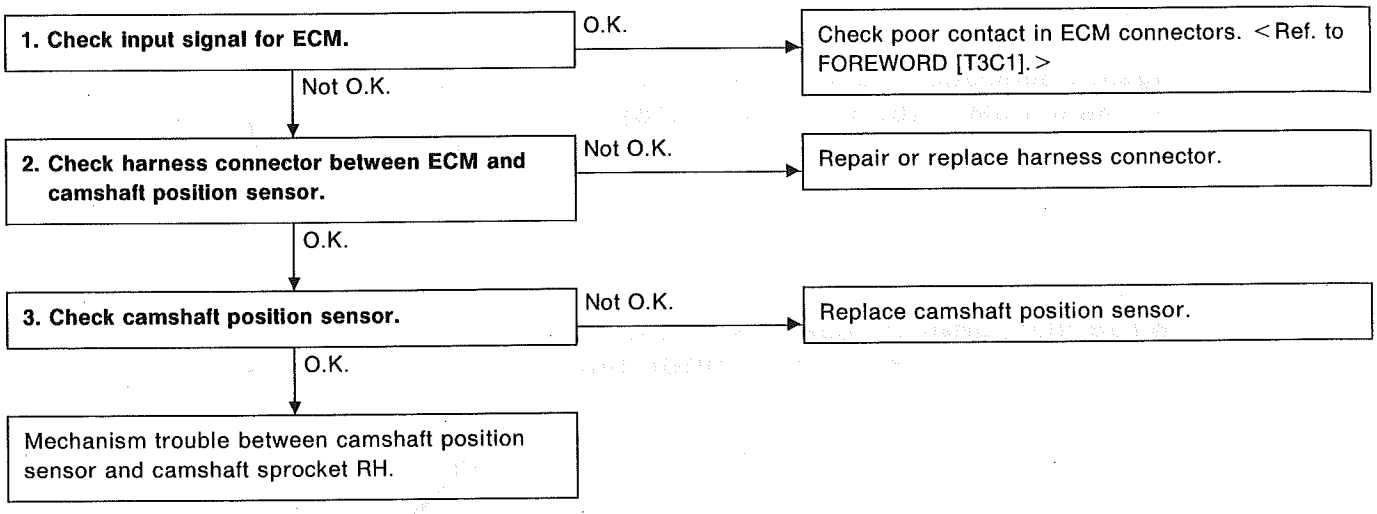
D: TROUBLE CODE (13)
— CAMSHAFT POSITION SENSOR —

DIAGNOSIS:

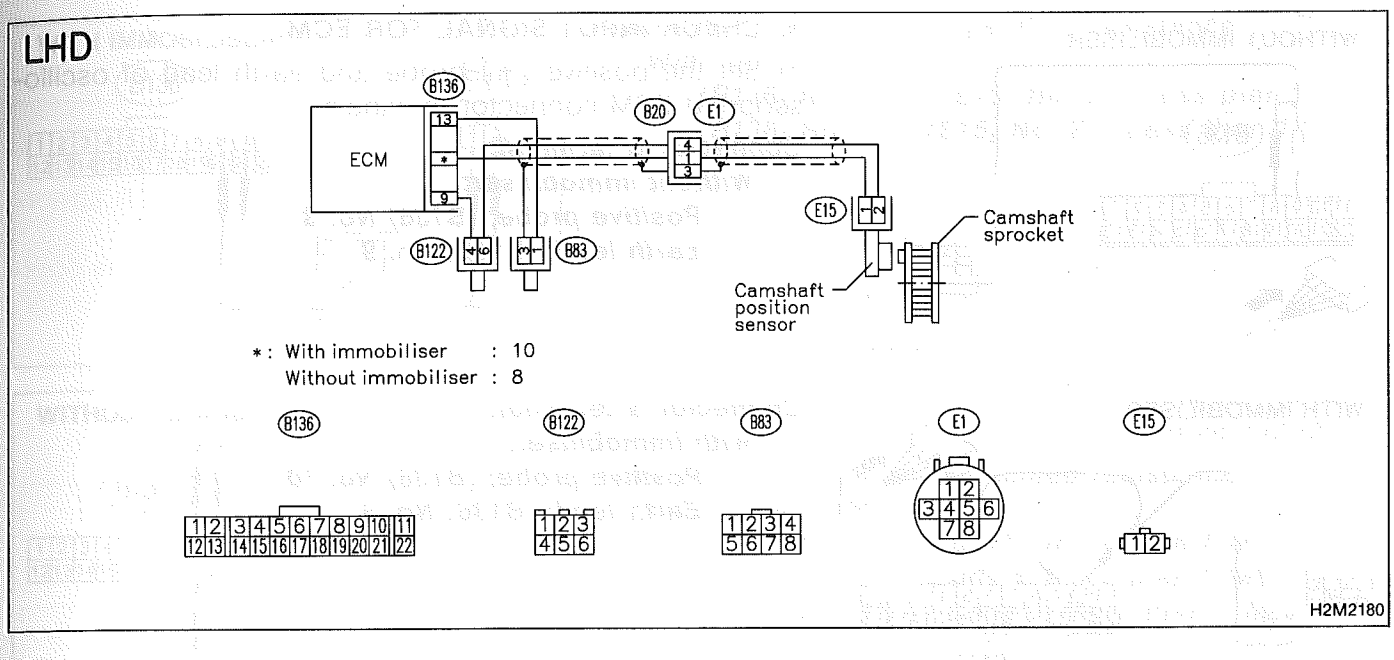
- No signal entered from camshaft position sensor, but signal entered from crankshaft position sensor.
- The harness connector between ECM and camshaft position sensor is in short or open.

TROUBLE SYMPTOM:

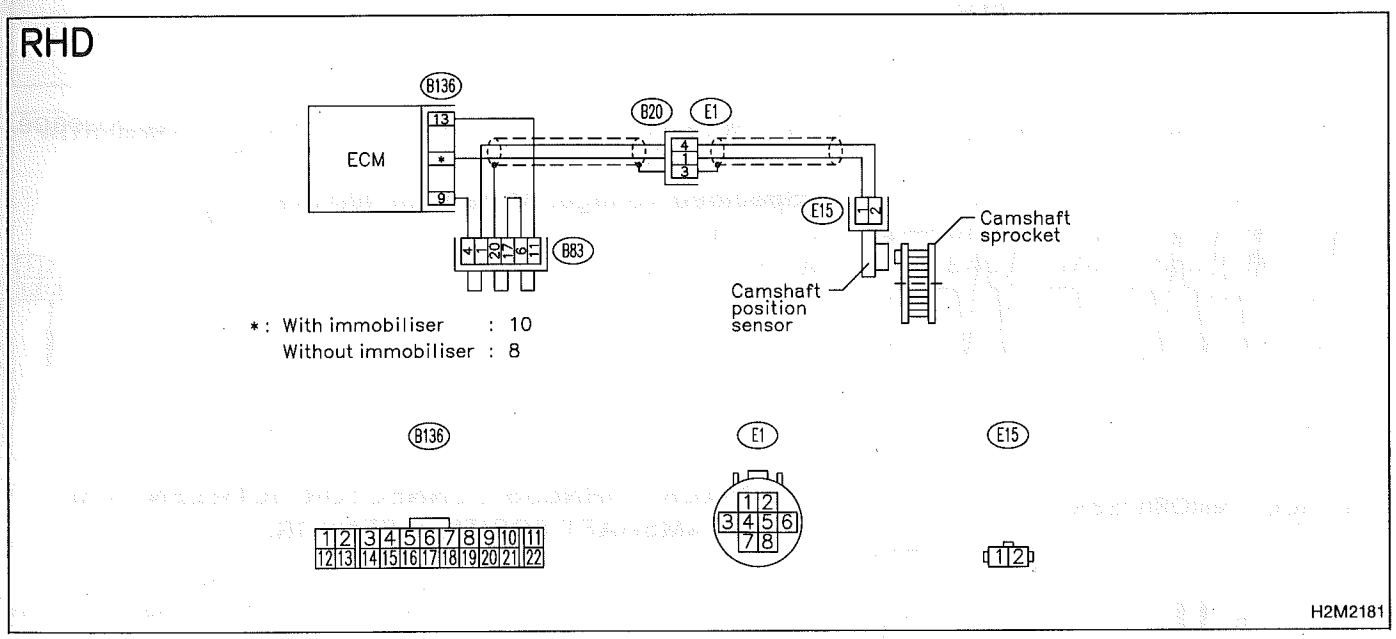
- Engine stalls.
- Failure of engine to start.

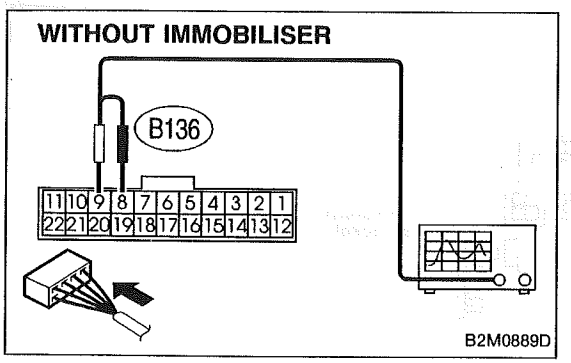


LHD


B136
ECM
13
*
9
B20
E1
4
1
3
E15
1
2
Camshaft sprocket
B122
4
6
3
1
B83
Camshaft position sensor
*: With immobiliser : 10
Without immobiliser : 8
B136
B122
B83
E1
E15
1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22
1 2 3
4 5 6
1 2 3 4
5 6 7 8
1 2
3 4 5 6
7 8
1 2
H2M2180

RHD

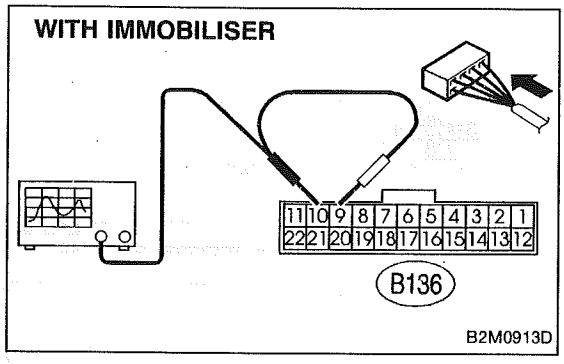

B136
ECM
13
*
9
B20
E1
4
1
3
E15
1
2
Camshaft sprocket
4
1
20
17
6
11
B83
Camshaft position sensor
*: With immobiliser : 10
Without immobiliser : 8
B136
E1
E15
1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22
1 2
3 4 5 6
7 8
1 2
H2M2181



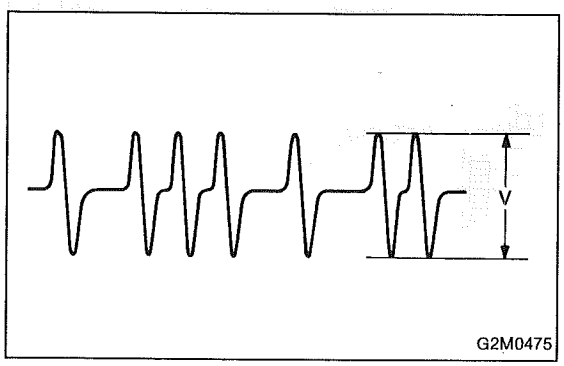
1. CHECK INPUT SIGNAL FOR ECM.

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

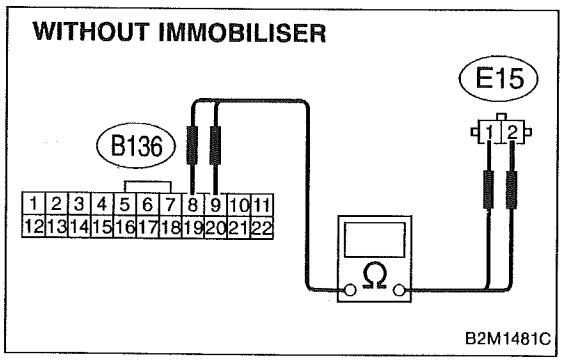


Connector & terminal:
With immobiliser:
Positive probe; (B136) No. 10
Earth lead; (B136) No. 9



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

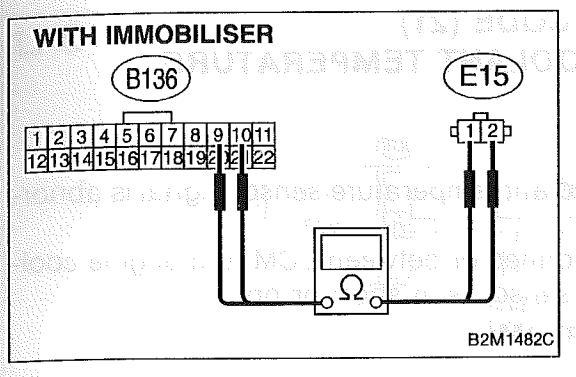
Specified voltage: More than 400 mV



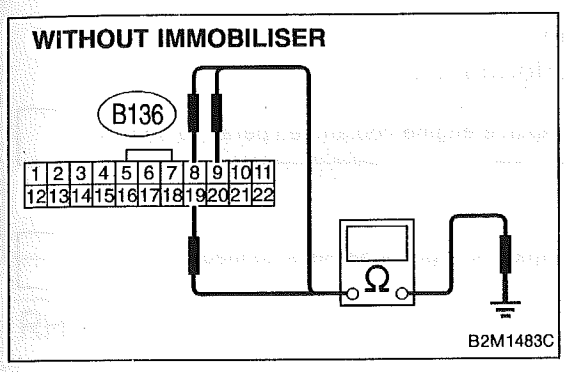
2. CHECK HARNESS CONNECTOR BETWEEN ECM AND CAMSHAFT POSITION SENSOR.

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

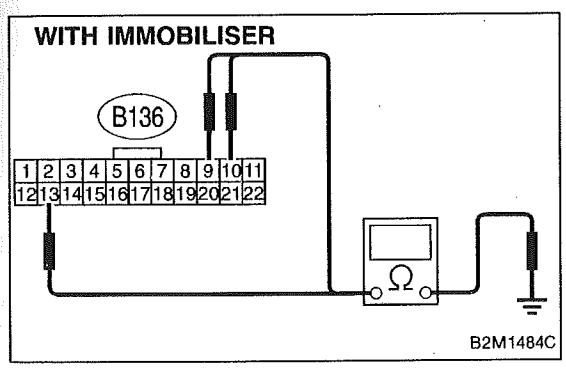


Connector & terminal / Specified resistance:
With immobiliser:
(B136) No. 10 — (E15) No. 1 / Less than 1 Ω
(B136) No. 9 — (E15) No. 2 / Less than 1 Ω

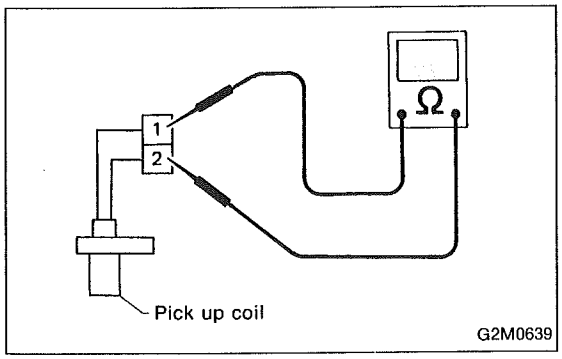


4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:
Without immobiliser:
(B136) No. 8 — Body / More than 1 MΩ
(B136) No. 9 — Body / More than 1 MΩ
(B136) No. 13 — Body / More than 1 MΩ



Connector & terminal / Specified resistance:
With immobiliser:
(B136) No. 9 — Body / More than 1 MΩ
(B136) No. 10 — Body / More than 1 MΩ
(B136) No. 13 — Body / More than 1 MΩ



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 ± 200 Ω

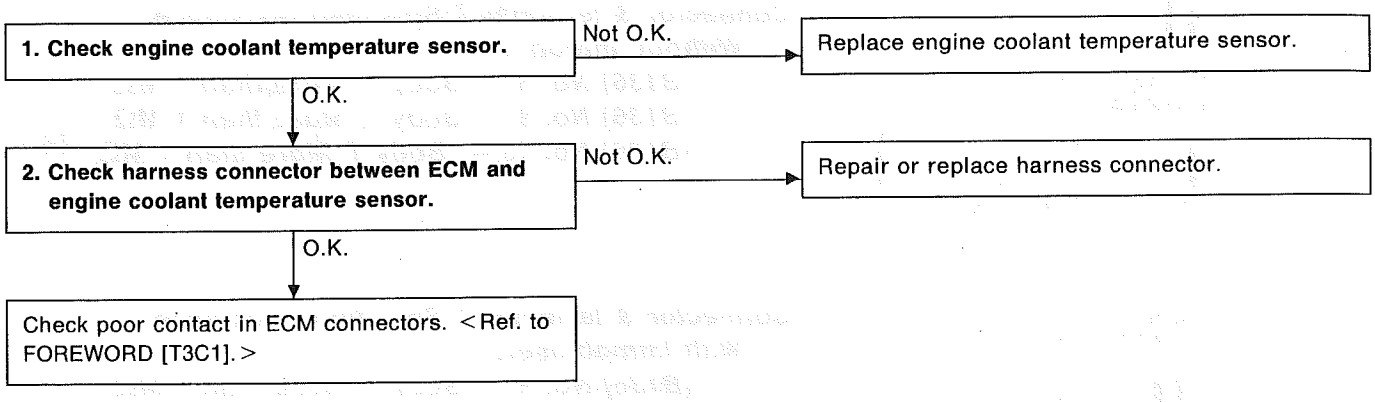
E: TROUBLE CODE (21) — ENGINE COOLANT TEMPERATURE SENSOR —

DIAGNOSIS:

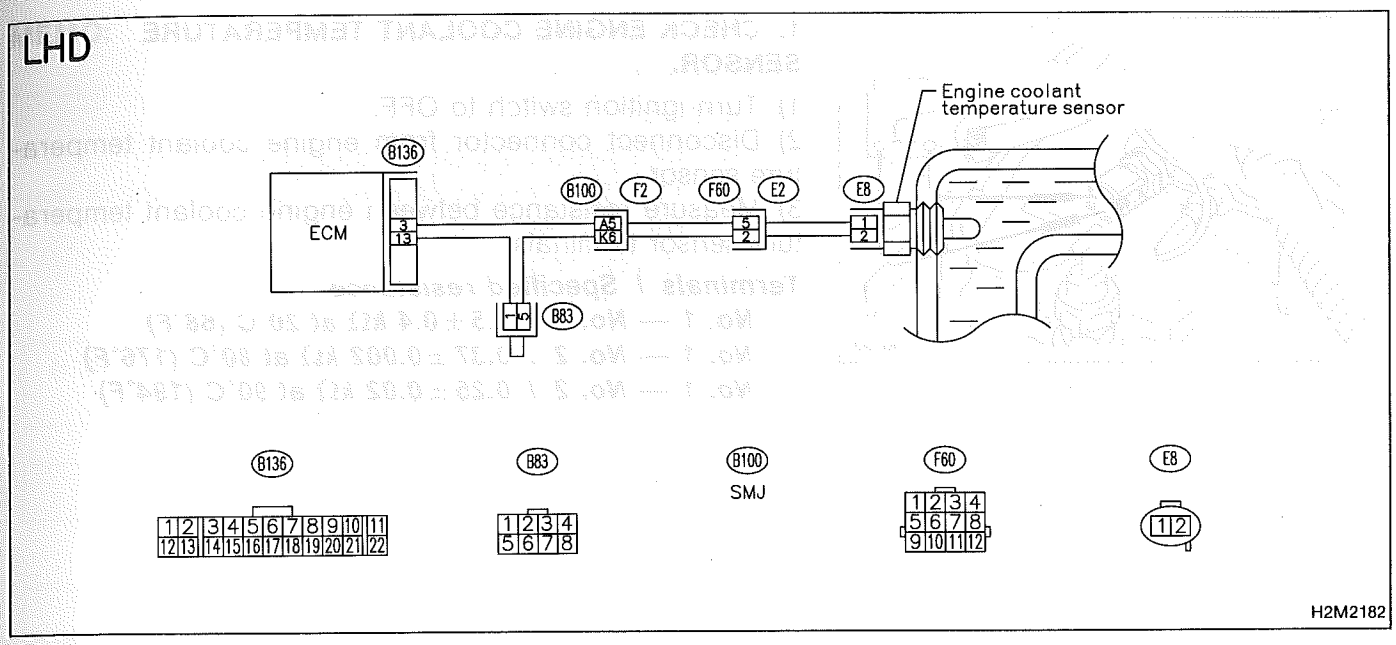
- The engine coolant temperature sensor signal is abnormal.
- The harness connector between ECM and engine coolant temperature sensor is in short or open.

TROUBLE SYMPTOM:

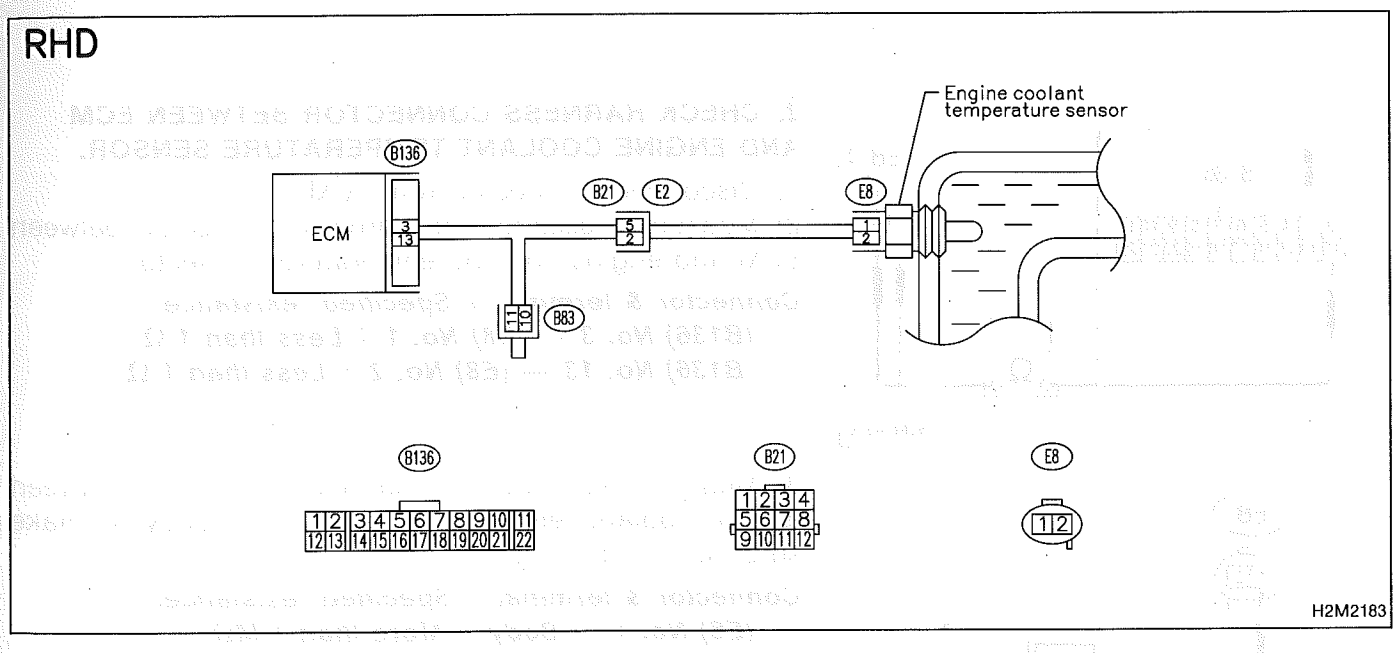
- Hard to start
- Erroneous idling
- Poor driving performance

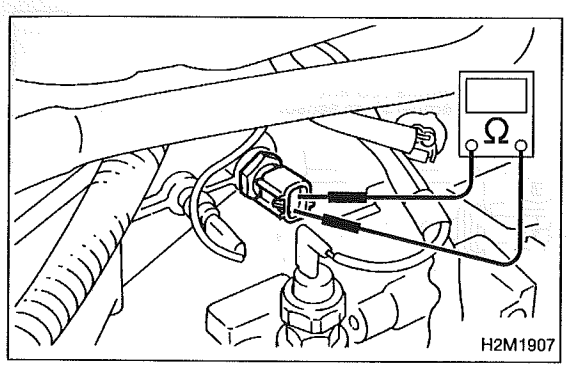


LHD


Engine coolant temperature sensor
B136
ECM
3
13
B100
F2
A5
K6
F60
E2
5
2
E8
1
2
B83
1
2
B136
1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22
B83
1 2 3 4
5 6 7 8
B100
SMJ
F60
1 2 3 4
5 6 7 8
9 10 11 12
E8
1 2
H2M2182

RHD

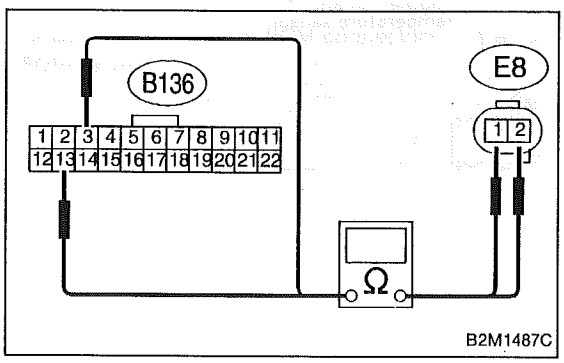

Engine coolant temperature sensor
B136
ECM
3
13
B21
E2
5
2
E8
1
2
B83
1
2
B136
1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22
B21
1 2 3 4
5 6 7 8
9 10 11 12
E8
1 2
H2M2183



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.

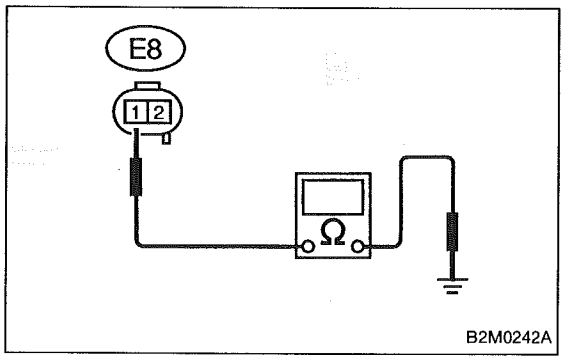
Terminals / Specified resistance:
No. 1 — No. 2 / 2.5±0.4 kΩ at 20°C (68°F)
No. 1 — No. 2 / 0.37±0.002 kΩ at 80°C (176°F)
No. 1 — No. 2 / 0.25±0.02 kΩ at 90°C (194°F)



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



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 MΩ